All Cartographic Orders thru C.O. 002/16 dated January 28, 2016 and all Memorandums dated thru December 30, 2013 have been incorporated into this manual. This digital document is considered current and complete as of: February 19, 2016 and shall now serve as the only official and authenticated version of the NOAA/National Ocean Service Nautical Chart Manual

NAUTICAL CHART MANUAL

VOLUME ONE
POLICIES AND PROCEDURES

Chapters 1 Through 7

RECORD OF CHANGES
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Version 2016.2

2/19/2016

U.S. Department of Commerce
Office of Coast Survey

Record of Changes **NAUTICAL CHART MANUAL**

Revisions and additions to the Nautical Chart Manual are provided through the issuance of official Marine Chart Division (MCD) Cartographic Orders and Memorandums. The following list represents those Cartographic Orders and Memorandums which have been issued to date and which have been inserted into this web-based version of the Manual.

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2016				
Version 2016.2 posted on 2/19/2016				
CO 002/16	January 28, 2016	New and Reconstructed Charts	Vol. 1, 2.5	
CO 001/16	January 6, 2016	Harbors of Refuge and Reported Anchorages	Vol. 1, 4.14.4.2	
Version 2016.1 posted on 1/6/2016				
2015				
CO 010/15	December 22, 2015	Overhead Cables	Vol. 1, 3.11.2	
CO 009/15	December 21, 2015	Intracoastal Waterway Magenta Line	Vol. 1, 5.10.2.2	
CO 008/15	December 21, 2015	Hydrographic Surveys, Bathymetric LIDAR, and Source Diagrams	Vol. 1, 4.2	
Version 2015.6 posted on 12/8/2015				
CO 007/15	December 2, 2015	Variant Names	Vol. 1, 7.4	
CO 006/15	December 2, 2015	Grids	Vol. 1, 2.9.2, 2.9.3	
Version 2015.5 posted on 9/3/2015				
CO 005/15	August 20, 2015	Satellite Derived Bathymetry	Vol. 1, 4.17	
Version 2015.4 posted on 8/17/2015				
CO 004/15	August 13, 2015	Radio Activated Sound Signals (MRASS and RRASS)	Vol. 1, 5.5.1	
CO 003/15	August 13, 2015	Application of Data	Vol. 1, 2.4.3	
Version 2015.3 posted on 2/10/2015				
CO 002/15	February 10, 2015	Pump-out Facilities	Vol. 1, 3.9	
Version 2015.2 posted on 1/30/2015				

CO 001/15	January 5, 2015	Charting USACE Data Outside of the Channel	Vol. 1, 4.6.3.1	
Version 2015.1 posted on 1/7/2015				
2014				
CO 016/14	December 11, 2014	No-Discharge Zones	Vol. 1, 4.14.1.1	
CO 015/14	December 10, 2014	Small-Craft Information	Vol. 1, 7.5	
CO 014/14	December 8, 2014	Channel Reach Names	Vol. 1, 4.6.1.1, 4.6.1.2	
CO 013/14	December 8, 2014	Removal of Charted Fish Havens	Vol. 1, 4.12	
CO 012/14	December 8, 2014	Coral Propagation Structures	Vol. 1, 4.13.6	
CO 011/14	October 29, 2014	New Definitions	Vol. 2, App. I	
CO 010/14	September 3, 2014	Spoil Areas	Vol. 1, 4.14.5.3.1	
Version 2014.4 posted on 8/18/2014				
CO 009/14	June 16 , 2014	Radio Activated Sound Signals (MRASS and RRASS)	Vol. 1, 5.5.1	
CO 008/14	June 16 , 2014	Onshore Wind Turbines and Onshore Wind Farms	Vol. 1, 3.8, 6.1.5	
CO 007/14	May 21, 2014	IALA Organization Name Change	Vol. 1, 5.2,5.4, Vol. 2, App. I,	
CO 006/14	May 21, 2014	Offshore Wind Turbines and Wind Farms	Vol. 1, 4.13.5.5	
CO 005/14	March 7, 2014	Last Correction Date and Cleared Through Dates	Vol.1, 1.4.5.5	
CO 004/14	March 7, 2014	Revision of Edition Dates Format	Vol.1, 1.4.5.2	
CO 003/14	March 7, 2014	Deletion of Sales Agent Credit Symbol	Vol. 1, 2.6	
CO 002/14	March 7, 2014	Deletion of Bar Codes, Stock and Reference Numbers	Vol.1, 2.17	
CO 001/14	February 3, 2014	AIS Aids to Navigation	Vol.1, 5.2	
2013				
Memorandum	December 30, 2013	Minerals Management Service (MMS) Name Changes	Vol. 1, Vol. 2	

CO 009/13	December 23, 2013	Addition of Commemorating Lithographic Charts Logo	Vol. 2/App. V	
CO 008/13	December 16, 2013	Deletion of Print-on-Demand Announcement Note	Vol. 1 7.6.3	
CO 007/13	August 20, 2013	Comments Request Note	Vol. 1 7.6.1	
CO 006/13	August 20, 2013	Logarithmic Speed Scale	Vol. 1 2.10.3	
CO 005/13	August 20, 2013	Overhead Cables	Vol.1 3.11.2	
CO 004/13	Feb 26, 2013	Intracoastal Waterway Course L	Vol.1 5.10.2.2	
CO 003/13	Feb 26, 2013	Pilot Boarding Areas	Vol.1 5.10.2.2	
CO 002/13	Feb 19, 2013	Code of Federal Regulations	Vol. 1. 4.14.1	
CO 001/13	January 14, 2013	COLREGS Demarcation Line	Vol.1. 4.14.6	
2012				
CO 005/12	August 22, 2012	Foul Ground	4.14.2	
CO 004/12	August 22, 2012	Definitions of Foul Area and Foul Ground	Vol. 2/App. I	
CO 003/12	August 22, 2012	Unexploded Ordnance	4.11.1.2	
CO 002/12	August 22, 2012	Definition of Unexploded Ordnance	Vol. 2/App. I	
CO 001/12	August 21, 2012	Subdivision of Selected Projection Lines	2.9.5.3	
2011				
Version 2011.4 posted on 12/29/2011				
CO 005/11	November 15, 2011	Ranges	5.8	
CO 004/11	August 31, 2011	Limits of Dredged Areas No Tint in Dredged Areas	4.6.4	
CO 003/11	August 10, 2011	Security Barrier	Vol. 2/App. I	
Version 2011.3 posted on 8/9/2011				
CO 002/11	August 4, 2011	Civil Reservations	4.14.7.4.3	
CO 001/11	August 4, 2011	Reconstructed Charts	1.4.9	
Version 2011.2 posted on 5/10/2011				
Relocated all cartographic orders and memorandums to Volume 2 Appendix 5				

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Version 2011.1 posted on 1/11/2011				
2010				
CO 003/10	November 10, 2010	Foul Area	4.14.2	
CO 002/10	November 10, 2010	Security Barriers	4.13.4	
CO 001/10	February 16, 2010	LORAN-C Termination	6.5.1	
2009				
CO 011 / 09	October 13, 2009	Boundaries and Zones	4.14.7	
CO 010 / 09	October 5, 2009	Print-on-Demand Announcement	7.6.3.1	Superseded by CO
CO 009 / 09	July 9, 2009	LORAN-C	1.5.1	
CO 008 / 09	July 9, 2009	LORAN-C	6.5.1	
CO 007/09	July 9, 2009	Channel Depths Legends	4.6.1.2	
CO 006/09	July 9, 2009	Channel Depths Legends	4.6.1.1	
CO 005/09	May 26, 2009	Revised Reprints	1.4.6	
Memorandum	February 20, 2009	Exposed Submarine Cables	Chapter 4	
CO 004 / 09	January 22, 2009	Standard Notes	Appendix IV, Miscellaneous References	
CO 003 / 09	January 21, 2009	NOAA Nautical Chart Symbol Catalog (Nautical Charting System II)	Appendix IV, Miscellaneous References	
CO 002 / 09	January 20, 2009	Analog Cartographic Orders and Memorandums	Vol. 1, Pt 1	
CO 001 / 09	January 19, 2009	Record of Changes- Discontinuance of Analog Format	Vol. 1, Pt. 1, Record of Changes	

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Carto Order/Memo	Issue Date	Subject	Section	Remarks
2008				
NONE				
2007				
Memorandum	December 21, 2007	Table: Fish Haven vs. Fish Trap vs. Fish Trap Area	4.12	DIGITAL DISTRIBUTION ONLY
CO 003 / 07	June 11, 2007	Update of Nautical Chart Manual Glossary	Vol. 2, Appendix I	BEGINNING OF DIGITAL DISTRIBUTION ONLY
CO 002 / 07	DOES NOT EXIST AND THEREFORE WILL NOT BE DISTRIBUTED			
CO 001 / 07	January 2, 2007	Record of Changes for the Year 2006	Vol. 1, Pt 1, Record of Changes	Supersedes C.O. 001/06

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2006				
CO 011 / 06	December 1, 2006	Channel Marker Notes and Title Block Format	Volume 2, Appendix IV	
CO 010 / 06	October 19, 2006	U.S. Office of Coast Survey 200th Anniversary Seal	Vol. 2, Appendix IV	
Memorandum	September 8, 2006	Great Lakes Hydrograph	7.1.2	Only supersedes page 7.2 of C.O. 009/06
CO 009 / 06	September 5, 2006	Tabulated Tide Notes	Vol. 1, Part 2; Vol. 2 App. IV	See above Memo dated September 8, 2006
CO 008 / 06	**DOES NOT EXIST AND THEREFORE WILL NOT BE DISTRIBUTED**			
CO 007 / 06	**DOES NOT EXIST AND THEREFORE WILL NOT BE DISTRIBUTED**			
Memorandum	July 14, 2006	Telephone Cable Abbreviated Label (i.e., "T")	Chapter 3	
Memorandum	July 14, 2006	Metered Bar Scale	2.10.2	
Memorandum	March 30, 2006	Depth Wiz Surveys	4.2.3.1	Supplements C.O. 002 / 06
CO 006 / 06	March 29, 2006	Deletion of "Nautical Updating Service" Note	1.7.10	Supersedes C.O. 009/02
CO 005 / 06	April 11, 2006	Notice to Mariners Caution Note	1.4.5.6	Supersedes MEMO dated 06/15/02
CO 004 / 06	**DOES NOT EXIST AND THEREFORE WILL NOT BE DISTRIBUTED**			
CO 003 / 06	**DOES NOT EXIST AND THEREFORE WILL NOT BE DISTRIBUTED**			
CO 002 / 06	February 1, 2006	Depth Wizard (Depth Wiz) Surveys	4.2.3	Also see above MEMO dated 3/30/06
CO 001 / 06	January 2, 2006	2006 Record of Changes (for the Year 2005)	Vol. 1, Pt. 1, Record of Changes	Supersedes C.O. 001/05

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2005				
CO 003 / 05	November 30, 2005	Requisite Minimum Pier Lengths Per Chart Scale	3.5	
CO 002 / 05	October 7, 2005	Small-Craft Marine Facility Tabulations	7.5	
CO 001 / 05	January 2, 2005	Record of Changes		Supersedes C.O. 011/04
2004				
CO 013 / 04	September 30, 2004	Sounding Conversion Table C: Meters to Feet to Fathoms & Feet and Table D: Meters to Feet to Fathoms	Appendix x IV	
Memorandum	September 20, 2004	Miscellaneous Nautical Chart Manual Edits		
CO 012 / 04	July 29, 2004	Shoreline	3.3.1	
Memorandum	July 26, 2004	Grammar Correction	4.12	
Memorandum	July 23, 2004	Potential Revision of Projection Ticks on Source Diagrams for Nautical Charts Converted to International Borders/Neatlines	2.9.5	
Memorandum	July 23, 2004	Intranet Nautical Chart Manual - New Address		Supersedes MEMO 05-19-03
CO 011 / 04	June 30, 2004	Record of Changes - Nautical Chart Manual		Supersedes C.O. 001/04
Memorandum	June 25, 2004	Nautical Chart Manual, Volume 1, Table of Contents		Supersedes C.O. 013/01
Memorandum	June 15, 2004	IHO/NOS International Border/Neatline Specifications-Replacement Pages	2.10.1.6, 2.10.1.11	Amends C.O. 005/04

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2004				
Memorandum	June 14, 2004	Note Z, No-Discharge Zone-Web Site Change	4.14.1.1	
CO 010 / 04	May 24, 2004	Nautical Chart Manual Digital File Access and Management System (D-FAMS)	0.3 - 0.6	
Memorandum	April 19, 2004	Nautical Chart Manual Index	Volume 1, Part 2	
CO 009 / 04	April 9, 2004	Submarine Pipelines	4.13.8	
CO 008 / 04	April 1, 2004	Section 4.14.5.3 U.S. Army Corps of Engineers (USACE) Established Dumping Areas and 4.14.5.3.2 Disposal Areas	4.14.5.3, 4.14.5.3.1, 4.14.5.3.2, and 4.14.5.3.3	
CO 007 / 04	April 1, 2004	Section 4.14.5.2.2 Discontinued (DISUSED) Chemical Munitions Dumping Areas	4.14.5.2.2	
CO 006 / 04	April 1, 2004	Section 4.14.5.2 U.S. Navy (DOD) Established Dumping Areas and Section 4.14.5.2.1 Ammunition and Explosives Dumping Areas	4.14.5.2 and 4.14.5.2.1	
CO 005 / 04	June 14, 2004	IHO/NOS International Border/Neatline Specifications	2.9.5	Supersedes C.O. 028/00
CO 004 / 04	April 1, 2004	Section 4.14.5 Dumping Areas-Overview and Section 4.14.5.1 EPA Established Dump Sites	4.14.5 and 4.14.5.1	Supersedes C.O. 019/03
Memorandum	March 16, 2004	Caution Note-Submarine Pipelines and Cables	4.13.8	
CO 003 / 04	February 19, 2004	Fish Havens	4.12	
CO 002 / 04	January 8, 2004	National Imagery and Mapping Agency (NIMA) Name Change	1.1.1	See also MEMO 11-25-03
Memorandum	January 30, 2004	Chart Symbolization of Federally Regulated Areas	4.14.1	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
Memorandum	January 20, 2004	Note *A* on NOS Hydrographic Surveys	4.11.1	
CO 001 / 04	January 1, 2004	Record of Changes - Nautical Chart Manual		
2003				
Memorandum	November 25, 2003	National Imagery and Mapping Agency (NIMA) Name Change	1.5.1	See also C.O. 002/04
Memorandum	November 25, 2003	Compass Roses	7.3.1	
CO 019 / 03	October 10, 2003	EPA Established "Interim" Dump sites	4.14.5.1	Superseded by C.O. 004/04
CO 018 / 03	September 12, 2003	Columbia River-Channel Tabulations and Tabulation Diagram	4.6.1	
Memorandum	September 11, 2003	Land Contour Type Style Corrections, Line Weight Clarifications	3.4.1	
Memorandum	September 5, 2003	Desk Reference Guide		Also amends C.O. 014/03
Memorandum	August 27, 2003	Nautical Chart Manual: Correction Pages 4-275 through 4-278	4.14.7	
Memorandum	August 1, 2003	Equivalent Graphic Pages for Rocks	4.9	
CO 017 / 03	July 15, 2003	National Weather Service Broadcasts from USCG "High Sites"	6.2.3	
CO 016 / 03	July 14, 2003	Nautical Charts Web Site	2.18	
CO 015 / 03	July 14, 2003	Tide Notes	7.1	
Memorandum	July 9, 2003	Submarine Cables on International Charts	1.3.1	
Memorandum	July 1, 2003	Conversion to Adobe (.pdf format): VOLUME 2 of the Nautical Chart Manual (Intranet Version)	Volume 2	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2003				
Memorandum	June 22, 2003	APPENDIX IV: Meters to Fathom Conversion Table	Appendix IV	
Memorandum	June 21, 2003	APPENDIX IV: Feet to Fathom Conversion Table	Appendix IV	
Memorandum	June 20, 2003	APPENDIX IV: Map Scales and Equivalents	Appendix IV	
Memorandum	June 19, 2003	APPENDIX IV: Proportional Divider Settings; Light Characteristic Phases	Appendix IV	
CO 014 / 03	June 16, 2003	Cartographic Order Format	0.1 and 0.2	
CO 013 / 03	June 2, 2003	Nautical Chart Catalogs	1.7.4	
CO 012 / 03	May 29, 2003	Subdivision of Selected Projection Lines	2.10.1.1	Incorporated into C.O. 005/04
CO 011 / 03	May 30, 2003	Samples: Margin and Border Note Formats; Small-Craft Chart and Cover Formats	Appendix IV	
CO 010 / 03	May 29, 2003	Nautical Chart Manual, Volume 2, Table of Contents	Table of Contents	Supersedes C.O. 010/01
CO 009 / 03	May 28, 2003	Chart Formats	2.5.2	
CO 008 / 03	May 27, 2003	Small-Craft Charts	1.3	
Memorandum	May 19, 2003	Intranet Nautical Chart Manual - New Address		Amends MEMO 09-12-02
CO 007 / 03	April 18, 2003	Nomenclature, and Small-craft	7.4	
CO 006 / 03	April 11, 2003	Correction to Specifications for Breakers	3.3.2	

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2003				
Memorandum	April 9, 2003	Clarification on Snags and Obstructions	4.11.4	
CO 005 / 03	March 31, 2003	Magnetics	7.3	Supersedes MEMO 07-30-02
CO 004 / 03	March 24, 2003	Wreck Charting Policy Revision	4.10.3	
Memorandum	March 28, 2003	Elevations of Bare Rocks (Islets)	4.9	
CO 003 / 03	February 18, 2003	Surveyed Areas with a High Concentration of Obstructions and/or Sunken Wrecks	4.11.1.1	
CO 002 / 03	January 21, 2003	Placement of Soundings	4.3.2.1	
CO 001 / 03	January 1, 2003	Record of Changes-Nautical Chart Manual	Record of Changes	Superseded by C.O. 001/04

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2002				
Memorandum	December 31, 2002	Deletion of "2002 The Year of Clean Water" Logo	IV	Supersedes C.O. 002/02
CO 015 / 02	October 1, 2002	No-Discharge Zone (NDZ) Note	4.14.1.1	
Memorandum	September 12, 2002	Conversion to Adobe (.pdf format) of the Nautical Chart Manual -Volume 1 as of December 31, 2002 (Intranet Version)		Amended by MEMO 05-19-03
CO 014 / 02	September 3, 2002	Record of Changes - Nautical Chart Manual		Superseded by C.O. 001/03
CO 013 / 02	August 5, 2002	Print-on-Demand Announcement Note	7.6.3	
Memorandum	July 30, 2002	Magnetic Variation Note	7.3.3	Superseded by C.O. 005/03
CO 012 / 02	July 23, 2002	Edition Dates and Corrected Through Dates	2.4.3	
CO 011 / 02	July 22, 2002	Edition Dates	2.6	Supersedes MEMO 03-14-02
Memorandum	July 22, 2002	Nautical Chart Manual Correction Pages: 7-5 through 7-8	7.3.1	
Memorandum	July 17, 2002	Nautical Chart Manual Correction Pages: 4-239 through 4-258.2	4.12	
Memorandum	July 8, 2002	Nautical Chart Manual Correction Pages; IV-20e and IV-20f	Appendix IV	
Memorandum	June 28, 2002	Nautical Chart Manual Correction Pages: 7-5 through 7-18	7.3.1	
Memorandum	June 28, 2002	Nautical Chart Manual Correction Pages: 7-1 through 7-4	7.1.1	
CO 010 / 02	June 24, 2002	Caution Note-"Limitations on the Use of Radio Signals	6.2.1	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2002				
Memorandum	June 21, 2002	Nautical Chart Manual Correction Pages: 4-35 to 4-40	4.3.3	
Memorandum	June 15, 2002	Notice to Mariners Caution Note Correction	1.4.5.6	Supersedes MEMO 05-22-02
CO 009 / 02	June 15, 2002	Nautical Updating Service Note	1.7.10	
Memorandum	June 12, 2002	Nautical Chart Manual Correction Pages-Pages 6-7 through 6-30	6.1.3	
Memorandum	May 22, 2002	Notice to Mariners Caution Note	1.4.5.6	Superseded by MEMO 06-15-02
CO 008 / 02	May 18, 2002	Eelgrass	4.14.2	
Memorandum	May 8, 2002	Nautical Chart Manual Page Header Number Revision	5.3.2	
Memorandum	May 2, 2002	Nautical Chart Manual Correction Pages - Page Header Number and Section Number Revisions; Correction Pages-Pages 5-41 through 5-44	5.10.2.2	
Memorandum	May 1, 2002	Nautical Chart Manual Correction Pages - Page Header Number and Section Number Revisions; Correction Pages-Pages 5-19 through 5-22	5.4.2	
Memorandum	May 1, 2002	Nautical Chart Manual Page Header Number Revisions; Correction Pages-Pages 5-33 through 5-40	5.10.2	
Memorandum	May 1, 2002	Nautical Chart Manual Page Header Number Revisions; Pages 5-45 through 5-50	5.10.3	
CO 007 / 02	April 30, 2002	Corrected Through Dates	1.4.5	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2002				
Memorandum	April 30, 2002	Nautical Chart Manual Intracoastal Waterway Aids to Navigation paragraphs (and Note Examples) Removed from "Ranges" Section; Page Header Number and Section Number Revisions; Correction Pages-Pages 5-23 through 5-32	5.4.3	
CO 006 / 02	April 18, 2002	Nautical Chart Manual NOS/ENC Object Specifications (Navigational Aids) Interpreting Ambiguous Light List Information	5.30.RF	
CO 005 / 02	April 17, 2002	Nautical Chart Manual NOS/ENC Object Specifications (Navigational Aids) Translation Tables	5.30.RF	
CO 004 / 02	April 16, 2002	Nautical Chart Manual NOS/ENC Object Specifications (Navigational Aids) Reference Section and Object Glossary	5.30.RF	
CO 003 / 02	April 18, 2002	Nautical Chart Manual NOS/ENC Object Specifications (Navigational Aids) General Encoding Information	5.30	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Acknowledgement Note	2.3.2	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Chart Parameter Correction Form; Sales Agent Credit Symbol	2.5.15	Superseded by C.O. 011/02
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - North American Datum Label and Notes	2.8.1	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2002				
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Lake Diagram; Sounding Units Label (Canadian Chart Coverage); Heights Note	2.8.2	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Figure 3-1: Shoreline and Foreshore Features	3.3	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Pump-out Facility Example	3.8	
Memorandum	March 14, 2002	Nautical Chart Manual Correction pages- Bridges and Overhead Power Cables	3.11.1	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Fathoms and Tenths Sounding Units Symbolization	4.11.1	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Page - Figure 4-1: Source Diagram	4.2.2	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Fish Haven Labels	4.12	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Dumping Ground Labels; Disposal Area Note; Colreg Note	4.14.5	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Cleared Depths	4.15.4	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Chart Specifications Form	2.5.13	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Chart Projection Figures	2.9.3	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Plane Coordinate Grid Note	2.9.5	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Bar Code Example	2.17	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2002				
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Pages 5-15 and 5-16: Section Number Revision	5.4	
Memorandum	March 14, 2002	Nautical Chart Manual Correction Pages - Pages 5-5 and 5-6	5.3	
Memorandum	March 14, 2002	Nautical Chart Manual: Page Header Number Revision; Correction Pages-Pages 5-9 and 5-10	5.3.2	
Memorandum	March 14, 2002	Nautical Chart Manual :Section Number Revisions; Correction Pages-Pages 5-11 and 5-14	5.3.3	
Memorandum	March 14, 2002	Nautical Chart Manual Page Header Number and Section Number Revisions; Correction Pages-IALA Maritime Buoyage System Notes	5.4	
CO 002 / 02	January 17, 2002	“2002 The Year of Clean Water” Logo	IV	Superseded by MEMO 12-31-02
CO 001 / 02	January 2, 2002	Record of Changes		Superseded by C.O. 001/03

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2001				
CO 023 / 01	December 21, 2001	Nautical Chart Manual, Chapter 5 Navigational Aids: Updating of General Information and Embedding of ENC Requirements	5	
CO 022 / 01	December 14, 2001	Response to Distorted Projection Lines	2.9.1	
CO 021 / 01	December 7, 2001	Revision of Temporary Defects Caution Note and the Combined Temporary Defects/Seasonal Aids Caution Note	5.1	
CO 020 / 01	December 1, 2001	No-Discharge Zones	4.14.1	
CO 019 / 01	October 3, 2001	EPA-Established Dump Sites	4.14.5	Supersedes C.O. 002/01 and C.O. 003/01.
CO 018 / 01	October 2, 2001	International Maritime Organization Adopted No Anchoring Areas	4.14.4	See also C.O. 017/01
CO 017 / 01	October 1, 2001	Anchorage Areas	4.14.4	See also C.O. 018/01
CO 016 / 01	Never Issued			
CO 015 / 01	June 18, 2001	ENC Encoding of Sediment Traps	4.30.13 4.30.14 4.30.15	
CO 014 / 01	June 18, 2001	Sediment Traps	4.6.5	
Memorandum	May 29, 2001	Nautical Chart Manual Length Conversion Tables	IV	
Memorandum	May 25, 2001	Updating the Nautical Chart Manual Preface	Preface	

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2001				
CO 013 / 01	May 18, 2001	Nautical Chart Manual, Volume 1, Table of Contents	Table of Contents	Superseded by MEMO 06-25-04
CO 012 / 01	May 15, 2001	Type Specifications	IV	
CO 011 / 01	May 18, 2001	Particularly Sensitive Sea Areas	4.14.7	
CO 010 / 01	May 23, 2001	Nautical Chart Manual, Volume 2, Table of Contents	Table of Contents	Superseded by C.O. 010/03
CO 009 / 01	May 23, 2001	Record of Changes		Superseded by C.O. 001/02
CO 008 / 01	January 31, 2001	NOS/ENC Object Specifications-Topological Structure	2.30.7	
CO 007 / 01	January 31, 2001	NOS/ENC Object Specifications-3E Areas	2.30.4.3	
CO 006 / 01	January 31, 2001	NOS/ENC Object Specifications-Which Large Scale Chart Shall be the Official Source Document	2.30.4.2	
CO 005 / 01	January 31, 2001	Introduction of ENC General Practices and Procedures to the Nautical Chart Manual	2.3	
CO 004 / 01	January 31, 2001	Incorporation of ENC Object Depth Contour-NOS/ENC Object Specification Pages	4.30.13	
CO 003 / 01	February 7, 2001	Dump Sites	4.14.5	Superseded by C.O. 019/01
CO 002 / 01	January 30, 2001	EPA Dumping Areas-Standardization of Primary Label	4.14.5	Superseded by C.O. 019/01

Record of Changes **NAUTICAL CHART MANUAL**

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2001				
Memorandum	January 8, 2001	Chapter 6		Amends MEMO 07-12-00
Memorandum	January 8, 2001	Chapter 2		Supersedes 42 selected pages.
Memorandum	January 8, 2001	Chapter 3		Amends MEMO 07-12-00
Memorandum	January 5, 2001	Chapter 4		Supersedes 20 selected pages.
CO 001 / 01	January 2, 2001	Record of Changes		Superseded by C.O. 001/02

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2000				
Memorandum	November 30, 2000	List of Acronyms	Acronyms	Amended by MEMO 09-05-03
Memorandum	November 30, 2000	Chapter 8		Amends MEMO 07-19-00
Memorandum	November 30, 2000	Chapter 1		Amends MEMO 7-12-00
Memorandum	September 22, 2000	Chapter 4		Amended by MEMO 01-05-01
CO 029 / 00	August 9, 2000	Overhead Pipes	3.12	
CO 028 / 00	July 27, 2000	Selective Implementation of IHO Border/Neatline Subdivision Specifications	2.10.1	Superseded by C.O. 005/04
Memorandum	July 26, 2000	Chapter 2		Amended by MEMO 01-08-01
Memorandum	July 21, 2000	Chapter 7		
Memorandum	July 19, 2000	Chapter 8		Amended by MEMO 11-30-00
Memorandum	July 19, 2000	Chapter 5		
Memorandum	July 12, 2000	Chapter 6		Amended by MEMO 01/8/01
Memorandum	July 12, 2000	Chapter 3		Amended by MEMO 01/8/01
Memorandum	July 12, 2000	Chapter 1		Amended by MEMO 11/30/00 and C.O. 007/02

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Carto Order/ Memo	Issue Date	Subject	Section	Remarks
2000				
Memorandum	June 23, 2000	Standard Notes	IV	Amends CO 024/00
CO 026 / 00	June 14, 2000	(1) Updating of Nautical Chart Manual Information on Depth Curves (2) Nautical Chart Manual Incorporation of ENC Objects: Depth Contour and Depth Area (3) Depth Area NOS/ENC Object Specifications Pages	4.30.12	
CO 024 / 00	May 17, 2000	Standards Notes	IV	Also see MEMO 06-23-00
CO 022 / 00	May 12, 2000	Nautical Chart Manual Index	Index	
CO 019 / 00	March 31, 2000	Nautical Chart Manual Incorporation of ENC Object: Dredged Area	4.30.14	
CO 018 / 00	March 31, 2000	Nautical Chart Manual Incorporation of ENC Data Requirements and Policies	1.10	

Record of Changes **NAUTICAL CHART MANUAL**

Carto Order/ Memo	Issue Date	Subject	Section	Remarks
1999				
Memorandum	November 30, 1999	Chapter 1		Amends 10 pages
1997				
CO 003 / 97	May 5, 1997	KAPP Numbers	IV	
1996				
CO 003 / 96	October 1, 1996	Type Specifications Revision	IV	See C.O. 012/01

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NAUTICAL CHART MANUAL

PREFACE

The Nautical Chart Manual is a comprehensive documentation of cartographic standards, procedures, and policies in two volumes for use within the Office of Coast Survey (OCS) in the production of nautical charts. It also serves to inform chart users and other interested parties of the policies and practices used in producing Office of Coast Survey nautical charts.

The economic importance and development of an area, the number and kinds of marine dangers or hazards therein, and the scale requirement are some of the variables that make a nautical chart an individual work. The chart, however, must still conform to prescribed cartographic standards and policies. The primary purpose of this manual is to define these standards to ensure accuracy, completeness, consistency, uniformity and simplicity in the general appearance of the nautical charts compiled by OCS.

The need for documented nautical chart production standards, procedures, and policies was recognized as early as 1920 when OCS published its first Nautical Chart Manual, a 34-page pamphlet. This manual was expanded and updated over the years, and in 1963 was published in its sixth edition. However, by 1992 more than 500 documents had been issued that amended, supplemented or affected the 1963 manual in some way. A simple updating of the manual was not realistic due to the quantity of new cartographic items, methods, policies and procedures that had been introduced since 1963.

This completely revised Nautical Chart Manual contains 8 chapters and 4 appendices in two volumes defining OCS policies, procedures, and other information required for nautical chart production. Volume One, which is divided into two (2) parts, contains cartographic policies and procedures. Volume Two is comprised of valuable reference materials including an extensive glossary (of nautical chart compilation terms) which has been assembled from 40 authoritative national and international reference works; a summary of OCS-approved standards and specifications for the various symbols used in nautical charting; a list of the abbreviations used in the manual; and an extensive index.

Additional items and topics provided in the Nautical Chart Manual include a correlation of the OCS publication Chart No. 1, Nautical Chart Symbols Abbreviations and Terms to Nautical Chart Manual topographic and hydrographic features; a historical background of OCS and its area of nautical charting responsibility; the legal requirements of the mariner to use appropriate-scale, up-to-date charts in U.S. ports; the coordination of international charting standards with existing OCS chart compilation policies, the relationship between OCS and international charting authorities; and OCS' production of both raster and Electronic Navigational Charts (ENCs).

This manual is intended for internal OCS use, with provision for a limited exchange within the nautical charting community. Comments and suggestions concerning this manual and its contents are encouraged and should be forwarded to the Chief, Marine Chart Division, N/CS2, National Ocean Service, NOAA, Silver Spring, Maryland 20910-3282.

REVISED MAY 25, 2001

NAUTICAL CHART MANUAL – VOLUME 1 – POLICIES AND PROCEDURES

CHAPTER 1- INTRODUCTION

U.S. Department of Commerce
Office of Coast Survey

Section 1 **NAUTICAL CHART MANUAL**

1 INTRODUCTION

1.1 A Brief History

In the early 1800's, a young United States of America consisted of some interior territory and 16 states along the eastern seaboard. Commerce between the states was mostly waterborne. Foreign trade, necessary for the survival and expansion of our national economy, was entirely by sea. The development of the Nation's natural resources was also dependent upon maritime commerce.

A lack of nautical charts, the most fundamental of navigation instruments, made navigation dangerous in the unknown waters along our coasts and in our harbors. Inadequate sketches of a few areas and written descriptions such as Blunt's Coast Pilot were the only printed information available to the mariner. Shipwrecks were common, insurance rates high, and products of commerce correspondingly high priced. Uncharted dangers in our coastal areas and harbors were a serious impediment to safe navigation.

Thomas Jefferson, among others, foresaw the need for comprehensive, reliable nautical charts to safeguard shipping, and he believed the government should be responsible for producing them. On February 10, 1807, Congress passed an act authorizing President Jefferson "...to cause a survey to be taken of coasts of the United States, in which shall be designated the islands and shoals and places of anchorage... ."

The Survey of the Coast (an agency which was renamed the Coast Survey in 1836, Coast and Geodetic Survey in 1871, National Ocean Survey in 1970, and National Ocean Service in 1982) completed its first hydrographic survey in 1834 of Great South Bay, Long Island. The U.S. Lake Survey, created in 1841 to conduct surveys and produce nautical charts of the Great Lakes and connecting waterways, was transferred to the National Ocean Service (NOS) from the U.S. Army Corps of Engineers (USACE) in 1970 as part of a major reorganization within the Department of Commerce. [1] In 1982, the Office of Charting and Geodetic Services was formed within NOS with the responsibility for nautical charting. In 1991, the Office of Charting and Geodetic Services was renamed the Coast and Geodetic Survey (C&GS) in honor of the original agency.

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The Coast and Geodetic Survey was consolidated with the Weather Bureau of the Department of Commerce known as the Environmental Science Services Administration (ESSA) by Reorganization Plan No.2 of 1965, effective July 13, 1965.

The Environmental Science Services Administration was abolished by Reorganization Plan No. 4 of 1970, effective October 3, 1970.

In order to implement this Reorganization Plan, the name Environmental Science Services Administration was changed to National

Oceanic and Atmospheric Administration (NOAA), while the Coast and Geodetic Survey was changed to the National Ocean Survey (NOS) by the order of the Acting Associate Administrator, December 19, 1970.

The National Ocean Survey became the National Ocean Service, the Office of Charting and Geodetic Services was formed as the unit within NOS responsible for nautical charting by order of the Administrator, December 1, 1982. On May 6, 1991, the Office of Charting and Geodetic Services was renamed the Coast and Geodetic Survey.

The first U.S. Government-produced nautical chart, a black and white print made in 1835 from a stone engraving, was of Bridgeport Harbor, Connecticut. Although lacking the detail of today's charts, it was compiled to an exceptional cartographic accuracy that has been a consistent characteristic of U.S. nautical charts throughout the years. Acquisition of a copperplate printing press in 1842 enabled the Coast Survey to publish a chart of New York Bay and Harbor in 1844 with finer definition than was possible from a stone engraving. The addition of color, first added to the charts by hand and later by color lithographic presses, has greatly enhanced the usefulness of the charts.

Many of the other nautical products and services produced by NOS, although more highly refined and technically advanced today, were also begun in the early days of the agency. For example, the original C&GS published its first U.S. Coast Pilot in 1875 after the government purchased the copyright and stereotype plates for the Coast Pilots commercially produced at that time by the Blunt Company. From its inception, C&GS was in the forefront of new surveying innovations. It used schooners to perform surveys, lead lines to measure soundings, and astronomic fixes and dead reckoning to position a survey ship when out of sight of land on the first hydrographic surveys in late 1834 and early 1835. NOS today employs automated systems for gathering source data from its diesel-fueled hydrographic vessels and to aid the shore-based hydrographic survey units. These systems electronically position the survey vessel and record soundings in both analog (graphic) and digital formats, thereby virtually eliminating the need to record survey data by hand. In addition, plane table methods for topographic work have given way to sophisticated digital photogrammetric techniques.

Some of the more important developments made in nautical charting have been the automation of hydrographic surveying, processing, and chart compilation and reproduction operations; selection of hydrographic and topographic detail for greater legibility; addition of selected topographic detail to aid navigation by radar; detailed fine-line depth contour development of submarine relief; introduction of folded charts for small-craft use; and the standardization of symbols to better conform to international standards and usage.

NOS performs public services essential to the safety and advancement of marine and air commerce, to surveying and mapping and other engineering work, and to the economic development of natural resources. The early leaders of the nation wisely considered such services as elements of the constitutional responsibility of the nation to promote and develop trade and commerce between the several states and with foreign nations. As a maritime nation with its thousands of miles of coastline, the United States must have a continually expanding knowledge of the sea around it, its coasts, the location of dangerous reefs and shoals, the extent of fishing banks and submerged lands, the rise and fall of the tide, and the direction and strength of sea currents affecting its navigation and communications.

Today, the activities of NOS in the fields of engineering, science, and higher mathematics provide data vital to the development of navigation, industry, and national defense. Still prominent among its varied functions is the responsibility for conducting surveys and publishing nautical charts of the 2½ million square miles of the coastal and Great Lakes waters of the United States and its possessions.

NOS has the responsibility for charting the national and territorial coastal waters of the United States including the Great Lakes, Puerto Rico, U.S. Virgin Islands, U.S. administered trust territories, and other islands in the Atlantic and Pacific Oceans.

Besides constructing and maintaining these charts, NOS also publishes the U.S. Coast Pilots and other navigational aids.

1.1.1 Legislative History of NOS

The following legislative history[2] is the basis of NOS' charting responsibilities.

1. Organic Act of 1807

The Organic Act of February 10, 1807, (2 Stat. 4134) authorized the president "to cause a survey to be taken of the coasts of the United States, in which shall be designated the islands and shoals, with the roads or places of anchorage, within twenty leagues[3] of any part of the shores of the United States; and also the respective courses and distances between the principal capes or head lands, together with such other matters as he may deem proper for completing an accurate chart of every part of the coasts within the extent aforesaid." Section 2 of the act further authorized "such examinations and observations to be made, with respect to George's Bank, and any other bank or shoal and the soundings and currents beyond the distance aforesaid to the Gulf Stream, as in his opinion may be especially subservient to the commercial interests of the United States."

The legislative history shows no intent on the part of Congress to establish a boundary line in the water at 20 leagues or at any other distance from shore. The act merely calls for a survey of the coasts[4] of the United States and a designation of the islands, shoals, roads, and anchorages "within twenty leagues of any part of the shores of the United States." This coastal survey would include both land area (with no defined limits) and water area to a distance of 20 leagues from shore.

Interestingly, the distance of 20 leagues had earlier been cited in the treaty with Great Britain in 1783, which settled the Revolutionary War. This treaty described the new nation's boundaries as "comprehending all islands within twenty leagues of any part of the shores of the United States." The

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2 Extracted from Coast and Geodetic Survey's Shore and Sea Boundaries (Shalowitz) and the Act of April 5, 1960, background.

3 In Thomas Jefferson's time, a "league" was probably defined as 3 sea miles, each mile being equivalent to 1 minute of latitude. A marine league is presently defined as a distance of 3 "geographical miles", a geographical mile being 1,852 meters. Thus, 20 leagues is understood to be about 60 nautical miles.

4 The term "coasts" appears to be used in the act in a very broad sense to cover both the land and water areas. Modern usage confinescoast" to a zone of land of indefinite width (perhaps 1-3 miles) bordering the sea – i.e., the land extending inland from the shore.

Supreme Court has held that this language was not intended to establish United States territorial jurisdiction over all waters lying within 20 leagues of the shore. The court noted that Secretary of State Jefferson's proposal only 10 years later (in 1793) that a 3-mile limit should be placed upon the extent of U.S. territorial waters bears out the conclusion that "language claiming all islands within a certain distance of the coast is not meant to claim all the marginal sea to that distance."

2. Act of March 3, 1843

A significant milestone in the history of the Coast Survey was reached when Congress passed the Act of March 3, 1843 (5 Stat. 630, 640), which provided that future appropriations should be "expended in accordance with a plan of reorganizing the mode of executing the survey" to be formulated by a board of officers from the Coast Survey, Navy, and Army. The plan defined the requirements for triangulation, astronomic, topographic, and hydrographic work and provided for the first time for the making of magnetic observations "as circumstances and the state of annual appropriations may allow."

Hydrographic surveys were extended seaward to include soundings of 120 fathoms depth. The Plan of 1843 specifically provided that "soundings shall be made along the whole line of the coast, as far inland as the ports and harbors for commerce, and as far seawards as to soundings of 120 fathoms depth." This was a definite modification of the 20-league provision in the Organic Act of 1807, and constituted a varying rather than a constant distance offshore.[5] The 120-fathom depth approximates the conventional edge of the continental shelf, which is taken as 100 fathoms. Along the northeast Atlantic coast and along the gulf coast, this depth varies considerably from 20-league belt specified in the Act of 1807.

Although the responsibilities of the Coast Survey were vastly increased during the ensuing years, the Act of March 3, 1843, and the plan of organization adopted pursuant thereto, governed its operations for more than a century until passage of the Act of August 6, 1947.

3. Act of August 6, 1947

The Act of August 6, 1947, (61 Stat. 787) was the first legislation in more than 100 years to define the functions and duties of C&GS. While it did not change previous authorizations to any great extent, it eliminated a number of obsolete statutes and assembled into one place various items of substantive legislation which had been enacted since 1807. Section 1 sets forth the purpose of the act and the authority conferred upon the Director of C&GS, under direction of the Secretary of Commerce, to conduct the following activities "in the United States, its territories, and possessions:"

5

Along the Atlantic coast, the 120 fathom depth curve varies from a maximum of 64 leagues east of Cape Cod to a minimum of 2 leagues off Miami Beach; in the Gulf of Mexico, it extends to a distance of 37 leagues off Tampa and 40 leagues at the boundary between Louisiana and Texas. The wording of the provision as to 120 fathoms depth in the Plan of 1843 also bears out the interpretation placed on the word “coasts” in the Act of 1807 – i.e., that it referred to land and water areas rather than to a boundary line at a distance of 20 leagues from shore.

a. Hydrographic and topographic surveys of coastal water and land areas (including surveys of off-lying islands, banks, shoals, and other offshore areas);

b. Hydrographic and topographic surveys of lakes, rivers, reservoirs, and other inland waters not otherwise provided for by statute;

c. Tide and current observations;

d. Geodetic control surveys;

e. Field surveys for aeronautical charts;

f. Geomagnetic, seismological, gravity, and related geophysical measurements and investigations, and observations for the determination of variation in latitude and longitude.

Section 2 of the act provides for the processing and dissemination of the field data resulting from the activities authorized in section 1, specifically the compilation, printing, and distribution of nautical and aeronautical charts and related navigation publications:

In order that full public benefit may be derived from the operations of C&GS by the dissemination of data resulting from the activities herein authorized and of related data from other sources, the Director is authorized to conduct the following activities:

a. Analysis and prediction of tide and current data;

b. Processing and publication of data, information, compilations, and reports;

c. Compilation and printing of aeronautical charts of the United States, its territories, and possessions; and, in addition, the compilation and printing of such aeronautical charts covering international airways as are required primarily by United States civil aviation;

d. Compilation and printing of nautical charts of the United States, its territories, and possessions;

e. Distribution of aeronautical charts and related navigational publications required by United States civil aviation;

f. Distribution of nautical charts and related navigation publications for the United States, its territories, and possessions.

4. Clarification of 1955

Thus the area of survey responsibility had progressed from the 20-league limit stated in the Organic Act of 1807 to the 120-fathom depth stated in the Act of 1843 which placed the limit farther offshore in most areas. (In 1843, the areas concerned were the Atlantic and Gulf coasts only.) For many years the 120-fathom curve was a primary factor on which operating funds for the Coast Survey were based.

In 1955, Admiral H. Arnold Karo, Director of C&GS, expressed concern to Congress about the agency's areas of hydrographic responsibility. He requested a determination and documentation of new boundary and various mileage statistics for a new and more realistic limit on which to base appropriation requests.

The Coastal Surveys Division was assigned the task of determining and documenting the new area of survey responsibility, and it established a somewhat arbitrary offshore limit of 60 nautical miles (coincident with the 20 leagues of 1807). This corresponded to the distance that the Electronic Position Indicator, the electronic positioning system in use at that time for hydrographic surveys, was considered dependably accurate. This became the baseline to which adjustments were made as deemed necessary generally ranging from 12 miles off of Nova Scotia, the Bahamas, and Cuba, to the 1,000-fathom curve off most of the east coast, to various political boundaries such as the U.S.-Russia boundary in the Bering Sea. The limits of modern hydrography in effect in 1955 were also used as appropriate. The 60-nautical-mile limit was affected in most other areas. Inclusion of the U.S.-controlled Caribbean and Pacific Islands was assumed. These limits conformed well to the specifications of the Act of August 6, 1947, which specified that surveys should include "coastal water and land areas (including surveys of off lying islands, banks, shoals, and other offshore areas)."

5. Act of April 5, 1960

Congress enacted legislation in 1960 to clear up misunderstandings resulting from the 1947 law, which it was widely believed limited C&GS in its overall operations "to the United States, its territories, and possessions" and its survey work to "coastal water and land areas including off lying islands, banks, shoals, and other offshore areas." The new law (74 stat. 16) eliminated all real or ambiguous restrictions on the geographical scope of the area in which NOS is authorized to operate. It made clear that the Survey was authorized to carry out its activities without regard to geographical limitations whenever the head of an executive agency determines the project to be essential to the national interest.

Until recent years, then, considerable uncertainty surrounded the NOS legal charting area of responsibility. The Act of April 5, 1960, was clearly intended to eliminate all confusion about this responsibility by removing the geographic restrictions for surveying and charting activities. It opened up all waters to NOS and authorized the Secretary of Commerce to conduct surveying,

charting, and geophysical activities without regard to geographic limitations in connection with projects designated essential to the national interest. The background statements for this act also expressed the intention that the U.S. Naval Oceanographic Office (NAVOCEANO) and NOS should cooperate in conducting oceanic surveys.

6. Area of Current Responsibility

Today NAVOCEANO and the National Geospatial-Intelligence Agency (NGA) still take primary responsibility for foreign surveying and charting activities, while similar domestic responsibilities rest with NOS. However, there are exceptions. For example, NGA produces charts of certain U.S. harbors where national security is involved, overprints many NOS small-scale charts for special purposes, and on occasion produces charts of domestic areas simply because, NOS does not have the resources to accommodate all NGA requirements. NOS has also conducted surveys of foreign waters at NAVOCEANO's request, eventually incorporating the results into any NOS charts of the area. NOS often enters into agreements with the Canadian Hydrographic Service (CHS) to survey Canadian waters. With few exceptions, however, NOS resources simply have not permitted further extension of its legally authorized activities, except for oceanographic research within the National Oceanic and Atmospheric Administration's (NOAA) broad scope.

The division of responsibility between NOS and USACE for charting inland waters and lakes remains unclear. Both NOS and USACE are authorized to produce maps, charts, and related publications covering the inland waters of the Nation. For a number of years, nautical charting for the U.S. portion of the Great Lakes, Lake Champlain, and the St. Lawrence River was under USACE authority. More recently this charting was the responsibility of the NOS Lake Survey Center in Detroit and was completely detached from other NOS nautical charting activities. In 1974, the charting work of the Lake Survey Center was integrated with all other NOS charting activities. The NOS and USACE responsibilities for other inland areas remain split, but successfully so, with the charting responsibilities for inland areas being determined cooperatively and individually as they arise.

The 200-mile limit of the Fishery Conservation Zone-Exclusive Economic Zone is sometimes incorrectly espoused as the NOS limit of surveying responsibility instead of the wider ranging (but also legally incorrect) offshore limits of present nautical chart coverage. Perhaps this reflects a desire for a limit that would be a feasible goal since it is the smaller of the two measurable areas (3,337,600 versus 10,644,000 square nautical miles) is easier to visualize, and is a continuously charted line. But, in fact, there are no such limitations.

1.1.2 Federal Requirements for Chart Usage

The modern nautical chart is constantly used by the prudent mariner to determine the safest course and is considered so indispensable that the U.S. Code of Federal Regulations requires vessels 1600 gross tons or larger to have charts of the U.S. waters on which they operate available for convenient reference at all times.

The following is extracted from the Federal Register, Vol. 48, No. 190, September 29, 1983, pages 44534 and 44535:

> "Regulations that would govern the operation of all major vessels in U.S. waters were introduced by an Advanced Notice of Proposed Rulemaking (ANPRM) on June 28, 1974, (39 FR 24157) in response to the Ports and Waterways Safety Act of 1972.
>
> Based upon comments received on the ANPRM, a Proposed Rule to establish a new Part to 33 CFR Part 164, entitled "Navigation Safety Regulations," was published on May 8, 1976 (41 FR 18766). These regulations, applicable to all vessels of 1600 grt [gross ton] or more operating on U.S. waters, were published as a Final Rule on January 31, 1977 (42 FR 5956). A proposed rule to modify the chart and publication requirements in 104.33 was published on July 7, 1983 (48 FR 31259).
>
> This rule modifies the requirements for carriage of nautical charts and publications by removing certain ambiguities from the Navigation Safety Regulations. These regulations are applicable to each self-propelled vessel of 1600 gross register tonnage or more operating on the navigable waters of the United States, except the Saint Lawrence Seaway.
>
> The final rule closely parallels that of SOLAS (see 1.6.3). The final rule requires marine charts to be of large enough scale, with sufficient detail to make safe navigation of the area possible.
>
> Charts and publications must be corrected, and updated with corrections contained in all Notices to Mariners reasonably available to the vessel. The latest edition is no longer required provided the edition on board is so corrected. The required Tide and Tidal Current Tables must be the current edition. Foreign charts and publications must equally provide for the safe navigation of the vessel for the area to be transited.
>
> A master in selecting a chart or publication for use in an area must evaluate it on the basis of its sufficiency for safe navigation. In some instances the largest scale chart available may not be necessary to provide for safe navigation of the vessel. The scale of a foreign chart need not be exactly the same as the corresponding U.S. chart available for an area, provided the scale and detail make safe navigation possible.

If the Captain of the Port determines that any charts or publications are inadequate for safe navigation, the Captain of the Port may require the master to obtain additional charts and publications before departure or subsequent return to that port.

Provided the charts and publications are currently corrected, requiring further carriage and retention on board of Notices to Mariners is unnecessary.

The requirement for carriage of U.S. Coast Guard (USCG) Local Notice to Mariners (LNM) is also eliminated. The LNM is not readily available outside the local port area in advance to transient vessels. Current local information is available from pilots, broadcast notice to mariners, port authorities, agents and the like. Masters should endeavor to obtain this information prior to transit."

The following regulations are extracted from 33 CFR 164:

"164.30 Charts, publications, and equipment. General.

No person may operate or cause the operation of a vessel unless the vessel has the marine charts, publications, and equipment as required by 164.33 through 164.41 of this part.

164.33 Charts and publications.

(a) Each vessel must have the following:

(1) Marine charts of the area to be transited, published by the National Ocean Service, U.S. Army Corps of Engineers, or a river authority that

(i) Are of a large enough scale and have enough detail to make safe navigation of the area possible; and

(ii) Are currently corrected.

(2) For the area to be transited, a currently corrected copy of, or applicable currently corrected extract from, each of the following publications:

(i) U.S. Coast Pilot

(ii) Coast Guard Light List

(3) For the area to be transited, the current edition of, or applicable current extract from:

(i) Tide tables published by the National Ocean Service.

(ii) Tidal current tables published by the National Ocean Service, or river current publication issued by the U.S. Army Corps of Engineers, or a river authority.

(b) As an alternative to the requirements for paragraph (a) of this section, a marine chart government may be substituted for a U.S. chart and publication required by this section. The chart must be of large enough scale and have enough detail to make safe navigation of the area possible, and must be currently corrected. The publication, or applicable extract, must singly or in combination contain similar information to the U.S. Government publication to make safe navigation of the area possible. The publication, or applicable extract must be currently corrected, with the exceptions of tide and tidal current tables, which must be the current editions.

(c) As used in this section, "currently corrected" means corrected with changes contained in all Notices to Mariners published by the National Geospatial-Intelligence Agency, or an equivalent foreign government publication, reasonably available to the vessel, and that is applicable to the vessel's transit."

1.2 Nature of Nautical Charts

Until recent times, nautical charts were constructed primarily to serve the needs of maritime navigation for large commercial and military ship operations. The purpose of today's nautical chart has been broadened to provide for and promote the growth of various segments of the national economy as well as to respond to the needs of technological developments. The proper presentation of hydrographic data is invaluable to such commercial interests as fishing, transportation, and underwater mineral resource development, and to that segment of the economy catering to recreational boating and sport fishing. Oceanographic programs, developments in ship design, and the growth in recreational boating all have contributed to the changing design of nautical chart presentations.

A basic requirement of a nautical chart is to promote safe navigation by providing the navigator with the proper information to assist in making the right decision at the right time. NOS must be able to anticipate these diverse needs and make them available to the user in the best graphic form. Any attempt to improve charts must take into account the navigator's point of view. User surveys on specific charting proposals, user evaluation surveys through contacts with private organizations, boat show participation, and direct contact with commercial and recreational boating interests are some of the methods NOS uses to collect information on the needs of navigators. These requirements must be evaluated and merged with cartographic feasibility, economic considerations, technical trends, and available resource.

A nautical chart is a graphic portrayal of the marine environment. It is used by the mariner both as a "road map" and worksheet. Used in conjunction with other supplemental navigational aids, such as Coast Pilots and Notices to Mariners (NM), the mariner is able to lay out courses and navigate a ship by the shortest, and most economical safe route. A chart is constructed then primarily to serve the needs of the mariner. It shows the nature and form of the coast, the depths of the water and general character and configuration of the sea bottom, the locations of reefs, shoals, and other dangers to navigation, the rise and fall of the tides, the locations of man-made aids to navigation, the direction and strength of water currents, and the characteristic of the Earth's magnetism in the area of the chart. Portraying, as it does, all this pertinent information in a single, inexpensive, easy-to-use, and easy-to-understand analog or digital format, the nautical chart is an indispensable navigational tool.

The long coastline of the United States - totaling about 100,000 miles of tidal shoreline presents many and varying problems in coastal geography. Added to this vast area to be charted are extensive intracoastal waterways and many bays and harbors. Eighty percent of the nautical charts published by NOS are at large scales (1:50,000 or larger) for navigation in the relatively restricted intracoastal waters. In these waters the navigator is often close to land and is vitally concerned with the shallow waters along the shore, the features of the shoreline, and the nearby land.

NOS publishes and maintains over 900 nautical charts of the coastal waters of the United States and its possessions. It also maintains records and supplies information about the coastal geography of the country which is required for the protection of the coastline and for economic development in coastal regions. Safety of life and property frequently depends directly upon the reliability of the NOS charts and publications; its precise geodetic surveys of the country are also the foundation of all topographic and geologic mapping, land surveys, and many extensive engineering projects. It is, therefore, NOS policy to stress accuracy and dependability in all field observations and publications for which it is responsible. The founders of NOS established high standards of accuracy early in the 19th century which have withstood the test of time.

However, charting an area is not a job that can be done once and then be forgotten. The marine environment is constantly changing as a result of the establishment of new ports and waterfront facilities, straightening rivers, dredging channels, adding piers, building bridges and changing bridge and cable clearances, deepening harbors, extending breakwaters, and changing landmarks. Other changes result from hurricanes and earthquakes as well as sediment deposition resulting from nature's more subtle and constant actions. Natural elements such as wind, tide, current, and storm erosion are potent forces that affect chart maintenance activity. All of these man-made and natural changes must be continually monitored, and the affected areas resurveyed and recharted if our waters are to remain safe for commerce, industry, recreation, and national defense.

1.2.1 Nautical Charts vs Topographic Maps

The nautical chart differs considerably from the topographic map in its treatment of the coastline. The topographic map emphasizes the land forms and the representation of relief, with shoreline as an approximate delineation of the waterline at mean sea level. In contrast, the nautical chart has such a unique requirement for detailed and accurate representation of the coastline and water forms that it must be considered in a separate category from topographic maps in any discussion of coastal geography.

Nautical charts also differ from maps in that standardized specifications cannot be applied indiscriminately to them. In fact, the attempted application of simple rules to govern chart content has been a principal cause of wasted effort in the past. For example, although topographic contours are undeniably valuable to the mariner on charts of some areas for radar reflection, visual profiles, and identification for relative position locating, their inclusion on other charts causes an amount of work out of proportion to their value. The drafting of standard rules covering particular features often leads to a misguided attempt to give a chart uniform treatment throughout, whereas an essential element of successful chart compilation is that different considerations apply as a compiler works from inshore to offshore areas, or along an open coast toward a shoal-encumbered estuary, or inland from the coastline. Therefore, the specifications outlined in this Manual are to be used as guidelines and the ultimate decision regarding depiction of the various features appearing on nautical charts must rest on the professional judgment of the cartographer.

Chart symbols are designed to convey to the navigator quickly, clearly, and unmistakably the information necessary for safe navigation. The graphic methods for charting coastline features encompass various combinations of individual symbols and symbol patterns, line drawings in which the line itself may be varied (as to line width, solid vs. dashed lines, etc.), screen tints, and legends. Too many symbols reduces the legibility of charts and the ease and speed with which they can be interpreted. Thus, simplicity is a key element in good chart compilation and one regarding sound cartographic judgment.

1.2.2 Hydrography

The soundings, or depths, are without doubt the single most significant feature appearing on a nautical chart, for it is these depths that show where a vessel can and cannot safely be navigated. Soundings are selected to show trends of bottom features not brought out by depth curves, with enough soundings to clearly show the shoal areas and the channels between. Careful selection of soundings is required to allow correct interpolation between them, to reflect the adequacy of the survey, and to permit the use of the chart as a plotting sheet.

Least depths are shown on shoals and in natural navigable channels and represent the most important class of soundings shown on the chart. The least depths in channels tell the mariner the maximum draft that can pass through that channel. In harbor areas, least depths are also important and are shown in the entrances to the harbors and basins and alongside piers and wharves. Enclosed deeps in shoal areas are shown, as their presence is helpful to mariners using echo sounders to confirm their position in poor visibility and are also useful when anchoring.

On large-scale charts and on other charts where the submarine topography is simple, a uniform pattern of soundings is selected to avoid the impression of an incomplete survey, sparse data, or old data when soundings were obtained by wire or lead line at relatively widely spaced intervals. Much of these old survey data, which dates back to the days of sailing survey vessels, are still being used and are still valid in certain areas of hard, stable bottom.

The quality of the bottom is particularly important as an indication of anchor-holding characteristics: sand and other firm deposits hold better than soft mud, while rocky bottom is undesirable for anchoring. When known, bottom material is shown on shoals, banks, and reefs as a guide to their stability and as a clue to possible bottom irregularity.

Depth curves, lines of equal depth which are the equivalent of land contours on a topographic map, are also of special importance in chart compilation. In drawing these curves, full use is made of all the soundings obtained on the hydrographic survey. Each curve is the equivalent of an infinite number of soundings of equal depth. By careful use of these curves, characteristic features of the ocean bottom are brought into prominence and provide the navigator with a simple method for position identification by comparing a line of echo soundings with the charted depth curves. They bring order out of what otherwise might appear to be chaos. Depth curves aid

in interpreting the soundings, in emphasizing the submerged dangers, and in defining the extent of safe channels. Depth curves are extended offshore at regular and predetermined intervals, with the spacing selected so that sufficient background or white space is retained to preserve the basic function of the chart as a medium for course plotting and other navigational notations.

The outer limit of the foreshore area, that part of the beach between high and low waters at ordinary tides, is determined by hydrographic or photogrammetric surveys. On a gently sloping coast, the area which uncovers at low water may reach a considerable distance from the high water line. This low water line is represented on the chart by a dotted line, if it is other than ledge rock, and emphasized by a green tint between the high water and the low water lines. This green tint - produced by overprinting the gold land tint and the blue water tint - is clearly visible under red chart-reading lighting (as are the separate land gold and water blue), which was not true of the yellow land color used prior to 1977. Within this foreshore area, the effects of the sea cutting into the shore, such as scoured ledge rock or scattered boulders, are also identified.

A selected offshore area adjacent to the foreshore is charted with a blue tint. The outer limit of this area is a particular depth contour, the selection of which varies according to the area and purpose of the chart. The blue-tinted area emphasizes the approximate extent of the zone considered to be the most threatening to the majority of mariners using the chart. It generally includes that area which is most affected by deposition and erosion. It is the area where bars, reefs, and isolated rocks are usually located. Most of the information for charting this area comes from hydrographic surveys. Surveys are more intensive in such areas, and the depth curves are defined in greater detail and reveal more of the bottom configuration. Legends are used to describe conditions which cannot readily be represented by symbols. Legends such as "Boulders," "Wreckage," or "Foul area," with limits if needed, may be charted over an extensive area.

1.2.3 Dangers

The principal dangers to navigation shown on nautical charts are rocks, reefs, shoals, and wrecks. Rocks are shown by an asterisk-like symbol if their peak uncovers within a low water to high water zone, and by an islet if it is always bare above the limit for high water. A submerged rock, one that is covered even at low water, is shown by a simple cross if the depth is unknown, or as a sounding with an adjacent *Rk* legend.

Isolated reefs are detached from shore, while ledges (rocky, coral, or lava formations) are connected with and fringe the shore. They are symbolized by a wavy detailed line simulating the irregular edging of the formation. The reef and ledge symbol shows a shelf of rock which uncovers at low water, and individual asterisk-like symbols show scattered rocks or high points which uncover at some stage of tide. Where a ledge extends below the low water level, it is depicted by sunken rock symbols or an area labeled *Foul* and outlined by a dotted line. Coral or lava rock are treated the same as rock ledge since they present the same hazard to the mariner. They are seldom labeled since identification can be inferred from their locality.

Rocks, reefs, and ledges are unyielding, and the wise mariner will avoid navigating areas where they are depicted.

Frequently there are other undetected hazards in the immediate vicinity.

Charted wrecks are of two kinds, stranded or sunken. A stranded wreck has some portion of the hull or superstructure visible above the sounding datum. It is represented on the chart by a pictorial ship profile symbol. A sunken wreck is completely submerged or may have masts visible above the sounding datum. Sunken wrecks are symbolized by a line crossed by three shorter lines.

When rocks, wrecks, or obstructions have been cleared by means of a wire-drag survey, the clearance depth is shown underlined by a bracket.

An enclosing dotted danger line is used to delimit and emphasize rocky and foul areas and also to mark shoal areas of unknown depth, isolated dangerous shoal areas, rocks and reefs, wrecks, and obstructions.

Continuous attacks by the sea upon points of land projecting into the water erodes away materials which are transported to other places and deposited as accretions to existing forms or which contribute to the formation of new shoals and bars. Natural forces working upon inlets create a constantly shifting arrangement of channels; cause inlets to open, close, or migrate; and cause a consequent readjustment of the shoreline. Progress in the evolution of shoreline configuration is usually gradual, but occasionally changes occur so rapidly and in such a strategic location that a definite marine hazard results which requires immediate action.

For areas subject to continuous and rapid change, a suitably worded caution note may be necessary. In extreme cases, such as for certain ocean inlets, hydrography and aids to navigation are not charted; instead, the position of such often-moved buoys are relayed to the mariner via the LNM.

1.2.4 Shoreline

The shoreline or high waterline is the most prominent line on the chart. It is represented by a solid black line (a dashed line if its delineation is only approximate). The shoreline is further emphasized by a gold color tint on the land side and a contrasting blue or green tint on the water side. Its configurations are important when the mariner is close to shore. The accurately determined shoreline reveals the physical geography of the shore, and it reflects the effects of prevailing currents, wave fronts, and storms. The shoreline delineates the seaward limits of both marsh and swamp areas since to the mariner this limit appears as the visible shoreline. Marsh areas carry a green tint and, where space permits, the legend "marsh" is added. The seaward extent of marsh is accurately surveyed, but the inshore boundary may be generalized, as the

ragged indentations into the land are of little importance on the nautical chart. Swamp is represented by the land tint and with a legend "swamp" or "mangrove." Since the vegetation of swamp land makes it appear as land to the mariner, its general location is sufficient for charting purposes.

Seawalls, bulkheads, and other man-made structures on the shoreline are represented on the chart by their outlines. They are not usually labeled since they are symbolized by a finer line and can be identified by their shapes or by their proximity to other cultural features. Structures which form a part of the shoreline but also extend underwater, such as marine railways or ramps, are represented by a dashed line showing that portion which covers at high water. Backshore is that part of the coast which extends inland from the shoreline to the cliff or bluff marking the limit of storm waters. The cliff or bluff is charted if it has landmark value or if it presents an obstacle to landing. The symbol used is drawn to suggest relative heights.

1.2.5 Aids to Navigation

Aids to navigation are shown on charts to assist the mariner in navigating a vessel safely from one place to another. They are placed at strategic points along the coast and navigable waterways to mark safe water and to provide navigators with a means to determine their position with relation to the land and to hidden dangers.

Charted aids fall into two classes, fixed aids and floating aids. Fixed aids include lighthouses, other fixed lights, daybeacons, man-made landmarks, and radio aids, including LORAN-C. Floating aids to navigation on the chart consist of articulated lights and the various types of buoys, lighted and unlighted. Many primary aids are equipped with sound devices such as a bell or horn to aid the mariner during periods of poor visibility. Prominent man-made structures are charted whenever they may be useful for vessel positioning. Radio towers and stacks are most useful for this purpose as they are not only good daytime references but their flashing red and strobe lights can be seen for long distances at night. All of these aids to navigation are clearly and distinctly marked on the chart, using symbols and labels that allow the mariner to readily recognize and use these features

1.2.6 Technological Progress

The physical geography depicted on nautical charts is revised by use of aerial photography as an integral part of the chart maintenance program. The shoreline is compiled at chart scale for direct application to the digital chart files, and the location of the aids to navigation and special landmarks are an integral part of the information furnished by the photogrammetric processes.

Aerial photographs are the basic media from which the shoreline is compiled. The many aids to navigation, including daybeacons and lights in our harbors and along the intracoastal waterways, show clearly on color photographs and can be readily located by photogrammetric measurement. By use of infrared photography, the water surface is reflected with little or no depth penetration. The waterline contour is well defined, and when taken in conjunction with the high and low stages of the tide, the high water and low water lines can be extracted for chart application. Other color film media have a water depth penetration quality that can be interpreted with certainty in relatively clear waters. This concept in photogrammetry, called photobathymetry, is applied primarily for nautical charting. Shoreline maps are prepared for nearshore hydrographic surveys and include such coastal geography as foreshore detail, underwater channel lines, shoals, and rocks. These features guide and supplement the hydrographic survey in the detail work for charting shallow waters adjacent to the shore.

Electronics and automation are key elements in modern mapping and charting. Electronic methods of charting and mapping, in one form or another, are now used by nearly all maritime nations for surveying the waters bordering their seacoasts, while aerial photogrammetric methods have become the universal medium for surveying the land features.

The whole field of surveying and mapping on land, sea, and in the air is undergoing major change. Surveyors have an important new yardstick at their disposal namely, the velocity of radio and light waves. Instruments using this new technology have not only reduced the cost of surveys, but have accomplished surveys that had been impossible with conventional methods. These methods have steadily improved, resulting in increasingly accurate hydrographic surveys and photogrammetric information. The rapidity with which depths can now be measured and topographic information collected has greatly increased the total amount of data available for application to the nautical charts in recent years.

Today's unprecedented demands for increasingly accurate cartographic products and the wealth of source materials available for their construction and revision have required accelerated chart production. Current cartographic operations have resulted in a shorter time span between inception and publication of a chart.

Automation places cartography on the threshold of the most revolutionary developments it has ever undergone. Electronic methods are steadily pushing seaward the frontiers of accurate hydrographic surveys and are making it feasible to explore the intricate patterns of deep coastal

slopes with an accuracy and completeness previously undreamed of - thus enhancing the safety of life and property at sea and increasing man's knowledge of world geography.

However, any changes in charting must continue to take into account the basic purpose of the nautical chart namely to provide sufficient information for safe navigation while avoiding the possibility of confusion or misinterpretation.

Many changes have taken place in hydrographic surveying and charting techniques during NOS' long years of public service. Each new milepost in this steady march of scientific and technical progress has added more accurate and more detailed information to the accumulated knowledge. Greatly enlarged efforts to solve problems through intensive research programs are in the offing. These efforts will contribute to the future progress of NOS in charting the Nation's waterways and coastal geography.

1.3 Chart Classification

Revised on May 27, 2003 by Cartographic Order 008/2003
See also Memorandum dated July 9, 2003

Variation in the precision and detail required to satisfy the needs of different users gives rise to a requirement for a variety of chart scales. Nautical charts vary in scale with the importance of the geographic area, the purpose for which the chart is designed, and the necessity for clearly showing all dangers within that area. Consideration of the varying needs of users has resulted in three categories of charts, the flat conventional charts, the folded or bound small-craft charts, and the marine facilities charts.

1.3.1 Conventional Charts

These charts are flat, printed reproductions of some portion of the Earth's surface. Depending on their scale, these charts show the nature and shape of the coast, depth of the water, general configuration and character of the bottom, prominent landmarks, port facilities, cultural details, dredged channels, aids to navigation, marine hazards, magnetic variations, and seaward boundaries. There are five classifications of conventional nautical charts:

1. International Charts

These consist of a series of five charts covering the Northeastern Pacific Ocean and the Bering Sea, compiled to internationally standardized cartographic specifications and at scales of 1:3,500,000 or 1:10,000,000. The navigational information provided includes depth curves, soundings, nautical symbols and related data, but does not include the charting of submarine cables (symbols L 30.1 and L 32).

These series of more than 80 sheets of small-scale charts encompassing the entire world, were the result of the participation of fifteen worldwide nations. The National Ocean Service is responsible for the production of the following five (5) charts: 50, 500, 501, 513, and 514.

2. Sailing Charts

Published at scales smaller than 1:600,000, these are intended for planning voyages and for fixing the mariner's position as the coast is approached from the open ocean or for sailing along the coast between distant ports. The shoreline and topography are generalized, and only offshore soundings, principal navigational lights and buoys, and landmarks visible at considerable distances are shown.

3. General Charts

These charts of the coast, published at scales ranging from 1:150,001 to 1:600,000, are intended for coastal navigation when a course is well offshore but can be fixed by landmarks, lights, buoys, and characteristic soundings.

4. Coast Charts

Published at scales ranging from 1:50,001 to 1:150,000, these charts are intended for near shore navigation inside outlying reefs and shoals, in entering or leaving bays and harbors of considerable size, and in navigating the larger inland waterways.

5. Harbor Charts

Published at scales of 1:50,000 and larger, these charts are intended for navigating in harbors and smaller waterways, and for anchorage.

1.3.2 Small-Craft Charts

These charts, published at scales ranging from 1:10,000 to 1:80,000, are designed for easy reference and plotting in limited spaces. In some areas these charts represent the only chart coverage for all marine users. They portray regular nautical chart detail and other specific details of special interest to small-craft operators, such as enlargements of harbors; tide, current, and weather data; rules-of-the-road information; locations of marine facilities and anchorages; courses and distances. Types of small-craft nautical charts include the following:

1. Folio Charts

These small-craft charts consist of two to four sheets printed front and back, accordion-folded, and bound in a protective cardboard jacket. (See Nautical Chart Manual, Volume 2, Appendix IV, page IV-14.)

2. Pocket Fold Charts

These small-craft charts consist of one sheet printed front and back; folded (1) on a horizontal axis (i.e., centerfold) and (2) in an accordion-folded format on a vertical axis. Pocket Fold charts are NOT issued in a protective cardboard jacket. (See Nautical Chart Manual, Volume 2, Appendix IV, page IV-14.2.)

To facilitate easy handling and storage, small-craft charts which were previously issued in the area chart, route chart and modified route chart formats have been re-designed and re-formatted as pocket fold charts. However, these categories of small-craft charts are still identified as their respective types due to the geographic coverage and depicted information.

a. Area Charts

These are versions of conventional nautical charts overprinted with additional small-craft information.

b. Route Charts

These charts are designed for river and narrow waterway coverage, and for much of the Intracoastal Waterway.

c. Modified Route Charts

These are versions of Intracoastal Waterway charts that were originally issued in a conventional chart format. Modified route charts are used for some areas that are not adaptable to the route chart style used for long, narrow waterways.

3. Recreational Charts

These are a series of large-scale charts, published in a book format, providing sequential page coverage for selected areas.

4. Canoe Charts

This is a chart series of the Minnesota-Ontario border lakes. Most canoe charts do not show hydrography. They are intended to portray the general shape and size of these lakes and the international boundary between Canada and the United States. They were originally designed for the International Boundary Commission/U.S. Section but are now also used to provide information of interest to campers and boaters who must portage between the lakes.

1.3.2.1 Designation in Chart Catalogs

Folio charts are identified in chart catalogs with the designation “SC FOLIO SMALL-CRAFT CHART”; Pocket Folds are identified in chart catalogs with the designation “PF” and Recreational charts are identified with the designation “SMALL-CRAFT BOOK CHART”.

All canoe charts are located in the Great Lakes. These charts are outlined in green in the chart catalog and are listed under the heading:

CANOE CHARTS
MINNESOTA-ONTARIO BORDER LAKES

1.3.3 Marine Facilities Charts

These charts are conventional charts with small-craft marine facility information overprinted on the chart and presented in tabular form on the back. These are produced for major port areas where facility information for a wide area, such as Narragansett Bay or Galveston Harbor, is useful for the mariner.

1.3.3.1 Designation in Chart Catalogs

Marine Facilities charts are identified in chart catalogs with the designation “MF”.

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1.4 Chart Production Terminology

1.4.1 Standard

A "standard" is a black, white, and magenta paper copy of the chart or compilation used to record and index all new information and source documents (except information from the NM) received during the life of the standard, usually 2 to 12 years. Information, source notations and listings that have been "canceled" by a date stamp are considered fully applied to the chart compilation; those items which are not date stamped have yet to be fully applied. Also recorded on the standard are certain standing items considered to be of value in the future application of source documents or other information to a chart. When the amount of source documents (and other information) indicated on the standard becomes excessive, a new standard is produced, and the old standard is stored for future reference and eventual microfilming.

1.4.2 Aid Proof

The term "aid proof" is no longer in use. The aid proof was a paper copy of a current chart on which were indicated all changes in aids to navigation, important notes and tabular corrections which were to be applied to the chart for the next printing. Information regarding changes to aids to navigation was derived principally from the NM. Aid proofs were replaced by drawing-aid proofs in 1976 and are available now only in the microfilm system maintained by the Nautical Data Branch (NDB) of NOS.

1.4.3 Drawing Aid Proof

The term “drawing aid-proof” is no longer in use. The drawing-aid proof was the medium upon which cartographic compilation edits (i.e., additions, revisions, deletions) were applied from source documents to all new editions (see Section 1.4.5) and certain minor reconstructed charts (see section 1.4.9). The drawing-aid proof served as a permanent graphic record of the cartographic changes, between chart printings, resulting from all source documents. It was a contact film positive of the black and magenta plates of a chart, reproduced on .007" stable-base plastic. (The contact film positive of the magenta plate was not considered a drawing-aid proof, but only an accessory drawing to the contact film positive of the black plate; therefore, the contact positive of the magenta plate was not archived or microfilmed as was the contact positive of the black plate.)

When a new edition or reconstruction of a nautical chart was scheduled to be published and the drawing aid proof was forwarded to the reproduction branch for the purpose of revising the appropriate chart negatives, an interim copy was made of the forwarded drawing aid proof. This interim copy, called an x-drawing and made of a more thinner plastic than the stable-base plastic, was retained in the compilation branch for the application of source material received in the division after the date the drawing aid proof was forwarded.

1.4.4 Proof

A proof (once produced on contact film, but now generated on paper from the raster files), is an advanced copy of a new edition of a chart. This advanced copy is produced to:

(a.) verify the presence of quality and correct content in the cartographic work before the chart's final printing
(b.) verify the design and plate registration of the chart,
(c.) verify the cartographic quality of the engraving work,
(d.) verify the proper use of colors for chart features when appropriate,
(e.) clean up cosmetic image defects.

1.4.5 New Edition

Revised on April 30, 2002 by CO 007/02.

A chart issue that cancels all previous issues is called a new edition. A new edition reflects one or more changes of such importance to navigation that all previous printings are obsolete. Changes may be based on corrections from the notice to mariners in addition to other sources.

1.4.5.1 Edition Number

The edition number shall be incremented with each new edition of the chart. The edition number shall be shown on all new editions as follows:

Conventional Charts-

The edition number shall be printed in the lower left corner of the chart, outside of the chart border, using the following form:

32nd Ed.,

The edition number shall start flush with an imaginary line extended from the outside edge of the left border. The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-1.

Small-Craft Chart Covers-

The edition number shall be printed in the lower border of the front cover, to the right of the chart number, 5.0 mm (0.2") from the bottom edge of the cover, using the following form:

EDITION 30

The edition number shall start flush from an imaginary line extended from the left side of the cover photograph. The edition number shall print in the color of the cover photograph and in 12 point Swiss Light style type. See Figure 1-2.

Small-Craft Folio Chart Pages-

The edition number shall print in the lower left corner of the page, immediately to the right of the chart number, using the following form:

32nd Ed.,

The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-3.

Small-Craft Pocket Fold Chart Cover Panels-

The edition number shall be printed after the chart number located above the publication note, which varies in location depending upon available space. The edition number shall be shown using the following form:

32nd Ed.,

The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-4.

Small-Craft Pocket Fold Chart Pages-

The edition number shall print in the lower left corner of the page, immediately to the right of the chart number, using the following form:

32nd Ed.,

The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-5.

Recreational Chart Covers-

The edition number shall be printed in the lower left corner of the chart, outside of the decorative border, using the following form:

32nd Ed.,

The edition number shall start flush from an imaginary line extended from the outside edge of the left border. The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-6.

Recreational Chart Pages-

The edition number shall be printed in the lower left corner of each page, immediately following the chart number, except for pages that are only included to display general information. The edition number shall use the following form:

32nd Ed.,

The edition number shall print in black, 8 point Swiss Light style type. See Figure 1-7.

1.4.5.2 Edition Date

Revised on March 7, 2014 by Cartographic Order 004/2014

The edition date represents the month and four digit year that a new edition is printed. The day of the month shall not be shown. The edition date shall be shown on all new editions as follows:

Conventional Charts-

The edition date shall immediately follow the edition number in the lower left corner of the chart, outside of the chart border, using the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September shall be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space and shall print in black, 12 point Swiss Light style type.

Small-Craft Chart Covers-

The edition date shall be shown in the lower border of the front cover, 10.0 mm (0.4") to the right of the edition number, 5.0 mm (0.2") from the bottom edge of the cover. The edition date shall assume the following form:

JUNE 2014

The month of the edition date shall not be abbreviated. The year of the edition date shall be shown by all four digits, such as, 2014. The edition date shall print in the color of the cover photograph and in 12 point Swiss Light style type.

Small-Craft Folio Chart Pages-

The edition date shall immediately follow the edition number in the lower left corner of each page, outside of the chart border, using the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September would be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month and year of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space.

Small-Craft Pocket Fold Chart Cover Panels-

The edition date shall immediately follow the edition number, located above the publication note, which varies in location depending upon available space. The edition date shall assume the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September would be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month and year of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space.

Small-Craft Pocket Fold Chart Pages-

The edition date shall immediately follow the edition number in the lower left corner of each page, outside of the chart border, using the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September would be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month and year of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space.

Recreational Chart Covers-

The edition date shall immediately follow the edition number in the lower left corner, outside of the decorative border, using the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September would be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month and year of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space.

Recreational Chart Pages-

The edition date shall immediately follow the edition number in the lower left corner of each page, outside of the chart border, except for pages that are only included to display general information. The edition date shall assume the following form:

Jun. 2014

Except for the month of May, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month. For example, September would be abbreviated, Sep. Only the first letter of the month shall be capitalized. The month and year of the edition date shall print in black, 8 point Swiss Light style type. The year of the edition date shall be shown by all four digits of the calendar year, separated from the month of the edition date by a space.

1.4.5.3 <u>Print Date</u>:

In the past, edition dates were also known as print dates. Print dates were always the Saturday date of the last applied weekly NM, published by NGA, provided the application of all LNM, published by the appropriate USCG District(s), to the same date or a later date had been made. The date of the latest LNM was not indicated. Print dates included month, day of the month and the last two digits of the calendar year. This practice is no longer used and the term “print date” shall not be used to indicate an edition date.

1.4.5.4 Sales Agent Credit Symbol:
Revised on March 7, 2014 by Cartographic Order 003/14

Authorized NOAA Nautical Chart sales agents have historically been given a refund credit for unsold charts made obsolete by the issuance of a new edition. The agent was directed to return the portion of the lower left corner of unsold charts that contained the chart number, edition information and a 1.7 mm black square. As NOAA Nautical Charts will no longer be produced through the lithographic process, the sales agent credit symbol shall not be shown on any NOAA paper/raster nautical chart scheduled for a new edition after April 5, 2014.

1.4.5.5 Last Correction and Cleared Through Dates
Revised on March 7, 2014 by Cartographic Order 005/14

NOAA Nautical Charts plotted as print-on-demand charts (POD) or portable document format charts (PDF) shall display a last correction date and cleared through dates.

The last correction date is the date the last correction was made to the chart files. Cleared through dates represent the number and date of the latest LNM and the number and date of the latest NM checked before the files were made available for plotting. The cleared through date for Canadian Notices to Mariners shall also be shown in areas of overlap with Canadian territory.

The last correction date and cleared through dates are automatically populated by the CRIT database.

Example:

Last Correction: 2/21/2014. Cleared through:
LNM: 0714 (2/18/2014), NM: 0914 (3/1/2014)

Corrected Through Dates

Corrected through dates (not to be confused with cleared through dates) were used on NOAA Paper Nautical Charts (in all of its forms) and NOAA Raster Navigational Charts (RNC) to indicate the date of the latest NGA weekly Notice to Mariners and USCG Local Notice to Mariners through which the new edition had been evaluated. The corrected through dates for the most recent LNM and NM were sometimes weeks apart and were often different than the dates shown in the POD banner box.

Example of corrected through dates:

32nd Ed., May / 02 ■ Corrected through NM Apr. 20/02
Corrected through LNM Apr. 10/02
16666

Corrected through dates shall be deleted from update files as corrections are applied by the Update Service Branch. Any corrected through dates remaining shall be deleted by the appropriate raster production branch when preparing a chart for a new edition.

1.4.5.6 Notice to Mariners Caution Note
Revised on April 11, 2006 by CO 005/06

The Notice to Mariners Caution Note shall be applied to all charts. The note explains the dates through which NM corrections and LNM corrections have been made, and the availability of chart updates corrected from notice to mariners published subsequent to corrected through dates listed in the lower left hand corner of the chart. The Notice to Mariners Caution Note shall not refer to notice to mariners publications published by Canada or other foreign governments. The note shall print in 7 point Swiss Light style type, set 3.5 inches wide, in the color and preferred locations indicated below for each type of chart. There are no alternative versions of the text of this note.

Conventional Charts.

The note shall print in magenta, as follows:

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

Preferred Locations of the Notice to Mariners Caution Note on Conventional Charts:

First preference: along the lower margin of the chart, preferably 15 mm (0.6") to the right of the right edge of the "Corrected Through Dates" note, 2.5 mm (0.1") from the outside edge of the bottom chart border.

Second preference: along the lower margin of the chart, anywhere to the left of the centerline of the chart, but only if the first preference cannot be accommodated. The note shall be 2.5 mm (0.1") from the outside edge of the bottom chart border.

Third preference: in the title block area.

Fourth preference: inside the chart neatline, lower left corner.

Fifth preference: along the lower margin of the chart, anywhere to the right of the centerline of the chart. The note shall be 2.5 mm (0.1") from the outside edge of the bottom chart border.

Sixth preference: along the top margin of the chart.

Last preference: anywhere else on the chart.

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

Small-Craft Folio Chart Covers.

The Notice to Mariners Caution Note shall not be shown on small-craft folio chart covers.

Small-Craft Folio Chart Pages.

The note shall print in magenta, as follows:

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

Preferred locations of the Notice to Mariners Caution Note on small-craft folio chart pages:

First preference: In the title area on page B.

Second preference: In another prominent area on page B, if the first preference cannot be accommodated.

Small-Craft Pocket Fold Chart Cover Panels.

The Notice to Mariners Caution Note shall not be shown on small-craft pocket fold chart cover panels.

Small-Craft Pocket Fold Chart Pages.

The note shall print in magenta, as follows:

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

Preferred locations of the Notice to Mariners Caution Note on small-craft pocket fold chart pages:

First preference: In a prominent location on side B.

Second preference: In a prominent location on side A, if the first preference cannot be accommodated.

Recreational Chart Covers.

The note shall print in black, as follows:

CAUTION

This chart has been corrected from the Notice to Mariners (NM) published weekly by the National Geospatial-Intelligence Agency and the Local Notice to Mariners (LNM) issued periodically by each U.S. Coast Guard district to the dates shown in the lower left hand corner. Chart updates corrected from Notice to Mariners published after the dates shown in the lower left hand corner are available at nauticalcharts.noaa.gov.

Preferred location of the Notice to Mariners Caution Note on recreational chart covers:

Inside the lower left corner of the decorative chart border.

Recreational Chart Pages.

The Notice to Mariners Caution Note shall not be shown on recreational chart pages.

1.4.6 Revised Print and Revised Reprint

1.4.6.1 Revised Print

Historically, revised prints have been issued when changes or corrections of a minor character were made to a printing. A revised print included all changes published in the Notice to Mariners since the preceding issue of the chart.

The date of the revised print was added to the edition date and was charted thus:

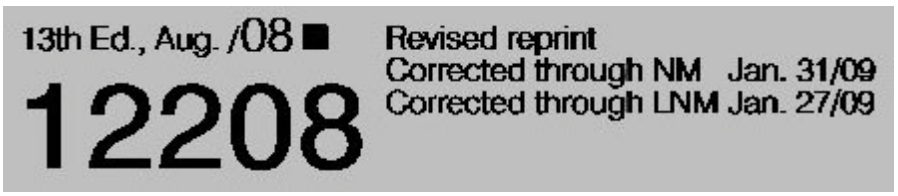
2nd Ed., Aug. 16/86; Revised Jan. 28/95

Revised prints were also known as new prints. This term became confused with the same term used for a lithographic copy of a new edition used for indicating corrections of a minor nature required for the next new edition, such as tint errors, difficult to read type, incorrect type sizes, etc. revised prints were rarely issued after the 1970's.

1.4.6.2 Revised Reprint

Revised reprint is the currently used term for what was formerly known as a revised print. A revised reprint is an internationally recognized term for a reprint that incorporates all LNM/NM since the current edition date and possibly amendments of no navigational significance, such as correcting a misspelling. Previous printings of the current edition will remain in force. A revised reprint will typically only be published when printed stock of the current edition is insufficient to cover existing or anticipated orders, but publication of a new edition is not warranted. Advance notification in LNM/NM, or elsewhere, of the issue of a revised reprint is not normally provided. The edition number and edition date in the lower left corner of the chart shall remain unchanged. The term, "revised reprint" shall be charted in black, 8 point Swiss Light style type, immediately to the right of the sales agent credit symbol. The corrected through dates (see Section 1.4.5.5) shall be moved down to clear the "revised reprint" type.

Example:



1.4.7 Reprint

Whenever the stock of a chart is depleted and the chart is reprinted without any revisions, the issue is called a reprint. A reprint is an exact duplicate of the current issue with no changes in printing or publication dates.

1.4.8 New Chart

A new chart is constructed to satisfy the needs of navigation in a particular area. It is laid out in conformity with a broad scheme to meet future needs in the adjacent areas and is designated by a number not assigned in recent years. New chart numbers are issued by NGA upon request. The area may have had no prior chart coverage at a given scale or the limits of an existing chart may require radical change. The new chart may cancel an existing chart. The edition date on which a new chart is first printed appears in the center of the upper margin of the chart as the first edition date, and remains there for the life of the chart, thus:

1st Ed., Mar. 2002

The first edition reference shall print in black, 6 point Swiss Light style type.

The first edition date may be immediately followed by a KAPP number. See Section 7.6.2.

1.4.8.1 Conversion of Two-Sided Charts

1. Edition Numbers

Selected two-sided charts are being converted to two separate one-sided charts. One side of the existing chart shall retain the current chart number and the other side shall be issued a new chart number. The assignment of a new chart number is predicated on requirements for print-on-demand charts. There is no substantive change in the associated graphic in terms of geographic limits, content, scale, etc.

The edition number for the next new edition of the chart retaining the current chart number and the chart assigned a new chart number shall be one edition number above the current chart edition number currently on issue.

Both the chart retaining the current chart number and the chart assigned with the new chart number at the time of printing shall have the same edition number.

EXAMPLE: Conversion of Chart 11329 - Edition Number

The current edition of Chart 11329 on issue is the 32nd, dated June 13, 1998.

For the next printing:

Side A of chart 11329 shall retain the original chart number - 11329, and consist of just one side without any references to side A.

The edition number of the next new edition shall be incremented to the 33rd edition in accordance with standard maintenance procedures.

Side B of chart 11329 shall be revised to the new chart number - 11325, and consist of just one side (the former side B of chart 11329).

The edition number of the next new edition (even though the first edition associated with this chart number) shall also be incremented to the 33rd edition.

2. First Edition Date

The date on which a new chart is first printed appears in the center of the upper margin of the chart as the first edition date (also commonly referred to as the 1st edition reference), and remains there for the life of the chart.

EXAMPLE: 1st Ed., Sep., 1960

The first edition note shall include the former or old chart number. This specification for all Marine Chart Division charts serves as an aid in relating the chart to older source records and the references listed under the old number.

EXAMPLES: Formerly C&GS 8252, 1st Ed., Feb., 1936 C1936-447

Formerly 101-SC, 1st Ed., 1959

Formerly LS 3, 1st Ed., 1852

SPECIFICATION: Based on requirements for print-on-demand charts, selected two-sided charts are being converted to two separate one-sided charts. One side of the existing chart shall retain the current chart number and the other side shall be issued a new chart number. When an existing chart number is changed, there must be a corresponding revision to the charted 1st edition reference.

The side of the chart being revised to a new chart number requires an additional modification to the charted 1st edition reference to preserve the uniformity and integrity of the referencing system. Consistent with prior specifications, the former NOS chart number and alphabetical letter designating the side of the chart shall be inserted into the existing 1st Edition Reference directly after the word "Formerly", e.g., Formerly NOS 99999B, ... A current example for chart 11329 is provided to illustrate the required changes.

The side retaining the current chart number does not require any changes to the 1st edition reference and meets the current specification.

EXAMPLE: Conversion of Chart 11329

For the next printing:

Side A of chart 11329 shall retain the original chart number - 11329, and consist of just one side without any references to side A.

This chart meets the current specification and no changes to the 1st edition reference are required.

Side B of chart 11329 shall be revised to the new chart number - 11325, and consist of just one side (the former side B of chart 11329).

Based on this revised specification, the existing 1st edition reference requires revision.

The currently charted 1st edition reference for side B of chart 11329 is:

Formerly C&GS 590, 1st Combined Ed. Mar. 1952 C-1933-389

After modification the resultant 1st edition reference for new chart number 11325 is:

Formerly NOS 11329B, C&GS 590, 1st Combined Ed. Mar. 1952 C- 1933-389

1.4.9 Reconstructed Chart
Last revised by Cartographic Order 01/2011 on August 8, 2011

When the accumulation of new information is sufficiently extensive to affect most of an existing chart, the chart may be completely recompiled on a new projection. This may also occur if there are changes to the chart limits. A reconstructed chart is issued as a new edition.

The first new edition of any paper or raster chart produced using NCSII shall be considered a reconstructed chart.

1.4.10 Provisional Chart

This is a special chart for which there is an urgent need. The chart is compiled from processed and approved source material. The label "PROVISIONAL CHART" is placed in two prominent locations on the chart in a manner that will require minimum restoration of charted detail when removed. Additional labels may be added if deemed desirable. The chart will retain the "provisional" label until all detail is charted.

Placement of this label shall be in the following order of preference:

1. On conventional charts

    a. Any prominent location in the upper and lower margin, preferably in opposite corners of the chart.

    b. Any prominent location inside the upper and lower border, preferably in opposite corners of the chart.

2. On small-craft charts

    a. On route charts, any prominent location within the chart along the base (bottom) and top on both sides.

    b. On folio and book charts, any prominent location on the cover.

1.4.11 Preliminary Chart

This is a chart for which there is a strong requirement, but of a region where some or all of the survey data does not meet modern standards. The deficiencies in surveys may be due to small scale, outmoded or nonstandard survey techniques, obsolete age, unprocessed or unapproved data, or other factors which cause the survey data to be below customary standards for the scale of the chart. A preliminary chart may or may not be published in full color. Included on the chart shall be a source diagram and a warning note stating that all or much of the hydrography shown on the chart is not of customary quality. Two examples of such warning notes follow:

WARNING
PRELIMINARY CHART

> All of the data on this preliminary chart is considered to be of marginal quality for modern charts. Many of the depths were taken by leadline in the early 1900's, so uncharted shoals are likely in this area. Navigators should use this chart with extreme caution and report discrepancies or hazards to the Director, Office of Coast Survey, (N/CS), National Ocean Service, NOAA, Silver Spring, Maryland 20910.

WARNING
PRELIMINARY CHART

> The soundings near Cape Jasper on this preliminary chart in the area of H-3012 and H-2462 are considered to be of marginal quality for modern charts. Continuous bottom profiles were not taken between soundings, and spacing between soundings is wide enough to allow hazards to remain undetected. Navigators should use this chart with caution and report discrepancies or hazards to the Director, Office of Coast Survey, (N/CS), National Ocean Service, NOAA, Silver Spring, Maryland 20910.

The label "PRELIMINARY CHART" shall be placed in two prominent locations on the chart in a manner that will require minimum restoration of charted detail when removed. Additional labels may be added if deemed desirable. The chart will retain the "preliminary" label until it is recompiled using processed and approved source material, all detail is charted, and all standard chart colors are shown.

Placement of this label shall be in the following order of preference:

1. On conventional charts

    a. Any prominent location in the upper and lower margin, preferably in opposite chart corners.

    b. Any prominent location inside the upper and lower border, preferably in

opposite chart corners.

2. On small-craft charts

a. On route charts, any prominent location within the chart along the base (bottom) and top on both sides.

b. On folio and book charts, any prominent location on the cover.

1.4.12 Section no longer exists.

1.4.13 <u>Overprint</u>

Overprints are used for additions, deletions, or revisions to existing charts. Overprints are most often used to correct a recently printed chart to avoid scrapping an entire press run. Usually the overprint will use standard chart colors, but on occasion, the color green will be used to call attention to the revision.

1.5 Interagency Coordination
Revised by December 30, 2013 Memorandum

USACE administers federal laws for the protection and preservation of the navigable water of the United States. The term "navigable waters" of the United States is defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (see 33 CFR 320.4).

Federal regulation of ocean waters is variously under the jurisdiction of the USACE, Bureau of Safety and Environmental Enforcement (BSEE), and other federal agencies. The term "ocean water" shall mean those waters of the open seas lying seaward of the base line from which the territorial sea is measured, as provided for in the Convention on the Territorial Sea and the Contiguous Zone (15 UST 1606; TIAS 5639).

The Departments of Commerce (of which NOS is a unit), Transportation (through the USCG), and Defense (DOD) have independent responsibility for carrying out extensive programs in support of ocean exploration and safety of marine navigation. The charting and related responsibilities of DOD and the USCG are delineated as follows:

1.5.1 Department of Defense

1. National Geospatial-Intelligence Agency (NGA)

Overall DOD mapping, charting, and geodetic policies are set by the NGA headquarters. The National Geospatial-Intelligence Agency (NGA) produces nautical charts and related navigational publications required by the DOD for areas outside of NOS responsibility. Overlap coverage exists where foreign water areas are contiguous with those of the United States. NGA produces several "limited distribution" charts containing berthing or military information strictly for naval use. It also overprints NOS charts with operational information.

NGA also publishes weekly Notices to Mariners (NM) that contain information needed to keep charts accurate and current. NOS contributes items for publication in the NM and reviews written by NGA prior to including them on NOS charts. NGA also supplies LORAN information for NOS charts.

2. U.S. Naval Oceanographic Office (NAVOCEANO)

Within DOD, NAVOCEANO conducts hydrographic surveys outside of the area of NOS responsibility to provide naval operating forces with marine environmental data needed to effectively operate U.S. ships and weapons systems and to provide for the security of the nation.

Unclassified data developed by NAVOCEANO, such as charts and atlases of foreign waters, are made available to the merchant marine and to the oceanographic community.

3. U.S. Army Corps of Engineers (USACE)

The USACE needs marine environmental data to plan, design, construct, operate, and maintain nonmilitary projects. USACE work is principally in national and territorial harbor or harbor approach areas, in areas of coastal erosion, and along intracoastal and inland waterways.

While the NGA publishes charts of foreign areas, coverage of national waters is divided between NOS and the USACE. Mapping and charting of the Great Lakes, Lake Champlain, and the St. Lawrence Seaway and River became the sole responsibility of NOS in October 1970 when the U.S. Lake Survey District of the USACE was merged with the NOS at the time of the formation of NOS.

The USACE submits copies of its hydrographic surveys, channel depth reports, navigation bulletins, project plans, and other relevant studies to the NOS Marine Chart Division (MCD). The USACE also furnishes copies of permits for construction or dredging that affect NOS charts, furnishes clearance data for overhead cables, confirms NOS charting of submarine pipelines and cables in inshore waters, and furnishes positions of aids to navigation. In return, MCD relays reports of shoaling, obstructions, and other pertinent items to the USACE districts.

NOS is responsible for compiling nautical charts of the harbors and coastal and offshore waters of the conterminous United States, Alaska, Hawaii, and territorial waters. However, both the USACE and NOS are authorized to publish maps, charts, and related publications covering the Nation's inland waters. Policies and procedures for disseminating navigation and chart data have been developed to achieve coordination between the two agencies and to avoid duplication.

1.5.2 U.S. Coast Guard (USCG)

MCD furnishes the USCG with accurate positions of aids to navigation. This information originates from both USACE and NOS sources. USCG District Offices issue this information in LNM and in the Light Lists. The LNM also provides up-to-date foreshore information. The data are published frequently and continued coordination is required between the agencies to clarify or confirm data. The USCG is the source for bridge clearance information, and it routinely furnishes information on areas where bottom changes indicate the need for new surveys and submits requirements for chart improvements.

1.5.3 Other Coordination

NOS provides consultant services to other federal agencies, states, local governments, and the public in matters pertaining to agency specialization covering high-order surveying, earth sciences, and physical oceanography. Among these services are the furnishing of technical advice and assistance in regard to the demarcation of shore and sea boundaries; the use and interpretation of NOS hydrographic, topographic, and geodetic surveys of coastal waters and the adjacent shore spanning more than a century and a half; and special instruction and training in surveying and charting techniques to personnel from other government agencies and to members of engineering and scientific organizations.

In addition to the sources mentioned above, NOS routinely receives chartable data from more than 60 other sources, including the U.S. Geological Survey (USGS), National Park Service, Bureau of Reclamation, Federal Aviation Administration, Soil Conservation Service, and BSEE.

NOS submits edited copies of charts of the International Rapids Section of the St. Lawrence River (charts 14761-14768 and 14770-14774) to the St. Lawrence Seaway Development Corporation and charts that cover the surveying and charting operations overlap of U.S.-Canadian waters in the Great Lakes (charts 14761-14768, 14770-14774, 14781, 14800, 14802, 14806, 14810, 14816, 14820, 14823, 14826, 14828-14830, 14832-14833, 14842, 14844, 14848, 14850, 14852, 14854, 14860, 14862, 14865, 14880, 14882-14884, 14960-14962, 14968, and 14982-14999) to the CHS, Central Region, Burlington, Ontario, for their review and comment prior to the publication of the chart. In addition, copies of new charts are submitted to the appropriate USACE District and the CHS regions for review and comment prior to publication.

1.5.4 Interagency Agreements

Interagency support and exchange of information is sometimes detailed in the Code of Federal Regulations for the particular agency involved. Separate agreements may be negotiated between agencies for more comprehensive details or to cover new items.

1.6 International Coordination

1.6.1 International Hydrographic Organization (IHO)

Much of the coordination of the hydrographic surveying and nautical charting requirements of international users is accomplished through the work of the International Hydrographic Bureau (IHB) and its 55 member countries called the International Hydrographic Organization (IHO). For example, the safety and defense of U.S. interests in this country and abroad depend to a great extent on the immediate availability of reasonably authoritative nautical charts of waters foreign to the United States. Since DOD cannot survey and chart all foreign waters, NGA has entered into reciprocal agreements with numerous foreign maritime nations, 27 to date, to produce "modified facsimiles" of charts from reproducibles furnished by these countries. (These are facsimiles on which the language, symbols, etc., have been modified by NGA for use by Americans.) This is in agreement with international coordination promoted by IHO Technical Resolution A 3.4. NOS reciprocates by furnishing chart reproducibles to these same countries upon their request and at no cost.

Prior to formation of the IHO, representatives of the world maritime countries held conferences in Washington, D.C., in 1899 and St. Petersburg, Russia, in 1912 in an attempt to achieve a degree of uniformity in hydrography. In London, in 1919, representatives of 24 nations convened at the first International Hydrographic Conference. The IHB was subsequently founded in 1921 by 19 member countries, and Monaco was selected as the location of the headquarters.

The name IHO was adopted in 1970 along with a convention of regulations to provide an organization with international legal status and recognition. Since then, the term IHB has been used to represent the headquarters and administrative staff of the organization at Monaco.
The goals of the IHO are as follows:

1. The coordination of the activities of national hydrographic offices;

2. The greatest possible uniformity in nautical charts and documents;

3. The adoption of reliable and efficient methods of carrying out and exploiting hydrographic surveys;

4. The development of the sciences in the field of hydrography and the techniques employed in descriptive oceanography; and

5. The promotion of measures aimed at establishing or strengthening the hydrographic capabilities of developing countries.

The work of the IHB is promulgated through the following publications:

1. The biannual International Hydrographic Review containing professional articles on hydrography and related subjects;

2. The monthly International Hydrographic Bulletin containing information of current hydrographic interest;

3. An annual yearbook; and

4. Chart specifications, survey standards, and other special publications on definitive works in hydrography.

IHB also sponsors International Hydrographic Conferences every 5 years at which delegates meet to review previous programs of the IHB and to plan for future programs. Regional Hydrographic Conferences are also conducted in the interim.

1.6.2 United States - Canada Hydrographic Commission

The United States and Canada have enjoyed both formal and informal cooperation in surveying and charting activities of mutual interest over a long period of time.

The U.S.-Canada Hydrographic Commission has the following objectives:

1. Coordinating the hydrographic operations of NOS and the CHS where the surveying and charting operations of U.S.-Canadian domestic waters overlap, or where improved efficiency could be attained through bilateral cooperation of survey effort;

2. Achieving maximum compatibility, uniformity, and interchangeability of all marine charts and related navigational publications produced by both agencies; and

3. Providing for the free exchange of unclassified nautical charts, publications, reproduction materials, field survey data, and related information necessary for an efficient and effective nautical charting program designed to provide maximum safety of marine navigation.

Three regional Charting Advisors Committees (for the Northeast Pacific, Great Lakes, and Atlantic Coast) coordinate the surveying and charting requirements and operational plans of the two countries in the border waters. Matters of concern include coordination of the planning and implementation of hydrographic surveys; chart production, including the specifications for chart schemes and formats; revisory surveys and chart maintenance; tidal and current surveys, water level gauging, and associated publications; establishment and maintenance of horizontal and vertical control; and sailing directions/pilots.

In addition, a Chart Standards Committee is responsible for ensuring maximum compatibility of the nautical charts produced by the two nations.

An example of productive cooperation between the two countries is the routine updating of six NOS charts by the CHS. A positive copy (SBM7) of the combined black and (screened) magenta of each New Edition of charts 14848, 14850, 14852, 14882, 14883, and 14884 is revised by the CHS, Central Region, Burlington, Ontario, from Canadian sources not available to NOS.

1.6.3 Other International Coordination

NOS also works closely with various other multinational organizations, such as the following:

1. International Maritime Organization (IMO)

The International Maritime Organization (IMO), formerly the Intergovernmental Maritime Consultative Organization (IMCO), is the agency of the United Nations concerned with maritime affairs.

U.S. participation in IMO is coordinated by the Department of State (DOS). Private sector input is solicited by DOS-sponsored Shipping Coordinating Committee (SCC); its 6 subcommittees and 10 working groups advise U.S. delegations to IMO meetings and conferences on the action to take on maritime matters.

NOS is closely involved in certain actions of the SCC's Subcommittee on Safety of Life at Sea (SOLAS), Working Group on Safety of Navigation, which the USCG chairs. NOS input primarily concerns the establishment and adjustments to vessel traffic separation schemes and other vessel routing measures. This includes evaluating existing hydrographic data and recommending new surveys. Also of interest is SOLAS' work on the 1972 International Regulations for Preventing Collisions at Sea (COLREGS), requirements concerning vessels carrying of charts, position fixing systems, search and rescue procedures, ships' mechanical and electronic requirements, and requirements concerning visibility from the bridge of a ship. NOS/USCG/NGA interactions are conducted by MCD.

Since its first assembly in 1959, IMO has produced some 30 conventions and protocols, the majority of which are now in force. Its most well-known convention is the 1972 Convention on COLREGS. These navigation rules apply to all vessels upon the high seas and in most connecting waters navigable by seagoing vessels.

1.7 Chart-Related Publications

The following is a list of publications that are used as a source or reference in the compilation of nautical charts.

1.7.1 Notice to Mariners (NM)

The NM, issued weekly by NGA, is prepared jointly with input from NOS and the USCG. The NM, a public information announcement of primary interest to navigators of deep-draft vessels, presents important matters affecting navigational safety, changes to channels, navigational aids, and other information for updating the nautical charts and publications produced by these agencies. NOS also prepares chartlets (revised, page-sized, black-and-white portions of nautical charts) for inclusion in the NM when the changes being announced are too extensive or detailed to be described as a text item.

1.7.2 Local Notice to Mariners (LNM)

The LNM, issued by each USCG district to disseminate important information affecting navigational safety within the district, includes data compiled by NOS. Since information on waters not navigable by oceangoing vessels, as well as temporary changes to published data that are known or expected to be of short duration, is not included in the weekly NM, the appropriate LNM may be the only source of such information. Small-craft owners using intracoastal and other waterways and small harbors that are not normally used by oceangoing vessels require the LNM to keep charts and related publications up to date. As with the weekly NM, NOS prepares chartlets when the changes being announced are too extensive or detailed to be described as a text item.

1.7.3 Chart No. 1

Chart No. 1, Nautical Chart Symbols and Abbreviations and Terms, is a NOS-produced publication prepared with the assistance of NGA which lists most of the symbols and abbreviations used on U.S. nautical charts. It also includes many definitions and other valuable data helpful in understanding NOS nautical charts and USCG navigational aids. Terms, symbols, and abbreviations are numbered in accordance with a standard format recommended by IHO.

1.7.4 Chart Catalogs

Revised on June 2, 2003 by CO 013/03

Nautical chart catalogs, produced and maintained by NOS, briefly describe each chart and other nautical publications NOS produces, authorized chart agents, and other information pertinent to selecting and ordering the publications. Chart coverage of the coastal waters of the U.S. and its territories is identified in a set of five nautical chart catalogs that includes the U.S. Atlantic Coast, including Puerto Rico and the Virgin Islands; the U.S. Gulf Coast, including Puerto Rico and the Virgin Islands; the U.S. Pacific Coast, including Hawaiian, Mariana and the Samoa Islands; Alaska, including the Aleutian Islands; and the U.S. Great Lakes and Adjacent Waterways. The bar code/stock number will refer to them as A, G, P, K, and L.

1.7.5 Coast Pilot Publications

1.7.5.1 United States Coast Pilot

The "United States Coast Pilot," in nine volumes, is a series of nautical books that cover a wide variety of information important to navigators of U.S. coastal and intracoastal waters and waters of the Great Lakes. Much of this book information cannot be shown graphically on the nautical charts and is not readily available elsewhere.

1.7.5.2 Distances Between United States Ports

"Distances Between United States Ports" is another publication relating to the marine world. This publication presents in tabular format the distances between many U.S. ports and between.

Effective immediately all extended maintenance cycle charts listed below, shall have the currently charted Updating Service note removed as per this cartographic order.

12-Year Nautical Updating Service Charts

16041	16082	16124	16441
16042	16083	16200	16442
16043	16084	16204	16446
16044	16085	16206	16462
16045	16086	16381	16463
16046	16087	16382	16474
16061	16088	16421	16475
16062	16101	16430	16476
16063	16102	16431	16477
16064	16103	16432	16478
16065	16104	16433	16484
16066	16121	16434	16486
16067	16122	16435	16487
16081	16123	16436	16490

8-Year Nautical Updating Service Charts

16300	16516	16535	17314
16322	16517	16547	17336
16323	16518	16549	17337
16343	16521	16551	17341
16363	16522	16568	17362
16501	16528	16591	17363
16511	16529	16599	17365
16513	16530	16762	17381
16514	16531	17301	17404
16515	16532	17313	17406

U.S. ports and Canadian ports in the Great Lakes. It is republished as required.

1.7.5.3 Coast Pilot Manual

The "Coast Pilot Manual" is a working guide for Coast Pilot personnel for the compilation and publication of the Coast Pilot publications. It is also a guide for other NOS personnel, including hydrographic and photogrammetric field parties, and others assigned to Coast Pilot field inspections, in making field observations and preparing reports from the field to update Coast Pilot publications. It is republished as required.

1.7.6 Tidal Publications

Tide tables are published annually by NOS to give the predicted times and heights of high and low waters for each day in the year for approximately 200 of the most important harbors which are designated as reference stations. The tables also include a limited amount of astronomical data. In addition, they contain tidal differences and factors for interpolating tidal predictions at thousands of subordinate stations. These subordinate stations are each tied to one of the reference stations so that predicted times and heights of high and low waters can be calculated for numerous coastal areas of only local importance. The range of the tide and mean tide level are also published for each of these subordinate stations.

Tide tables are available for the following regions:

1. East Coast of North and South America, including Greenland;
2. West Coast of North and South America, including the Hawaiian Islands;
3. Europe and the West Coast of Africa, including the Mediterranean Sea; and
4. Central and Western Pacific Ocean and the Indian Ocean.

1.7.7 Tidal Current Publications

1. Tidal Current Tables

These are published annually by NOS to provide predicted times of slack or minimum currents for each day of the year at 54 places located around the Atlantic Coast of North America, the Pacific Coast of North America and Asia, as well as data for predicting currents at approximately 2,400 subordinate stations in these areas. The two volumes of tables also furnish average speeds and directions for maximum floods and ebbs and provide data for computing the velocity of the current at any time and the duration of slack water or minimum current. Descriptions and predictions for selected locations of rotary currents, observed velocities, the mean position of the Gulf Stream, tidal current direction deviations due to wind conditions and types of combination currents are also provided in the tables, together with a limited amount of astronomical data for the edition year.

2. Tidal Current Charts

These graphically represent tidal currents in selected bays and harbors of the United States. Each of the 12 tidal current chart series consists of a set of 12 or 13 charts (pages) which depict, by means of arrows and figures, the direction and speed of the tidal for equal intervals of the tidal cycle. They are used in conjunction with the annual tidal current tables, except for the Narragansett Bay chart which is used with the tide tables.

3. Tidal Current Chart Diagrams

This is a series of 12 monthly diagrams covering selected areas such as Long Island and Block Island Sound, Boston Harbor, Upper Chesapeake Bay, and New York Harbor. The diagrams are used with the corresponding tidal current charts to determine tidal current predictions in the area.

1.7.8 Coastal Zone and Continental Shelf Products
Revised by December 30, 2013 Memorandum

1. Offshore Oil and Gas Lease Maps

These are small-scale nautical charts overprinted in red with data obtained from BOEM of the Department of Interior to show offshore oil and gas lease areas and blocks. They are useful for planning purposes because they show block leases for extensive areas, whereas the official BOEM diagrams depict only small areas. The Offshore Oil and Gas Lease Maps series presently includes the following: 1113-A, Havana to Tampa Bay; 1114-A, Tampa Bay to Cape San Blas; 1115-A, Cape St. George to Mississippi Passes; 1116-A, Mississippi River to Galveston; and 1117-A, Galveston to Rio Grande.

2. Geophysical Maps

Geophysical maps are no longer produced.

1.7.9 Section no longer exists.

1.7.10 Nautical Updating Service
Revised on March 29, 2006 by CO 006/06

A Nautical Updating Service was begun in 1975 for certain NOS charts on either an 8 or 12-year maintenance cycle and covering areas of little change. This particular service has been discontinued and the note removed from the affected charts.

1.7.10.1 NOAA's New Update Service for Notice to Mariners

NOAA's new Update Service for Notice to Mariners was established in 1996 and replaced the former Nautical Updating Service. This new service provides access to updated raster nautical charts (RNCs), electronic navigational charts (ENCs), print-on-demand paper charts (POD) and the MCD Chart Updates database. This new Update Service for Notice to Mariners can be accessed at the Office of Coast Survey (OCS) web site: http://nauticalcharts.noaa.gov.

1.7.11 Nautical Training Charts

Nautical training charts are outdated nautical charts used for educational purposes in training classes for small-boat operators. The following training charts are currently available: 39 TR, West End of Lake Erie; 116-SC TR, Long Island Sound; 1210 TR, Martha's Vineyard to Block Island; 12221 TR, Chesapeake Bay Entrance; 12354 TR, Long Island Sound-Eastern Part; 13205 TR, Block Island Sound and 18465 TR, Strait of Juan de Fuca-Eastern Part. Relevant pages of symbols and abbreviations from Chart No. 1 are printed on the reverse side of some of the training charts.

1.7.12 By Products and Services

Many spin-offs accrue from the national charting program. Although these by-products and services are not used for navigation, government agencies and industry use them for planning and designing offshore engineering projects and for offshore resource exploration and development activities. The most important of the by-products are these:

1. Topographic surveys and planimetric shoreline maps
2. Aerial photographs
3. Hydrographic survey smooth sheets
4. Graphic depth records
5. Descriptive reports
6. Sedimentology samples and data.
7. Geodetic surveys
8. Leveling networks
9. Tide and current data

1.8 Repository

The NOS archive contains all of the original field surveys made by NOS over the years. This archive (commonly called the "vault" because it is a securable area) is maintained by the Data Control Section of the Hydrographic Surveys Division (HSD) of NOS.

Hydrographic, planetable, and photogrammetric surveys of the coastal areas have been used to produce and maintain nautical charts since 1834. Over 26,000 individual surveys are now on file. Because of the need for chart maintenance, many areas along the coast have been surveyed several times. These resurveys represent a unique and comprehensive record of the Nation's coastline and the adjacent waters over an extended time period, including changes resulting from both natural and man-made causes. These records are used extensively by the public and by other Government agencies for research, engineering, and development purposes. They are often referred to in property disputes where the shoreline represents a boundary, and certified copies are frequently presented as evidence in the courts.

Hydrographic and topographic surveys are made and registered separately. Hydrographic surveys are identified by a number with the prefix "H," "FE," "D," or "WD." Topographic surveys or photogrammetric shoreline maps are identified by a number with the prefix "T" or "TP". Hydrographic and topographic surveys of the Great Lakes completed prior to the closing of the Lake Survey Center in 1976 are combined on a single sheet and are identified by a number with the prefix "I."

Both hydrographic and topographic surveys are indexed on a separate set of full-sized, chart-based diagrams and are color coded and tabulated to give information on the survey registry number and type, chief of the survey party, scale, and date of survey. Indexes for hydrographic and topographic surveys to about 1970 are available in 8½"x11" size. The approximate area covered by any individual hydrographic or topographic survey is shown on the diagrams. The area of coverage varies depending upon chart needs at the time of the survey. From 1835 to 1927, practically all of the topographic surveys were made by planetable, and these original planetable sheets are also filed in the archive. Photographic reproductions of surveys are usually made on a fast print paper coated with silver bromide emulsion and are positives (black lines and figures on a white background). Photographic reproductions can also be made on stable-base media at a higher cost. A Descriptive Report describing survey details is available for most surveys.

1.9 Foreign Copyright Claims

The following note shall be shown on all charts depicting an international boundary or any foreign territory:

COPYRIGHT

No copyright is claimed by the United States Government under Title 17 U.S.C. However, other nations may claim intellectual property rights on the compilation of data depicting the foreign waters on this chart.

The following text shall be included under "NAUTICAL CHARTS" in Chapter 1 of all United States Coast Pilot volumes that describe U.S. waters adjacent to international boundaries:

Chart Copyright. - No copyright is claimed by the United States Government under Title 17 U.S.C. However, many NOS nautical charts cover the boundary waters of the United States and depict our international borders. In the interest of navigational safety, the charted features do not stop at the border, but continue into the foreign territory. In most instances, the information about the charted features in foreign territories is provided by foreign hydrographic offices following the provisions of the International Hydrographic Organization. In these instances, other nations may claim intellectual property rights on the compilation of data depicting the foreign waters shown on NOS charts.

1.10 Electronic Navigational Charts (ENCs)

In 1997, the Marine Chart Division began creating a digital vector database of selected nautical chart features. The purpose of this database is to provide highly accurate and current vector data for the production of electronic navigational charts. These electronic navigational charts or ENCs, are being produced in accordance with the International Hydrographic Organization Transfer Standard for Digital Hydrographic Data Publication S-57,(current edition 3.0); and are intended for use in commercially available Electronic Chart Display and Information Systems (ECDIS).

An electronic navigational chart has been defined by the International Hydrographic Organization as a database which:

- **is standardized as to content, structure and format,**
- **is issued for use under the authority of government-authorized hydrographic offices; and,**
- **meets the International Maritime Organization (IMO) Performance Standards for use with [an] ECDIS**

ENCs differ from raster charts primarily because of the "smart data" concept. Whereas raster charts are merely a pixel image of a nautical chart, the database behind an ENC will permit a mariner's navigational system to provide the appropriate warnings and information that are based on both the ENC data and the ship's own characteristics.

The Marine Chart Division, in recognizing the need to currently and efficiently maintain its two production systems, has assigned to the Cartographic Standards Group the responsibility of incorporating into the Nautical Chart Manual:

those procedures to be performed in the raster production branches in support of ENC production efforts, and,

the ENC Extraction Specification containing the procedures (in accordance to S-57 requirements) in which the data for ENCs is to be collected and attributed.

The ENC Extraction Specification will apply to ENC production only.

It must be noted that the ultimate goal of the Marine Chart Division is to incorporate the LAMPS2/ENC production system throughout the division and have each cartographer produce from this one technical system, both an ENC and its respective raster counterpart. At present, however, the operation of the raster and ENC production systems are two very distinct and diverse processes which result in MCD personnel acquiring specific knowledge of either one or the other's chart compilation requirements.

It is now a goal of the Cartographic Standards Group to identify those comparable requirements which may support both the raster and ENC compilation processes, eliminate the dual examination of source documents and promote a timely and efficient application of charting information by cartographers operating both systems.

NAUTICAL CHART MANUAL – VOLUME 1 – POLICIES AND PROCEDURES

CHAPTER 2 – GENERAL PRACTICES AND PROCEDURES

U.S. Department of Commerce
Office of Coast Survey

2 GENERAL PRACTICES AND PROCEDURES
Revised by July 12, 2000 Memorandum

2.1 Organization and Responsibilities

The primary responsibility for nautical chart production is vested in the Office of Coast Survey (OCS). Source data used in chart production is also received from the National Geodetic Survey (horizontal and vertical control), Center for Operational Oceanographic Products and Services (COOPS)(tidal data and tide tables), Office of Marine and Aviation Operations (OMAO)(hydrographic surveys); and outside of NOS, the National Environmental Satellite, Data, and Information Service, a unit of NOAA (magnetic data).

OCS is responsible for providing basic maps, charts, publications, and other specialized data required for safe marine navigation.

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2.2 Production Scheduling

Ideally, the existing stock of the chart would be on the verge of depletion when a New Edition of that chart is printed. The nautical charting program attempts to strike a balance between running out of charts and throwing away numerous copies of obsolete editions. To this end, the production manager prepares an annual charting plan. The plan takes into account charting priorities set by the production manager and production branches and current funding restraints. After the plan is approved by management, it constitutes the basic charting program for the year.

This is a flexible schedule that is examined at least once a year and modified as new requirements are identified and available resources are evaluated.

Administrative data which can alter the annual charting plan may come from a variety of sources:

1. Production Branches

In the daily examination and application of cartographic data received, the production branches may recommend extending or shortening the printing cycle of a chart or printing a chart ahead of schedule because of excessive corrections.

2. Quality Assurance, Plans and Standards Branch (QAPSB)

Quite often the issuance of Cartographic Orders and directives by QAPSB calling for the implementation of new procedures or techniques can result in significant increases to the annual workload, especially if changes to symbols are required. Major charting actions resulting from NGA requirements for national defense, user surveys, and examinations for in-house efficiencies, may also affect scheduling.

3. Nautical Data Branch (NDB)

The charting schedule can be altered based on notification by NDB of the anticipated arrival of new revision data, e.g., new aids to navigation projects or new harbor construction projects.

4. Distribution Branch

The Distribution Branch may request revisions to the printing schedule based on stock inventory.

5. Remote Sensing Division (RSD) and Hydrographic Surveys Division (HSD)

Chart scheduling depends on timely completion of surveys by these two divisions.

6. U.S. Coast Guard (USCG)

The USCG can affect the charting program by making extensive changes to aids to navigation.

7. National Geospatial-Intelligence Agency (NGA)

NGA has the largest effect on the charting program because its sudden high-priority requirements for New Charts must be met.

8. Coast and Geodetic Survey Management

The charting schedule can be altered by decisions of management to meet special NOS requirements or objectives.

9. Other Federal Agencies or Non-Federal Sources

Other sources may make charting demands (sometimes through Congress) requiring prompt action.

2.3 Sources of Cartographic Data

Charting material consists principally of topographic and hydrographic surveys made by NOS, supplemented by miscellaneous surveys and textual information provided by other organizations. All material must be critically examined, with particular attention directed to the actual date of the survey, geographic datum, depth unit, plane of reference, purpose and quality of the survey, and whether it is an original source or from another compilation, e.g., a Canadian chart or USGS quadrangle map. **The latest information does not necessarily supersede all earlier data.** In areas not subject to extensive changes, well-controlled hydrographic surveys of other organizations should be considered along with the basic NOS surveys. In areas undergoing constant and extensive change, only the latest information should be used. In regions where some areas undergo rapid change while other areas do not, partial supersession of the various surveys may be necessary. The proper acceptance, rejection, and coordination of available information constitute the supreme test of the cartographer's skill, since lives and property damage in the millions of dollars are at stake. In particular, shoal soundings over obstructions or rocks must not be deleted without convincing proof that these dangers have been removed or are nonexistent.

The original source material is to be used in the compilation of New Charts and in correcting existing charts. Large-scale charts that have been corrected from original source material in turn become the source material for small-scale charts. In this case, the original source material is referred to only where necessary to check questionable information.

Cartographers should not hesitate to initiate an inquiry through their Branch Chief whenever information is lacking or when existing information requires checking.

Original source material is retained in the NDB until it is microfilmed for permanent storage. Original Chart Letters and Blueprints are usually discarded after microfilming. Microfilm copies of discarded source material are available for reference and research.

All available sources of information should be used in the construction of a chart. These sources include the military and other federal government agencies, state and local agencies and private organizations.

A partial listing of sources of cartographic data follows:

2.3.1 Military Sources

1. U.S. Army Corps of Engineers:
   - Harbor improvement projects
   - Channel maintenance surveys
   - Channel tabulations
   - Annual Reports
   - Port Series publications

Project Maps (in book form)
Construction permits
Cable clearances
Intracoastal Waterway maps
River and inland waterway maps
Navigation regulations
Dumping grounds, disposal areas, and spoil areas
Danger zones and restricted areas
Pipeline areas

2. U.S. Coast Guard:
   Local Notice to Mariners
   Light Lists
   Anchorage areas
   Rules of the Road
   Bridge clearances and regulations
   Traffic Separation Schemes (TSS)
   Vessel Traffic Service (VTS) Areas

3. National Geospatial-Intelligence Agency:
   Weekly Notice to Mariners
   LORAN data
   NGA reference number
   Surveys and charts
   Fleet Guides, Sailing Directions, etc.

2.3.2 Other Federal Sources

1. NOAA/Office of Coast Survey/National Ocean Service:
   Hydrographic surveys
      Basic, Wire Drag, Navigable Area, Field Examination
      Chart Evaluation Surveys
   Photogrammetric surveys
   New Aeronautical and Nautical Charting Investigations (NANCI)
   Geodetic surveys
   Aeronautical charts
   Tides and currents
   Geographic names
   Coast Pilot inspections

2. U.S. Geological Survey:
   Topographic Quadrangles

3. St. Lawrence Seaway Development Corp.
   Seaway regulations

4. Environmental Protection Agency:
   Ocean dump sites

5. U.S. National Park Service:
   Park and reservation boundaries

6. State Department:
   Maritime limits

7. NOAA/National Weather Service:
   Weather Warning Maps

8. NOAA/National Marine Fisheries:
   Marine sanctuaries

9. National Archives:
   Code of Federal Regulations

10. NOAA/National Environmental Satellite, Data, and Information Service:
    Magnetics

2.3.3 State and Local Sources

1. Park and reservation boundaries
2. Local regulations
3. Port authorities

2.3.4 Private

1. U.S. Power Squadrons Cooperative Charting Program
2. U.S. Coast Guard Auxiliary Chart Updating Program
3. Private reports and queries
4. Pilots associations
5. Lake Carriers' Association
6. Fishing associations
7. Marina owners
8. Publishers (Waterway Guide and others)

2.3.5 Foreign and International Sources

1. Canadian Sources:
   Canadian Hydrographic Service
   Canadian Coast Guard

Notice to Mariners
List of Lights, Buoys, and Fog Signals
Dominion Marine Association
St. Lawrence Seaway Authority of Canada

2. Other Sources:
   United Kingdom Hydrographic Department
   International Maritime Organization Regulations
   International Hydrographic Organization Chart Specifications

2.3.6 Adopt-A-Chart Program
Revised by March 14, 2002 Memorandum

An acknowledgment note shall be added to selected nautical charts being monitored by members of the United States Power Squadrons (USPS) through the Cooperative Charting Adopt-A-Chart Program. This program is designed to resolve charted discrepancies and give recognition to participating USPS units. The note shall be revised to indicate the appropriate Power Squadron and District. The selected nautical charts will be documented in Chart Letters and noted on the Nautical Chart Standard.

ACKNOWLEDGMENT

The National Ocean Service acknowledges the exceptional cooperation received from members of the Xxxxxxxxx Power Squadron, District X, United States Power Squadrons, in continually providing essential information for revising this chart.

The note shall be printed in black, 7 point Swiss Light type and placed near the title block if possible. The second preference shall be outside the border at the bottom of the chart.

2.4 Cartographic Revision

Cartographic data from any source (see Section 2.3) may require revisions to the chart.

2.4.1 Registration and Screening of Data

All cartographic source documents received by NOS (except NM) are evaluated first by NDB before being registered for entry into the nautical charting system. Additional information is requested for incomplete reports, and useless information is discarded. Registration consists of assigning a unique identification number to each document, indexing the document on the appropriate chart Standards, and cross-referencing it to previously received documents.

After a source document is registered, NDB screens it for appropriate charting information. If the document contains no appropriate charting information, it is marked as "HISTORY" on the chart standard and the document is archived. If the document does contain usable information, it is forwarded to the production branches for further processing.

2.4.2 Evaluation for Critical Information

When the production branches receive a document, it is immediately examined for critical information. If a hazard to navigation is found, the data is immediately applied to all affected charts. The production branches evaluate the data and, if appropriate, write up the item for publication in the NM or the LNM. If the corrections are extensive, a reproducible page-size chartlet is made, reproduced, and forwarded to NGA and/or the USCG district for inclusion in the NM and/or LNM, as appropriate. See Section 4.2.4 for more information concerning how reports of dangers to navigation are handled. The source is then filed until the affected charts are scheduled to be updated for printing.

The Update Service Branch examines the USCG's LNM and NGA's weekly NM immediately on arrival to determine chartable items. They are applied to copies of the digital files and reviewed similarly to the application of other source data. Channel tabulations are prepared by examining channel surveys (blueprints and digital files) and tabulation letters.

2.4.3 Application of Data
Revised on July 23, 2002 by CO 012/02 and on August 13, 2015 by CO 003/15

MCD releases source information to the ENC, RNC, PDF, and Print on Demand (POD) products. This change only applies to products produced from the NCSII production system and on products that contain only one set of files (one WIP) that have not yet been loaded into the NIS. This change provides mariners with more timely information that in the past was not made available until a new edition was released.

CRIT	(Acronym for "Aids to Navigation Critical Corrections"). The official Marine Chart Division aids to navigation history of cartographic work; a database, begun in 1987, which incorporates the aid to navigation changes reported in United States Coast Guard Local Notices to Mariners and the National Geospatial-Intelligence Agency Notice to Mariners and Canadian Notice to Mariners. It also includes updates affecting hazards to navigation, channel tabs, bridge and cable clearances, and regulatory changes that are identified by MCD cartographers.
Continual Maintenance (CM)	All non-critical source applied to the nautical chart suite of products. Hydrographic and shoreline surveys are two CM sources, but there are also many others.

Before the scheduled new edition of the chart, a cartographer retrieves all unapplied source data, evaluates them, resolves any discrepancies, and applies them to the digital chart files. If source data are found to be inadequate for charting, they are returned to NDB, which will attempt to obtain additional information.

Cartographers apply both critical and noncritical source data to the digital chart files using the following application process: Required horizontal and vertical datum conversions shall be computed and applied, and source material shall be converted. Revisions shall be applied to the digital chart files, working from one chart to the next through progressively decreasing scales. The source and disposition shall be recorded on each chart history for each item applied (see Section 2.13). Supportive services may be requested from RSD, HSD, or CSG. The compiler's application of all source material shall be reviewed by a senior cartographer reviewer for accuracy, completeness, legibility, and general appearance. Applications may not be reviewed by the cartographer making the application.

Before charts are posted as new editions the production branches must make certain that all current source material has been applied, all cartographic policies and procedures have been taken into consideration, and magnetic variations and tide boxes have been updated, if necessary. The current edition of the chart should be referenced to ensure that no land, intertidal, depth area or other tints have mistakenly been changed or deleted. Cartographers should make frequent reference to the current edition of the chart in order to be aware of underlying tints.

Corrections to topography made by RSD shall be revised as necessary to conform to chart standards.

Compilers and reviewers are reminded of their responsibility to ensure that overlapping and adjoining charts are in agreement. Although large scale charts that have been corrected from original source material become source material for smaller scale charts, this does not relieve cartographers from the responsibility of researching original source material in resolving discrepancies between overlapping and adjoining charts. Comparison and agreement must be made with all overlapping charts at the same scale and larger.

Edition dates represent the month and year that a new edition is posted.

2.4.4 3-E (Economy, Efficiency, and Effectiveness)

The Department of Commerce (DOC) inaugurated its 3-E Improvement Program aimed at achieving greater economy, efficiency, and effectiveness of operations in August 1964 under Administrative Order 211-1. The nautical charting program was identified as an area where significant reductions in cost could be achieved. Small-scale charts were examined to identify specific areas covered by larger-scale charts where duplicate chart coverage on different chart scales could not be justified by navigational needs. The elimination of duplicate coverage has reduced maintenance cost and extended some printing cycles.

The effort to eliminate duplicate chart coverage continues. As new charts are published and existing chart limits are revised, small-scale charts shall be examined to see if there are areas of charted detail that cannot be justified by navigational needs. Areas selected for the 3-E Program shall have all charted detail below the shoreline plane of reference and all aids to navigation removed. Blue tint No. 1 shall be added to the entire water area. Labels identifying the next largest scale chart shall be added throughout the areas, as appropriate. The labels shall be in 7 pt. Swiss Light Italic; e.g., (use chart 12222). Overhead cables and their identifying labels shall be retained; however the vertical clearance shall be deleted. All bridge labels shall be deleted. The channel limits of USACE maintained channels shall be retained, but all depth references are removed.

2.4.5 Quality Review and Quality Assurance

1. Compilation Review

The basic review of all source material application is performed by the senior compilers in the production branches. This review is a complete item-by-item check of all corrections made to the digital chart files by the cartographer. The emphasis of this review is the accurate representation of source data at the scale of the chart. The compilation supervisor will occasionally perform this review, but generally does a more cursory inspection of the chart files.

2. Senior Reviewer Inspection

A senior reviewer in each production branch also inspects the total chart revision package with primary emphasis on clarity of presentation and for adherence to NOS cartographic specifications. The source material is rarely re-examined except in the event of obvious discrepancies.

3. Notice to Mariners Inspection

The NM Update Service inspects the digital files of charts going forward for possible NM items that may have been overlooked during compilation. In addition, a general inspection is made of the charted aids to navigation. Also, a check of the accuracy and completeness is made of NM references on the chart.

4. Source Data Inspection

NDB makes a cursory inspection of the histories and checks that all indexed source material has been either applied or addressed.

5. Quality Inspection

The production branches do a complete item-by-item check of the final printed chart. If everything is in order, they declare the chart cleared for public issue.

2.5 New and Reconstructed Chart Requirements
Last revised by Cartographic Order 002/16 on January 28, 2016

The majority of requests for new charts originate from chart users and are received from a variety of channels including email, IDMS inquiry, phone call, letter, or direct conversation with a NOAA employee. The justification for a particular new chart can be unique and will vary based on a number of factors. Whether the justification is related to general standards or a particular local circumstance, a subjective judgment is required as to the relative strength of the justification. Chart actions are either taken immediately or as resources permit. NSD assesses chart requests and makes recommendations to MCD for new charts, ENCs and insets.

The reconstruction of charts is the procedure used to improve the quality of the chart and incorporate new symbology, changes in type style and symbology. Alternatively, the reconstruction may be the result of a need to expand existing coverage or to accommodate the lengthening of a channel. Often, changes in cartographic policy can accumulate over the years until a chart presents a mixture of type styles and outdated symbology. Examples of this include the use of symbolized depth curves instead of labeled solid lines, dot patterning in low water areas in place of green tint, and excessive road patterns instead of urban tint.

All raster charts produced with the NCSII production system must conform to the requirements of reconstructed charts, the only exception is that a chart produced with NCSII may not always conform to the chart size as specified in section 2.5.6, This task simplified is by NCSII, because it automatically applies the latest charting standards for symbology and text specified in the nautical chart manual.

2.5.1 Chart Numbers

Each chart is assigned a unique number, based on its scale and geographical location.

Charts are divided into five categories with each category having a different number of digits.

1-digit	Charts that have no scale. The book, *U.S. Chart No. 1, "Symbols, Abbreviations and Terms used on Paper and Electronic Navigational Charts,"* is currently the only NOAA instance in this category.
2-digits	Charts with a scale of 1:9,000,001 and smaller.
3-digits	Charts with a scale from 1:2,000,001 to 1:9,000,000.
4-digits	Special purpose maps and charts not included in other categories for navigational charts, e.g. Training Charts.
5-digits	Charts with a scale of 1:2,000,000 or larger.

Chart numbers are assigned by NGA. A written request must be submitted for all new charts and for changes in existing chart numbers.

2.5.2 Chart Coverage

Current and anticipated requirements of the expected primary chart user must be taken into consideration when determining chart coverage. The availability of source material of sufficient quality to produce a chart with the proposed limits should be considered. Coverage must allow for adequate overlap with adjoining charts while avoiding unnecessary duplicate coverage. Dangerous passages should not be located near the border so that mariners may safely transition to the adjoining chart. Chart coverage must include all aids to navigation and landmarks required for position fixing. The preferred layout would be a rectangular chart, without border breaks, and without jogs in the border. Skewed projections are acceptable in order to reduce the number of charts required to cover an area.

2.5.3 Chart Formats

NOS uses a variety of chart formats, each designed for a particular segment of the boating public. Currently, the format for new charts will be selected from either the conventional format or the pocket fold format:

- The conventional format is a flat chart.

- The pocket fold format is a single long, narrow sheet, printed front and back and folded similar to a road map (see Nautical Chart Manual, Volume 2, Appendix IV, page IV-14.2).

Other formats currently in use are the folio format and the recreational format:

- The folio format consists of two to four sheets, printed front and back, accordion-folded and bound in a protective cardboard jacket (see Nautical Chart Manual, Volume 2, Appendix IV, page IV-14.14).

- The recreational format consists of a series of large-scale charts providing sequential page coverage and published in a book format.

2.5.4 Metric Charts

NOS produces metric nautical charts of domestic and adjoining waters. These are primarily in the Great Lakes or as part of the INT chart series that NOS is responsible for.

2.5.5 Sounding Units

The three options for sounding units on all new and reconstructed charts are feet, fathoms, and meters. The charts that use fathoms as the sounding unit will show fathoms and feet to eleven fathoms and then whole fathoms. General guidelines have been established for selecting the appropriate depth unit for each chart series. The same depth unit shall be used throughout a single chart. General and Sailing charts along all coast and Coastal charts along the Pacific coast should use fathoms as the depth unit. On all other charts on the Great Lakes, Atlantic, and Gulf

coast the depth unit should be feet, as is also the case with most of the Harbor charts on the Pacific Coast. Charts of Alaska and the Hawaiian Islands are generally in fathoms. Metric depth units shall be used on International charts and charts co-produced with the Canadian Hydrographic Service.

2.5.6 Chart Size

Nautical chart size is directly related to chart scale which, in turn, is dependent on the amount of detail that must be charted to provide a concise, legible, graphic representation of necessary data. Generally, nautical chart size is also dependent on inclusion of appropriate geographic features to satisfy navigation demands and a basic chart purpose.

Another factor to be considered in selecting a chart size is the requirement of various nations throughout the world to reprint and reissue charts of another nation, reformatted in their native language. Some nations do not have printing presses that will accept the NOS maximum size paper, which is 42 1/2 inches by 59 7/8 inches. In order to obtain uniformity and compatibility between nations, the IHO recommends the use of a standard metric A0 paper, defined as having dimensions of 841 millimeters by 1189 millimeters (33.11 inches by 46.81 inches). The use of the internationally accepted A0 size paper will help standardize the size of nautical charts and allow for exchange of chart reproduction datasets among nations for the multi-nation printing of individual charts.

NOS began in 1975 planning new and reconstructed conventional nautical charts to fit A0 paper size having an internationally accepted maximum chart neatline size of 750 millimeters by 1100 millimeters. Many existing NOS charts have neatline sizes larger than this desired maximum size and will require changes in scale or limits when reconstructed, if they are to conform to the international size requirements. It should be noted that printing charts on A0 paper is desired for compliance with IHO recommendations related to exchanging reproduction datasets between countries, and every effort is being made to meet those conditions. However, there is no mandatory requirement that all charts fit A0 neatline or paper size. Modification of chart scales or limits must incorporate an evaluation of contemporary user needs which a new chart scheme would be designed to satisfy.

The guidelines listed below should be used in constructing new charts.

NEW CHART CONSTRUCTION PARAMETERS

PAPER SIZE

millimeters	inches
914.4 X 1219.2	36 X 48
914.4 X 1371.6	36 x 54
841.0 X 1189.0	33.11 x 46.81

NORMAL NEATLINE

millimeters	inches
818.0 X 1141.8	32.2 X 44.95
818.0 X 1294.2	32.2 X 50.95
750.0 X 1100.0	29.53 X 43.31

MAXIMUM NEATLINES

millimeters	inches
837.1 X 1167.2	32.96 X 45.95
837.1 X 1319.6	32.96 X 51.95
760.0 X 1138.2	29.92 X 43.7

NORMAL WORK LIMITS

millimeters	inches
863.6 X 1168.4	34 X 46
863.6 X 1320.8	34 X 52
790.2 X 1138.2	31.11 X 44.81

MAXIMUM WORK LIMITS

millimeters	inches
882.7 X 1193.8	34.75 X 47.0
882.7 X 1346.2	34.75 X 53.0
809.3 X 1163.6	31.86 X 45.81

Figure 2-1

2.5.7 Chart Scale

The nautical chart is designed as a work sheet on which courses are plotted and positions determined. It assists the mariner in avoiding dangers and arriving safely at his destination. The design of a nautical chart depends upon the navigational requirements in a particular area. A vessel sailing between distant ports and restricted to the main channels in entering a port does not need the same information on a chart that a small pleasure boat needs while cruising in protected waterways, and which may be required to venture into unfamiliar places. The amount of detail, physiographic and geographic, that can be adequately shown on a chart is dependent on its scale. To meet these different needs a variety of scales are used, ranging from 1:2,500 to about 1:5,000,000. Large-scale charts cover relatively small areas and are used by the mariner for

inshore or harbor navigation; small-scale charts covering large areas are used for offshore navigation.

There are a number of factors that must be evaluated when selecting a scale that will be the most effective for the expected user of a proposed chart. The limits of the area to be covered will influence the selection of a scale. Adjustments to chart limits must be made in order to include important aids and significant dangers to navigation. Such items should not be allowed to fall just outside the chart limits. The number, size, and draft of vessels using the waterway and whether the new chart is intended for commercial or recreational small craft must be considered in selecting the proper scale. The waterfront industry involved in maritime commerce will give an indication of the type of vessels expected to use the chart. The selected scale should conform to existing chart series scales and provide an adequate ratio with other charts covering the same area. The scale of existing topographic and hydrographic surveys must be considered when selecting a chart scale. Generally, the scale of the chart should be one-half the scale of the surveys in order to ensure adequate coverage. The scale must be large enough to adequately display the aids to navigation and include enough shore features to facilitate position fixing. Also, enough overlap must be included with adjoining charts so that the vessels position can be transferred. Areas with complex or restrictive passage will require large scale charts. The nature of the sea bottom will affect the selection of scales. Irregular or changeable areas will require a larger scale to ensure safe navigation than areas of smooth bottom.

2.5.8 Source

The success of the NOS nautical charting program does not depend solely on the cartographic expertise available to produce the charts. Of prime importance is the availability of contemporary and credible information for use in chart production and its timely dissemination to the user, thus ensuring the mariner maximum safety and usable information. Some of this information is acquired by NOS through its own field survey efforts and some is obtained from more than 60 outside sources.

The credibility of NOS basic data is ensured today more than ever before through established standards under which NOS field surveys are performed, both with respect to the acquisition of the raw field data and the processing of it. The availability of data consistent with charting needs is being ensured through two principal efforts:

- the application of automation in the acquisition and processing of field survey data and

- the concerted effort made to schedule surveys in advance of projected data need.

2.5.9 Survey Support

The availability of adequate hydrographic surveys must be considered when establishing a priority schedule. When a charting request has been received NSD performs an analysis to determine if the existing hydrographic surveys in the area are adequate for the desired action. If they are, the change is scheduled for chart compilation as priorities warrant and as resources become available. If adequate surveys do not exist, a hydrographic survey requirement is

identified. It should be noted that the need for hydrographic data is not restricted solely to support new chart construction, but is often in support of improving existing chart depiction.

Generally, for a survey to be considered adequate, it must have been performed to certain prescribed standards or specifications, some of which are general and others peculiar to the area being surveyed. The minimum qualifications of an adequate survey is one performed since 1940 which employed a continuous bottom profiling echo sounder to acquire water depth. Today's standards reflect the latest techniques in source data acquisition and automation while at the same time preserving continuity with the principles of plane, geodetic, cadastral, and hydrographic surveying.

2.5.10 In-House Chart Examination

Each chart, from its initial construction through the various printings, is reviewed and reevaluated in order to see if it continues to adequately meet the needs of the maritime community. Frequently, this analysis results in consideration of chart cancellation, or reveals the need for new or revised chart coverage. Within the context of the chart evaluation, "adequate" is determined by the following questions:

1. Is the source material — geodesy, topography, hydrography, cultural detail — of sufficient quality to meet national and international standards?

2. Is the scale of the chart large enough to provide sufficient detail for the anticipated use?

3. Have new editions been issued with sufficient frequency to ensure that pace is kept with both natural and man-made changes?

An affirmative response to all three of these is required in order to affirm a chart's adequacy.

Office analysis also involves periodically examining the layout and scale of a suite of charts covering a discrete area. These analyses may reveal that the coverage could better serve the user by alteration of chart layout and scale. This may be a derivative of changing needs in the area or a recognition that the current layout was accumulated over the years to meet specific needs that arose without consideration of the relationship to the charts in the suite.

The user demand for individual charts is periodically monitored. If a chart shows particularly low demand, or historically a low rate of change, consideration will be given to a longer issue interval, cancellation of the chart in favor of others, reformatting the chart, absorbing it as an inset on another chart, or merging two or more charts into one chart. Conversely, evidence of special needs, increasing user demand, or an increasing higher rate of change may warrant a shorter issue interval and reexamination of coverage.

2.5.11 Scheduling

Chart and survey priorities are established and modified in order to provide products in a descending order, starting with those that are most needed to ensure safety of navigation and to satisfy defense needs. Chart priorities and survey priorities are also interwoven in that the data collected from all field surveys ultimately appears on nautical charts, either in the form of a new chart or as a revision to an existing chart.

A set of interrelated parameters are employed to assist in prioritizing charts and surveys for accomplishment:

1. How safe (or hazardous) to navigation is the area?
2. What type of craft frequent the area?
3. What is the volume of traffic in the area?
4. What resources are available for field surveys?
5. Where are the field resources and when can they be made available?
6. What can support data (e.g., tide, photogrammetry, geodesy) be supplied?
7. When can support data (e.g., tide, photogrammetry, geodesy) be supplied?
8. What are weather conditions in the area?
9. What would be the logistics situation?
10. What has been the volume and weight of request?
11. What production resources are available to translate field data to charts?

Management of the chart and survey schedule is the joint responsibility of MCD and HSD.

2.5.12 Chart Specifications

A list of specifications is compiled for each new chart and reconstructed chart. For new charts, NSD provides a signed memorandum for the Chief of MCD. Part of this memorandum is a chart specification sheet that provides all the information that MCD needs to begin the construction of a new chart. For NCSII charts, the MCD Branch Chief must fill out an NCSII Chart Request form, which is found on OCS Navigator.

2.5.13 Corrections to the Chart Parameters Database

There may be occasions where the Chart History and Plotting Parameters File (CHAPP) database may need to be corrected. If a correction is required then a policy letter requesting the corrections must be created and registered.

2.6 Sales Agents Credit Symbol

Revised on March 7, 2014 by Cartographic Order 003/14

See Section 1.4.5.4.

2.7 Reproduction of NOS Charts

Foreign Reproductions

NOS permits foreign governments to reproduce NOS charts under the following conditions:

The published National Ocean Service (NOS) charts and related publications are in the public domain and are not copyrighted. To avoid any misrepresentation with the possibility of misleading users, we request that evidence be deleted of this agency's involvement in any reproduction made by private United States or foreign organizations. This includes the deletion of information that would identify NOS, NOAA, or the Department of Commerce as the United States producers of the chart along with any other detail that might imply that the reproduction is an official United States publication.

> Where selected information is extracted from NOS nautical charts for recompilation into a private producer's product, NOS requests that NOS not be identified since the data from the original chart used for source may be condensed, expanded, generalized, supplemented, omitted, or may be out of date when the recompiled product is published. NOS assumes no liability as to the accuracy or completeness of the recompiled information.
>
> The NOS does not provide reproducibles to those individuals desiring to republish its charts. However, reproducibles are provided, on a non-reimbursable basis, for the small-scale "International Chart Series" to International Hydrographic Organization (IHO) member countries through IHO agreements. Reproducibles for other nautical charts are normally provided to foreign governments, on a non-reimbursable basis, provided a bilateral agreement exists with NGA.

Private Domestic Reproductions

A similar statement is provided for domestic requesters, preceded by this additional caveat:

> It is the policy of the National Ocean Service (NOS) not to provide reproducible materials of navigational charts to the public. The NOS is charged, under the provisions of 33 U.S.C. 883, with the production of charts to meet civil and military requirements. This mission includes the stringent control of informational material to ensure that the safety of the using public is protected. Only the printed product ensures that there is consistent control and reflects all current changes and conditions.
>
> As an exception to the above, NOS will sell reproducible materials to private companies when the requirement is for a contract with a Federal or State agency for nonprofit projects. Evidence of the contractual arrangement, such as a letter from the agency, will be necessary. Also, State agencies will be required to ensure that the resulting products will not be for sale.

Also for domestic requesters, the following statement replaces the third paragraph cited above:

Under the rules of public domain, the NOS cannot control how purchased NOS charts will be used or prevent their being reproduced. However, court interpretations of the Federal Tort Claims Act have tended to hold the U.S. Government liable for damages due to incorrectly charted information. Reproducers of NOS charts may be subject to similar liability.NOS frequently receives requests from individuals and industry for permission to reproduce NOS publications. This following statement reflects NOS policy with respect to such reproduction:

> The published NOS charts and related publications are in the public domain and are not copyrighted. To avoid any misrepresentation with the possibility of misleading users, we request that evidence be deleted of this Agency's involvement in any reproduction made by private U.S. organizations. This includes the deletion of information that would identify NOS, the National Oceanic and Atmospheric Administration, or the Department of Commerce as the U.S. producers of the chart along any other detail that might imply that the reproduction is an official U.S. Publication. In the interest of users' safety, NOS strongly requests that each reproduction which may possibly be used for navigational purposes should prominently display a note, "THIS REPRODUCTION IS NOT FOR USE IN NAVIGATION."
>
> Under the rules of public domain, NOS cannot control how purchased NOS charts will be used or prevent their being reproduced. However, court interpretations of the Federal Tort Claims Act have tended to hold the U.S. Government liable for damages due to incorrectly charted information. Reproducers of NOS charts may be subject to similar liability.

2.8 Datums

Revised by March 14, 2002 Memorandum

A datum is a reference point, line, or surface used as a reference in surveying and mapping. In charting, horizontal datums (also called horizontal control datums and horizontal geodetic datums) and vertical datums (also called vertical control datums and vertical geodetic datums) must be considered. The former form the basis for computations of horizontal control surveys in which the curvature of the earth is considered, while the latter is the basis to which evaluations are referred.

2.8.1 Horizontal Datums

1. Background

During the early years of survey operations, many independent triangulation networks were established in the United States each referenced to a horizontal datum based on independent astronomic observations within the network. Consequently, hydrographic and topographic surveys conducted within such areas were based on these independent local datums. Since 1844, two spheroids of reference have been used by this agency in its geodetic triangulation. From 1844 to 1880, the Coast Survey used the Bessel's spheroid of reference; since then it has used the Clarke's spheroid of 1866. Various independent datums were based on each until 1901 when the U.S. Standard Datums was adopted.

A new adjustment of the U.S. network of horizontal control known as the "North American Datum of 1983" (NAD 83) has been adopted as the standard datum for nautical charts. The parameters of the ellipsoid of reference used with NAD 83 are very close to those used for the World Geodetic System of 1984 (WGS 84). The ellipsoid used for NAD 83, Geodetic Reference System 1980, is earth centered or geocentric as opposed to the non-geocentric ellipsoids previously employed. This means that the center of the ellipsoid coincides with the center of mass of the earth.

At present, the majority of charts published by NOS are on NAD 83. Other datums in use are the following:

1. Old Hawaiian Datum
2. Local Astronomic Datums
3. Guam 1963 Datum

2. Charting Procedure

The horizontal chart datum shall be specified in the title notes on all charts.

With the exception of the charts of the Hawaiian Islands and other western Pacific islands (which will be compiled on WGS 84) all New Charts and Reconstructed Charts shall be produced on NAD 83. New Editions are produced using computer processes to convert to NAD 83 whenever the average shift values have been received from the National Geodetic Survey (NGS).

Even though NAD 83 can be extended to NOS charts of the Hawaiian Islands and other western Pacific islands, the Director of NOS decided that these charts will be compiled on WGS 84. For charting purposes, there is virtually no difference between WGS 84 and NAD 83, and the use of WGS 84 will satisfy a DOD requirement. The selection of the appropriate datum for each chart will be decided when the conversion values are ordered.

NAD 83 conversion values will be provided when the latitude and longitude of the chart corners are submitted through the Chief, NDB, to NGS. The values provided will be a mean for the entire chart.

As shown below the primary datum reference in the title block shall be shown in 10 pt. Swiss Light. The secondary datum reference shall be shown in parentheses in 8 pt. Swiss Light. On revised conventional charts, both datum references shall be shown in 8 pt. Swiss Light. On small craft charts, both datum references shall be shown in 8 pt. Swiss Light.

North American Datum of 1983 (World Geodetic System 1984)	World Geodetic System 1984 (North American Datum of 1983)	North American Datum of 1983 (World Geodetic System 1984)

When the magnitude of the shift between the existing chart datum and NAD 83 will not result in a significant plottable difference (less than 0.20 millimeters), the conversion to NAD 83 can be accomplished by revising the datum reference in the chart title block and, for informational purposes, adding a temporary chart note.

The informational note shall be as follows:

HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System of 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 do not require conversion to NAD 83 for plotting on this chart.

When the shift in projection is plottable (shift greater than 0.20 mm), the projection on the black plate shall be revised, the datum reference shall be changed, and a conversion note shall be added. The values shown in the note will represent a +/- mean datum shift for the chart as a whole and will facilitate the transfer of data from the previous datum to NAD 83. An example of a note is as follows:

HORIZONTAL DATUM

The horizontal reference datum of this chart is North American Datum of 1983 (NAD 83), which for charting purposes is considered equivalent to the World Geodetic System of 1984 (WGS 84). Geographic positions referred to the North American Datum of 1927 must be corrected an average of 0.000" xxxxxward and 0.000" xxxxward to agree with this chart.

This note shall remain on the chart until it is deemed no longer necessary.

If available resources or other considerations do not permit revising the projection, a temporary note describing the magnitude of the shift from NAD 83 to the chart datum shall be added to the new edition of the chart. The value shown in the note will represent a +/- mean datum shift for the chart as a whole. An example of the note is as follows:

HORIZONTAL DATUM
The horizontal reference datum of this chart is North American Datum of 1927. Geographic positions on North American Datum of 1983 (NAD 83) must be corrected an average of 0.271" southward and 0.322" eastward to agree with this chart. For charting purposes, NAD 83 is considered equivalent to the World Geodetic System 1984 (WGS 84) datum

All horizontal datum notes, unless otherwise stated, shall be black 7 pt. Swiss Light.

The method for determining the direction of the horizontal datum shifts is shown below. In general, latitude corrections will be positive in the Gulf, on the East Coast, in the eastern Great Lakes and southern California. They will be negative in the western Great Lakes, on the West Coast, Alaska, Hawaii and Puerto Rico.

HORIZONTAL DATUM SHIFT DETERMINATION

Corrections received from NGS are based on subtracting the NAD 1927 positions of triangulation stations from the NAD 1983 positions.

For charts getting a projection shift:

	Latitude		Longitude	
If the correction is:	Positive	Negative	Positive	Negative
(1) The projection lines will move:	South	North	East	West
(2) The note (27 to 83) will read:	Northward	Southward	Westward	Eastward
(3) Corrections to GP's will be:	Added	Subtracted	Added	Subtracted

For charts on which the projection shift is not made and the 83 to 27 note is used:

(4) The note will read:	Southward	Northward	Eastward	Westward
(5) Corrections to GP's will be:	Subtracted	Added	Subtracted	Added

For charts on east longitude, the actions under longitude in (3) and (5) will be reversed.

Longitude corrections will be positive in the western Gulf, the western Great Lakes, the West Coast and Alaska. They will be negative in Hawaii, Puerto Rico, on the East Coast and the eastern Great Lakes.

Correction values from NGS for Hawaiian charts are based on the OLD Hawaiian datum and those for Puerto Rican charts are based on the Puerto Rico datum even if the listings refer to NAD 27. In the Great Lakes, the reference to NAD 27 is true. If a chart is on the 1902 datum the difference between that and NAD 27 must be determined before the shift to NAD 83 can be made.

2.8.2 Vertical Datums

A vertical datum is a reference point or place to which elevations of the land or depths of the sea are tied.

The base from which NOS measures vertical heights is the National Geodetic Vertical Datum of 1929. This datum was called the "Mean Sea Level Datum of 1929" prior to being renamed in 1973. This datum will be further adjusted and replaced by the North American Vertical Datum of 1988.

Sounding datums used in coastal areas for nautical charting are not referred to the 1929 datum but are determined by local observations, ideally over a period of 19 years. The official time period over which tide observations are taken to obtain mean values for tidal datums has been standardized by NOS. The present National Tidal Datum Epoch is from 1960 through 1978. There have been two epochs used previously in this century; 1924 through 1942, and 1941 through 1959.

1. Definitions

Mean higher high water (MHHW) is a tidal datum which is the average of the higher high water of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, simultaneous observational comparisons are made with a control tide station in order to derive the equivalent datum of the National Tidal Datum Epoch.

Mean high water (MHW) is a tidal datum which is the average of all the high water heights observed over the National Tidal Datum Epoch. For stations with shorter series, simultaneous observational comparisons are made with a control tide station in order to derive the equivalent datum of the National Tidal Datum Epoch.

Mean sea level (MSL) is a tidal datum which is the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch. Shorter series are specified in the name -- e.g., monthly mean sea level and yearly mean sea level.

Mean water level (MWL) is the mean surface elevation as determined by averaging the heights of the water at equal intervals of time, usually hourly, over the National Tidal Datum Epoch. MWL is used in areas of little or no range in tide.

Mean low water (MLW) is a tidal datum which is average of all the low water heights observed over the National Tidal Datum Epoch. For stations with shorter series, simultaneous observational comparisons are made with a control tide station in order to derive the equivalent datum of the National Tidal Datum Epoch.

Low water datum (LWD) is the dynamic elevation for each of the Great Lakes and Lake St. Clair and the corresponding sloping surfaces of the St. Mary's, St. Clair, Detroit, Niagara, and St. Lawrence Rivers to which are referred the depths shown on the navigational charts and the authorized depths for navigation improvement projects. LWD may also be an approximation of MLW that has been adopted as a standard reference for a limited area and is retained for an indefinite period regardless of the fact that it may differ slightly from a better determination of MLW from a subsequent series of observations. Such an approximation is used primarily for river and harbor engineering purposes. Boston LWD is an example.

Mean lower low water (MLLW) is a tidal datum which is the average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, simultaneous observational comparisons are made with a control tide station in order to derive the equivalent datum of the National Tidal Datum Epoch.

Extreme low water is the lowest elevation reached by the sea as recorded by a tide gage during a given period. NOS routinely documents monthly and yearly extreme low water for its control stations.

Gulf coast low water datum (GCLWD) is a tidal datum consisting of MLLW when the type of tide is mixed and MLW (pre-National Tidal Datum Convention definition, November 28, 1980) when the type of tide is diurnal.

2. Sounding Datums

The datums of reference currently used for depths on nautical charts published by the NOS are as follows:

1. For the Atlantic Ocean, certain areas of the Caribbean, the Gulf of Mexico, and the Pacific Ocean, MLLW.
2. For the Great Lakes and connecting waterways, LWD.
3. For most other larger navigable rivers and lakes, special datums.

a. Atlantic Coast

MLLW was authorized for use as the chart sounding datum for the east coast of the United States with the adoption of the National Tidal Datum Convention of 1980. It has been determined that the MLW values observed during the 1941-59 epoch are, for charting purposes, the same as the MLLW values observed during the newer 1960-78 epoch. However, this change in datums has only recently been approved for implementation on charts due to limited resources. Information will be provided by the Center for Operational Oceanographic Products and Services (COOPS), N/OPS, as part of its regular review of tidal datum information. No adjustments are to be made in the soundings, shoreline, low water line, heights, elevations, or the application of tide predictions for navigational purposes. Hydrographic surveys that use MLLW as the sounding datum can be applied to charts that use MLW as the chart datum since the two datums are equivalent.

b. Gulf Coast

The chart datum for soundings and depth curves on charts covering coastal waters from Mangrove Point, Florida (latitude 25°22'33"N, longitude 80°18'36"E) to the United States-Mexico border was changed to MLLW from GCLWD, effective November 28, 1980. This datum change, also the result of the National Tidal Datum Convention of 1980, was announced in the Federal Register (vol. 45, no. 207, October 23, 1980). The Center for Operational Oceanographic Products and Services, began providing datum label changes from GCLWD to MLLW for nautical charts in its regular review of tidal datum information beginning in December 1982. All references to GCLWD shall be changed to MLLW on all nautical charts, Coast Pilots, and other related publications published after January 1, 1983.

No adjustments are to be made in the soundings, shoreline, low water line, clearances, heights, elevations, or the application of tide predictions for navigational purposes.

c. Great Lakes

The Great Lakes-St. Lawrence River system, shared by the United States and Canada, requires international coordination to establish a common elevation reference or datum by which water levels can be measured. The first common datum between the United States and Canada was the International Great Lakes Datum (1955) or IGLD (1955). Due to movement of the earth's crust, the datum reference system used to define water levels within the Great Lakes-St. Lawrence River system must be adjusted every 25 to 35 years.

A new vertical datum, for referencing elevation values for the Great Lakes Vertical Control Network, has been established. The new datum, known as the International Great Lakes Datum (1985) or IGLD (1985), has replaced the old datum of IGLD (1955). As part of the datum revision, a new zero reference location (the point to which all other elevations are referenced) has been established. The zero reference point of IGLD (1985) is located at Rimouski, Quebec, Canada.

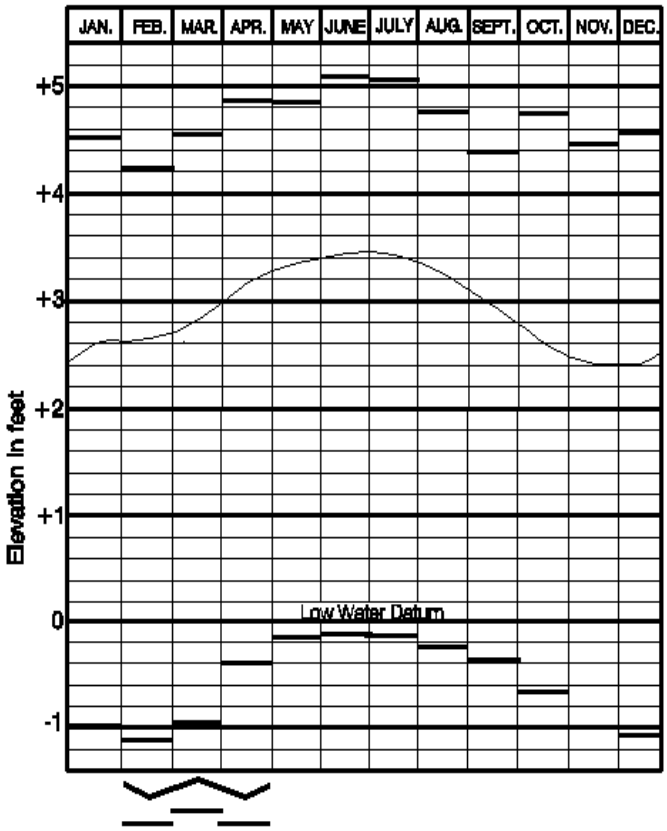
The following table indicates the revised Low Water Datum (LWD) reference for each lake from IGLD 1955 to IGLD 1985:

	Low Water Datum			
	Meters		Feet	
	IGLD 55	IGLD 85	IGLD 55	IGLD 85
Lake Superior	182.9	183.2	600.00	601.10
Lake Michigan	175.8	176.0	576.80	577.50
Lake Huron	175.8	176.0	576.80	577.50
Lake St. Clair	174.2	174.4	571.70	572.30
Lake Erie	173.3	173.5	568.60	569.20
Lake Ontario	74.0	74.2	242.80	243.30

On all affected Great Lakes-St. Lawrence navigation charts, the LWD (or chart datum) shall be changed from IGLD (1955) to IGLD (1985). Correspondingly, references to zero point shall be changed to Rimouski, Quebec, and charted LWD elevations shall be revised to the IGLD 85 figures shown above. Charted water depths will not require modification.

The LWD for connecting channels, affecting some nautical charts of the Great Lakes-St. Lawrence River system is based on the sloping surface of the water at selected points referred to the gagereadings at those points. As these charts go forward, the referenced profile stations should be provided to the Measurement Branch, Great Lakes Section, for updating. Charted water depths will not require modification.

The values of LWD were chosen so that during the navigation season the actual water levels in each lake would be above the LWD elevation most of the time. A hydrograph of average monthly water levels with respect to the sounding datum is shown on each chart (see Figure below). The averages are based on the most recent 10-year period of observations available. In addition, it also shows the extreme high and low monthly water levels for the period of observation.



Average levels (1987-1996)
Extreme Levels (period of record)
Low Water Datum, which is the plane of reference for the levels shown on the above hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below Low Water Datum, the existing depths are correspondingly greater or lesser than the charted depths.

Shoreline shown on Great Lakes charts represents the level of the water at the time the survey was accomplished. If there is an appreciable displacement between the shoreline thus determined and the line representing the sounding plane of reference, the sounding datum line will be charted using the symbol labeled C a in Chart No. 1 and a green tint will be shown between that line and the shoreline.

In the Great Lakes and St. Lawrence River where the United States and Canada have overlapping chart coverage, Canadian soundings for the most part are based on the same datum as soundings on NOS charts. Any exceptions are stated by notes on the Canadian charts; in this case, soundings must be corrected accordingly before being transferred to NOS charts.

In other areas where NOS charts cover Canadian waters, notably Dixon Entrance, the Washington-British Columbia area, and the Maine-New Brunswick area, soundings on the Canadian side of the boundary are applied directly from the Canadian sources and the datum reference is revised as needed (see below). The only exceptions to this practice are in the narrow portions of Lubec

Channel and St. Croix River where soundings on both sides of the international boundary are referred to MLW.

SOUNDINGS IN FATHOMS
AT MEAN LOWER LOW WATER IN U.S. TERRITORY
AT LOWEST NORMAL TIDES IN CANADIAN TERRITORY

d. Pacific Coast

The chart sounding datum for Pacific coast charts is MLLW.

e. Navigable Rivers and Special Datums

In the Mississippi River above Head of Passes, Louisiana, soundings are referred to an Adopted Average Low Water Plane (ALWP) established by the USACE and referred to MSL. It varies from approximately MSL at Chalmette, Louisiana, to over 5 feet above MSL at Bayou Sara, Louisiana, 263 miles above Head of Passes.

In the Columbia River between Harrington Point and Bonneville Dam, the sounding datum is the Columbia River Datum which is the plane of MLLW during lowest river stages. In the impoundments behind dams in the Columbia River and elsewhere, soundings are referred to normal pool level.

Similarly in the Hudson River above Haverstraw Bay, soundings are referred to Hudson River Datum which is defined as MLW during lowest river stages.

There are some non-tidal coastal areas, most notably Laguna Madre, Texas, Biscayne Bay, Florida, and Pamlico Sound, North Carolina, where a special LWD is applied because of lack of regular tide signals in these areas. In such areas the periodic tide has a mean range less than one-half foot. The soundings are based upon a low water datum equal to one-half foot below mean sea level.

3. Chart Notes

In general, heights and clearances on NOS charts are referred to MHW except in non-tidal areas where they are referred to the sounding datum. Any variations to this practice should be clearly stated in an explanatory note in the title area of the chart. In tidal areas when the information is available, the note "Heights in feet above Mean High Water" shall be used. When contour and spot elevations based on the plane of mean sea level are charted, the following note shall be used:

HEIGHTS
Elevations of rocks, bridges, landmarks and lights are in feet and refer to Mean High Water. Contour and summit elevation values are in feet and refer to Mean Sea Level.

On metric charts, the reference to "feet" will be replaced by "meters."

2.9 Projections and Grids

Projections are the lines representing the parallels of latitude and meridians of longitude drawn on a chart. Grids, in contrast, are a pattern of squares or rectangles superimposed on a chart to permit location of any point by a system of rectangular coordinates.

2.9.1 Projections
Revised on December 14, 2001 by CO 022/01

The construction of any map or chart requires that points on the earth's spheroidal surface be transferred to points on a plane surface (the map or chart). In order for features displayed on the resulting map or chart to bear some resemblance, in regard to shape and relative position, to the corresponding features on the earth, a suitable transformation system is required.

The parallels of latitude and the meridians of longitude constitute a framework (or projection) for accurately placing all detail when constructing a nautical chart. They are essential to the navigator for plotting and scaling all data and positional information.

Very few projections used in charting are true projections in the geometrical sense. They are instead mathematical constructions intended to possess certain desirable qualities.

Numerous inquiries have been received by Marine Chart Division regarding inaccurate projection lines on some nautical charts. Marine Chart Division response, when directed by the Chief of MCD:

I Background:

Since NOS' beginning in the early 19th century, the production of nautical charts has been accomplished by using the most efficient compilation methods and storage media available at the time. However, regardless of the compilation method or storage medium used, ruled projections were examined and found to always be within the acceptable tolerance set by NOS.

The majority of NOS chart projections were originally ruled prior to 1920 and involved the use of either a Projection Ruling Machine or Coordinate Plotter. Although the names of these machines may imply that a projection was produced automatically, the ruling processes were basically

manual, requiring the cartographer to (a.) calculate all appropriate meridian and parallel distances, and (b.) manually operate the machine. Manual cartographic processes were also used to incorporate the change from a horizontal datum of NAD27 to NAD83 in the 1980's.

The storage media used during the years has included copper plates, glass plates, film and scribe coat. Each medium represented the most stable medium available at the time of its use, however, each medium also exhibited varying degrees of stability.

Projections ruled by hand more than eighty (80) years ago, datum changes applied manually and various mediums introducing their own degree of stability have created a suite of nautical charts containing projection lines that could not possibly agree with a computer generated projection.

II Scanning and Warping Didn't Make It Better:

In 1994, the entire suite of nautical charts was scanned and converted to raster format. These initial scanned images were used to produce the first NOS raster charts made available to the public on CD-ROM's.

In addition to any pre-existing projection distortion being inherited by the scanned raster, an additional degree of distortion was introduced because of the inappropriate choice and use of a non-vacuum scanner. The use of a vacuum scanner during the scanning process would have prevented any movement of the chart as it was being loaded into or as it was exiting the scanner. Such movement however, only introduced the greater degree of distortion in the borders and did not cause a level of distortion that (a.) exceeded the NOS projection tolerance for either the border or the inner neatline, or (b.) was considered navigationally significant or a danger to the chart user.

In 1996, a requirement arose to establish an accurate geo-reference system for the suite of raster charts. This geo-reference system was necessary (a.) to bring the distorted raster projections further into agreement with a perfect projection, and, (b.) to ensure the positional accuracy of all charting information.

To establish the proper geo-reference system, each projection intersection <u>within</u> the raster chart panel was warped (referenced) to its corresponding projection intersection <u>within</u> a computer-generated projection. The corners of the raster chart panel were not used as warp reference points because priority was given to ensuring the integrity of the internal projection intersections. All deviations from the computer-generated "perfect" projection existing after the warping process was completed were within the acceptable tolerance level set by NOS.

III Conclusion:

1. *To reiterate: Projections ruled by hand more than eighty (80) years ago, datum change applied manually and various mediums introducing their own degree of stability created a suite of nautical charts containing projection lines that could not possibly agree with a computer generated projection.*

2. *During the scanning process, (the process required to produce the first NOS raster charts), (a.) any pre-existing projection distortion was inherited by the scanned raster and (b.) an additional level of distortion was introduced because of the inappropriate choice and use of a non-vacuum scanner.*

3. Although a warping procedure was performed by NOS in an attempt to bring the imperfect raster projection into greater agreement with a computer-generated "perfect" projection, an amount of deviation still existed. However, this deviation was within the tolerance level set by NOS.

4. The only charts which NOS produces and which may have perfect projections are those which were reconstructed on a computer-generated projection. Limited funding and resources prevent NOS from reconstructing its full suite of charts solely for the purpose of containing perfectly generated projections. All processes which have affected NOS' charted projections [i.e., manual ruling, varied storage medium, manual datum shift, scanning, warping], (a.) did not result in a deviation amount that was not within the tolerance level set by NOS, and, (b.) did not affect the quality or the positional accuracy of all navigational information.

Historically, the two basic projections used by NOS have been Mercator and polyconic. The ease of construction of these two projections was a factor in their use until the advent of automated plotting techniques. The Mercator projection is still used for most NOS nautical charts, except for Great Lakes charts. These are mostly polyconic, but are being converted to Mercator as resources permit and as the charts are converted to metric units. Polyconic projections are still widely used for hydrographic field sheets and photogrammetric surveys. Recently, NOS has begun using the Lambert conformal conic and transverse Mercator projections along with the polyconic, for large-scale hydrographic and photogrammetric surveys.

1. Mercator Projection

Nautical charts which are constructed on the Mercator projection have meridians of longitude and parallels of latitude represented by straight lines intersecting at right angles. The distances between meridians are equal throughout the chart and distances between parallels increase progressively from the equator toward the poles to compensate for the fact that the meridians are not converging as they do on a globe. This results in a constantly increasing scale going from the equator toward the poles.

This projection has a number of advantages, among which are its rectilinearity, simplicity of construction, convenience in plotting positions from the border subdivisions, and the fact that a course can be laid off from any meridian or compass rose within its borders. Its principal advantage, however, and the one responsible for its worldwide use for nautical charts is that any straight line drawn on it in any direction is a rhumb line (loxodromic curve). Thus the rhumb line, or the track of a ship on a constant course, is a straight line on the projection and will pass all features along that line exactly as they are charted. This is a great advantage in coastal navigation since the straight line represents a planned course and will indicate at once the distance at which dangers will be passed abeam if this course is maintained.

Disadvantages of the Mercator projection are that it makes comparison of areas very misleading on small-scale charts when large differences of latitude are involved, and that great circle routes cannot be plotted conveniently on it without the use of an auxiliary gnomonic chart. Other disadvantages are that the scale constantly and slightly changes with the latitude, with the result that a graphic scale cannot be used on smaller-scale charts, making it necessary to measure distances along the border divisions for the various latitudes. (On all nautical charts, a minute of latitude is considered to be approximately 1 nautical mile.) Also, for long distances such as those encountered in radionavigation, bearings must be adjusted before plotting.

Both radio waves and light travel along great circles. But except in high latitudes, visual bearings are short enough that they can usually be plotted as straight lines on a Mercator chart without significant error. Radio bearings, however, are often observed at such distance from the transmitter that the use of a rhumb line is not satisfactory. A conversion angle is customarily applied as a correction to the observed angle to find the equivalent rhumb line. These conversion angles are listed in NGA Pub. 117, Radio Navigational Aids, and in the appendix of the Coast Pilots in abbreviated form. A complete set of conversion angle tables are given in the American Practical Navigator (Bowditch), vol. II, table 1.

2. Polyconic Projection

The polyconic projection was devised by Ferdinand Hassler, the first superintendent of the Coast Survey. The primary advantage of this projection is its ease of mechanical construction and the fact that a general table for its use has been calculated for the whole earth. No calculation is required to construct this projection other than to reduce the table values to the scale of the projection.

The polyconic projection is not conformal, nor do the parallels and meridians intersect at right angles. However, it is sufficiently close to other types of projections having these properties that the ease of construction makes this projection attractive for field applications, especially at large scales. Until recently this projection was used for almost all NOS field survey sheets. It is still used for most charts of the Great Lakes and will continue to be used until the charts can be converted to the Mercator projection using automated techniques.

3. Lambert Conformal Conic and Transverse Mercator Projections

These projections are used as the base for the various State grid systems and as such show the State systems as true rectangular coordinate systems. These are discussed in more detail in the following discussion of grids.

4. Modified Universal Transverse Mercator Projections

With the advent of electronic computing and plotting equipment this projection has come into use as the base projection for NOS field sheets.

2.9.2 Grids
Revised on December 2, 2015 by CO 006/15

A grid is two sets of mutually perpendicular lines dividing a map or chart into squares or rectangles to permit location of any point by a system of rectangular coordinates. The following subsection describes an additional grid used on NOS charts.

2.9.2.1 Universal Transverse Mercator Grid

The Universal Transverse Mercator (UTM) grid is one of several grids devised to simplify the problems of giving directions, distances, and positions in military operations. Since these computations must be simple, rapid, and accurate, a system based on latitude and longitude was found to be unwieldy. During World War I, the French adopted rectangular grids superimposed upon the Lambert conformal conic projection. After the war, the Germans and Russians adopted transverse grids. Unfortunately, the United States established a polyconic based grid, which is not conformal. The British developed several systems, in yards, for various parts of their empire. By the end of World War II, about 100 different grids were in use. At that time, the U.S. Army Map Service reviewed the existing situation and devised the UTM grid, plus the Universal Polar Stereographic (UPS) grid, to cover the entire world in a well-planned system using metric units.

The UTM and UPS grids have grown in importance in recent years. They are used in Europe and the U.S.S.R. for surveying purposes as well as for mapping and military purposes.

There are 60 UTM and 2 UPS zones which together cover the world. Each of the UTM zones covers 6° of longitude and extends from 80° S to 84° N. The UPS zones cover the two polar areas.

2.9.3 Constructing Projections

All projection constructions and coordinate computations are now performed using automated methods. Should one need the information on how to construct a projection by hand, it can be found in an archived edition of the NCM.

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2.9.4 Grid Computations

1. Computation of Rhumb Lines

The following is a simplified approach to computing points along rhumb lines, useful for determining such things as where a rhumb line crosses a chart neatline when one or both ends of the line are outside the limits of the chart (see below).

Given: A rhumb line connecting points A and B.

A = 45°00' N 75°00' W
B = 50°00' N 70°00' W

Required: Latitude where the line intersects the meridian, 72°30', at point C.

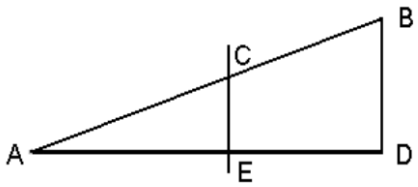

Figure 2-5a

In minutes of longitude:

AD = 300
AE = 150

From the Mercator Projection Tables:

50° = 3456.62418
45°= -3013.46698
BD = 443.15720

The values from the Mercator Projection Tables are also expressed in minutes of longitude.

By similar triangles:

CE/BD = AE/AD
CE = BD x (AE/AD)
CE = 443.15720 x (150/300) = 221.57860

Mercator Projection Table value for C:

3013.46698
+ 221.57860
3235.04558

To determine the latitude represented by 3235.04558, interpolation is required between the values shown in the Mercator Projection Tables.

From the Mercator Projection Tables:

47°33' = 3234.16181
3235.04558 Diff. = 1.47725
47°34' = 3235.63906

The fractional part of the minute is determined by the proportion of the partial meridional difference to the total meridional difference for one minute of latitude.

$$\frac{3235.04558 - 3234.16181}{3235.63906 - 3234.16181} = \frac{0.88377}{1.47725}$$

This ratio times 60 seconds will provide the increment of latitude which must be added to 47°33' to give the latitude of point C.

$$\frac{0.88377}{1.47725} \times 60 = 35.895 \text{ seconds}$$

Latitude of point C = 47°33'35.9"

2. Conversion of Local Coordinates

When geographic coordinates have not been computed for the area of the survey to which they are to be applied, it will be necessary to compute the positions on C&GS Form 89, "Computation of Geographic Coordinates from Plane Coordinates, as shown in the following examples. When this is accomplished, the form should be attached to the Chart History.

The following examples show how to find the geographic position of a point whose rectangular coordinates from a known geographic position are given:

a. Example No. 1

To compute the geographic position of a point whose local grid coordinates are 40,000 ft. S. and 160,000 ft. E.:

(1 foot=0.3048006096)

Origin of coordinates: Cape Disappointment Lighthouse, Washington

Lat. 6°16' 1038 m. Coordinate value of origin} N. or S. 0.0 feet
Long. 124°03' 67 m. referred to the Zero} E. or W. 0.0 feet

Name of Station: X

Coordinates:	N. or S. 40,000 feet	=	12,192 m.
	E. or W. 160,000 feet	=	48,768 m.

Latitude N. - S. coordinates:

N. or S. 40,000 feet	=	12,192 m.
+ or - seconds in meters	=	1,038 m.
N. or S. of 46°16'	=	11,154 m.
*From table + or - 7'	=	12,968 m.
Lat. (uncorrected) 46°09'	=	1,814 m.
**Curvature --	=	194 m.
***Latitude 46°09'	=	1,620 m.

*From Special Publication No. 5, page 103.
**Correction from formula for curvature corrections, See Section C. below
***Use in taking out longitude values from Polyconic Projection Tables, Special Publication No. 5, C&GS, page 102.

Longitude E. - W. coordinates:

E. or W. 160,000 feet	=	48,768 m.
+ or - seconds in meters	=	67 m.
E. or W. of 124°03'	=	48,701 m.
***From table + or - 38'	=	48,914 m.
Longitude 123°25'		213 m.

b. Example No. 2

To compute the geographic position of a point whose local grid coordinates are 30,000 ft. N. and 155,000 ft. W.

(1 foot = 0.3048006096)

Origin of coordinates: Maryland

Lat. 38°20' 426 m. Coordinate value of origin} N. or S. 0.0 feet
Long. 75°10' 315 m. referred to the Zero } E. or W. 0.0 feet

Name of Station: Y

Coordinates:	N. or S.	30,000 feet	= 9,144 m.
	E. or W.	155,000 feet	= 47,244 m.

Latitude N. - S. coordinates:

N. or S.	30,000 feet	= 9,144 m.
+ or - seconds in meters		= 426 m.
N. or S. of 38°20'		= 9,570 m.
*From table + or - 5'		= 9,250 m.
Lat. (uncorrected) 38°25'		= 320 m.
**Curvature--		= 138 m.
***Latitude 38°25'		= 182 m.

Longitude E. - W. coordinates

E. or W. 155,000 feet = 47,244 m.
+ or - seconds in meters = 315 m.

E. or W. of 75°10' = 47,559 m.
***From table + or - 31' = 46,579 m

Longitude 75°42' 980 m.

*From Special Publication No. 5, page 87.
**Correction from formula for curvature corrections, see Section C. below
***Use in taking longitude values from Polyconic Projection Tables, Special Publication No. 5, C&GS, page 86.

c. Curvature Corrections (Example based on Example No. 1 above)

$$\text{Curvature correction (see note)} = A \times \left| \frac{\text{long}}{10{,}000} \right|^2$$

Case No. 1 (page 102): $8.15 \times \left| \frac{48{,}768}{10{,}000} \right|^2 = 194$ m.

NOTE: In computing A, use the interpolated uncorrected latitude of point whose geographic position is being computed (see table below.)

TABLE OF CURVATURE FOR 10,000 METERS

Lat.	A. meters	Lat.	A. meters	Lat.	A. meters	Lat.	A. meters
25°	3.65	31°	4.71	37°	5.90	43°	7.30
26°	3.82	32°	4.90	38°	6.12	44°	7.56
27°	3.99	33°	5.09	39°	6.34	45°	7.83
28°	4.16	34°	5.28	40°	6.57	46°	8.10
29°	4.34	35°	5.48	41°	6.80	47°	8.39
30°	4.52	36°	5.69	42°	7.05	48°	8.69

2.9.5 Projection Specifications
Revised by July 23, 2004 Memorandum and on June 14, 2004 by CO 005/04

2.9.5.1 Map Projections

Definition: **Map Projection.** A systematic drawing of lines on a plane surface to represent the parallels of latitude and the meridians of longitude of the earth or a section of the earth. A map projection may be established by analytical computation or may be constructed geometrically. [1]

Definition: **Graticule.** The network of lines representing meridians and parallels on a map, chart or plotting sheet. [1]

Projection lines are full lines extending from neatline to neatline. Projection lines shall be shown as continuous lines except where legibility is excessively impaired. Projection lines shall **ONLY** be deleted for large items such as the chart title, notes, bar scales, and a "1" sounding or other single-line features when aligned with the projection. Every effort shall be made to preserve the projection intersections that bound charted features.

The scale of a chart constructed on a Mercator projection is based on a parallel of latitude usually at or near the center of the chart. The scale of a chart constructed on a Polyconic projection is based on a central meridian of longitude. The central parallel (latitude) or the central meridian (longitude) at which a chart is constructed is **ALWAYS** published in the title block of the base chart. Whenever a chart shall include insets or extensions, these **MUST** be constructed on the same projection and with the same central parallel (or meridian) as the base chart. This is especially important when scaling or transferring information from the base chart to the inset or extension and vice versa. Exceptions **MUST** be approved by the Chief, Quality Assurance, Plans and Standards Branch.

NOTE: Historically, the two basic projections used by NOS have been Mercator and Polyconic. Although the Mercator projection remains the primary projection used for most NOS nautical charts, those NOS nautical charts originally constructed with a Polyconic projection (i.e., Great Lake charts) are, as resources permit, currently being converted to a Mercator projection. **ALL** New and Reconstructed charts shall be constructed on a Mercator projection and therefore based on a central parallel of latitude.

To comply with International Hydrographic Organization chart specifications (see Nautical Chart Manual, Section 2.5.9, Chart Size), neatline dimensions of all New and Reconstructed Charts should not exceed 750 millimeters by 1,100 millimeters. Only in exceptional cases may these neatline dimensions be extended (i.e., to include navigationally critical features). This will enable most charts to be printed on the standard metric A0 (pronounced "A Zero") paper size of 841 millimeters by 1,189 millimeters. (See Nautical Chart Manual, Section 2.10.1.5, International Border Dimensions to obtain the specifications for charting neatline dimension values.)

2.9.5.2 Projection Line Intervals

Definition: **Interval.** The extent of difference/distance between two qualities; conditions. [42]

The interval of projection lines is always dictated by the scale of the chart, inset, extension, etc. The interval in which projection lines shall be constructed shall be based on the following National Ocean Service specifications:

Scale of Chart	Interval of Projection Lines	Scale of Chart	Interval of Projection Lines
1: 5,000	30"	1: 300,000	30°
1: 10,000	1'	1: 400,000	30°
1: 15,000	1'	1: 500,000	1°
1: 20,000	2'	1: 600,000	1°
1: 30,000	2'	1: 700,000	1°
1: 40,000	5'	1: 800,000	1°
1: 50,000	5'	1: 1,000,000	2°
1: 60,000	5'	1: 1,500,000	2°
1: 80,000	10'	1: 2,000,000	2°
1: 100,000	10'	1: 3,000,000	5°
1: 125,000	10'	1: 4,000,000	5°
1: 200,000	20'	1: 5,000,000	5°
1: 250,000	20'	1: 10,000,000	10°

Figure 2-6

The interval of graduation numbering is chosen from the sequence: 30", 1', 2', 5', 10', 20', 30', 1°, 2°, 5° and 10°. Equal intervals of subdivision, numbering and dicing are normally given for latitude and longitude. **ALL** parallels and meridians shown **SHALL** be numbered.

Intervals between projection lines should not exceed 20 centimeters nor be closer than 10 centimeters regardless of scale. The major exceptions to this policy are 1:40,000-scale small-craft charts with a 2-minute projection interval, and 1:40,000-scale and 1:80,000-scale conventional charts with 5-minute and 10-minute projection intervals, respectively. On occasion, intervals between meridians may be less than 10 centimeters in the higher latitudes where parallel and meridian intervals differ greatly. Similarly, intervals between parallels may be slightly greater than 20 centimeters so that the meridians will not be awkwardly close. This shall be individually determined either by chart series or individual chart.

Figure 2-7, which is a proximate reciprocal of Figure 2-6, shows the scale limits between which various latitude intervals fall into the 10- to 20- centimeter spacing.

PROJECTION LINE INTERVALS

Projection Interval (Latitude)	**Limiting Scales**	
	20-cm Spacing	10-cm Spacing
15"	2,315	4,630
30"	4,630	9,260
1'	9,260	18,520
2'	18,520	37,040
5'	46,300	92,600
10'	92,600	185,200
15'	138,900	277,800
20'	185,200	370,400
30'	277,800	555,600
1°	555,600	1,111,200

Figure 2-7

2.9.5.3 Subdivision of Selected Projection Lines
Revised on August 21, 2012 by CO 001/12

General Requirements:

1. Authority.

To assist mariners in plotting positions, selected projection lines shall be subdivided and labeled on nautical chart panels specifically authorized by the Chief, Marine Chart Division. At present, skewed chart panels, small-craft charts and charts based on polyconic projections are excluded from consideration.

2. Requirements for Authorized Charts Only.

Alternating projection lines shall be subdivided along their entire lengths. The projection lines to be subdivided shall be selected in a manner that assures that a chart displays subdivisions along at least one projection line of latitude and one projection line of longitude when the chart is folded in quarters. It is preferable that the projection lines selected for subdivision not be in close proximity to the chart borders.

The selected projection lines shall be subdivided along their entire lengths at major intervals, intermediate intervals and minor intervals. The spacing of major intervals, intermediate intervals, and minor intervals is dependent on the charted projection interval and the scale of the chart panel. Subdivision intervals are specified in Figure 2-8.

SUBDIVISION INTERVALS

PROJECTION INTERVAL	SCALE	MAJOR INTERVAL	INTERMEDIATE INTERVAL	MINOR INTERVAL
12"	All Scales	6"	None	1"
24"	All Scales	6"	None	1"
30"	All Scales	6"	None	1"
36"	All Scales	6"	None	1"
1'	1:1 to 1:25,000	30"	6"	1"
1'	1:25,001 to 1:40,000	30"	None	6"
1'	1:40,001 and smaller	30"	None	None
2'	1:1 to 1:25,000	1'	30"	6"
2'	1:25,001 and smaller	1'	30"	6"
4'	All Scales	1'	30"	6"
5'	1:1 to 1:100,000	1'	30"	6"
5'	1:100,001 and smaller	1'	None	30"
10'	1:1 to 1:80,000	5'	1'	6"
10'	1:80,001 to 1:100,000	5'	1'	12"
10'	1:100,001 and smaller	5'	1'	30"
15'	All Scales	5'	1'	30"
20'	All Scales	10'	1'	30"
30'	All Scales	10'	5'	1'
1°	All Scales (except Chart 14500)	20'	5'	1'
1°	Chart 14500 only	10'	None	None
2°	All Scales	1°	30'	5'
5°	All Scales (except Chart 530)	1°	15'	5'
5°	Chart 530 only	1°	None	15'
10°	Chart 50 only	5°	1°	30'

Figure 2-8

Some small chart panels have existing projection lines which do not accommodate the above scheme. In such cases, the existing projection lines must be deleted and new projection lines selected to accommodate projection subdivisions based on tenths of a minute, fractions of tenths of a minute or multiples of tenths of a minute. New projection lines shall be selected only with prior approval of the Chief, Cartographic Systems and Standards Branch.

To accommodate subdivision of selected projection lines, border scale graduation along the neatline must agree with Chart Specifications of the IHO, Section 200 and "International 2, Borders, Graduation, Grids and Linear Scales" (INT 2), which is an ANNEX to Chart Specifications of the IHO, Section 200.

Any chart border that is based on a subdivision scheme other than tenths of a minute (6 seconds), or multiples of tenths of a minute, must be converted before selected projection lines can be subdivided. Under no circumstances may a chart panel show a ten second border scale graduation and a six second projection line subdivision.

A sample section of a chart with selected subdivided projection lines is shown in Figure 2-9.

Line Type and Weight:

Subdivision ticks intersecting selected projection lines at major intervals shall be charted with a solid line, 0.1 mm line weight, 4.0 mm long.

Subdivision ticks intersecting selected projection lines at intermediate intervals shall be charted with a solid line, 0.1 mm line weight, 3.0 mm long.

Subdivision ticks intersecting selected projection lines at minor intervals shall be charted with a solid line, 0.1mm line weight, 2.0 mm long.

Location and Orientation:

Subdivision ticks charted at major, intermediate and minor intervals shall be charted perpendicular to the selected projection lines they intersect and shall extend on both sides of those selected projection lines.

Labels and Notes:

Projection line subdivision ticks and subdivided projection line intersections shall not be labeled. Existing labels shall be deleted when a new edition is produced.

Color and Screening:

Ticks subdividing projection lines and all associated labeling shall be charted in black.

SAMPLE PROJECTION LINE SUBDIVISION

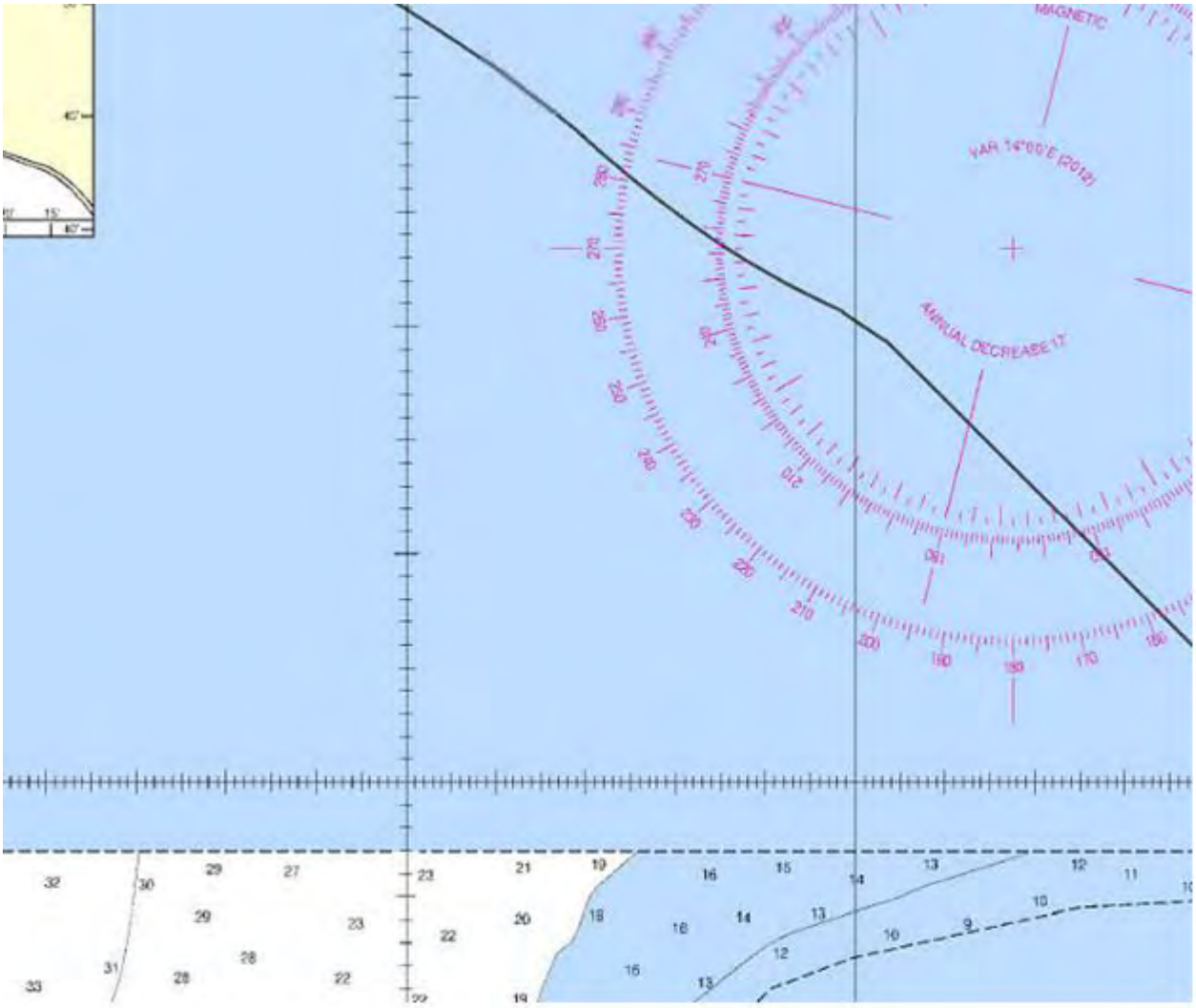

Figure 2-9

2.10 Chart Scales

Nautical charts have a variety of scales used for plotting, scaling and conversions. The style, placement and selection of the scales will vary from chart to chart depending on the type of chart, area of coverage and primary chart user. The following guidelines/specifications should be used in selecting the proper scale and format for each chart.

2.10.1 Border Scales

Four basic styles of border scales are currently in use on National Ocean Service charts. They are the standard Coast Survey chart border, the Great Lakes chart border, the small-craft chart border and the international chart border. A number of variations to these styles have also come into use over the years.

To comply with the specifications published in Section 200 of the International Hydrographic Organization Chart Specifications, and its ANNEX– INT 2, "Borders, Graduation, Grids and Linear Scales", National Ocean Service charts shall now have the international style border and graduation pattern. Specific guidelines for applying the international specifications to NOS charts are provided in Sections 2.10.1.5 through 2.10.1.12.

The guidelines provided have been adapted from the official specifications published by the International Hydrographic Organization, and include those specifications, developed by the Quality Assurance, Plans and Standards Branch, of relevant items left to the discretion of each individual Hydrographic office (e.g., type font and size; minor subdivision unit to be indicated, etc.).

> The specifications developed by the Quality Assurance, Plans and Standards Branch are not enumerated as such. For this reason, the Nautical Chart Manual shall be used as the authoritative source for border specifications.

Definition: **Chart Border.** A line which serves as an enclosing boundary and which encompasses the neatline and graphic area of a nautical chart. [10] See Figures 2-11 and 2-12 for examples.

Definition: Graduation. The division and subdivision of latitude and longitude shown in the borders of a chart at the outside of the neatline. [17]

Definition: **Neatline.** Line separating the body of a chart from the chart border. [17]

2.10.1.1 Plan Borders and Scale Borders

International borders consist of two mutually exclusive styles (or types) and **are based on the scale of the chart.** These two styles are: plan and scale.

Definition: **Plan Border.** The type of border used by a large scale map or chart of a small area. NOS charts having a chart scale larger than 1:50,001 shall have plan borders. [1] (See Figure 2-11)

Definition: **Scale Border.** The type of border used by a small scale map or chart of a large area. NOS charts having a chart scale of 1:50,001 and smaller shall have a scale border. [1] (See Figure 2-12)

2.10.1.2 Implementation of the IHO Chart Specifications for Borders

Due to a number of factors, the implementation of IHO chart specifications for borders is not currently applicable to all NOS charts. The following paragraphs delineate these factors (with respect to currently charted border styles) and enumerate the applicability of IHO border and graduation specifications.

Specific guidelines for applying the international specifications to NOS charts are provided in Sections 2.10.1.5 through 2.10.1.12.

NOS implementation of the IHO specifications for borders and graduation will:

(1) Standardize most MCD nautical chart borders with the IHO specifications, (NOTE: Small-craft charts and charts having a skewed or Polyconic projection shall not be revised),

(2) Provide continuous graduation and labeling along neatlines, and

(3) Revise the graduation units to a system based on one-tenth of a minute (6 seconds).

The following four sections differentiate implementation requirements/considerations for **ALL** National Ocean Service chart products.

A. Existing NOS Conventional Charts

In order to obtain uniformity and compatibility between charts printed by different nations, the IHO recommends the use of a standard metric A0 (pronounced "A Zero") paper size, defined as

having dimensions of 841 millimeters x 1,189 millimeters (33.1 inches x 46.81 inches) and an internationally accepted maximum chart neatline size of 750 millimeters x 1,100 millimeters. Many existing NOS charts have neatline sizes larger than this desired maximum size. To comply with the IHO size requirements, many existing NOS charts would require changes in chart scale or limits.

In addition, many NOS margin/border notes were placed based on distances from the traditional borders. To comply with the IHO size requirements, many existing borders would have to be extended, and, although there is no mandatory requirement that all charts fit A0 neatline or paper size, the extension of many NOS borders would exceed NOS maximum paper size requirements (i.e., 42.5 inches by 59.875 inches).

Therefore, taking into consideration practical production factors including paper sizes, margin/border note recollection, and Print-on-Demand requirements, the standardization of existing NOS conventional chart neatlines and borders **shall only involve the revision of the existing graduation to the appropriate international style graduation pattern specified for the particular chart scale** (see Section 2.10.1.8); **and the deletion of the 0.1mm inner border line**. (See Figure 2-10)

The 1.5 millimeter black border on an existing NOS conventional chart border **shall not be shifted or moved** from its current location **nor shall it be revised from its current line weight** of 1.5 millimeters to the IHO specified width of 1.0 millimeter.

Existing inner borders (see Figure 2-10) shall be deleted from **ALL** conventional charts.

See Nautical Chart Manual, Section 2.10.1.5 for the dimensions and graphic representations of the conversion of existing NOS conventional charts to IHO specifications.

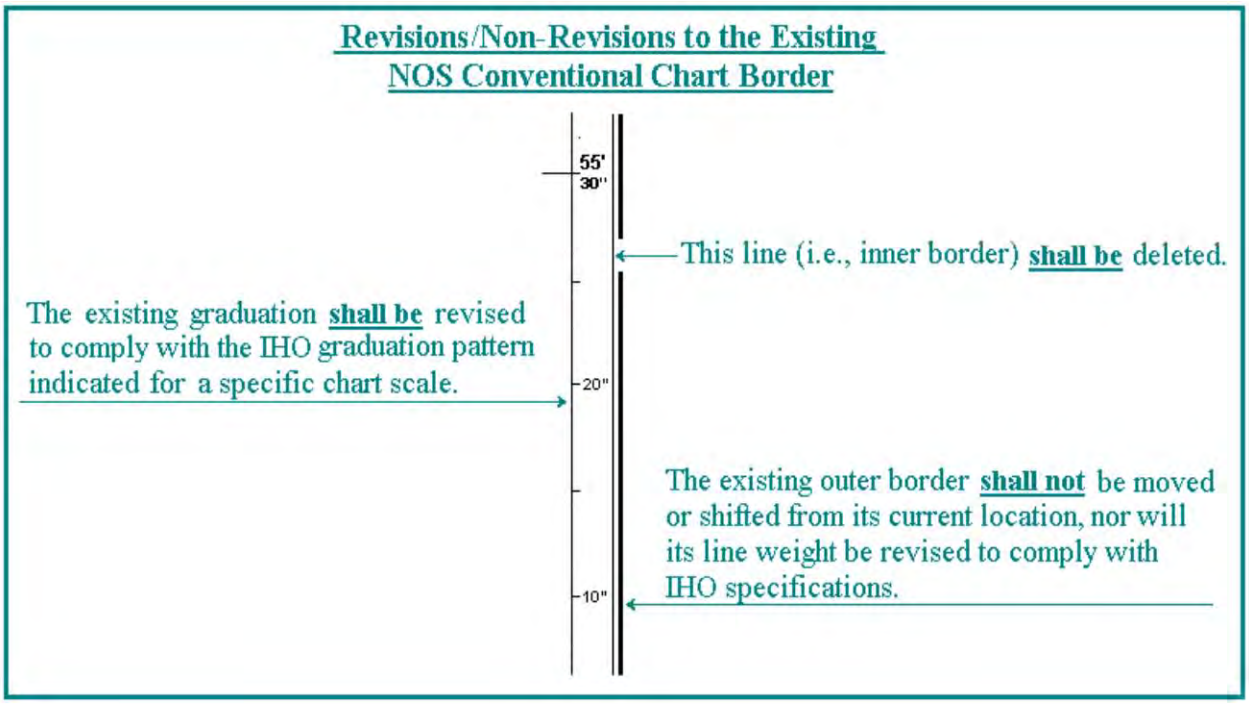

Figure 2-10

B. Polyconic Charts, Small-Craft Charts and Charts with a Skewed Projection

Polyconic charts, small-craft charts and charts having a skewed projection shall **NOT** be converted to the IHO format. It shall be the responsibility of the Chief, Marine Chart Division, to determine the feasibility of re-formatting or reconstructing charts in these categories, to comply with established IHO specifications.

C. Nautical Charts Previously Constructed with International Style Chart Borders

Nautical charts previously constructed with international style chart borders shall be re-evaluated for specific compliance to the IHO/NOS border/neatline specifications provided in the following Nautical Chart Manual, Sections 2.10.1.5 through 2.10.1.12. Included in these sections are those specifications, developed by the Quality Assurance, Plans and Standards Branch, of relevant items left to the discretion of each individual Hydrographic Office. Because these specifications may or may not affect currently charted international borders, compliance to the provided specifications will have to be assessed on a chart by chart basis.

D. Non-Standard Variations in Border Styles

Any existing nautical chart that does not conform to one of the basic border styles or which cannot be converted to the IHO/NOS specifications provided in Nautical Chart Manual, Sections 2.10.1.5 through 2.10.1.12 shall be referred to the Chief, Quality Assurance, Plans and Standards Branch for evaluation.

2.10.1.3 International Border Component Identification

The purpose of this section is to identify the component parts of international style borders. Each graphic example provided shall apply to the specific chart classification(s), chart printing(s) and chart scale(s) indicated in the associated table. [NOTE: Graphic examples are not shown to scale and have been enlarged for illustrative purposes. Graphic lines and labels indicated in black represent information as it shall be printed on the nautical chart. Lines, labels and arrows indicated in green are not to be printed on the nautical chart and are only being provided as descriptive elements.]

Cross-references to International 2 (INT 2), "Borders, Graduation, Grids and Linear Scales", have also been provided and are indicated in Figure 2-64 in the following parallel format: (T)

Note: There are *two* International Border Component Identification Figures. Figure 2-11 delineates the IHO PLAN Border and Figure 2-12, the IHO SCALE Border.

Definitions: **Chart Classification.** The three categories of charts produced by NOS (i.e., conventional, small-craft and marine facility). (See Nautical Chart Manual, Section 1.3, Chart Classification)

Chart Printing. Chart production terminology indicating the type of chart edition to be published. The primary types of chart printings are a New Edition (i.e., existing chart), a Reconstructed Chart or a New Chart. (See Nautical Chart Manual, Section 1.4, Chart Production Terminology)

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Component Identification: International PLAN Border	
Chart Classifications Affected:	Conventional
Chart Printings Affected:	New Editions, Reconstructed Charts, New Charts
Charts Scales Affected:	Larger than 1:50,001

- Corresponding border dimensions are provided in Figures 2-15 and 2-17.

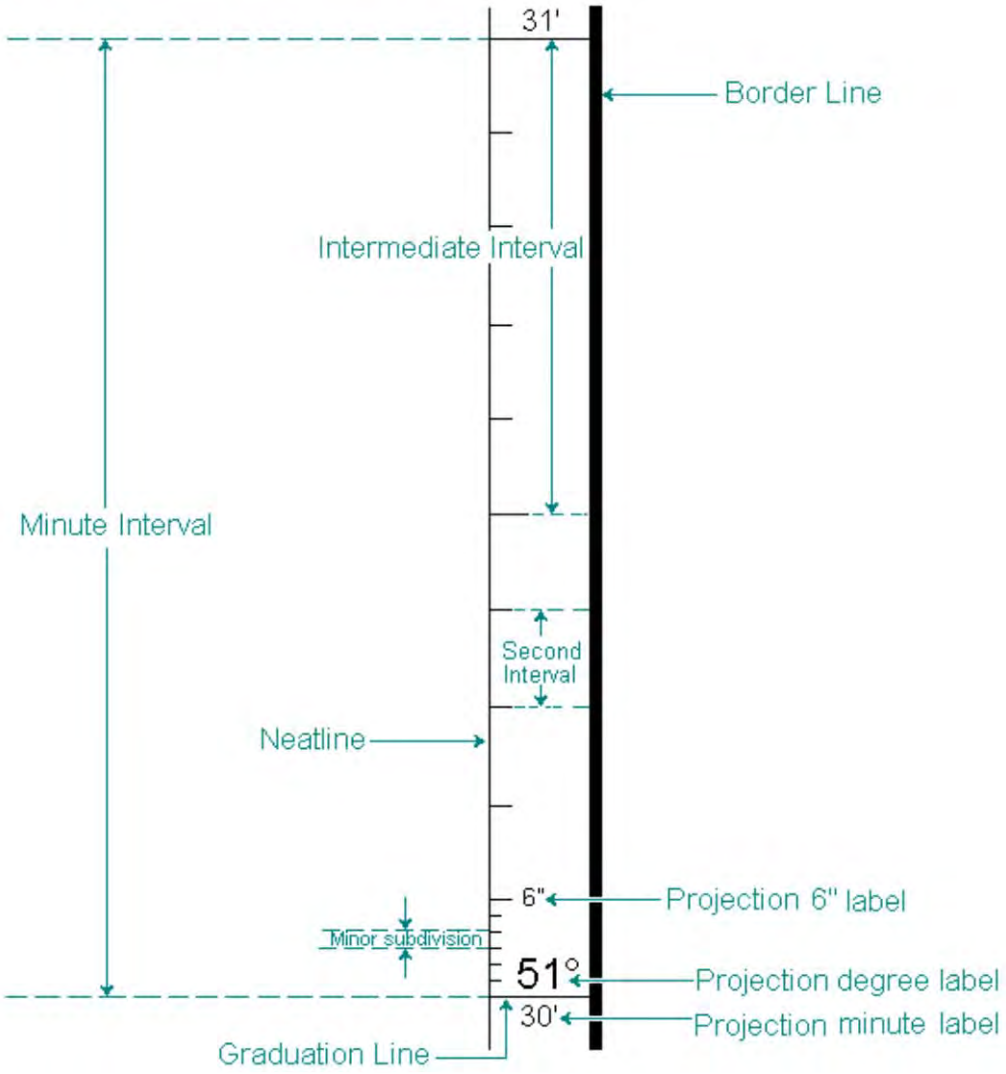

Figure 2-11

Component Identification: International SCALE Border	
Chart Classifications Affected:	Conventional
Chart Printings Affected:	New Editions, Reconstructed Charts, New Charts
Charts Scales Affected:	1:50,001 and smaller

- **ALL** corners for SCALE borders shall be mitred.
- Corresponding border dimensions are provided in Figures 2-16 and 2-18.

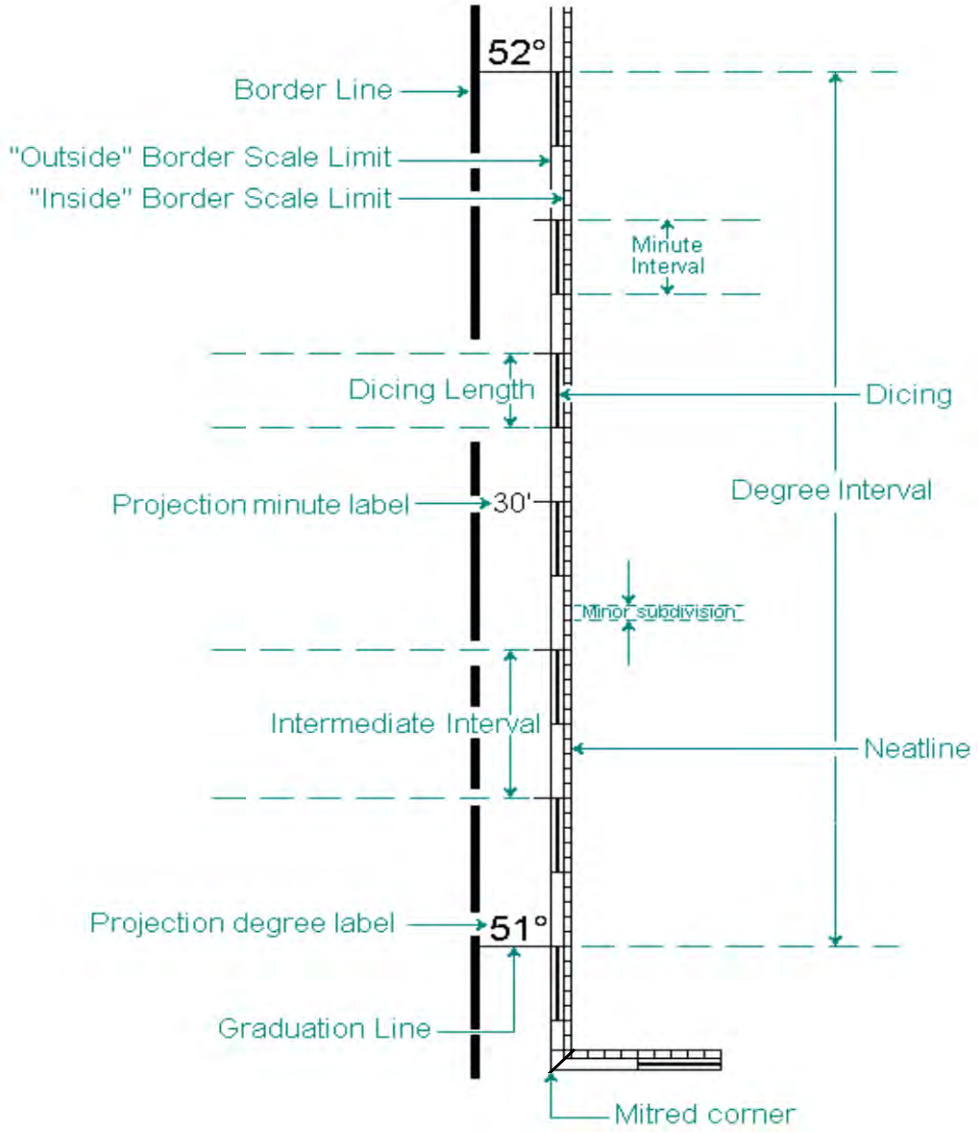

Figure 2-12

2.10.1.4 Table of Contents, Compilation Flow Chart and Figure Index

Due to the complexity and volume of the extraordinarily detailed information provided on the following pages, a Table of Contents, Compilation Flow Chart and a Figure Index, having the below listed objectives, are being provided.

A. Objectives:

1. To aid in the identification of the IHO/NOS components and border dimensions required for a specific chart scale,

2. To aid in the identification of the IHO/NOS border dimensions required for a New Edition of an NOS conventional nautical chart,

3. To aid in the identification of the IHO/NOS border dimensions required for a Reconstruction and a New Chart,

4. To aid in the identification of the IHO/NOS graduation pattern required for a specific chart scale, and

5. To aid in the identification of specific graduation pattern diagrams and nautical chart examples.

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CONSTRUCTION OF INTERNATIONAL BORDERS
TABLE OF CONTENTS

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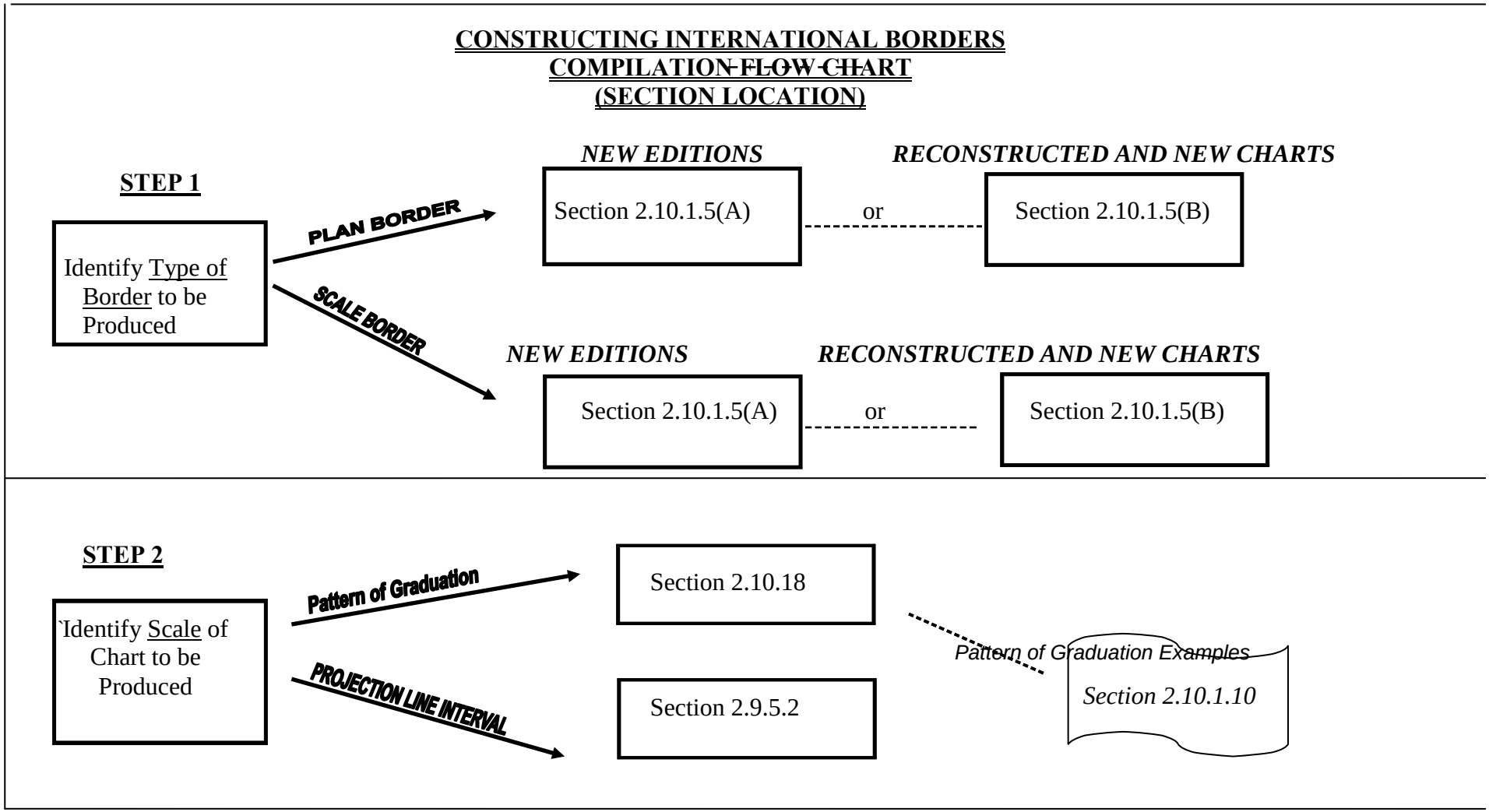

Figure 2-13

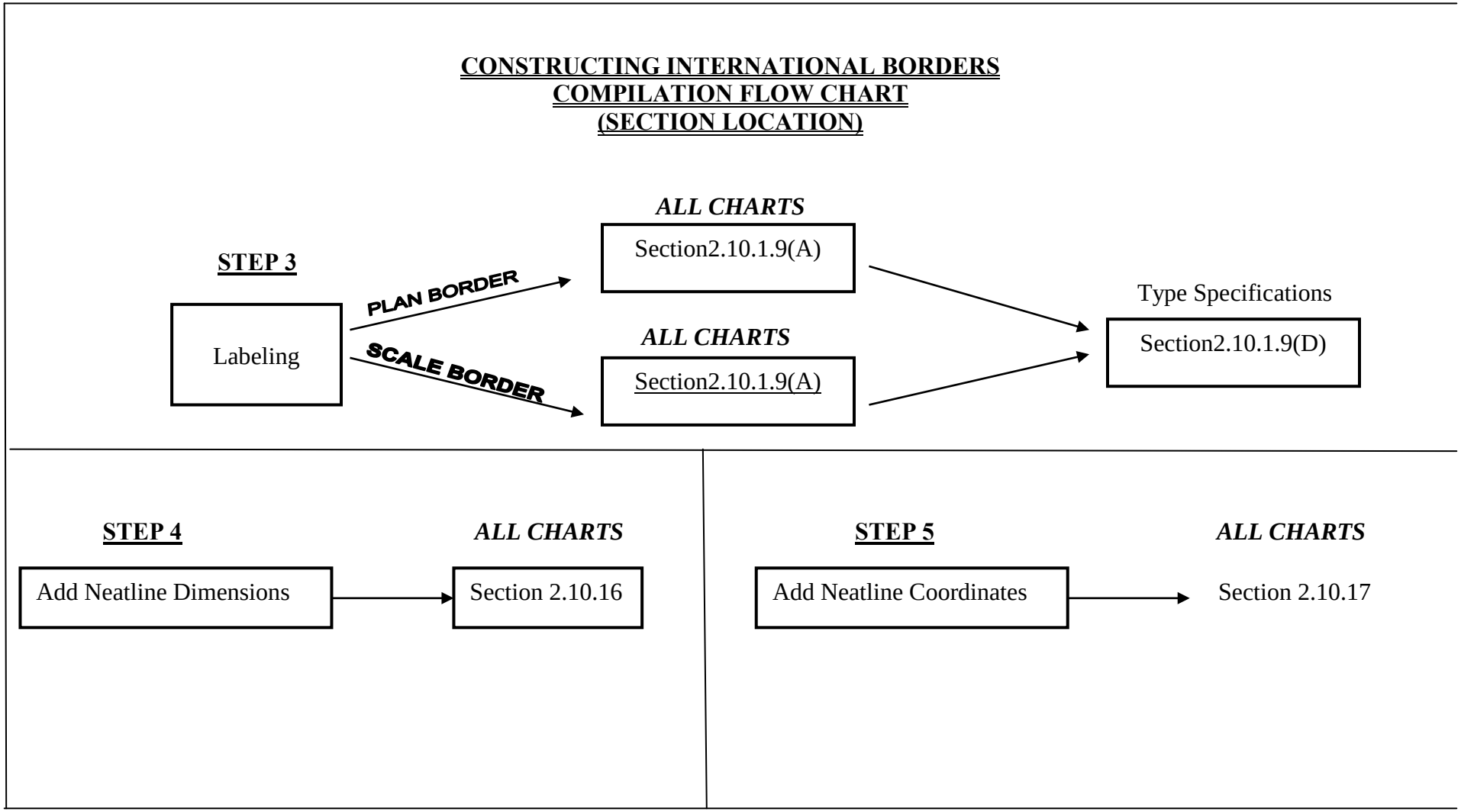

Figure 2-14

IHO/NOS Border Dimensions and Graduation Patterns Figures Index

IHO/NOS Border Dimensions

(Section 2.10.1.5)

New Editions	
Scale of Chart	**Figure Number**
Larger than 1:50,001	2-15
1:50,001 and smaller	2-16

Reconstructed and New Charts	
Scale of Chart	**Figure Number**
Larger than 1:50,001	2-17
1:50,001 and smaller	2-18

IHO/NOS Pattern of Graduation Diagrams Examples

(Section 2.10.1.8)

Scale of Chart	Figure Number	Example ID
Larger than 1:5,001	2-42	**1**
1: 5,001 **to** Larger than 1: 50,001	2-43	**2**
1:50,001 **to** Larger than 1:100,001	2-44	**3**
1:100,001 **to** Larger than 1:200,001	2-45	**4**
1:200,001 **to** Larger than 1:500,001	2-46	**5**
1:500,001 **to** Larger than 1:1,500,001	2-47	**6**
1:1,500,001 **to** Larger than 1:2,250,001	2-48	**7**
1:2,250,001 **to** Larger than 1:4,750,001	2-49	**8**
1:10,000,000	2-50	**9**

IHO/NOS Pattern of Graduation - Chart

(Section 2.10.1.10)

Scale of Chart	Figure Number
Larger than 1: 5,001	2-22
1: 5,001 **to** Larger than 1: 50,001	2-23
1:50,001 **to** Larger than 1:100,001	2-24
1:100,001 **to** Larger than 1:200,001	2-25
1:200,001 **to** Larger than 1:500,001	2-26
1:500,001 **to** Larger than 1:1,500,001	2-27
1:1,500,001 **to** Larger than 1:2,250,001	2-28
1:2,250,001 **to** Larger than 1:4,750,001	2-29
1:10,000,000	2-30

Other IHO/NOS Border Specifications Figures

Topic	Section Number	Figure Number
(IHO) Adjacent Borders: Dimensions, Line and Type Specifications (Conventional Charts Only)	2.10.1.12	2-59 through 2-63
Charting of Neatline Dimensions	2.10.1.6	2-19
Charting of Neatline Coordinates	2.10.1.7	2-20
Component Identification: International PLAN Border	2.10.1.3	2-11
Component Identification: International SCALE Border	2.10.1.3	2-12
Figure Cross-Reference to International 2 (INT 2) - "Borders, Graduation, Grids and Linear Scales"	2.10.1.13	2-64
Flow Chart (Constructing International Borders)	2.10.1.4	2-13 and 2-14
Insets Placed within a PLAN Border	2.10.1.11 (G)(1.)	2-52 through 2-54
Insets Placed within a SCALE Border	2.10.1.11 (H)(1.)	2-55 through 2-58
Inset Placement Near a Corner of the Main Panel	2.10.1.11 (A)(2.)	2-51
Interval of Projection Lines *(Indicates the interval in which projection lines on NOS nautical charts shall be constructed.)*	2.9.5.2	2-6
Labeling: Interval of Label Placement	2.10.1.9	2-41
Labeling: PLAN Borders	2.10.1.9 (A)	2-31 through 2-34
Labeling: SCALE Borders	2.10.1.9 (B)	2-35 through 2-39
Labeling: Type Specifications	2.10.1.9 (D)	2-40
Projection Line Intervals (*Demonstrates scale limits between which various latitude intervals fall into the 10- to 20- centimeter spacing)*	2.9.5.2	2-7
Revisions/Non-Revisions to the Existing NOS Conventional Chart Border	2.10.1.2 (A)	2-10
Subdivision Intervals	2.9.5.3	2-8

2.10.1.5 International Border Dimensions

A. New Editions (of Conventional Charts)

The dimensions of existing NOS conventional chart borders shall be revised to agree with the values provided in Figures 2-15 and 2-16. Figure 2-15 represents the dimensions for a PLAN border and Figure 2-16, a border requiring the SCALE format.

NOTE: The outer limit of the border on existing NOS conventional charts **shall not be moved** from its current location, **nor shall its line weight be revised**.

Although the specifications for independent components are also provided in Figures 2-15 and 2-16, from a practical perspective, **ALL** line weights shall be 0.1 millimeters, with the exception of the Border (1.5mm) and, when applicable, dicing (0.2mm).

Corresponding component identification graphics for a PLAN border and a SCALE border are provided in Figures 2-11 and 2-12, respectively.

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International PLAN Border Dimensions
(For New Editions of Conventional Charts - scales larger than 1: 50,001)

Component	Line Weight	Length	Distance between
(a.) Border Line	1.5mm		
(b.) Graduation Line	0.1mm	* 9.0mm	
(c.) Distance between border and neatline			* 9.0mm
(d.) Intermediate Interval Tick	0.1mm	** 3.0mm	
(e.) Second Interval Tick	0.1mm	** 1.5mm	
(f.) Minor Subdivision Tick	0.1mm	** 0.8mm	
(g.) Neatline	0.1 mm		

Values highlighted in yellow represent the only variations between the comprehensive IHO dimensions and NOS specifications for New Editions of conventional nautical charts.

* *Length of line or distance, as measured from center of border line to center of neatline.*

** *Length of line, as measured from outer edge of tick to center of neatline.*

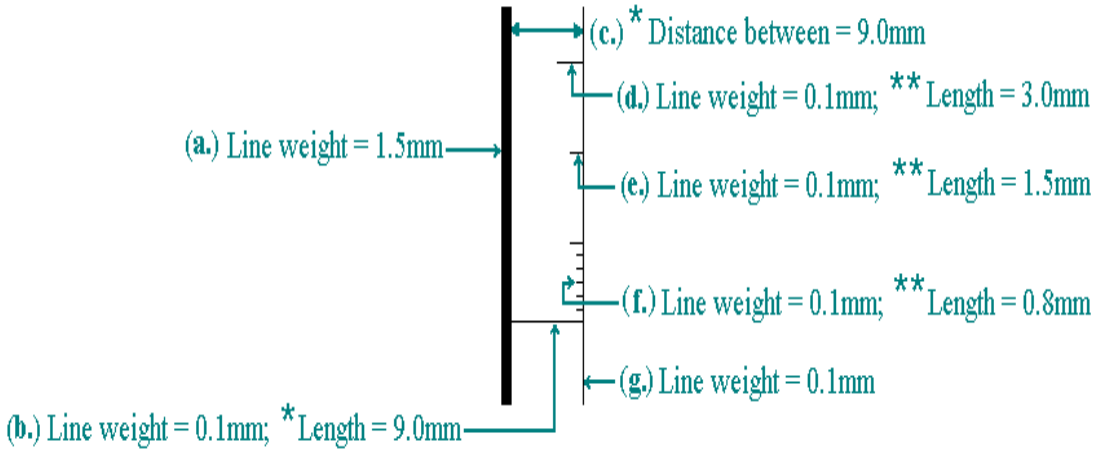

Figure 2-15

International SCALE Border Dimensions
(For New Editions of Conventional Charts - scales 1:50,001 and smaller)

Component	Line Weight	Length	Distance between
(a.) Border Line	1.5mm		
(b.) Distance between border and neatline			* 9.0mm
(c.) Graduation Line	0.1mm	** 7.0mm	
(d.) Minor Subdivision Tick	0.1 mm	*** 0.8mm	
(e.) Intermediate Interval Tick	0.1mm	+ 1.5mm	
(f.) Distance between neatline and limit of border scales			++ 2.0mm
(g.) Distance between neatline and limit of border scales			++ 0.8mm
(h.) Dicing	0.2mm		
(i.) Minute Interval Tick	0.1mm	+++ 2.0mm	
(j.) Neatline	0.1mm		
(k.) **"Inside" border scale limit**	**0.1mm**		
(l.) **"Outside" border scale limit**	**0.1mm**		

Values highlighted in yellow represent the only variations between the comprehensive IHO dimensions and NOS specifications for New Editions of conventional nautical charts.

* *Distance, as measured from center of border line to center of neatline.*

** *Length of line, as measured from center of border line to center of "outside" border scale limit.*

*** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

\+ *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*

++ *Distance, as measured from center of border scale limit to center of neatline.*

+++ *Length of line, as measured from center of "outside" border scale limit to center of neatline.*

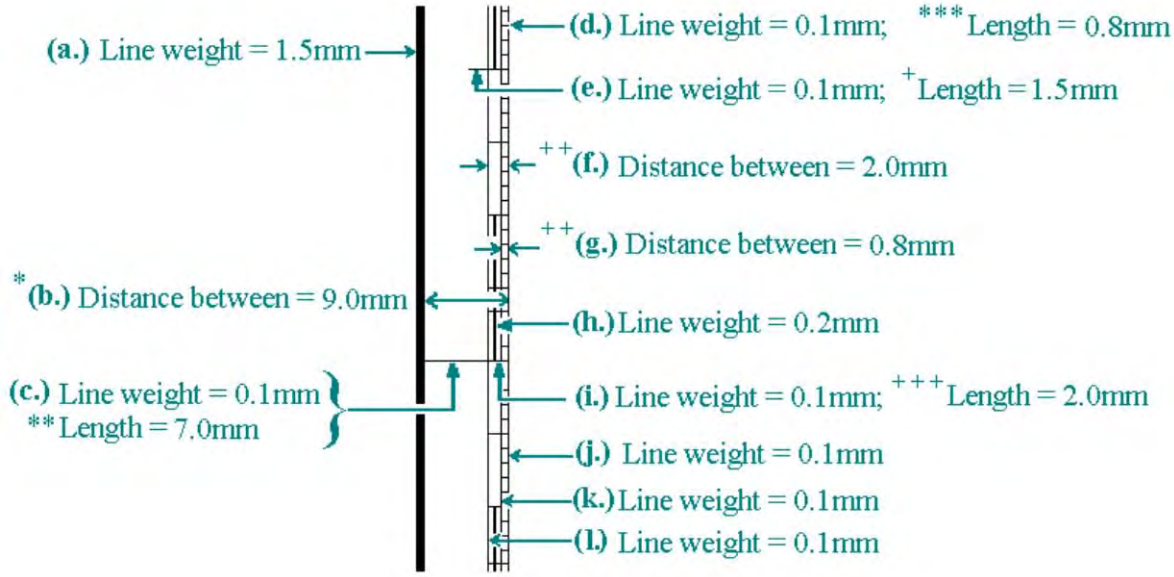

Figure 2-16

B. **RECONSTRUCTED** and **NEW** Conventional Charts

The borders on all Reconstructed and New NOS conventional charts shall be constructed based on the following IHO specified dimensions. PLAN borders shall be used for chart scales larger than 1:50,001 (Figure 2-17); SCALE borders shall be used for chart scales 1:50,001 and smaller (Figure 2-18).

Component	Line Weight	Length	Distance between
(a.) Border Line	1.0mm		
(b.) Graduation Line	0.1mm	* 11.5mm	
(c.) Distance between border and neatline			* 11.5mm
(d.) Intermediate Interval Tick	0.1mm	** 3.0mm	
(e.) Second Interval Tick	0.1mm	** 1.5mm	
(f.) Minor Subdivision Tick	0.1mm	** 0.8mm	
(g.) Neatline	0.1mm		

* *Length of line or distance, as measured from center of border line to center of neatline.*
** *Length of line, as measured from outer edge of tick to center of neatline.*

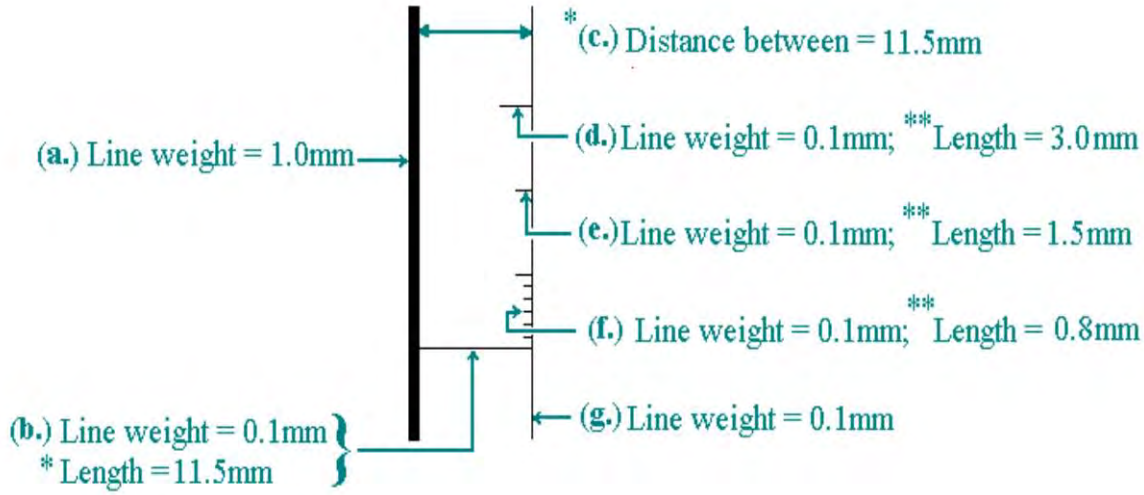

Figure 2-17

International SCALE Border Dimensions
(For Reconstructed and New Charts - scales 1:50,001 and smaller)

Component	Line Weight	Length	Distance between
(a.) Border Line	1.0mm		
(b.) Distance between border and neatline			* 11.5mm
(c.) Graduation Line	0.1mm	** 9.5mm	
(d.) Minor Subdivision Tick	0.1mm	*** 0.8mm	
(e.) Intermediate Interval Tick	0.1mm	+ 1.5mm	
(f.) Distance between "outside" border scale limit and Neatline			++ 2.0mm
(g.) Distance between "inside" border scale limit and Neatline			++ 0.8mm
(h.) Dicing	0.2mm		
(i.) Neatline	0.1mm		
(j.) "Inside" border scale limit	0.1mm		
(k.) "Outside" border scale limit	0.1mm		
(l.) Minute Interval Tick	0.1mm	+++ 2.0mm	

* *Distance, as measured from center of border line to center of neatline.*

** *Length of line, as measured from center of border line to center of "outside" border scale limit.*

*** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

\+ *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*

++ *Distance, as measured from center of "inside" border scale limit to center of neatline.*

+++ *Length of line, as measured from center of "outside" border scale limit to center of neatline.*

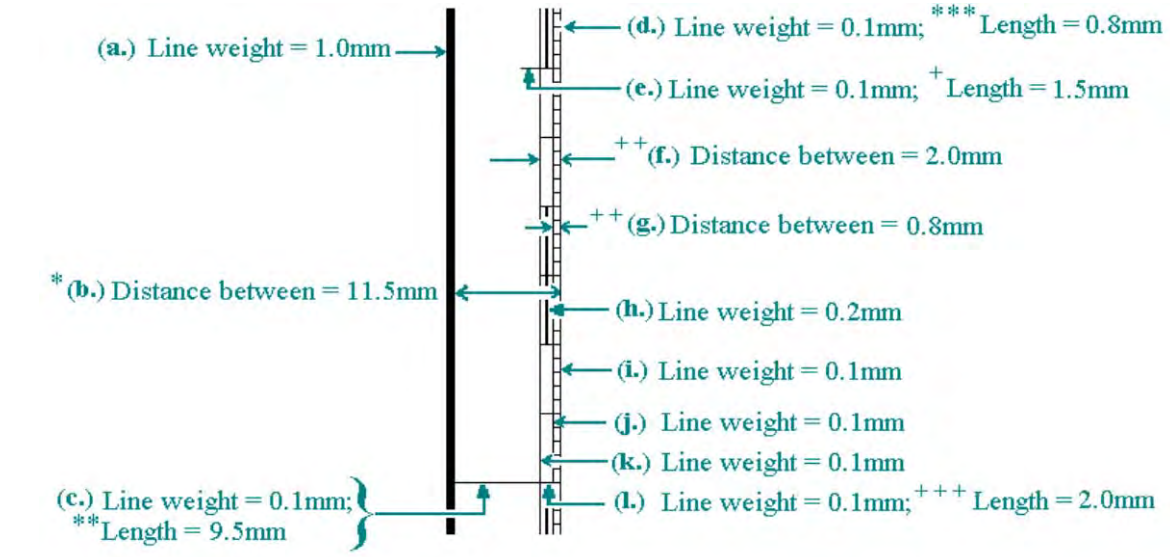

Figure 2-18

2.10.1.6 Charting of Neatline Dimensions
Revised by June 15, 2004 Memorandum

The international chart border scheme shall include the charting of the neatline dimension values. However, neatline dimensions shall **not** be charted for insets. (NOTE: Neatline dimensions do not include detail extending beyond the neatline.)

A. Composition of Neatline Dimension Values

1. The north-south dimension shall **ALWAYS** be expressed first.

2. All values shall be expressed in millimeters to one decimal place (e.g., 980.5 X 650.5 mm). Values beyond one decimal place shall be truncated. Values calculated as whole numbers shall also be expressed to one decimal place (e.g., 860 millimeters shall be charted as 860.0).

3. The two component values shall be separated by the function symbol (Capital X).

4. The unit label for millimeters (i.e., mm) shall be placed after the last numeric value only, and shall not be followed by a period.

5. The neatline dimension values shall not be enclosed by parentheses.

B. Location of Neatline Dimension Values

(NOTE: Neatline dimensions shall not be shown for insets.)

Neatline Dimension Values shall be:

1. Located within the chart border.

2. Placed **ONLY** in the lower right-hand corner of the border.

3. Centered vertically between the outside edge of the neatline and the inside edge of the border line for a PLAN border; centered vertically between the outside edge of the graduation pattern and the inside edge of the border line for a SCALE border.

4. Located horizontally:

   a. PLAN Border - Right justified to the outside edge of the *conceivable* extension of the y-axis. See Figure 2-19, A.

   b. SCALE Border - Right justified to the outside edge of the y-axis formed by the *conceivable* extension of the outside edge of the graduation pattern. See Figure 2-19, B.

b. Alternate Preference - The first available lateral space between the longitudinal labels. See Figures 2-19, C.

C. Label Specifications for Neatline Dimension Values

1. A neatline dimension value shall be charted in black 5 point Swiss Light Vertical type.

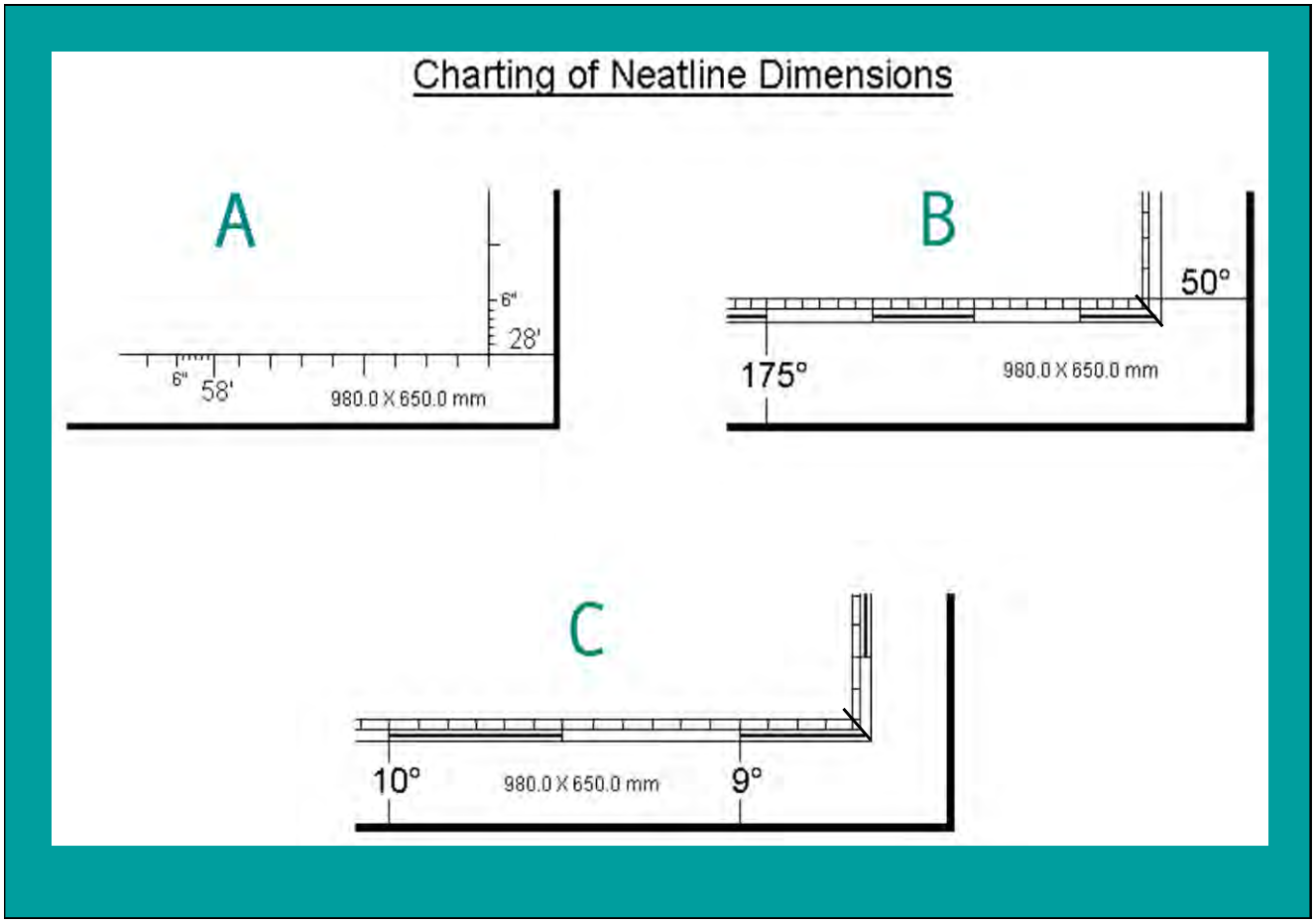

Figure 2-19

2.10.1.7 Charting of Neatline Coordinates

The international chart border scheme shall include the charting of the neatline coordinates. Neatline coordinates, unlike neatline dimension values, shall be charted on **ALL** chart panels (i.e., KAPPS).

A. Composition of Neatline Coordinates

1. Neatline coordinates shall represent the geographic position of the neatline corners.

2. Neatline coordinates shall be expressed in the conventional manner of degrees, minutes, and seconds.

   a. All New and Reconstructed Charts shall be constructed and expressed in degrees, minutes and even seconds.

   b. Existing Charts may be expressed in degrees, minutes and to the tenth of a second. Values beyond one decimal place shall be truncated.

   c. An existing chart can have a combination of coordinates expressed to the even second and coordinates expressed with a decimal second value.

3. Neatline Coordinates shall be followed by the appropriate designator (i.e., N, S, E or W). See Figure 2-20. The directional designator shall not be followed by a period.

B. Location of Neatline Coordinates

1. Neatline Coordinates shall be:

   a. located inside the neatline, and

   b. placed in both the lower left-hand and upper right-hand corners.

2. Latitudinal Coordinates shall run parallel with lines of latitude.

3. Longitudinal Coordinates shall run parallel with lines of longitude.

4. Latitudinal and Longitudinal values shall be aligned 1.0mm from the inside edge of the neatline.

5. Coordinates in the lower left-hand corner shall commence and be spaced 3.0mm from the perpendicular inside edge of the neatline corner. (See Figure 2-20, A)

   The longitudinal coordinate in the upper right-hand corner shall commence and be spaced 3.0mm from the perpendicular inside edge of the neatline corner. (See Figure 2-20, B)

   The latitudinal coordinate in the upper right-hand corner shall end and be spaced 3.0mm from the perpendicular inside edge of the neatline. (See Figure 2-20, B)

C. Label Specifications for Neatline Coordinates.

1. A neatline coordinate shall be charted in black 5 point Swiss Light Vertical type.

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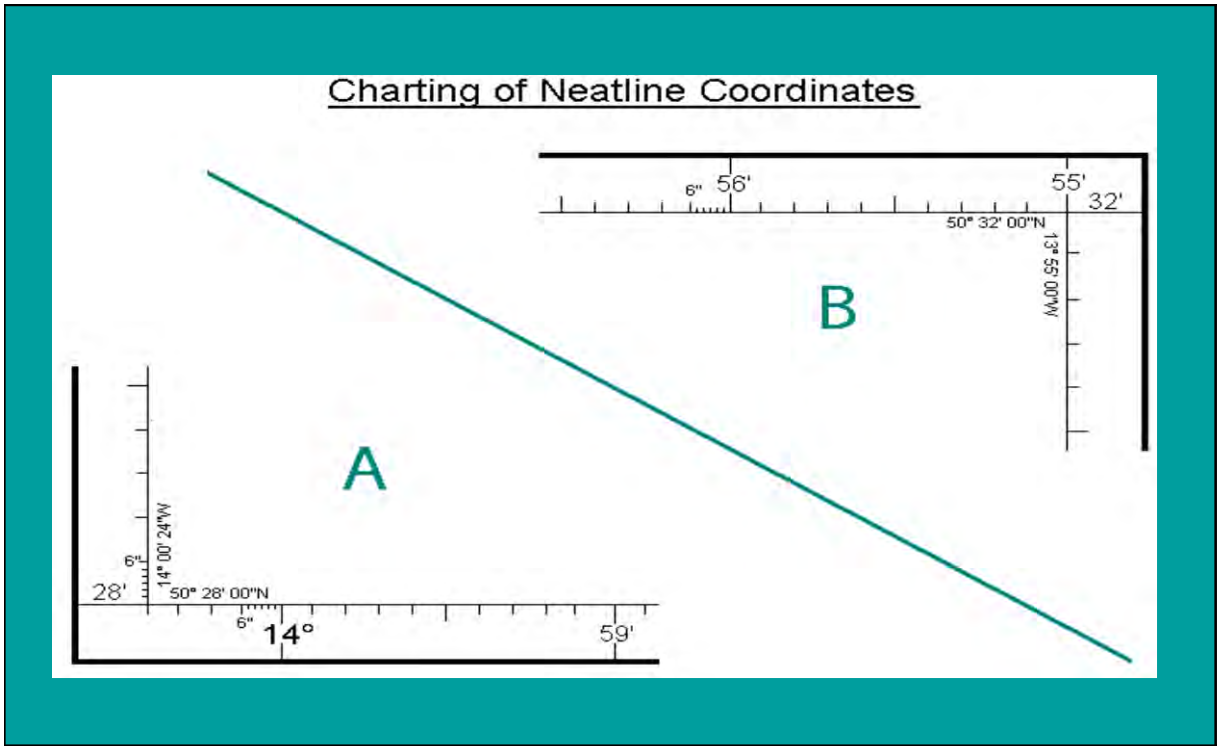

Figure 2-20

NOTE: When the neatline coordinates on a nautical chart conflict with critical charted information, that chart shall be referred to the respective Branch Chief for evaluation.

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2.10.1.8 Pattern of Graduation

The graduation or graduation pattern of a chart is the division and subdivision of latitude and longitude shown in the border of a chart – adjacent to the outside of the neatline. All National Ocean Service nautical charts and insets shall be graduated.

The pattern of graduation shall vary with the scale of the nautical chart. See Figure 2-21 below for the appropriate graduation pattern to be shown for each chart scale; and Figures 2-22 through 2-30 for the respective graphic diagrams.

PATTERN OF GRADUATION FOR CHART SCALES

See Figure	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length	INT2 Reference
2-22	Larger than 1: 5,001	-	-	1'	1"	-	-
2-23	1: 5,001 **to** Larger than 1: 50, 001	-	30"	1'	1"	-	E
2-24	1: 50,001 **to** Larger than 1: 100,001	1°	5 '	30"	6"	1'	F
2-25	1: 100,001 **to** Larger than 1: 200,001	1	5'	1'	12"	1'	G
2-26	1: 200,001 **to** Larger than 1: 500,001	1°	5 '	1'	30"	1'	H
2-27	1: 500,001 **to** Larger than 1: 1,500,001	1°	10 '	5'	1'	5'	J
2-28	1: 1,500,001 **to** Larger than 1: 2, 250,001	1°	30 '	10'	2'	10'	K
2-29	1: 2,250,001 **to** Larger than 1: 4, 750, 001	1°	-	30'	5'	30'	L
2-30	1: 10,000,000	5°	-	1°	10'	1°	M

Figure 2-21

Additional IHO graduation rules include the following:

- Equal intervals of subdivision, numbering and dicing shall be shown for the latitude and longitude of a chart.
- Intervals between projection lines should not exceed 20 centimeters nor be closer than 10 centimeters regardless of scale. See Figure 2-6 for the interval of projection lines.
- *Neatlines* (on New and Reconstructed Charts) shall be located on the exact graduation/subdivisions (i.e., degrees, minutes and even seconds).
- *Minor subdivisions* indicated on the plan borders shall be shown in seconds and **shall only be applied to the minute intervals adjacent to the meridians and parallels shown.**
- *Dicing* on SCALE borders shall be done in such a way that intervals east and south of even numbered ticks or graduation lines are diced.

Graphic Diagrams of Required IHO Graduation Patterns For Chart Scales

PLAN BORDER

Limiting Scale: Larger than 1: 5,001

Degree Interval	-----
Intermediate Interval	-----
(a.) Minute Interval	1'
(b.) Minor Subdivision	1"
Dicing Length	N/A
(c.) Second Interval	6"

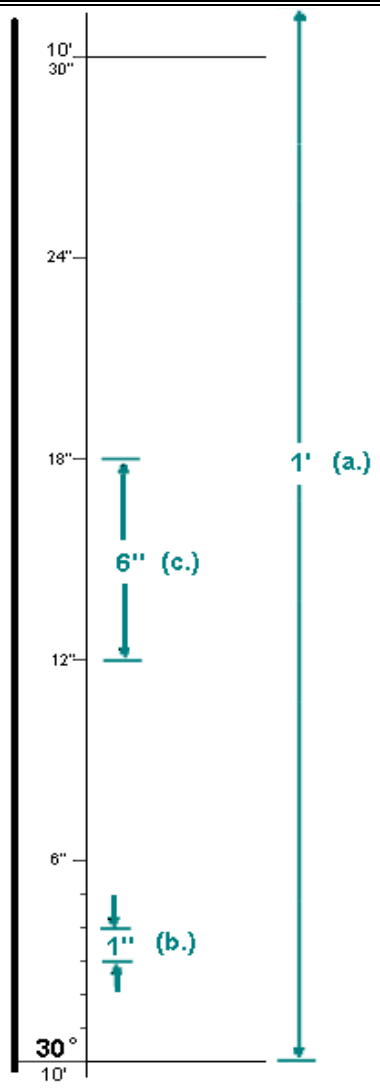

Figure 2-22

PLAN BORDER

Limiting Scale: 1: 5,001 to Larger than 1: 50,001

Degree Interval	-----
(a.) Intermediate Interval	30"
(b.) Minute Interval	1'
(c.) Minor Subdivision	1'
Dicing Length	N/A
(d.) Second Interval	6"

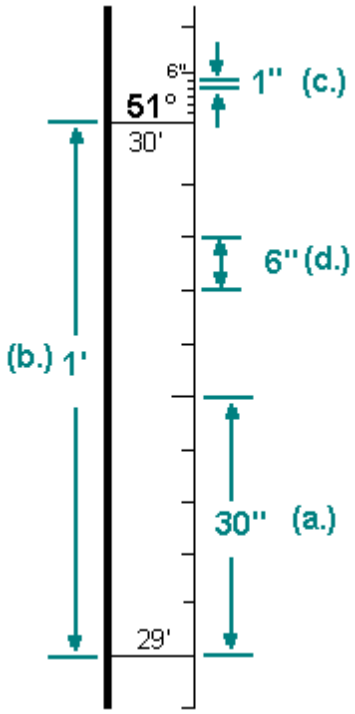

Figure 2-23

SCALE BORDER

Limiting Scale: 1: 50,001 to Larger than 1: 100,001

Degree Interval	1°
(a.) Intermediate Interval	5'
(b.) Minute Interval	30"
(c.) Minor Subdivision	6"
(d.) Dicing Length	1'

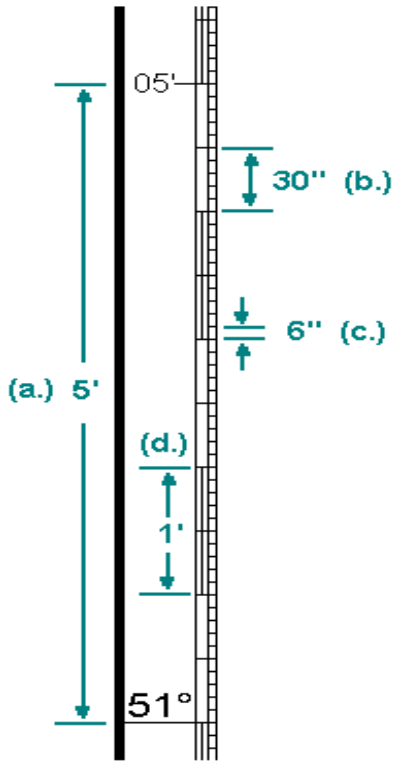

Figure 2-24

SCALE BORDER
Limiting Scale: 1: 100,001 to Larger than 1: 200,001

Degree Interval	1°
(a.) Intermediate Interval	5'
(b.) Minute Interval	1'
(c.) Minor Subdivision	12"
(d.) Dicing Length	1'

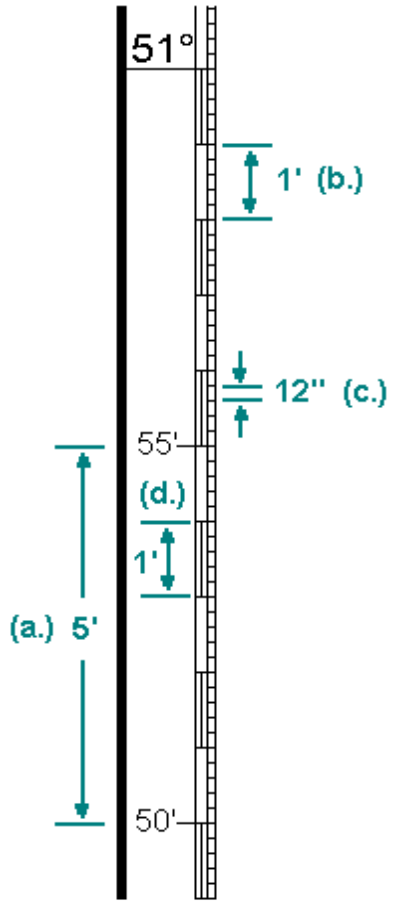

Figure 2-25

SCALE BORDER
Limiting Scale: 1: 200,001 to Larger than 1: 500,001

Degree Interval	1°
(a.) Intermediate Interval	5'
(b.) Minute Interval	1'
(c.) Minor Subdivision	30"
(d.) Dicing Length	1'

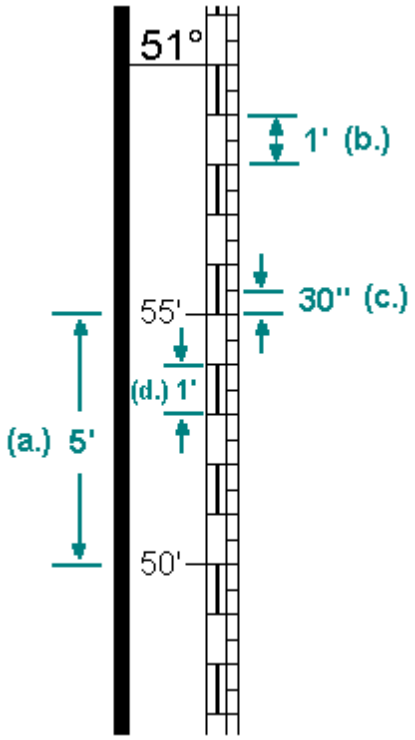

Figure 2-26

SCALE BORDER

Limiting Scale: 1: 500,001 to Larger than 1: 1,500,001

(a.) Degree Interval	1°
(b.) Intermediate Interval	10'
(c.) Minute Interval	5'
(d.) Minor Subdivision	1'
(e.) Dicing Length	5'

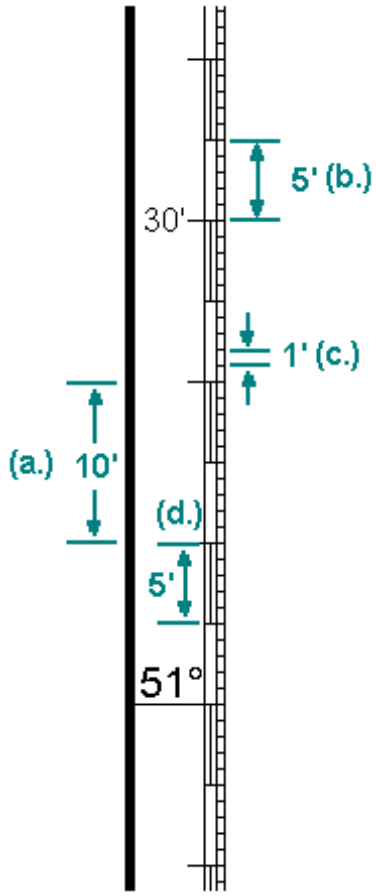

Figure 2-27

SCALE BORDER

Limiting Scale: 1: 1,500,001 to Larger than 1: 2,250,001

(a.) Degree Interval	1°
(b.) Intermediate Interval	30'
(c.)Minute Interval	10'
(d.) Minor Subdivision	2'
(e.) Dicing Length	10'

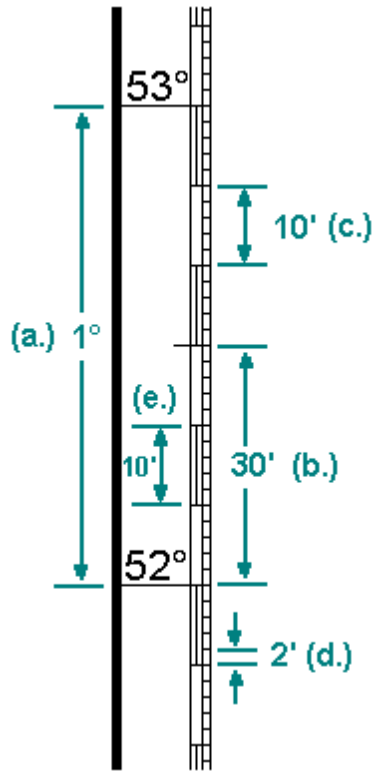

Figure 2-28

SCALE BORDER

Limiting Scale: 1: 2,250,001 to Larger than 1: 4,750,001

(a.) Degree Interval	1°
Intermediate Interval	-----
(b.) Minute Interval	30'
(c.) Minor Subdivision	5'
(d.) Dicing Length	30'

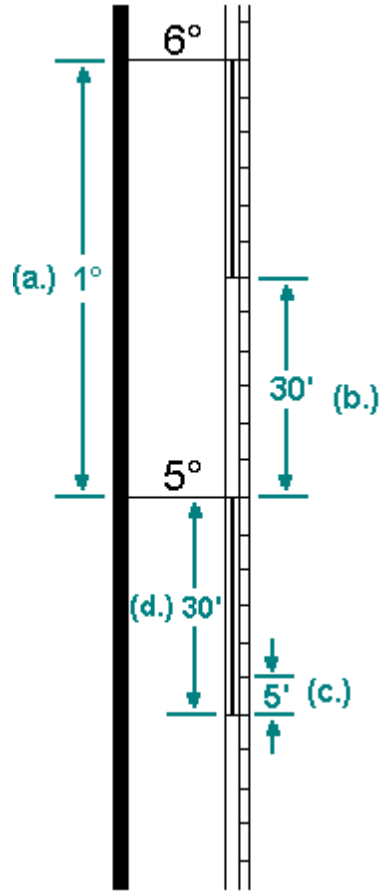

Figure 2-29

SCALE BORDER

Limiting Scale: 1: 10,000,000

(a.) Degree Interval	5°
Intermediate Interval	-----
(b.) Minute Interval	1°
(c.) Minor Subdivision	10'
(d.) Dicing Length	1°

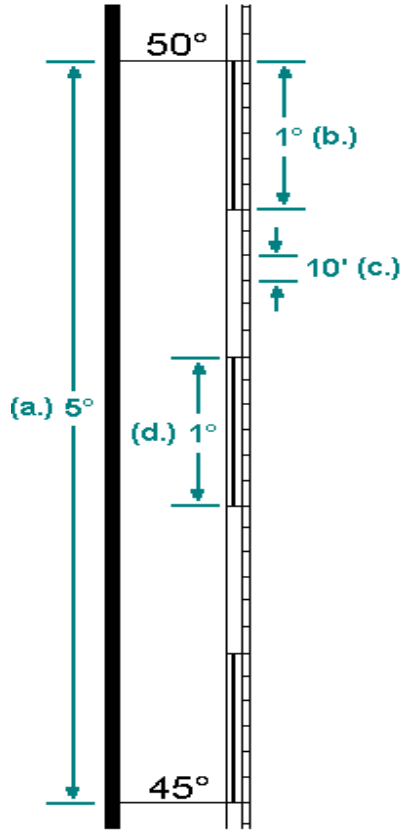

Figure 2-30

2.10.1.9. Labeling

All parallels and meridians shown shall be labeled. (See Figure 2-41 for the location of all labels to be charted.)

A. PLAN Borders (Placement of Labels)

1. Degree and Minute Labels

A latitude label consisting of both the degree label and the minute label shall be placed such that the degree label is 1.0 millimeter above the graduation line and the minute label is 1.0 millimeter below (the graduation line). The degree label is to be centered laterally between the neatline and the border; the minute label is to be centered laterally directly under the degree numeric value. (See Figure 2-31) A degree label for latitude shall be shown at least once on every panel or inset.

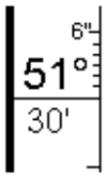

Figure 2-31

A latitude minute label unaccompanied by a degree label (or a latitude degree label unaccompanied by a minute label) shall be placed 1.0 millimeter above the graduation line and centered laterally between the neatline and the border. (See Figure 2-32)

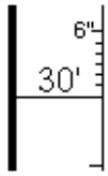

Figure 2-32

A longitude label shall be placed such that a label consisting of both the degree label and the minute label is centered horizontally and vertically on the meridian graduation line. A longitude minute label unaccompanied by a degree label (or a latitude degree label unaccompanied by a minute label) is placed such that the numeric value of the label is centered horizontally and vertically (on the meridian graduation line). The graduation line shall always be "broken" 4.0 mm for the placement of the associated label. (See Figure 2-33)

Figure 2-33

2. 6" Labels

The 6 second (6") interval of all minor subdivisions indicated on a PLAN border shall be identified by the use of 6" labels.

On north latitude charts, the 6" label shall be located above the graduation line (See Figure 2-34, A). On south latitude charts, the 6" label shall be located below the graduation line (See Figure 2-34, B).

On west longitude charts, the 6" label shall be located to the left of the graduation line (see Figure 2-34, C); and on east longitude charts, the 6" label shall be located to the right of the graduation line. (See Figure 2-34, D)

In all instances, the 6" label shall be located 0.5 mm from the 6" tick.

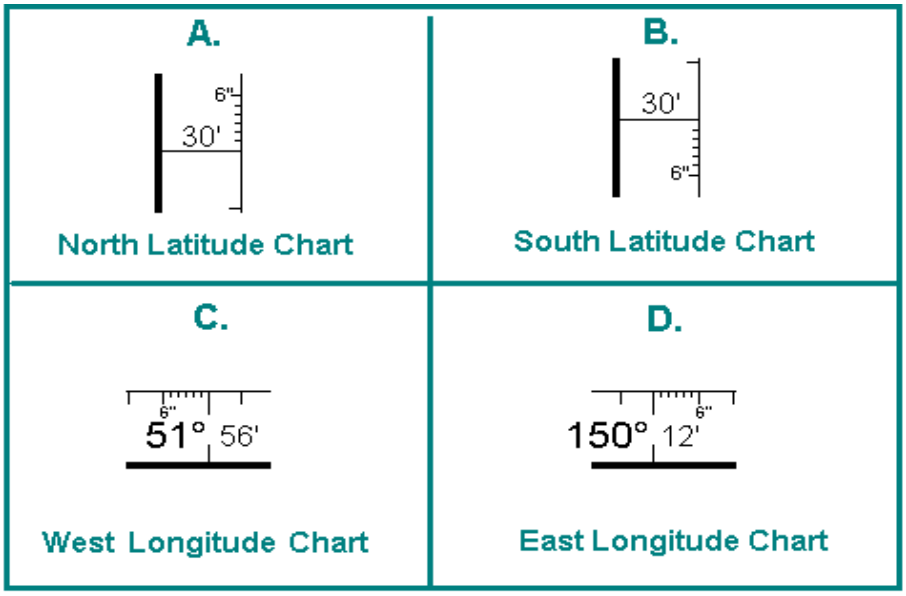

Figure 2-34

NOTE: See Section 2.10.1.8 for the location of all minor subdivisions.

B. SCALE Borders (Placement of Labels)

1. Degree and Minute Labels

A latitude label consisting of both the degree label and the minute label shall be placed such that the degree label is 1.0 millimeter above the graduation line and the minute label is 1.0 millimeter below (the graduation line). The degree label is to be centered laterally between the border and the "outside" border scale limit; the minute label is to be centered laterally directly under the degree numeric value. (See Figure 2-35.) A degree label for the latitude shall be shown at least once on every panel or inset.

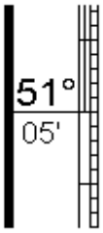

Figure 2-35

A latitude degree label unaccompanied by a minute label shall be placed 1.0 millimeter above the graduation line and centered laterally between the border and the "outside" border scale limit. (See Figure 2-36.)

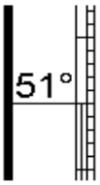

Figure 2-36

A latitude minute label unaccompanied by a degree label shall be placed such that the label is laterally located 1.0 mm from the associated tick. (See Figure 2-37)

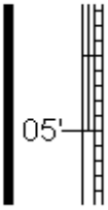

Figure 2-37

A longitude label consisting only of the degree value or consisting of both the degree and minute values shall be placed such that the numeric value of the label is centered horizontally and vertically on the meridian graduation line. The graduation line shall always be "broken" 4.0 mm for the placement of the associated label. (See Figure 2-38)

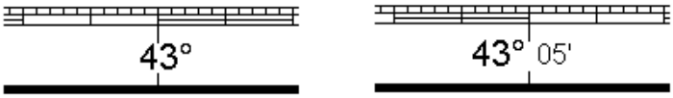

Figure 2-38

A longitude minute label *unaccompanied* by a degree label shall be placed such that the numeric value of the label is laterally located 1.0mm from the associated tick. (See Figure 2-39)

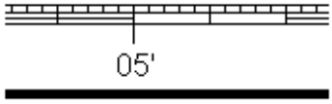

Figure 2-39

2. Second Labels

Not Applicable

C. North (N), South (S), East (E), West (W) Indicators

North (N) or South (S) indicators shall not be shown. A West (W) or East (E) indicator shall be shown at least once on every panel or inset.

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D. Type Specifications

Label	Type Style	Type Size
Degrees (57°)	Swiss Regular Vertical	* 12 point
Minutes (41')	Swiss Regular Vertical	** 9 point
Seconds (30")	Swiss Light Vertical	6 point
6" labels	Swiss Light Vertical	5 point
Neatline dimensions	Swiss Light Vertical	5 point
Neatline coordinates	Swiss Light Vertical	5 point

* Insets: 10 point
** Insets: 8 point

Figure 2-40

E. Leading Zeros

All minute labels representing a single digit value are to be expressed with a leading zero (i.e., 05').

F. Chart Scales Larger than 1:5,001

For chart scales larger than 1:5,001, the 6", 12", 18", 24", 30", 36", 42", 48", and 54" labels shall be shown at all appropriate and respective graduation ticks.

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INTERVAL OF LABEL PLACEMENT			
Scale	**Location No.1**	**Location No. 2**	**Minor Subdivision Label**
1:5,000	Every 6", 12", 18", 24", 30", 36", 42", 48", 54" tick.		6" tick
1: 10,000	Projection line interval (i.e., every **1'**)	N/A	6" tick
1: 15,000	Projection line interval (i.e., every **1'**)	N/A	6" tick
1: 20,000	Projection line interval (i.e., every **2'**)	Minute interval (i.e., every **1'**)	6" tick
1: 30,000	Projection line interval (i.e., every **2'**)	Minute interval (i.e., every **1'**)	6" tick
1: 40,000	Projection line interval (i.e., every **5'**)	Minute interval (i.e., every **1'**)	6" tick
1: 50,000	Projection line interval (i.e., every **5'**)	Minute interval (i.e., every **1'**)	6" tick
1: 60,000	Projection line interval (i.e., every **5'**)	Minute interval (i.e., every **1'**)	6" tick
1: 80,000	Projection line interval (i.e., every **10'**)	Intermediate interval (i.e., every **5'**)	N/A
1:100,000	Projection line interval (i.e., every **10'**)	Intermediate interval (i.e., every **5'**)	N/A
1:125,000	Projection line interval (i.e., every **10'**)	Intermediate interval (i.e., every **5'**)	N/A
1:200,000	Projection line interval (i.e., every **20'**)	Intermediate interval (i.e., every **5'**)	N/A
1:250,000	Projection line interval (i.e., every **20'**)	Intermediate interval (i.e., every **5'**)	N/A
1:300,000	Projection line interval (i.e., every **30'**)	Intermediate interval (i.e., every **5'**)	N/A
1:400,000	Projection line interval (i.e., every **30'**)	Intermediate interval (i.e., every **5'**)	N/A
1:500,000	Projection line interval (i.e., every **1°**)	Intermediate interval (i.e., every **10'**)	N/A
1:600,000	Projection line interval (i.e., every **1°**)	Every **30'**	N/A
1:700,000	Projection line interval (i.e., every **1°**)	Every **30'**	N/A
1:800,000	Projection line interval (i.e., every **1°**)	Every **30'**	N/A
1:1,000,000	Projection line interval (i.e., every **2°**)	Every **1°**	N/A
1:1,500,000	Projection line interval (i.e., every **2°**)	Every **1°**	N/A
1:2,000,000	Projection line interval (i.e., every **2°**)	Every **1°**	N/A
1:3,000,000	Projection line interval (i.e., every **5°**)	Every **1°**	N/A
1:4,000,000	Projection line interval (i.e., every **5°**)	Every **1°**	N/A
1:5,000,000	Projection line interval (i.e., every **5°**)	N/A	N/A
1:10,000,000	Projection line interval (i.e., every **10°**)	Every 5**°**	N/A

Figure 2-41

2.10.1.10 Examples of Graduated Nautical Chart Neatlines

Following are examples of graduated charts based on the specifications provided by the International Hydrographic Organization or expanded by the Quality Assurance Plans and Standards Branch. Each pattern of graduation required for a specific chart scale has been provided as an example and includes all associated labeling and linear dimensions.

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Pattern of Graduation

Example 1

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length	Second Interval
Plan	Larger than 1: 5,001	-	-	1'	1"	-	6"

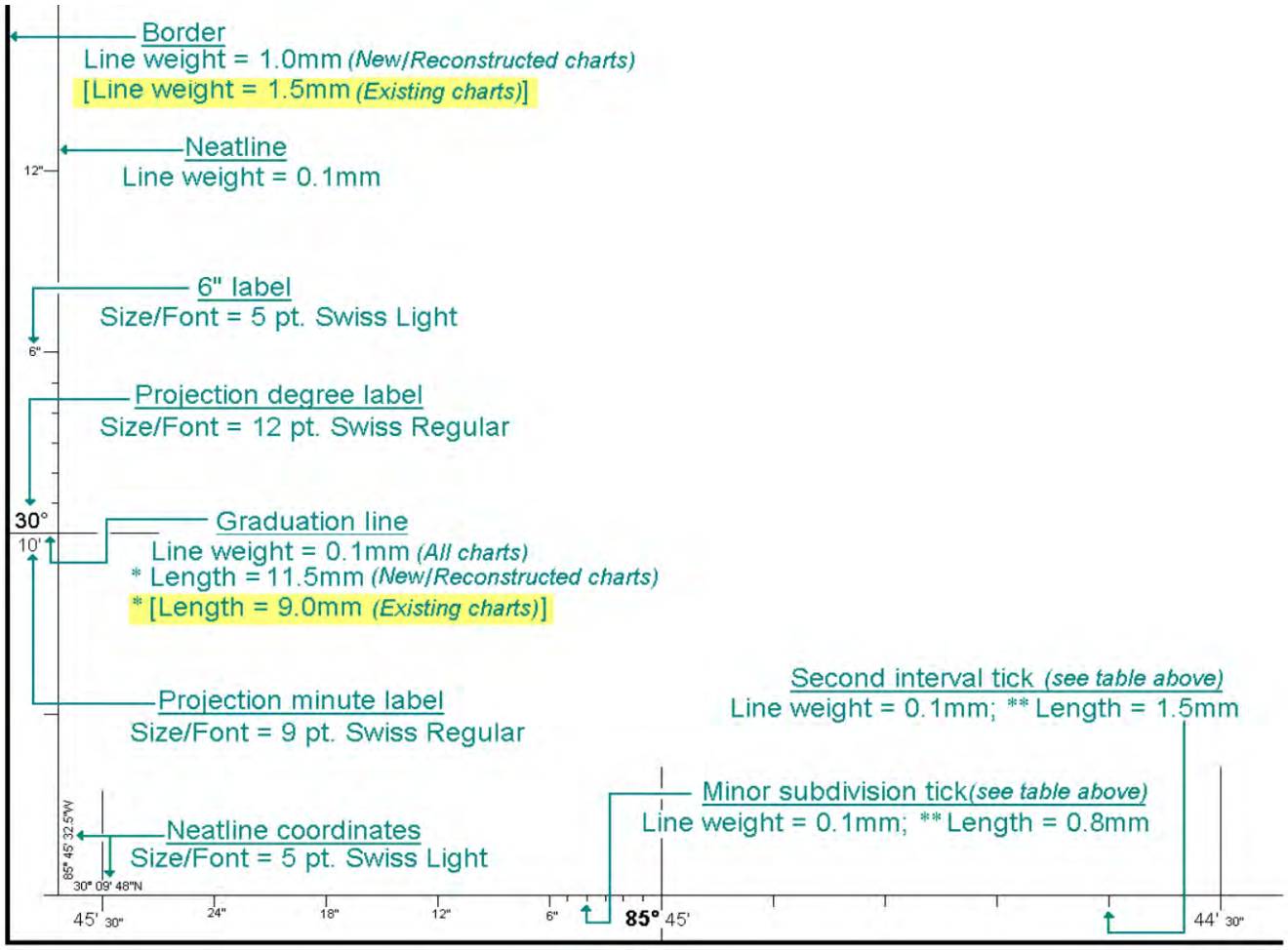

Figure 2-42

* *Length of line, as measured from center of border to center of neatline.*

** *Length of line, as measured from outer edge of tick to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed NOS conventional charts.

Pattern of Graduation
Example 2

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length	Second Interval
Plan	1:5,001 to Larger than 1: 50,001	-	30 '	1'	1"	-	6"

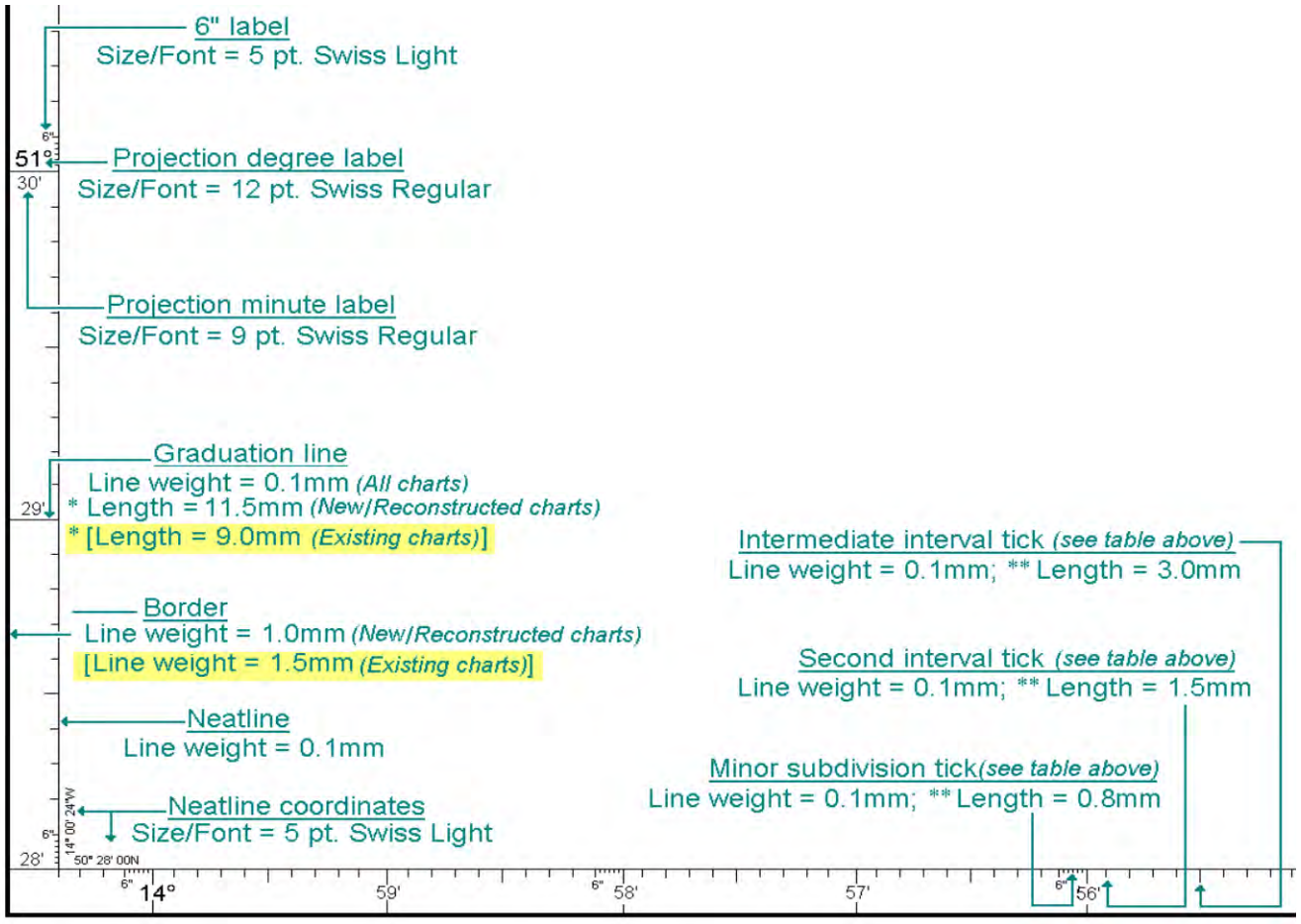

Figure 2-43

* *Length of line, as measured from center of border to center of neatline.*

** *Length of line, as measured from outer edge of tick to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed NOS conventional charts.

Pattern of Graduation

Example 3

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1:50,001 **to** Larger than 1: 100,001	1°	5 '	30"	6"	1'

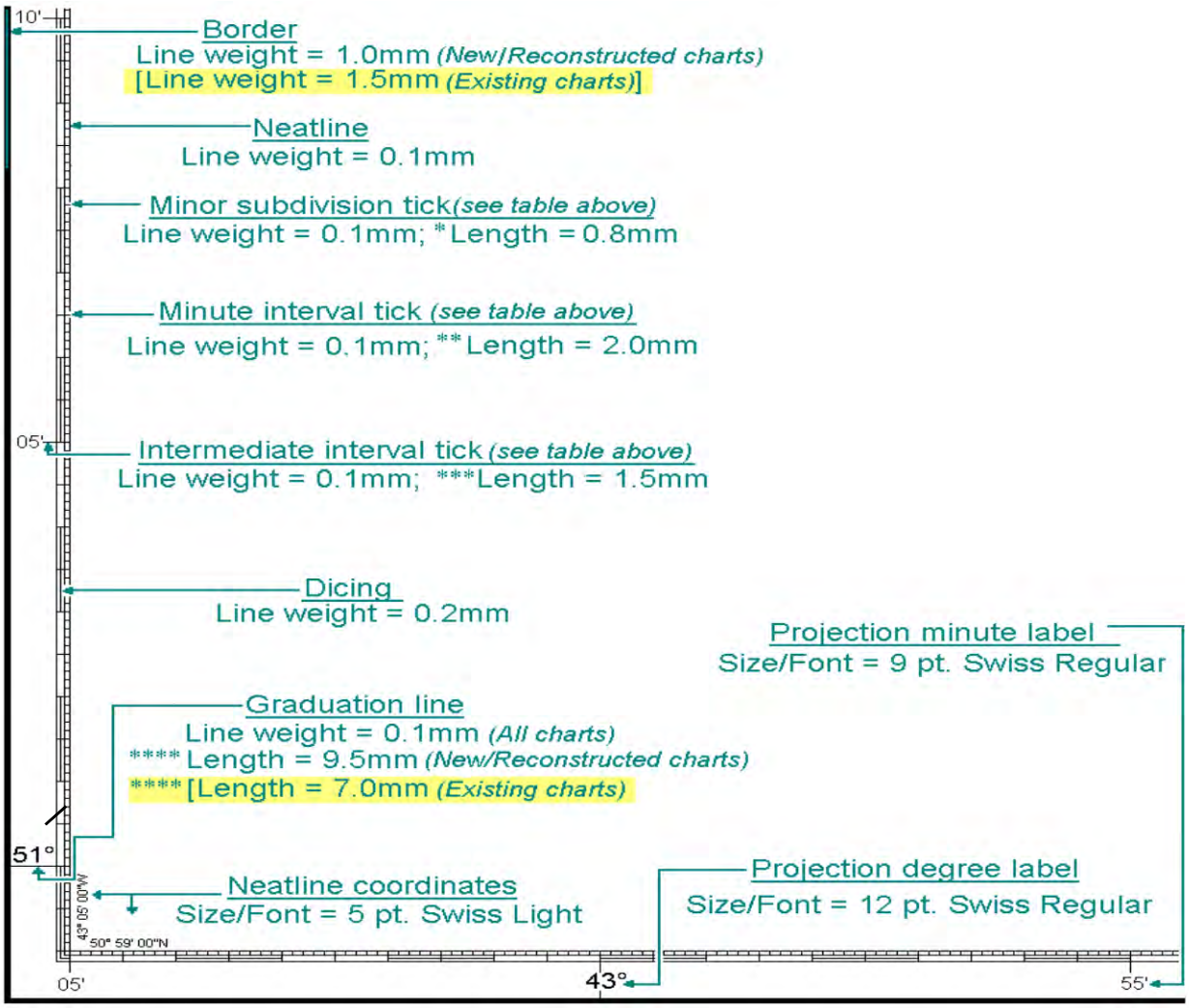

Figure 2-44

* *Length of line, as measured from center of "inside" limit of border scale to center of neatline.*
** *Length of line, as measured from center of "outside" limit of border scale to center of neatline.*
*** *Length of line, as measured from outer edge of tick to center of "outside" limit of border scale.*
**** *Length of line, as measured from center of border to center of "outside" limit of border scale.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 4

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1:100,001 **to** Larger than 1: 200,001	1	5 '	1'	12"	1'

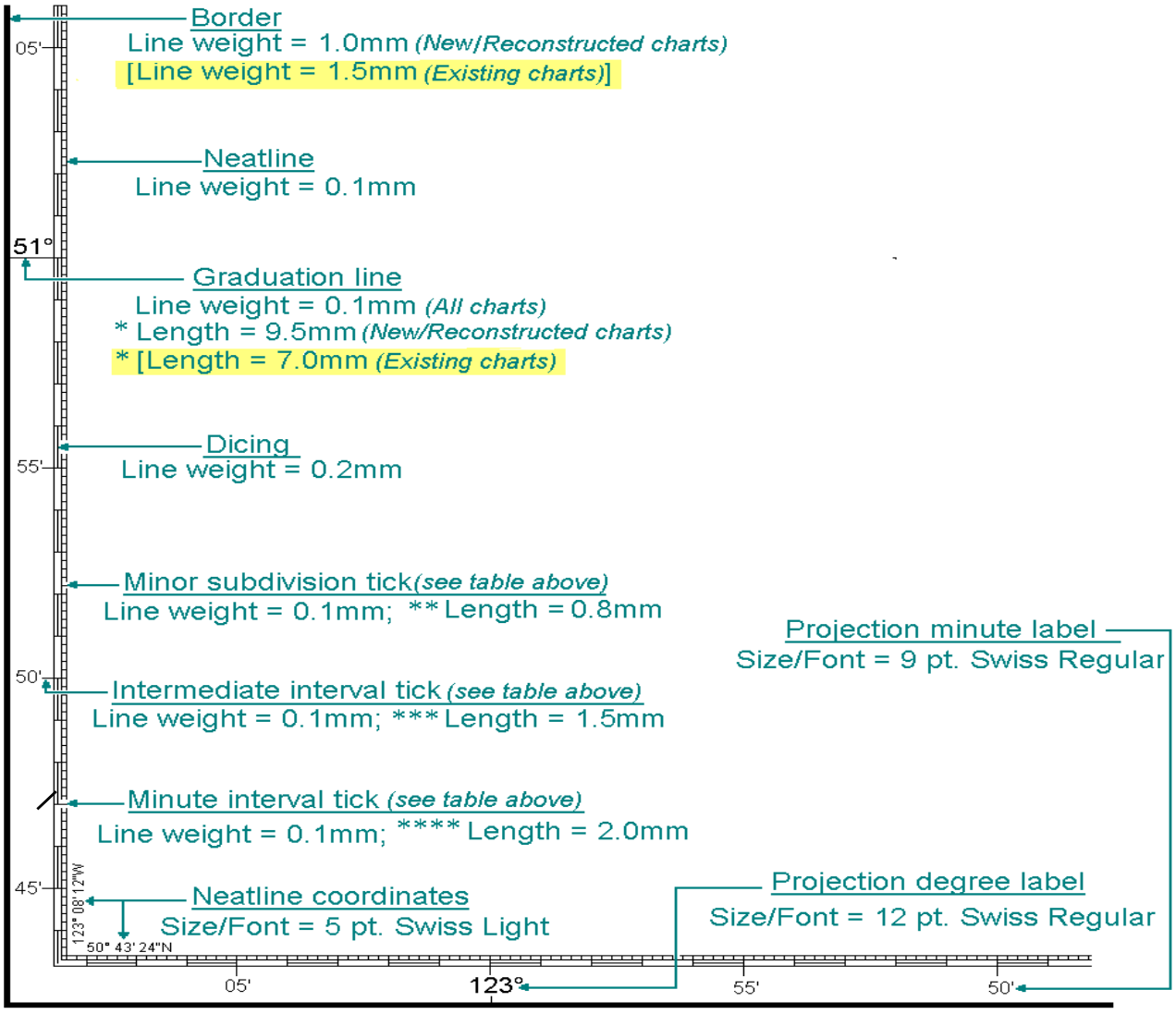

Figure 2-45

* *Length of line, as measured from center of border to center of "outside" border scale limit.*

** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

*** *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*

**** *Length of line, as measured from center of "outside" border scale limit to center of neatline*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 5

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1:200,001 **to** Larger than 1: 500,001	1	5 '	1'	30"	1'

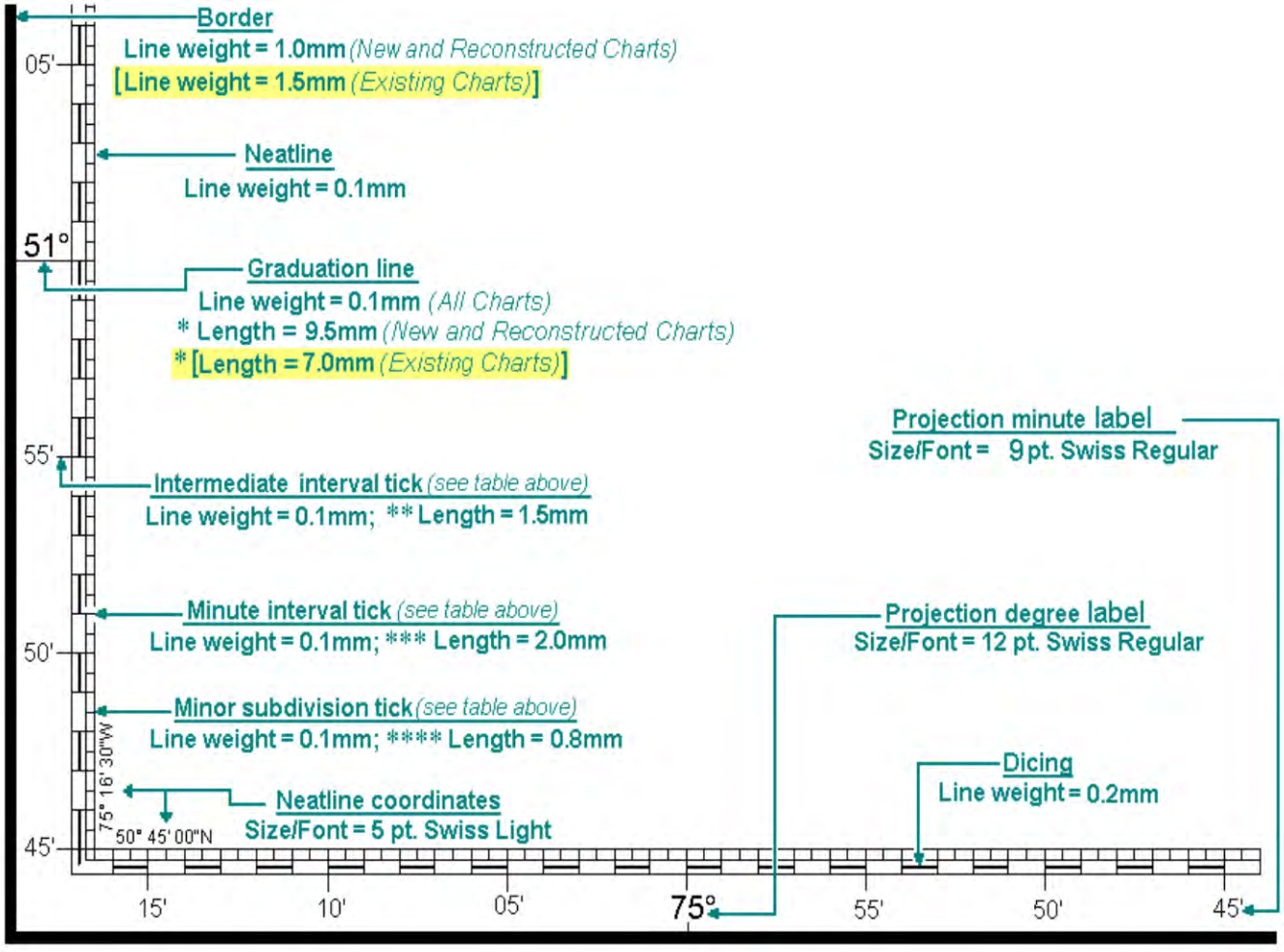

Figure 2-46

* *Length of line, as measured from center of border to center of "outside" border scale limit.*

** *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*

*** *Length of line, as measured from center of "outside" border scale limit to center of neatline.*

**** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 6

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1: 500,001 **to** Larger than 1: 1, 500,001 100,000000000000000000000000,1	1	10 '	5'	1'	5'

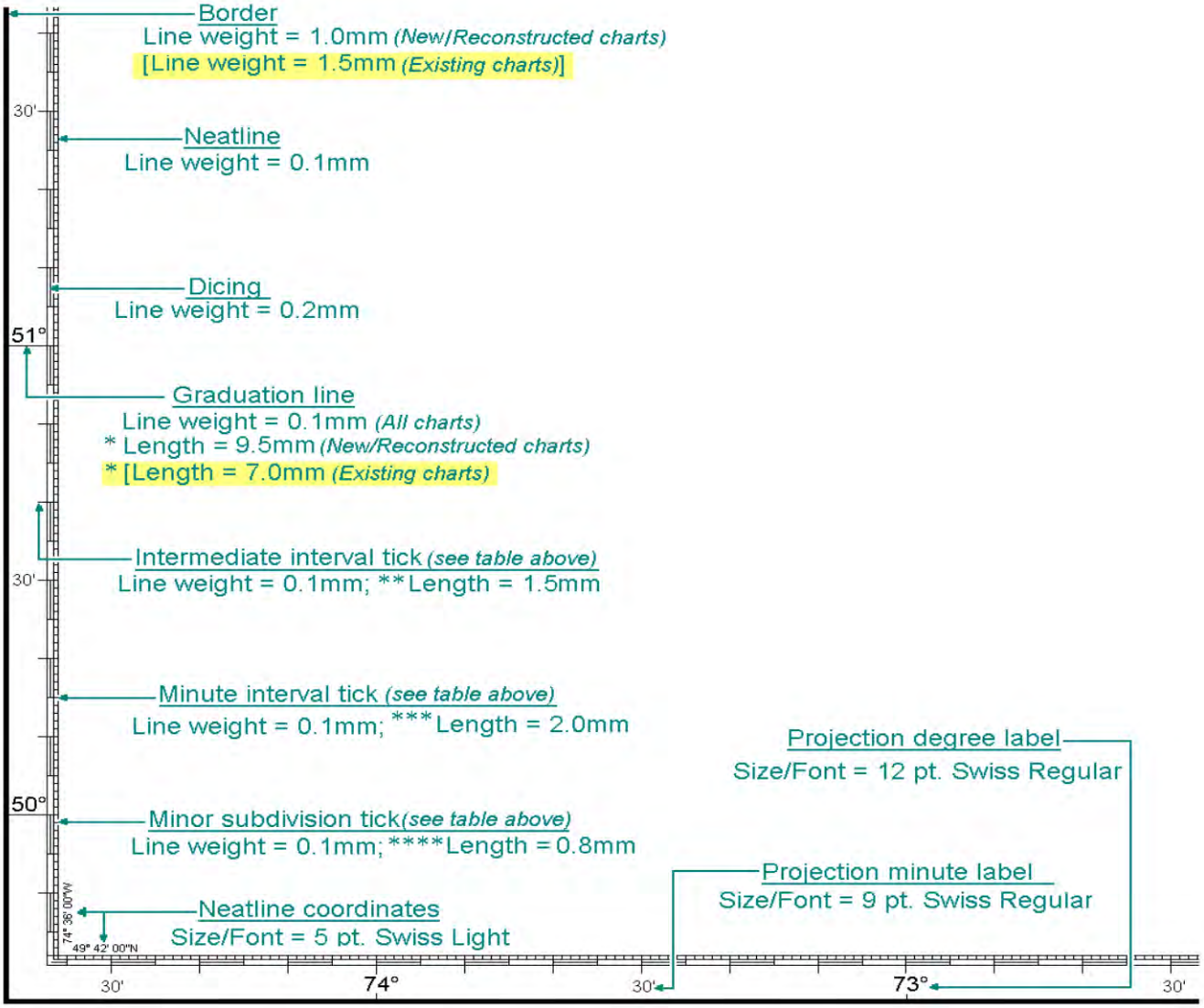

Figure 2-47

* *Length of line, as measured from center of border to center of "outside" border scale limit.*

** *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*

*** *Length of line, as measured from center of "outside" border scale limit to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 7

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1: 1,500,001 **to** Larger than 1: 2, 250,001	1°	30 '	10'	2'	10'

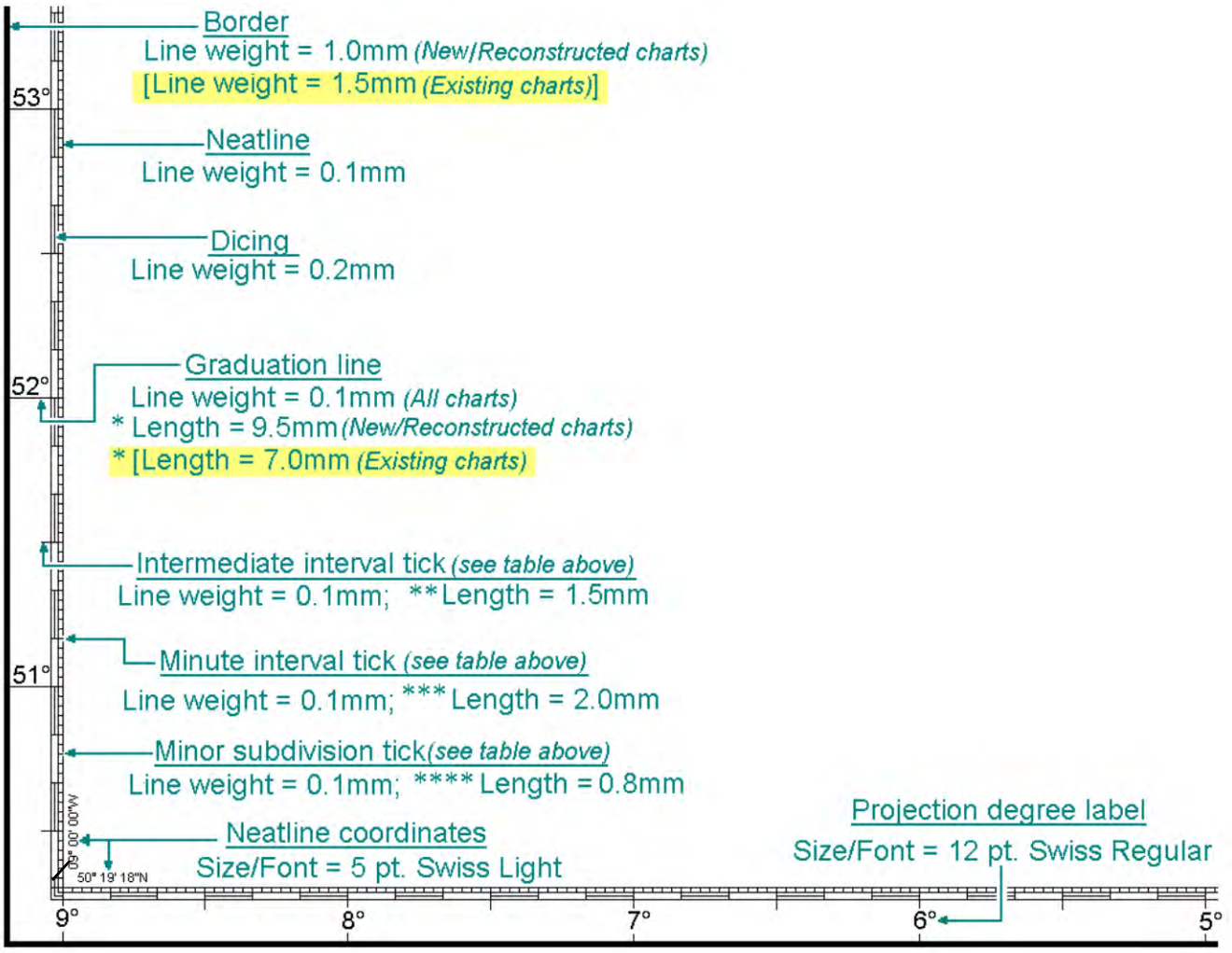

Figure 2-48

* *Length of line, as measured from center of border to center of "outside" border scale limit.*
** *Length of line, as measured from outer edge of tick to center of "outside" border scale limit.*
*** *Length of line, as measured from center of "outside" border scale limit to center of neatline.*
**** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 8

Border Type	Limiting Scale	Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
Scale	1: 2,250,001 **to** Larger than 1: 4,750, 001	1°	-	30'	5'	30'

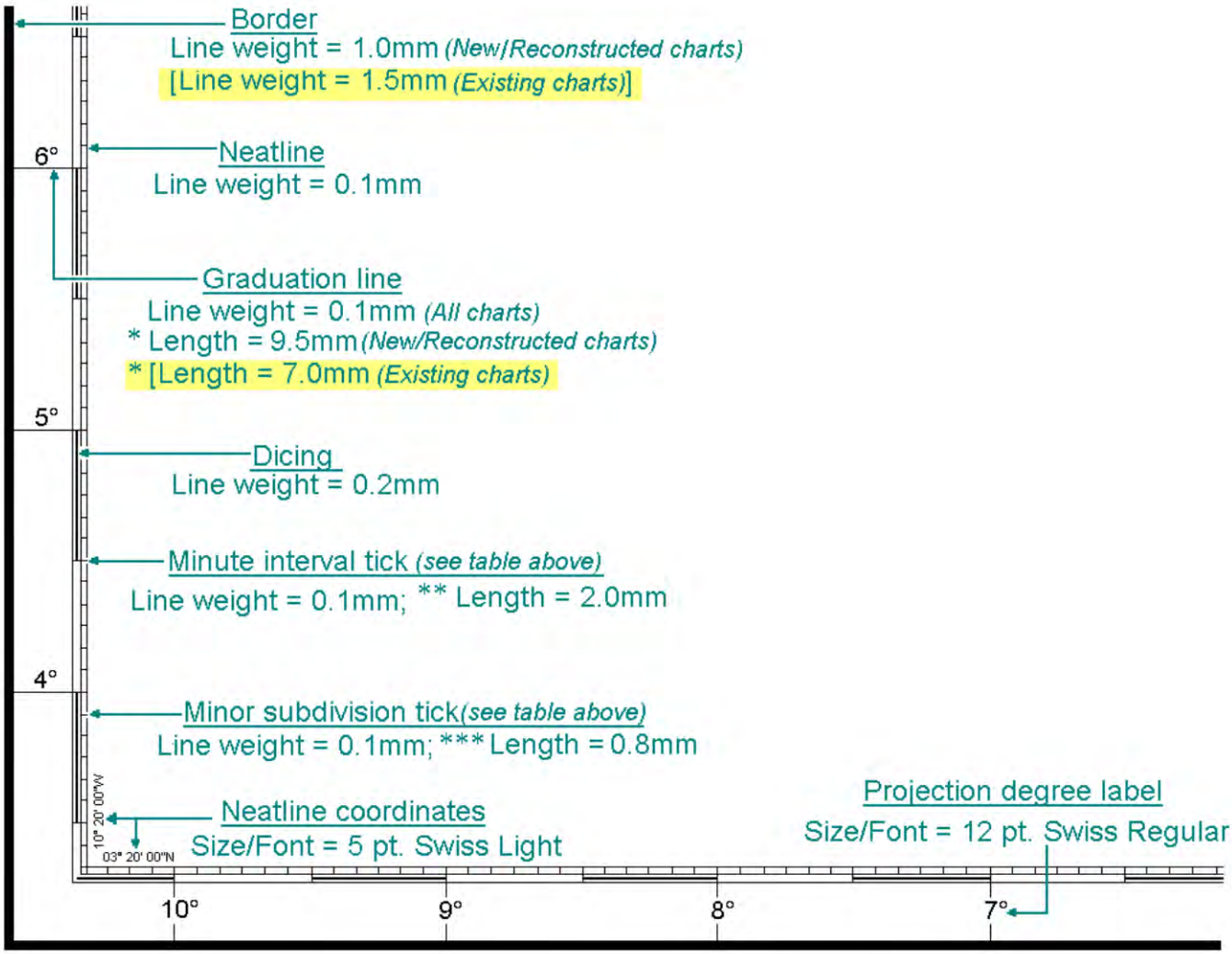

Figure 2-49

* *Length of line, as measured from center of border to center of "outside" border scale limit.*
** *Length of line, as measured from center of "outside" border scale limit to center of neatline.*
*** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

Pattern of Graduation

Example 9

Border Type	Limiting Scale		Degree Interval	Intermediate Interval	Minute Interval	Minor Subdivision	Dicing Length
	Largest	Smallest					
Scale	1: 10,000,000		5°	-	1	10'	1

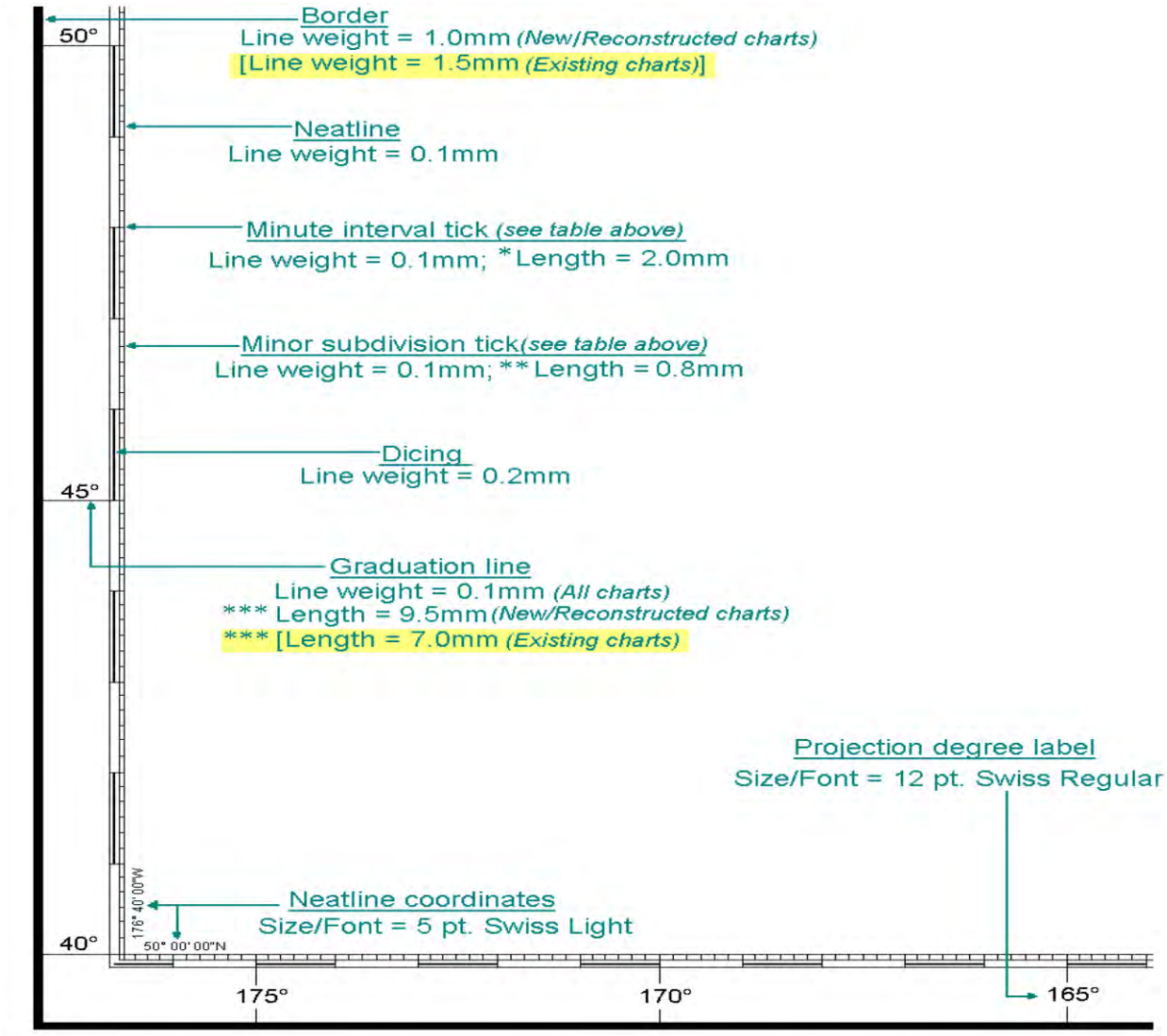

Figure 2-50

* *Length of line, as measured from center of "outside" border scale limit to center of neatline.*

** *Length of line, as measured from center of "inside" border scale limit to center of neatline.*

*** *Length of line, as measured from center of border to center of "outside" border scale limit.*

Values highlighted in yellow represent the only variations between the modified IHO dimensions for existing NOS conventional charts and the comprehensive IHO dimensions for New and Reconstructed conventional charts.

2.10.1.11 IHO Insets and Extensions

Inset: A separate chart graphic which is (a.) of a limited area (b.) placed within the neatline of a nautical chart, **and** (c.) constructed at a larger scale than the scale of the main chart panel, but at the same central latitude.

Extension: A separate chart graphic which is (a.) generally placed within the neatline of a nautical chart, (b.) constructed at the same scale and central latitude as the main chart panel, and (c.) represents a continuation of a specific area currently charted on the main panel.

A. IHO Specifications: Placement/Location of Insets and Extensions

In accordance with IHO specifications, new insets and extensions to be placed on New, Reconstructed and existing NOS nautical charts shall be placed within the neatline of a nautical chart such that the inset's or extension's border:

1. is always parallel to the corresponding border of the main panel, and

2. when near the main panel's corners, is at equal distances from the main panel's neatline (see Figure 2-51).

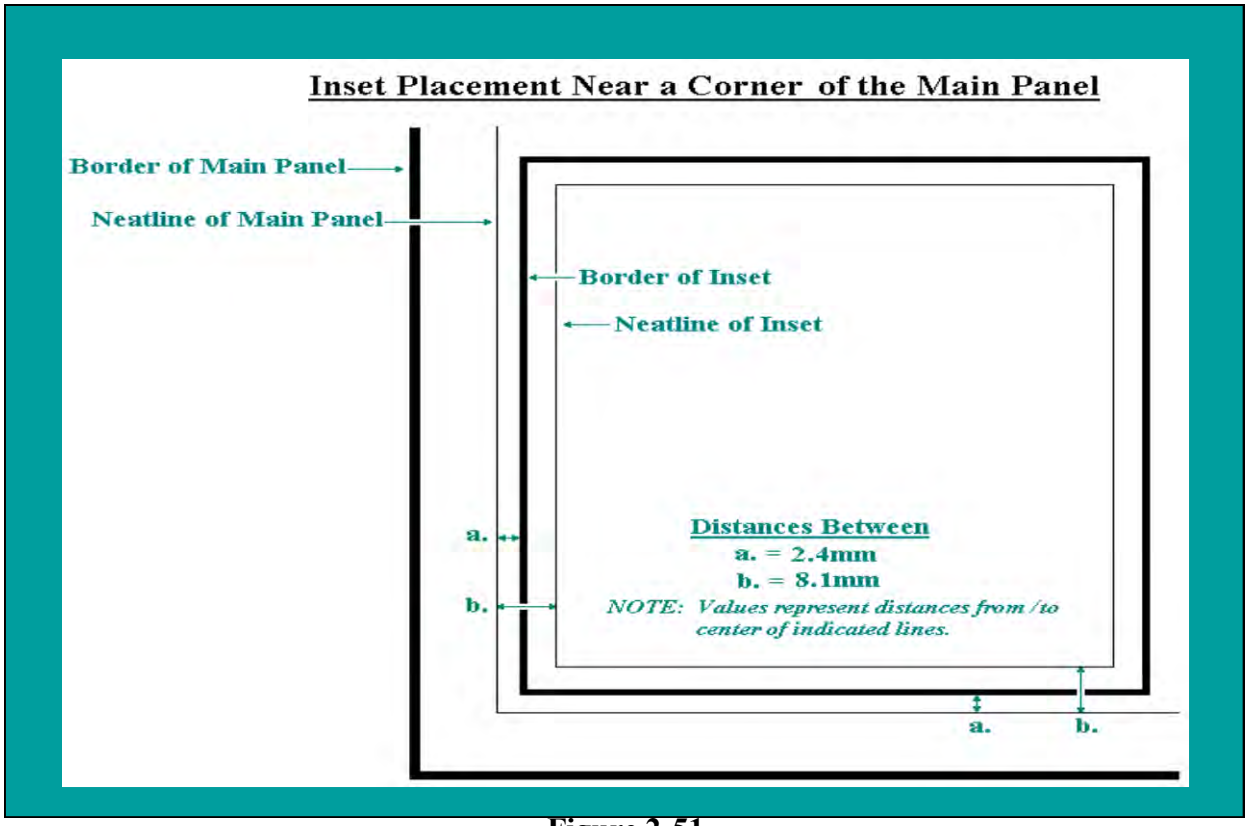

Figure 2-51

B. Projection Lines

All new insets and extensions shall have at least one parallel and one meridian shown. The interval in which projection lines shall be drawn shall be based on the specifications provided in Figure 2-6.

C. Pattern of Graduation

The graduation for all new insets and extensions shall vary with the scale of the inset. See Figure 2-21 to obtain the appropriate graduation pattern for the scale of the inset to be constructed.

D. Neatline Coordinates

All new insets and extensions shall include the charting of the neatline coordinates. See Section 2.10.1.7 for specifications.

E. Labeling

See Section 2.10.1.9

F. Existing Insets and Extensions

Existing insets and extensions which have an irregular shape (i.e., are not square or rectangular) or which cannot easily be converted to the IHO/NOS specifications provided in Nautical Chart Manual, Sections 2.10.1.2 through 2.10.1.12 shall be referred to the Chief, Marine Chart Division for evaluation. It shall be the responsibility of the Chief, Marine Chart Division to determine the feasibility of re-formatting or reconstructing these insets or extensions and the associated main chart panel.

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G. Insets Placed within a PLAN Border

1. Dimensions, Line and Type Specifications

The following IHO dimensions shall apply in the construction and placement of new insets and extensions placed within a chart having a PLAN border. (Refer to Figure 2-54 for the location of the indicators.)

IHO Graduated Inset/Extension Dimensions, Line and Type Specifications (Insets Placed within a PLAN Border)

Indicator	Description	Item	Specification
a.	Border Line (inset)	Line weight	0.8mm
b. , s.	Neatline	Line weight	0.1mm
c. , g.	Distance		8.1mm
d. , h.	Distance		5.3mm
e. , i.	Distance		2.0mm
f. , l.	Neatline coordinates	Type font	5 pt. Swiss Light Vertical
j.	Graduation line (inset)	Line weight	0.1mm
		Length	5.3mm
k. , u.	Minor subdivision tick	Line weight	0.1mm
		Length	0.8mm
m. , y.	Projection minute label	Type font	8 pt. Swiss Regular Vertical (All projection degree labels indicated.)
n.	Projection degree label	Type font	10 pt. Swiss Regular Vertical (All projection “degree” labels indicated.)

Figure 2-52

IHO Graduated Inset/Extension Dimensions, Line and Type Specifications (Insets Placed within a PLAN Border)
(continued)

Indicator	Description	Item	Specification
o. , t.	6" label	Type font	5 pt. Swiss Light Vertical (All 6" labels.)
p . , x.	Second interval tick	Line weight	0.1mm
		Length	1.5mm
q. , w.	Intermediate interval tick	Line weight	0.1mm
		Length	3.0mm
r.	Border (main panel)	Line weight	New/Reconstructed charts: 1.0mm *[Existing charts: 1.5mm]*
v.	Graduation line (main panel)	Line weight	0.1mm
		Length	New/Reconstructed charts: 11.5mm [*Existing charts (plan border): 9.0mm*]

Figure 2-53

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IHO Graduated Inset/Extension:Dimensions, Line and Type Specifications
(Insets Placed within a PLAN Border)

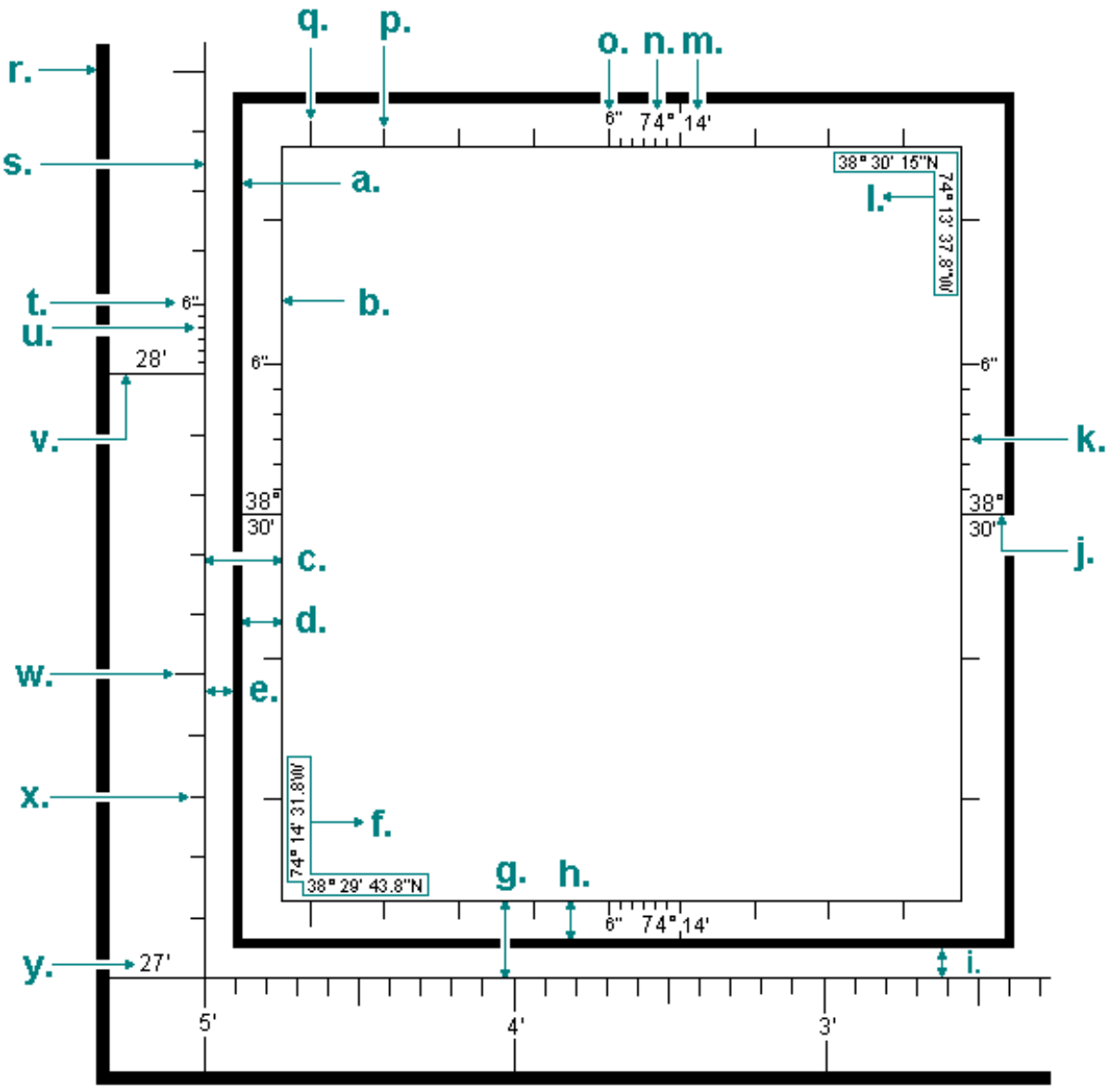

Figure 2-54

NOTE: When an inset is placed in the lower left hand corner or upper right hand corner of a chart, the neatline coordinates of the main panel shall not be indicated.

H. Insets Placed within a SCALE Border

1. Dimensions, Line and Type Specifications

The following IHO dimensions shall apply in the construction and placement of new insets and extensions placed within a chart having a SCALE border. (Refer to Figure 2-58 for the location of the indicators.)

IHO Graduated Inset/Extension Dimensions, Line and Type Specifications (Insets Placed within a SCALE Border)			
Indicator	**Description**	**Item**	**Specification**
a.	Border Line (inset)	Line weight	0.8mm
b.	Neatline	Line weight	0.1mm
c. , g.	Distance		8.1mm
d. , h.	Distance		5.3mm
e. , i.	Distance		2.4mm
f. , l.	Neatline coordinates	Type font	5 pt. Swiss Light Vertical
j.	Graduation line (inset)	Line weight	0.1mm
		Length	5.3mm
k.	Minor subdivision tick	Line weight	0.1mm
		Length	0.8mm
m.	Projection minute label	Type font	8 pt. Swiss Regular Vertical (All projection degree labels indicated.)
n.	Projection degree label	Type font	10 pt. Swiss Regular Vertical (All projection “degree” labels indicated.)

Figure 2-55

IHO Graduated Inset/Extension Dimensions, Line and Type Specifications (Insets Placed within a SCALE Border) (continued)			
Indicator	**Description**	**Item**	**Specification**
o.	6" label	Type font	5 pt. Swiss Light Vertical (All 6" labels.)
p.	Second interval tick	Line weight	0.1mm
		Length	1.5mm
q.	Intermediate interval tick	Line weight	0.1mm
		Length	3.0mm
r.	Border (main panel)	Line weight	New and Reconstructed charts: 1.0mm [*Existing charts: 1.5mm*]
s.	Projection minute label	Type font	5 pt. Swiss Regular Vertical
t.	Intermediate interval tick	Line weight	0.1mm
		Length	1.5mm
u.	"Outside" border scale limit	Line weight	0.1mm
v.	"Inside" border scale limit	Line weight	0.1mm
w.	Dicing	Line weight	0.2mm
x.	30" interval tick	Line weight	0.1mm
		Length	2.0mm
y.	Minor subdivision tick	Line weight	0.1mm
		Length	0.8mm
z.	Minute interval tick	Line weight	0.1mm
		Length	2.0mm

Figure 2-56

IHO Graduated Inset/Extension Dimensions, Line and Type Specifications (Insets Placed within a SCALE Border)			
Indicator	**Description**	**Item**	**Specification**
aa.	Neatline (main panel)	Line weight	0.1mm
bb.	Projection degree label	Type font	12 pt. Swiss Regular Vertical
cc.	Graduation line (main panel)	Line weight	0.1mm
		Length	New and Reconstructed charts: 9.5mm [Existing charts: 7.0mm]

Figure 2-57

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IHO Graduated Inset/Extension:Dimensions, Line and Type Specifications
(Insets Placed within a SCALE Border)

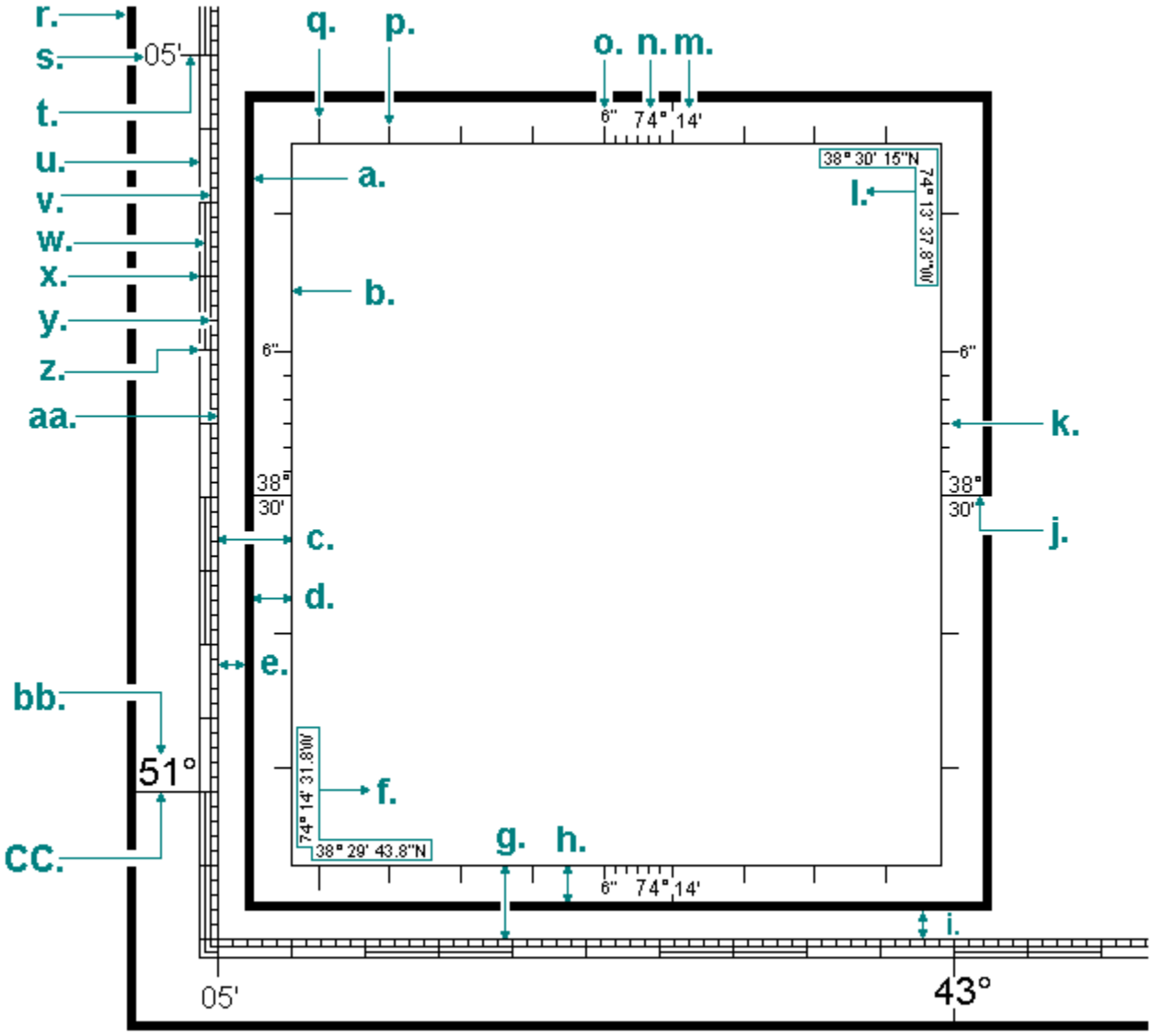


Figure 2-58

NOTE: When an inset is placed in the lower left hand corner or upper right hand corner of a chart, the neatline coordinates of the main panel shall not be indicated.

2.10.1.12 IHO Adjacent Borders: Dimensions, Line and Type Specifications (Conventional Charts Only)

Existing, New and Reconstructed conventional nautical charts which have or are to have adjacent borders shall be constructed based on the following IHO dimensions. (Refer to Figure 2-63)

IHO Adjacent Borders Dimensions, Line and Type Specifications (Conventional Charts Only)			
Indicator	**Description**	**Item**	**Specification**
a.	6" label	Type font	5 pt. Swiss Light Vertical (All 6" labels.)
b.	Minor subdivision tick	Line weight	0.1mm
		Length	0.8mm
c.	Second interval tick	Line weight	0.1mm
		Length	1.5mm
d.	Outside border	Line weight	1.0mm
e.	Neatline	Line weight	0.1mm
f.	Intermediate interval tick	Line weight	0.1mm
		Length	3.0mm
g.	Distance (from center of border to center of neatline)		6.5mm
h.	Neatline coordinates	Type font	5 pt Swiss Light Vertical
i.	Inner border	Line weight	0.8mm
j.	Distance (from center of neatline to center of neatline)		13.4mm

Figure 2-59

IHO Adjacent Borders
Dimensions, Line and Type Specifications
(Conventional Charts Only)
(continued)

Indicator	Description	Item	Specification
k.	Distance (from center of neatline to center of bottom limit of border scale)		12.6mm
l.	Distance (from center of neatline to center of top limit of border scale)		11.4mm
m.	Distance (from center of neatline to center of inner border)		5.3mm
n.	Distance (from center of neatline to center of neatline)		11.4mm
o.	Distance		5.3mm
p.	Neatline	Line weight	0.1mm
q.	Inner border	Line weight	0.8mm
r.	Graduation line	Line weight	0.1mm
		Length	6.5mm (from center of neatline to center of inner border)
s.	Neatline coordinates	Type font	5 pt Swiss Light Vertical
t.	Projection second label	Type font	6 pt. Swiss Light Vertical (All projection second labels indicated.)
u.	Projection minute label	Type font	8 pt. Swiss Regular Vertical (All projection minute labels indicated.)

Figure 2-60

IHO Adjacent Borders
Dimensions, Line and Type Specifications
(Conventional Charts Only)
(continued)

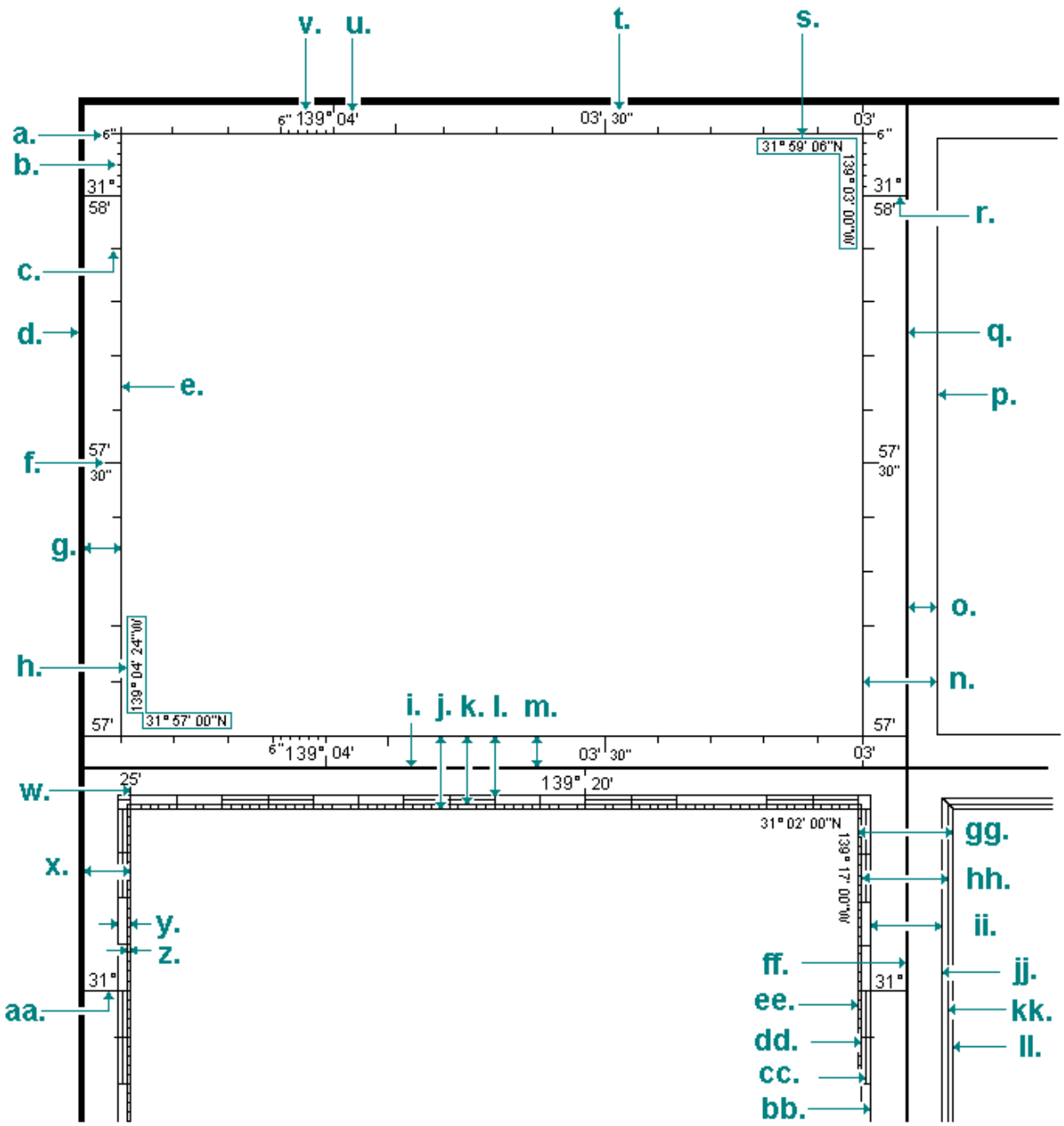
Indicator	Description	Item	Specification
v.	Projection degree label	Type font	10 pt. Swiss Regular Vertical (All projection degree labels indicated.)
w.	Intermediate interval tick	Line weight	0.1mm
		Length	3.0mm
x.	Distance (from center of outer border to center of neatline)		8.5mm
y.	Distance (from center of left limit of border scale to center of neatline)		2.0mm
z.	Distance (from center of right limit of border scale to center of neatline)		0.8mm
aa.	Graduation line	Line weight	0.1mm
		Length	6.5mm (from center of outer border to center of neatline)
bb.	Right border scale limit	Line weight	0.1mm
cc.	Dicing	Line weight	0.2mm
dd.	Left border scale limit	Line weight	0.1mm
ee.	Neatline	Line weight	0.1mm
ff.	Inner border	Line weight	0.8mm
gg.	Distance from center of left panel neatline to center of right panel neatline.		15.4mm

Figure 2-61

IHO Adjacent Borders Dimensions, Line and Type Specifications (Conventional Charts Only) (continued)			
Indicator	**Description**	**Item**	**Specification**
hh.	Distance from centerline of border scale left limit (left panel) to centerline of border scale right limit (right panel)		13.8mm
ii.	Distance from centerline of border scale right limit (left panel) to centerline of border scale left limit (right panel)		11.4mm
jj.	Neatline	Line weight	0.1mm
kk.	Neatline	Line weight	0.1mm
ll.	Neatline	Line weight	0.1mm

Figure 2-62

(The remainder of this page is intentionally blank)


v.
u.
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a.
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x.
y.
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aa.
bb.
cc.
dd.
ee.
ff.
gg.
hh.
ii.
jj.
kk.
ll.
6" 139° 04'
03' 30"
03'
31° 59' 06"N
139° 03' 00"W
31° 58'
57' 30"
31° 57' 00"N
139° 04' 24"W
139° 20'
31° 02' 00"N
139° 17' 00"W
25'

Figure 2-63

Section 2.10.1.13 Figure Cross-Reference to International 2 (INT2), "Borders, Graduation, Grids and Linear Scales"

Nautical Chart Manual Figure	INT2 Figure
2-11	T
2-12	U
2-15	A
2-16	B
2-17	A
2-18	B
2-22	------
2-23	E
2-24	F
2-25	G
2-26	H
2-27	J
2-28	K
2-29	L
2-30	M
2-42	------
2-43	E
2-44	F
2-45	G
2-46	H
2-47	J
2-48	K
2-49	L
2-50	M
2-51	D
2-54	D
2-58	D
2-63	C

Figure 2-64

2.10.2 Bar Scales
Revised by July 14, 2006 Memorandum

On July 1, 1954, DOC and DOD officially adopted the international nautical mile, which had been approved by the International Hydrographic Conference of 1929 and has since been adopted by nearly all maritime states.

This action, as well as the impending worldwide adoption of the meter as the uniform basic system of measurement, dictates that scales for both international nautical miles and meters must be incorporated into a graphic bar scale set for placement on NOS nautical charts.

The procedures described in this section shall routinely apply only to New and Reconstructed Charts (whether constructed by manual or automated methods).

1. Use on Charts

a. Mercator Projection

For charts constructed on the Mercator projection, graphic scales shall be used when the scale of the chart is such that practical scale distortion is minimal. Graphic scales shall not be used when the north-south scale distortion exceeds 2 percent overall. As a general rule, this means that bar scales will not be used on Mercator charts smaller than 1:80,000 scale, except in Alaska, where the 2-percent distortion factor is generally exceeded at scales of 1:80,000. On determination of special need, bar scales may be used on smaller-scale charts in addition to the standard scale border subdivision, providing these charts do not exceed the 2-percent distortion limitation.

An exception of this rule is for Great Lake Mercator charts where bar scales are used across the scales. In addition, on Great Lake charts, different bar scales may be used across the same chart. The mariner uses the bar scale located nearest to the latitude of his position.

A simple approximate method for determining whether a chart exceeds the 2-percent limit is to take the northern and southern limits of the chart and find the length of 1 minute of longitude from C&GS Special Publication No. 5. For example, chart 17316 extends from 58°06' N. to 58°52' N. From Special Publication No. 5, the value of 1 minute of longitude at 58°06' N. is 982.8 meters and at 58°52' is 961.7 meters. Dividing the first value by the second gives 1.022, or 2.2 percent, difference over the chart. Similarly, for chart 11462, the limits are 24°48' N. and 25°36' N. with the corresponding lengths of minutes being 1685.2 meters and 1674.3 meters. Dividing the first value by the second gives 1.007, or 0.7 percent, distortion.

b. Polyconic Projection

For charts constructed on the polyconic projection, graphic scales shall be used on all charts of

1:120,000 scale and larger. Scale is practically consistent throughout polyconic projections; scale distortion is not a limiting factor. For the Great Lake area, bar scales are used on all polyconic charts.

2. Selection of Bar Scales

a. International Nautical Mile Scale

This shall be used on charts of 1:10,000 scale and smaller, subject to the chart scale and distortion limitations noted above. Its use is optional on charts larger in scale than 1:10,000.

b. Statute Mile Scale

This shall be used only on charts of areas in which statute miles are prominently used in measuring or marking distances (e.g., the Intracoastal Waterway, Mississippi River, Great Lakes, Columbia River, etc.). Moreover, it shall be shown only when the chart falls within the chart scale and distortion limitations mentioned previously.

c. Yard and Meter Scales

These shall be used on all charts that carry the international nautical mile and/or statute mile scale, and on all charts larger than 1:10,000 scale.

3. Placement

a. On flat charts exceeding 620 square inches in area (4,000 square centimeters) within the neatline, two graphic scale sets shall be used on each chart if possible. Their location must be individually determined for each chart. However, when space permits, one scale set should be placed near the top and the other at the bottom, on opposite sides, and within the neatline. On smaller charts having an area of 620 square inches (4,000 square centimeters) and less, within the neatline, only one graphic scale set should be placed within the neatline.

b. On folded charts, when space permits, a graphic scale set shall be placed on alternate panels so that every two adjoining panels with a down-fold contain a scale set. A scale set should not be placed on folds of the printed chart.

c. Scales shall be positioned horizontally, parallel to the border frame, preferably on land area and/or near the chart title.

d. No linework of the bars shall be closer than 6 millimeters (0.236 inch) to the neatline (or the outside border when placed in the margin).

4. Construction Specifications and Units

a. Graphic scales shall be shown in the following sequence, reading from top to bottom:

1. International nautical miles
2. Statute miles
3. Yards
4. Meters

This sequence shall remain constant, even though all four scales may not be required for all charts.

The natural scale of the chart shall be computed and labeled as a one-line ratio -- e.g., "SCALE 1:40,000". Note that "natural scale" is defined as the scale of the chart at its central parallel and is not necessarily the common central parallel of a series of charts used for projection computation (which may be outside the chart limits). This natural scale and its central parallel are also used in the chart title.

Single stroke vertical type shall be used for all labeling.

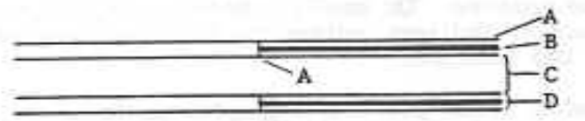
The center shading line shall be shown in each scale, except meter, in alternate major divisions beginning with the second division to the right of the reference zero. The use of the shading line in the minor division units to the left of the reference zero is optional; but if used, it should begin in the first unit left of the reference zero.

The following major divisions are to be used on yard and meter scales:

1:10,000 and larger	--	units of 100
1:10,001 to 1:20,000	--	units to 500
1:20,001 to 1:90,000	--	units of 1,000
1:90,001 to smaller	--	units of 2,000

Subdivisions on all scales shall be decimal parts of the major division.

Lineweight and spacing shall conform to these specifications:



A = .10 mm
B = .25 mm
C = 6.0 mm (space between)
D = 1.3 mm (inside dimension)

No scale shall exceed a maximum length of 185.2 millimeters.

Portions of scales may be used on insets and charts of small neatline area when space is limited.

5. Equivalents

Following is a list of the official conversion values to be used for measurements on nautical charts. Figure 2-13 shows commonly used chart scales and equivalents.

1 international nautical mile = 1,852 meters
1 statute mile = 1,609.344 meters
1 yard = 0.9144 meters
1 foot = 0.3048 meters
1 inch = 25.4 millimeter

6. Automated Production

Graphic bar scale sets complete with labeling can be produced by automated methods. Requests for these sets should be coordinated through the Chief, Marine Chart Division, and should include the following:

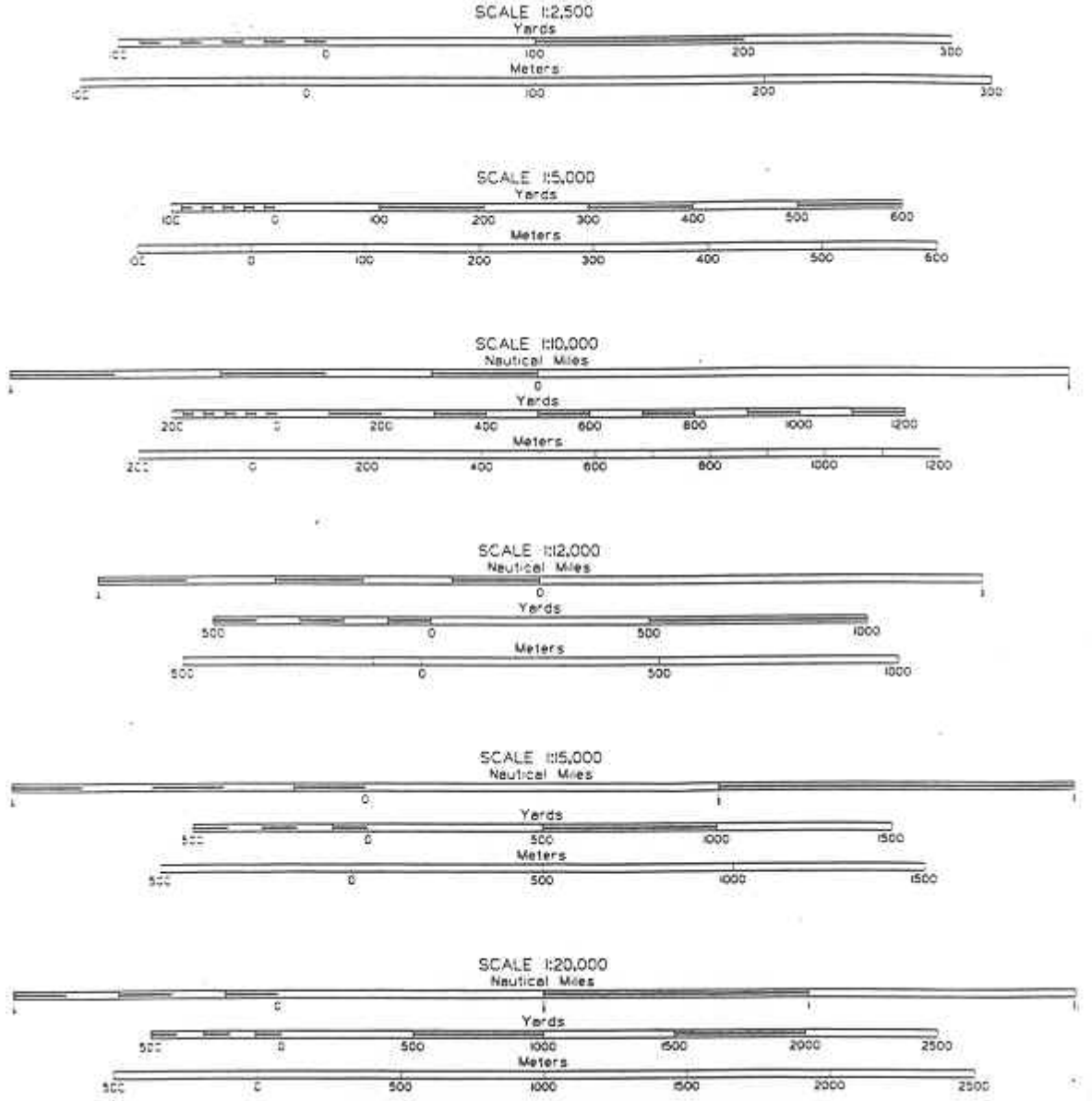
1. Scale of set
2. Whether statute mile bar scale is to be included
3. Whether standard width or shortened to specified units (for insets, etc.) is desired

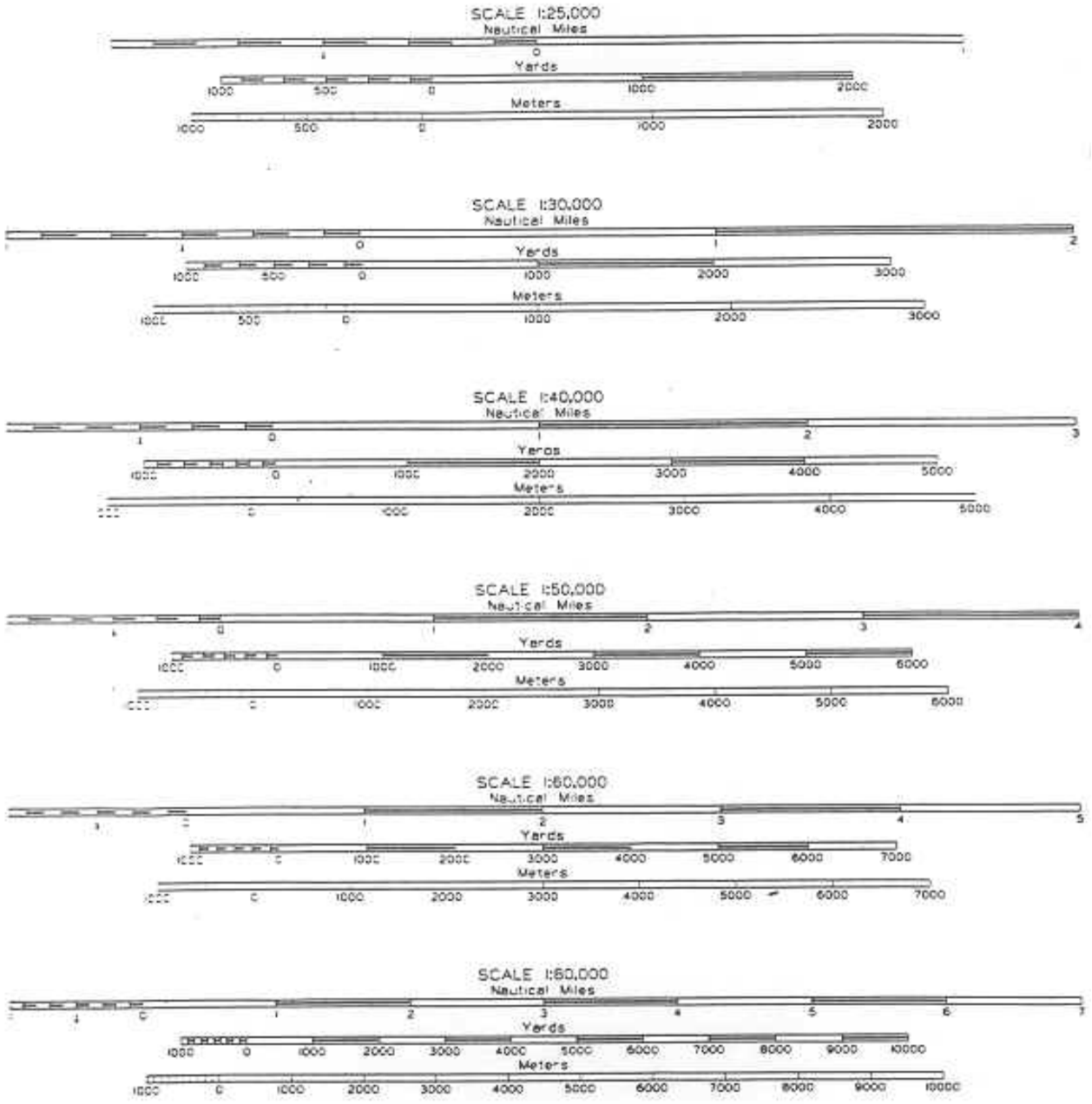
Examples of graphic bar scale sets for the most commonly used chart scales are shown in Figure 2-14. These examples should not be used for precise measurements. Sets for use at other charting scales can also be generated.

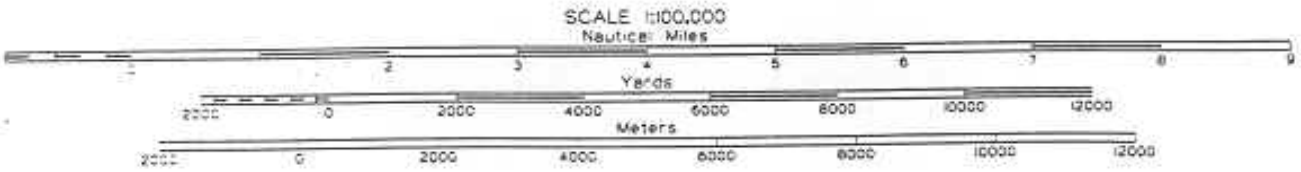
COMMONLY USED CHART SCALES AND EQUIVALENTS

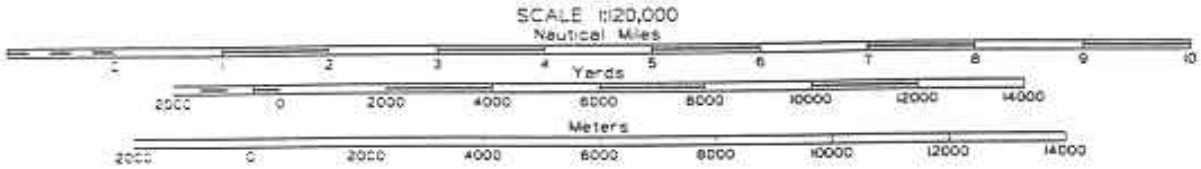
Fractional scale	Dimensions are in millimeters			
	Int. Naut. Mile	Statue Mile	Meters	Yards
			100	100
1:2,500	740.800	643.738	40.000	36.576
1:5,000	370.400	321.869	20.000	18.288
1:10,000	185.200	160.934	10.000	9.144
			500	500
1:12,500	148.160	128.748	40.000	36.576
1:15,000	123.466	107.290	33.333	30.480
1:20,000	92.600	80.467	25.000	22.860
			1,000	1,000
1:25,000	74.080	64.374	40.000	36.576
1:30,000	61.733	53.645	33.333	30.480
1:40,000	46.300	40.234	25.000	22.860
1:50,000	37.040	32.187	20,000	18.288
1:60,000	30.867	26.822	16.667	15.240
1:80,000	23.150	20.117	12.500	11.430
1:100,000	18.520	16.093	10.000	9.144
1:120,000	15.433	13.411	8.333	7.620
Formula	$\frac{1,852}{\text{Scale } (1,000)}$	$\frac{1,609.344}{\text{Scale } (1,000)}$	$\frac{1,000}{\text{Scale } (1,000)}$	$\frac{914.4}{\text{Scale } (1,000)}$

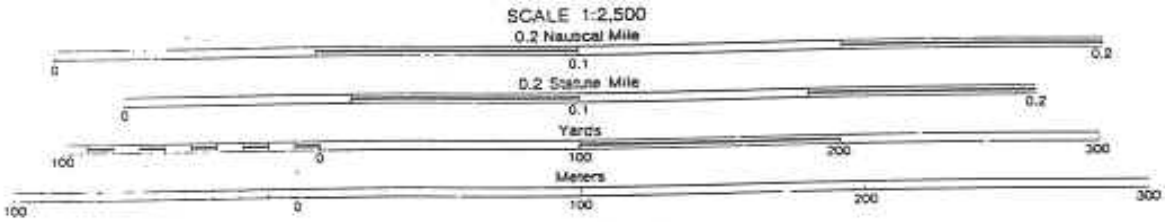
Figure 2-13

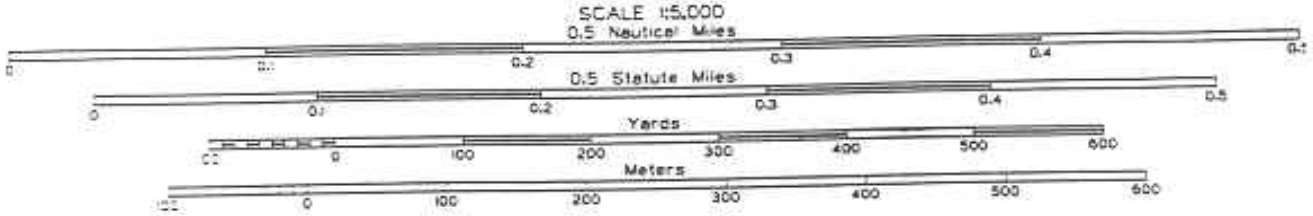


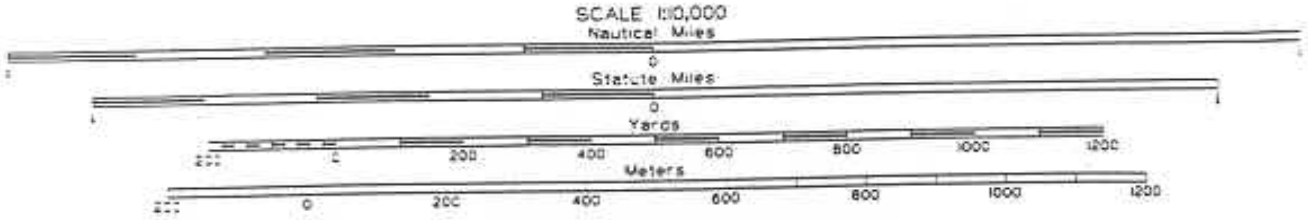


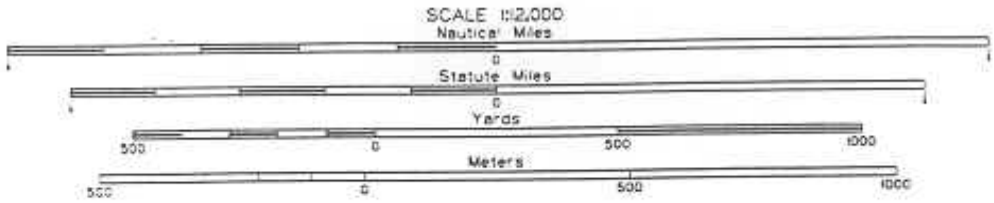


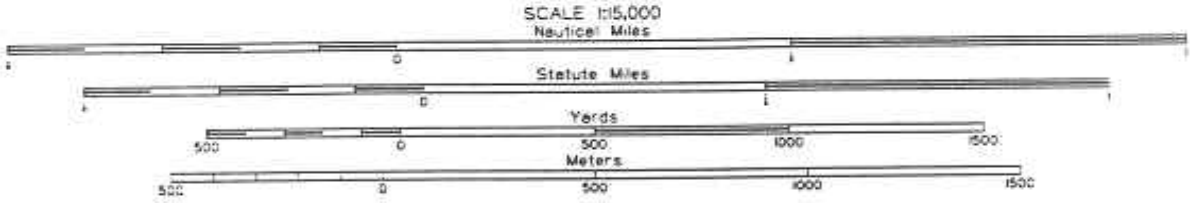


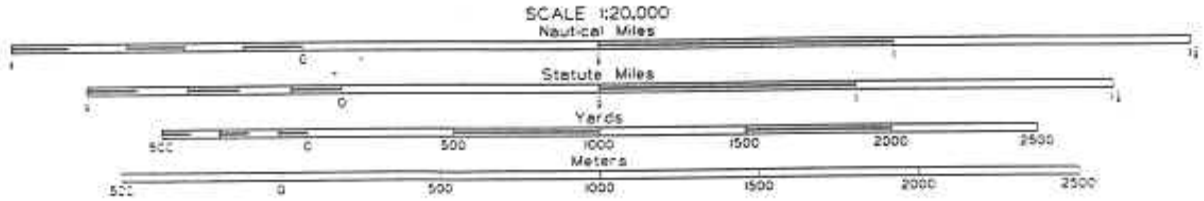


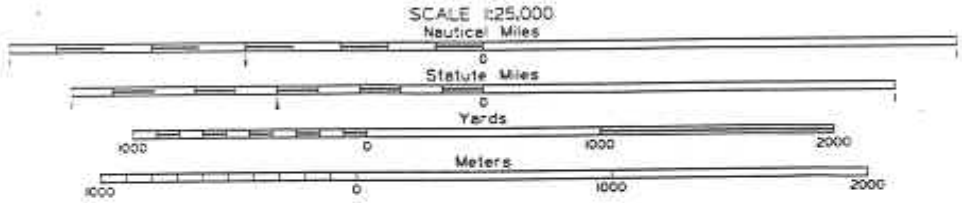


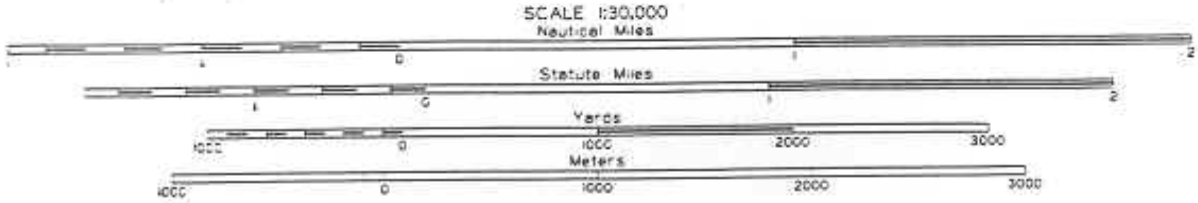


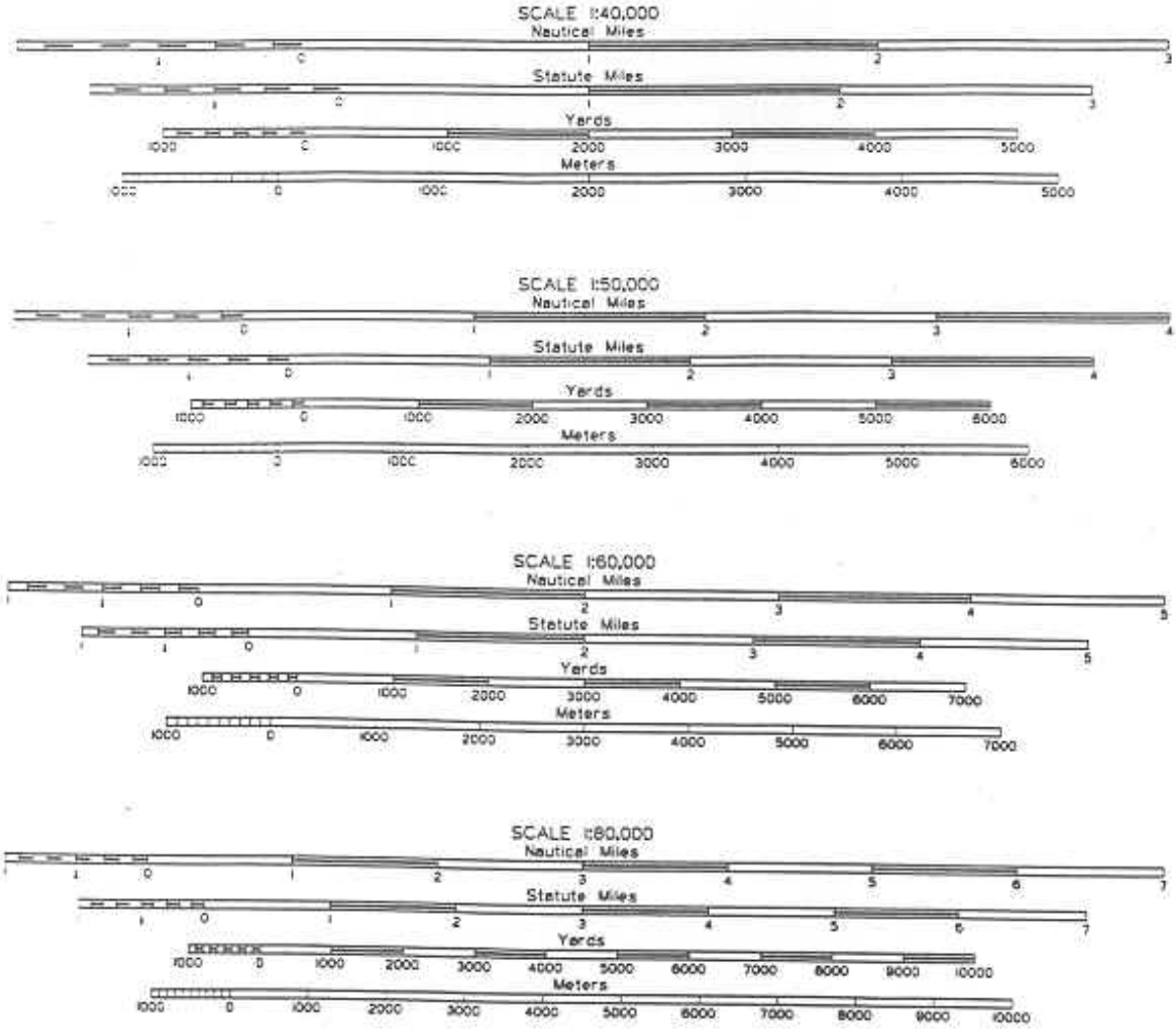












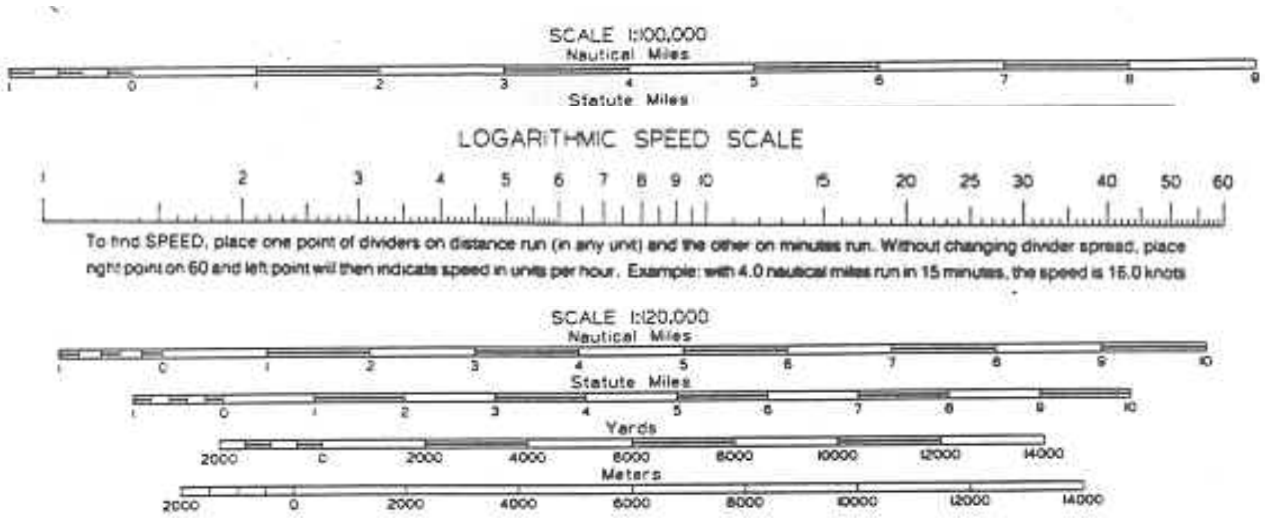


Figure 2-14

2.10.3 Logarithmic Speed Scale

Revised on August 20, 2013 by Cartographic Order 006/13

The Logarithmic Speed Scale shall no longer be shown on NOAA nautical charts because it is rarely used. Omission of the logarithmic speed scale provides space for other charting information.

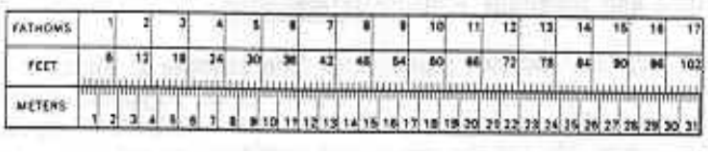
In the past, a logarithmic speed scale was placed on all charts of 1:40,000 scale and larger and on smaller-scale charts, if it was a service to users. This included charts designed for recreational use (e.g., those which carried listings of marine facilities) and certain smaller-scale charts of very active areas where there was no chart coverage of 1:40,000 scale or larger.

This scale was placed inside the neatline of the chart when space permitted.

An example of a logarithmic speed scale follows:

2.10.4 Depth Conversion Scale

Depth conversion scales have been designed for both horizontal and vertical placement (see Figure 2-15). A scale's placement on a chart shall be based on the following order of preferences:



A. Depth conversion scale for Horizontal Placement

Figure 2-15

B. Depth conversion scale for Vertical Placement

1. Conventional Charts:

First preference is to place the horizontal version 2.5 millimeters outside the lower border and 15 millimeters left of the subtitle.

Second preference is to place the horizontal version within the chart neatline and adjacent to a graphic bar scale.

Third preference is to place the vertical version within the chart neatline near the left or right neatline.

2. Small-Craft Charts

The second or third preference above shall apply because of limited margin space.

Scales placed within the neatline should be placed on a land area if possible, and not closer than 6 millimeters (0.236 inch) to the neatline.

2.10.5 Latitude and Longitude Plotting Interpolator

A latitude and longitude plotting interpolator (see example in Figure 2-16) serves as an aid in plotting geographic positions on Great Lakes polyconic charts at scales of 1:50,000 or smaller. The interpolator,

similar to the LORAN-C interpolator and others, is designed to compensate for the converging meridians on polyconic charts. A number of interpolators are available and the proper size should be selected for a given chart depending on the spacing of projection lines. One interpolator is required for each chart.

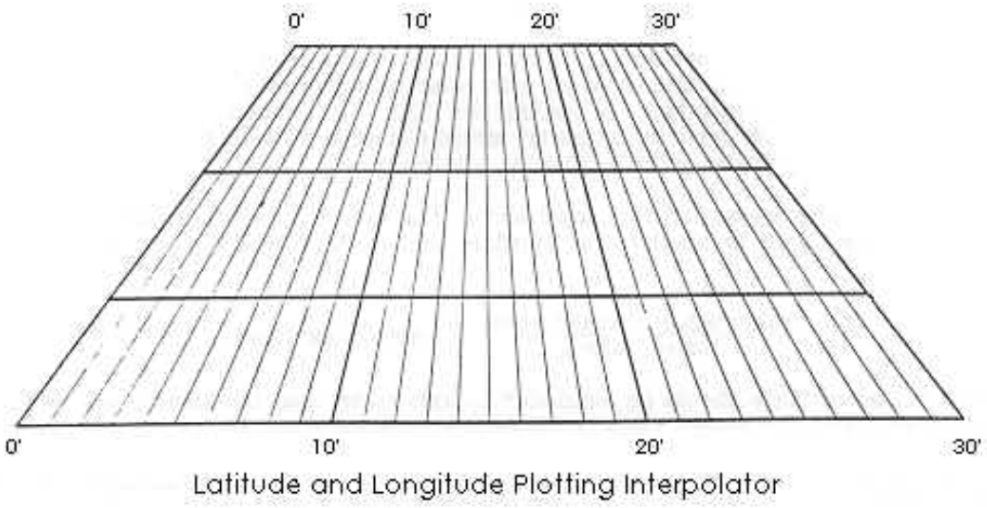


Figure 2-16

For charts and insets at scales larger than 1:50,000, the convergence of meridians is small enough so that a subdivided plan border will suffice for plotting geographic positions.

Interpolators will remain on the designated Great Lakes charts until the charts are reconstructed and converted to Mercator projections.

2.10.6 Scaling and Plotting

1. Scaling Positions

Geographic positions -- that is, latitude and longitude -- are required for many points located on graphic source materials in order to be included in the automated system. For convenience, the latitude and longitude are given in degrees and minutes with the seconds of arc in meters. The accuracy of the positions of photo (topo) points and topographic points does not warrant the scaling of the positions of these points to tenths of meters. Therefore, the seconds of arc in meters shall be scaled and corrected for any distortion of the manuscript to the nearest meter and shall be checked with the same accuracy.

The seconds in meters may be scaled or checked with a beam compass and metal meter scale, the Lockerbie Diagonal Scale, the Sylar-Lockerbie Scale, or a triangular centimeter scale if the scale (or a section thereof) is subdivided to 0.5 millimeters.

The Lockerbie Diagonal Scale may be used as follows scaling the meridional differences (dms) parallel differences (dps) of points. The zero of the scale (the small space between the two lines at the base) can be placed over the given point and any vertical line of the scale placed in coincidence with the nearest meridian line. Without further adjustment, the seconds in meters between the point and a parallel of latitude are indicated at the place where the parallel intersects one of the diagonal lines of the scale. The same process is followed to scale the longitude, except the vertical line is placed in coincidence with the nearest parallel. The seconds in meters between the point and a meridian are indicated at the place where the meridian intersects one of the diagonal lines of the scale.

The Sylar-Lockerbie Scale consists of four Lockerbie scales printed in a single diagram on the underside of a thin sheet of transparent plastic. The center point of the scale is placed directly over the point to be scaled. The vertical line of the scale nearest a meridian is oriented parallel to that meridian. The four quantities in meters forward latitude, back latitude, forward longitude, and back longitude can all be measured at the one setting. This scale is obtainable in two scale ratios -- 1:10,000 and 1:20,000.

A triangular centimeter scale with 0.5-millimeter subdivisions is useful for scaling the positions of stations on manuscripts at scales of 1:10,000 and 1:20,000. On these manuscripts, the seconds in meters may be read directly. To do so, the centimeter scale must be held parallel with the nearest meridian for scaling latitudes and parallel with a parallel of latitude for scaling longitudes, except when the manuscript is of a scale slightly smaller than 1:10,000 or 1:20,000. In the latter case, the scale is placed at a slight angle to the projection lines so that it bisects the point, the zero of the scale coincides with one meridian or parallel and the exact reading on the scale (corresponding to one subdivision of the projection at the latitude of the station) coincides with the opposite meridian or parallel. The value of the seconds in meters of latitude or longitude of the point can then be read directly from the scale. This method compensates for the scale error of the projection, and the values need not be corrected.

2. Correction for Scale Error of the Projection

Map manuscript projections often are not exactly at even scales, such as 1:10,000 or 1:20,000. Consequently, the dms or dps must often be corrected for the scale difference of the manuscript projection. In scaling positions, the manuscript projection should always be checked for scale by comparing scaled distances between projection lines with the corresponding values given in Special Publication No. 5.

To correct distances scaled from manuscripts that are distorted or constructed at a scale slightly larger or smaller than standard scales, the following relation should be used:

$$\frac{\text{tabular value} - \text{scaled value}}{\text{scaled value}} = \text{correction factor}$$

Each scaled distance should be multiplied by this factor and the amount added to or subtracted from the scaled value to obtain the true value.

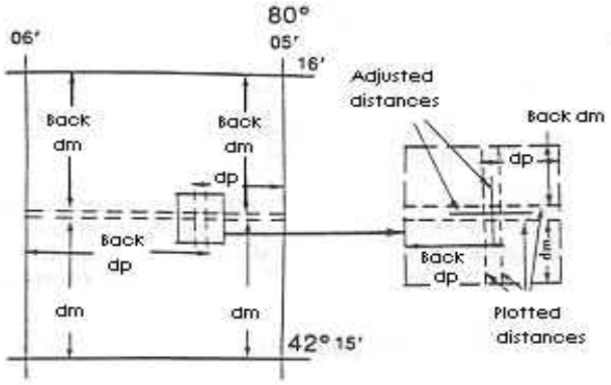
To plot a station on a distorted manuscript or one constructed at a scale slightly larger or smaller than standard scales, the following relation should be used:

$$\frac{\text{tabular value} - \text{scaled value}}{\text{tabular value}} = \text{distortion factor}$$

Each true value that is to be plotted on the manuscript should be multiplied by this factor and the amount added to or subtracted from the true value.

3. Plotting Positions

The positions of landmarks and fixed aids to navigation determined to third-order or higher accuracy shall be plotted from the computed values of latitude and longitude. The differences along adjacent meridians (dms) and the differences along adjacent parallels (dps) are plotted from the south parallel and east meridian, respectively, using a beam compass and metric scale (see below). Dividers can be used to measure short distances, but they become less accurate when spread appreciably. The dm and dp values (in meters) shall be marked by fine prick points adjacent to each set of projection lines and then connected by fine pencil lines. To check the plotting and to compensate for sheet distortion, plot the back dms and back dps from the north parallel and the west meridian. Distortion, if present, will be proportional between each set of dm and dp parallel lines. The position of the station at the intersection of the final dm and dp lines is marked by a fine needle hole that can be blackened by rotating a sharp pencil point in the hole. Ink should never be used to mark the point. The plot of the position shall be checked by the same method.



2.11 Chart Outlines and Diagrams

Chart outlines and diagrams are used to display larger scale overlapping or adjoining chart coverage on smaller scale charts. The intent is to provide the user with a reasonably complete reference by

using the chart in hand to assist in the transition from one chart to another, and to indicate the location of larger scale charts for more detailed use. This is especially important where hydrography has been eliminated on a smaller scale charts due to larger scale chart coverage.

Two methods of indicating the larger scale chart coverage may be used:

1. By directly outlining the larger scale charts

2. By showing a chart index diagram

The outlining method is preferred, although there may be instances where the legibility of the chart could be impaired by the use of additional linework. In these circumstances, a chart index diagram may be more desirable if space is available. Only in exceptional instances may both methods be used on the same base chart.

Outline method:

1. The chart outlines shall be shown with a screened unbroken line of 0.25 mm lineweight. The outline shall be a 25 percent, 200-LPI biangle screened black line for NOS charts, a 33 percent, 200-LPI biangle screened blue line for NGA charts, and a 33 percent, 200-LPI screened gold line for foreign charts.

2. The overall coverage of the larger scale chart being diagramed shall be shown, without interior linework for insets and extensions. Insets and extensions should be shown as part of this outside limit to show the complete area covered by the large-scale chart.

3. All labels referring to outlines shall be in the same color and screen tint as the lines. Although the labels will be made somewhat transparent by screening, they should be placed to avoid overprinting critical information.

4. Labels should be 12 pt. Swiss Light type style and should consist of only the chart number and scale. Size may be smaller as needed.

Diagram method:

1. Placement: preferred placement of the diagram is on land area as space permits, but not closer than 6.0 mm to the neatline of the chart. Its location should not displace any of the more important notes normally shown in a grouping. The index must not obscure important hydrographic detail.

2. Size: the size of the index is controlled to a great extent by the placement. The neatline limits of the index shall be the same as the neatline limits of the chart on which it is placed. The scale should correspond to the chart catalog scale. Multiples of fractions of 50 percent thereof may be used when needed to enlarge for legibility or reduce to fit space.

3. Charts diagramed: next larger scale charts must be shown, with all larger scale charts being limits of the index shall be the same as the neatline limits of the chart on which it is placed. The scale should correspond to the chart catalog scale. Multiples of fractions of 50 percent thereof may be used when needed to enlarge for legibility or reduce to fit space.

3. Charts diagramed: next larger scale charts must be shown, with all larger scale charts being shown only where legibility permits. Smaller scale charts may be shown when considered essential information for the chart user.

4. Nomenclature: major waterways and other large and important water features must be shown as well as the largest metropolitan areas. The selection of names will be a matter of judgment in many cases, but it should be remembered that these names will provide primary chart orientation for the user.

The approximate position circle symbol may be used for larger metropolitan areas.

Boundary lines should be avoided.

5. Avoid projection lines and north arrows. Show only minimum projection ticks and label with black 6 pt. Swiss Light type style. The index, having same neatline limits as the chart, shall also be oriented the same as the chart.

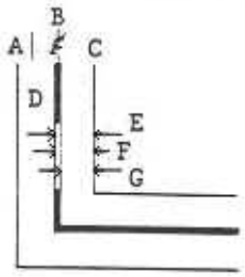
6. Notation: the statement "For detailed information use larger scale charts," in black, and tabulation of the charts with their scales shall be placed within the diagram. The chart outlines shall be labeled only with the chart number. Leaders may be used to improve legibility. Six pt. Swiss Light style type shall be used for all chart labels, tabulations, and the note. The tabulated charts shall be in the same color as their outlines (item 7).

7. Colors, screen tints, and line specifications:

The water area shall be untinted.

The land tint shall be gold 20 percent 120-LPI; the use of the urban screen should be avoided.
Shoreline: 0.15 mm black
NOS chart outlines: 0.25 mm black
NGA chart outlines: 0.25 mm blue
Foreign chart outlines: 0.25 mm gold

Diagram border detail:



A. Chart neatline
B. Diagram border, 0.8 mm
C. Diagram neatline, 0.1 mm
D. 6.0 mm minimum space
E. 6.1 mm
F. 5.7 mm
G. 5.3 mm

Any deviations from these guidelines must be approved by the Chief, CSSB.

2.12 Type

The style, size, and spacing of type used on charts published by NOS are illustrated in the Type Specifications section of this manual.

In determining the size of type to be used, the cartographer should give the maximum size to the main line of the title. All other type should be smaller. Minor names of only local importance should be inconspicuous. The space available on the chart and the relative importance of the feature to which the name or term applies should be considered in selecting the size and spacing of the type. The legibility of place names is usually improved by increasing the space between the letters.

2.13 Chart Histories

2.13.1 Compilation Histories

The data applied to create a new edition of a nautical chart should be reflected on the chart history with the corresponding edition number. For example, the history for the first edition of a chart would be labeled "Edition No. 1".

As we operate today there are manual chart histories, automated chart histories and CRIT histories. All histories for the same edition of a chart shall carry the same edition number. All Chart Histories shall carry the edition number of the next edition of the chart in the space marked "EDITION NO." As an example, if the printed chart is the 10th edition, the Chart Histories being prepared for the next edition would be completed as "EDITION No. 11".

The "History of Cartographic Work," commonly known as a "history," is continually maintained to document the application of all source material. This form is the only permanent record of the compilation process. For this reason it must represent a complete and detailed record of all available information used or consulted in the compilation, whether it results in a New Chart, Reconstructed Chart, New Edition, Revised Print, or chartlet. The information used for the compilation may come from various types of surveys and records such as hydrographic surveys and accompanying descriptive reports, photogrammetric maps and descriptive reports, blueprints, letters, chart evaluation surveys and reports, field examinations and reports, USACE reports, triangulation records, and the many other sources listed in Section 2.3.

It is the cartographer's duty to obtain, whenever possible, any available information in addition to that on record in NDB which is pertinent to the job in hand. Each piece of source material containing an item falling within the chart limits must be entered on the history and the disposition of each item clearly stated. In addition to source material, other sources of information affecting charting policy must also be identified on the history with a brief explanation of the charting action taken. This would include Cartographic Orders, memos, format changes, etc. Items which are unavailable or which the cartographer cannot fully apply must also be accounted for on the history.

Standard abbreviations should be used to conserve space.

The history is divided into five major sections, each of which is discussed here separately. A sample chart history form is included as Figure 2-17.

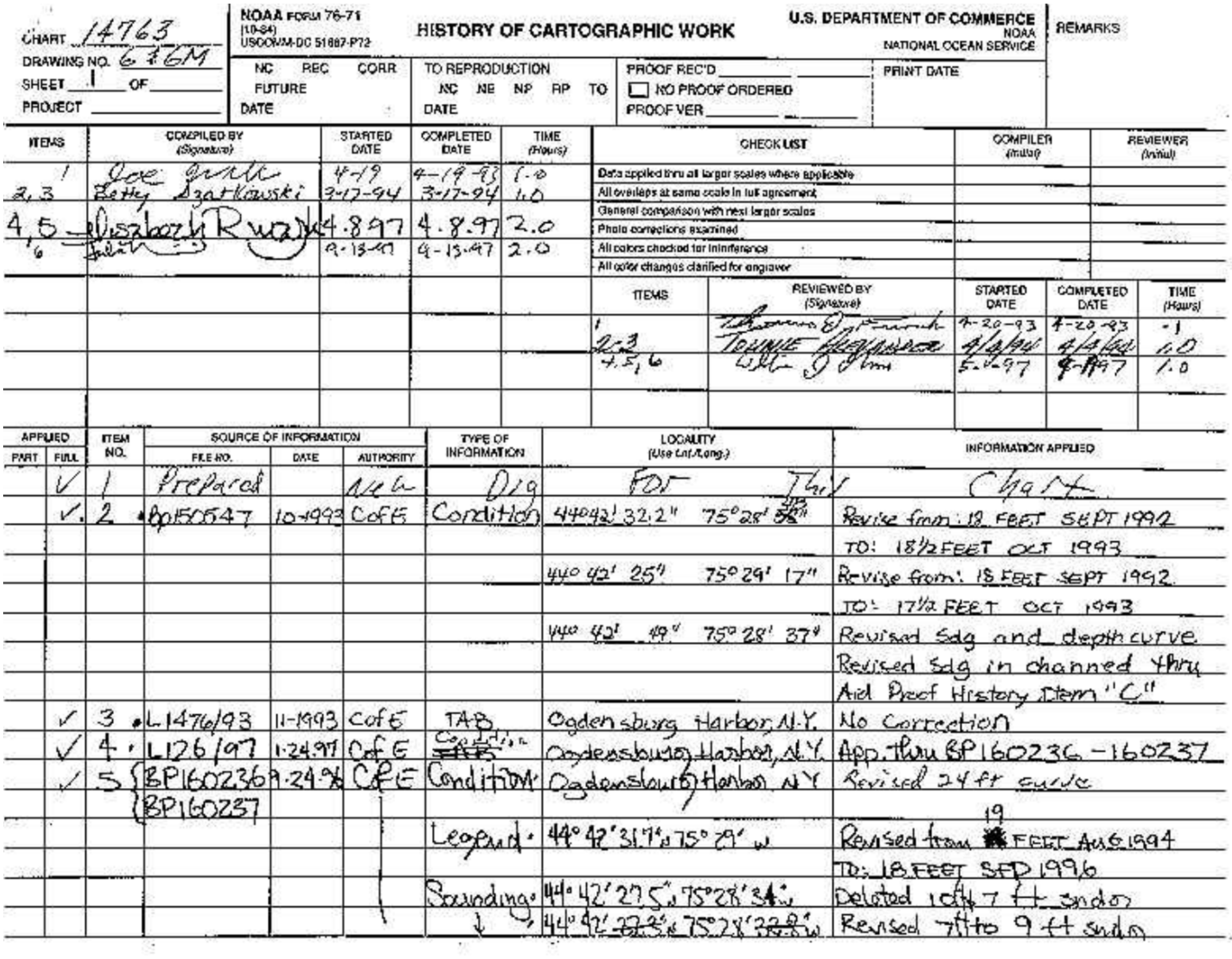


CHART 14763
DRAWING NO. 676M
SHEET 1 OF
PROJECT

NOAA FORM 76-71 (10-84) USCOMM-DC 51687-P72
HISTORY OF CARTOGRAPHIC WORK
U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SERVICE
REMARKS

NC REC CORR FUTURE DATE | TO REPRODUCTION NC NE NP RP TO DATE | PROOF REC'D / NO PROOF ORDERED / PROOF VER | PRINT DATE

ITEMS	COMPILED BY (Signature)	STARTED DATE	COMPLETED DATE	TIME (Hours)
1	Joe [illegible]	4-19	4-19-93	1.0
2, 3	Betty Szatkowski	3-17-94	3-17-94	1.0
4, 5	Elisabeth Rwazk	4.8.97	4.8.97	2.0
6	[illegible]	9-13-97	9-13-97	2.0

CHECK LIST (COMPILER (Initial) / REVIEWER (Initial)):
Data applied thru all larger scales where applicable
All overlaps at same scale in full agreement
General comparison with next larger scales
Photo corrections examined
All colors checked for interference
All color changes clarified for engraver

ITEMS	REVIEWED BY (Signature)	STARTED DATE	COMPLETED DATE	TIME (Hours)
1	[illegible]	4-20-93	4-20-93	.1
2, 3	[illegible]	4/4/94	4/4/94	1.0
4, 5, 6	[illegible]	5-?-97	5-?-97	1.0

APPLIED PART	APPLIED FULL	ITEM NO.	FILE NO.	DATE	AUTHORITY	TYPE OF INFORMATION	LOCALITY (Use Lat./Long.)	INFORMATION APPLIED
	✓	1	Prepared		NCW	Dig	For	Thy Chart
	✓	2	BP150547	10-1993	CofE	Condition	44°42' 32.2" 75°28' 58"	Revise from: 18 FEET SEPT 1992 TO: 18½ FEET OCT 1993
							44° 42' 25" 75° 29' 17"	Revise from: 18 FEET SEPT 1992 TO: 17½ FEET OCT 1993
							44° 42' 49" 75° 28' 37"	Revised Sdg and depth curve. Revised Sdg in channel thru Aid Proof History Item "C"
	✓	3	L1476/93	11-1993	CofE	TAB	Ogdensburg Harbor, N.Y.	No Correction
	✓	4	L126/97	1-24-97	CofE	Condition	Ogdensburg Harbor, N.Y.	App. thru BP160236 - 160237
	✓	5	BP160236 BP160237	1-24-97	CofE	Condition	Ogdensburg Harbor, NY	Revised 24 ft curve
						Leopard	44° 42' 31.7", 75° 29' w	Revised from 19 FEET AUG 1994 TO: 18 FEET SEP 1996
						Sounding	44° 42' 27.5", 75° 28' 34"	Deleted 1 of 7 ft sndg
							44° 42' [illegible], 75° 28' [illegible]	Revised 7 ft to 9 ft sndg

Figure 2-17

1. The Heading

The Heading is located at the top of the form extending across the page. Beginning on the left, the cartographer shall fill in chart number, drawing number, sheet number, and project number. The block titled "Future" is filled in and date-stamped when the chart is forwarded for reproduction. The block titled "To Reproduction" is filled in and date-stamped by NDB. The "Proof Received" area is filled in by the production branch. If proofs are ordered, the first line shows the date they are received and the second line is the cartographer's initials. The "Print Date" is filled in by the production branch after the chart is printed. Comments of significant importance are added in the "Remarks" area by the cartographer or reviewer.

2. The Check List

The Check List consists of a list of six items that the cartographer and reviewer must initial to verify that each item has been completed. If an item has not been completed, the cartographer or reviewer shall enter "see item #___," Referring to the item number in the Information Section which corresponds to the entry. A brief explanation of why the entry could not be completed must be included in the Information Section.

3. "Compiled By" Section

This section begins with a column is labeled "Items," which refers to the item numbers the cartographer assigns to source material used in the compilation process. These item numbers are found in the Information Section (which should be completed before this section). The cartographer should enter the number of the first item applied, followed by a dash, and then the last consecutive item number applied. The cartographer also notes the starting date and date of completion, as well as the total time spent applying these items (in hours to the nearest half hour).

4. "Reviewed By" Section

This section, located below the Check List, is filled in by the reviewer in the same way as the "Compiled by" section.

5. Information Section

This section of the history, which comprises the lower half of the form, is divided into several columns, each of which will be explained separately. The Information section is filled in by the cartographer.

a.. Applied

This column is used to indicate whether an item has been partly or fully applied. It is also used to show that an application has been deferred or that an item is unavailable or could not be located.

When the application of an item is deferred, the cartographer shall enter "FWD" (forward), through both the "Part" and the "Full" columns. The cartographer must then enter an explanation of why this action was taken in the "Information Applied" column.

If a source document is unavailable or cannot be located, it should be handled as a deferred item. The cartographer should include a reference to the last date the item was not located or was unavailable.

If an item has been partially applied, the cartographer shall place an X in the column under "Part."

If an item has been fully applied, the cartographer shall place an X in the column under "Full."

Under no circumstances shall an item be considered fully applied unless it results in a complete application of all pertinent information from the source document.

Incompletely processed hydrographic and topographic surveys can never be fully applied. Chapters 3 and 4 of this manual explain the processing stages for these documents.

b. Item Number

The cartographer shall number each item consecutively. In the event two or more items refer to each other -- i.e., a USACE channel tabulation and a USACE survey it was compiled from, they may be indicated by one number.

c. Source of Information

These entries should clearly identify the source document.

(1) File No.

If a document has been formally registered as a valid source document (given a document number), the cartographer shall enter this identification number. In all other cases, the cartographer shall enter the originator's identification as the file number.

In the case of hydrographic or topographic surveys, the cartographer shall indicate the status of the survey.

If a blueprint is a copy of a hydrographic or topographic survey, the cartographer shall indicate the survey number.

If the source document has been partially applied or forwarded, the cartographer shall underline the file number.

(2) Date

For cartographic orders, geographic names standards, hydrographic surveys and topographic surveys, the cartographer shall enter the year of the document. For all other documents, the cartographer shall enter the full date (month/day/year) where it can be established.

(3) Authority

In this column the cartographer shall enter the original source of the document, not an intermediate source.

d. Type of Information

In one or two words, the cartographer shall state the general type of information contained in the source document.

e. Locality

In this column, the cartographer shall enter the latitude and longitude of the source document or item applied. For documents which cover a large area, the cartographer shall give the limits of the area covered. On small-scale charts or where a small area is covered, the cartographer shall use an approximate center point. If the document covers the entire limits of the chart, the cartographer shall enter "Entire Chart." If several items, especially landmarks, are applied from one document, each position must be listed separately. The name of the river or channel and the stationing along the channel should be listed for USACE channel surveys.

f. Information Applied

In this column the cartographer shall briefly describe what was applied from the source document. If the application was made through a larger-scale chart, this must be stated. It is important that this entry accurately but briefly describe what was applied to the chart.

Any explanations or other information that may be of use to the reviewer or to another cartographer in the future should also be included.

A brief statement giving the reason a document is partially applied or forwarded shall also be entered in this column.

2.13.2 Section no longer exists.

2.13.3 Section no longer exists.

2.14 Section no longer exists.

2.15 Cartographic Tools

2.15.1 Section no longer exists.

2.15.2 Computer-Supported Reductions

Scanning and warping can be used to reduce paper source documents to chart scale. Digital reductions, enlargements, and enhancements are primary cartographic tools.

2.16 Standards

2.16.1 General

The public is informed of cartographic standards by publication of new or revised symbology on nautical charts with explanations published in the Coast Pilots as authorized by the legislative authorities:

1. Organic Act of February 10, 1807 (2 Stat. 4134)
2. Appropriations Act of 1843
3. Act of August 6, 1947, (61 Stat. 787); (33 USC 883a and 883b)
4. Act of April 5, 1960 (74 Stat. 16)
5. Department of Commerce Organization Order 25-58, July 11, 1971
6. 33 CFR 164

Cartographers of NOS apply the standards to the products through various internal documents such as this manual and updated cartographic directives. Most standards used in compilation of nautical products are obtained or derived from U.S. Government sources, or are developed within the agency. Other standards are adopted from the IHO and the CHS.

NOS charts are continually examined for conformance to standards for plotting of data; accuracy, completeness, and clarity of depiction of detail; and adherence to printing standards for color rendition, registration of colors, and lithographic screening.

NOS participates in the activities of standards development of the IHO, NGA, DOD, the U.S.-Canada Hydrographic Commission, the American Congress on Surveying and Mapping, and the American Society of Photogrammetry. It also participates with other groups, such as the USCG and the United Kingdom Hydrographic Department, as the occasion dictates.

Primary activities of standards development focus on the uniform worldwide standards developed and recommended by the IHO (whose 53-country participating membership includes the United States, represented jointly by NOS and NGA). All member countries vote on the proposals, and those adopted are promoted worldwide in an attempt to achieve uniform standards for all chart products. This is a long-standing and ongoing effort. Any standards being considered for adoption by NOS are extensively researched; historical records, as well as information from the sources previously identified, are studied. NOS coordinates with NGA to ensure that all U.S. charts adhere to the standards as much as is practical. To this end, Chart No. 1, "Nautical Chart Symbols and Abbreviations" is jointly prepared by NOS and NGA.

A study is currently underway with the CHS to identify and resolve as many differences as possible between U.S. and Canadian charts without violating IHO and United States standards. The goal is to attain reasonable similarity in those charts for which the two countries exchange reproducibles.

2.16.2 Accuracy Standards

Accuracy is the most important requirement of a good nautical chart, and extreme care must be exercised so that no critical or essential information is omitted and such information is depicted in the most beneficial way. There are four considerations for an accurate depiction of information on nautical charts:

1. Depiction of information
2. Type of information
3. Accuracy of position
4. Relative accuracy

All four must be taken into consideration for any application of data.

Depiction of Information

A navigator must often read charts in the dim light of a pilot house with the ship pitching or rolling in a heavy sea. These conditions necessitate clarity and legibility in chart detail. The keynote of good charting is, therefore, accuracy with simplicity. The cartographer's constant challenge is to avoid encumbering the chart with detail which is not essential for navigation. A cartographer must choose the best way to portray information as well as judging its positional accuracy.

Type of Information

Whether information is judged critical or noncritical in respect to its positional accuracy may have bearing on whether it is used in compilation. A report of a dangerous wreck with an inaccurate position shall be used because it gives the mariner at least a warning that a dangerous obstruction is in the area, whereas an accurate position of a structure not considered an aid to navigation, landmark, or obstruction would not be used.

Accuracy of Position

Cartographers shall use the most accurate information available to them. Where possible, this positional information shall conform to the National Map Accuracy Standards (see Section 1 below).

Relative Accuracy

Accuracy of position, legibility, and consistency in selection and placement of charted features, names, notes, and other details are important requirements in nautical chart compilation. However, it may be more important for charted features to be in the correct relation to each other than to be shown in their correct geographic positions. A floating aid, for example, should be charted in the proper position relative to the danger it marks. Although this may be a degradation of the reported position, it serves the mariner better.

Charts differ from maps in many ways, one of which is that standardized specifications cannot be applied indiscriminately to charts. There is only one fundamental criterion which should be applied. Each detail should be assessed for its usefulness to some important class of chart user in the context of the surrounding details and the scale of the chart. Useless details should not be charted and minor features should be excluded if their inclusion would tend to obscure more important features.

Often a fine sense of judgment is required in interpreting source materials. When discrepancies between sources are encountered, every effort should be made to initiate investigations to determine true conditions.

1. U.S. National Map Accuracy Standards (NMAS)

Publication accuracy is specified in the National Map Accuracy Standards (NMAS) which are generally followed by most Federal mapping agencies. Whenever possible, nautical chart compilation should be held to these standards. These mainly apply to topography and culture, areas for which the NMAS were originally created. It is often not possible to hold to these standards in hydrography and in the many reports which result in charted features, such as dangers, obstructions, or shoaling.

The NMAS for published maps are as follows:

a.. Horizontal Accuracy

For maps on publication scales larger than 1:20,000, not more than 10 percent of the points tested shall be in error by more than 1/30 inch (0.8 mm; 0.033 in.), measured on the publication scale; for maps on publication scales of 1:20,000 or smaller, 1/50 inch (0.5 mm; 0.020 in.). These limits of accuracy shall apply in all cases to positions of well-defined points only. Well-defined points are those that are easily visible or recoverable on the ground, such as the following: monuments or markers, such as benchmarks, property boundary monuments; intersections of roads, railroads, etc.; corners of larger buildings or structures (or center points of small buildings); etc. In general what is well-defined will also be determined by what is plottable on the scale of the map within 1/100 inch (0.25 mm; 0.010 in.). Thus while the intersection of two roads or property lines meeting at right angles would come within a sensible interpretation, identification of the intersection of such lines meeting at an acute angle would obviously not be practicable within 1/100 inch. Similarly, features not identifiable upon the ground within close limits are not to be considered as test points within the limits quoted, even though their positions may be scaled closely upon the map. In this class would come timber lines, soil boundaries, etc.

b. Vertical Accuracy

As applied to contour maps on all publication scales, not more than 10 percent of the elevations tested shall be in error by more than one-half the contour interval. In checking elevations taken from the map, the apparent vertical error may be decreased by assuming a horizontal displacement within the permissible horizontal error for a map of that scale.

The accuracy of any map may be tested by comparing the positions of points whose locations or elevations are shown upon it with corresponding positions as determined by surveys of a higher accuracy. Tests shall be made by the producing agency, which shall also determine which of its maps are to be tested and the extent of such testing.

Published maps meeting these accuracy requirements shall note this fact in their legends, as follows: "This map complies with National Map Accuracy Standards."

Published maps failing to meet these requirements shall omit from their legends all mention of standard accuracy.

When a published map is a considerable enlargement of a map drawing (manuscript) or of a published map, that fact shall be stated in the legend. For example, "This map is an enlargement of a 1:20,000-scale map drawing," or "This map is an enlargement of a 1:24,000-scale published map."

To facilitate ready interchange and use of basic information for map construction among all Federal map making agencies, manuscript maps and published maps, wherever economically feasible and consistent with the use to which the map is to be put, shall conform to latitude and longitude boundaries, being 15 minutes of latitude and longitude, or 7 1/2 minutes, or 3 3/4 minutes in size.

For international accuracy standards for hydrographic surveys, see Special Publication N0. 44, Book 1, "IHO Standards for Hydrographic Surveys", 2nd Edition, 1982, IHB, Monaco.

2. Review

Every source application must be thoroughly reviewed. This review must include every sounding, elevation, name, aid to navigation, and hydrographic and topographic feature. Special care must be taken to see that every danger, danger curve, and channel is distinctly and correctly represented. If changes are necessary, the compilation must be returned to the original compiler for correction; otherwise, the same type of mistake might be repeated.

Slight and unimportant inaccuracies ordinarily need not be changed. For instance, soundings need not be moved if the locations are in error by less than the accepted tolerance.

2.16.3 Displacement Tolerances

Maximum displacement tolerances for register, point and line data, and soundings on nautical charts should seldom exceed those stated here. These tolerances have evolved over the years by considering:

(1) The preservation of safety of navigation by the accurate portrayal of navigationally critical elements such as physical hazards along navigation routes, aids to navigation including landmarks and electronic positioning systems, and hydrography limiting the draft and width of vessels through passages;

(2) What is possible and practical in the manual chart production system (automated processes now in use and being developed are well within these values);

(3) Conformance to NMAS in the cumulative total, where possible.

1. Compilation Processes, Position Displacement from Source at Compilation Scale

a. Point data: All discrete points, including landmarks, fixed aids to navigation, etc., shall be located within +/-0.15 millimeter (0.006 inch) of the correct geographic positions as measured on the digital chart files or other final compilations, or on construction plates (as for New and Reconstructed Charts). Discrete points are defined as those points for which a geodetic or grid coordinate is given.

b. Line data, axis-to-axis: One-half the symbol lineweight to a +/-0.15 millimeter (0.006 inch) maximum displacement is acceptable.

c. Soundings: A displacement equal to one-half the height of a whole number, not including superscripts or subscripts is acceptable.

2. Position Displacement from Compilation

a. Point data: The maximum displacement acceptable is one-fourth of the diameter of the symbol dot or circle, or 0.15 millimeter (0.006 inch), whichever is less.

b. Line data, axis-to-axis: The maximum displacement acceptable is one-half the symbol lineweight to a 0.15mm (0.006 inch) maximum.

c. Soundings: A displacement value equal to one-half the height of a whole number, not including superscripts or subscripts, is acceptable.

3. Reproduction Mechanical Processes

a. Adherence to lineweight +/- 0.025 millimeter (0.001 inch)

b. Prepunch +/- 0.025 millimeter (0.001 inch)

c. Register marks between repromats +/- 0.05 millimeter (0.002 inch)

d. Vacuum frame film movement +/- 0.025 millimeter (0.001 inch)

e. Film compositing +/- 0.05 millimeter (0.002 inch)

f. Press printing register, colors to black +/- 0.1 millimeter (0.004 inch)

Note that the maximum potential errors do not usually occur throughout the chart but appear at only one place on the chart. These errors are considered insignificant when distributed this way provided the maximum tolerance limit is observed.

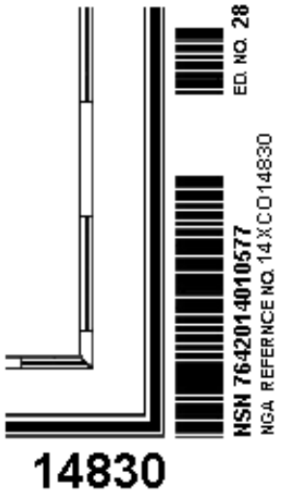
2.17 Bar Codes, Stock and Reference Numbers

Revised on March 7, 2014 by Cartographic Order 002/14

Bar codes have historically been placed on nautical charts and other NOAA products at the request of the National Geospatial-Intelligence Agency (NGA) to support Department of Defense distribution procedures. The bar code identified the national stock number (NSN) and edition number of each nautical chart. NGA has notified MCD that the bar code, National Stock Number and NGA Reference Number are no longer required on MCD products.

Bar Codes, Stock and Reference Numbers shall not be shown on new editions published after April 5, 2014.

Example of a bar code, National Stock Number and NGA Reference Number:



2.18 Nautical Charts Web Site
Revised on July 14, 2003 by CO 016/03

General Requirements

Useful navigational information is available on the internet, both on NOAA web sites and on sites maintained by other agencies. As the number of chart users with internet access grows, the number of requests for the Marine Chart Division to provide the addresses of government web sites of interest to the mariner also grows. MCD shall accommodate in two ways:

1. The Print-on-Demand production staff will maintain an "Internet Sites of Interest" note on select "Value Added Format" POD charts. The web sites found in this note shall be limited to sites operated by government agencies, pilots' associations, harbor masters, et cetera. The maintenance of the POD note (both in selection of web sites and charts on which the note falls) shall rest with the POD production staff.

2. A note shall be added to all new nautical chart editions. Due to the ephemeral nature of web site addresses, and to facilitate future revisions, the note shall contain only one web address, the Office of the Coast Survey's Nautical Charts Home page - nauticalcharts.noaa.gov - where additional useful information, such as a page of links to other government sites, shall be located.

Feature Recommendation for a Notice to Mariners

The addition of the nautical chart web site address shall not warrant a Notice to Mariners.

Line Type and Weight

Not applicable.

Location and Orientation

Placement on Conventional Charts shall be as follows:

First Preference - in the title block, beneath the sounding datum note.

Second Preference - any land area inside the neatline.

Third Preference - any other area on the chart.

Placement on Small-Craft Folio Charts shall be:

First Preference - in the title block, beneath the sounding datum note.

Second Preference - any location on the title page.

Third Preference - any other area on the chart.

Placement on Small-Craft Pocket Fold Charts shall be:

First Preference - in the title block, beneath the sounding datum note.

Second Preference - any location outside the neatline on the cover side (usually Side B).

Third Preference - any other area on the chart.

Placement on Small-Craft Recreational Charts shall be:

First Preference - in the title block, beneath the sounding datum note.

Second Preference - any location on the title page.

Third Preference - any other area on the chart.

Labels and Notes

The note shall be in 7 point Swiss Light, and shall read:

Additional information can be obtained at nauticalcharts.noaa.gov.

Color and Screening

The nautical charts web site note shall print in black.

Feature Removal from Chart

If circumstances require the relocation of a web sites note, and no suitable location can be found, the note shall be deleted.

NAUTICAL CHART MANUAL – VOLUME 1 – POLICIES AND PROCEDURES

CHAPTER 3- TOPOGRAPHY

U.S. Department of Commerce
Office of Coast Survey

3 TOPOGRAPHY
Revised by July 12, 2000 Memorandum

3.1 General

On nautical charts, coastal configuration and prominent land features are charted to help the mariner determine the vessel's position at sea in relation to various fixed visible objects. The distance inland to which topographic features are charted will vary with chart scale, type of terrain, availability of source data, and adequacy of navigational aids. The significance of such features to the mariner must also take into account the requirements of both visual and radar navigation. Since navigators see the coast in profile, their interest in land detail is greatest at the shoreline and falls off rapidly inland.

On coasts poorly marked by navigational aids, detailed coastal topography is particularly important to the navigator. Nevertheless, the density of topographic detail should be kept to a minimum consistent with showing the significant identifiable features and the general relief of the skyline. Thus landmarks should stand out from less important detail.

Treatment of detail should vary with distance inland. Inconspicuous features such as marshes and minor lakes and streams usually are shown only when they are within a short distance of the coast, usually about a mile.

On steep coasts with deep water close inshore, sea traffic is likely to be concentrated off points of land. Therefore, the nature of each headland should be made clear, e.g. cliffs, sloping or low profile. Contours are of great value for depicting this relief.

Along a low-lying coast, even minor features along the shoreline could have landmark value because of the lack of prominent features. Therefore, sand dunes, mangroves, low bluffs, etc., should be shown on larger-scale charts. Physical features that could not be easily identified such as gravel, brush, trees, etc., are not shown by symbols but by name.

Topography includes not only coastline and natural land features, but cultural (i.e., man-made) features including berthing structures (piers), erosion-control structures (breakwaters), ports and harbors, as well as bridges and roads, buildings and other structures (such as tanks and towers) that may serve as landmarks to the mariner.

On large-scale charts, the detail in proximity to a harbor should be comprehensive. The dock areas, roads, and buildings along the coastline should be charted to give the mariner an indication of the port facilities available. Landmarks and distinctive features in the vicinity of the harbor should be shown, whereas surrounding built-up areas need only be depicted by urban tint, if they are shown at all. On small-scale charts, some generalization will be required in congested areas.

Symbols used on NOS charts are taken from Chart No. 1, Nautical Chart Symbols Abbreviations and

Terms. References to symbols throughout this and following chapters (such as C d, D 5) refer to Chart No. 1. However, not all symbols shown in Chart No. 1 are used on NOS charts.

3.2 Topographic Surveys

Topographic surveys locate and identify the natural features and culture of the land surface. NOS surveys are of areas adjoining charted waterways. Delineation of detail is depicted by means of conventional symbols. The topographic "survey sheet" is the primary authority for charting the shoreline, including the geographic place names and topographic features. Survey sheets may vary in both coverage and in content, with the area of coverage generally corresponding to the chart needs at the time the survey is requested.

Photogrammetric surveys provide topographic data through the use of aerial photographs that are enlarged and compiled in map form using stereoscopic or other rectification equipment. The extent of coverage may be as much as 5 miles inland. Planimetric surveys portray land features or detail in a horizontal plane only. They are distinguished from a topographic map by the omission of relief.

From 1835 to 1927, practically all NOS topographic and planimetric surveys were made by planetable, an instrument used by surveyors to plot surveys at the time the observations are made. The planetable consists of a tripod-mounted board to which the survey sheet is clamped. The board can be adjusted in the horizontal plane. An alidade is used to measure distances and directions. The distances are usually obtained by stadia observations on a graduated board or rod.

Since 1930, aerial photographs have been used almost exclusively to supply topographic and related data for nautical charting. Modern photogrammetric surveys are registered as topographic-photogrammetric maps (TP sheets). These TP sheets are the initial source for most of the land detail shown on nautical charts produced today. On TP sheets, landmark features and possible landmark features are shown with a circle 2.5 mm in diameter (see B 32 in Chart No. 1.) When a delineated feature has not been evaluated by field methods or other documented sources for its value as a landmark, it is labeled with capital and lowercase letters. Features recommended as landmarks are labeled with all capital letters. (See Section 6.1.1 for a further discussion of how landmarks are charted.)

On photogrammetric survey sheets produced prior to June 1977, the 2.5-mm circle was used to denote only features of known landmark value and a 1.25-mm circle was used to denote other features (those of unknown landmark value). The small circle should not be confused with the landmark symbol denoting "position approximate" (see B 33 in Chart No. 1) since the horizontal position of both size circles complies with the accepted national standards of map accuracy.

Thus the basic topographic information to be shown on New Charts and Reconstructions should be obtained from NOS surveys.

Topographic-photogrammetric maps provided to NDB prior to 1980 fall into five classes. The treatment of each is discussed below.

1. Class I and II topographic maps are the final basic registered maps which have been field inspected, edited, and the Descriptive Report signed by the Chief, Photogrammetry Branch. They should be fully applied to New and Reconstructed Charts, as well as to chart maintenance drawings as time permits.

2. Class III topographic maps are the final basic registered maps which have not been fully field inspected, edited, or signed. These maps should be partly applied to New and Reconstructed Charts until they have been field investigated, edited, and signed.

3. Class IV and V topographic maps are the final basic registered maps that are complete except for revisions made during review. These maps should be partially applied to maintenance chart drawings and may be used on New and Reconstructed Charts only as a last resort.

Since 1980, most topographic maps furnished to NDB have been Class III maps. Before these maps are registered, the Quality Control Unit of the Remote Sensing Division circles and annotates questionable items for field investigation. A duplicate copy of this annotated map is furnished to NDB as a Blueprint and is applied by the compiler as follows:

1. The compiler examines the Blueprint for critical items, omitting the encircled areas which are subject to field investigation. The Blueprint is marked "fully applied" after application, if appropriate.

2. The map (TP sheet) number and the Blueprint number should be referred to on the Chart History -- e.g., "Bp 111300 (TP 0101)" -- and marked "fully applied," if appropriate. The map (TP sheet) and its Descriptive Report are not acquired from the vault at this time for examination and application.

3. When the map (TP sheet) has been fully field examined, edited, and signed, the final basic registered map and Descriptive Report are acquired from the vault and fully applied as a Class I map.

3.2.1 New Aeronautical and Nautical Charting Investigations (NANCI)

NANCI’s are no longer used.

New Aeronautical and Nautical Charting Investigations (NANCI) supplemented air photo maintenance for NOS nautical charts. NANCI source was compiled by the RSD.

NANCI source was derived from a cooperative procedure utilizing advanced technology methods obtained through the Eastern Mapping Center of the USGS. NANCI source consisted of a graphic compilation on stable base plastic. Text, arrows and leaders were compiled in blue pencil and used by the CRU as supporting documentation. Deletions were marked in green pencil. Features which could not be located were also identified in green pencil. The acronym "NANCI" was shown on all copy.

NDB assigned blueprint or chart letter status for registration of NANCI as source documents. These blueprint/chart letter numbers were used to reference NANCI source on the History of Cartographic Work.

NANCI source identified revised shorelines, landmarks, revised topographical features such as piers, breakwaters, jetties, bulkheads, and roads. Because of the accuracy of NANCI data, NANCI revisions were applied freely by the cartographer to the chart drawing.

The shoreline on NANCI source, represented by an unbroken solid red line, was usually positioned by evaluating NANCI imagery at below predicted high tide stages. If tidal information was pertinent to the application of NANCI source (i.e., the shoreline revisions were based at high tide stages), an applicable note was added to the source. Approximate shoreline on NANCI source, represented by a broken red line, could also be directly transferred to the chart drawing.

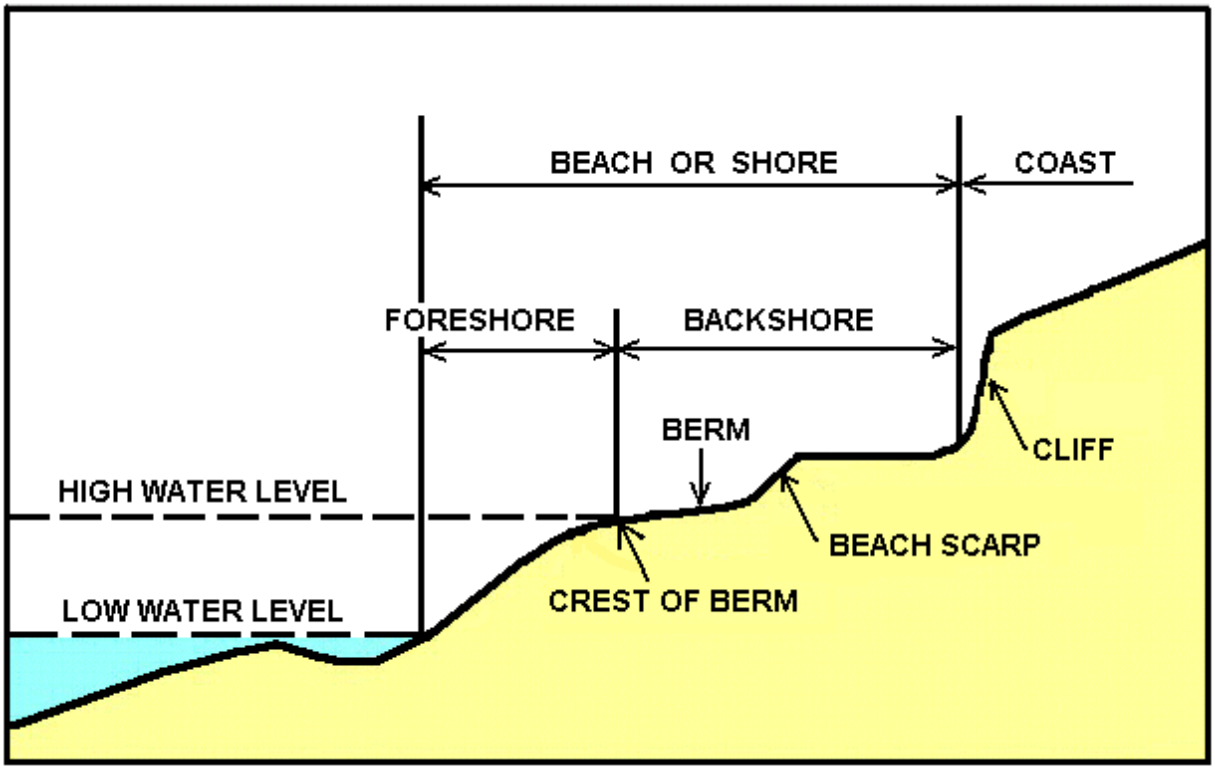
In addition to revisions customarily applied from NANCI source, an approximate sounding datum line was often applied on the NANCI manuscript exclusively with a purple continuous line.

The approximate sounding datum line was sufficient for use as an extended green tint limit to show new green tint seaward of the shoreline. NANCI source was not used to retract the low water tint landward from a chart sounding datum line.

The outermost limit of the approximate sounding datum line was used if it was seaward of the charted sounding datum line and from a later source than the charted line. In this instance the inner limit line was removed unless there was clear evidence of deeper water from later date sources. These later date sources were not only NOS field surveys but were also traditionally from external sources such as authoritative surveys, inspection reports, and other credible reports of deeper water.

3.3 The Coastline

NOS generally considers the terms "coastline" and "shoreline" to be synonymous. Coastline symbols are shown in section C of Chart No. 1. This section discusses the charting of various types of shoreline and foreshore features (see Figure 3-1).



Shoreline and Foreshore Features
Figure 3-1

3.3.1 Shoreline Plane of Reference
Revised on July 29, 2004 by CO 012/04

The shoreline represents the line of contact between the land and a selected water elevation. This dividing line between land and water features is also referred to as the "Shoreline Plane of Reference" (SPOR). In areas affected by tidal fluctuation, this line of contact is usually the mean high water line. In confined coastal waters of diminished tidal influence, a mean water level line may be used. The shoreline of interior waters (rivers, lakes) is usually a line representing a specific elevation above a selected datum. Whenever possible, the shoreline shall be delineated from NOS surveys.

Shoreline from United States Geological Survey (USGS) Quadrangles

Shoreline shown on most USGS quadrangles is referenced to mean sea level and shall not be used in compiling or revising nautical charts, **except** as noted in the following paragraphs. In relatively flat coastal areas there could be a significant difference between shoreline based on mean sea level and mean high water. However, the shoreline shown on the quadrangle may be used for charting when the quadrangle has been revised from NOS imagery. Man-made features along the coast, such as piers, bulkheads, etc., may be transferred from the quadrangle since normal fluctuations in water level would not result in a chartable difference in those features. See Sections 3.5 and 3.6.

In **non-tidal areas**, USGS quadrangles may selectively be used in compiling or revising the shoreline **when** adequate surveys, based on the chart's shoreline plane of reference, are not available. In non-tidal areas, there is very little difference between the shoreline plane of reference shown on the quadrangle and the shoreline plane of reference shown on the nautical chart. Types of natural shoreline, in non-tidal areas, applied from USGS quadrangles shall follow the symbolization specifications found in Section 3.3.1.1. Approval from the Chief, Marine Chart Division, **must** be obtained prior to compiling or revising natural (non-manmade) shoreline from quadrangles.

In rare circumstances, shoreline in **coastal and other tidal areas** may have to be compiled or revised from USGS quadrangles when adequate shoreline based on the chart's shoreline plane of reference is not available. Approval from the Chief, Marine Chart Division, must be obtained prior to compiling or revising natural (non-manmade) shoreline from quadrangles.

Natural shoreline in coastal and other tidal areas, applied from source material that is based on a different shoreline plane of reference than the chart (such as a USGS quadrangle), shall be shown as approximate shoreline (C 2; see Section 3.3.1.1).

A request for contemporary shoreline data, using the shoreline plane of reference of the chart, must be forwarded to the Remote Sensing Division, through the Nautical Data Branch, whenever USGS quadrangles are used for compiling or revising shoreline.

Shoreline from Smaller Scale Charts or Smaller Scale Source Material

Surveyed or unsurveyed shoreline, applied to a nautical chart from smaller scale source material or a smaller scale chart, shall be charted as approximate shoreline (C 2; see Section 3.3.1.1). Apparent shoreline applied to a nautical chart from smaller scale source or a smaller scale chart, shall still be shown as apparent shoreline (C 32, C 33; see Section 3.3.1.1).

A request for contemporary shoreline data, using the shoreline plane of reference of the chart, must be forwarded to the Remote Sensing Division, through the Nautical Data Branch, whenever smaller scale source material or smaller scale charts are used for compiling or revising shoreline.

3.3.1.1 Types of Natural Shoreline

Surveyed Coastline (C 1)

Surveyed natural coastline is symbolized by a solid black line (0.25 mm) delimiting the gold tint. The exceptions to this lineweight are for apparent shoreline (see below) and minimum sized islets (see Section 4.9). Apparent shoreline and minimum sized islets are delineated with a 0.15 mm solid black line.

Approximate Shoreline (C 2)

Approximate shoreline shall be shown on larger scale charts by a dashed black line (0.25 mm) delimiting the gold tint. This is used to show that the coast has been inadequately surveyed.

Unsurveyed Shoreline (C 2)

Unsurveyed shoreline shall be charted the same as approximate shoreline.

Apparent Shoreline (C 32, C 33)

Apparent shoreline is used on charts to show the outer edge of marine vegetation where the limit would reasonably appear as the shoreline to the mariner, or where it prevents the shoreline from being clearly defined. Apparent shoreline is symbolized by a light solid black line (0.15 mm). See also, Section 3.4.7, “Marshes and Swamps.”

3.3.1.2 Specific Shoreline Features Landward of the High Water Line

Specific features landward of the shoreline (generally the mean high water line) are shown as follows:

Flat Coast (C 5)

Flat coast is depicted as any other coastline, but often will include a descriptive label -- e.g., "Sandy", "Stony", or "Dunes" -- when required by the chart specifications or when it is considered useful to inform the mariner of the character of a coast that is very flat and without distinguishing features.

Steep Coast-Bluff; Cliff (C 3)

A coast backed by a very sharp, conspicuous rise is considered to be a bluff (if it is not rocky) or a cliff (if it is rocky). Such a coast is useful for visual and radar identification. Cliffs and bluffs are an exceptionally useful locating reference where they alternate with low-lying coast along the shoreline. Where cliffs or bluffs are prominent features, they should be shown on all scales of charts provided there is charted hydrography within their range of visibility. The top height of a cliff may be used by mariners for determining a vessel's distance offshore and should be shown as an elevation when it is prominent and conspicuous (see C 11).

3.3.2 Foreshore

The intersection of the low water tidal plane with the shore is commonly called the “chart sounding datum line," and is based on tidal definition. It follows the plane of reference used on the hydrographic surveys on which the chart is based. For more information on tidal datums, see Section 2.8.2, Vertical Datums.

The part of the shore lying between the crest of the seaward berm (the upper limit of wave wash at high tide, and thus an area that extends farther inshore than the shore) and the ordinary low water mark, and which is ordinarily traversed by the uprush and back rush of the waves as the tide rises and falls, is called the foreshore. Note that the upper limit of the wave wash at high tide and the MHWL may not be the same and may differ significantly on low lying coasts.

Foreshore areas (the area between the Shoreline Plane of Reference and either the chart sounding datum line or the approximate sounding datum line) shall be tinted green. The character of the area, when known, shall be labeled as the chart scale permits (see C c in Chart No. 1). Descriptive labels would include "*Mud*", "*Sand*", "*Stone*", "*Gravel*", et cetera, and are discussed below. These labels may assist the mariner in deciding where a safe landing can be made in an emergency and in determining the vessel's location.

Chart Sounding Datum Line (C a)

The chart sounding datum line in tidal areas shall be represented by a single row of dots (called the low water line). The low water line shall be charted only from NOS surveys (hydrographic or topographic), and USACE sources.

The charted low water line shall reflect the delineation shown on the most contemporary NOS topographic survey, including Class I, Class II, Provisional Surveys, Digital Manuscripts (DM), or Geographic Cells (GC), unless other contemporary supporting hydrographic data is available.

Approximate Sounding Datum Line (C b)

Where a source of a lower order than a field survey is used to determine the sounding datum line, the resulting line where the tint changes from green to blue is considered to be an approximate sounding

datum line. The area which uncovers (the green tint) shall not be delimited by a black low water line, either dashed or dotted. Such an approximation may result from an indistinct aerial photographic image or an onsite visual observation.

Mud
Sand
Stone or Gravel
Sand and Mud
Sand and Gravel

An appropriate label describing the foreshore ("*Mud*", "*Sand*", etc.) may be added along the inshore side of the low water line, and the enclosed area shall be shown with green tint. The offshore limit is symbolized by a low water line (C c, J 20) or an approximate sounding datum line (C b).

Grass

Areas seaward of the high water line which are identified only as grass on the source shall be charted using a dashed line to show the limit of the grassy area, and the label "*Grass*" as discussed in Section 4.14.2, "Miscellaneous Marine Areas."

Breakers (C d, K 17)

Breakers along a coast should be labeled where they appear consistently in a location in which no shoals or reefs are charted. Wherever they are charted, they should be labeled "*Breakers*" in 6 pt. Swiss Light Italic. Limits of large areas of breakers shall be shown with a black dashed line (.008/.080/.030", C d, K 17). See Section 4.14.2, "Miscellaneous Marine Areas."

Rock (J 21); Coral (J 22)

Rock or coral that uncovers at sounding datum is charted using the label "*Rock*" or "*Coral*" in the intertidal area. The offshore limit of the uncovering (green-tinted) area is symbolized by the ledge symbol.

For charting of rocks and coral, see also Section 4.8, "Ledges and Reefs, and Section 4.9 "Rocks."

Rubble (C e)

Foreshore covered with rubble shall be labeled "*Rock*".

3.4 The Land

Land features such as elevations, coastal vegetation, and certain inland waters are charted when they will be of aid to mariners. Land symbols are shown in Section C of Chart No. 1. Elevations are shown by land contours and hachures. Form lines (C 13) and shading (C g), once used on NOS charts, could still appear on some charts that have not seen recent printings. These shall be replaced with modern symbols when a new edition is printed.

3.4.1 Land Contours
Revised by September 11, 2003 Memorandum

Land contours are one way of showing land elevations and relief on nautical charts. On charts where a need for visual or radar requirements exist, land contour lines should be shown. Contour lines specify a vertical distance above a datum plane, usually mean sea level. The vertical distance between contour lines is the contour interval.

The source for land contours and spot elevations (C 11) will usually be USGS quadrangles. When contour and spot elevations are charted, a note labeled "HEIGHTS" shall be included specifying what plane of reference (usually mean sea level) the elevations are based on. See the sample "Heights" note in Section 2.8.2.

Contour Lines (C 10)

Contours on nautical charts shall be charted as follows:

In general, contour lines are to be shown only where they are considered useful for radar navigation or for identifying land features and profiles from seaward. Landforms on the back side of features which are out of view of the mariner or radar add little or nothing to the usefulness of the chart.

Contour intervals are selected considering clarity of depiction, scale, and general slope, and need to show the character of details which constitute the relief of an area. The interval shall be uniform on any one chart, except that an intermediate interval may be approximated by a dashed line to define a summit or other important feature.

Contour lines are transferred exactly from the source to the chart. They must not be smoothed to the extent that they change recognizable features or characteristics of the terrain. In general, smoothing should be avoided.

Contour lines shall be fine 0.004" (0.10 mm) lines, but index contours, usually every fifth contour, may be emphasized by use of a bolder 0.008" (0.20 mm) line.

Where slopes are steep, contours should not be merged, but intermediate ones shall be omitted to leave a space of about 0.012" (0.3 mm) between those shown. However, index contours, if used, should not be omitted.

The label for the contour value shall be placed at suitable intervals parallel with and centered on the index lines. In flat areas where the index lines are far apart, the labels should be shown on every line. In steep areas usually only the index contour is labeled. Labels shall be 6 point Swiss Light Italic type.

Contours should be updated on New Editions only to meet the real needs of the mariner. If the existing chart displays incorrect contours in areas not visible from the water, they should be deleted from the chart rather than making extensive revisions unnecessarily.

Approximate Contour Lines (C 12)

Approximate contours are shown using dashed (rather than solid) lines, and are labeled from the source in 6 point Swiss Light Italic.

Peaks (C 10, C 11); Treetop Elevations (C 14)

Selected peaks shall be represented by the spot elevation dot and accompanying elevation label (C 11). Note that an intermediate interval may be approximated by a dashed line, and labeled, to show a summit (C 10). Elevations of points on slopes shall be omitted. Treetop elevations may be charted on peaks in southeast Alaska only and are labeled in 6 point Swiss Light Italic with the height followed by a space and then the abbreviation “TT”(e.g., *61 TT*). A treetop height may also be useful to show the profile height of an island and may be charted upon recommendation by a reliable source as the result of an on-site inspection (C 14).

3.4.2 Hachures

Hachures (C f), may be used to identify a steep coast, but unlike contours they do not show degree of slope or actual elevation of ground above chart datum. Hachures shall not be used to represent large areas of relief.

Peaks Accentuated with Hachures

Hachures may also be used to accentuate a spot elevation on very small-scale charts without contours. If used in this manner, they must be used consistently throughout a chart.

3.4.3 Inland Waters

Shoreline that bounds navigable inland waters shall be charted as fully as practicable, consistent with the scale of the chart. Shoreline that bounds non-navigable inland waters shall be charted only to provide a general picture of land and water areas.

Inland bodies of water shall be charted as follows:

Glaciers (C 25)

A glacier is considered to be a landform and shall be outlined by a 0.006" (0.15 mm) dashed line within which there is no tint. The label "Glacier" or the geographic name thereof should be shown inside the feature in lieu of interior fill. Labels shall be in Swiss Light type.

Intermittent Rivers and Streams (C 21)

Intermittent rivers and streams, which are dry much of the time, shall be represented by a line composed of a series of three dots and a dash.

Lakes and Ponds (C 23); Lagoons (C h)

Lakes, ponds, and lagoons shall be shown where they are part of the course of major rivers or are close to the coastline. This shoreline shall be an 0.25-mm line. Names shall be in Swiss Regular Italic type placed inside the feature. Such features are normally tinted blue.

Rapids and Waterfalls (C 22)

When rapids or waterfalls limit navigation, they shall be represented by one or more lines of dashes drawn parallel to the shoreline.

Rivers and Streams (C 20)

Rivers and streams are shown with a 0.25-mm lineweight. Where a double line is used for a pictorial presentation (without hydro), the tint shall be blue. Names of rivers shall be in Swiss Regular Italic. The type should follow the course of the river.

Salt Pans

A salt pan is an area bounded by dikes in which sea water is evaporated. Generally, the symbol in Chart No. 1, section C 24 is not used. The label "Salt pans" should be charted in lieu of the lined square interior fill shown in Chart No. 1.

3.4.4 Trees

Isolated trees are seldom charted as landmarks (see Section 6.1) due to their relatively temporary nature, variable height, and lack of distinction in a group. However, they may be shown in exceptional instances where no other visual references are available to mariners. When a conspicuous and prominent tree is recommended for charting, the landmark symbol and label ("TREE") shall be used. Pictorial tree symbols shown in Chart No. 1, section C 31, are not used on NOS nautical charts.

3.4.5 Lava Flow

A lava flow shall be outlined by an 0.15-mm dashed line with the land tint shown within the enclosed area (see also Section 4.14.2, Miscellaneous Marine Limits). The label "Lava" should be charted in lieu of the symbol shown in Chart No. 1 (C 26.)

3.4.6 Vegetation

In general, the vegetation cover is of little importance on charts, except along the coastline where isolated features may aid in identifying stretches of shoreline lacking other features. Since mangrove is often impenetrable, identifying it will aid the mariner in knowing where the shoreline can be accessed.

Bushes (Co)
Coniferous Woodland (Cj)
Cultivated Fields (C 1)
Deciduous Woodland (Ci)
Grass (Cm)
Paddy (Rice) Fields (Cn)
Park
Tree Plantation (Ck)
Woods, in General (C 30)

These features shall be charted by label only (no symbols) where they are recommended by a field observation. The symbols shown in Chart No. 1, section C (as shown above) are not used on NOS nautical charts. The labels that should be used ("Bushes", "Wooded", "Cultivated", etc.) are shown in Chart No. 1.

3.4.7 Marshes and Swamps

The shoreline in marsh, mangrove, cypress, or similar swamp areas is generally obscured by vegetation and will not ordinarily be located on NOS surveys. In these areas, the apparent shoreline is usually depicted by a fine line on NOS surveys and transferred to the chart. Marsh and swamp areas depicted on NOS surveys shall be represented on charts as follows:

Mangrove (C 32)

The seaward limits of mangrove are shown with the apparent shoreline (0.15 mm) symbol. A dashed 0.15-mm line shall be used for the landward limits of the area. Gold tint and the label "Mangrove" shall be shown within the charted limits. The pictorial mangrove symbol shall be used only when space is not available for the label.

Marshes (C 33)

A marsh area inside the shoreline shall be represented by green tint and labeled "Marsh" or "Ma" where space permits. A dashed 0.15-mm line shall be used for the landward limits of the area. Other symbols (e.g., for roads, railroads, levees, and bluffs) may be used for the inshore limits of the marsh area. The apparent shoreline shall be shown with an 0.15-mm line.

Swamps (C 33)

A swamp area inside the shoreline shall be shown with gold tint, represented by an 0.15 mm dashed line denote the inshore limit, and labeled "Swamp".

3.5 Ports and Harbors
Revised on November 30, 2005 by Cartographic Order 003/05

Man-made shoreline and structures (such as piers and breakwaters) are always shown with an 0.15-mm lineweight. Any feature, or a portion thereof at or above the Shoreline Plane of Reference is shown with a solid line and gold tint; the portion of the feature below the Shoreline Plane of Reference (such as the submerged end of a jetty) is shown with a dashed line and blue tint.

The single-line/double-line criteria presented in Section 3.5.1 for charting piers shall be used as a guide for the other structures of this group as well (such as breakwaters, etc.).

Work in Progress (F 31, F 32)

New construction projects extending into the water area shall be charted upon notification that construction has begun. The limits of the new construction shall be outlined with a black dashed 0.15-mm line and labeled "Under construction". All charted detail, including the shoreline, shall be deleted from within the new area, and gold tint shall be added. The dashed line shall be changed to a solid line at the completion of the project, providing the project was constructed according to plan.

3.5.1 Berthing Structures

Berthing structures are usually constructed to afford facilities for mooring a vessel. They adjoin berthing areas and are connected to the shoreline at one end. Berthing structures include fixed and floating piers, wharfs, and gridirons.

Grids; Gridirons (F 24)

A grid or gridiron is a flat frame structure erected on the foreshore so that a vessel may be placed on it at high water for servicing at low water. The outline is charted and labeled "Grid" in Swiss Light Italic.

Piers (F 14)

A pier is a structure extending into the water to provide a mooring or landing.

The following specifications are provided for guidance in the application of pier detail and that of other port and harbor structures.

Piers should be shown with an 0.15-mm double line where space and scale permit, filled with a gold tint. When the centerline separation of the sides of a parallel, double line pier is less than 0.3 mm at chart scale, the pier shall be shown as a single 0.25-mm line centered on the space between the two sides. Positions of any piers along a shoreline should not be displaced. All piers charted must be in their true position.

1. "Essential" Piers

Piers shall not be charted that are less than 0.8 mm in their greatest dimension at chart scale. (See Figure 3-1a on the following page to obtain the requisite minimum length per chart scale.)

The above rule does not apply when a pier has been identified either in the source document or by cartographic evaluation as navigationally essential. "Essential" piers which are less than the minimum specified length at charting scale must be extended to the minimum length so that they are recognizable.

Examples of "essential" piers follow:

(a) Piers of unusual commercial importance, e.g., a ferry terminal, cannery/processing plant, or oil terminal

(b) Piers at possible emergency facilities, e.g., USCG station, harbor police, or hospital

(c) Piers at commercial marine facilities (small-craft charts only)

(d) Piers which indicate the extension or termination of a primary (or charted) road

(e) Piers limiting a harbor entrance or inlet, i.e., similar to a breakwater

(f) Piers adjoining or encroaching into a channel, natural or man-made

(g) Conspicuous piers that could be used as a navigational reference in an area otherwise devoid of conspicuous features

When it is not clear whether a pier should be considered "essential," its retention should always be favored on larger-scale charts.

2. Piers Close Together

The congestion of piers in some areas precludes the portrayal of all data on charts in a useful manner. Elimination of piers from a chart to avoid illegible congestion of waterfront detail requires careful application of these procedures. Determination of "essential" piers will also identify the "nonessential" piers that can be eliminated. Thus the following "drop-out" specifications have been established.

Requisite Minimum Pier Lengths
Per Chart Scale
i.e., .8 mm at Chart Scale

					Source Document		
(a.)		(b.)	(c.)	(d.)	(e.)	(f.)	(g.)
		REQUISITE MINIMUM					
SCALE	OF CHART	LENGTH	FEET	YARDS	METERS	CENTIMETERS	MILLIMETERS
		AT					
		Chart Scale					
1:	2500		6.6	2.2	2.0	200	2000
1:	5000		13.1	4.4	4.0	400	4000
1:	10000		26.2	8.7	8.0	800	8000
1:	15000		39.4	13.1	12.0	1200	12000
1:	20000		52.5	17.5	16.0	1600	16000
1:	25000		65.6	21.9	20.0	2000	20000
1:	30000		78.7	26.2	24.0	2400	24000
1:	40000		105.0	35.0	32.0	3200	32000
1:	50000		131.2	43.7	40.0	4000	40000
1:	60000		157.5	52.5	48.0	4800	48000
1:	80000		210.0	70.0	64.0	6400	64000
1:	100000		262.5	87.5	80.0	8000	80000
1:	200000		524.9	175.0	160.0	16000	160000
1:	400000		1049.9	350.0	320.0	32000	320000
1:	500000		1312.3	437.4	400.0	40000	400000
1:	1000000		2624.7	874.9	800.0	80000	800000
1:	1200000		3149.6	1049.9	960.0	96000	960000
	EXAMPLE:	To be applied to a chart having a scale of **1:20,000**, the length of a newly					
		established pier (as reported in the source document), must be at least:					**52.5 ft**
							17.5 yds
							16 m
							1,600 cm
							16,000 mm
		Formula for Determining **(in Feet)** .8 mm at Chart Scale:					
		(1 Ft = 304.8 mm)					
		[.8 mm ÷ (304.8 mm ÷ Scale of Chart) **]**					

If the centerline separation of two adjacent parallel piers of different lengths is less than 0.3 mm at chart scale, the shorter of the two piers should not be charted unless it is identified as "essential" (as previously defined). For example, a short pier that locates a harbor police facility should be charted even though it may be closer than prescribed tolerances to a much longer pier. Thus, the depiction of two piers as one wide-based pier will sometimes occur, especially at smaller chart scales.

Adjacent parallel piers of the same length (including finger piers) shall be reduced in number when the centerline separation between them is less than 0.3 mm at chart scale. This may mean showing only alternate piers (or fewer, depending on chart scale) for groups of three or more. This "thinning out" procedure must be done carefully to ensure that the end piers of a group and those toward the most navigable or heavily trafficked areas are retained.

Piers with irregular configuration must be individually evaluated before removal from charting requirement (except for nonessential piers that are too small at chart scale, as discussed previously).

Floating Piers

Floating piers shall be charted, subject to the same provisions that apply to other piers. Floating piers that meet the charting criteria shall be identified by symbol and label whenever possible. The label "Floating pier" shall be shown where space permits in 5 pt. Swiss Light Italic.

The line symbol for a floating pier shall be detached from any fixed portion of pier or the shoreline by a gap of 0.3 mm.

Floating piers are sometimes removed at the end of the boating season. This possibility must be considered when evaluating recommendations for changing charted features to ruins based on Cooperative Charting Program reports or photographic revisions.

See Section 4.13.3 for charting of other floating structures.

Piers In Ruins (F 33.1, F 33.2)

The area surrounding a pier in ruins, especially those submerged at the SPOR datum, represents a potential hazard to navigation. Because of this danger, it is important that ruined piers be charted in a way that will alert mariners to the possibility of submerged dangers nearby. For this reason, a dashed line shall be used for piers, or portions of piers, that are submerged at SPOR. The same symbol may also be used for piers above SPOR that are known to be in a ruined condition, thereby giving warning that submerged debris may be nearby.

If it is significant that a pier is in ruins, e.g., a pier formerly considered "essential" that can no longer be used for landings, it should carry the label "Ruins" if space permits. Such piers should continue

to be charted until their appearance on a chart is no longer considered useful to chart users.

When double-line, gold-tinted piers become ruins, blue tint should be substituted for the former gold tint. Charts which carry no blue tint will show such ruined piers with no tint.

In general, piers in ruins which are 0.8 mm and longer at chart scale are considered hazardous and should be charted. Exception from charting shall be considered only when the pier in ruins is covered by notation or when it lies within a foul or otherwise delimited area.

Piers in ruins that are less than 0.8 mm in their greatest dimension at chart scale, shall not be charted except when they are identified for retention through cartographic evaluation. Such piers should be enlarged to minimum charting size.

Piers in ruins that should be exaggerated to the minimum charting size include the following:

(a) Those that are considered navigationally hazardous

(b) Those that are located in an isolated area or present an unexpected obstruction to landing

(c) Piers of unusual commercial importance which have become ruins

In cases of doubt, piers in ruins should be charted, especially on largest-scale charts.

The dash symbol (constituting an 0.6-mm dash and an 0.2-mm space) shall always begin with the space adjoining the point of origin, e.g., the shoreline or other structure.

The terminating dash in a series of dashes depicting a pier in ruins may be longer or shorter than the prescribed 0.6 mm, but not more than 1.0 mm or shorter than 0.3 mm. This will prevent charting an unrecognizable "speck" and enable the symbol to depict the pier's true termination (within 0.1 mm).

Wharfs (F 13)

A wharf usually runs parallel with the shoreline and is used for loading and discharging cargo. Its seaward face should be charted, as should the depth alongside.

3.5.2 Erosion-Control Structures

Structures that extend into the water, or are solely within the water, usually constructed to protect an area harbor or shoreline and not intended for berthing are described as breakwaters. Jetties, groins, seawalls, dikes, and levees all have similar purposes.

Breakwaters (F4.1)

A breakwater is an artificial embankment built to form or protect a harbor. It is usually a relatively large and extensive structure built of masonry and stone, but occasionally may be made of wood. It may extend out from shore in various configurations, or it may be placed roughly parallel to and separated some distance from the shore, thus providing access to the protected area behind. Breakwaters detached from the shoreline usually represent a significant obstruction to navigation and are always charted. The lineweight used to symbolize a breakwater is exaggerated to 0.25 mm on small-scale charts if a single line rather than a double line is used. The length of the breakwater shall be a minimum of 0.8 mm at chart scale. Floating breakwaters shall be charted the same as fixed breakwaters, but labeled "Breakwater", and with the addition of any anchoring appurtenance symbolization (see Section 4.13.7).

Groins (F 6.1, F 6.2, F 6.3)

A groin is a low wall-like structure usually extending perpendicular to the shore to prevent shoreline erosion.

Jetties (F a, F b, F c)

A jetty is a structure, ordinarily of riprap, stone, and concrete, extending into the water perpendicular to the shoreline, usually used to protect a channel entrance. It is charted according to the same charting specifications as piers (see Section 3.5.1).

Seawalls (F 2.1, F 2.2)

A seawall is a solid erosion-control structure, usually of masonry, sometimes with a sloping face, and usually aligned with the shoreline. On very large-scale charts, the feature may be outlined as shown on the source. On smaller-scale charts, the 0.15 mm lineweight used to symbolize man-made shoreline is used.

Dikes and Levees (F 1)

Dikes and levees are considered synonymous for charting purposes. Both are man-made embankments usually composed of earth rubble and constructed for shoreline protection, landside containment of material (e.g. dredged spoil), or protection from flooding. The symbol may be slightly displaced so as not to overprint the shoreline. A half symbol may be shown in congested circumstances. A label "Road on levee" may be charted if this is important.

3.5.3 Docks and Tidal Basins

A dock may be defined as the berthing slip between two piers or an area cut into land for the berthing

of vessels. A pier is sometimes erroneously called a dock but the two should be distinguished. A dock is also a basin or enclosure for the reception of vessels which has a means for controlling the water level.

Docks

A dock is usually shown as the area between two piers. A "slip" is another term for a dock.

Dry Docks (F 25)

A dry dock is a structure in which vessels can be floated for servicing. It is charted by its actual shape, with the gate closed.

Floating Dry Dock (F 26)

These are charted by actual outline and gold tint only when they are known to be permanently moored in a fixed position.

Tidal Basins (F 28)

A tidal basin serves as a dock but has no gate to control the water level, which rises and falls with the tide. It is charted by its actual shape and should be labeled "Tidal basin" in Swiss Regular Italic.

Wet Docks (F 27)

A wet dock is an enclosed area within which water can be maintained at a desired level to keep vessels afloat. The ship enters the dock through a lock or gate which can be opened at a high water level or over a fixed sill. It is charted by its actual shape and should be labeled "Wet Dock" in Swiss Regular. See also Section 3.5.4.

3.5.4 Locks and Other Barriers

Locks, gates, barriers, and other man-made structures are used to control the height and flow of water. Any such structure which may prevent navigation under certain conditions or which closes an otherwise navigable waterway must be charted, preferably to scale or at least by symbol.

Clearances shall be shown in the same manner as for bridges, giving the lock dimensions, sill clearances, traffic control lights and information, CFR references, and any other information that is not subject to change and which may aid the mariner.

The same procedure for noting VHF radio monitoring facilities for communication with mariners applies to these structures as applies to bridges (see the discussion of bridge radio services in Section 3.11.1).

Locks (F41.1, 41.2)

Navigation locks shall be shown in the closed position by a solid black line (0.15 mm lineweight). Caissons and gates for controlling the water level in a wet dock or nontidal basin shall also be shown in the closed position by a solid line. Power plant cooling water intakes and discharges, and barriers for dam spillways, intakes, and overflows are also shown by solid line.

Floodgates and Sills

Floodgates and saltwater intrusion barriers shall be shown in the open position, with the closed position shown by a black dashed line (0.15 mm lineweight). Sills, when charted as part of these structures or as a separate structure for controlling a water level, are also shown by a dashed line since they are submerged at some tide stage.

3.5.5 Landing and Launching Sites

Marine Railways (F 23)

A marine railway is used to haul boats from the water, usually to expose the hull as in a dry dock. It is charted with the hatched railroad symbol for the visible portion, and a dashed line for the submerged portion, and is labeled "Marine railway". On charts produced by foreign countries, the marine railway may be denoted as a "Patent slip".

Ramps (F 23)

Ramps are sloping runways, usually hard surfaced, used for launching boats from a trailer. An outline is shown, as appropriate to the scale, and labeled "Ramp". The label alone may be charted at small scale.

3.6 Man-Made Features

On large-scale charts, man-made features along the coastline such as roads, railroads, embankments, levees, power lines, etc., should be charted where scale permits. Some major features may be charted inland to give an indication of the degree of development. Symbols for these features are shown in section D of Chart No. 1.

Major railroads, streets, and highways shall be shown in port areas, adjacent to coast, and approaching bridges across navigable waterways. These shall be charted, named, and numbered as appropriate. The determination of "major" is obtained from the USGS quadrangles, State maps, atlases, or other sources of authority. Major features are shown with emphasized symbolization such as the red lining on quadrangles.

Canal (F 40)

Where possible, a canal should be shown by a double line with a blue tint between the lines. Where the scale is too small to use the double line, a single line (0.15 mm) may be used with the label "Canal" in 6 pt. Swiss Light Italic. See Section 3.5.4 for charting of canal locks.

Dam (F 44)

A dam shall be represented to scale whenever possible. At small scale, a comb-shaped symbol is drawn across and slightly overlapping the banks of the river, the teeth pointing in the direction of the water flow. See Section 3.5.4 for charting of barriers for dam spillways.

Ditch (F 40)

A ditch is shown as a single line (0.15 mm) with the label "Ditch" in 6 pt. Swiss Light Italic. See Section 3.5.4 for charting of ditch flood gates or sluices.

Log Boom (N 61)

See Section 4.13.4, "Logging Structures."

Pipelines on Land (D 29)

Pipelines on land are generally not charted, but they are shown in black if they cross above navigable waters. Buried pipes are not charted.

Railroads (D b)

A single 0.20-mm hatched line is used to symbolize both single- and double-track railroads. The initials of the railroad name, if known, should be charted along the track in 5 pt. Swiss Light. In the case of railroad yards, enough of the tracks should be represented to indicate the area covered or the limiting tracks and an appropriate legend may be shown. Electric railways in cities are generally not charted.

Roads and Road Patterns (D 1, D 2, D 10, D 11, D a)

Roads should generally not be shown on charts smaller in scale than 1:250,000. At scales larger than 1:250,000, only through or connecting public highways and roads leading from highways and terminating at the shore need be shown. Private roads leading from public highways to buildings should be omitted. In urban and suburban areas, only streets, which are actually constructed and in use are to be charted. Streets may be omitted as necessary for clarity. Numbers and names of important U.S. highways shall be charted when the information is available. Lesser routes shall be labeled provided the labels do not cause undue congestion.

Primary transportation routes in cities, towns, and rural areas are symbolized by single or double lines depending on the chart scale. Generally the double-line road symbol is used only on charts of scale at 1:20,000 and larger. Roads may also be shown to scale at charts of 1:10,000 scale and larger where this will be useful to the chart user. This determination must be based on the cartographers judgment.

The lineweight for double-line roads is 0.1 mm with 0.75-mm spacing between lines, centerline to centerline. The single-line road lineweight is 0.3 mm. Single- and double-line roads shall not be used on the same chart except where it is appropriate to use a double line on a large-scale inset and a single line on the smaller-scale base chart.

Streets and roads providing access to marine facilities and potential waterfront landing sites shall be shown where reasonably practical. Some roads in rural areas that serve as connectors to major highways must also be shown, even though they are not considered major. All highways thus selected for charting will be shown regardless of subsequent "urban screening." These highways shall be kept up to date by newly arriving sources.

Roads shown by dashed lines on the survey sheets are not to be charted unless they are considered vital, in which case they are charted using solid lines.

Extensive street patterns serve little purpose on charts and rapidly become a significant maintenance problem. Their obsolescence is quickly recognized by the chart user, thus affecting the credibility of the chart. The urban screen (see also Section 3.8) shall be used in lieu of street patterns to denote built-up areas. However, major named or numbered streets shall be shown through the screened area.

Trails (D 12)

Trails are not generally shown on nautical charts. However, portage trails are shown on canoe charts.

Tunnel Entrances (D 16)

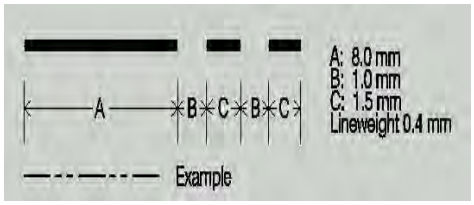
Tunnel entrances shall be indicated by a symbol similar to a bracket; the path of the railway or road underground shall be represented by dashed lines.

3.7 Land Boundaries and Limits

Land boundaries shall be shown in black on nautical charts. In general, State boundaries are shown over land areas only, stopping at the shoreline. International boundaries are shown over land areas and may be shown beyond the shoreline into water areas. Along the border line the name of the State or nation shall be shown at appropriate intervals in 8 pt. Swiss Light type. Limits of airports and civil reservations are also charted on occasion.

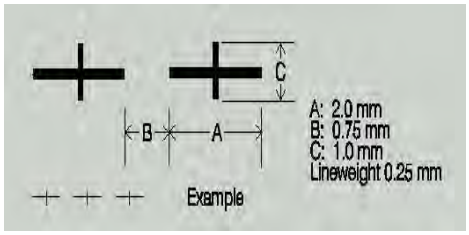
State Boundaries

State boundaries shall be symbolized by a so lid black dashed line as shown below:



International Boundaries (N 40)

International boundaries on land shall be symbolized by a black dashed line of crosses as shown below:



Airport Limits (N e)

On large-scale charts, important airport limits shall be shown with a line of short black dashes (0.15 mm lineweight). The label "Airport" in 7 pt. Swiss Light type should be included within the charted limits. (See also Section 3.8)

Civil Reservation Limits (N f)

These limits shall be shown only if requested by a cognizant agency. (See also Section 4.14.7)

3.8 Buildings and Structures

Last revised by Cartographic Order 008/14 on June 16, 2014

When charting buildings in urban and suburban areas, villages, and other built-up areas, the aim of the cartographer should be to create a correct impression of the extent of the built-up area and the density of the buildings. Within built-up areas, only waterfront, landmark, and certain public buildings of interest shall generally be shown individually. The built-up areas should be shown by urban screen.

Away from ports and other built-up areas, even minor buildings (such as a boathouse) may be charted individually where they lie close to the coastline. Waterfront buildings are considered to be of navigational interest and shall be charted in some detail, not over generalized. In ports, buildings along the waterfront considered of significance to commercial shipping or recreational boating are individually represented, scale permitting.

Conspicuous buildings may be charted as landmarks to aid in navigating the waters adjacent thereto. Landmarks (See Section 6.1) must be prominent as viewed from seaward and be useful to mariners in determining a vessels direction or position.

Airports (D 17; N e)

On large-scale charts, the limits of runways of commercial airports may be shown. See also Section 3.7 for charting limits of major airports. Pictorial symbols are not used for airports.

Buildings (D 5, D 6, E d, F 61, F 62.2, F 63)
Tanks (E 32)

Prominent buildings along the waterfront and large individual buildings back from the waterfront that could be of navigational assistance to mariners should be shown by actual shape on charts 1:40,000 scale or larger, when at all possible. No other buildings are shown. A landmark symbol and label is usually charted for prominent buildings on small-scale charts.

General criteria to be applied to these features are these:

1. All symbols and labels shall be printed black.

2. Labels shall be in 6 pt. Swiss Light.

3. Line weights shall be 0.15 mm.

4. All structures charted shall be shown to scale, subject to minimum size criteria.

5. Ruins are subject to the same size criteria as active structures and shall be labeled.

6. Normal land or urban tints will be shown as required by other charting criteria.

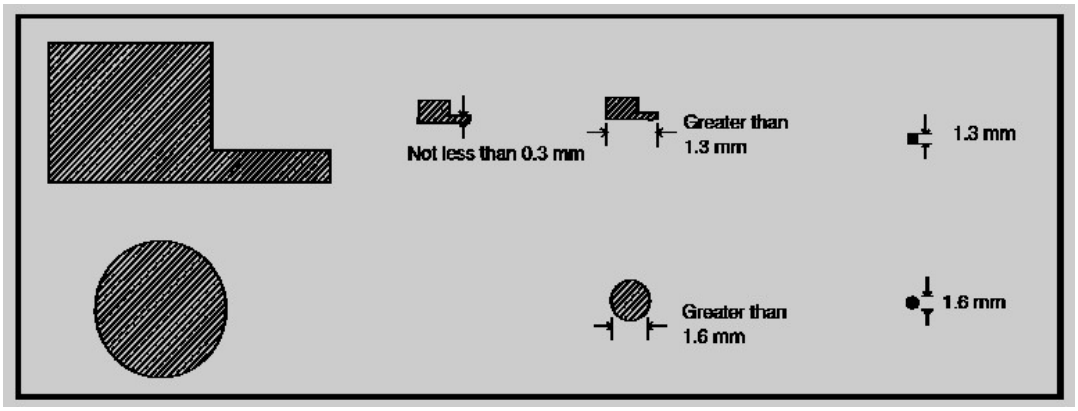
7. Crosshatching used to fill in buildings and tanks is normally oriented 45° as shown in Figure 3-2. Crosshatching aligned the same way should be avoided in buildings angled differently over a large area; opposing crosshatching should be avoided in adjoining buildings. Considerable judgment may be needed to prevent a strained and unskilled effect when using crosshatching to depict buildings.

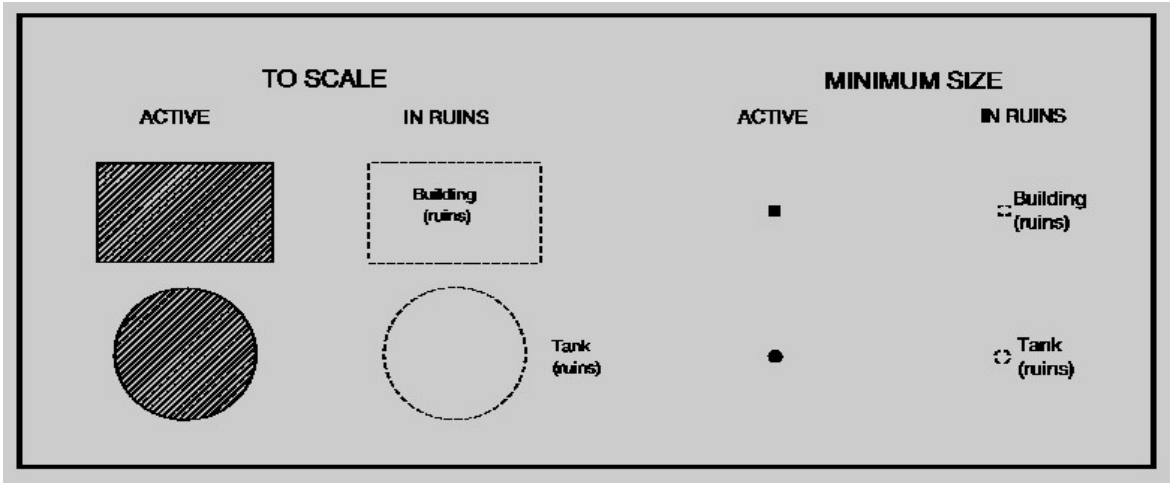
The following size criteria shall be applied to specific cases (see Figure 3-2):

1. Non-cylindrical structures considered active (i.e., not in ruins) shall be charted to scale by solid outline and crosshatching when the charting size is greater than 1.3 mm in any dimension. The smallest dimension for an outlined symbol shall not be less than 0.3 mm (double lineweight). When the greatest dimension at chart scale is 1.3 mm or less, a minimum-size solid black square, 1.3 mm on a side shall be used to depict the structure.

Ruins shall be labeled and shown by a dashed outline without crosshatching. When the greatest dimension at chart scale is 1.3 mm or less, a minimum-size open black dashed square, 1.3 mm on a side, shall be used to depict the structure.

2. Cylindrical structures or tanks considered active shall be charted to scale by solid outline and crosshatching when the charting diameter is greater than 1.6 mm. When the charting dimension is 1.6 mm or less, a solid black circle with a 1.6-mm diameter shall be shown. Ruins shall be labeled and shown by a dashed outline without crosshatching. When the charting dimension of a tank in ruins is 1.6-mm or less, an open black dashed circle with a 1.6-mm diameter shall be shown.





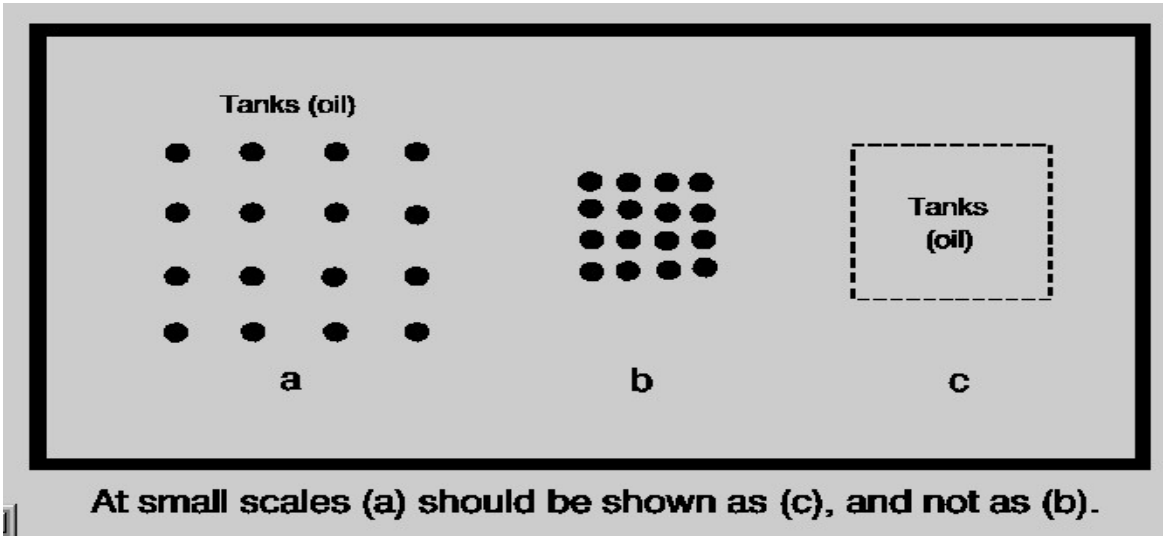


Figure 3-2

At smaller scales, the minimum-size symbols for tanks or buildings in a dense group may get too closely spaced. Rather than deleting some of the symbols where the individual structures cannot be symbolized clearly and distinctly, a dashed area outline shall replace the group of symbols and shall be labeled (e.g., Tanks (oil)) so that active structures are not mistaken for ruins. The dashed area outline for groups of tank or buildings shall not be smaller than 1.3 mm on any side.

A primary and a secondary description in the label shall be used whenever possible e.g., "Tanks (oil)," "Building (City Hall)," or "Building (aquarium)". The term "Tank Farm" shall not be used.

Cemeteries (E 19)

On large-scale charts, the limit of prominent cemeteries may be shown with the label "Cemetery" or "Cem" in 6 pt. Swiss Light.

Church Buildings (E 10.1 through E 18)

Church buildings considered prominent features, but which have not been recommended as landmarks, may be charted by their symbols. When the greatest dimension at chart scale is 1.3 mm or less, a minimum-size solid black square, 1.3 mm on side, with a cross attached, shall be used to depict the structure. A label may be added if considered useful.

Hospitals (F 62.2)

All hospitals should be shown, where appropriate, using the same guideline previously stated for buildings, and with the legend "Hospital" in 7 pt. Swiss Light.

Landmarks

A prominent feature on a building or the building itself may be shown by a landmark symbol (B 32, B 33) and labeled (as appropriate from section E) when it is specifically recommended for charting as a landmark (see Section 6.1).

Urban Screen

The urban screen (dark gold tint) is charted primarily to enable the mariner to identify developed areas at night by the projection and reflection of lights in the low atmosphere (called "nightglow"). These lighted areas of sky can be seen for great distances offshore under many conditions and provide assistance in many a landfall.

The USGS quadrangles are the principal source for delineating urban areas, supplemented by photographs or other authoritative sources. The limits for the area to be screened are compiled from source onto the digital chart files. The screen is an additional gold (30 percent, 120 LPI) screen

overprinting the regular gold (20 percent, 120 LPI) screen land tint, but rotated 30 degrees to avoid creating a moiré pattern.

The outline of an area to be screened must be applied with care. Undeveloped areas that will not produce nightglow must not be screened. Normally excluded from screening will be larger parks and recreation areas (stadium lights are considered unreliable for this purpose), strips of development along the shore, and industrial areas.

Urban screen is also useful in updating older charts to avoid the largely useless and time-consuming updating of road networks which have not been routinely maintained over the years. See discussion of roads and road patterns in Section 3.6.

Wind Turbines

Definition: **WIND TURBINE.** A tower and associated equipment that generate electrical power from wind. They can be sited on land or offshore. [103]

Definition: **WIND FARM.** A collection of wind turbines that are collocated and are organized as a single power generation unit. [103]

General Requirements

Wind turbines are generally tall, multi-bladed structures, usually with two or three blades and are often visible over long distances in good visibility. Their purpose is to generate electricity for large communities, or to feed a national power grid. They are often arrayed in groups, known as wind farms, and may be sited offshore or onshore.

If the mechanical energy produced by the structure is used directly by machinery, such as for pumping water, cutting lumber or grinding stones, the machine is called a **windmill**. If the mechanical energy is instead converted to electricity, the machine is called a **wind turbine**.

A wind turbine may be charted on land when it is reported to be conspicuous from seaward or when recommended by RSD.

Guidance for encoding onshore wind turbines and onshore wind farms is found in Nautical Chart Manual, Volume 3, Section E.1, Landmark (LNDMRK) and Section E.4, Production/Storage Area (PRDARE).

Standards for charting offshore wind turbines and offshore wind farms are found in Nautical Chart Manual, Volume 1, Section 4.13.5.5.

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted onshore wind turbine or onshore wind farm shall be evaluated for a Notice to Mariners.

Line Type and Weight (Paper and Raster)

Onshore wind farm limits shall be charted on paper and raster charts with a dashed limiting line: 0.20/2.00/0.75 mm (0.008/0.080/0.030 inches)

Location and Orientation

An onshore wind turbine or onshore wind farm shall be charted in its exact geographic position as depicted in the source material.

Size and Shape

Individual wind turbines are shown on paper and raster charts by the Chart No.1 symbol L 5.1, with the position circle at the base of the symbol indicating the location of the structure.

Example:

Onshore wind farms may be shown by groups of individual wind turbine symbols in their actual positions if scale and available information allow. If necessary, especially when the symbols for individual wind turbines get too densely spaced, wind farm limits may also be shown in lieu of individual wind turbine symbols. A wind farm limiting line shall be shown on paper and raster charts using a black dashed limiting line 0.20/2.00/0.75 mm (0.008/0.080/0.030 inches).

Examples:

Onshore wind farm limits may be broken on paper and raster charts for other charted detail.

Labels and Notes

Individual onshore wind turbines shall not be labeled. The symbol is sufficient for recognition.

Aeronautical obstruction lights installed on wind turbines shall not be charted.

A wind farm consisting of onshore wind turbines and charted with a black dashed limiting line symbol shall be labeled, “Wind Farm” on paper and raster charts in black 6 pt. Swiss Light type.

Preferred placement of the “Wind Farm” label is within the charted limits of the wind farm, but labeling adjacent to the limiting line is allowable when necessary.

Color and Screening

All wind turbine and wind farm symbols labels shall be charted in black.

Feature Removal from Chart

Onshore wind turbines or onshore wind farms may be removed from the chart if they are determined to no longer be visible from the water or lack prominence, based on reports from government agencies, cooperative charting reports by U.S. Power Squadrons or the Coast Guard Auxiliary or other reliable sources.

In instances where non-authoritative sources report onshore wind turbines not visible or prominent, the feature shall be referred to the Nautical Data Branch for confirmation by an established authority as indicated above.

3.9 Miscellaneous Stations
Revised by March 14, 2002 Memorandum
Revised on February 10, 2015 by Cartographic Order 002/15

Pump-out Facilities (Fd)

Definition: A PUMP-OUT FACILITY is a location where vessels may empty their sewage holding tanks. [29]

General Requirements (All Charts):

In accordance with Public Law 102-587, Section 5603(d), NOS charts shall indicate the locations of pump-out stations and waste reception facilities for the use of operators of recreational vessels.

Private pump-out facilities, not intended for public use, shall not be charted.

Federal, state and local governments and facility owners shall be considered authoritative sources for charting pump-out facilities. Locations of pump-out facilities provided by authoritative sources shall be considered stations available for public use and shall be charted.

Reports of locations provided by non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to chart pump-out facilities, unless accompanied by information from an authoritative source. Pump-out facilities reported by non-authoritative sources shall be referred to the Nautical Data Branch for confirmation by an authoritative source.

A pump-out facility shall be charted where a deleted marine facility tabulation (see Section 7.5) indicated the presence of a pump-out facility with the letter “P”.

A pump-out facility symbol shall not obscure critical features such as aids to navigation, rocks, shoal depths, submerged obstructions etc.

A pump-out facility symbol shall not be shown in areas devoid of hydrography.

Feature Recommendation for a Notice to Mariners

A newly applied, revised or deleted pump-out facility shall be evaluated for a Notice to Mariners. Generally a Notice to Mariners is not required.

Location and Orientation:

The pump-out facility symbol shall be charted at the exact geographic position provided in the source document. When necessary, a leader may be used in congested areas.

Size and Shape:

The pump-out facility symbol shall be charted on paper/raster charts to the size and shape of the standard cartographic symbol in Chart No. 1 (Fd).

Labels and Notes:

When the symbol for a pump-out facility is charted, that chart shall display a sample pump-out facility symbol immediately followed by the note "Pump-out facilities" anywhere within the land area of the chart, preferably grouped with other notes. The note shall be charted in 8 point Swiss Light type.

Example: 

Color and Screening:

The pump-out facility symbol, sample pump-out facility symbol, pump-out facilities note and leader (if used) shall be charted with magenta.

Feature Removal from the Chart:

A charted pump-out facility shall not be removed from the chart until an established authority provides information that this service is no longer provided for public use. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to delete pump-out facilities unless accompanied by information from an authoritative source. A recommendation for removal of a pump-out facility from a non-authoritative source shall be referred to the Nautical Data Branch for confirmation by an authoritative source.

When the only or last remaining pump-out facility symbol has been removed from the chart, the sample pump-out facility symbol and associated note "Pump-out facilities" shall also be removed from the chart.

U.S. Coast Guard Stations (T 10, T 11)

The USCG provides both watch-keeping and rescue services. Stations at which a continuous watch is kept must have a commanding view, are often associated with signal stations, and are visually prominent.

Stations with lifesaving equipment, especially lifeboats, are usually in relatively sheltered positions. They are not necessarily visually prominent and their precise positions are unimportant. They are described as lifesaving stations (T 12).

A landmark symbol (a circle enclosing a dot) shall be shown for accurately located USCG stations. The name of the station shall also be shown on coastal series and larger-scale charts (T 10). When the station is not a recommended visual landmark, the pictorial symbol (T 12) is used. On charts smaller than the coastal series, the abbreviation "CG" shall be used with the pictorial symbol.

Fireboat Station (T d)

These stations shall be shown on the largest-scale chart coverage and labeled "FIREBOAT STATION" in 7 pt. Swiss Light, all caps. The small landmark symbol is also used.

Flagstaffs; Flagpoles (E 27)

A flagpole rising from a building is referred to as a "flagstaff". It is not usually recommended as a landmark because it is not often the most conspicuous part of the feature.

A single-staff flagpole rising from the ground and not attached to a building is usually more conspicuous and is more frequently charted. A flagpole recommended as a landmark is charted using a landmark symbol (position accurate or position approximate) and labeled "FP" or "Fp" as appropriate.

Flag Towers (E 27)

Any scaffold-like tower, on which flags are hoisted, such as a USCG skeleton steel flagpole, is called a "Flag Tower". The term "signal tower" shall not be used. A flag tower recommended as a landmark is charted using a landmark symbol (position accurate or position approximate) and labeled "F TR"or "F Tr", as appropriate.

Lookout Towers (T f)

A lookout tower is any tower surmounted by a small house in which a watch is habitually kept, such as a USCG lookout tower or a fire lookout tower. This term must not be used for an observation tower or a part of a building in which a watch is not kept. The standard procedure for selecting a position accurate or position approximate symbol and label is used.

Marine Police Stations (T c)

These stations should be shown on the largest-scale charts and labeled "MARINE POLICE" in 7 pt. Swiss Light, all caps. The position approximate symbol is also used.

Pilot Stations (T 3)

The most important feature of a pilot station is the position of the meeting (or boarding) place. A special magenta pictorial symbol (see T 1.1) is used for this purpose. The shore station may sometimes communicate visually with ships but cannot generally be considered a signal station. It should be charted with a landmark symbol and the legend "PIL STA".

3.10 Military Features

Military Installations

Routine charting of military features without researching for a possible security clearance requirement can include only the outline of the installation and the proper name label.

Prominent natural features and unclassified aids to navigation that are included in the Light List within the limits of a military installation may be charted. However, objects of present military importance that are considered to be important navigational features (e.g., stacks, towers, domes, aeronautical lights, etc.) may be charted only with the consent of proper military authorities. Requirements for charting objects within military installation are as follows:

1. A feature located within a military reservation shall not be charted without first obtaining a written security clearance from the appropriate military authorities.

(a) If the security clearance is denied, the feature will not be applied to any chart nor will an entry be made in the documentation system. The source shall be destroyed and no further action will be taken.

(b) If security clearance is granted, the feature shall be charted and evaluated for possible publication in the Notice to Mariners. The limits of a military installation shall be shown with a long-short dashed line. The feature should be outlined in black.

2. A security clearance is not required if the object is already shown on a public document such as an aeronautical chart, USGS quadrangle or other unclassified charts or maps. (Aerial photographs available to the public shall not be considered a public document.)

3. A security clearance is also not required if the object recommended for charting is requested by the military organization that has jurisdiction over the landmark.

Abandoned Military Features (E 34.1)

Some coastlines have prominent, abandoned military structures that are in ruins or are used for civil purposes. These structures, which range from forts to minor lookout posts, are often the main distinctive feature of headlands or stretches of coastline. Abandoned features visible from seaward may be shown on charts where military regulations permit.

Structures shown on large-scale charts should be charted by outline to scale, generalized where necessary. On small-scale charts the normal symbols for individual buildings shall be used (D 5, D 6). Where possible, the structure should be named. Buildings which are clearly in ruins shall be shown in dashed lines. (See also Section 3.8, "Buildings and Structures".)

3.11 Bridges and Overhead Cables

3.11.1 Bridges
Revised by March 14, 2002 Memorandum

1. General (D 22 through D 24, D d, D e)

Bridge symbols shall be shown as appropriate for roadways, railroads, and other crossings where they intersect navigable waterways on nautical charts, i.e., those showing hydrography, a legend, or a tabulated (numbered) marine facility shown above the bridge.

If known, names of bridges shall be charted. They are sometimes used to separate channel reaches, are often used as locating references by the mariner, and are used to coordinate other graphics and texts with the chart.

The first source for bridge names shall be the USCG Bridge Book or permit plans. Any disagreements with the Bridge Book name shall be resolved with the USCG by the NDB before charting. The bridge name shall be in 5 pt. Swiss Light.

The terms "left" and "right" when referring to bridge spans means left and right proceeding in the direction of increasing mileage values assigned to the waterway, including the Intracoastal Waterway. The Bridge Book shall provide guidance for labeling existing bridges spans, and Completion Reports shall be the source for new construction. Discrepancies shall be referred to the NDB for resolution.

Names for railroads, major streets and highways, and routes at bridges shall be labeled with the name and route number.

Critical dangers to navigation located under bridges (such as rocks and shoal soundings) must be charted in their positions on the largest-scale chart coverage. The bridge symbol should be broken when such dangers are charted beneath the bridge structure. Dolphins, piles, snags, etc., charted prior to bridge construction will be removed from the chart when construction of the bridge is complete only if the completion report or other authoritative source states that they have been removed.

In general, the bridge symbol should be omitted where navigation is obviously not intended, e.g., drainage canals, cooling outlets, oil exploratory canals, etc., and where the bridge is not listed in the Bridge Book. In these instances, the waterway crossing shall be shown without the bridge symbol detail.

2. Bridge Clearances (D 20, D 21)

Bridge clearances, both horizontal and vertical, shall be shown on all charts having hydrography or other information which shows that navigation can take place on both sides of the structure.

Charted clearances shall be rounded down to the nearest foot. Bridge clearance notes should be kept short and long explanations should be avoided where possible.

The USCG is the authority for bridge clearance information and for resolving discrepancies in bridge clearance data. The information in the USCG Completion Reports (USCG form CG-4599) is usually considered final and approved, and the data from this source shall be used on all NOS publications.

The four-volume "Bridges Over Navigable Waters of the United States," or Bridge Books are on file in the NDB. The Bridge Books are not to be used as the authority for clearances. Any questionable data concerning bridges shall be resolved by this Unit before application of such data to NOS publications. Many bascule bridges do not open to a fully vertical position due to bridge operator intervention, physical limitations of the bridge design, or capability of the operating machinery.

If the USCG form CG-4599 and associated bridge plans do not indicate any restricted horizontal clearance information for the bascule bridge in the open position, the bridge label text will carry clearances for the bridge in the closed position only. These clearances shall be charted similar to the following example:

BASCULE BRIDGE
HOR CL 46 FT
VERT CL 10 FT

Many bascule bridges do not provide the same horizontal clearance between the open ends of the drawspan(s) as is provided between the bridge fenders at the water surface. The drawspan(s) may overhang the bridge fenders when the bridge is open. If the USCG form CG-4599 and associated bridge plans provide restricted horizontal clearance information for the bascule bridge in the open position, the restricted horizontal clearance shall be incorporated into the bridge clearance text following the closed horizontal clearance. These clearances shall be charted similar to the following example:

BASCULE BRIDGE
HOR CL 173 FT
HOR CL 102 FT (OPEN)
VERT CL 44 FT

Under no circumstances, will UNLIMITED clearances for bascule bridges be charted.

In addition to adding restricted horizontal clearance information to the bascule bridge label text, the following caution note will be added to all nautical products depicting bascule bridges:

CAUTION
BASCULE BRIDGE CLEARANCES

For bascule bridges, whose spans do not open to a full upright or vertical position, unlimited vertical clearance is not available for the entire charted horizontal clearance.

The caution note shall be in black, 7 pt. Swiss Light type style, set either 2 inches or 3 1/2 inches wide, and be placed in a prominent location on the chart.

a. Bridge Card File

Bridge clearances (NOAA Form 76-90) are filed in the production branches. They are compiled by the cartographer making the chart application from USACE construction permits and USCG Completion Reports, the five volume Bridge Book, supplements to the Bridge Book, and information from State governments.

The bridge card (see Figure 3-3) is compiled as follows: The section headed "Charts" lists all charts showing the clearance for a particular bridge. The "Mile" designation on the form is the distance (to the nearest hundredth of a mile) from the mouth of the waterway to the bridge, with lines drawn through the geographic areas unaffected by this application. The "Waterway" designation is the name of the waterway the bridge crosses. The "Description" should include the name associated with the bridge (e.g. Interstate 70, Norfolk Southern Railroad, etc.) and the name of any nearby locality. The ("Latitude" and "Longitude" shall be scaled from the chart using the center of the waterway as the reference point. Under the heading "Charting Note," the bridge label should be listed as it will appear on the chart. The "Authority" is the document giving the bridge alignment and clearances and would usually be a Chart Letter or Blueprint. The "Remarks" column is used to briefly describe any modifications of the bridge symbol or bridge note. The "Date" is the date of the chart application and the "Initial" that of the compiler. The person who reviews the chart application and the information on the bridge card shall add a check mark, the date of the review, and another set of initials.

Black ink shall be used to fill out the bridge card.

NOAA FORM 76-90
(5-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

CHART(S) MILE_____

BRIDGE / CABLE } CLEARANCE

ATLANTIC
PACIFIC
GULF

WATERWAY_____ LAT. _____ LONG. _____

DESCRIPTION

CHARTING NOTE	AUTHORITY	REMARKS	DATE	INITIAL

USCOMM-DC 44361-P7

Bridge and Cable Card
Fig 3-3

b. Procedures for Applying Bridge Data

If critical corrections are made to the digital chart files, a Notice to Mariners is written. Whether or not a NM is required, an entry shall be made in the "Remarks" column of the bridge card.

The completed bridge cards are filed by latitude and longitude according to the following guidelines:

1. Atlantic coast and west coast of Florida to longitude 84°00', filed first by latitude and second by longitude.

2. Gulf coast from longitude 84°00' to the Mexican border, filed first by longitude and second by latitude.

3. Pacific coast including Alaska and Hawaii, filed first by latitude and second by longitude.

4. Great Lakes, filed first by longitude and second by latitude.

c. Charting Clearances for New Bridges

Bridge structures are charted in three stages as follows:

(1) Upon Receipt of a USCG Construction Permit

A bridge under construction is charted using a dashed line (H c) and is labeled "Bridge under construction". A magenta (20 percent 120 LPI) screen extending 500 feet (150 meters) each side of the bridge centerline, from shoreline to shoreline, will be supplemented by the following magenta caution note, if appropriate.

CAUTION
Fixed and floating obstructions, some submerged, may exist within the magenta tinted bridge construction area. Mariners are advised to proceed with caution.

The caution note shall be 7 pt Swiss Light and set either 2" or 3 1/2" wide.

(2) Upon Completion as Reported by the LNM or USCG

When the bridge is reported to be complete, the dashed lines shall be changed to solid lines, the authorized permit clearances shall be added, as shown, and the magenta screen deleted.

Example:

FIXED BRIDGE
HOR CL 35 FT AUTH
VERT CL 9 FT

(3) Upon Receipt of the Completion Report

When the official Completion Report has been received, the bridge clearances should be revised as necessary, and the notation "AUTHORIZED", shall be removed.

When it is necessary to chart a clearance on a newly completed bridge and a USCG-approved "as built" clearance is not available from the Completion Report or Bridge Book, the cartographer should do the following:

When it is necessary to chart a clearance on a newly completed bridge and a USCG-approved "as built" clearance is not available from the Completion Report or Bridge Book, the cartographer should do the following:

(a) The clearance as stated in the construction permit should beapplied and labeled "AUTHORIZED", provided it is from an approved charting source. After the bridge has been inspected by the USCG and NOS receives "as built" clearances and approval, the label "AUTHORIZED" shall be removed.

(b) Clearance from a reliable source that has not been issued or approved by the USCG may be charted only if it is clearly as "REPORTED". Special care must be taken to adjust all "reported" values to the bridge clearance datum.

(c) All fractions of a foot shall be disregarded in determining the final charted clearance.

(d) The tabulation in the Bridge Book lists clearances referred to low water and high water, except as follows:

(i) In tidal waters, the clearance shown refers to MHW and, except in regions of diurnal inequality where the MLLW clearance may be given.

(ii) In nontidal waters, the clearance shown at high water refers to the stage at which navigation generally ceases, although there are exceptions. In the Columbia River, charted clearances are referred to Columbia River Datum (MLLW during lowest river stages).

(e) Clearances above dams are referred to the datum of soundings, which is ordinarily the Normal Pool Elevation.

(f) Normal Water Surface elevation on certain rivers is considered MHW, for charting purposes.

(g) Bridge clearance notes (and the bridge name) shall be in 5 pt. Swiss Light type.

3. VHF Radio Capability

Bridge tenders at many of the bridges across navigable waterways are equipped with VHF radios for communication with mariners. Establishing radio communication between the bridge tender and the

vessel operator is both convenient and safer than depending upon whistle signals. Using radio, opening arrangements can be made from a greater distance and with greater clarity. Sound signals may be inadequate especially if there is to be a delay in opening the bridge. An unscheduled delay and information as to its reason and duration can be communicated by radio, but not by whistle signals.

The desirability of using radio contact has been specifically recognized in changes to USCG bridge regulations. Accordingly, the information required for mariners to establish VHF radio communication with a bridge tender shall be shown as the last line of the charted bridge clearance note in 5 pt. Swiss type. This information may be accepted from any reliable source. The line shall state "VHF," the call letters and the calling channel, and include "REP" (for "reported") unless specifically cleared or verified by the FCC, the USCG, their official publications, or NOS field parties or inspections. Communication channel numbers should not be shown since this information is given to the mariner by the bridge tender over channel 16, the universal contact channel known to all VHF operators.

3.11.2 <u>Overhead Cables</u> (D26)
Revised on December 22, 2015 by Cartographic Order 010/15

Definition: **Overhead Cable.** A stranded conductor or an assembly of two or more electric conductors insulated from each other, but laid up together with a strong waterproof covering. [43] *Note: This definition is for a cable in general. It can be assumed that an overhead cable is not a submarine cable, but rather one that is suspended in the air by two or more structures.*

Definition: **Safe Vertical Clearance.** The height above the vertical control datum at which the highest points of a ship can pass under an overhead power cable without risk of electrical discharge from the cable to the ship or without making contact with a bridge. [103]

Definition: **Vertical Clearance.** The minimum vertical space available for passage. [103]

General Requirements

Overhead cables shall be shown across all charted waterways, including single-line streams. An identifying label shall be charted with each cable, or group of cables, and shall not be removed unless the cable is removed. Clearances shall be added when the waterway is shown with hydrography, a depth legend, depth note, or tabulated depth data upstream of the cable.

Overhead power cables that run along the shoreline of lakes whose levels may fluctuate due to seasonal variations or are controlled by dams shall be charted.

The USACE is the agency that grants permits for the construction of cables, with data providing cable clearances, location and labeling information, coming to NDB in the form of completion letters from applicants or via NOAA questionnaire. An overhead cable symbol may also be charted at the request of a court or National Transportation Safety Board (NTSB) recommendation, or requestor of similar authority, if the feature is supported by topography, or justifiable for other reasons.

Some overhead cable crossing locations are charted from NOS surveys, imagery, USGS quadrangles, Notice to Mariners, and similar authoritative sources. Great care must be taken in selecting an identifying label for cables from these sources due to the hazardous nature of high voltage power lines. The preliminary label "OVERHEAD POWER CABLE" or "OVHD PWR CAB" is recommended for any cable where identification is questionable. All questionable cables **MUST** be referred to the Nautical Data Branch for clarification.

Overhead cable support structures that are of landmark value and are located with sufficient accuracy shall be charted with the appropriate landmark symbol and label.

A database of cable clearances is maintained by the Nautical Data Branch in the same manner as for bridge clearances. The files were compiled primarily from information furnished by the USACE in the form of construction permits, as well as from other authoritative sources.

As with bridges, the vertical datum of the chart plays a crucial role in determining the clearance for any cable. Care must be taken to assure that a charted cable clearance is based on the shoreline plane of reference. Clearances above dams shall be referred to the sounding datum which is ordinarily the Normal Pool Elevation. In the Columbia River, clearances charted shall refer to the Columbia River Datum (Mean Lower Low Water during lowest river stages).

Charting Overhead Cables from Geographic Cells

Overhead cables shown on geographic cells may be added as depicted. When so doing, the cartographer must keep in mind the following:

1. The possibility exists that portions of the geographic cell have been superseded by more recent source. Check for source that might indicate the feature has been removed or relocated.

2. A vertical clearance MUST be obtained. The cartographer shall contact NDB, who shall in turn request further information from the appropriate authority.

3. Until a cable clearance is obtained, the cable shall be charted with the preliminary label "OVERHEAD POWER CABLE" or “OVHD PWR CAB”.

Relocating Overhead Cables from Geographic Cells

Overhead cables may be relocated by geographic cells. The cartographer must exercise caution when so doing, because:

1. The possibility exists that portions of the geographic cell have been superseded by more recent source. Check for source that might indicate the overhead cable has been modified, or that a replacement cable has been or is being built.

2. The geographic cell may be less accurate than the original source adding the overhead cable, especially if the cable has associated accurate landmarks, such as towers. The cartographer shall examine all pertinent source to determine the levels of accuracy of each, and revise the cable using the geographic cell only if it is found to be the more accurate.

3. Under no circumstances shall an overhead cable clearance be revised when a cable is relocated from a geographic cell. If clearance questions arise, contact NDB.

Feature Recommendation for a Notice to Mariners

A Notice to Mariners shall be generated for a newly applied, revised, or deleted overhead cable.

Line Type and Weight

Overhead cables shall be charted with a black 0.15/1.25/0.50mm (0.006/0.050/0.020") dashed line.

Location and Orientation

Overhead cables shall be charted in their exact geographic position. A group of cables attached to the same structure and/or whose symbols are, due to scale, so closely spaced as to be touching or overlapping may be represented by a single dashed line.

Size and Shape

Overhead cables shall be charted to scale, using the standard cartographic symbol in Chart No. 1 (D26, NOAA Column). The symbol shall consist of at least two full dashes and shall continue across foreshore and marsh areas to the shoreline. It shall terminate just inside the shoreline or at an associated landmark symbol. Overhead cables charted over waterways less than 3.0 mm (0.12”) wide at chart scale, or over single line streams, shall be charted by 2 full dashes extending beyond the each shoreline.

Labels and Notes

Overhead cables are charted with a black dashed line and a label. The label shall state the type of cable and, if hydrographic information shows that navigation can take place on both sides of the cable, the vertical clearance.

Generally, the vertical clearance authorized by the USACE is used for charting rather than the “as built” clearance. It shall be rounded down to the nearest foot or meter (meter and decimeter if the clearance is less than 10 meters, with meters being abbreviated as a lowercase “m” with a space after the height value, e.g., “AUTH CL 9.6 m”). This information should be found on the

USACE permit or completion notice.

Cable clearance notes shall be in 5-point Swiss Light type, for example:

OVERHEAD POWER CABLE
AUTHORIZED CLEARANCE 100 FEET

The following abbreviations may be used: OVHD, PWR, CAB, AUTH, CL, FT, REP, m.

The difference in electrical potential between power cables and telephone cables must be recognized by cartographers. Power cables may carry high voltage and sometimes high amperage as well. They constitute an extreme electrical hazard to mariners, as well as a physical obstruction. Cables known to be power cables must always carry the word “POWER” or “PWR” in the label.

For example:

OVHD PWR CAB
AUTH CL 100 FT

A safe vertical clearance shall be charted when the USACE issues a permit, or re-issues a permit, for an overhead cable and a safe vertical clearance is provided. A safe vertical clearance may also be charted from a completion letter from USACE or the cable owner. The safe vertical clearance is the vertical clearance authorized by the USACE minus a safety margin needed to avoid an electrical discharge arcing from the cable to a high point on the vessel. This reduced clearance shall be charted in magenta, in place of an authorized physical clearance. A “REPORTED” or “REP” label shall not be used when a safe vertical clearance is provided by the USACE or the cable owner.

Example:

OVHD PWR CAB
SAFE CL 87 FT

In exceptional cases, both the USACE authorized physical vertical clearance and a safe vertical clearance may be charted for the same cable, when approved in advance by the Chief, Marine Chart Division.

Example:

OVHD PWR CAB
AUTH CL 100 FT
SAFE CL 80 FT

It is not normally necessary to seek safe vertical clearances for currently charted overhead power cables. NDB shall seek a safe vertical clearance for newly installed or rebuilt overhead power cable crossings where the authorized clearance of the cable is the controlling vertical clearance for the waterway.

Telephone cables normally carry lower voltages; therefore, telephone cables are principally an obstruction. Cables known to be telephone cables shall include the word “TELEPHONE” or “TEL” in the charted label, for example:

OVHD TEL CAB
AUTH CL 100 FT

If the label is for a group of cables, it shall include all types of cables in the group and the lowest vertical clearance for the group, for example:

OVHD PWR & TEL CABS
AUTH CL 80 FT

Overhead cables frequently cross waterways at or near bridges. In these instances the cable note may be combined with the bridge note, preferably placed below the bridge clearance label:

FIXED BRIDGE
HOR CL 75 FT
VERT CL 50 FT
OVHD PWR CAB
AUTH CL 70 FT

Due to the difficulties associated with determining clearances (e.g., extreme atmospheric conditions may cause dangerous fluctuations in cable clearances), physical clearances received from sources other than the USACE, and those listed as surveyed or “as built”, must be charted with the label “REPORTED” or “REP”:

OVHD PWR CAB
AUTH CL 50 FT REP

A safe clearance shall only be charted from information provided by the USACE or by the cable owner. A safe clearance reported by any other source shall not be charted and shall be referred to NDB for verification.

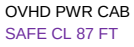
In areas where hydrography or navigation information is not available for both sides of the overhead cable or in areas where this information has been deleted due to larger-scale coverage, the overhead cable symbol shall be charted with only the label identifying the type of cable, without a clearance.

Example:

Color and Screening

An overhead cable symbol shall be shown in black. Overhead cable labels and clearances shall be charted in black, EXCEPT for safe vertical clearances, which shall print in magenta.

Example:



Feature Removal from Chart

A charted overhead cable shall be removed when there is conclusive evidence that the feature no longer exists in the charted position. Such evidence shall be from USACE reports, NOS hydrographic surveys, imagery with field inspection, USGS maps with field inspection, reports from the cable owner or construction drawings with specific reference to removal. Non-authoritative sources (e.g., U.S. Power Squadron Reports, U.S. Coast Guard Auxiliary Reports, private reports, imagery without field inspection (including geographic cells), LNM, USGS Maps without field inspection etc.) do not have sufficient authority to declare an overhead cable nonexistent.

In instances where non-authoritative sources identify an overhead cable as not visible in its charted position, the feature shall be referred to NDB and remain charted until removal has been confirmed by one of the above mentioned authoritative sources.

3.11.3 Overhead Cable Cars

The label "OVERHEAD CABLE CAR" shall be used for charting overhead cable cars. The term "tramway" shall not be used.

This feature shall be charted with short dashed black lines as for an overhead power cable (D 26). If the source states that the cable suspending the car does not carry electric power, it shall be labeled "OVERHEAD CABLE". Otherwise it must be assumed that it may carry power and should be labeled "OVERHEAD POWER CABLE". This will alert the chart user to the possible hazard to be expected.

The vertical clearance to both the car and the cable shall always be charted when it is available. This will avoid restricting the available clearance for a waterway unnecessarily by charting only the clearance to the car. The car may only cross the waterway occasionally, or even seasonally, thus presenting an obstruction to the mariner only at that time.

These clearances shall be charted as one note:

OVHD CABLE CAR
AUTH CL 37FT
OVHD PWR CAB
AUTH CL 49 FT

3.12 Overhead Pipe (D 28)
Revised on August 9, 2000 by Cartographic Order 029/00

Definition: An OVERHEAD PIPE is a conduit for transporting materials at some height over a land or water surface.

Location and Orientation on the Chart:

U.S. Army Corps of Engineers (USACE) permits are the authority for the location and the vertical clearance of overhead pipes. NOS Surveys, U.S. Geological Survey (USGS) maps, aerial photos, other imagery, construction drawings and Notice to Mariners are additional authoritative sources for charting the location of overhead pipe crossing symbols.

The Nautical Data Branch (NDB) shall refer reports of overhead pipes from non-authoritative sources such as U.S. Power Squadron (USPS) Reports, U.S. Coast Guard Auxiliary Reports, private reports, etc. to the USACE for permits. Until positional information is received from an authoritative source listed above, the overhead pipe symbol shall be charted from the nonauthoritative source.

Overhead pipe symbols shall be charted across all waterways, including single line streams.

Overhead pipes shall be charted in their exact geographic position.

Text referring to an overhead pipe shall be located adjacent to the overhead pipe symbol to which it refers.

When the supporting structures for an overhead pipe are considered of landmark value and are located with sufficient accuracy, they shall be charted with the appropriate landmark symbol.

An overhead pipe symbol shall not be charted when attached to a bridge.

An overhead pipe symbol may be displaced slightly when located near a bridge.
An overhead pipe shall not be charted on land.

Feature Recommendation for Notice to Mariners:

A newly applied, revised or deleted overhead pipe shall be referred for a Notice to Mariners.

Line Type and Weight:

Overhead pipes shall be charted with as a distinctive solid line, 0.20mm in lineweight.

Size and Shape:

An overhead pipe symbol shall be charted to the size and shape of the standard cartographic symbol shown in Chart No. 1 [D 28].

Vertical Datum Reference:

Vertical clearances are always referenced to a known vertical datum.

In tidal waters, vertical clearances shall be referenced to Mean High Water (MHW).

In non-tidal waters, the vertical clearance shall refer to the shoreline plane of reference (SPOR). Any variation from this practice shall be clearly stated in an explanatory note in the title area of the chart.

For charting purposes, Normal Water Surface elevation on certain rivers shall be considered SPOR.

Vertical clearances above dams shall be referred to the sounding datum stated on the chart, which is ordinarily the Normal Pool Elevation.

Labels (General Rules):

The label for an overhead pipe is typically comprised of two parts; a label identifying the symbol as an overhead pipe and a vertical clearance.

Example:

OVERHEAD PIPE
VERTICAL CLEARANCE 35 FEET

When an overhead pipe symbol is charted from a non-authoritative source for location such as U.S. Power Squadron (USPS) and U.S. Coast Guard Auxiliary Reports, private reports, etc., the overhead pipe shall be labeled as a reported feature.

Example:

OVERHEAD PIPE REPORTED

The USACE is the authoritative source for all overhead pipe clearances. The Nautical Data Branch shall obtain a permit from the USACE for the vertical clearance of any overhead pipe charted from another source.

A vertical clearance shall be shown for any overhead pipe crossing a waterway showing depth information or if a tabulated marine facility is charted upstream from the overhead pipe.

Vertical clearances of overhead pipes shall be rounded down to the nearest foot (or meter on metric charts; meter and decimeter if the clearance is less than 10 meters).

An overhead pipe shall not be labeled, “Overhead pipeline.”

Where space is limited, the following abbreviations are authorized: OVHD, REP, VERT, CL, FT and m.

Labels for overhead pipes shall be charted with 5 pt. Swiss Light type, all capitals.

Labeling (Specific Guidance):

1. Labeling an overhead pipe charted from a USACE permit.

An overhead pipe, authorized by the USACE, shall be labeled as shown.

Example:

OVERHEAD PIPE
VERTICAL CLEARANCE 35 FEET

2. Labeling an overhead pipe when a non-USACE source reports a vertical clearance greater than the vertical clearance authorized by the USACE.

The vertical clearance authorized by the USACE shall be retained when a non-USACE source reports a vertical clearance greater than the vertical clearance authorized by the USACE. The NDB shall refer the reported clearance to the USACE for confirmation upon receipt of the report.

Example:

OVERHEAD PIPE
VERTICAL CLEARANCE 35 FEET

3. Labeling an overhead pipe when a non-USACE source reports a vertical clearance less than the clearance authorized by the USACE.

The vertical clearance authorized by the USACE shall be retained when a non-USACE source reports a vertical clearance less than the vertical clearance authorized by the USACE. In addition, the vertical clearance reported by a non-USACE source shall also be shown immediately below the authorized clearance as a reported clearance with the year of the report included. The NDB shall refer the reported clearance to the USACE for confirmation upon receipt of the report.

Example:

OVERHEAD PIPE
VERTICAL CL 35 FEET
VERTICAL CL 31 FEET REPORTED 1999

4. Labeling an overhead pipe when a vertical clearance is reported by an authoritative source for location listed above other than the USACE and no authorized clearance has been received from the USACE.

The vertical clearance reported by an authoritative source for location other than the USACE shall be charted as a reported clearance with the year of the report included. The NDB shall refer the reported clearance to the USACE for confirmation upon receipt of the report.

Example:

OVERHEAD PIPE
VERTICAL CL 31 FEET REPORTED 1999

5. Labeling an overhead pipe when a vertical clearance is reported by a non-authoritative source such as U.S. Power Squadron (USPS) Reports, U.S. Coast Guard Auxiliary Reports, private reports, etc. and no authorized clearance is available from the USACE.

No vertical clearance shall be charted. The overhead pipe shall be labeled as a reported feature when the overhead pipe symbol is charted from a non-authoritative source. The NDB shall refer the reported overhead pipe and vertical clearance to the USACE for confirmation upon receipt of the report.

Example:

OVERHEAD PIPE REPORTED

6. Labeling an overhead pipe when no vertical clearance information is available.

A label identifying the symbol as an overhead pipe shall be charted when a vertical clearance has not been obtained. An overhead pipe symbol shall be labeled as reported when the symbol is charted from a non-authoritative source for location such as U.S. Power Squadron (USPS) Reports, U.S. Coast Guard Auxiliary Reports, private reports, etc. In either case, the NDB shall refer the overhead pipe to the USACE for a permit.

Examples:

OVERHEAD PIPE

OVERHEAD PIPE REPORTED

7. Labeling an overhead pipe charted across a waterway that does not show depth information nor a tabulated marine facility charted upstream from the overhead pipe.

A vertical clearance shall not be charted when an overhead pipe symbol is charted across a waterway that does not show depth information nor a tabulated marine facility upstream from the overhead pipe. A label identifying the symbol as an overhead pipe shall be charted. An overhead pipe symbol shall be labeled as a reported feature when the symbol is charted from a non-authoritative source for location such as U.S. Power Squadron (USPS) reports, U.S. Coast Guard Auxiliary reports, private reports, etc.

Examples:

OVERHEAD PIPE

OVERHEAD PIPE REPORTED

8. Labeling an overhead pipe attached to a bridge when the vertical clearance of the pipe is less than the vertical clearance of the bridge.

The vertical clearance of an overhead pipe attached to a bridge shall be shown when the vertical clearance of the overhead pipe is less than the vertical clearance of the bridge.

Example:

OVERHEAD PIPE
VERTICAL CLEARANCE 47 FEET
FIXED BRIDGE
HOR CLEARANCE 200 FEET
VERTICAL CLEARANCE 50 FEET

9. Labeling an overhead pipe crossing a waterway near a bridge.

In these instances the vertical clearance of the overhead pipe shall be combined with the bridge clearances, as close as possible to the symbols for the overhead pipe and the bridge.

Example:

OVERHEAD PIPE
VERTICAL CLEARANCE 47 FEET
FIXED BRIDGE
HOR CLEARANCE 200 FEET
VERTICAL CLEARANCE 50 FEET

10. Labeling multiple overhead pipes that cross a waterway adjacent to each other.

The vertical clearances authorized by the USACE shall be combined, showing the clearance of the lowest overhead pipe. The total number of overhead pipes represented shall be listed first in the label. Vertical clearances authorized by the USACE shall not be combined with reported clearances.

Example:

3 OVERHEAD PIPES
VERTICAL CLEARANCE 37 FEET

Color:

Overhead pipes and associated labeling shall be charted with black.

Feature Removal from Chart:

A charted overhead pipe shall not be removed until conclusive evidence that the feature does not exist in the charted position. Such evidence shall be from USACE reports, NOS hydrographic surveys, USGS maps with field inspection, aerial photos or other imagery with field inspection, or construction drawings with specific reference to removal. Non-authoritative sources (e.g., U.S. Power Squadron Reports, U.S. Coast Guard Auxiliary Reports, private reports, etc.) do not have sufficient authority to declare a feature non-existent.

In instances where non-authoritative sources identify an overhead pipe not visible in its charted position, the feature shall remain charted until removal has been confirmed by an authoritative source listed above.

Overhead Pipe Card File:

A card (NOAA Form 76-90) for each overhead pipe shall be maintained with the Bridge Card File (see Section 3.11.1) in the compilation area. The specific card shall be revised every time source data is selected regarding that specific overhead pipe. The card is completed as follows:

1. CHART(S):

List all charts showing the specific overhead pipe.

2. MILE:

Enter the distance (to the nearest hundredth of a mile) from the mouth of the waterway to the overhead pipe, if known.

3. TYPE OF STRUCTURE:

Cross out the words “Bridge” and “Cable” and add the term, “Overhead Pipe”.

4. GEOGRAPHIC AREA:

Cross out the geographic areas unaffected by this application. “Great Lakes” may need to be added, if appropriate.

5. WATERWAY:

List the name of the waterway the overhead pipe crosses.

6. LATITUDE, LONGITUDE:

The latitude and longitude shall be scaled using the center of the crossing as the reference point.

7. CHARTING NOTE:

List the overhead pipe labeling exactly as charted.

8. AUTHORITY:

List the source document identification that added, revised or deleted the overhead pipe symbol, associated label or clearance.

9. REMARKS:

Write a short narrative of the cartographic action taken, substance flowing through pipe, ownership of pipe and telephone number of owner, if known.

10. DATE:

Enter month, day and year the overhead pipe was compiled and the date reviewed.

11. INITIAL:

List initials of compiler and reviewer.

NAUTICAL CHART MANUAL - VOLUME 1 - POLICIES AND PROCEDURES

CHAPTER 4 - HYDROGRAPHY

U.S. Department of Commerce
Office of Coast Survey

4 HYDROGRAPHY

Revised by September 22, 2000 Memorandum

4.1 General

Natural hydrographic features are charted after a thorough study of the configuration of the bottom as portrayed by surveys, primarily NOS hydrographic surveys. Submarine relief must be presented clearly, and important objects must not be obscured by other data. A dangerous rock, an islet, or the least depth over a shoal must be shown prominently; small islets and rocks should be exaggerated if necessary, to make them easily discernible.

The graphic portrayal of hydrographic information on a chart is represented by depth soundings, their associated depth contours or curves, depth-dependent color designations (blue tints), and notes showing the controlling depth of improved channels. Together these must convey adequate depth information to enable the chart user to navigate safely. Labels describing the character of the bottom are particularly important in harbors and other anchorage areas, but are also useful to fishermen. Symbols and labels depicting the existence of such natural dangers as ledges and reefs and isolated rocks, as well as man-made obstructions ranging from fish havens to cribs and platforms to submarine cables and pipelines, are also charted.

Guidelines published in the Hydrographic Manual, Fourth Edition, 1976, and Wire-Drag Manual, Publication 20-1, are designed to ensure that basic NOS hydrographic surveys (as defined in Section 4.2.1) supersede all previous NOS surveys in the area covered. The proper charting instructions must be clearly stated, and exceptions shall be noted in the Descriptive Report (DR), for the application or removal from charts of wrecks, dangers, least depths, or wire-drag clearances, etc.

Data handling throughout the system must be prompt and thorough to ensure timely dissemination of information to chart users. Questionable recommendations for charting action must be referred for resolution to HSD through the Chief, NDB. When applying hydrography, the cartographers must constantly be alert for items that should be included in the NM. This is most important since failure to recognize a potential navigational hazard and to alert mariners via the NM could result in a major marine disaster. Additionally, early requests for supplemental information to facilitate the processing of these items is critical. NDB shall be notified immediately of any requirement for data to rectify discrepancies and deficiencies which may preclude safe disposition of critical items or eventual assimilation of the source into the data base. Items requiring immediate attention for charting action or publication in the NM should be applied and a NM issued pending such resolution. The mariner must always be informed of any dangers suspected, whereas final corrective action can be taken later. A questionable feature is usually charted as "Rep" (reported) until it has been resolved. When applying reviewed basic surveys to the charts, the cartographer must also take care not to inadvertently remove items dating from sources more recent than the survey. Conflicts between

contemporary hydrographic and topographic surveys in the delineation of the low water line, or the height rocks awash actually uncover, should be resolved by giving greater weight to the information on the reviewed hydrographic survey. More care is required in evaluating unreviewed hydrographic surveys because of the development of increasingly sophisticated photogrammetric methods (e.g.,infrared photography and photobathymetry) to record these hydrographic details.

Hydrography shall be applied from the largest- to the smallest-scale charts, with the larger-scale portrayal serving as the source for the next-smaller scale. Detail is eliminated and generalized as scale is reduced. Yet critical shoal soundings, rocks, and other dangers must be retained when applying surveys through the scales. Significant submerged features should not be generalized, and generalization must never compromise navigational safety.

To aid in navigating by echo-sounding apparatus, depth curves are given special prominence on nautical charts in areas where modern hydrographic surveys have been made. The more accurately the chart depicts deepwater submarine relief, the more certain the navigator can be of the vessel's position.

Note that hydrographic features are always labeled using slant (italic) type whereas topographic features are labeled with vertical type.

4.2 Hydrographic Surveys
Revised on December 21, 2015 by Cartographic Order 008/15.

4.2.1 NOS Surveys

The principal objective of hydrographic surveys conducted by NOS is to obtain hydrographic data for the compilation of nautical charts. Emphasis is on those features that may affect safe navigation.

Prior to the start of any NOS survey, project instructions are prepared and supplement the general instructions given in the NOS Hydrographic Surveys Specifications and Deliverables Document (HSSD), and the Field Procedures Manual. The details of the project instructions vary from specific to general depending on the nature, the locality, and the unique requirements of the survey.

1. Types of Surveys

a. Basic Hydrographic Surveys (H)

A Basic Survey is a complete and thorough survey that does not need to be supplemented by other surveys. For charting purposes, a basic hydrographic survey must be adequate to supersede all prior surveys of the same area. A basic survey shall verify or disprove the existence of all charted or reported features of significance. Basic Surveys delivered to MCD by HSD meet or exceed the NOS HSSD.

b. Bathymetric Surveys

A Bathymetric Survey is a track-line or multibeam survey run in a systematic pattern of wide-line spacing, e.g., 2 miles. It is used primarily to define bottom topography and as a source of fill soundings. In deep ocean areas, Track-Line or Bathymetric Surveys may constitute the only available information.

c. Chart Evaluation Surveys (CES)

The CES program is designed to accomplish the following:

(1) Resolve all deficiencies in charted hydrography and other selected chart information. (A deficiency is a weakness in charted information that can be corrected through field examination or by similar methods.)

(2) Evaluate the adequacy and accuracy of hydrographic information on existing charts.

(3) Verify or revise information published in the appropriate Coast Pilot.

(4) Conduct user evaluation and public relations efforts to provide a public awareness of NOS and its products, and to obtain user input.

d. Geophysical Surveys (see Track-Line Surveys)

e. Navigable Area Surveys (NAS)

NAS provide hydrographic information in areas where existing chart data is inadequate. By restricting the area of coverage of these surveys, yet retaining the basic hydrography concept within the surveyed waters, there will normally be a more rapid progression of field work and availability of data. The coverage is reduced by normally omitting requirements for: (1) development of the 0-foot curve and foul nearshore areas not considered navigable and (2) complete field edit of the survey area. Prior to 1973, these surveys were called "Corridor Surveys" (CS).

f. Reconnaissance Surveys

Reconnaissance Surveys determine the extent of change in an area since the last survey. Comparison of the results of a Reconnaissance Survey with prior survey provides the information needed to classify and design new survey requirements.

g. Revisory Surveys

A Revisory Survey is similar to a CES, but with emphasis on topography rather than hydrography. Historically, hydrography on such surveys has been of a reconnaissance nature and has usually been limited to verification of charted information in channels, harbors, and approaches.

The primary objective of a Revisory Survey is to field inspect and, when necessary, to revise the topographic and hydrographic features shown on the published charts so that New Editions are as up-to-date and accurate as possible.

h. Special Surveys

A hydrographic survey is classified as a Special Survey if the general requirements or specifications do not logically fall into any of the standard categories. A special survey may cover small areas for limited purposes such as to prove or disprove the existence of reported dangers or obstructions, to provide data for harbor development, or to supplement prior surveys for construction of a large-scale chart. Other surveys,

regardless of size of area, may be classified as special if significant deviations from line spacing or degree of coverage requirements are authorized. Special surveys include the following:

(1) Field Examinations (FE)

These are investigations of specific features, such as obstructions, rocks, and wrecks, or basic hydrographic surveys of limited extent.

(2) Additional Work (Ad. Wk.)

These provide additional development of specified features as a supplement to a basic hydrographic survey.

(3) Tag-Line Surveys

When detailed surveys of important docks, anchorages, or restricted areas are needed, Tag-Line Surveys often prove to be the most efficient and accurate method available. They are generally of large scale (1" = 100') with very closely spaced soundings and sounding lines. This type of survey, if required, will most often be accomplished as part of a basic hydrographic survey or registered as a field examination.

i. Track-Line Surveys

The NOAA survey vessels occasionally obtain soundings along their line of travel on extended voyages from port to project areas for bathymetric mapping or to provide fill soundings for small-scale charts. Track-Line Surveys are obtained when there is a specific need for the data and are controlled using the most accurate positioning system available to the vessel. The track lines are plotted either on Ocean Survey Sheets (OSS series) or on U.S. Navy Bathymetric Charts (as specified in the project instructions).

j. Geophysical Surveys

Geophysical Surveys are occasionally conducted to obtain depths of the bottom sediment layer, gravity and magnetic information, along with soundings, at wide-line spacing. The soundings may be used as a chart source.

k. Side Scan Sonar

Side Scan Sonar surveys are used primarily to supplement conventional echo sounding surveys and to investigate reported dangers to navigation. Side scan sonar is being used for many investigations of reported dangers to navigation.

l. Outside Source (W)

Outside Source surveys that have not been acquired under an official HSD project may be evaluated for use in nautical charting.

m. Airborne Lidar Bathymetry (ALB) Data

Definition: **LIDAR**. (Light Detection and Ranging): An airborne instrument that measures distance to an object by measuring the time difference between of a transmitted laser pulse and the rerun time of the reflected pulses. The measured time interval is converted into distance using the speed of light values characteristic of the medium. Topographic lidar measures elevations on land. ALB use a green laser pulse (typically, 532 nm) to measure water depths. The ability of ALB to detect the bottom and obtain depth information is totally dependent on water turbidity. Depending of the ALB system, bottom detection can range from one to three Secchi Disk Depth.

MCD cartographers shall chart LIDAR data based on the recommendations of HSD provided in the HCell Report. Encoding of features from the HCell, such as the quality of position (QUAPOS) or quality of sounding (QUASOU), may aid in decision making.

When it is unclear to MCD cartographers, whether or not the data provided by HSD is adequate to supersede charted information or whether or not the data meets standards for positional accuracy, depth accuracy or object detection, the Branch Chief or Team Lead shall contact NDB for resolution with HSD and/or RSD.

Hydrographic LIDAR data may be received in MCD from sources other than HSD. In such cases, NDB shall request charting advice from HSD and/or RSD

When assistance from HSD and/or RSD is unavailable in determining the suitability of third party bathymetric LIDAR data for charting, the following policies shall be followed:

- Only depths shoaler than charted depths shall be added to the chart.

- Uncharted offshore or shoreline features shall be added to the chart as the chart scale permits.

- Charted offshore or shoreline features such as rocks or submerged piles, which may have escaped detection, shall not be deleted nor relocated.

2. Processing of NOS Surveys

HSD processes the data gathered from hydrographic surveys at their processing branches located at Atlantic Marine Center and Pacific Marine Center. As a result, NDB now receives only the final approved HCell of the survey along with an HCell Report.

4.2.2 USACE Surveys

The USACE administers Federal laws enacted for the protection and preservation of navigable waters of the United States. For work seaward of the shoreline, the USACE is authorized to approve plans and issue construction permits for structures of any kind, establish harbor lines, and remove sunken vessels and obstructions endangering navigation. The navigable waters of the United States over which USACE jurisdiction extends include all ocean and coastal waters within a zone 3 nautical miles seaward from the coastline. Wider zones of 3 leagues (9 nautical miles) are recognized in some areas of the Gulf of Mexico and the Caribbean (see 33 CFR 329.12 - .14 for more details).

Copies of survey data, both sounding plots and channel condition reports, are made available to NOS for application to nautical charts and will generally be accepted and registered as source documents. Suspected significant errors in control data, various limit lines, plotted sounding lines, depths, and other charting data shall be brought to the attention of the USACE for rectification if these errors cannot be resolved unequivocally within NOS. This procedure shall not affect the routine scanning of the registered data for publication of suspected dangers in the NM.

1. Initial Screening and Application

All registered and indexed survey data shall be forwarded to the production branches immediately.

a. Expediting Critical Items

USACE survey data shall be screened for items affecting the safety of navigation immediately upon receipt in the production branches. Survey data on which critical items appear shall be assigned first priority for application to the digital chart files. Critical items must be applied promptly and notice to mariners written.

The production branches must also expedite the processing of USACE surveys and channel depth reports that affect tabulated depths and depth legends on existing charts.

In all cases, critical items must be applied and the corresponding notice to mariners written as quickly as possible.

b. Delineation of Depth Contours and Curves

The placement of depth contours or curves and the avoidance of ½-foot soundings on USACE surveys shall be consistent with the guidelines established for NOS hydrographic surveys (see Section 4.4.2, Depth Contours and ½-Foot Soundings).

2. Classifications of USACE Surveys

The relative degree of chart application required will depend on the status of the USACE hydrographic survey being applied.

a. Reconnaissance -- a general survey to determine whether a channel has shoaled to lesser depths than the approved project or to determine the need for a more detailed survey.

b. Condition and Examination -- a more detailed survey to determine the current condition or the controlling depth of a channel and to plan future maintenance dredging and preparation of channel condition statements to be issued to navigation interests.

c. Preliminary -- a detailed survey to determine the condition of a channel; plans and specifications for future dredging work are based on this survey.

d. Contract drawing -- a survey furnished to a contractor specifying the area and depth to be dredged (or work to be accomplished) to fulfill contract terms.

e. Pre-dredging – a survey made immediately before commencement of dredging to determine the latest condition of the channel.

f. After dredging – a survey made immediately after completion of dredging to determine the latest condition of the channel and to determine whether additional dredging is required to meet the terms of the dredging contract.

g. As-built -- a survey certifying that the channel has been dredged or a structure has been built in accordance with the contract plans. An as-built survey normally is used to show a feature as it was actually constructed.

3. In Galveston Bay and the Houston Ship Channel

Depths (including Channel Tabulations, Channel Legends and Channel Depth Notes) are referenced on nautical charts to a specified vertical datum. In Galveston Bay, the Houston Ship Channel and in the vicinity of Freeport, Texas the vertical datum is Mean Lower Low Water (MLLW). Recent information received from the U.S. Army Corps of Engineers (USACE) is referenced to a local dredging reference - Mean Low Tide (MLT). These two vertical references are not equivalent.

Combined with measured subsidence of the bottom, it has been determined that an approximate conversion value of 1 foot needs to be added (making depths deeper) to USACE hydrography referenced to Mean Low Tide. This information is typically provided by USACE in tabulated form or as channel profile (crosscut) graphics.
DESIGNATED GEOGRAPHIC AREA:

All USACE projects referenced to MLT and located within the following designated area shall subscribe to these specifications. The designated area is as follows:

An area encompassing all of Galveston Bay, from and including the Galveston Bay Entrance Channel and the Houston Ship Channel in its entirety.

Inside Galveston Bay, along the axis of the INTRACOASTAL WATERWAY, the eastern limit includes all USACE projects west of longitude 94°28'00.63"W (which is equal to the western neatline dimension of Chart 11332). The western limit extends to longitude 95°50'01.65"W (which is equal to the western neatline dimension of Chart 11321) and encompasses all of Freeport Harbor, from and including the Freeport Harbor Channel.

DEPTH INFORMATION:

USACE depth information is portrayed on NOS charts as (1) a Channel Tabulation, (2) a Channel Legend/Channel Depth Note, or (3) as Soundings. All USACE sources in the designated

area referencing Mean Low Tide (MLT) shall be applied according to the following specifications.

(1) CHARTED CHANNEL TABULATIONS:

USACE depth information, referenced to MLT, provided in tabular or graphic form shall be applied to the charted channel tabulation as is without the application of the approximate conversion value.

All charted channel tabulations within the designated area shall subscribe to this format. There are no conditions where a charted channel tabulation contains a combination of different datums within the same tabulation.

The header in the tabulation currently reading:

"CONTROLLING DEPTHS FROM SEAWARD IN FEET AT MEAN LOWER LOW WATER (MLLW)"

shall be revised to:

"CONTROLLING DEPTHS FROM SEAWARD IN FEET AT MEAN LOW TIDE (MLT)"

A modification statement shall be added at the bottom of each channel tabulation when MLT data is used.

The following statements, in upper case letters, shall be inserted below the bottom horizontal line of the tabulated data table and above the note:

INFORMATION IN THIS TABULATION HAS BEEN PROVIDED TO NOAA BY THE U. S. ARMY CORPS OF ENGINEERS. DEPTHS ARE REFERENCED TO A LOCAL DREDGING REFERENCE CALLED MEAN LOW TIDE. FOR AN APPROXIMATE CONVERSION TO MEAN LOWER LOW WATER, ADD 1 FOOT TO EACH DEPTH IN THE TABULATION.

NOTE - CONSULT THE CORPS OF ENGINEERS FOR CHANGES SUBSEQUENT TO THE ABOVE INFORMATION.

When the charted tabulation has footnotes, the statement noted above shall be inserted after the last footnote.

(2) CHARTED CHANNEL LEGENDS AND CHANNEL DEPTH NOTES:

USACE depth information, referenced to MLT, provided in tabular or graphic form shall be applied to revise/update a charted channel legend or channel depth note. The approximate conversion value of 1 foot shall be added to the MLT value. The resultant charted value will be 1 foot deeper than the MLT value. Note: When a legend is used to describe a channel, a spot sounding located within a channel must also be converted.

(3) CHARTED SOUNDINGS LOCATED OUTSIDE CHARTED CHANNEL LIMITS:

Soundings referenced to MLT and located outside charted channel limits shall be converted using the approximate conversion value of 1 foot. The resultant charted value will be 1 foot deeper than the MLT value. Note: Depth curves originating on any USACE source referenced to MLT must not be used. Depth curves should be regenerated after applying the approximate conversion value of 1 foot to individual soundings.

4. Charting of Aids to Navigation and Topography

The survey base used by the USACE to plot hydrography usually does not show current topographic information. The USCG aids to navigation, especially fixed aids, generally appear on USACE surveys in their location at the date of the original base even if they have since been relocated or removed. A specific request to the USACE is usually required to obtain current locations of fixed aids. Positions of aids provided by the USACE must be approved by the USCG before they are charted.

NOS cartographers shall compare all fixed aids to navigation appearing on USACE surveys with their charted positions. Any suggested revisions to aids included in a Light List shall be brought

to the attention of the branch's Update Service cartographer, which will seek USCG approval of the recommended charting action which is required before charted aids are changed.

USACE surveys may be used as the charting source for features not listed in the Light List such as privately maintained aids, dredging markers, piles, stakes, and similar objects that can affect surface navigation. This information should be used if it is current.

USACE surveys may also be used as the source for shoreline changes when they are supported by hydrography or when the date of the survey base is more recent than that shown on other available sources. The approximate shoreline symbol C 2 shall be charted in this case unless the shoreline datum is considered to be reasonably well defined.

4.2.3 Satellite Derived Bathymetry

Definition: **SATELLITE DERIVED BATHYMETRY (SDB).** A optical remote sensing method for estimating depth analytically using visible bands of satellite imagery. [104]

Background

Satellite Derived Bathymetry (SDB) is a tool that can be used to map shallow water bathymetry using publicly-available satellite imagery. Main applications where SDB can be used on NOAA charts are: 1) to characterize a coastal area and 2) to monitor seafloor changes that may have occurred since the last hydrographic survey was conducted.

General Requirements

Satellite Derived Bathymetry (SDB) may be used to revise waterways on nautical charts that have not been recently surveyed by acoustic means, such as MBES, or by Airborne Lidar Bathymetry (ALB) and/or are economically/strategically impractical to survey, such as extremely remote or highly dynamic areas. The use of SDB data is especially useful where vessel traffic or the deployment of aids to navigation indicate that charted data is misleading and there are no recent surveys to update the chart.

- SDB data must be approved by an SDB Analyst designated by the Chief, MCD and the data must be registered as source by NDB before any chart application.
- SDB data is to be typically used in shallow water areas. SDB may be used in deeper water when directed by an SDB Analyst.
- SDB shall not be used where contemporary echo sounder or Airborne Lidar Bathymetry survey data is available.
- SDB shall not be used to update areas with critical under-keel clearance requirements for large (SOLAS) vessels, where high resolution, systematic hydrographic surveys meeting NOAA Hydrographic Specifications are required. (Such as Port of Los Angeles/Long Beach)
- SDB data shall not be used to disprove existing charted shoal depths, but it may be used to improve the position of shoals derived from historical surveys or notes of “Shoal Reported”, unless directed by an SDB Analyst.
- Depth soundings shall be charted from SDB data only upon direction from an SDB Analyst.
- Charted depths within the corresponding depth area after application of SDB data shall be retained on the chart unless deletion is directed by an SDB Analyst. For example, a 15 foot depth sounding charted between an approximate 12 foot depth curve and an approximate 18 foot depth curve charted from SDB shall generally be retained as charted.

- Charted depths deeper than the corresponding depth area after application of SDB data shall be deleted from the chart. For example, a 21 foot depth sounding charted between an approximate 12 foot depth curve and an approximate 18 foot depth curve charted from SDB shall be deleted from the chart.
- Dangers such as wrecks, rocks, obstructions and shoals shall not be deleted from the chart based on the application of SDB data unless directed by an SDB Analyst.
- Areas of interest, where acquisition of SDB data may be advantageous, may be reported to an SDB Analyst by MCD Staff, the Chief of any MCD branch or a Team Lead.
- The Chief, NDB shall notify HSD, RSD or NSD, as appropriate, when analysis of SDB indicates that new hydrographic and/or topographic survey data would be advantageous.

Feature Recommendation for a Notice to Mariners

Newly applied, revised or deleted data based on SDB shall be evaluated for a Notice to Mariners or chart update.

Line Type and Weight

Depth curves (contours) charted from SDB data shall be considered to be approximate depth curves.

Approximate depth curves applied from SDB data may be extended into deeper charted water but shall not be retracted unless directed by an SDB Analyst.

Coastline from SDB data shall be considered to be approximate shoreline. Approximate shoreline applied from SDB data may be retracted or extended only after consultations with RSD for best available data.

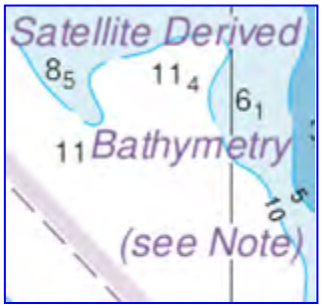
Areas revised from SDB shall be delineated by a boundary consisting of a dashed magenta line. On raster charts, this line is specified as: 0.25/2.00/0.75mm (0.010/0.080/0.030”), Symbol N 1.2, with a magenta screened tint band. The thickness of the magenta band may vary depending on the size of the area.

Size and Shape

A Satellite Derived Bathymetry area shall be determined by the geographic extent of the data revised.

Labels and Notes

A label shall be placed within or near the limits of the SDB data stating *“Satellite Derived Bathymetry (see note)”*. See Figure below. The label shall be in magenta, preferably 7 point Swiss Light Italic, depending on the size of the area.



A magenta note shall be applied to the chart referring to revisions from SDB. The note must indicate that uncharted dangers may exist. The note shall be 7 point Swiss Light on paper and raster charts.

NOTE _
Satellite Derived Bathymetry
Depths within the area indicated are derived from satellite imagery from *[year]*. Their vertical accuracy is typically ± 2m. Uncharted dangers may exist.

The vertical uncertainty in the note must be converted to the chart unit equivalent of 2 meters (7 feet or 1 fathom) on non-metric charts.

A CATZOC (Category of Zone of Confidence) value of "C" or lower shall be encoded for the ENC product as determined by an SDB Analyst.

Color and Screening

The limit of the SDB data and the screened tint band shall be charted in magenta.

SDB area labeling shall be in magenta.

A note referring to Satellite Derived Depths shall be in magenta.

Approximate shoreline charted from SDB data shall be in black.

An approximate depth curve (contour) charted from SDB data shall be in the same color as other depth curves on that chart.

Feature Removal from Chart

An SDB area limit, labeling and note shall be deleted when a more recent systematic survey has been applied in the same area.

4.2.4 Miscellaneous Surveys

Depth Information is received from many sources other than NOS, USACE, and DOD. This information may range from substantial state and local government surveys to a single uncontrolled line of soundings from an individual without correctors for tide or transducer depth.

All such information must be carefully screened prior to chart application to separate valid and sufficiently complete data from data that should be rejected as inadequate. Every effort shall be made to obtain sufficient additional information to salvage an otherwise useless survey if it is

judged to be potentially useful, for example additional metadata such as provided (horizontal and vertical references, surveyor, and acquisition system. Then this dataset should be further considered for charting application.

Great care must be exercised in the application of private surveys to make certain that all relevant positioning factors involved are considered for adequacy, that the date and time of the survey work are available for construction of a tide curve for derivation of tide correctors, and that all soundings are corrected for the depth of the transducer. Failure to consider parameters, such as the depth of the transducer, can result in charted depths that are different than the actual depths.

Depths charted from non-authoritative sources should include the word “reported” and the date of the survey as a legend or note, as appropriate, until they can be verified by an authoritative survey. Two examples of such disclaimers follow:

3 ft shoaling rep 1999

_____ Creek

Hydrography in the _____ Creek from the entrance to the railroad bridge is reported from a private survey of 1999.

4.2.4.1 Depth Wizard (DepthWiz) Surveys

Revised by on February 1, 2006 by Cartographic Order 002/06 and by a March 30, 2006 Memorandum

Definition: DEPTHWIZ. Is a system that measures depths of water, integrating a Differential Global Positioning System (DGPS) or Wide Area Augmentation System (WAAS) receiver, a

depth sounder, and a PC type computer programmed using time corrections, transducer corrections, tide corrections, etc. that adjusts measured depths to the chart sounding datum. [29]

General Requirements:

The Cooperative Charting Program of the United States Power Squadrons (USPS) is conducted in coordination with the Marine Chart Division. Under the program, USPS members supply data to the Marine Chart Division which may lead to corrections to nautical charts and Coast Pilot volumes. Included with this electronically submitted information is data from depth surveys conducted by USPS members. Following the collection and input of specified data, DepthWiz outputs a computer file for transmittal to the Marine Chart Division. DepthWiz provides a consistent procedure and common data set to use in survey reporting. DepthWiz has been

adopted as the approved method for USPS Cooperative Charting participants to obtain and submit depth survey data.

DepthWiz survey data may be represented on charts by soundings, notes, legends, and tabulation footnotes.

DepthWiz surveys shall be evaluated for quality of data by the Nautical Data Branch before application to nautical charts.

Before applying DepthWiz surveys to nautical charts, the area covered by the survey must be researched for sources of a more recent date.

DepthWiz surveys, although considered non authoritative, will be used to supplement these sources in the following manner:

- DepthWiz data shall be considered adequate to chart new shoals and obstructions as reported features.
- DepthWiz data shall not be considered adequate to supersede shallower soundings or disprove charted wrecks, rocks, obstructions or labeled shoals.
- DepthWiz data shall NOT be used to make charted depths deeper.
- Charted hazards and mooring structures, such as piles, platforms, sills, etc. shall not be deleted by DepthWiz data.
- Charted shoreline, islets or dams shall not be deleted or revised by DepthWiz data.

- DepthWiz surveys showing significant changes to depths, shoreline (including islets), hazards, mooring structures or dams shall be referred to NDB to request investigation by authoritative sources.

Revision of Soundings and Depth Curves

Soundings and depth curves selected from DepthWiz surveys shall be charted in accordance with Sections 4.3 Soundings and 4.4 Depth Contours and Curves.

Exception:

Since natural channels may constitute routes from deep water into shore or harbor areas, the charting of unconfirmed shallower depths from DepthWiz surveys may prohibit the transit of

vessels that use the route. An additional survey may be needed to confirm reported depths. Such conditions shall be reported to NDB if subsequent DepthWiz surveys have not confirmed the reported shoaler depth.

Revision of Dredged Areas Depths

When revising dredged area information displayed by tabulations, legends or notes, the selection of DepthWiz data to be charted as depth information shall be in accordance with Section 4.6.1 Tabulations, Legends and Notes; Section 4.6.2 Updated Old Channel Depth Information and Section 4.6.3 Revised Channel Depths.

Federally Maintained Channels:

The USPS has been discouraged from surveying in USACE maintained projects. An MCD production reviewer shall notify NDB when the reported depth from a U.S. Power Squadron DepthWiz survey is shoaler than the charted controlling depth. NDB shall request a second DepthWiz survey to confirm the reported shoal depth(s) in the channel. Controlling depths in federally maintained channels shall not be revised from a single DepthWiz survey. NDB shall notify the USACE about the reported depth if confirmed by a second DepthWiz survey.

When a shoal depth in a federally maintained channel has been confirmed by a second DepthWiz survey, the tabulated controlling depth shall not be revised, but a footnote shall be added, such as "SHOALING REPORTED TO 16 FEET AT 41° 30' 00.5" N/ 081° 42' 31.4" W, JANUARY 2006".

When a shoal depth in a federally maintained channel labeled with a controlling depth legend has been confirmed by a second DepthWiz survey, an additional notation such as *"Reported shoaling to 11 feet in channel 2006"* shall be added. The charted controlling depth legend shall be retained.

An MCD reviewer shall notify NDB when a depth in the Intracoastal Waterway, confirmed by a second DepthWiz survey, is less than the controlling depth published in the Local Notice to Mariners. A label such as, *"Shoaling rep 2006"* shall then be added at the location of the shoal if hydrography is currently charted. A shoaling label shall not be charted where hydrography is not shown, but in either case, the shoaling shall be reported to NDB, which shall notify the USACE of the reported shoaling condition.

In **non-federally maintained channels,** where a second DepthWiz survey confirms a shallower depth, the charted depth information shall be replaced by a reported depth. The depth shall be reported to NDB by the reviewer and NDB shall notify the authority for the channel of the reported shoaling condition.

In **non-federally maintained channels**, where a USPS DepthWiz survey reports a deeper depth, the date of charted depth information shall be revised only if the DepthWiz survey adequately covers the entire area to which the legend or note refers.

Location and Orientation:

When charting a reported sounding from a DepthWiz survey, the whole number shall be centered on the geographic position of the depth.

When a controlling depth note is charted with depths from a DepthWiz survey, the note shall be placed in the vicinity of the data. A label referencing the note, such as, *"(see note B)"* shall be charted in black at the location of the shoal.

Size and Shape: Soundings in traditional units (i.e., feet, fathoms) shall be charted with 7 pt. Swiss Light. On metric charts, soundings shall be charted with 7 pt. Swiss Light Italic.

Labels and Notes: The abbreviation "*Rep*" shall be appended to any charted depth that has originated from a DepthWiz survey. The year that the depth was found shall be included:

Example:

7 *Rep (2006)*

The label shall be charted with 7 pt. Swiss Light Italic.

In the case where all charted soundings in a river, creek, small cove or other definable area are reported by a DepthWiz survey, the "*Rep*" label shall be omitted from the soundings. A label "*(see note _),*" in 6 pt. Swiss Light Italic, shall be centered within the area of the revised soundings. When the label cannot be located within the limits, it shall be placed adjacent to the area so that the mariner will associate the label with the extent of the reported hydrography. The

use of an arrow or leader to associate a label with a location, although discouraged, may be necessary.

Examples:

Note __
_____ Creek
Hydrography in _____ Creek, from the entrance to the bridge, is reported from a private survey of 2006.

These note shall be charted with black 7 pt. Swiss Light, set 2" to 3 ½" wide.

Color and Screening:

Soundings, labels, legends and notes shall be charted with black.

Feature Recommendation for a Notice to Mariners

Newly applied, revised, or deleted depth information (sounding, tabulation, legend or note, etc.) shall be evaluated for a Notice to Mariners.

Feature Removal from the Chart:

Charted depth information (i.e. soundings, legends, tabulations and notes) provided by USPS DepthWiz surveys shall be superseded by subsequent data from NOS, USACE, Navy or other authoritative sources.

4.2.5 Danger to Navigation Reports

NOS field units (vessels, contractors and navigation response teams) are required to submit a Danger to Navigation Report for:

- Significant uncharted rocks, shoals, wrecks and obstructions.
- Depths which are found to be significantly shoaler than charted depths and features.
- Uncharted or inadequately charted clearances for bridges and overhead cables or pipes.
- Other submerged or visible features, or conditions considered dangerous to navigation.

In general, Dangers to Navigation Reports are no longer submitted directly from NOS field units to the USCG and NGA for inclusion in the NM. NOS policy dictates that in most cases, these reports shall be forwarded immediately to the Marine Chart Division (MCD) through the Atlantic Hydrographic Branch (AHB) or the Pacific Hydrographic Branch (PHB). A copy shall also be sent to the Hydrographic Surveys Division Operations Branch. If a significant danger to navigation is discovered and is an immediate danger to vessel traffic, the field unit or COTR shall submit the information as quickly as possible to the Captain of the Port, USCG and pilots. The information shall also be submitted as described above.

The necessity for prompt action in evaluating and charting an item from a Danger to Navigation Report cannot be overemphasized. Immediately upon receipt of a Danger to Navigation Report, the Nautical Data Branch (NDB) shall process the report as a source document and indicate

"priority" status. The report shall then be immediately forwarded to the appropriate production branch for application to all affected charts.

NDB shall notify the chief of the appropriate production branch and the Chief of the Coast Pilot Branch, by electronic mail, that a priority source document is available for chart application. NDB shall forward a copy of the source document to the Coast Pilot Branch.

If corrections are complex, a chartlet may be prepared for issue. Notice to Mariners items generated during application of a Danger to Navigation Report shall be submitted to the appropriate MCD production branch without delay. The reviewer of the priority source document in the production branch shall alert the branch cartographer responsible for Crit review by electronic mail, that one or more priority items are being submitted for inclusion in the NM. The appropriate production branch shall promptly process and transmit the submission to USCG and NGA for inclusion in the next issue of the NM. Danger to Navigation Reports must be processed immediately and every effort shall be made to transmit the submission to USCG and NGA within one week, at most, after receiving a Danger to Navigation Report in MCD. The appropriate production branch shall also forward a copy of the NM submission to AHB or PHB.

Reports of inadequately charted clearances for bridges and overhead cables or pipes shall be referred to the recognized authority by the NDB. Chart application will depend upon the authority's response to the NDB inquiry.

NOS field units are also required to report the following information to the USCG in a timely manner for a "Broadcast to Mariners:"

- Floating wreckage, logs, derelicts or other similar objects that are menaces to navigation.

- A fixed or floating aid to navigation found to be off station to an extent that the aid does not serve its purpose adequately.

- A fixed or floating aid to navigation showing significantly different characteristics than those charted or described in the Light List.

A Danger to Navigation Report will also be prepared for these conditions and it will be forwarded to MCD through AHB and PHB.

Unanchored floating dangers are not charted due to their constantly changing positions and temporary nature. However, such hazards may be of immediate interest to mariners. Therefore, any reports of hazardous unanchored floating dangers received by an MCD production branch

from a Danger to Navigation Report shall be promptly verified by that production branch and shall verify whether or not the unanchored floating dangers were reported to the USCG. The production branch shall notify AHB or PHB when the USCG has been contacted concerning a Danger to Navigation Report.

Reports of aids to navigation that do not adequately serve their intended purposes and aids to navigation showing different characteristics from those shown on the chart, or in the in the Light List, may also be received by an MCD production branch and shall verify whether or not the information was reported to the USCG. The production branch shall notify AHB or PHB when the USCG has been contacted concerning a Danger to Navigation Report.

4.2.6 Source and Zone of Confidence Diagrams

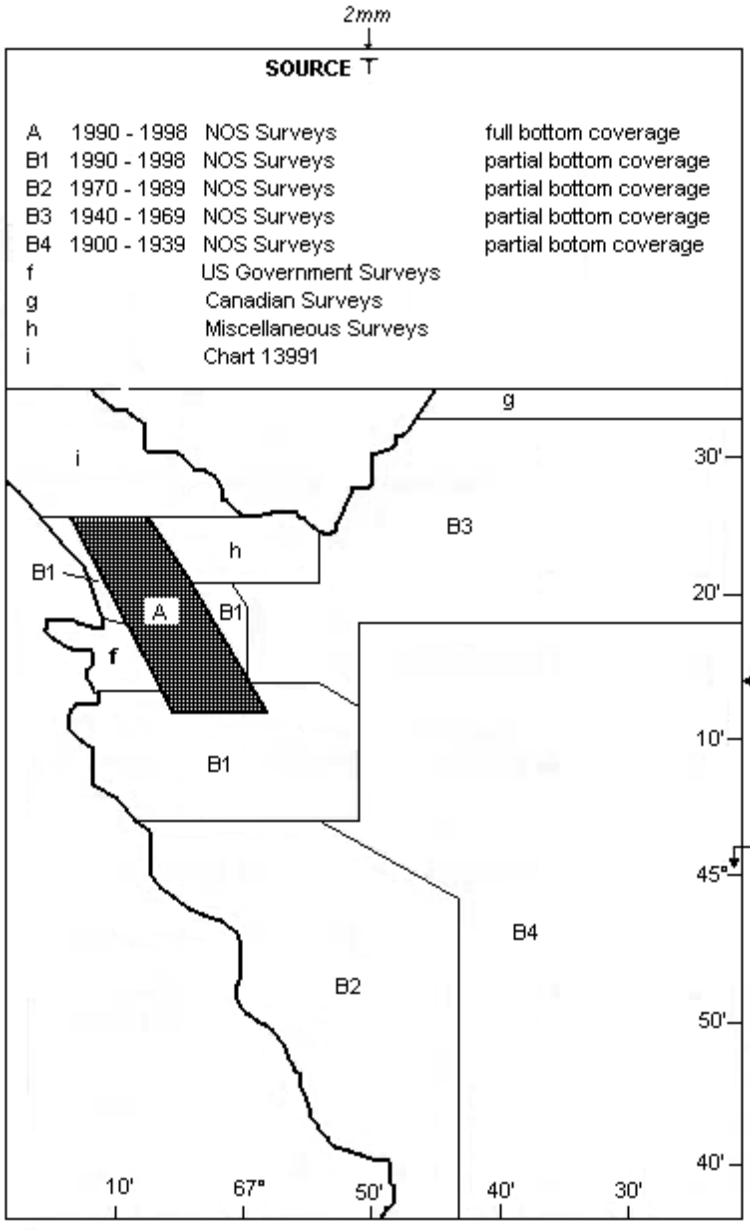
Source diagrams, as used on NOS nautical charts, consist of a graphic delineating the limits of the most recently available hydrographic survey information that has been evaluated for chart application, and the associated textual information. MCD uses two types of source diagrams for charts. Traditional source diagrams (section 4.2.7.1) shall be used on charts that do not fall under the New and Reconstructed Chart policy. Charts that fall under New and Reconstructed Charts shall use the Zone of Confidence (ZOC) diagrams as outlined in section 4.2.7.2

Source diagrams shall be added to all charts 1:500,000 scale and larger unless specifically excluded by the Chief, MCD. Source diagrams shall be revised as subsequent hydrographic source documents are evaluated.

4.2.6.1 Source Diagrams on Existing Charts

The "Authorities" note shall not be used in lieu of a source diagram. Graphic and textual specifications for source diagrams are detailed in the following paragraphs. A typical source diagram is shown in Figure 4-1.

SOURCE DIAGRAM



Outside Border Dimensions 75mm x 110mm
(for chart with neatlines 750mm x 1100mm)

Figure 4-1

An area updated by SDB shall be outlined in a paper/raster chart source diagram. The source date of the imagery shall be shown in the source diagram, not the date of the compilation. The source shall be listed as “Satellite Imagery”.

The note reference on the chart and in the corresponding source diagram shall reference the next available note letter.

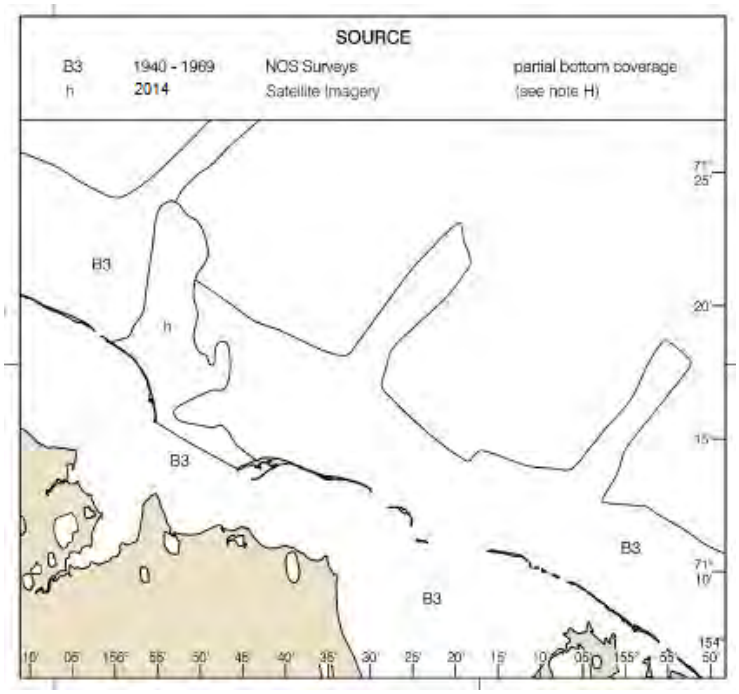


Figure 4-2

a. Specifications of Graphics

The overall linear dimensions of the graphic shall be one-tenth of the chart's neatline dimensions. A 0.2 mm black outline shall be used for the diagram's border. The normal coastline (0.2 mm, black) shall be shown within the diagram with all land areas tinted gold. The survey area limits shall be shown by a solid black 0.15 mm line. Identifying letters or references shall be placed in the approximate center of the survey area in 7 pt. Swiss Light.

A screened 25 percent blue tint fill shall be used to identify areas of 100 percent bottom coverage. All other water areas shall be white.

Survey limits shall not be delineated in areas where hydrography is not charted. The limits of large scale charts may be delineated and survey limits omitted within the larger scale chart outlines, in source diagrams shown on charts smaller than 1:100,000 scale. An alpha identifier, in 7 pt. Swiss Light, shall be placed in the approximate center of each outlined larger scale chart. The outline of large scale charts may be used only in congested areas in source diagrams for charts at 1:100,000 scale and larger. The limits of surveys conducted by USACE in maintained channel shall not be included in source diagrams. USACE surveys covering large areas shall be delineated.

The minimum sized feature on a ZOC diagram shall be the size of a 0.3MM circle.. A leader shall be used to connect an alpha identifier with the corresponding minimum size outline.

Projection ticks 2.0 mm in length, 0.15 mm line weight, shall be shown along the inside border and labeled in 6 pt. Swiss Light. The intervals of these ticks shall be such that each projection line on the base chart is represented by a tick on the diagram. Preferred placement of the ticks and labels is along the east and south limits of the diagram. Shoreline and survey limit lines shall be broken for labels and ticks. The projection value labels on the base chart shall be used as a guide for labeling the ticks on the source diagram. For example, if the label on the base chart included degrees and minutes then degrees and minutes shall be used on the diagram (see Figure 4-1).

For charts with insets or extensions: the inset shall be shown in the diagram if it is of substantially larger scale (at least four times larger than the base chart) and the area is covered by more than two surveys. If the area within the inset is covered by one or two surveys only, the diagram for the base chart is sufficient. Extensions shall always be shown in the diagram. The inset or extension limits shall be shown by a 0.2 mm line similar to the diagram border. Procedures for adding graduation ticks and values to insets and extensions are the same as for the base diagram.

b. Specifications of Text

Textual information for source diagrams shall be arranged in tabular form in an area directly above the graphic, under the heading "SOURCE" and outlined by the same 0.2 mm border as the graphic. The heading shall be in 8 pt. Swiss Regular type. All other text shall be in 7 pt. Swiss Light. The height of the bordered text area is variable depending on the number of references but shall extend at least 2.0 mm above the heading.

The minimum width of this tabulation shall be equal to the width of the graphic. In some cases, it may be necessary for the width of the tabulation to exceed the width of the graphic. The tabulation shall print against a white background.

Tabulated text shall include the date band identifier, origin, and whether the bottom coverage is full or partial for each survey or group of surveys referenced to one alpha or alphanumeric identifier. Adjacent surveys, regardless of scale, collected within the same time bands and with the same type of coverage, shall be grouped under one identifier.

Surveys shall be identified according to the following classification scheme:

A. 1990 to the present (where full bottom coverage was achieved). These surveys used side scan sonar or multibeam technology and differential GPS positioning.

B1. 1990 to the present (where partial bottom coverage was achieved). These areas were surveyed using single beam echo sounder technology and may utilize differential GPS positioning.

B2. 1970 to 1989. Partial bottom coverage was achieved using single beam echo sounder technology and primarily electronic positioning.

B3. 1940 to 1969. Partial bottom coverage was achieved using single beam echo sounder technology and primarily visual positioning.

B4. 1900 to 1939. Partial bottom coverage was achieved using primarily lead line technology and visual positioning.

B5. Pre-1900. Partial bottom coverage was achieved using primarily lead line technology and visual positioning.

Actual dates of surveys shall not be used. For example, if surveys used to compile the hydrography on a particular chart were conducted in 1946, 1955, 1956, 1971, and 1976, they could be grouped under two alphanumeric identifiers. One identifier, B2, would label the area covered by the 1971 and 1976 surveys and be referenced in the textual information using the dates 1970-1989. Another identifier, B3, would label the area covered by the 1946, 1955, and 1956 surveys and would be referenced in the textual information using the dates 1940-1969. Surveys from different time bands shall not be grouped together.

If a survey was conducted in more than 1 year and those years transcend time bands, the time band that would apply to the most recent work shall be used.

For time bands dated from 1990, the date of the most recent survey in that category shall be used as the ending date for that time band. For example, if the most recent survey providing full bottom coverage on a particular chart was conducted in 1997, the resulting time band in the tabulated text shall read,1990-1997.

When a time band dated from 1990 is used, the ending date of that time band shall not be advanced with each new edition. If a new edition is produced in the year 2000, and the latest survey providing full bottom coverage is still 1997, the ending date of that time band shall remain 1997.

The ending date of a time band dated from 1990 shall change when more recent hydrographic source is applied to the chart.

The type of coverage for each survey or group of surveys shall be identified in the textual source tabulation according to the following terminology: "full bottom coverage" for surveys that utilized side scan sonar or multibeam throughout the entire survey or "partial bottom coverage" for surveys that utilized single beam echo sounder or lead line. A survey that utilized a single beam echo sounder with side scan sonar within a limited area shall be listed as having partial bottom coverage. Surveys with full bottom coverage shall not be grouped with surveys achieving partial bottom coverage.

A category for miscellaneous surveys may have to be included to cover areas where surveys are too numerous to identifying or to cover areas that would otherwise not be covered. Such areas shall be identified "Miscellaneous Surveys" and the dates shall be omitted. Dates shall also be omitted from references to large-scale charts.

The term "U.S. Government Surveys" shall be used to refer to government sources other than NOS. This term shall include USACE surveys of large areas. Dates and type of bottom coverage shall be omitted from references to these surveys.

Surveys conducted by foreign governments shall be listed separately from U.S. sources. Dates and types of bottom coverage shall be omitted from references to foreign surveys.

Surveys detailing full bottom coverage shall be listed first. All other NOS surveys shall follow, listed chronologically, with the most recent first. References to larger scale charts should appear last.

The following note shall be added to all charts displaying a source diagram.

SOURCE DIAGRAM

The outlined areas represent the limits of the most recent hydrographic survey information that has been evaluated for charting. Surveys have been banded in this diagram by date and type of survey. Channels maintained by the U.S. Army Corps of Engineers are periodically resurveyed and are not shown on this diagram. Refer to Chapter 1, United States Coast Pilot.

The note shall print in black and in 7 pt. Swiss Light. Placement of the note shall be in the following order:

1. Directly above the diagram.
2. Directly below the diagram.
3. Any other location in close proximately to the diagram.

4.2.6.2 ZOC Diagrams for New and Reconstructed Charts

For New and Reconstructed Charts MCD uses to Zone of Confidence (ZOC) diagrams that enable mariners to assess the quality of the hydrographic data from which the chart was compiled in a similar yet slightly different fashion.

The use of ZOC diagrams provide consistency in the display of source data between digital and paper charts, as the Category of Zones of Confidence (CATZOC) definitions are derived directly from S-57. The responsibility of assigning the ZOC value resides in HSD.

The quality of the hydrographic source data is assessed according to six categories: five quality categories for assessed data (A1, A2, B, C and D) and a sixth category (U) for data which has not been assessed. If none of the hydrographic sources used on a chart have been assessed, a ZOC diagram indicating only 'U' values should not be added to the chart, as it would not include any information of use to the mariner.

The assessment of hydrographic data quality and classification into zones is based on a combination of:

- Date of Surveys
- Position accuracy,
- Depth accuracy, and
- Sea floor coverage (certainty of significant feature detection).

Where a charted survey is supplemented by occasional soundings from a less accurate source, only the main survey should normally be categorized.

The higher ZOC categories, A1 and A2, demand full sea floor ensonification or sweep and require very high accuracy standards which have only been achievable with the technology available since about 1980. Therefore many sea lanes which have been regarded as adequately surveyed may carry a ZOC B classification. Modern surveys of critical areas can be expected to carry ZOC A2 classification while ZOC A1 will cover only those areas surveyed under exceptionally stringent conditions for very special reasons.

Additional categories to those listed in S-57 may be added to ZOC diagrams for paper charts, e.g.:

Maintained Depth (abbreviation MD) and **Dredged Area** (abbreviation DA). Such areas often do not accurately indicate actual depths, but do indicate minimum depths at the time of dredging.

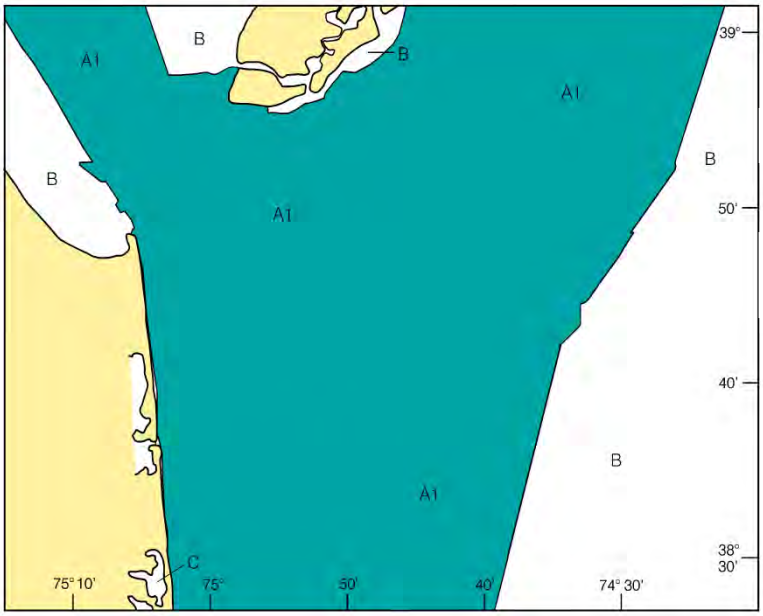
Unsurveyed (abbreviation UNS): this should be evident from the face of the chart, but may also be indicated on the ZOC Diagram. **The date of a survey may be important,** particularly in areas of mobile or unstable sea floor. The survey date may be inserted in parentheses against the ZOC value on the face of the diagram. To avoid too complex a diagram, dates of surveys may be grouped; or a suitable note added to the relevant portion of the chart, rather than complicating the diagram.

After disaster surveys. As a result of some disasters, such as: earthquakes, tsunamis, hurricanes, it is possible that large areas of seafloor have moved and/or become cluttered with dangerous obstructions. Emergency surveys may be conducted to cover essential shipping routes and inside harbors. Outside these surveyed areas, much of the existing charted detail may then be considered suspect, however good the previous surveys may have been. Depending on the circumstances, MCD in consultation with MCD may opt to degrade the CATZOC value until the area can be resurveyed.

If additional emphasis is required for after disaster surveys, the newly surveyed area may be highlighted on the Source or ZOC diagram with tint. The tint should be grey but may be another color except green, blue or magenta. On ZOC diagrams, the areas of bathymetry outside the re-surveyed area must be reclassified; usually category ‘D’ will be appropriate, as large depth anomalies and new obstructions may now be expected.

The "Authorities" note shall not be used in lieu of a ZOC diagram. Graphic and textual specifications for source diagrams are detailed in the following paragraphs. A typical ZOC diagram and table is shown in Figure 4-3.

ZOC DIAGRAM



Border lineweight – 0.2mm

Projection Tick 0.15mm line, 2mm long

Outside Border Dimensions 78.8 x 797.7mm
(for chart with neatlines 797.7mm x 996.1mm)

ZOC TABLE

ZOC CATEGORIES (Refer to Chapter 1, United States Coast Pilot)				
ZOC	DATE	POSITION ACCURACY	DEPTH ACCURACY	SEAFLOOR COVERAGE
A1	2010 - 2015	± 16.40ft	= 1.64ft + 1%d	All significant seafloor features detected.
A2	2007 - 2011	± 65.62ft	= 3.28ft + 2%d	All significant seafloor features detected.
B	1953 - 1998	± 164.04ft	= 3.28ft + 2%d	Uncharted features hazardous to surface navigation are not expected but may exist.
C	1921-1922	± 1640.42ft	= 6.56ft + 2%d	Depth anomalies may be expected.
D	1899-1901	Worse than ZOC C	Worse than ZOC C	Large depth anomalies may be expected.
U	Unassessed - The quality of the bathymetric data has yet to be assessed.			

Figure 4-3

a. Specifications of Graphics

The overall linear dimensions of the graphic shall be one-tenth of the chart's neatline dimensions. A 0.2 mm black outline shall be used for the diagram's border. The normal coastline (0.2 mm, black) shall be shown within the diagram with all land areas tinted gold. The survey area limits

shall be shown by a solid black 0.15 mm line. Identifying letters or references shall be placed in the approximate center of the survey area in 7 pt. Swiss Light.

A screened 25 percent blue tint fill shall be used to identify areas of 100 percent bottom coverage. All other water areas shall be white.

Survey limits shall not be delineated in areas where hydrography is not charted. The limits of large scale charts may be delineated and survey limits omitted within the larger scale chart outlines, in source diagrams shown on charts smaller than 1:100, 000 scale. An alpha identifier, in 7 pt. Swiss Light, shall be placed in the approximate center of each outlined larger scale chart. The outline of large scale charts may be used only in congested areas in source diagrams for charts at 1:100,000 scale and larger. The limits of surveys conducted by USACE in maintained channel shall not be included in ZOC diagrams. USACE surveys covering large areas shall be delineated.

The minimum sized feature on a ZOC diagram shall be the size of a 0.3MM circle. A leader shall be used to connect an alpha identifier with the corresponding minimum size outline.

Projection ticks 2.0 mm in length, 0.15 mm line weight, shall be shown along the inside border and labeled in 6 pt. Swiss Light. The intervals of these ticks shall be such that each projection line on the base chart is represented by a tick on the diagram. Preferred placement of the ticks and labels is along the east and south limits of the diagram. Shoreline and survey limit lines shall be broken for labels and ticks. The projection value labels on the base chart shall be used as a guide for labeling the ticks on the ZOC diagram. For example, if the label on the base chart included degrees and minutes then degrees and minutes shall be used on the diagram (see Figure 4-1).

For charts with insets or extensions: the inset shall be shown in the diagram if it is of substantially larger scale (at least four times larger than the base chart) and the area is covered by more than two surveys. If the area within the inset is covered by one or two surveys only, the diagram for the base chart is sufficient. Extensions shall always be shown in the diagram. The inset or extension limits shall be shown by a 0.2 mm line similar to the diagram border. Procedures for adding graduation ticks and values to insets and extensions are the same as for the base diagram.

b. Specifications of Text

Textual information for ZOC diagrams shall be arranged in tabular form and placed below the graphic as shown in Figure 4-3 The table is outlined by the same 0.2 mm border as the graphic. The heading shall be in 7 pt. Neue Helvetica type. All other text shall be in 6 pt. Neue Helvetica.

Due to limited space it may be necessary to eliminate some of the fields in the table. If that is the case then the cartographer may eliminate the column for Position Accuracy. If space is still limited then the column for Depth Accuracy may be eliminated.

4.3 Soundings

The soundings and related depth curves (see Section 4.4) are the most important information charted. Soundings and depth curves must be selected to portray the character of the bottom clearly and accurately, as well as to correctly reflect the adequacy (density) of the source. Even very deep soundings and curves must be charted since areas of charts lacking hydrographic information will suggest nonexistent, sparse, or inadequate data. Depth information must be shown for the entire chart, if available; it should not be limited to channels or passages.

Shoal areas are important because they represent navigational hazards. But deepwater submarine relief is also important to the navigator in determining a vessel's location. The more faithfully the chart depicts this relief, the more effectively the navigator can relate depth readings obtained by the depth sounder to the chart, and the more certain the navigator will be of the vessel's location. Depth soundings also depict natural channels between shoal areas and into harbors and anchorages. See Section 4.6 for the charting of soundings in improved channels.

NOS hydrographic surveys of the east coast and Puerto Rico begun after October 23, 1980, use MLLW as the sounding datum rather than MLW) as in the past. Because the differences between MLLW and the chart datum (MLW) are minor, surveys can be fully applied without making any adjustments in the soundings, shoreline, low water line, or clearance heights.

4.3.1 Bottom Features

An accurate depiction of bottom features is the primary function of soundings and depth curves on charts. The following features should be charted so as to be easily recognized by chart users.

1. Shallow Areas

Shallow areas are large expanses of shoals or of shallow water where the changes in depth are relatively slight. Some bays fed by river systems are shallow throughout.

2. Shoals and Banks

Shoals are shallows that constitute offshore hazards to navigation. They are defined as having a depth of ten fathoms or less and may be composed of any material except rock or coral. A shoal may be an isolated feature or part of a shoal area composed of two or more shoals. A bank is an area of relatively shallow water which is, however, of sufficient depth for safe navigation. Bars are ridges of sand or gravel, often at the mouth of a river, which may obstruct navigation. Note that shallow areas of rock and coral are charted as ledges and reefs and labeled, rather than being delineated solely by depth indicators.

3. Irregular Bottoms

Irregular bottom areas may consist of shoals, shallows, passages, deeps, etc., and are characterized by relatively large abrupt depth differences throughout the region.

4. Smooth Bottoms

Smooth bottom areas are expanses where variations in depth are gradual and are relatively small compared to the size and depth of the area as a whole.

Smooth areas in relatively deep water are the least important feature shown on charts. Generally, they pose no navigational hazard. They are depicted to provide "bottom detail" to navigators, rather than to enhance boaters "safety".

5. Navigable Channels and Passages

A channel or passage is a relatively deeper navigable route through an otherwise shallow area. Natural channels or passages are important features which contribute to the navigational value of a chart.

Natural channels may constitute routes from deep water into shore or harbor areas, or routes between deepwater areas through shoals or bordering shallow areas.

In general, all natural channels are charted using both soundings and depth contours. When the chart scale is too small to illustrate all the channels shown on the survey, the most important routes shall be retained at the expense of the less important or more restrictive alternate routes.

6. Deeps

Deeps are local deformations in the bottom configuration characterized by a significant increase in depth when compared to the surrounding areas.

The boundary of a deep is the zone which separates the deep area from the surrounding shallower water. The size of the zone depends on how well the deep can be distinguished from the surrounding area. Criteria similar to those for shoals can be used to establish the boundary zone.

Deeps do not constitute the same navigational hazards as shoals. Nevertheless, deeps must be charted to aid mariners in determining a vessel's position (by comparing a line of soundings from a depth recorder with the depths on the chart) and, in shallower areas, for purposes of anchoring, swimming, and landing. Representative deeps must also be shown to indicate the character of the bottom.

4.3.2 Selection and Spacing of Soundings

The density of soundings shown on the chart is usually considerably reduced from that shown on the sources. The selection process must ensure that the overall presentation of depth data is accurate, complete, and will be quickly and easily understood by mariners (see Figure 4-2).

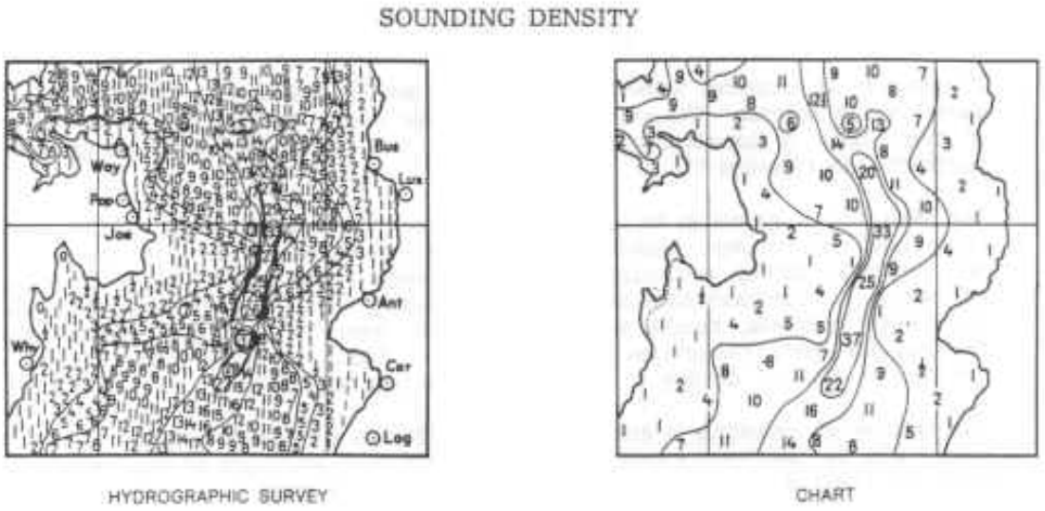


Figure 4-2

The selection of soundings to be shown on a chart is one of the most critical aspects of nautical cartography. Maintaining a balance between clear and safe interpretation and complete survey presentation is a challenge for even the most experienced cartographer. Emphasis must be placed on selecting a sufficient density of soundings for natural channels, shoals, or other hazardous areas to adequately highlight these features for quick recognition by the mariner. Additional supportive soundings are selected at a lesser density to complete the bottom description.

The spacing of soundings is also significant. Whereas fill soundings (over flat bottom areas) will be relatively widely spaced, the density of soundings in shoal areas helps draw the chart users attention to potentially dangerous areas.

Bottom contouring and feature identification are necessary predecessors to sounding selection. The order in which soundings are selected from sources depends upon the bottom features of the area being charted and their relative significance to the overall bottom shape. As a rule, selection

of soundings should begin with shoal areas and natural navigational channels and work toward deeper water.

The selection of soundings must accomplish the following:

1. All shoal areas that might impede surface navigation must be identified.

2. Information about natural channels between or through shoal or hazardous areas must be provided.

3. The configuration of the bottom must be graphically portrayed.

Note, on all compilation drawings, Figures denoting soundings shall be of uniform size (not larger than 2 mm or smaller than 1.5 mm).

1. Least Depths

Least depth soundings over features which are delineated by depth curves (such as pinnacles, domes, or ridges) should always be identified first because they often are associated with hazardous shoal areas. They also prove valuable in identifying navigable passages. When selecting least depth soundings, cartographers should keep in mind that the primary function of a nautical chart is to provide safe navigation.

A least depth sounding must be selected for each shoal feature charted. When more than one shoal feature exists in an area, selection of soundings begins with the shoalest feature in the area. When two adjacent features are at about the same depth, the selection of soundings should begin with the one that is most critical, that has the greatest depth differential, or is nearest the most prominent navigation route. This procedure of selecting features based on their relative importance prevents conflicts from occurring later between the various supportive soundings which may exist outside the depth curve.

When applying hydrography from larger to progressively smaller scales, a series of shoals may have to be generalized into a single shoal feature. When this is necessary the shoalest sounding from the group shall be selected to represent the least depth over the generalized shoal.

The least depth for a natural channel (also termed "controlling depth") must also be charted. This provides information about the minimum limiting depth in an approach or channel. Every natural channel has at least one controlling sounding which identifies the minimum depth of the channel. Careful selection of this sounding is extremely important in providing for safe navigation.

2. Critical Soundings

Within each isolated feature bound by a depth curve, the shoalest seaward sounding must be selected. This sounding is, by definition, a critical sounding, and therefore, must be selected even if it is a sounding with the same value as the curve. Critical soundings represent least depths in proximity to known or potential navigational routes. Such soundings are normally considerably shallower than their surrounding depths. Note that while a critical sounding is almost always a least depth, a least depth is not always a critical sounding; the soundings location is also an important factor.

A chart user should be able to assume that the water depth between two adjoining critical soundings is no less than the lesser of those two soundings. To satisfy this requirement, many closely spaced and equivalent critical soundings may have to be selected in shoal areas if the chart scale permits. Critical soundings may be spaced very close together to increase the amount of detail presented to the chart user; however, they shall not be closer than about 6 mm.

3. Deep Soundings

Deeps, like shoals, are local deformations in the bottom shape. Deeps are significantly deeper than the surrounding area and must be represented by at least one sounding that shows its maximum depth.

Soundings which are approximately 10 to 20 percent deeper than their surroundings are considered important soundings and will usually be selected by cartographers. However, a deep sounding shall not normally take precedence over an adjacent critical shoal sounding.

The boundary of a deep may be considered to be the deepest regular curve that encloses the area, thus separating it from the surrounding area. Defining this boundary will assist the cartographer in selecting soundings to describe the bottom.

4. Supportive Soundings

Supportive soundings (sometimes termed "developmental soundings," but not to be confused with "fill soundings") supply additional information to the user about the shape of the bottom. They are also used to provide periodic identifiers for depth curves and to show changes in bottom slope away from shoals or deeps.

The most important function of supportive soundings is to provide depth information for navigation between shoals, islands, and other obstructions. They are also used to provide information about the shape and size of shoals and the slope of the bottom. They are also valuable in determining a vessel's position by the "line of soundings" method. Since more soundings are required to provide this type of detail on slopes than in flat areas, the increased density of soundings also serves to draw the chart user's attention to the shoal. Therefore, supportive soundings have two purposes with respect to shoals – they alert the chart user to the shoal and provide information about the shoal.

Supportive soundings for shoal areas are selected after least depths and critical soundings have been selected and then by working toward the boundary zone of the shallow area in a series of steps largely determined by the number of intermediate depth curves that enclose or limit the area. Selection starts within the closed depth curve around a least depth sounding. Generally, if the enclosed area is small and smooth (i.e., the distance from the shoalest sounding to any point on the depth curve is less than 10 mm), no supportive soundings are required. If the area can accommodate additional soundings without sacrificing clarity then those soundings which convey bottom shape and changes not captured by the depth curves should be considered for selection. Inside the depth curve, supportive soundings should be selected around the critical sounding to show the sloping characteristics and to help define the depth curve.

Supportive soundings are also used to portray significant deep areas. Deep soundings which are selected, but not enclosed by a depth curve, should be surrounded by a ring of irregularly spaced supportive soundings. Usually, support soundings selected around deeps are separated by greater spacing than for support soundings selected around a comparably sized shoal. Without this ring, a chart user could easily misread the depth of the water between a critical deep and a nearby fill sounding. Depth curves around very small isolated deeps are usually not charted unless to do so would serve a specific purpose. When a depth curve is drawn, the first sounding selected is the deepest. If the chart scale permits, supportive soundings are selected to describe the deep in greater detail, helping to show the character of the bottom.

Important bottom structures not captured by least depth and critical soundings will help determine the placement of supportive soundings. In general, supportive soundings should be at least 10 mm apart when critical soundings are not present.

Supportive soundings also portray the detailed structure of natural channels. When scale permits, these should be selected in a pattern with enough density to illustrate the recommended channel route by delineating both the width and the depth of the navigable portion. Water depths between adjacent selected supportive soundings must be the least depth in the immediate area which they represent.

Depth curve anomalies, such as relatively long but narrow departures into shallower water from a depth curve's normal gentle curve, are given credibility by the inclusion of supportive soundings along and near the end of the extension, as chart space permits. Long, sinuous, deep depth curve anomalies which are too narrow to include a sounding are sometimes eliminated in favor of chart simplicity, although it is preferable to show them.

Soundings adjacent to depth curves are often considered fill soundings, but they are really supportive soundings. These soundings imply the value of the depth curve. This is important since a depth curve's label may be some distance from the area of interest to a chart user. Also, depth curves which enclose small areas are generally not labeled. Thus this use of supportive soundings eliminates the necessity of labeling every curve frequently and thereby simplifies the chart.

Where possible, supportive soundings should not be chosen at the same depth as a charted depth curve (shallow side) or one unit (foot or fathom) greater than the curve value (deep side) since these soundings present little additional information from what the curve itself presents. For example, an 18- or 19-foot sounding near the 18-foot depth curve is almost superfluous; however, a 15-foot sounding near the curve would be unexpected and therefore should be selected in place of a nearby 18-foot sounding. Note that as the scale of the chart becomes smaller, it becomes easier to select supportive soundings at different depths than the depth curve. The spacing between two supportive soundings or between a supportive and a fill sounding is somewhat less than the typical separation between fill soundings. Spacing between supportive soundings should be between 40 and 100 percent of the spacing between fill soundings, with the distance depending on the relative importance of the supportive sounding. (The greater the difference in depth between the sounding and the depth curve, the more important the sounding.)

Supportive soundings are generally used to provide additional information to the chart user about critical soundings or to indicate the value of depth curves. Supportive soundings are usually selected to form a ring around a critical sounding. As the depth differential between the critical sounding and these adjacent soundings increases, the spacing between the critical sounding and the surrounding supportive soundings decrease. Because this spacing is less than for fill soundings, supportive soundings provide a more detailed representation of bottom features. In addition, this decrease in spacing (hence, increase in the density of soundings) helps draw the user's attention to potentially dangerous areas.

Closely spaced supportive soundings outside the depth curve of an isolated shoal are used to indicate the slope of the sea bottom near the shoal. The density of these soundings is also used to increase the visibility of a small but dangerous shoal.

5. Fill Soundings

Fill soundings are used to portray smooth bottoms areas or deep areas between shoals that are not adequately defined by supportive soundings. Normally, fill soundings provide information about large, gradually sloping depressions that are not deep enough to be enclosed by a depth curve. Ideally fill soundings radiate away from the deep sounding.

Fill soundings are used to complete the portrayal of bottom shape. They reflect the water depth in the neighborhood of the supportive sounding. When compared with nearby soundings, they indicate the general slope of the area. It is desirable to select a symmetric pattern of fill soundings in areas separated by depth curves. However, this is not absolutely necessary nor always possible.

For large, relatively flat areas, no sounding is unique and all of the selected soundings will be of this type. The spacing between selected soundings should be constant to reflect the smooth character of the bottom. The pattern of selected soundings should smoothly blend with the selection pattern in neighboring regions; however, the spacing should be somewhat greater than in more irregular

areas. This increase in spacing should occur gradually in the transition region between flat areas and the less flat areas of the chart. Fill soundings generally are from 15 mm to 30 mm apart.

Depth curves and fill soundings are used to depict the general trend of the ocean bottom, whereas critical and supportive soundings are selected to indicate departures from the trend. Thus they are usually placed closer together than fill soundings.

6. Channel Range Soundings

When a range is charted to show the centerline of a channel, a line of soundings shall be selected on the range. This policy shall not apply to dredged channels where depths are stated by tabulation or note (see Section 4.6).

7. Nonjunction Soundings

When the application of a recent survey to a chart reveals conditions so changed that a satisfactory junction cannot be made with the hydrography of former surveys, a blank band of approximately 5 mm shall be left beyond the limits of the more recent survey and a note added such as "Hydrography to (eastward) from surveys of 1934." Care should be taken that no critical data from the earlier surveys are deleted by the blank band.

8. Changeable Areas

All hydrographic detail, including soundings and floating aids, may be omitted from areas known to undergo continual and rapid change, such ocean inlets and openings between barrier islands. If charting this information would present a false (hence unsafe) picture because of its changeability, the area shall be tinted blue No. 1 and an explanatory note shall be charted.

9. Soundings Omitted Within Groups of Rocks or Coral Heads

On small-scale charts, soundings within a group of rocks or coral heads through which there is no apparent channel should be omitted.

10. Soundings in Slips and Around Piers

Soundings in docks, slips, and around piers should be shown where space allows. The cartographer should select soundings far enough off piers to provide depths at the keel lines of vessels which use these piers. A dated depth legend, if available, may be shown in lieu of hydrography if space allows and a survey is not available.

11. Depths Over Rocks

A sounding over an isolated rock shall have the label "*Rk*" placed next to it.

12. No-Bottom Soundings (I 13)

When no bottom is found, the measured depth shall be shown under a bar with a small dot over it, but this type of fill sounding shall be avoided whenever possible.

13. River Depths

The shoreline shall be broken for soundings such as for narrow rivers where the sounding units would touch the shoreline because of the size of the feature at chart scale. When applying hydrography in navigable tributaries, the cartographer must select soundings that indicate controlling depths in conjunction with those that portray the best navigable channel. Along narrow streams, the controlling depths as stated in USACE reports should be shown.

Where feature size or chart scale does not allow for the representation of both controlling depths and channel depths, the controlling depths shall take precedence. Depth legends shall be added to identify small navigable tributaries when the cartographer determines that depth representation by soundings will not adequately describe the feature at chart scale (Ic). When adding a legend, the controlling depth for the entire feature must be used. When the depth information is questionable, the term "Reported" shall be added to the legend, e.g., *7 feet reported 1999.* These legends shall be in slant type.

When necessary, notes may be used in conjunction with charted hydrography to describe navigable tributaries. Notes shall include only the controlling depth.

CLEARWATER BEACH

The controlling depth was 5 feet for a mid-width of 50 feet to the turning basin at Clearwater Beach and 7 feet in the turning basin.

Nov 1999, May 2000

Such notes shall be in vertical type (7 pt. Swiss Light) set 2" or 3½" wide.

4.3.2.1 Placement of Soundings
Revised on January 21, 2003 by Cartographic Order 002/03

Soundings shall be charted in their exact geographic positions. The visual center of the whole number (one or more digits) is always considered the geographic position of the charted sounding, including a whole number with a fractional component and a whole number with a subscript component. The visual center of the bar between numerator and denominator is always considered the position of the charted fractional soundings without a whole number component.

Soundings are rarely moved from their geographic positions. When it is necessary, the maximum position displacement from its exact geographic position is 1/2 the height of the charted whole number not including fractional or subscript components.

4.3.3 Sounding Conversion Tables

All sounding units on any one chart shall be expressed in the same depth unit: i.e., feet, fathoms (or fathoms and feet to 11 fathoms), or meters (with decimeters to 20.9 meters and half-meters from 21 to 30.5 meters). This policy shall apply to large-scale plans (insets) on a chart and to all of a group of plans forming a chart. The only exception to this rule shall apply to channel legends and controlling depth tabulations which may be expressed in feet on charts showing soundings in fathoms and to certain existing general charts in the Great Lakes which show feet to depths of 30 feet and fathoms in greater depths.

Note that soundings in fractional units without a whole number shall show a bar between the numerator and the denominator, e.g., $\frac{1}{2}$

Fractions preceded by a whole number shall have the bar omitted -- e . g . , $3\frac{1}{2}$

When soundings plotted on surveys must be converted to different units of measurement for charting, the following sounding conversion tables shall be used.

1. Converting Soundings to Fathoms and Feet.

Table A of Figure 4-3 shall be used when converting soundings plotted on NOS surveys in fathoms and tenths of fathoms to fathoms and feet on the chart.

On charts constructed prior to 1948, sounding units shown in fathoms were expressed in fathoms and ¼-fathoms up to 7 fathoms, then in fathoms and ½-fathoms up to 8 fathoms. Fractions were not used for depths greater than 8 fathoms except adjacent to the 10-fathom curves where, in flat bottom, 10½-fathom soundings were used to avoid displacement of the curve. When extensive hydrographic

revisions are made to these charts, the sounding units shall be changed to fathoms and feet in depths less than 11 fathoms.

2. Converting Soundings to Feet

Table B of Figure 4-3 shall be used when converting tenths of feet on surveys to half or whole feet on the chart.

Note that the use of ½-foot soundings should be avoided. Their use is permitted only when clearly useful as a controlling depth in dredged or natural channels. In this application, the decimal values of 0.28 (0.3) to (through) 0.77 (0.7) shall be shown as ½ foot.

3. Converting Soundings to Fathoms and Fractions of Fathoms

Table C of Figure 4-3 shall be used when converting tenths of fathoms on the survey to fractions of fathoms on the chart.

When soundings in whole feet or fathoms and feet or in feet and tenths of feet are to be charted in fathoms and fractions of fathoms, the feet remaining after converting into whole fathoms (6 feet equals one fathom) shall be converted to fractions of fathoms using Table D of Figure 4-3.

4. Rounding Metric Soundings

Depths charted in meters shall be shown by rounding off the surveyed soundings as follows: to meters and decimeters for depths between 0.1 and 20.9 meters, to the nearest half-meters for depths from 21 to 30.5 meters, then to whole meters for depths 31 meters and greater. The break points are .07/.08 for rounding to tenths of meters, and .77/.78 for rounding to whole meters. The decimal values .28 through .77 shall be rounded to a half-meter (.5).

Examples of these roundings follow:

To Meters and Tenths (0.1 to 20.9)	**To Half-Meters (21 to 30.5)**	**To Whole Meters (31 meters and deeper)**
15.37 = 15.3	26.27 = 26	35.77 = 35
15.38 = 15.4	26.28 = 26.5	35.78 = 36
	26.77 = 26.5	
	26.78 = 27	

SOUNDING CONVERSION TABLES

Table A: Fathom to Feet
Survey to Chart

On the Survey (Tenths of a fathom)	On the Chart (Feet)
0.1	0
0.2	1
0.3	2
0.4	2
0.5	3
0.6	3
0.7	4
0.8	5
0.9	5

Figure 4-3

Table B: Tenths of Feet to Whole and Half Feet
Survey to Chart

On the Survey (Tenths of a foot)	On the Chart (1/2-foot)	(Whole feet)
0.1	0	0
0.2	0	0
0.3	1/2	0
0.4	1/2	0
0.5	1/2	0
0.6	1/2	0
0.7	1/2	0
0.8	1	1
0.9	1	1

Table C: Tenths of Fathoms to Fractions of Fathoms

Survey to Chart

On the Survey	On the Chart		
Fathoms	1/4 fm.	1/2 fm.	Whole Fathoms
0.1	0	0	0
0.2	1/4	0	0
0.3	1/4	0	0
0.4	1/4	1/2	0
0.5	1/2	1/2	0
0.6	1/2	1/2	0
0.7	1/2	1/2	0
0.8	3/4	1/2	1
0.9	3/4	1	1

Figure 4-3

Table D: Feet and Tenths to Fractions of Fathoms

Survey to Chart

On the Survey (Feet and tenths)	On the Chart (1/4-fathoms)
0.0 to 0.9	0
1.0 to 2.4	1/4
2.5 to 4.0	1/2
4.1 to 5.4	3/4
5.5 to 5.9	1

(Feet and tenths)	(1/2-fathoms)
0.0 to 1.9	0
2.0 to 4.9	1/2
5.0 to 5.9	1

(Feet and tenths)	(Whole fathoms)
0.0 to 4.9	0
5.0 to 5.9	1

Figure 4-3

5. NGA Publications

NGA issues three publications for use in compiling NGA charts and for use in applying U.S. Navy surveys and foreign chart data to NOS charts.

1. Table No. 1

NGA policy requires that hypsography (elevations) on NGA nautical charts be changed to the metric system when derived from other sources showing units in feet. During the transition period of converting elevations from feet to meters, elevations will be charted in both systems. NGA Standard Conversion Table No. 1: U.S. Customary and International Feet to Meters and Meters to Feet (DADMS Stock No. Standcontable 01) provides standard conversions between the two systems of measurement. These tables are based on the National Bureau of Standards Miscellaneous Publication No. 286, dated May 1967.

2. Table No. 3

DMA Standard Conversion Table No. 3: Fathoms, Fathoms and Feet, Feet to Meters, Meters and Decimeters; Fractions of Fathoms to Meters and Decimeters (DADMS Stock No. Standcontable 03) is used for converting soundings to the metric system. In January 1970, NGA began compiling the depths on nautical charts in meters and decimeters. Simultaneously with this conversion of soundings to metric measurements, the assumed speed of sound in salt water used for NAVOCEANO surveys was changed from 800 fathoms (1,463 meters) per second to 820 fathoms (1,500 meters) per second. This change in the assumed speed of sound in salt water is included in the conversion of fathoms or fathoms and feet or feet to meters.

In January 1972, NGA announced its intention to discontinue the use of decimeters on U.S. Navy survey sheets and resultant charts to depths up to 21 meters. With the publication of these revised tables, NGA nautical charts compiled from U.S. Navy sources express depths in meters and halfmeters (5 decimeters) to a depth of 31 meters, and in whole meters for greater depths.

3. Table No. 4

DMA Standard Conversion Table No. 4: Fathoms and Feet to Feet to Meters and Decimeters from 0.0 to 29.9 meters; Fathoms to Meters from 30 to 9,215 meters (DADMS Stock No. Standcontable 04) provides conversion from fathoms and feet to meters and decimeters beginning with 1 foot (shown as 0.1) and continuing in 1-foot increments through 16 fathoms and 5 feet (shown as 16.5). However, the bulk of this publication serves as an aid in conversion from fathoms to meters and decimeters at 1-fathom increments from 17 fathoms (31 meters) through 5,039 fathoms (9,215 meters). In the fathom column 0.1 = 1 foot. In the meter column 0.1 = 1 decimeter.

3. USACE and Canadian Hydrographic Service

Soundings applied to NOS charts from USACE hydrographic surveys and nautical charts or hydrographic surveys of the CHS do not require the use of conversion tables with implied velocity correctors. These sources are considered to have already been corrected, unless they specifically state otherwise. The conversion tables located in the appendix should be used as needed when applying sounding units from these sources.

4.4 Depth Contours and Curves

The selection of depth contours or curves to be charted is given on the chart specification sheet compiled for each chart. Supplemental depth contours or curves not listed on the chart specification sheet shall not be charted without approval of the Chief, NSD (see Sections 4.2.2 and 4.4.3 for a list of standard and supplemental contours and curves). The selection of tint contours or curves will be based on the draft of vessels expected to use the chart and will be given on the chart specification sheet. Depth contours are screened and should not be used on charts showing depth curves, but should be used on new or reconstructed charts only.

Depth contours or curves are best used on charts to illustrate shallow areas, shoals and banks, irregular bottoms, navigable channels and passages, and deeps. Depth contours and curves are particularly useful to navigators using echo sounding apparatus.

Bottom features are more readily identified by the mariner when soundings and contours are both shown. The configuration of the bottom in areas of constant or near-constant slope is represented by depth curves. Depth curves in these areas are parallel, and the separation decreases with increasing slope. Thus closely spaced depth curves show rapidly changing depth.

Depth contours and curves are differentiated as follows:

A **depth contour** is a line connecting points of equal water depth. Depth contours represent bottom configuration at the time of the survey, subject only to generalization for clarity at smaller scales.

A **depth curve** is a line approximating points of equal water depth. It is sometimes significantly displaced outside of soundings, symbols, and other chart detail for clarity as well as generalization. Depth curves therefore represent an approximate location of the line of equal depth as related to the surveyed contour line delineated on the source.

The term “curve” is often used collectively for both depth curves and depth contours. The distinction may be important only cartographically.

ENC Bulletin. RE: Depth Contours

Within the ENC environment, there is to be no differentiation between a depth contour and a depth curve. **Depth contours and depth curves are considered to be the same object.** The only IHO/S-57 object class which is to be used when encoding those depth curves *or* depth contours to be charted on National Ocean Service ENCs is **“Depth Contour”** (IHO/S-57 object acronym: **DEPCNT)**.

ENC Bulletin. RE: Depth Areas

The *ENC Object: Depth Area (DEPARE)* is defined by the IHO/S-57 as "a water area whose depth is within a defined range of values". The most common depth area is the area falling between 2 depth contours (i.e. the area between the 6 foot depth contour and the12 foot depth contour is a *depth area with a defined range of 6 to 12 feet.* Six (6) feet is the *minimum* depth range value and twelve (12) feet is the *maximum* depth range value.) ENC depth areas may be created as area features or as linear features.

Depth Area (area)

Depth contours will typically be the nautical feature which will define the boundaries of those depth areas which are to be encoded as area objects--- the values of the depth contours will usually provide the respective ranges. However, it must be noted that *area* depth areas may also be formed from the boundaries of other ENC objects, [e.g., the zero (0) depth contour (i.e. low water line) and coastline, areas of omitted bathymetry, and the navigable portion of rivers, lakes and canals.] This ENC Bulletin and the *NOS/ENC Object Specifications* Section 4.30.12 will concentrate mainly on the formation of depth areas from depth contours. See Section 4.30.12 for a full listing of all nautical features which may form ENC depth areas.

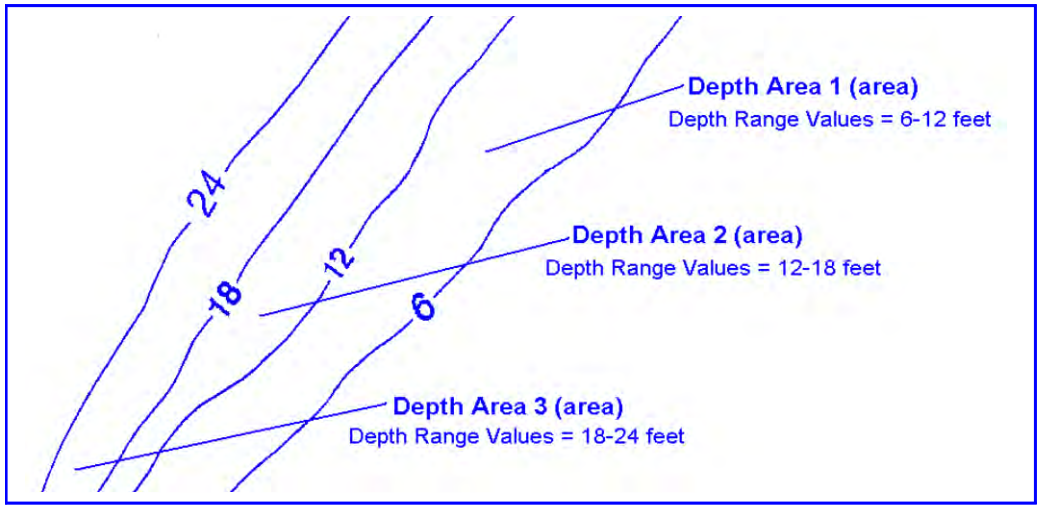


Figure 4-4a

NOTE: An Electronic Charting and Display System (ECDIS) also allows the display of depth areas which are not formed from the boundaries of any particular ENC object, but are based on a depth range entered into the system by the navigator. For example: A NOS ENC may have a its standard depth contour interval 6 ft,12 ft, 18 ft, 24 ft. An ECDIS allows a user to display an interim depth area whose depth range may fall *between* any two of the standard interval values for the ENC (e.g. the ECDIS may display a depth area whose depth range is 6 to 8 ft or 6 to 10 ft, provided that these intermediate depth areas are also encoded in the ENC).

(continued)

Group 1 (and Group 2) Area Objects:

Within the ENC environment, all *geo-feature objects belong to one of two (2) groups (i.e., Group 1 or Group 2).

All ENC area objects which belong to Group 1 are said to be the "skin of the earth" objects. That is, these objects provide total and continuous coverage of the earth and therefore **must not:**

1. intersect with themselves, or
2. overlap each other, or
3. have gaps in coverage

To not intersect with itself means that the Group 1 object must define the boundary of an area and be totally enclosed, with no overshoots or intersections of boundary lines (gaps between boundary lines also are not allowed). "To not overlap with each other" is a self explanatory term which also means that there can only be one (1) boundary line between two individual but adjoining Group 1 objects. The objects affected will have **"coincident geometry"**, representing the "sharing" of the same boundary line. To not have gaps in coverage means that all geographic areas affected by an ENC must be covered by a Group1 object.

A Depth Area (area) is a Group 1 object. A Depth Area (line) is a Group 2 object. The following list contains those ENC objects which are considered Group 1 objects:

1. Depth Area (area) (DEPARE)
2. Dredged Areas (DRGARE)
3. Floating Dock (area) (FLODOC)
4. Hulk (area) (HULKES)
5. Land Area (area) (LNDARE)
6. Pontoon (area) (PONTON)
7. Unsurveyed Area (UNSARE)

All other geo-feature objects are considered Group 2 objects.

*** A geo-feature object per the IHO/S-57 is a "feature object which carries the Descriptive characteristics of a real world entity". It is the ENC object which is synonymous to a particular nautical feature.**

(continued)

Depth Area (line)

The ranges of the 3 depth areas previously identified in Figure 4-4a portray a configuration of the ocean bottom which has a constant and even slope. However, geological forces aren't always so accommodating to the safe and prudent navigator. Although relatively little is known of the relief below the surface of the sea, (a surface which covers nearly 71 percent of the earth), enough has been discovered to indicate that the unseen topography beneath the oceans has all the characteristics of the topography above. Both have mountains extending to amazing heights above their surroundings, depressions deeper than the Grand Canyon, rolling hills, vast plains and numerous ridges. This lack of uniformity in the ocean floor results in a lack of continuity in the succession of ocean depths, that is, an area may exist, which has a configuration of constant and even slope, then, suddenly and rapidly this configuration may fall away to much greater depths.

When individual depth areas cannot be adequately portrayed at the ENC's compilation scale, this discontinuity in the succession of ocean depths may be taken into account by the creation of a depth area of the type *line.*

An ENC *linear depth area* will be created in the following situations:

1. When two or more depth contours merge to form a single contour at the scale of an ENC;
2. When depth contours (including the zero value contour) merge with the coastline;
3. When depth areas adjoin man-made constructions which are always bare at the shoreline plane of reference (SPOR) (i.e. wharves, double-line piers);

4. When depth areas adjoin non navigable waterways.

An ENC *linear depth area* will be created in the following situations **only** when discontinuity in the succession of the depth range values exists:

5. When depth areas adjoin a dredged area.
6. When dredged areas adjoin dredged areas.

The most important concept about the formation of all depth areas is that the overall succession of depth areas and their defined depth ranges **must be continuous**. There can be no overlaps or discontinuity in the depth range values of connecting depth areas.

A linear depth area is basically created to eliminate an occurrence of "discontinuity" in the succession of the *maximum* to *minimum* depth range values of adjoining Depth Area objects.

Depth Area Concepts and Terms:

The *Maximum to Minimum* Concept:
The *maximum* depth range value of one depth area **must** be the *minimum* depth range value of the next deeper and successive depth area.

The Depth Range Succession:
A *"Continuous"* Succession Example
The *depth range succession* which must **not** be "discontinuous" is the **standard depth curve interval** of the particular ENC

A "continuous" succession of maximum to minimum depth range values of an ENC having a depth curve interval of: *0 (low water), 6, 12, 18, 24* (feet) would be: *0 - 6, 6-12, 12-18*, 18-24 (feet). This "continuous" succession illustrates the required **maximum to minimum** concept mentioned above (i.e. the *maximum* depth range value of one depth area is the *minimum* depth range value of the next deeper and successive depth area).

When Does a "Discontinuous Succession" (i.e. "Discontinuity") Occur?
A "discontinuous succession" generally occurs in those situations requiring a linear depth area. (See previous page). However, to numerically identify a "discontinuous succession", a "discontinuous succession" will occur when the *maximum* depth range value of a depth area **does not equal** the *minimum* depth range value of the *deeper, succeeding* and *adjoining* depth area.

For example, assume the following:

FACT 1 -- Depth Area 1 has a depth range value of 6-12 feet
FACT 2 -- The deeper, successive and connecting depth area (Depth Area 2) has a depth range value of 18-24 feet.

A "discontinuity" has resulted in the succession of depth range values because the maximum depth range value of Depth Area 1 → 12 ft, does not equal the minimum depth range value of Depth Area 2 → 18 ft. A linear depth area having a depth range of 12-18 feet must be created along the boundary between Depth Area 1 and Depth Area 2 to eliminate the "discontinuous succession".

Several graphic examples (with the accompanying explanations) of depth area (areas) and depth area (lines), and the determination of the respective depth range values have been provided in the *NOS/ENC Object Specifications* section of this manual. See Section 4.30.12.tinuous succession".

When applying survey data to charts where the hydrography is represented by depth curves, the curves shall include within their limits all soundings of the same depth as the curve. Depth curves shall not touch the sounding figures and shall be drawn around rocks and other symbols for natural features. This policy shall not apply to New Charts or Reconstructions where the hydrograph has been recompiled and where depth contours are used.

Wherever necessary, additional depth curves shall be added to existing charts at the time of extensive hydrographic corrections. Written approval should be submitted by the Chief, NSD, identifying the approved curves. The required interval for New or Reconstructed charts is stated in the chart specification sheet prepared for each chart.

When shoreline is revised without the application of new hydrographic surveys, the depth curves may require modification to show a reasonable relationship to the new shoreline. Approximate depth curves may be used if necessary.

ENC Bulletin. RE: Shoreline Revisions and Depth Areas

When there is a revision of shoreline the *Depth Area* which was previously formed from the limits of the old shoreline and the zero (0) depth contour (i.e. low water line) must also be revised to reflect the new shoreline location. If a zero (0) depth contour is not charted, then the depth area limits previously formed from the old shoreline and the first successive depth contour must be revised.

ENC Bulletin. RE: Depth Contour Modification and Depth Areas

Whenever depth contours are modified, the corresponding *Depth Area*s which were formed from the *old* depth contour limits, must be revised to reflect the new location of the depth contours.

Not all depth contours on a source are generalized to depth curves on a chart. Only those determined by specific application, such as congestion or interference with a critical feature or sounding, are considered for generalization

.

4.4.1 Guidelines for Applying Depth Curves

1. Depiction of Bottom Features

The development of depth curves varies according to the particular bottom feature being charted. In analyzing the survey data to be represented on the chart, the cartographers should be aware of the following: Large shallow areas are generally represented by a sparsity of depth curves, while banks, bars and isolated shoals are represented by a series of closely spaced depth curve closures.

Isolated shoals are usually considered relatively dangerous navigational features. The least depth over a shoal is enclosed by the shoalest curve portraying the shoal. Shoal boundaries are defined by the deepest depth curve that is attributed to the shoal deflection and the next deeper curve. Inflection zones associated with shoals represent areas where there is a definite change in the relative density of adjacent intermediate depth curves.

Shoal areas are defined by a group of depth curve closures, one for each shoal, where scale permits. Generally, the number of closed depth curves for each shoal is less than if it were an isolated shoal, since the deeper depth curves must display the blending of one shoal into another. The boundary of a shoal area is defined by the deepest depth curve that approaches the depth of the surrounding general depths in the `area.`

ENC Bulletin. RE: Depth Area and Shoals

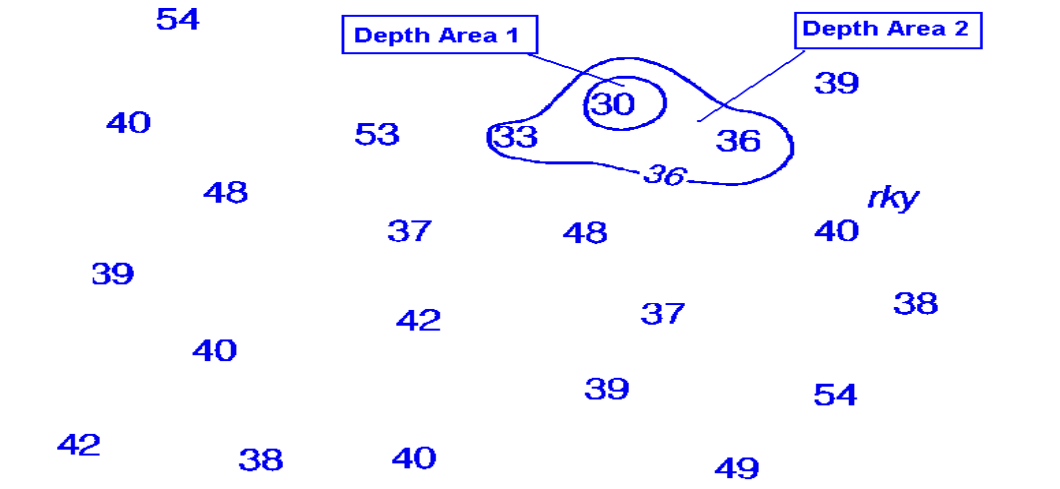


Figure 4-4b

All shoal areas which are defined by a depth contour are to be encoded as the *ENC Object: Depth Area [DEPARE (area)]*. The boundaries are also to be encoded as the *ENC Object: Depth Contour [DEPCNT (line)]*. If two or more contours are used in the portrayal of the shoal, the area within each individual contour boundary will be encoded as a separate depth area object.

Irregular bottoms consist of shoals, shallows, passages, deeps, etc and are characterized by relatively large depth differences that occur abruptly throughout the region. In areas with irregular bottoms, depth curves must be selected for each isolated shoal's least depth. Supportive soundings and depth curves are then selected to reinforce this least depth as well as to define zones between the shoals. This will aid in conveying to the chart user the large depth variations in the area.

Smooth bottom areas exist where the depth varies gradually from place to place across the area. Usually variations are relatively small compared to the size of the area and the regional depth. They are characterized by smoothly flowing and relatively widely spaced depth curves with occasional closures where shoals may exist.

Depth curves are particularly useful in showing natural channels from deep water into shore or harbor areas and routes between deepwater areas through shoals. When the chart scale is too small to illustrate all the channels shown on the survey, the most important routes shall be retained at the expense of the less important or more restrictive alternate routes.

Depth curves are usually not shown around charted isolated deeps in shallow areas unless the deep is part of a natural channel. Depth curves will usually be shown with charted deeps in deeper water. Isolated deep curves must always be supported with a sounding inside.

ENC Bulletin. RE: Depth Areas and Deeps

A depth area is also formed when a depth contour surrounds a deep sounding.

Depth curves around depressions are of little value and, in general, should be omitted, but they shall be shown when they reveal features which may have some value in navigation, or when they indicate on which side of a river the deepest water may be found (see Figure 4-5).

As illustrated in Figure 4-6, short sections of broken curves on the survey sheets should be connected if the configuration of the bottom revealed by other curves in the area being charted indicates that it would be logical.

DEPTH CURVE DEPICTION

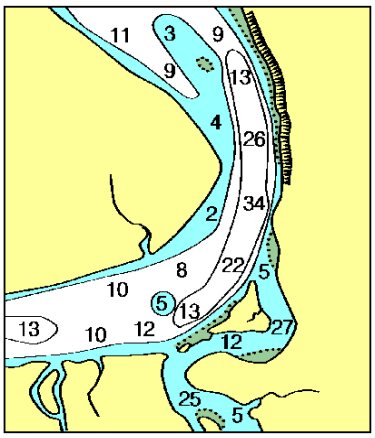
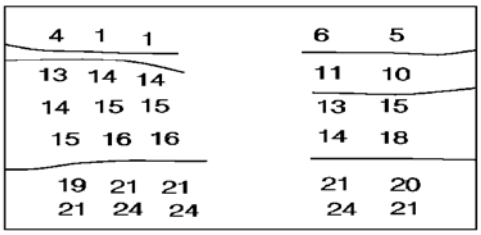
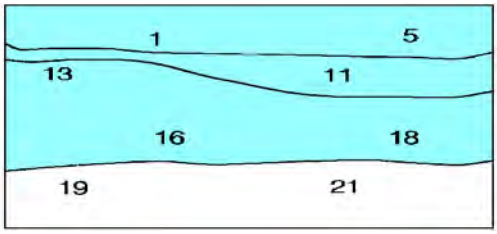


Figure 4-5

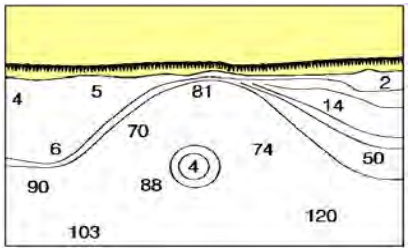


HYDROGRAPHIC SURVEY

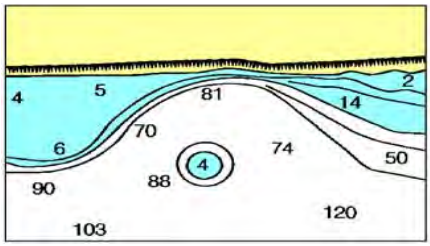


CHART

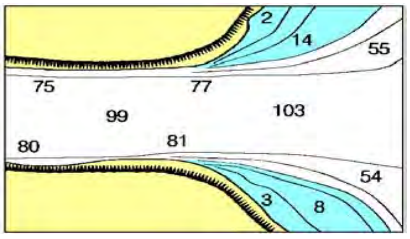
Figure 4-6



Deepest Shoalest Curves
(No Tint Involved)



Tint Curve Unbroken
(18ft. Curve)



Deepest Curve
Maximum Width Channel

Figure 4-6a

When it becomes necessary to omit some depth curves on steep slopes, the deepest curve (and the shoalest, if space permits) should be retained and the less important intermediate ones omitted. Curves must never run abruptly into each other or into the shore, but must be curved to make them parallel as is the case in nature. The curve to which the blue tint is to be shown shall be given preference over all other curves and shall be as complete as possible (see Figure 4-6a).

a. Solid vs. Screened Printing

In recent years, NOS has been using screened continuous depth contours on all New and Reconstructed charts. This permits depth contours to be taken directly from the hydrographic survey with only minor generalization. Screened depth contours are not broken for other charted detail, such as type, soundings, symbols, etc., as are depth curves.

(1) Depth Curves Printed in a Solid Line

The following guidelines for depth curves and contours can be applied regardless of chart scale:

Ideally, the charted depth curves shall follow those shown on the hydrographic survey as conditions permit.

Bottom detail that is too minute to be usefully displayed on the chart may be generalized. However, generalized depth curves must not cross areas shoaler than the depth curve value. Curves for very narrow winding features may be generalized toward the deeper side, or even terminated and closed at the origin.

Where generalization is necessary, the curve shall always be displaced toward deeper water, except where this may close or seriously reduce the width of a navigable channel. The minimum width between depth curves identifying a natural channel shall be 0.3 mm.

Two or more shoals may be merged to appear as one larger shoal if the channels or passages between them cannot be clearly depicted at the chart scale. However, care must be taken not to close off what may be a useful navigational channel.

Depth curves may be merged or deleted to avoid undue confusion in the chart presentation (e.g. on steep slopes or isolated shoals). When omitting depth curves, the shoalest, the deepest, and the tint curve (i.e. danger curve) shall be retained and the intermediate curves omitted. The blue tint danger curve shall be retained in preference to all other depth curves and shall be as complete as possible.

ENC Bulletin. RE: Merging Depth Contours

If two or more depth contours are merged, a *linear depth area* is created at the location of the merging.

A depth curve may be smoothly and slightly bent toward deeper water if the curve overprints an important selected sounding—such as where it would align with a sounding digit 1.

Depth curves must never run abruptly into each other or into the shore but must be curved to make them parallel as is the case in nature.

b. Depth Contours Screened on New and Reconstructed Charts

The following guidelines shall apply to New Charts and Reconstructions:

Depth contours shall be shown by continuous lines screened in blue or black as given in the chart specification sheet.

Depth contours may be generalized at small scales when bottom features become too minute to visualize or the lines are too sinuous to be usefully displayed.

Depth contours shall be broken only for contour labels and notes and shall overprint all other chart features, e.g. soundings, symbols, type, etc.

ENC Bulletin. RE: Depth Contours and Breakage

ENC depth contours shall never be broken for contour labels or notes during their application to an ENC. The value of the contour is entered in the attribute VALDCO (*Value of Depth Contour*).

c. Blue Depth Contours and Curves

Contours and curves are usually printed in black. On occasion, blue or a combination of blue and black may be used on the same chart. A requirement for exceptions to black contours and curves is stated in the chart specification sheet.

On New Charts and Reconstructions, where the hydrography is recompiled, depth contours shall be continuous blue or black lines, screened as required by the chart specifications.

Depth curves are symbolized by dots and dashes on those charts that have not been modernized and by continuous solid or screened black or blue lines on charts that have been modernized. Continuous lines should be substituted for dotted and dashed depth curves as the workload permits.

ENC Bulletin. RE: Depth Contour Symbolization

The IHO Special Publication 52 - *Specifications for Chart Content and Display Aspects of ECDIS* (IHO S-52) is the IHO document which contains the required color and symbol specifications for all ENC objects to be displayed on a ship's Electronic Chart Display and Information System (ECDIS). In accordance with IHO/S-52 specifications, all ENC depth contours which bound a ship's designated ENC blue tint areas are highlighted as a wide gray line. All ENC depth contours which fall in all other hydro areas will be displayed as solid black lines (if the depth contour has not been encoded as approximate).

On New or Reconstructed Charts, depth contours shall be shown with a 0.10-mm (49 percent, 200- LPI) biangle screened line as required by the chart specifications.

The screening of depth curves or contours on the chart will not include the low water line (zero value curve). The low water line will continue to be depicted by a dotted line

ENC Bulletin. RE: The Low Water Line and Symbolization

Within the ENC environment, the low water line is also considered (and encoded) as a **depth contour with a value of 0**, however it will display on an ECDIS as a **solid black line**.

4.4.2 Depth Curve Placement

Depth curves are generally drawn between the .2 and .3 foot units. This conforms to the rounding standard used to obtain whole soundings, places the depth curves on the proper side of these soundings, and allows the direct scaled transfer of depth curves and soundings from USACE hydrographic surveys to the chart compilation without major adjustment. In the case of NOS surveys, depth curves are already provided. Where depth curves need to be drawn, the guidelines presented in the NOS Hydrographic Manual shall be followed.

Sources expressed in fathoms and tenths of fathoms for use on charts in units of fathoms and feet shall be drawn at the 0.1 fathom value. This conforms to the rounding system for converting fathoms and tenths of fathoms to fathoms and feet.

4.4.2.1 Depth Contour Placement

Depth contours are drawn between the .0 and .1 foot units by definition.

4.4.3 Selection of Depth Contour and Depth Curve Intervals

The tables in Figure 4-7, Figure 4-8 and the Appendices are to be used for selecting standard depth contour and curve intervals for sounding units charted in feet, fathoms, fathoms and feet, or meters. In addition to the standard curves, a 3 foot curve is also used in some shallow water areas, such as the Florida Keys.

ENC Bulletin. RE: Depth Contour Intervals

If a raster/paper chart is the source for the encoding of depth contours, the interval of depth contour selection for ENCs is to agree with the interval currently being portrayed on that raster/paper chart which represents the largest scale coverage for the particular geographic region.

If high resolution data is the source for the encoding of ENC depth contours, the interval of depth contour selection is to agree with the interval currently being portrayed on the high resolution source document.

1. Feet and Fathoms

For depth contours or curves where the charted sounding units are feet, fathoms, or fathoms and feet, use the intervals presented in Figure 4-7.

2. Meters

For depth contours or curves where the charted sounding units are in meters or meters and decimeters, use the intervals presented in Figure 4-8.

4.4.4 Labeling of Contours/Curves

Depth contour and curve designators shall be in 6 pt. Swiss Light Italic. The contour or curve lines shall be broken for the designators with the designator centered on the line. Where depth contours or curves are screened, the designator shall also be screened.

As a general rule, designators shall be placed along the lines at 10-cm to 15-cm intervals so they will not interfere with soundings, symbols, type, compass roses, etc. In congested areas, designators may be staggered along the lines if this improves the legibility of the chart. In all cases, the shoalest curves, the deepest curves, and the tint curves must be labeled. All depth contours and curves shall be labeled in the same unit as the soundings shown on the chart.

Designators for depth contours and curves on metric charts with italic soundings shall be in 6 pt. Swiss Light type.

ENC Bulletin. RE: Depth Contours and Labeling

The value of an ENC depth contour is entered in the attribute VALDCO (Value of Depth Contour).

4.5 Shallow Water Tints

In association with depth contours and depth curves, a blue tint No. 1 (8 percent 120-LPI screen), shall be shown on the chart to emphasize shoaler water areas considered dangerous to navigation. The depth contour or depth curve selected as the boundary for the tinted area shall be determined by the chart scale, the prevailing depths available, and the draft of vessels expected to navigate within the charted area. This policy shall apply to all charted areas expected to be navigated.

Beyond the area tinted blue No. 1, a deeper contour or depth curve may be selected as the boundary of an area to be emphasized by the lighter blue tint No. 2 (3 percent 120-LPI screen). This second depth zone will expand the usefulness of the blue-tinted "danger area" to another group of chart users.

On charts where two blue tints are shown, the darker tint shall represent the shallower water. The selection of blue tints in association with depth contours or depth curves shall be stated on the chart specification sheet.

ENC Bulletin. RE: ENCs and Blue Tints

The area(s) tinted blue on a NOS raster/paper chart may not always agree with the area(s) tinted blue on its NOS ENC counterpart (i.e. when the ENC is viewed using ENC display software). The depth contours which are displayed as the boundaries of a particular ENC's blue No. 1 and/or blue No. 2, are determined by a ship's Electronic Charting and Display System (ECDIS) and the value entered (into the ECDIS) as the draft of the particular vessel. What may be considered blue water for one vessel may not be considered blue water for another. **Therefore, the blue water designation for all ENCs depends on the individual characteristics of a ship**. There is no mechanism (when compiling an ENC) by which the cartographer may indicate shoaler water through the use of blue No.1 and/or blue No. 2.

Blue tint No. 1 shall also be used to emphasize offshore features considered dangerous to navigation, generally in depths of 11 fathoms (20 meters) or less, when they are enclosed by a dotted danger line and not supported by depth contours, depth curves and/or soundings, e.g., wrecks, rocks, obstructions, foul areas, etc., that are outside of the charted blue tint curve.

ENC Bulletin. RE: Depth Areas and Wreck Areas, Rock Areas, Obstruction Areas, Foul Areas

Wrecks, rocks, obstructions and foul areas shall be encoded as their respective or synonymous ENC object **and** shall also be encoded as the *ENC Object: Depth Area area)* when these objects are to be charted as ENC area objects.

On charts where two blue tints are used in conjunction with depth contours and/or depth curves and where dangerous offshore features, e.g., shoals, submerged reefs, etc., are supported by depth contours, depth curves and soundings, the actual depth over the feature will determine which blue tint shall be shown.

The area inside the low water line (intersection of the established low water datum and the shore) shall be shown on the chart with a green tint derived by combining (trapping) gold 20 percent, 120 LPI (land tint) and blue 8 percent, 120 LPI (shoal water tint) as an overprint.

All hydrographic features, including foreshore ledges and reefs, shown on Office of Coast Survey charts that bare at the chart sounding datum shall carry a green tint derived by using this overprinting method.

4.5.1 Feature Removal From the Chart

A charted depth contour or depth curve shall not be removed until an established authority provides conclusive evidence that the contour or curve does not exist in the charted position. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit), do not have sufficient authority to declare a feature non-existent.

Specific instructions to field parties call for basic hydrographic surveys to supersede all previous surveys made by this agency in the areas covered. When applying reviewed basic surveys to the charts, all prior depth curves shall be removed. Care must be taken not to remove curves charted after the date of the survey.

ENC Bulletin. RE: Removing ENC Depth Contours

As new depth contours are revised, added to and/or deleted from an ENC from official source documents, it will be the cartographer's responsibility not only to accurately portray and encode the limits of the new/revised associated depth areas, but to also ensure that all pre-existing depth areas which are **not** currently indicated on the official source document as requiring addition or revision, are also revised as appropriate.

To be revised as appropriate refers to the modification of those depth areas which have or will have an indirect relationship to the new or revised ENC depth area(s) by the sharing of **"coincident geometry".**

DEPTH CONTOUR/CURVE INTERVALS

Feet and Fathoms

Feet	Fathoms
0	0
3	0
6	1
12	2
18	3
24	4
30	5
36	6
60	10
120	20
180	30
240	40
300	50
600	100
1,200	200
1,800	300
2,400	400
3,000	500
6,000	1,000
12,000	2,000
18,000	3,000

Figure 4-7

DEPTH CONTOUR /CURVE INTERVALS

Meters, Meters and Decimeters

Meters

0	90	1,500
2	100	2,000
5	200	2,500
10	300	3,000
20	400	3,500
30	500	4,000
40	600	4,500
50	700	5,000
60	800	5,500
70	900	6,000
80	1,000	6,500
		7,000

To convert fathoms to meters for the intervals listed above, see the table in the appendix.

Figure 4-8

4.6 Improved Channel

An improved channel is part of a body of water where the bottom has been dredged deep enough for navigation through an area not otherwise suitable. Channels represent the deepest and safest navigable passages in rivers and harbors, at harbor entrances and across bars and shoals. The location, length, width and controlling depth in channels are a primary concern to the mariner. Channels shall be charted and controlling depths indicated. The side limits of improved channels are shown on charts by dashed lines (I 22).

Federal channels are under the jurisdiction of the United States Army Corps of Engineers (USACE), and are maintained to provide an assigned controlling depth. Other channels may be under the jurisdiction of state governments, local governments or private authorities.

A controlling depth is the least depth in the channel or approach to an area, such as a port or anchorage, governing the maximum draft of vessels that can enter. Except when tabulated or noted, the controlling depth, as well as the width and date ascertained, is shown within or adjacent to the channel. Surveys, Monthly Reports, Annual Reports, and letters from the USACE are the principal sources of information for charting controlling depths in federal improved channel projects. Letters from private sources usually provide information for nonfederal improved channels. Controlling depths shall be charted in feet on nonmetric charts and in meters and decimeters on metric charts. The necessity for clear labeling of charted channels cannot be overemphasized. On charts showing soundings in fathoms, the depth unit “feet” should not be abbreviated when used for channels and associated areas.

4.6.1 Tabulations, Legends and Notes

Revised on September 12, 2003 by Cartographic Order 018/03

4.6.1.1 Tabulations

Revised July 9, 2009 by Cartographic Order 006/09 and December 8, 2014 by Cartographic Order 014/14

Charted tabulations are tables furnishing controlling depths in federally maintained channels, as well as dates of the surveys and project dimensions.

In addition to surveys, the USACE furnishes detailed information on depths in the major dredged channels in tabular form. These reports are called Reports of Channel Conditions (CCR) and contain the project dimensions, controlling depth in each quarter and the date of survey for channels 400 or more feet wide. The same information is given for channels from 100 to 399 feet wide, except the controlling depth is given for the middle half and for each outside quarter. CCR's are used to update charted channel depth tabulations and are also published in the Local and Weekly Notice to Mariners.

In general, the USACE does not submit CCR's for channels less than 100 feet in width or for channels having a project depth of less than 10 feet, except for coastal inlets and harbors of refuge. Controlling depths reported for these channels are based on at least 80 percent of the project width.

MCD shall accept and publish depths provided in USACE Reports of Channel Conditions (CCR) of federal projects. Paper or digital versions of USACE survey sounding plots shall not be used by MCD to determine controlling depths inside federal project limits when a CCR has been provided and is based on the same or subsequent surveys. When evaluation of the CCR, or the sounding plots in the absence of a report, reveals an apparent error, such as when a charted fourteen foot controlling depth is shown in the CCR as four feet, the discrepancy shall be brought to the attention of NDB. NDB shall contact the USACE to coordinate Office of Coast Survey action with USACE before revising the chart.

When a CCR is provided, any spot soundings currently charted from prior sources within the channel limits or on the channel edge shall be deleted when not addressed in the CCR.

MCD will thoroughly examine USACE surveys to determine controlling depths inside the channels when surveys are received without a CCR.

Care must be exercised when determining controlling depths from sounding plots. Simply using the shoalest depth within a dredged area can unnecessarily restrict navigation. Controlling depths should be as close as possible to the project depth for the greatest available width. Critical shoals along the edges of the channel should be described by a footnote in the tabulation. Locations of shoals should be identified using geographic positions. The location of shoals should not be

reported in footnotes using the names of aids to navigation. Footnoted shoals shall not be chart as spot soundings on the channel graphic.

Controlling depths in channel depth tabulations shall not be superseded by examinations consisting of a few sounding lines only. Controlling depths shall not be made deeper when the examination consists only of a few sounding lines, as opposed to a well developed survey.

Charted channel depth tabulations shall include the actual depths from reports or surveys, even when they exceed project depths. Project depths may be obtained from the Project Maps by USACE District, a set of publications on file in NDB. NDB shall create a source document when new or revised data affecting project dimensions is received.

USACE improved channels which are 400 feet or more in width (type 1) for their major portion should be tabulated by quarters; channels 100 feet to 399 feet wide (type 2) should be tabulated by outside quarters and middle half; and channels less than 100 feet (type 3) should be tabulated by full width. In some cases, USACE has deviated from this scheme when reporting controlling depths in CCR's. Despite this deviation, the quartering scheme used in the CCR shall be reflected on the charted channel depth tabulation. Quartering used on the largest scale ENC must be used when quartering limits have not yet been provided by the USACE. Any discrepancy between the quartering provided by the USACE in the CCR and the USACE provided channel framework shall be brought to the attention of NDB. NDB shall contact the USACE to coordinate Office of Coast Survey action with USACE.

Channel reach names, reach lengths, widths and project depths shown in the charted depth tabulation should agree with those shown in the CCR as much as possible. The goal is to avoid discrepancies between NOAA and USACE charting products. The channel reach name should be populated in the ENC. Reach names and lengths may be combined on paper/raster charts when available space on the chart is an issue. When reach names are too long, cumbersome or otherwise unacceptable for charting, cartographic discretion may be exercised on paper/raster charts to modify the reach. When reach names are modified, emphasis should be placed on making sure that cartographers and chart users can correctly associate the reach names in the USACE CCR and survey drawings, charted channel limits and the tabulation. It is also important that any revised names make sense to the cartographers for future source application. Such changes shall only be made after consultation with the Nautical Data Branch Point of Contact with USACE. This provides an opportunity for feedback to USACE that might result in a more suitable channel reach name on USACE source.

Channel reach names in ENCs shall not deviate from the CCR, since space is not an issue in the ENC.

When the magenta lines separating reaches on the chart do not agree with the reaches shown in the CCR, the reach separator lines shall be deleted from the chart and NDB shall be notified. NDB will contact the USACE to resolve the discrepancy.

4.6.1.1.1 Columbia River Main Channel Tabulations

An **EXCEPTION** to standard procedures for charting channel tabulations exists for the Columbia River. This change affects charted channel tabulations for the main channel of the Columbia River on Charts 18521, 18523, 18524, 18525, 18526 and 18531.

Due to the changeable nature of the Columbia River, from its mouth at the Pacific Ocean to the Bonneville Dam, the U. S. Army Corps of Engineers conducts frequent hydrographic surveys of the main channel. The time frame involved in the processing of this data (from the generation of analog hydrographic surveys, receipt of surveys by the Marine Chart Division, compilation of Channel Tabulations and subsequent publication in Local Notice to Mariners) may extend beyond the date of a new hydrographic survey. Because of this condition, it is difficult to consistently provide the mariner with the most up-to-date controlling depth data.

The U. S. Army Corps of Engineers, Portland District, now provides a web site of controlling depths for the main channel of the Columbia River consistent with the format of current Marine Chart Division Channel Tabulations. Controlling depths are rounded to the nearest foot. The quality accuracy and completeness of data contained on this web site resides with the U. S. Army Corps of Engineers. This web site is updated monthly and can be accessed (Note that Netscape Navigator users must use Version 7.0 or a newer version) at:

https://www.nwp.usace.army.mil/op/n/chpubs.htm#pubs-status-reports

The Marine Chart Division, in order to provide the same controlling depths for the main channel of the Columbia River, has implemented the following changes to facilitate the dissemination of this information to the mariner in a more timely manner. These specifications and procedures are applicable **ONLY** to the main channel of the Columbia River and the associated channel tabulations on charts 18521, 18523, 18524, 18525, 18526 and 18531.

General Requirements

The following changes have been made to facilitate this process:

(1) The U. S. Army Corps of Engineers web site for the main channel of the Columbia River is considered the equivalent of a U. S. Army Corps of Engineers controlling depth report. The Marine Chart Division shall accept U. S. Army Corps of Engineers controlling depth reports generated from this web site, revise designated channel tabulations and publish updated channel tabulations consistent with current policy. This includes controlling depth and Date of Survey values. Reference: Nautical Chart Manual, Section 4.6.1, Tabulations, Legends and Notes, 1. Tabulations.

Section 4.6.1.1.1 NAUTICAL CHART MANUAL

This policy reads, in part:

> "MCD will continue to accept and publish USACE controlling depth reports on federal projects, subject to examination of the surveys when provided graphically (blueprints) or digitally (DD). Where this examination reveals an apparent error or need for significant change to the report, NDB will contact the USACE to correlate Office of Coast Survey action with USACE evaluation before revising the channel depth on the chart."

The U. S. Army Corps of Engineers will send e-mail notification to the Nautical Data Branch when the web site has been updated. The Nautical Data Branch will immediately extract this information from the web site and generate a Chart Letter for updating charted channel tabulations.

Production Branch personnel shall **NOT** compile directly from the web site. Compilers shall use **ONLY** the Chart Letter generated by the Nautical Data Branch for updating the specified channel tabulations.

(2) Existing Channel Tabulations shall be modified in accordance with the attached specification. This specification also requires the addition of a footnote to the existing designated channel tabulations on charts 18521, 18523, 18524, 18525, 18526 and 18531. **See Section 4.6.1.1.1.1, "Modification of Existing Tabulations"**.

(3) A Columbia River Tabulation Diagram (depicting how the U. S. Army Corps of Engineers quarters their data) shall be added to each affected chart. **See Section 4.6.1.1.1.2, "Columbia River Tabulation Diagram"**.

(4) These changes shall not affect legends, soundings outside the main channel or other charted tabulations such as Ilwaco Harbor or the Clatskine River. Depths outside the improved channel shall continue to be compiled from analog and digital surveys in accordance with current specifications.

4.6.1.1.1.1 Modification of Existing Tabulations (Columbia River Charts 18521, 18523, 18524, 18525, 18526 and 18531)

Note that this modification is **NOT** for all channel tabulations contained on the above charts. It includes **ONLY** those designated channel tabulations that provide controlling depths for the Columbia River Main Channel.

Feature Recommendation for a Notice to Mariners

A revision to the controlling depths extracted from the U. S. Army Corps of Engineers web site (Chart Letter) shall **ALWAYS** result in the issuance of an updated channel tabulation as a Notice to Mariners.

This will help ensure that mariners with charts updated through Notice to Mariners, Print-on-Demand Charts issued by this agency and the U.S. Army Corps of Engineers web site are identical or potentially require only the application of one Notice to Mariners publication.

When there are revisions to the Project Dimensions, Name of the Channel segments, or a reconfiguration of channel segment/s, the changes **MUST** be coordinated with the U. S. Army Corps of Engineers. Revisions of this type shall **ALWAYS** be published as a Notice to Mariners.

Line Type and Weight

Textual content revisions to an existing channel tabulation shall be 5 point Swiss Light. See Labels and Notes".

Location and Orientation

Not applicable. The location of a Channel Tabulation shall subscribe to the general specifications applicable to **ALL** Channel Tabulations. This specification **ONLY** deals with modifications to the textual content of six (6) specific existing channel tabulations. See "Labels and Notes".

Size and Shape

Not applicable. The size and shape of the Channel Tabulation shall remain as charted. Revisions shall be made **ONLY** to the textual content of the tabulation as described in "Labels and Notes".

Section 4.6.1.1.1.1 NAUTICAL CHART MANUAL

Labels and Notes

The following changes/revisions shall be made to the existing textual content of designated Columbia River Channel Tabulations for Charts 18521, 18523, 18524, 18525, 18526 and 18531.

(1) Channel Tabulation Title Block: The following changes shall be made to the Channel Tabulation Title Block.

When the controlling depth data is applied **ONLY** from the controlling depth report, the Title Block will assume the standard format:

TABULATED FROM SURVEYS BY THE CORPS OF ENGINEERS - REPORT OF _____

(2) Controlling Depths Header: The following change shall be made to the current Controlling Depths Header. [Reference "(5) Footnote", below]

An asterisk, a blank space and text SEE FOOTNOTE (i.e. * SEE FOOTNOTE) shall be appended to the end of the existing text. When the existing text refers to a footnote, the footnote shall assume the plural form. See examples below for Charts 18521 and 18525:

EXAMPLE: Chart 18521

The Controlling Depths Header currently reading "*** SEE FOOTNOTE**"
shall be revised to the plural form

"*** SEE FOOTNOTES**"

EXAMPLE: Chart 18525

The Controlling Depths Header currently reading "**CONTROLLING DEPTHS FROM SEAWARD IN FEET AT COLUMBIA RIVER DATUM (CRD)**"

shall be revised to

"**CONTROLLING DEPTHS FROM SEAWARD IN FEET AT COLUMBIA RIVER DATUM (CRD)* SEE FOOTNOTE**"

(3) Tabulated Depth Values:

ALL tabulated depth values shall be entered from the controlling depth Chart Letter.

(4) Date of Survey Column:

ALL date(s) of survey values shall be entered in the conventional tabulation numeric month/year values format (i.e. 3-03).

(5) Footnote:

The following footnote [Reference "(2) Controlling Depth Header", above] shall be inserted in the bottom section of the tabulation box and shall be listed first. The text shall be in upper case letters.

CONTROLLING DEPTHS ROUNDED TO NEAREST FOOT

Color and Screening

A Channel Tabulation shall **ALWAYS** chart in black.

Feature Removal from Chart

A Columbia River Channel Tabulation shall ONLY be deleted with the approval of the Chief, Quality Assurance, Plans and Standards Branch and requires coordination with the U. S. Army Corps of Engineers.

4.6.1.1.1.2 Columbia River Tabulation Diagram

A Columbia River Tabulation Diagram (depicting how the U. S. Army Corps of Engineers quarters their data) shall be added to the affected charts -18521, 18523, 18524, 18525, 18526 and 18531. The diagram is identical for each of the six (6) charts. The Columbia River Tabulation Diagram is available as a Digital Document (DD).

> The charted Channel Tabulation for Chart 18531, in accordance with current specifications, is not quartered. It is separated: LEFT OUTSIDE QUARTER, MIDDLE HALF OF CHANNEL AND RIGHT OUTSIDE QUARTER. A customized tabulation diagram will not be developed for this chart. It shall carry the identical diagram as other designated charts. The U. S. Army Corps of Engineers web site provides channel values parallel with the currently charted tabulation.

Feature Recommendation for a Notice to Mariners

Not applicable. The Columbia River Tabulation Diagram is static (fixed) and not intended to be updated. It is designed to illustrate to the mariner how the U. S. Army Corps of Engineers quarters their data.

Line Type and Weight

A Columbia River Tabulation Diagram border, interior lines and graphic channel segments shall be charted with a 0.2 mm (.008") line weight.

Channel segments located within the Tabulation Diagram do not subscribe to the same charting specifications as navigable channels.

Location and Orientation

A Columbia River Tabulation Diagram **MUST** be located in close proximity to the associated existing channel tabulation. The diagram is intended to be used by the mariner in conjunction with the charted channel tabulation.

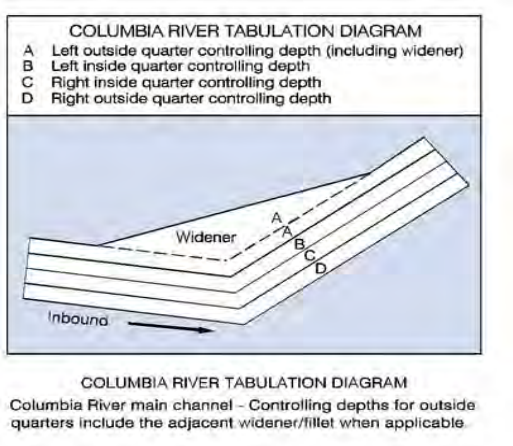
Size and Shape

The linear dimensions of a Columbia River Tabulation Diagram shall be 2.5 inches wide by 2.25 inches high. The Columbia River Tabulation Diagram is available as a Digital Document (DD).

Labels and Notes

A Columbia River Tabulation Diagram includes (already incorporated as part of the graphic) the following note in 7 point Swiss Regular black text and is centered directly below the diagram.

COLUMBIA RIVER TABULATION DIAGRAM
Columbia River main channel - Controlling depths for outside quarters include the adjacent widener/fillet when applicable.



COLUMBIA RIVER TABULATION DIAGRAM
Columbia River main channel – Controlling depths for outside quarters include the adjacent widener/fillet when applicable.

Color and Screening

A Columbia River Tabulation Diagram shall **ALWAYS** be charted in black.

ALL text shall be charted in black and includes text within and outside the diagram.

The area located within the text box at the top of the tabulation diagram shall be white (no tint).

The area within the channel boundaries and the widener shall be white (no tint).

The area located within the bottom of the tabulation diagram, surrounding the channel/widener and extending to the border of the diagram shall chart in blue.

Feature Removal from Chart

Not normally applicable. A Columbia River Tabulation Diagram shall remain as charted. Removal of a Columbia River Tabulation Diagram is **ONLY** with the approval of the Chief, Quality Assurance, Plans and Standards Branch.

4.6.1.2 Legends

Revised on December 8, 2014 by Cartographic Order 014/14

A channel legend is the controlling depth information labeled on the chart to provide the mariner channel details that include controlling depth, available width and date of survey or report. Legends are used for both federally maintained channels and non-federally maintained channels.

Federally Maintained Channels

MCD shall chart the controlling depths and available widths provided in USACE Report of Channel Conditions (CCR) of federal projects. Paper or digital versions of USACE survey sounding plots shall not be used by MCD to determine controlling depths inside federal project limits when a CCR has been provided and is based on the same or subsequent surveys. When evaluation of the CCR, or the sounding plots in the absence of a CCR, reveals an apparent error, such as when a charted fourteen foot controlling depth is shown in the CCR as four feet, the discrepancy shall be brought to the attention of NDB. NDB shall contact the USACE to coordinate Office of Coast Survey action with USACE before revising the chart.

When a CCR is provided, any spot soundings currently charted from prior sources within the channel limits or on the channel edge shall be deleted when not addressed in the CCR. MCD will thoroughly examine USACE surveys to determine controlling depths inside the channels when surveys are received without a CCR.

Care must be exercised when determining controlling depths from sounding plots. Simply using the shoalest depth within a dredged area can unnecessarily restrict navigation. Controlling depths should be as close as possible to the project depth for the greatest available width. Critical shoals along the edges of the channel should be charted as spot soundings. Spot soundings should be a representation of the shoaling condition; therefore care must be taken not to show more soundings than are needed to inform the mariner of the shoaling condition. Controlling depths in channel depth legends shall not be superseded by examinations consisting of a few sounding lines only. Controlling depths shall not be made deeper when the examination consists only of a few sounding lines, as opposed to a well developed survey.

Charted legends shall show channel depths greater than project depths when provided in a CCR. Charted legends shall not show controlling depths greater than project depths, when not supported by a CCR, unless approved by the Chief, QAPSB. Project depths may be obtained from the CCR and the Project Maps by USACE District, a set of publications is on file in NDB. NDB shall create a source document when new or revised data affecting project dimensions is received.

The quartering scheme used in the CCR shall be reflected on the charted channel depth legend. Quartering used on the largest scale ENC must be used when quartering limits have not yet been provided by the USACE. Any discrepancy between the quartering provided by the USACE in the CCR and the USACE provided channel framework shall be brought to the attention of NDB.

NDB shall contact the USACE to coordinate Office of Coast Survey action with USACE. Channel reach names should not normally be added to channels showing depth legends. Any exception must be approved by a Products Branch Chief.

When the magenta lines separating reaches on the chart do not agree with the reaches shown in the CCR, the reach separator lines shall be deleted from the chart and NDB shall be notified. NDB will contact the USACE to resolve the discrepancy.

When a CCR is available on a consistent basis, the project should be converted from legend format, and in most cases, from a sounding pattern within the project limits, to a channel depth tabulation. Depiction of channel depths using a pattern of depth soundings should be avoided in most cases, unless requested by a NOAA authority, such as a Navigation Manager, another federal agency or user group such as a local pilots' association.

27 FEET FOR MIDDLE WIDTH OF 150 FEET JANUARY 2000

This form of legend shall be used for channels when the tabulated form is not considered justified, and when there are shoals in the outer quarters near the edges of the channels.

The controlling depth given shall be as close as possible to the project depth and shall be for the greatest available width. Consideration shall be given to the draft of the vessels expected to use such channels when selecting the depth and width to be charted.

When the available width closely approximates the project width, the word *"MIDDLE"* may be omitted.

Additional emphasis and clarity may be attained by positioning the legend outside, but adjacent and parallel to, the channel, by the judicious and discreet use of a note positioned nearby with a leader to the area. The use of channel notes referenced by letters or numbers is not encouraged.

5 feet rep

This form of legend shall be used when the date the controlling depth was determined or the width to which it applies is not known. Inquiries for better data should be exhausted, through NDB, before resorting to this form for Federal or military projects.

Nonfederally Maintained Channels

Channel depth and date information, provided by authoritative sources and nonauthoritative sources, may replace charted channel legends. Authoritative sources include NOS surveys, USACE surveys, state and local government surveys and port authority surveys. Nonauthoritative sources include reports from pilot associations, U.S. Power Squadrons, U.S. Coast Guard Auxiliary, facility owners, managers, operators, harbor masters and private parties. Source depths must be adjusted to the chart sounding datum.

"Reported" is attached to controlling depth information that has not been confirmed by an authoritative field examination or survey party. Information on these channels is shown in a channel legend on the chart. Usually, these are channels which are not federally maintained and the depth information in the channel legends is often very old. Members of recognized chart updating organizations, Office of Coast Survey Coast Pilot inspectors, chart evaluation parties, and other Office of Coast Survey hydrographic field parties usually receive these reports from private individuals while in the field, but occasionally reports from private individuals are received directly in this office. Reports from Office of Coast Survey field parties with personnel capable of evaluating positional and data accuracy, assessing sounding methods used, or interpreting indications of recent maintenance dredging should be considered more reliable than other reports.

Reports resulting from general inspections conducted for Coast Pilot revision shall not be used to revise controlling depth legends charted in channels unless they are supported by controlled, properly developed surveys. This will also apply to inspections received through the Cooperative Charting Program. See Section 4.6.2 Updated Old Channel Depth Information, Charting Guidelines for Cooperative Charting Program or Nonauthoritative Source.

Data received as a result of a general inspection may be second hand information or any depth without observation or supporting data from controlled, properly developed surveys.

State and local governments, local authorities, and private parties often furnish depths in non-federal improved channels. These surveys must be evaluated for quality of data before application to the nautical charts.

In nonfederal improved channels, the controlling depth along with a survey date (year) shall be used from authoritative sources that provide a minimally acceptable survey that has been certified by a licensed surveyor, engineer, or surveying/engineering firm. For example:

6 FEET 2000

The reported controlling depth, along with a survey date (year), shall be used from nonauthoritative sources that provide reports or minimally acceptable surveys in nonfederal improved channels. For example:

6 feet reported 2000

Minimally acceptable surveys must meet the following criteria:

1. Controls, projections and grids, are properly labeled and identified.

2. Horizontal and vertical datums are specified.

3. The surveying method is indicated and its accuracy can be determined as it relates to the final product.

The echosounder, which produces a continuous profile of the bottom, is the best method of measuring depths. The sounding pole and leadline are other tools used for measuring depths. Time, position, and depth must be provided. Data should include any corrections to tide and transducer depth.

Positions for the measured depths are best calculated utilizing Differential Global Positioning System (DGPS). The sextant is another good positioning tool available.

4. The spacing between the survey soundings should not exceed 5mm at chart scale.

5. Rocks, shoals, and other dangers to navigation have been satisfactorily investigated.

When permit drawings for public or private developments indicate that dredging has been accomplished but no after-dredging survey has been furnished, a legend such as “Reported dredged 6 feet 1999" or “6 ft rep 1999", may be used. The date should be retained if possible.

Approx 5 ft rep 1999

This form of legend shall be used when it is known that tidal corrections, if appropriate, for survey and report data to be used in charting cannot be determined and applied.

Hydrography may be charted to emphasize shoaling in symbolized channels if this will increase the mariner’s safety. The dashed channel limit should be broken as needed for clarity, with the same depth curves and tints used as on the body of the chart.

The shoaling charted shall not be reflected in the channel legend. Where the channel is tabulated, the shoaling shall be used as appropriate for the controlling depth or added as a footnote for that section.

Channels that have been dredged and surveyed but are not intended for general navigational use should be shown by hydrography without a legend. Examples of these are channels dredged for construction purposes and oil well development channels.

4.6.1.3 Notes

A channel note is a brief comment or explanation, printed on the chart, to provide the mariner with channel details that include controlling depth, available width and date of survey or report. Notes can be used for both federally maintained channels and nonfederally maintained channels.

Charted notes shall not show channel depths greater than project depths unless approved by the Chief, Marine Chart Division.

The following note shall be added to all charts with improved channels:

CAUTION

Improved channels shown by broken lines are
subject to shoaling, particularly at the edges.

On charts where dredged channel legends and tabulations are adequately covered by larger-scale charts, the legend and tabulation shall be omitted, a "(see note)" placed in the channel, and a note (preferably on land) added similarly to the following:

BEAUFORT INLET

The project depth is 30 feet to Morehead City.
For controlling depths, use chart 11547.

When the limits of an improved channel are charted and complete tabulations or charted depth legends are not shown, the controlling depths may be indicated in a charted note.

Where neither hydrography nor the limits of an improved channel are shown in a river or tributary, a note may be used to indicate the controlling depths.

4.6.2 Updated Old Channel Depth Information

The Nautical Data Branch shall notify the proper authority of the need for updated survey data when the controlling depth information is 12 years or older. Charting guidelines for old controlling depth information will depend on the response of the authority to the data requested by NDB.

Charting Guidelines for USACE/Authoritative Source

1. No reply:

    a. Retain the charted depth legend or note, or delete the channel limits and replace legend or note with the most recent hydrography.

    b. Retain the charted tabulation or delete the channel limits and replace the tabulation with the most recent hydrography.

2. Letter provides updated controlling depth information:

    Revise the controlling depth.

3. Survey provides updated controlling depth information:

    a. Compile the charted controlling depth information from the source, or delete channel limits and compile the new hydrography from the survey if the channel is not going to be regularly maintained.

    b. b. For tabulations, quarter the blueprints, add least depth to tab, or delete channel limits and compile the new hydrography from the survey and delete tabulation information, if the channel is not going to be regularly maintained.

4. Reply states that the dredged area is not regularly maintained:

    Retain charted information or delete channel limits and replace with the most recent hydrography.

5. Reply states that the dredged area (previously maintained by USACE) is no longer a federal project.

    a. For charted legends, retain information, or delete channel limits and replace with the most recent hydrography.

b. For charted notes, delete reference to USACE and retain controlling depth, or delete channel limits and replace with most recent hydrography.

c. For tabulations, delete channel limits and replace with the most recent hydrography, or re-fabricate the charted tabulation into a legend. The tabulation information must be deleted.

Charting Guidelines for Cooperative Charting Program or Nonauthoritative Source

(Revisions under these guidelines require "reported" to be added to the legend or note.)

1. No reply:

Retain the charted controlling depth information.

2. Reply confirms the currently charted controlling depth:

Revise date from source.

3. Reply provides updated controlling depth information.

a. The facility owner, harbor master, manager or operator reports a deeper or shallower depth to their facility. Revise charted depth information as indicated in the report.

b. The pilot associations, private parties, U.S. Power Squadrons or U.S. Coast Guard Auxiliary reports a shallower depth. For depths supported by minimally acceptable survey criteria (see page 4-40c), revise the charted depth information. For general inspection (see page 4-40b), confirm the depth by the authority for the channel.

c. The pilot associations, private parties, U.S. Power Squadrons or U.S. Coast Guard Auxiliary reports a deeper depth. Revise only the date of charted depth information until depth is confirmed by the authority for the channel.

4. Minimally acceptable or better survey (see page 4-40c) provides updated controlling depth information:

Compile the charted controlling from the source or delete the channel limits and compile the new hydrography.

4.6.3 Revised Channel Depths

Revised channel depth information published in the NM shall be in the same format as presently charted. Revisions to the channel limits or changes in format, such as replacing a legend with soundings and curves, will require a chartlet.

Revised tabulations must include all entries not superseded as well as the result of new surveys. This will permit the revised tabulation to be mounted over the charted tabulation.

A footnote shall be added to call attention to the fact that the USACE should be consulted for subsequent information on all controlling depth notes and tabulations for channels maintained by the USACE. A note such as the following will suffice:

> Note: The Corps of Engineers should be consulted for changes subsequent to the above information.

4.6.3.1 Charting USACE Data Outside of the Channel
Revised on January 5, 2015 by Cartographic Order 001/15

Survey data received from USACE is primarily used to chart depth information within the limits of a channel project or the approaches to maritime facilities. USACE data obtained outside of the channel limits is considered to be of secondary importance.

The volume of data received from USACE is considerable. MCD is only able to invest limited resources to evaluate USACE data outside of the channel. Therefore, minor changes to soundings or depth curves from USACE data must be avoided. **Charted soundings and depth curves outside of the channel, or where channel limits are not shown, shall not be revised from USACE surveys when the newly received USACE data is, in the opinion of the cartographer, in close agreement with the currently charted hydrography.**

As an example, if a USACE survey shows depths of 11 or 12 feet in an area outside of the channel and depth soundings of 10 to 14 feet are charted in the same area, a cartographer could use his or her cartographic judgment to decide that the USACE data is in close agreement with the charted depths. Revision to those depths from the USACE survey would not be required.

As another example, if a USACE survey shows a depth of 9 feet outside of the channel and it is in an area where depth soundings of 20 to 24 feet are charted, a cartographer could use his or her cartographic judgment to decide that the USACE data is not in close agreement with the charted depths and that the 9 foot sounding would be charted from the USACE survey.

When no change is charted, a statement, “no correction, data consistent with charted hydrography” shall be added to the chart history. USACE data outside of the channel shall not be evaluated when a more recent USACE survey covering the same area is available.

The area outside of a channel can be changeable. The conditions outside of the channel can be affected by dredging beyond the channel limits, erosion or deposits from currents, and expansion of shoals near stream outlets, spoil areas, dumps sites etc.

Some exceptions where USACE data outside of the channel limits should be charted include the following:

- Any depth that can be considered a hazard when a vessel can reasonably be expected to navigate over that position shall be charted.

- Shoals that represent an encroachment toward a channel with the potential to be a future hazard should also be charted. Removal of existing shoals may be considered if the data supports a general deepening condition.

- Soundings and depth curves outside of the channel should be revised when that action opens up an area that was previously closed off to navigation by vessels that typically transit the area near the channel or a facility.

Soundings charted outside of the channel must be spaced in a manner to give a depiction of the depths outside of the channel without creating “clutter”. See Section 4.3.2, “Selection and Spacing of Soundings.”

4.6.4 Channel Symbols, Tolerances, and Tints

Revised on August 31, 2011 by Cartographic Order 004/11

The specifications listed here should be adhered to as rigidly as possible.

1. Symbols

Dashed lines of the following specifications (lineweight/length of dash/space) shall be used to show channel limits and associated areas that are part of the same project:

a. Type 1 channel (400 feet or more in width for its major portion):
0.25/6.0/1.5 mm (0.010"/0.240"/0.060")

b. Type 2 channel (100 feet to 399 feet in width for its major portion):
0.25/4.0/1.0 mm (0.010"/0.160"/0.040")

c. Type 3 channel (less than 100 feet in width for its major portion):
0.25/2.0/0.75 mm (0.010"/0.080"/0.030")

A Type 3 channel limit line may be used for any improved channel charted at 1:400,000 scale or smaller.

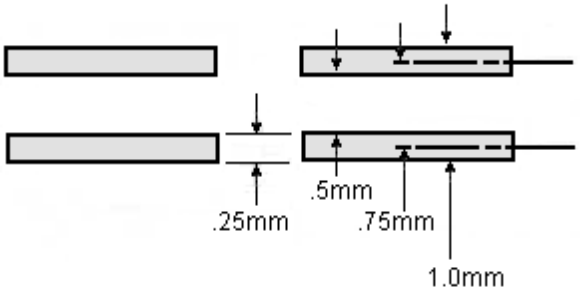
On all new and reconstructed Nautical Charts, including paper and raster charts produced using the NCSII system, all channel and associated dredged area limits will be shown as black dashed lines following the specifications for Type 3 channels (lineweight/length of dash/space) 0.25/2.0/0.75 mm (0.010"/0.080"/0.030").

A combination of Type 2 and Type 3 channel limits may be used when necessary for clarity, such as when an auxiliary channel is charted adjacent to a main channel. In such cases, the main channel may be shown with a Type 2 symbol and the outer edge of the auxiliary channel may be shown with a Type 3 symbol.

To ensure that each channel control or turning point is graphically shown on the chart, care should be taken to ensure that each successive control point (from seaward) begins with a dash. However, no dash shall be shorter than 1.0 mm, and spaces between dashes must be preserved.

2. Tolerances

The minimum width between the 0.25 mm channel limit lines is 0.5 mm (0.75 mm between centerline axes).



An improved channel shall not be charted when the channel limit lines touch each other at chart scale. Reference shall be made to a larger scale chart, if available.

Example:

(use chart 12345)

3. Blue Tint in Channels:

To improve the clarity of charted channels and to simplify compilation with a single rule, blue tint shall not be shown inside improved channel limits, regardless of project depth, project width, controlling depth, or the tinting of hydrography at either end of the charted channel

4.6.5 Sediment Traps

Revised on June 18, 2001 by Cartographic Order 014/01

Definition: A **Sediment Trap** is a dredged area (within a federally maintained navigation project) that is designed as a catch basin to capture shifting sediment and silt. The primary purpose of a sediment trap is to prevent excessive shoaling in an adjacent channel.

Other Names for Sediment Traps: Sediment traps may also be identified or labeled on source documents as *Impoundment Areas*, *Impoundment Basins* or *Settling Basins*. Regardless of the alternate name indicated on the source document, all shall be charted and labeled on NOS nautical charts as the feature, Sediment Trap.

General Requirements: Sediment traps are established or approved by the United States Army Corps of Engineers (USACE) and will always be a component of and adjacent to a federally maintained channel. However, because sediment traps are subject to rapid and severe shoaling,

they are channel components which are **not** intended for navigation and therefore shall **not** be included in a channel tabulation either as a line item or as a footnote.

The official source for the application of sediment traps will typically be USACE blueprints. Documents from sources other than the USACE and which report the establishment of a sediment trap(s), shall be forwarded to the Nautical Data Branch (NDB) for verification with the USACE. Sediment traps reported from non-official sources shall not be charted before documentation citing their USACE approval is received in NDB.

Symbolization: Sediment Traps shall be shown by a black dashed line (0.2/2.0/0.75 mm). All soundings and depth curves shall be omitted within the limits of the sediment trap and blue tint no.1 shall be added.

Labels and Notes: The following label shall be added within the sediment trap limits and shall be laced parallel to the sediment trap axis.

SEDIMENT TRAP
(see note)

The first line of the label (i.e., *SEDIMENT TRAP*) shall be shown in all capital letters, black 7 pt. Swiss Light Italic type. The second line of the label (i.e., *see note*) shall also be shown in black 7 pt. Swiss Light Italic type, however all lowercase letters shall be used. (A type size, appropriate to the size of the feature being charted and the scale of the chart, may be used as an alternate.)

A note, to be shown in black 7 pt. Swiss Light, shall be placed on the chart in a prominent location and shall read:

SEDIMENT TRAPS
Sediment traps are designed to delay shoaling of the navigable portion of a channel by trapping advancing littoral material. Sediment traps may shoal at a rapid rate spilling over into the adjacent navigation channel, therefore, mariners should exercise caution when operating near them.

Inactive Sediment Traps: A sediment trap is considered “inactive” when it is no longer a component of a federal project and will not be periodically dredged.

When a sediment trap is indicated on a source document as being inactive, the limits and blue tint shall be retained on the chart and the label *(inactive)* shall be added to the charted label as follows.

SEDIMENT TRAP
(inactive)
(see note)

Feature Removal from the Chart: The limits, blue tint and labels of a sediment trap shall not be removed from a nautical chart until a sediment trap has been determined "inactive" **and** a new hydrographic survey of the area has been received in MCD. (A new hydrographic survey of the area is a survey (from an official source) which was performed and verified **after** the date the sediment trap was determined to be inactive.

The sediment trap note shall not be removed from a nautical chart until a thorough examination of the chart results in the conclusion that all sediment trap limits have been deleted.

Feature Recommendation for a Notice to Mariners: All newly established sediment traps shall, upon application to a nautical chart, be recommended for a Notice to Mariners.

Graphic Example:

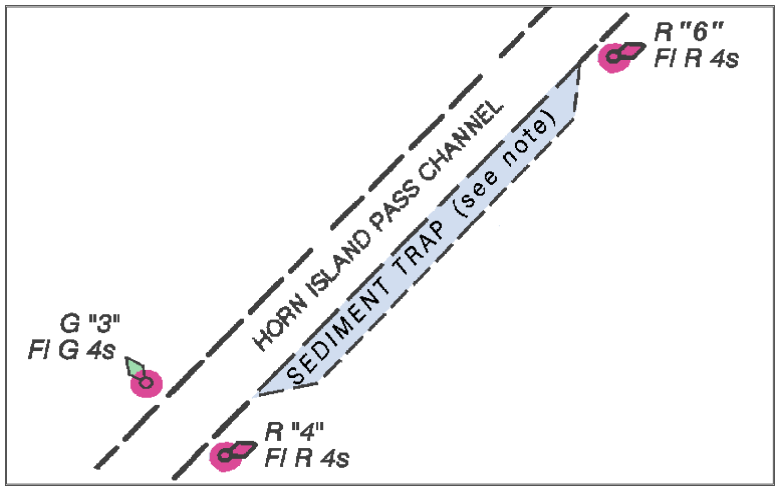


Figure 4-8b

4.7 Bottom Characteristics

The character of the bottom shall be identified on all nautical charts, particularly in harbors, designated anchorages, and all other areas where vessels may anchor. Besides providing information useful for anchoring, bottom characteristics are charted to provide the following information:

1. They assist fishermen in selecting areas where fish may be found and in avoiding places where nets and equipment may be damaged.

2. In tidal areas, they show where vessels may safely take the ground at low water.

3. In shoal areas, they help navigators to assess the stability of shoals and to distinguish rocky areas from areas of unconsolidated materials.

4.7.1 Designated Abbreviations

The bottom characteristics and abbreviations shown in the table in Figure 4-9 have been designated for use on Office of Coast Survey nautical charts and are also internationally accepted and recommended for charting. When transferring bottom characteristics from the survey to the chart, care should be taken to place the labels reasonably close to and slightly below and to the right of any adjoining sounding, provided there is sufficient space. Otherwise, the labels should be placed on or close to the source position so that they correctly represent the bottom at that location. Two descriptive words or their abbreviations will usually suffice.

Especially in harbors, in inland waters, and along the coast, the type of bottom should be charted, e.g., "rky", "hard," "M", "soft", "S", "sticky", etc. Colors of bottom materials shall be omitted since they are of little or no use to navigators. Colors may be shown only if they are of specific interest to the purpose of the chart.

Nouns and their abbreviations shall begin with a capital letter; adjectives or qualifying words and their abbreviations shall be composed of lowercase letters only. Bottom characteristics shall be charted in black 7 pt Swiss Light Italic.

BOTTOM CHARACTERISTICS AND ABBREVIATIONS

Noun	Source-Abbreviation	Chart-Abbreviation
Boulders	Blds	*Blds*
Clay	Cl	*Cy*
Coral	Co	*Co*
Coral Head	Co Hd	*Co Hd*
Gravel	G	*G*
Grass	Grs	*Grs*
Mud	M	*M*
Ooze	Oz	*Oz*
Pebbles	P	*P*
Sand	S	*S*
Shells	Sh	*Sh*
Shingle	Sn	*Sn*
Silt	Silt	*Si*
Stones	St	*St*
Seaweed	Wd	*Wd*

Adjective	Source Abbreviation	Chart Abbreviation
Broken	brk	*bk*
Coarse	crs	*c*
Dark	dk	*dk*
Fine	fne	*f*
Gritty	gty	*gty*
Hard	hrd	*h*
Large	lrg	*lrg*
Light	lt	*lt*
Rocky	rky	*rky*
Small	sml	*sml*
Soft	sft	*so*
Speckled	spk	*spk*
Sticky	stk	*sy*

Figure 4-9

4.7.2 Special Bottom Types

Sandwaves (J 14)

Sandwaves are large wavelike sediment features composed of sand or other mobile sediment. The wavelength may reach 300 feet; heights to 30 feet are common, and heights to 90 feet have been observed. A sandwave area shall be identified using the pictorial symbol without a label.

Kelp, Seaweed (J 13.2)

Kelp is a large blade-shaped, vine-like seaweed which generally grows in areas of rocky bottom and in exposed waters and is commonly found in depths up to 10 fathoms. The presence of kelp may indicate that submerged pinnacle rocks exist in the area or it may be an area that tends to collect drifting kelp. The kelp symbol shall be charted to represent kelp and other seaweed areas reported by surveys or other reliable sources when they are considered to be of a rather permanent and obstructing nature during the navigation season. A label is not necessary with the pictorial symbol. Kelp areas should be enclosed with the limiting danger curve (K 1) when it is believed that the kelp indicates a rocky and dangerous bottom.

(The remainder of this page is intentionally blank.)

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4.8 Ledges and Reefs

A ledge is a rock formation connecting and fringing the shore of an island or large land mass; it is generally characterized by a drop-off in the submarine topography. A reef is a rock or coral formation dangerous to surface navigation. Rocky reefs are always detached from the shore; coral reefs may or may not be connected to the shoreline.

Uncovering Ledges and Reefs (J 21, J 22, K h)

The standard ledge symbol shall be used to chart ledges and reefs identified by field surveys as uncovering at the chart sounding datum. A label shall be added when scale permits to identify the feature, e.g., *"Rock"* or *"Coral"*. Labels shall be shown in slant type (6 pt. Swiss Light Italic).

On small-scale charts where the chart dimensions of uncovering ledges or reefs are less than 3mm in their greatest dimension, the rock awash symbol (K a) shall replace the ledge symbol.

Along continuous stretches of ledge or reef, the outer edge of the ledge symbol shall be substituted for the low water depth curve in the absence of any other low water curve on the source. The area between the seaward limit of the symbol and the high water line shall be tinted green on the chart.

For the purpose of chart clarity at small scales, rock awash symbols located close to uncovering ledges or reefs shall be included within the ledge symbol limits and the rock symbols shall be deleted.

Significant rocks or coral heads that bare on uncovering ledges or reefs shall be charted with the Rock awash symbol.

Submerged Ledges and Reefs (K 16, K g)

Ledges and reefs identified by field surveys as submerged at the chart sounding datum shall be shown by a black dotted line to represent a danger limit, and blue tint to delineate the limits of the feature. Where the limits are not defined, the danger curve can be omitted and only the blue tint retained. A label shall be added to identify submerged ledges and reefs, e.g., *"Subm ledge"* or *"Subm reef"*.

Depths over rocks or coral heads within submerged ledge or reef limits shall be charted using soundings and labels, e.g., " 5 *Rk"* or " 5 *Co Hd"*. When the depth over these features is unknown, the submerged rock symbol (K 13) shall be used with the appropriate label.

On small-scale charts where it is not possible to chart selected depth information, the shoalest depthover the submerged ledge or reef shall be included in the legend. Labels shall be shown in slant type (6 pt. Swiss Light Italic):

"*Subm ledge* (*cov* 6 *ft at MLLW*)"

"*Subm ledge* (*cov* 6 *ft at MLLW*)"

Oyster Reefs (K 1)

Oyster reefs shall be charted using the same criteria as for submerged ledges and reefs. When oyster reefs bare at the chart sounding datum, green tint shall be added to the dotted danger curve. A label shall be added to identify oyster reefs, e.g., "*Oyster Bar"* or "*Oyster Reef*" in slant type (6 pt. Swiss Light Italic).

4.9 Rocks
Revised by March 28, 2003 Memorandum

Rocks are classified as bare, awash, or submerged. A submerged rock is potentially the most dangerous natural hazard to navigation. Thus great care must be exercised in evaluating and charting submerged rocks. A submerged rock is considered dangerous to surface navigation when it is 11 fathoms (20 meters) or less below the sounding datum in a navigable area. This guideline shall be modified, as required, for areas expected to be navigated by vessels with a draft deeper than 11 fathoms or for any other special circumstances. Dangerous rocks shall be emphasized by using a black dotted limiting danger curve (K 1) to encircle the symbol, with blue tint.

Most rocks shown on NOS nautical charts have been identified either by NOS hydrographic surveys or topographic-photogrammetric maps. Where conflicts exist between these two sources, the final reviewed hydrographic survey shall be the authority for charting all offshore rock features. Other sources may be the USACE, USGS, and similar authorities provided the data are judged to be reliable.

Where rocks of various types are grouped together (e.g., bare, awash, or submerged), the cartographer must select those considered most critical to navigation for application to the chart. Care should be taken to select a representative pattern that adequately portrays the area while including those that define the outermost edge of the group. See Section 4.14.2, Foul Areas.

See Chart No. 1 (Section K), and Figures 4-10a and 4-10b for the range of symbols used in charting rocks. See also, Figures 4-11a through 4-11i.

Islets (K 10)

A bare rock (islet) is an extremely important positional reference for the mariner since it can be seen at all tide stages. A bare rock near a submerged rock also serves as an excellent natural marker for the submerged hazard. Islets shall be shown to scale, when possible, or by the standard islet, or bare rock, symbol (K 10) for small-scale representation. Elevations associated with these features shall be shown in slanted type (6 pt. Swiss Light Italic).

When applying rocks that bare to small-scale charts, the cartographer may have to exaggerate their size in order to retain the feature. The minimum charting size for a bare rock (or islet) is 0.65 mm by 0.5 mm. This size limitation is imposed to avoid charting “dots” which could be misinterpreted as imperfections on the chart reproducibles and consequently removed in the reproduction processes. Where bare rocks clustered together prohibit complete representation at chart scale, those considered most threatening to navigation shall be charted. However, two or more bare rocks should not be merged into one symbol if they can be shown separately with some distinction.

4.9.1 Rock Symbolization Zones

The classification of rocks shown on National Ocean Service charts varies according to the geographic location of the charted area (See Figures 4-10a, 4-10b and 4-11a through 4-11i). Thus the definitions of “bare”, “awash” and “submerged” rocks vary for the Atlantic and Gulf coasts, the Pacific coast and the Great Lakes.

4.9.2 Heights and Depths of Rocks

Especially where isolated and dangerous rocks exist, heights on rocks that are bare or awash, as well as depths over submerged rocks, shall be shown when chart scale permits. However, only the most prominent rocks that bare or are awash on rocky ledges shall be shown with their associated heights (see also Section 4.8, Ledges and Reefs). Heights associated with rocks awash shall be shown in vertical type (6 pt. Swiss Light) with an underbar.

The submerged rock symbol (+) shall not be used where the depth over the rock is known, except when the scale of the chart prohibits using the depth figure. Submerged rocks obtained from non-tide-controlled photography with estimated depths derived from predicted tides shall be charted with the label “*rep*”. The date shall be included where it can be shown clearly without interfering with other charted detail.

(4 ft rep 1985) or *(4 ft rep)*

CHART NO. 1, SECTION DESIGNATION: K

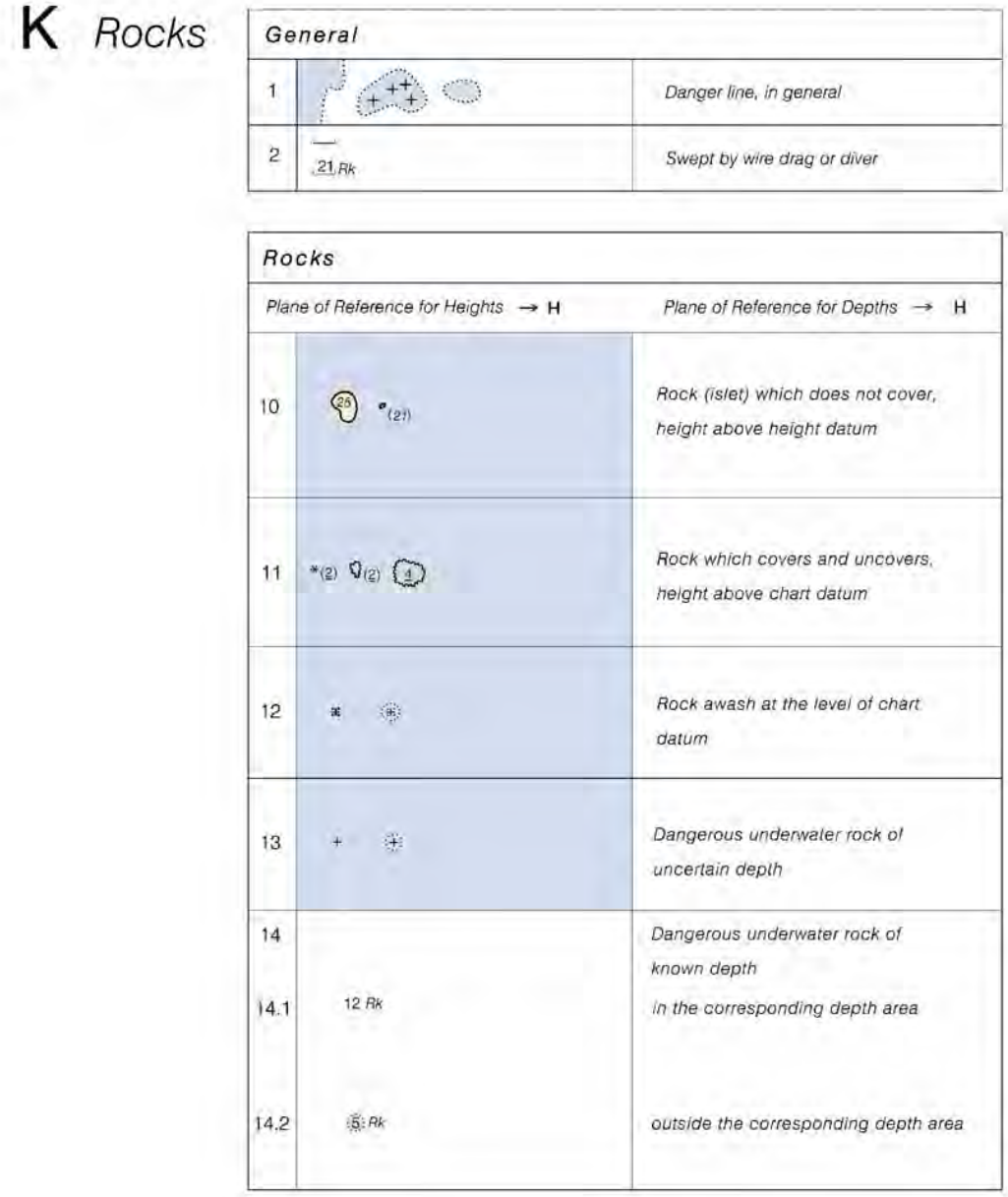

Figure 4-10a
Chart No. 1 Symbolization

CHART NO. 1, SECTION DESIGNATION: K (continued)

15	+ 35 Rk	Non-dangerous rock, depth known
16	+ Co + 3 + Reef line + + + +	Coral reef which covers
17		

Supplementary National Symbols		
a	* *	Rock awash (height unknown)
b	5 Rk 5 Rks	Shoal sounding on isolated rock or rocks
c		
d		
e		
f	21 Rk	Sunken danger with depth cleared (swept) by wire drag
g	Reef	Reef of unknown extent
h	* Co Coral Co Co	Coral reef, detached (uncovers at sounding datum)

Figure 4-10b
Chart No. 1 Symbolization

ATLANTIC COAST AND THE GULF OF MEXICO

Figure 4-11a illustrates in tabular form the classification relationships between charting symbology and charting definitions.

Figure 4-11b illustrates the same relationships, described in Figure 4-11a, in the form of a stylized graphic profile. Mean High Water is equal to 7 feet in this illustration. (See also, vertical planes of reference)

Figure 4-11c represents the most basic of the illustrations. The graphic survey symbols are translated on a one-to-one basis, where possible, into the charted graphic. **Heights based on the variability of Mean High Water are expressed as (L), where (L) is equal to the elevation above Mean Lower Low Water.**

The “Survey Symbol” column indicates the range of NOS Hydrographic Survey graphic symbolization and the “Chart Symbol” column represents the corresponding translation of the survey symbol into charting symbolization, consistent with generalization and alternative symbolization specifications.

ATLANTIC COAST AND THE GULF OF MEXICO: Figure 4-11a illustrates in tabular form the classification relationships between charting symbology and charting definitions.

ATLANTIC COAST AND THE GULF OF MEXICO
CLASSIFICATION OF ROCKS

Bare rock	*A rock more than 1 foot above Mean High Water*
	*Conforms to the shape of the feature*
(2)	*Minimum size symbol*
Rock awash that uncovers	*A rock exactly 1 foot above Mean High Water to exactly 1 foot above Mean Lower Low Water*
 (4)	*Conforms to the shape of the feature*
(4)	*Standard size symbol*
Rock awash at the sounding datum only	*A rock less than 1 foot above Mean Lower Low Water to exactly 1 foot below Mean Lower Low Water*
	Standard size symbol
Sunken rock	*A rock covered more than 1 foot at Mean Lower Low Water*
+	*Unknown depth*
2 *Rk*	*Known depth*
23 *Rk*	*Cleared depth*

Figure 4-11a

ATLANTIC COAST AND THE GULF OF MEXICO: Figure 4-11b illustrates the same relationships, described in Figure 4-11a, in the form of a stylized graphic profile. In this example, MHW = 7 feet.

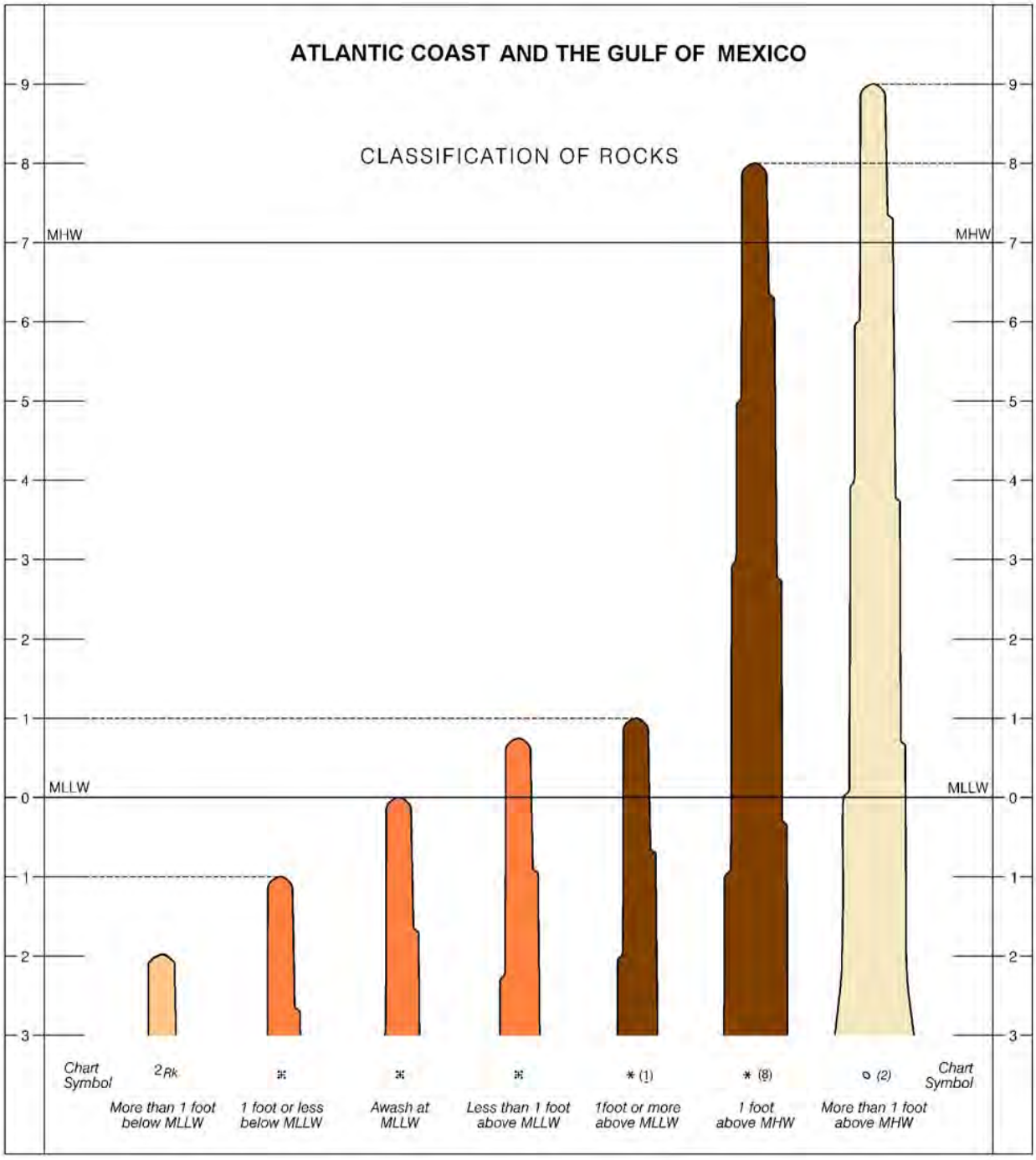

Figure 4-11b

ATLANTIC COAST AND THE GULF OF MEXICO: Figure 4-11c, Survey Symbol to Chart Symbol.

NOS SURVEY SYMBOLIZATION TO CHART SYMBOLIZATION FOR THE ATLANTIC AND GULF COASTS

SURVEY SYMBOL	CHART SYMBOL	ELEVATION OR DEPTH	
° (3)	° (3)	3	
° (2)	° (2)	2	
* (L)	* (L)	1	
* (L)	* (L)	0	MHW
The vertical distance of MHW above MLLW is variable and predicated on the Hydrographic Survey. **Survey Symbols** for a rock above MLLW to and including 1 foot above MHW = * (L), where L is equal to the height above MLLW.		VARIABLE DISTANCE	
* (1)	*(1)	1	
* (0)	*	0	MLLW
1 Rk	*	1	
2 Rk	2 Rk	2	
3 Rk	3 Rk	3	

( ) around figures indicate an offset from the position symbol.

Non underlined figures in ( ) represent elevations above MHW for a bare rock.

Underlined figures in (_) represent the height above the sounding datum. These values are sometimes referred to as negative soundings.

Figure 4-11c

PACIFIC COAST AND ALASKA

Figure 4-11d illustrates in tabular form the classification relationships between charting symbology and charting definitions.

Figure 4-11e illustrates the same relationships, described in Figure 4-11d, in the form of a stylized graphic profile. Mean High Water is equal to 6 feet in this illustration. (See also, vertical planes of reference)

Figure 4-11f represents the most basic of the illustrations. The graphic survey symbols are translated on a one-to-one basis, where possible, into the charted graphic. **Heights based on the variability of Mean High Water are expressed as (L), where (L) is equal to the elevation above Mean Lower Low Water**.

The "Survey Symbol" column indicates the range of NOS Hydrographic Survey graphic symbolization and the "Chart Symbol" column represents the corresponding translation of the survey symbol into charting symbolization, consistent with generalization and alternative symbolization specifications.

PACIFIC COAST AND ALASKA: Figure 4-11d illustrates in tabular form the classification relationships between charting symbology and charting definitions.

PACIFIC COAST AND ALASKA

CLASSIFICATION OF ROCKS

Bare rock	*A rock more than 2 feet above Mean High Water*
	*Conforms to the shape of the feature*
(3)	*Minimum size symbol*
Rock awash that uncovers	*A rock exactly 2 feet above Mean High Water to exactly 2 feet above Mean Lower Low Water*
 (4)	*Conforms to the shape of the feature*
(4)	*Standard size symbol*
Rock awash at the sounding datum only	*A rock less than 2 feet above Mean Lower Low Water to exactly 2 feet below Mean Lower Low Water*
	Standard size symbol
Sunken rock	*A rock covered more than 2 feet at Mean Lower Low Water*
+	*Unknown depth*
3 *Rk*	*Known depth*
23 *Rk*	*Cleared depth*

Figure 4-11d

PACIFIC COAST AND ALASKA: Figure 4-11e illustrates the same relationships, described in Figure 4-11d, in the form of a stylized graphic profile. In this example, MHW = 6 feet.

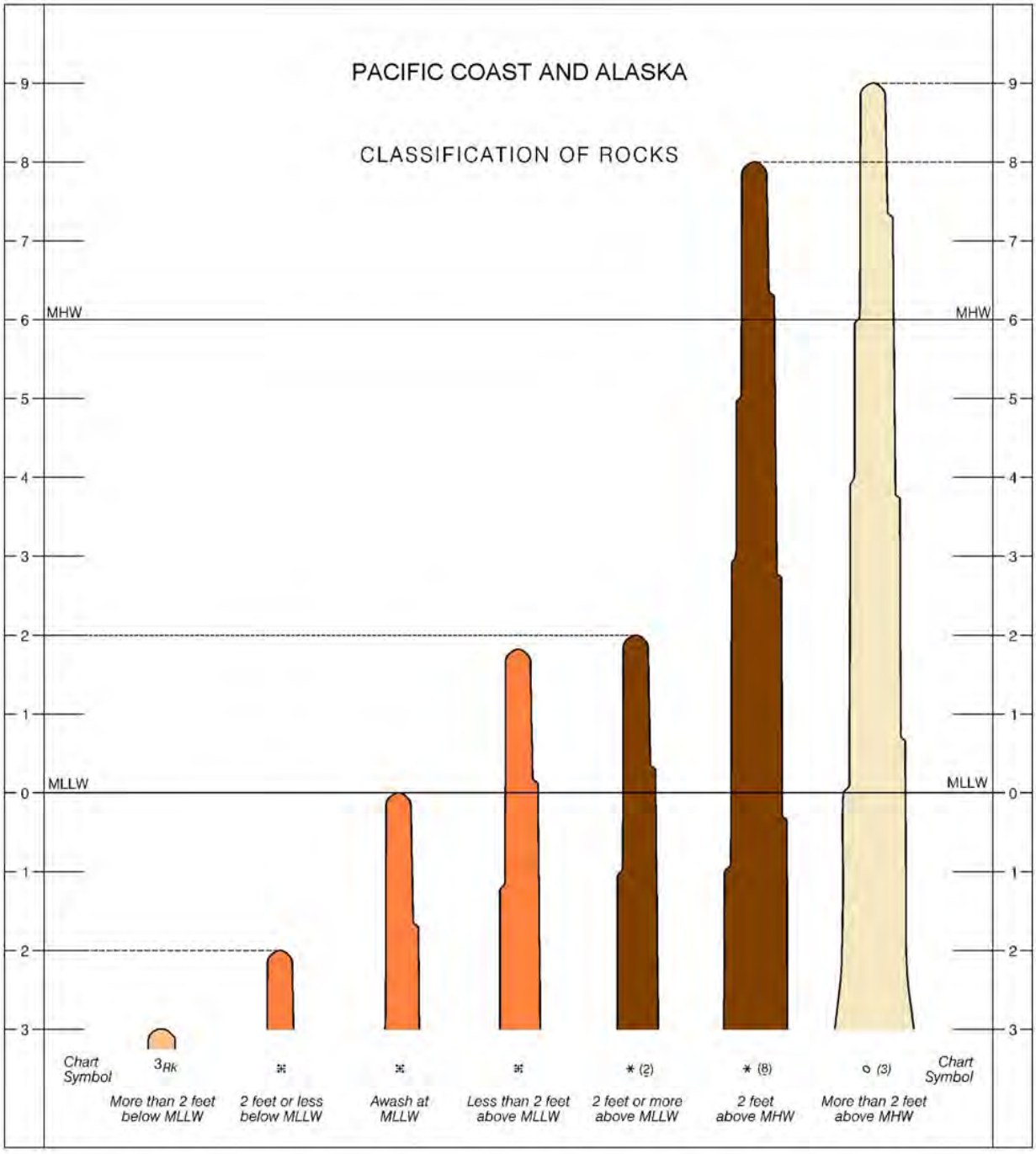

Figure 4-11e

PACIFIC COAST AND ALASKA: Figure 4-11f, Survey Symbol to Chart Symbol.

NOS SURVEY SYMBOLIZATION TO CHART SYMBOLIZATION FOR THE PACIFIC COAST AND ALASKA

SURVEY SYMBOL	CHART SYMBOL	ELEVATION OR DEPTH
° (3)	° (3)	3
* (L)	* (L)	2
* (L)	* (L)	1
* (L)	* (L)	0 — MHW
The vertical distance of MHW above MLLW is variable and predicated on the Hydrographic Survey. **Survey Symbols** for a rock above MLLW to and including 2 feet above MHW = * (L), where *L* is equal to the height above MLLW. **Chart Symbols** for the corresponding heights, except for 1 foot above MLLW, = * (L), where L is equal to the height above MLLW.		VARIABLE DISTANCE
* (2)	* (2)	2
* (1)	*	1
* (0)	*	0 — MLLW
1 Rk	*	1
2 Rk	*	2
3 Rk	3 Rk	3

( ) around figures indicate an offset from the position symbol.

Non underlined figures in ( ) represent elevations above MHW for a bare rock.

Underlined figures in (_) represent the height above the sounding datum. These values are sometimes referred to as negative soundings.

Figure 4-11f

GREAT LAKES

Figure 4-11g illustrates in tabular form the classification relationships between charting symbology and charting definitions.

Figure 4-11h illustrates the same relationships, described in Figure 4-11g, in the form of a stylized graphic profile.

Figure 4-11i represents the most basic of the illustrations. The graphic survey symbols are translated on a one-to-one basis into the charted graphic. Compare the simplicity of this figure with one vertical (Low Water Datum) datum with the graphic illustrations in Figures 4-11c and 4-11f with two vertical datums (Mean High Water and Mean Lower Low Water).

The “Survey Symbol” column indicates the range of NOS Hydrographic Survey graphic symbolization and the “Chart Symbol” column represents the corresponding translation of the survey symbol into charting symbolization, consistent with generalization and alternative symbolization specifications.

GREAT LAKES: Figure 4-11g illustrates in tabular form the classification relationships between charting symbology and charting definitions.

GREAT LAKES

CLASSIFICATION OF ROCKS

Bare rock	*A rock more than 4 feet above Low Water Datum*
	*Conforms to the shape of the feature*
(5)	*Minimum size symbol*
Rock awash that uncovers	*A rock exactly 4 foot above Low Water Datum to exactly 2 feet above Low Water Datum*
 (4)	*Conforms to the shape of the feature*
* (4)	*Standard size symbol*
Rock awash at the sounding datum only	*A rock less than 2 feet above Low Water Datum to exactly 2 feet below Low Water Datum*
*	*Standard size symbol*
Sunken rock	*A rock covered more than 2 feet at Low Water Datum*
+	*Unknown depth*
3 *Rk*	*Known depth*
23 *Rk*	*Cleared depth*

Figure 4-11g

GREAT LAKES: Figure 4-11h illustrates the same relationships, described in Figure 4-11g, in the form of a stylized graphic profile

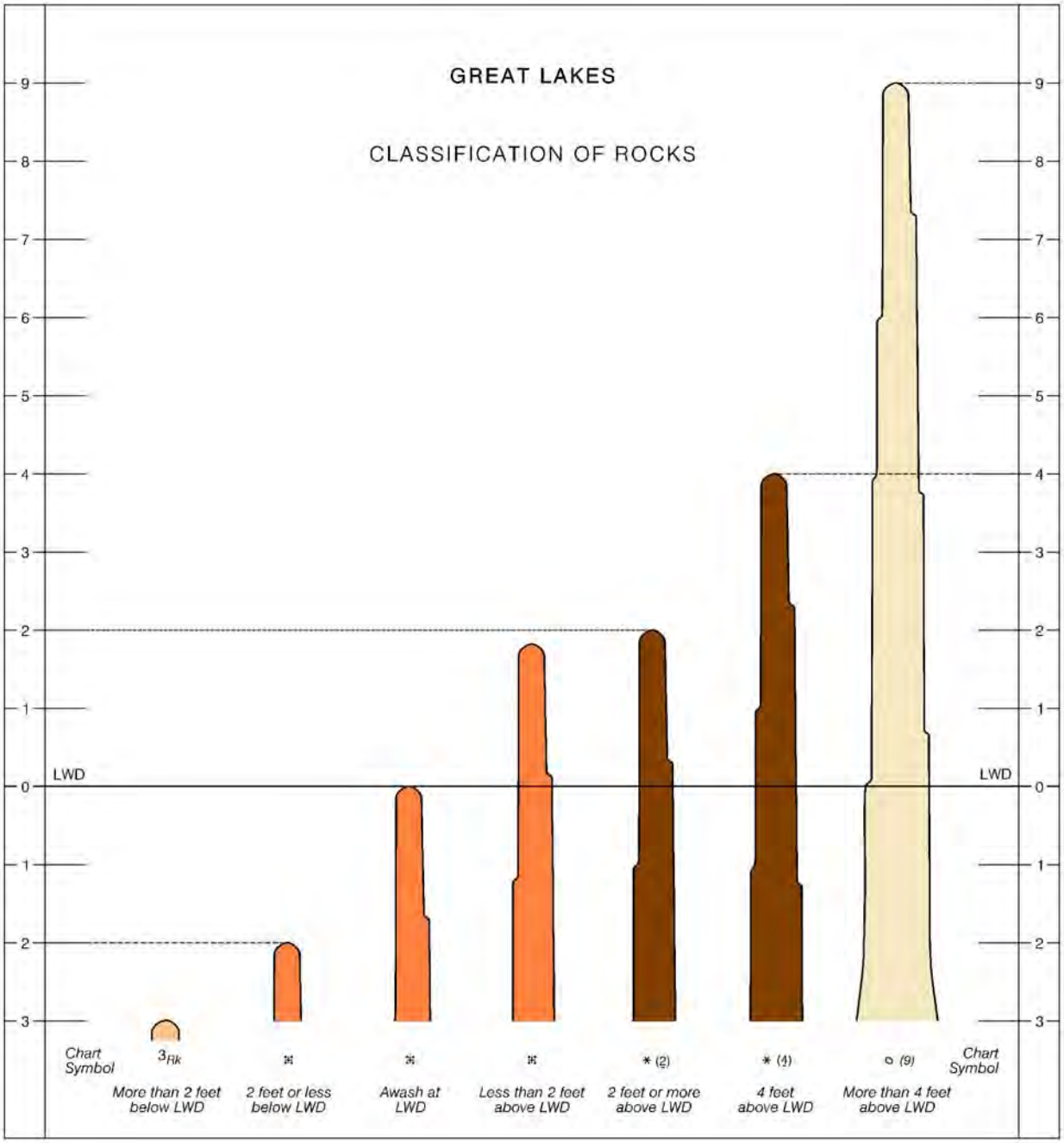

Figure 4-11h

GREAT LAKES: Figure 4-11i, Survey Symbol to Chart Symbol.

NOS SURVEY SYMBOLIZATION TO CHART SYMBOLIZATION FOR THE GREAT LAKES

SURVEY SYMBOL	CHART SYMBOL	ELEVATION OR DEPTH
° (10)	° (10)	10
° (9)	° (9)	9
° (8)	° (8)	8
° (7)	° (7)	7
° (6)	° (6)	6
° (5)	° (5)	5
* (4)	* (4)	4
* (3)	* (3)	3
* (2)	* (2)	2
* (1)	*	1
* (0)	*	0 — LWD
* covered 1ft at LWD	*	1
* covered 2ft at LWD	*	2
+ covered 3ft at LWD	3 Rk	3
+ covered 4ft at LWD	4 Rk	4

( ) around figures indicate an offset from the position symbol.

Non underlined figures in ( ) represent elevations above the LWD for a bare rock.

Underlined figures in (_) represent the height above the LWD. These values are sometimes referred to as negative soundings.

Figure 4-11i

4.10 Wrecks

Wrecks depicted on nautical charts are classified as stranded or sunken. A stranded wreck is defined as one which has any portion of the hull or superstructure above the sounding datum. Sunken wrecks are below the sounding datum or have only the masts visible. Important information received on new wrecks or changes in the status of existing wrecks shall be published in the LNM.

4.10.1 Stranded Wrecks

Stranded wrecks shall be charted using the following symbol: (K 24). The baseline of the symbol is shown parallel to the bottom of the chart, and the circle on the baseline marks the published position of the wreck. This symbol shall not be rotated, but it can face either right or left. Where the scale of the chart is large enough, the true outline of a stranded wreck shall be shown with a solid line, land tint, and labeled: (K 20). Note that if a significant portion of the wreck is determined to be bare at the Shoreline Plane of Reference by source or cartographic judgment, it is considered to be a topographic (rather than a hydrographic) feature and labeled with vertical (rather than italic) type.

4.10.2 Sunken Wrecks

Dangerous Sunken Wrecks (K 25, K 26, K 27, K 28)

A sunken wreck shall generally be classified as dangerous to surface navigation when any part of it lies, or is judged to lie, at 11 fathoms (20 meters) or less below the sounding datum. This presumes the wreck to lie in an area where obstructions at such depths are considered hazardous to surface vessels capable of navigating in the vicinity. Wrecks deeper than 11 fathoms may also be considered dangerous in areas expected to be navigated by deeper-draft vessels.

Dangerous wrecks over which a precise least depth or clearance has not been determined shall be charted using the following symbol: (K 28). The center crosslines of the symbol mark the published position of the wreck. The symbol should be rotated to the alignment of the sunken wreck, when known; otherwise it should be oriented parallel to the baseline of the chart. For emphasis, blue tint No. 1 shall be added within the enclosing danger curve.

Sunken wrecks with only their masts visible at the sounding datum shall be charted using the same symbol as dangerous wrecks with the added label "*Masts*" (K 25).

Where the depth over the wreck is unknown, the dangerous wreck symbol may be used if no safe clearance can be reliably estimated and it is judged that the wreck may be dangerous to navigation.

A wreck over which a precise least depth has been determined shall be charted with a sounding surrounded by a dotted danger curve, blue tint No. 1, and a label: *"Wk"* (K 26).

A cleared depth over a wreck obtained by a wire-drag survey shall be shown with a sounding surrounded by a dotted danger curve, blue tint No. 1, a wire-drag symbol outside the danger curve below the sounding, and the label "*Wk*" (K 27). A cleared depth obtained by wire drag will take precedence over a sounding obtained by fathometer. However, a least depth obtained by measured methods, such as by a diver, shall take precedence for charting over a wire-drag cleared depth if it is confirmed as a least depth during final processing and approval.

Where the scale of the chart is large enough, the true outline of the sunken wreck shall be shown with a dotted line, blue tint No. 1, and labeled "*Wk*." Wrecks that uncover at the chart datum and cover at the Shoreline Plane of Reference shall be charted with a dashed line, blue tint No. 1, and labeled "*Wk*."

The label "*Wreckage*" and a dotted danger curve should be used to identify areas where numerous wrecks are located or where the wreckage is scattered. Blue tint No. 1 shall be included within the danger curve (K 32).

Nondangerous Sunken Wrecks (K 29)

Sunken wrecks that are not deemed dangerous to surface vessels expected to be navigating in the vicinity shall be charted with a sunken wreck symbol only: (K 29), or with a known least depth and label "*Wk*." When using the symbol the center crosslines of the symbol mark the published position of the wreck, and the symbol should be rotated to the alignment of the sunken wreck, when known; otherwise, it should be oriented parallel to the baseline of the chart. Blue tint No. 1 and a danger curve are not required.

4.10.3 Wreck Charting Policy
Revised on March 24, 2003 by Cartographic Order 004/03

All stranded and sunken wrecks (dangerous or nondangerous) shall be shown on all charts which are intended for navigation. All nondangerous wrecks may not be charted. See Section 4.11.1.1.

To avoid inconsistencies, the criteria to be used for charting nondangerous wrecks shall be the same for all charts. The charting of nondangerous wrecks out to the 300-fathom curve on "Wreck Charts" was discontinued in the early 1970's. Nondangerous wrecks currently shown only on the former “Wreck Charts” shall not be deleted without a recommendation from an authoritative source and documented on the Chart History. Those nondangerous wrecks shown on the charts listed below shall be charted on the overlapping, larger scale charts where hydrography is shown. The following charts were previously designated Wreck Charts: 11300, 11340, 11360, 11400, 11420, 11460, 11480, 11520, 12200, 12214, 12221, 12300, 12326, 13009, 13200, 13260, 13267, 18003, 18010, and 18022.

4.10.4 Deletion of Charted Wrecks

A wreck or other obstruction that is charted shall not be deleted until there is conclusive evidence that it does not exist or no longer exist in the charted position. Conclusive evidence of nonexistence of a wreck or other obstruction may be furnished in either of two ways:

a. A wreck or other obstruction and all references thereto shall be deleted from the charts when a report of its removal is received from the USACE, the USCG, a harbormaster, or an equally authoritative source. If the LNM is used as the basis for chart action, the source of the report must be stated in the LNM.

When the words "destroyed" or "demolished" are used by a reporting source, the wreck shall continue to be charted until its status is proved by a survey, although the symbolization could be changed, e.g., a dangerous sunken wreck could be recharted as a nondangerous sunken wreck.

b. All references to a wreck or other obstruction shall be removed from all charts when an NOS hydrographer recommends its deletion in the DR of a survey. These recommendations shall be based on the results of a wire-drag or side scan sonar survey disproving the charted wreck or other obstruction, or other conclusive determination and must be confirmed during final processing and approval.

Wrecks and other obstructions must not be removed from charts on the basis of NOS preliminary data or reports or on the basis of any other NOS data which has not undergone final processing and approval. Examples of preliminary reports which must not be used as authority for removal are the Monthly Activities Reports from NOAA survey ships and the Chart Correction Mailbox System reports. These reports may be used to add information to the charts if, for example, an older charted wreck or other obstruction is not deleted in favor of a new reported position without conclusive approved survey evidence that the older wreck or other obstruction does not exist.

Wrecks which are neither verified nor disproved by a wire-drag or side scan sonar survey will remain on the chart; if a cleared depth over the charted position has been obtained from a wire-drag survey, the notation *(cleared _____ ft 1982)* shall be charted. This will permit the charting of a clearance depth regardless of a wreck's actual depth or where a wreck cannot physically be proved or disproved.

4.10.5 Automated Wreck and Obstruction Information System

The HSD maintains the Automated Wreck and Obstruction Information System (AWOIS), an automated file of information concerning wrecks and obstructions which have been or may be assigned for field investigation by a hydrographic field unit. Each unique AWOIS record is organized into four categories:

(1) Header -- contains information about the name of vessel if known, quadrant, vessel registry number, geographic position, area, position accuracy, survey status, carto code, and chart;

(2) History -- chronological list of researched source documents describing the origin and latest information available about a wreck or obstruction;

(3) Description -- sources of information not used in the nautical chart revision process, e.g., copyrighted publications, physical descriptions of a wreck; and

(4) Survey Requirements -- provides instructions to NOS hydrographers regarding the type and extent of field work necessary to verify or disprove a wreck or obstruction.

Six AWOIS computer generated listings are available covering all U.S. coastal waters. Special areas, usually a subset of data contained within or overlapping with any one of the six standard area printouts, can also be produced simply by furnishing the geographic limits of the relevant area in latitude and longitude.

The AWOIS file is not considered a complete source of information, and additional wreck and obstruction data may exist elsewhere within NOS. Information charted on the basis of AWOIS data or other lists of wrecks that do not originate from the NM, NOS field parties, or other sources accepted as authoritative shall carry the label "Rep".

4.11 Obstructions

4.11.1 Miscellaneous Dangers

Generally, anything that would hinder marine navigation may be classified as an obstruction. More specifically, an obstruction on a nautical chart is usually considered to be a hard, unyielding isolated object located in generally deeper depths that would endanger or prevent the safe passage of vessels. The term "obstruction" is often used as a preliminary label for unknown reported dangers until they can be identified and properly labeled. "*Rep*" and "*PA*" (see Section 4.11.3) shall be used to label obstructions as appropriate.

The majority of items charted as obstructions are reported to the NOS through the LNM and from USCGAUX and USPS reports. The USACE requires the removal, if possible, of man-made obstructions considered dangers to navigation.

The guidelines for classifying an obstruction as dangerous to surface navigation are the same as for sunken wrecks and sunken rocks. Generally, those lying at 11 fathoms (20 meters) or less below the sounding datum are considered hazardous. However, these guidelines shall be modified, as required, for areas expected to be navigated by deeper draft vessels.

Obstructions (K 40, K 41, K 42)

Obstructions are charted with a danger curve and blue tint No. 1. A least depth obtained by a reliable surveying method shall be charted within the danger curve, if available. The label "*Obstn*" and the year reported shall be charted when the type of obstruction and its least depth are not known. The label shall be charted in 6 pt. Swiss Light Italic.

A cleared depth over an obstruction obtained by a wire-drag survey shall be shown with a sounding surrounded by a dotted danger curve, blue tint No. 1, the proper label, and a wire-drag basket symbol inside the danger curve, see Chart No. 1 (K 41). A cleared depth obtained by wire drag will take precedence over a sounding obtained by fathometer. However, a least depth obtained by measured methods, such as by a diver, shall take precedence for charting over a wire-drag cleared depth if it is confirmed as a least depth during final processing and approval. Features which are neither verified nor disproved by a wire-drag or side scan sonar survey, but where a cleared depth over the charted position has been obtained from a wire-drag survey, will carry the charting notation *(cleared_____ ft 1982).* This will permit the charting of a clearance depth regardless of actual depths or where disapproval of an item is not physically possible.

Obstructions discovered by NOS hydrographic field parties that are not examined to determine the type of object, the least depth, nor an accurate position shall be charted with a danger curve, blue tint No. 1, and labeled:

Obstn PA
Unexam

Included in this category are items found during examination of side scan sonar records after completion of a project.

Some noninvestigated side scan sonar estimated depths may be retained on the final smooth sheet. For example, an estimated depth retained on the smooth sheet from a survey conducted in fathoms and tenths would be identified by a label and note thusly:

1^{6} *Obstn (A)*

(A) Depths on these obstructions were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computer offsets from the vessel's track.

This obstruction shall be charted as follows:

Chart in fathoms and fractions . . . . . 1 1/2 *Obstn Rep 1989*

Chart in fathoms and feet . . . . . 1.3 *Obstn Rep 1989*

Chart in feet . . . . . 9 *Obstn Rep 1989*

Chart in meters and decimeters . . . . . 2.9 *Obstn Rep 1989*

An unidentified submerged object that is not considered to be the remains of a submerged wreck and is not considered to be a danger to surface navigation shall be charted with a 1-mm circle and labeled "*Snag*". If a least depth over the debris has been determined by a lead-line sounding or similar precise, surveying method, the sounding will be charted in lieu of the 1-mm circle, but will still be labeled "*Snag*".

Critical dangers to navigation located under bridges (such as rocks and shoal soundings) shall be charted in their correct positions on the largest-scale chart coverage. The bridge symbol shall be broken to clear the charted danger.

Deletion of charted obstructions shall comply with the guidelines established for deletion of charted wrecks (see Section 4.10.4). See also Section 4.10.5, Automated Wreck and Obstruction Information System.

Note *A* on NOS Hydrographic Surveys

Some field investigations conducted with side scan sonar have "Note *A*" which states that certain depths obtained over rocks, wrecks, and obstructions are approximate. The Marine Chart Division (MCD) has charted these depths with the notation "reported." The hydrographic survey processing centers are no longer referencing rocks with Note *A*. They are being shown as rocks with a known depth over them.

MCD cartographers shall chart the sounding without the word, "reported," and without the accompanying date, when applying surveys prior to 1995 where depths over rocks are referenced by Note *A*.

Existing reported notes on rocks applied through earlier side scan survey may be removed as time permits. These "reporteds" must be verified through examination of surveys.

4.11.1.1 Full Bottom Coverage Surveyed Areas with a High Concentration of Obstructions and/or Sunken Wrecks

Revised on February 18, 2003 by Cartographic Order 003/03

Advances in hydrographic surveying technology have resulted in full bottom coverage that detects most objects on the sea floor. Numerous submerged features are being detected, surveyed and labeled as obstructions on hydrographic surveys with this new technology. Many of these obstructions are not hazards to surface navigation and should not be shown as such. There are three accepted compilation practices for charting areas with full bottom coverage surveyed areas with a high concentration of obstructions and/or sunken wrecks:

(1) All obstructions of unknown depth shall be charted. Chart **all** surveyed obstructions along with a selection of soundings that reflects the depths of the natural bottom in the area. Obstructions with least depths of 66 feet or less shall be emphasized by using a black dotted danger curve that encircles the sounding, with blue tint No. 1, and labeled. Obstructions more than 66 feet shall have the sounding labeled only. This guideline shall be modified, as required, for areas expected to be navigated by vessels with a draft deeper than 11 fathoms or for any other special circumstances.

(2) All obstructions of unknown depth shall be charted. Make a selection of least depths over obstructions and natural bottom depths. Attach the appropriate label such as *Obstn* or *Wk* to each charted obstruction. Charting all obstructions and sunken wrecks existing in the area is not required.

(3) All obstructions of unknown depth shall be charted. Make a selection of least depths over obstructions **determined** to be hazards to surface navigation and natural bottom depths. Attach the appropriate label (e.g., *Obstn* or *Wk*) to each charted obstruction. Charting all obstructions and sunken wrecks existing in the area is not required.

Any surveyed obstruction or sunken wreck may be emphasized with a dotted danger curve, blue tint No.1, and a label at the discretion of the cartographer.

Labels and Notes: When choosing the second or third practice that results in three or more obstructions not being charted, a label and note shall be added to the chart. A label, shown in black 7 pt. Swiss Light Italic, shall be placed inside the area with a high concentration of obstructions and /or sunken wrecks. The limit of the area will not be charted. The note gives the mariner the limit of the area.

Examples:

Numerous obstructions (see note _)

Numerous sunken wrecks (see note _)

Numerous obstructions and sunken wrecks (see note _)

A note shall be shown in black 7 pt. Swiss Light.

Examples:

NOTE _

Numerous obstructions, located from Lat. 41° 01' 15"N to 41°05' 19"N and bound on the East and West by the Mean High Water line, are not considered hazards to surface navigation and are not charted.

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NOTE _

Numerous sunken wrecks, non-dangerous to surface navigation, exist in the area within a radius of 2.5 nautical miles from a point at Lat. 41° 11' 55"N, Long. 75° 53' 18"W and are not charted.

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When choosing the second or third practice that results in two or fewer obstructions not being charted, a label and note shall not be added. Those obstructions not shown shall be denoted in the Chart History.

All obstructions shall carry the label abbreviation '*Obstn*' with black 6 pt. Swiss Light Italic. The label 'Obstruction' shall not be charted. All sunken wrecks shall carry the label abbreviation '*Wk*' with black 6 pt. Swiss Light Italic.

4.11.1.2 Unexploded Ordnance
Revised on August 22, 2012 by Cartographic Order 003/12

Definition: Unexploded Ordnance refers to any undetonated explosive material which is reported to be outside the charted limits of established regulated explosives dumping areas. (unexploded bombs, depth charges, torpedoes, ammunition, pyrotechnics, etc.) [29]

General Requirements

Unexploded ordnance constitutes a significant hazard to navigation. Unexploded ordnance shall be charted when reported in Notice to Mariners or by other government sources. Reports of unexploded ordnance from non-authoritative sources (e.g. U.S. Power Squadron, U.S. Coast Guard Auxiliary) shall be evaluated for charting and forwarded to the Nautical Data Branch for confirmation by the military or U.S. Coast Guard.

Sunken wrecks containing unexploded ordnance shall be considered dangerous wrecks and shall be charted as such. See Section 4.10.

Unexploded ordnance refers to many of the same types of materials found in established regulated explosives dumping areas but are located outside the charted limits of established regulated explosives dumping areas and are charted in accordance with the following specifications and guidelines. See Section 4.14.5.2 for charting "Established U.S. Navy Dumping Areas".

Feature Recommendation for a Notice to Mariners

Newly applied, revised or deleted unexploded ordnance shall require a Notice to Mariners.

Line Type and Weight

Unexploded ordnance shall be charted with a dotted danger limiting line: 0.25/0.6 mm (0.010/0.025"). This symbol shall be used regardless of depth due to the dangerous nature of unexploded ordnance.

Exception:

Large areas of a chart (such as 20 square miles) that indicate the possibility or probability of unexploded ordnance without specific locations of deployment must be outlined on paper/raster charts with a dashed limiting line: 0.20/2.0/0.75 mm (0.008"/0.080"/0.030"). In this case, the dotted danger limiting line is not used due to the non-specific location of the unexploded ordnance and the need to avoid impeding navigation with an extensive area of dotted danger symbolization.

Location and Orientation

Unexploded Ordnance shall be charted in its exact geographic position as depicted or stated in the source data.

Size and Shape:

The size and shape of an unexploded ordnance feature shall reflect the exact geographic limits as described in or shown on the source document when its size is greater than 2.55 mm in any dimension at chart scale.

When the extent of an area of unexploded ordnance is unknown,

or when unexploded ordnance is defined by a single point,

or with a size equal to or less than 2.55 mm in all dimensions at chart scale,

the minimum size unexploded ordnance symbol (dotted circle 2.55 mm in diameter) shall be used.

Example:

Sunken wrecks containing unexploded ordnance shall be charted with the dangerous sunken wreck symbol. See Section 4.10.

Labels and Notes

Unexploded ordnance features shall be labeled "*Unexploded ordnance*" followed by the year the hazard was reported, in parentheses, preferably located just below the *"Unexploded ordnance"* label.

Unexploded ordnance
(reported 2011)

In accordance with Section 7.4, the letter "o" in *ordnance* shall not be capitalized and the letter "r" in *reported* shall not be capitalized. The word "reported" may be abbreviated as *"rep"* when necessary.

The labeling shall be black 7 point Swiss Light Italic.

Sunken wrecks containing unexploded ordnance shall be labeled "*Wreck (unexploded ordnance"* with black 6 point Swiss Light Italic. A date may be added if known and space allows, such as

Wreck
(unexploded ordnance rep 2011)

The type of unexploded ordnance shall be charted if known (e.g., bombs, depth charges, etc.), with black 7 point Swiss Light Italic.

Unexploded bomb
(reported 2011)

As above, the first letter of any word after the first word in the primary label for this feature (in this case, "*bomb"*) shall not be capitalized. The word *"reported"* shall not be capitalized and may be abbreviated as "rep" when necessary.

The label for unexploded ordnance shall be placed adjacent to the feature when it cannot be located within the limits, so that the mariner will associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted unexploded ordnance feature is discouraged.

The label for a large area of a chart that indicates the possibility or probability of unexploded ordnance without specific locations of deployment shall be similar to:

Unexploded ordnance
(reported 2011)
(see note)

The first letter in the word, *"see"* shall not be capitalized.

The label shall be charted within the limits of the area.

The *"see note"* label shall refer to a charted cautionary note similar to the following:

CAUTION
UNEXPLODED ORDNANCE

Mariners are cautioned against anchoring, dredging, or trawling
in this area due to the possible existence of unexploded ordnance.

The caution note shall be in black, 7 pt. Swiss Light type style, set either 2 inches or 3 1/2 inches

wide and be placed in or near the title area.

Color and Screening

The limiting lines of unexploded ordnance along with associated labeling and notes shall be shown in black.

Due to the dangerous nature of unexploded ordnance:

Blue 8% tint shall always be shown within minimum sized unexploded ordnance symbols, regardless of depth.

Blue 8% tint shall be shown within the symbol for a wreck with unexploded ordnance on board (dangerous wreck symbol), regardless of depth.

Blue 8% tint shall be shown, regardless of depth, within unexploded ordnance areas that do not cover large areas of the chart (such as 20 square miles).

Feature Removal from Chart:

Charted Unexploded Ordnance features shall only be removed from the chart when recommended to do so by U.S. Coast Guard or military sources. Non-authoritative sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports) do not have sufficient authority to declare this feature nonexistent.

4.11.2 Doubtful Dangers

The "doubtful danger" category is reserved for reported obstructions that have been poorly investigated or not investigated at all, but which still must be charted because of the potential hazard to navigation that they represent. The source may be so deficient that it may be probable that the item has been reported with significant error in depth or position or may not even exist.

Sounding Doubtful (I 2)

The label "*SD,*" indicating uncertain depth, should be attached to a depth shown on a chart over a shoal, rock, or any submerged obstruction that is strongly suspected of being in error. The position is not in doubt.

Position Doubtful (B 8)

The label "*PD,*" indicating uncertain position, is used principally to indicate that a submerged feature such as a wreck, shoal, rock, obstruction, etc., has been reported in various positions but no one position has been definitely verified. The existence of the feature is not in question, only its correct position.

Existence Doubtful (I 1)

The label "*ED,*" indicating uncertain existence, is used principally to indicate the possible existence of a wreck, shoal, rock, obstruction, etc., the actual existence of which has not been established.

4.11.3 Questionable Danger

The "questionable danger" category includes those items that are questionable only because the positional accuracy or source is not of acceptable survey standards.

Position Approximate (B 7)

The label "*PA*" is used principally to indicate that the position of a danger has not been accurately determined by an authoritative survey. While the position is not of the desired accuracy, it is sufficiently accurate to be used for interim charting until the position can be established by authoritative survey methods.

Reported (I 3.1, I 3.2, I 4)

The label "*Rep*" is attached to any charted feature that is considered dangerous to navigation but has not been confirmed by an authoritative field observation or survey party. The year that the object

is reported shall be included:

Example: *Obstn (Rep 2000) Rk (Rep 2000)*

4.11.4 Natural Dangers

Deadheads (K 43.2)

A deadhead is a grounded log or tree trunk often floating free at one end at or below the surface of the water. A deadhead is usually charted with a 1-mm circle and labeled Snag.

Logs (K 43.2)

Logs that are grounded, with some parts visible above the surface of the water, may require charting. These logs would be charted with a 1-mm circle and labeled Snag.

Snags (K 43.2)

A tree or branch embedded in a river or lake bottom and not visible on the surface is charted as a snag. An unidentified submerged object or debris that is not considered to be the remains of a submerged wreck is also charted as a snag. These are not always considered to be a danger to surface navigation.

Stumps (K 43.2)

Stumps are the stationary remains of trees, often submerged.

4.12 Fish Havens

Revised on February 19, 2004 by Cartographic Order 003/04 and December 8, 2014 by Cartographic Order 013/14

Definition: **FISH HAVENS.** Areas established by private interests, usually sport fishermen, to simulate natural reefs and wrecks that attract fish. The reefs are constructed by placing assorted materials on the sea floor in areas which may be of very small extent or may stretch a considerable distance along a depth contour. Fish Havens are outlined and labeled on charts. Also, called Fishery Reefs. [1]

General Requirements

Fish Havens are artificial shelters constructed of rocks, rubble, boxcars, boats, concrete, special designed precast structures to enhance fish habitats, remnants of oil well structures, etc. that are placed on the sea floor to attract fish. Fish Havens are often located near fishing ports or major coastal inlets and are usually considered hazards to shipping. Constructed of rigid material and projecting above the bottom, they can impede surface navigation and therefore represent an important feature for charting. The Fish Haven may be periodically altered by the addition of new material, thereby possibly increasing the hazard. Permits issued by the U.S. Corps of Engineers (USACE) shall be the sole source for charting obstructions classified as Fish Havens in U.S. territorial waters, or to the 3-league (9 mile) line off Texas, West Coast of Florida, and Puerto Rico. The location, configuration, and authorized minimum depth can usually be extracted for charting from the permit. Fish Havens shall be charted in ALL cases where hydrography and other navigational detail are shown in the area.

EXCEPTIONS: A Fish Haven reported through other sources, such as the USCGAUX and USPS including Notice to Mariners shall be labeled "*Obstn*" and the depth, if known, shall be charted as reported. In all cases, soundings within the limits of the obstruction equal to or less than the reported depth shall be charted. Soundings within the limits greater than the reported depth shall not be shown. Depth curves shall not be shown. Sunken wrecks and obstructions with unknown depths or known depths less than the reported depth shall be shown within the limits. Sunken wrecks and obstructions with known depths greater than the reported depth shall not be shown within the limits. Other charted detail considered deeper than the reported depth within the obstruction limits (except submarine pipelines, submarine cables and wells) shall not be shown.

The Update Service Branch shall forward Fish Haven information published in Notice to Mariners to Nautical Data Branch. Upon receiving the information from these other sources, the Nautical Data Branch will request a copy of the permit from the appropriate Corps of Engineers district office so that the Fish Haven can be properly charted and labeled.

Fish Havens shall be charted upon notification that construction has begun, but the term "under construction" shall not be used in the chart label.

All new or revised submarine cables and submarine pipelines located within or traversing a charted Fish Haven shall be charted. Currently charted submarine cables and submarine pipelines that terminate at the limiting edge of a charted Fish Haven shall be researched and reapplied.

All wells located within a charted Fish Haven shall be charted.

In all cases, soundings within the Fish Haven equal to or less than the authorized minimum depth shall be charted. Soundings within the Fish Haven greater than the authorized minimum depth shall not be shown. Depth curves shall not be shown. Sunken wrecks and obstructions with unknown depths or known depths less than the reported depth shall be shown within the limits. Sunken wrecks and obstructions with known depths greater than the authorized minimum depth shall not be shown within the limits. Other charted detail considered deeper than the authorized minimum depth within the Fish Haven limits (except submarine pipelines, submarine cables and wells) shall not be shown.

Fish Havens are usually marked by privately maintained buoys. Only those aids to navigation approved by the U.S. Coast Guard (USCG) and published in the Local Notice to Mariners shall be charted. Reports of uncharted aids in the vicinity of Fish Havens shall be referred to the USCG for verification and charting recommendations. Problems encountered in the application of aids to navigation shall be referred to the Chief, Update Service Branch.

Feature Recommendation for Notice to Mariners

A newly applied Fish Haven regardless of its minimum depth shall require a Notice to Mariners. A relocation of a charted Fish Haven generally requires a Notice to Mariners. Any decrease in the Fish Havens minimum clearance requires a Notice to Mariners.

Line Type and Weight

Authorized Minimum Depths of 11 Fathoms or Less.

Fish Havens with authorized minimum depths (from USACE permits) of 11 fathoms (20 meters) or less shall be charted with a dotted limiting danger line: 0.25/0.6 mm (0.10/0.25") and blue tint No. 1.

Authorized Minimum Depths Greater than 11 Fathoms.

Fish Havens with authorized minimum depths (from USACE permits) greater than 11 fathoms shall be charted with a dashed limiting danger line: 0.15/1.25/0.5 mm (0.006/0.050/0.020") and no tint.

Authorized Unknown Minimum Depths.

Fish Havens located in general depths less than 11 fathoms (20 meters) shall be charted with a dotted limiting danger line: 0.25/0.6 mm (0.10/0.025") and blue tint No. 1.

Fish Havens not considered a danger to navigation when located in general depths greater than 11 fathoms (20 meters) shall be charted with a dashed limiting danger line: 0.15/1.25/0.5 mm (0.006/0.050/0.020") and no tint.

Fish Havens considered a danger to navigation when located in general depths greater than 11 fathoms shall be charted with a dotted limiting danger curve: 0.25/0.6 mm (0.010/0.025") and blue tint No 1.

Location and Orientation

Fish Havens shall be charted in their exact geographic positions as depicted or stated in the source material.

The center of the 2.0 mm square Fish Haven symbol shall be carefully charted to make certain that it encloses the entire Fish Haven. The square symbol shall have the same orientation as the Fish Haven.

Size and Shape

Fish Havens shall be charted with the standard cartographic symbols in Chart No. 1 (K 46.1 or 46.2).

Fish Havens shall be charted to their true size and shape provided the minimum dimension is at least 2.0 mm or greater at chart scale. The use of the 2.0 mm minimum will ensure that the symbol will appear on the chart as a recognizable feature, and will permit the display of a sufficient blue tint to improve the recognition of those that have a dotted limiting danger line symbol.

Minimum-Size Fish Havens

A 2.0 mm square, either dotted or dashed (depending on whether its authorized minimum depth is greater or less than 11 fathoms)(20 meters), shall be charted when the maximum dimension of the Fish Haven would be less than 2.0 mm at chart scale. The plotting center of the square must be carefully determined to make certain that it encloses the entire Fish Haven area. The symbol square should be oriented the same as the true feature.

Fish Havens are normally rectangular in shape but may be circular, oval or irregular. The circular line symbol shall only be charted to scale if it represents the true size and shape of the Fish Haven. A 2.55 mm diameter circle, either dotted or dashed (depending on whether its authorized minimum depth is greater or less than 11 fathoms)(20 meters), shall be charted when the maximum dimension of a circular Fish Haven would be less than 2.55 mm at chart scale.

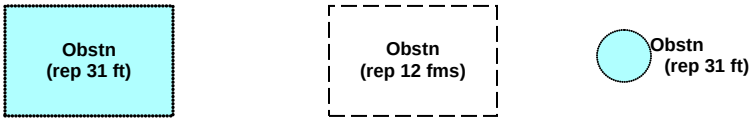
Fish Havens and Obstructions (Fish Havens reported through sources other than a USACE permit) without a description of shape or size shall be charted as circle 2.55 mm in diameter, dotted or dashed.

Labels and Notes

The label "*Obstruction*" shall not be charted. Instead, the abbreviation "*Obstn*" shall be used. All labels associated with Fish Havens shall be charted with black 7 point Swiss Light Italic.

The label shall be located inside the limits of the feature. When the label cannot be located within the limits of a Fish Haven, it shall be placed adjacent to the feature so that the mariner will associate the label with the charted feature. The use of an arrow or leader to associate the label with a charted Fish Haven is discouraged. Every effort shall be made to retain as much of the surrounding charted hydrography as possible when charting Fish Havens and accompanying labels in coastal areas on small-scale nautical charts.

Fish Havens reported through sources other than the U.S. Army Corps of Engineers (USACE), such as the Cooperative Charting Program, shall be charted as obstructions and the depth, if known, shall be charted as "*rep.*" They shall not be charted as a "*Fish Haven*." For example:



All Fish Havens shall be charted in areas where hydrography is depicted and labeled as obstructions if they are considered a danger to surface navigation, and carry a depth reference if known. Complete labeling shall be shown on the largest-scale charts and on smaller-scale charts where this can be accomplished without undue congestion. The preferred labeling for Fish Havens on large-scale and small scale charts is shown as Figure 4-12.

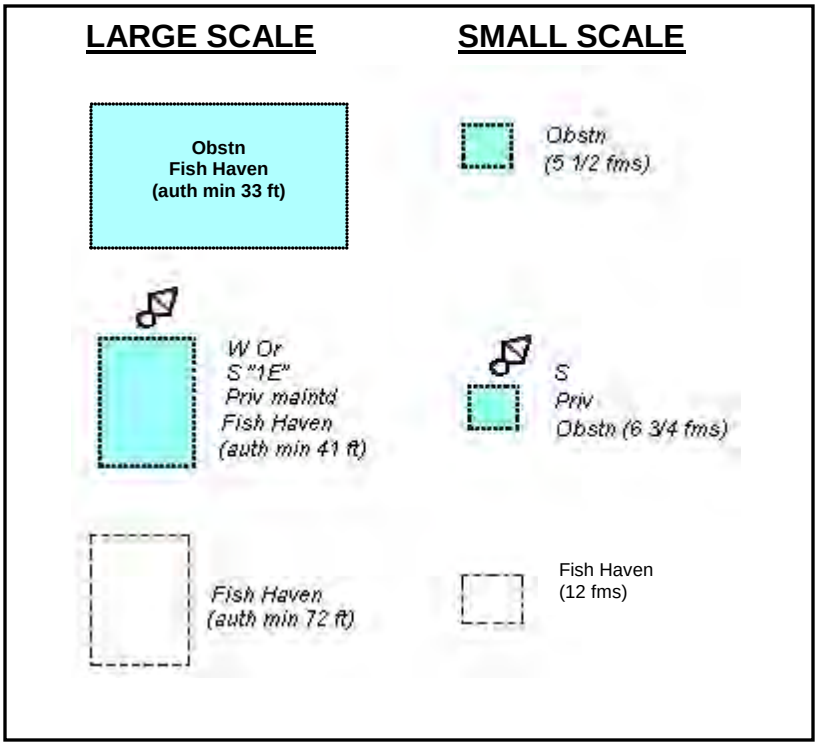


Figure 4-12

The addition of Fish Havens and their accompanying labels in some areas has resulted in the elimination of many critical soundings on smaller scale charts. Therefore, the next-largest-scale charts should be outlined or diagramed on the small-scale charts that show Fish Havens to identify charts where more detailed hydrographic information is available.

The above labeling guidelines supersede the labels associated with cartographic symbols in Chart No. 1 (K 46.1 and 46.2).

Color and Screening

Fish Haven limiting lines shall be charted with black.

Fish Havens with authorized minimum depths of 11 fathoms or less shall be charted with blue tint No.1.

Fish Havens with unknown authorized minimum depths in general depths less than 11 fathoms shall be charted with blue tint No. 1 throughout the Fish Haven limits.

Fish Havens with unknown authorized minimum depths located in depths greater than 11 fathoms and considered a danger to navigation shall be charted with blue tint No. 1.

Fish Havens not considered a danger to navigation when located in general depths greater than 11 fathoms shall be charted with no tint.

Feature Removal from Chart

A charted fish haven shall not be removed from the chart until all of the following conditions are met:

- The United States Army Corps of Engineers permit has either expired or has been rescinded.
- Charted hydrography has been added to the former fish haven from a survey conducted after the date the permit expired or was rescinded and that HSD has determined that the survey meets the IHO standard for M_QUAL attribute CATZOC A1 (see Volume 3).
- The permittee has provided a document stating that no material has been deployed since the date of the survey and that no further material will be deployed.

When only part of the fish haven meets all of the requirements for feature removal, the remaining portion of the fish haven must be retained on the chart with a revised limiting line separating the remaining fish haven from the deleted portion.

As an example:

A permit for a fish haven expired in June 2000.

The last deployment of material was in August, 1989.

The permittee states that no further material will be deployed.

A survey was conducted in the northern half of the former fish haven in May, 2010.

Therefore, the survey was conducted after the permit expired and after the last deployment of material.

HSD has determined that the survey meets IHO M_QUAL attribute A1.

Hydrography has been added from that survey to the chart in the northern half of the former fish haven.

Then,

All of the necessary conditions (shown in the bulleted list above) have been met for removing the northern half of the fish haven.

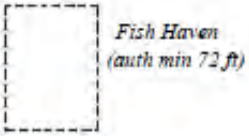
A survey meeting the above requirements has not been provided for the southern half of the fish haven, therefore all of the requirements for deletion of the southern half have not been met.

The southern half of the fish haven must then be retained and a new limiting line must be added between the retained southern half of the fish haven and the deleted northern half of the fish haven.

FISH HAVENS VS. FISH TRAPS VS. FISH TRAP AREAS

	* Fish Havens (i.e., artificial fishing reefs)	Fish Traps (i.e., fishing structures)	Fish Trap Areas
General			
1.	**Established by private interests; Federal, State and local governments.**	**Established by private interests; Federal, State and local governments.**	**Authorized by USACE.**
2.	**Used to simulate natural fish habitats for the primary purpose of attracting fish**	**Used to catch fish.**	**Used to indicate where fish traps are authorized to be established.**
3.	**Constructed by dumping junk**	**Constructed by building (and maintaining) traps; according to established regulations (i.e., CFR).**	**Intangible boundary limits; indicated on NOAA nautical charts.**
4.	**Junk may include rocks, rubble, concrete, boxcars, ships, military tanks, remnants of oil well structures, etc.**	**Fence like structure.**	
Upon Receipt of Source Document, Is Feature Always Charted As A.....?			
5.	**Only if USACE permit has been issued and received within the Nautical Data Branch**	**Only if structure is deemed to be:** **a. substantial and permanent in nature, and,** **b. a hazard to navigation**	**1. Only when a specific agreement exists with a State or authorizing agency, or** **2. When marked by buoys or other markers.**

NOTE: The information provided, primarily refers to the charting of fish havens on large scale charts. To obtain information concerning the application of fish havens to small scale charts, please refer to the Nautical Chart Manual, page 4-240.2, Figure 4-12.

	Fish Havens (i.e., artificial fishing reefs)	Fish Traps (i.e., fishing structures)	Fish Trap Areas
	Symbology (Actual Shape Charted)		
5A.	**a. with /USACE Permit** **b. auth min depth ≤ 11 fms** 	(Chart No. 1, K44.2) 	(Chart No. 1, K45)
	a. with USACE Permit **b. auth min depth > 11 fms** 		
	Symbology WITHOUT USACE Permit (Actual Shape Charted)		
5B.	**a. WITHOUT USACE Permit** **b. known depth ≤ 11 fms** 	**N/A**	**N/A**
	a. WITHOUT USACE Permit **b. known depth >11 fms** 		
	(See footnotes [1] and [2] below.)		

[1] The label: “under construction” shall NOT be added.

[2] To obtain the authorized minimum depth, the source document shall be forwarded to the Nautical Data Branch.

	Fish Havens (i.e., artificial fishing reefs)	Fish Traps (i.e., fishing structures)	Fish Trap Areas
Symbology WITH/WITHOUT USACE Permit (Minimum Size Symbol Required)			
5C.	**Rectangular shaped Fish Havens and Obstructions: 2.0 mm square (dotted or dashed as appropriate); labeled as appropriate - *See items 5A or 5B.* (Also see footnote [3] below.)**	**Rectangular shaped Fish Traps: 2.0 mm square (dotted) labeled as appropriate.**	**N/A**
	Circular, oval or irregularly shaped Fish Havens and Obstructions: 2.55 mm diameter circle (dotted or dashed as appropriate); labeled as appropriate - *See items 5A or 5B.* (Also see footnote [4] below.)	**Circular, oval or irregularly shaped Fish Traps: 2.55 mm diameter circle (dotted); labeled as appropriate.**	
Is Feature Applied in Areas containing Charted Hydrography and Other Navigational Detail?			
6.	**Yes**		
After Application to Chart, will Feature contain Soundings?			
7.	**Fish Havens: Only when soundings are <u>equal to</u> or <u>less than</u> authorized minimum depth.**	**No**	**Yes**
	Obstructions: No. (See footnote [5] below.)		
After Application to Chart, will Feature contain Depth Curves?			
8.	**Fish Havens: No**	**No**	**Yes**
	Obstructions: No		

[3] ONLY if actual shape of fish haven is rectangular in shape.
[4] ONLY if actual shape of fish haven is circular, oval or irregular in shape.
[5] Upon receipt of USACE Permit and authorized minimum depth: (a) the obstruction will be revised to a Fish Haven, (b) all labeling shall be applied as appropriate, and (c) all soundings shall be restored

	Fish Havens (i.e., artificial fishing reefs)	Fish Traps (i.e., fishing structures)	Fish Trap Areas
Associated Labels			
9.	**FISH HAVENS** **Black *7 pt. Swiss Light Italic*** **a. auth min depth ≤ 11 fms** **Example: *Obstn* *Fish Haven* *(auth min depth 33 ft)*** **b. auth min depth > 11 fms** **Example: *Fish Haven* *(auth min 72 ft)*** **OBSTRUCTIONS** **Black *7 pt. Swiss Light Italic*** **a. auth min depth ≤ 11 fms** **Example: *Obstn* *(rep 33 ft)*** **b. auth min depth > 11 fms** **Example: *Obstn* *(rep 72 ft)***	**Black 6 pt. Swiss Light Vertical** **Example: Fish trap**	**No label is charted with the symbol. The symbol is identified in the Fish Trap Areas note.**
Associated Notes			
10.	None	FISHING AND HUNTING STRUCTURES Uncharted fish and wildlife harvesting devices and structures such as fish traps, pound nets, crab traps, and duck blinds, some submerged, may exist in the area of this chart, particularly in the near shore area. Mariners should proceed with caution.	FISH TRAP AREAS Boundary lines of fish trap areas are shown thus: Submerged piling may exist in these areas.

		Fish Havens	Fish Traps	Fish Trap Areas
Charted Contents				
11.	a.	Soundings less than the authorized minimum depth.	None	All detail in area of Fish Trap Area symbol shall be retained.
	b.	Sunken wrecks with unknown depths or known depths less than the authorized minimum depth.		
	c.	Obstructions with unknown depths or known depths less than the authorized minimum depth.		
	d.	Submarine cables (within or traversing)		
	e.	Submarine pipelines (within or traversing)		
	f.	Wells		
Non-Charted Contents				
12.	a.	Soundings greater than the authorized minimum depth.	All	N/A
	b.	Depth curves		
	c.	Sunken wrecks with known depths greater than the authorized minimum depth.		
	d.	Obstructions with known depths greater than the authorized minimum depth.		
	e.	Other charted detail.		

Sunken Airplane

(Photo courtesy of the "State of Florida Artificial Reef Program.)

Old U.S. Army M-60's

(Photo courtesy of the "State of Florida Artificial Reef Program.)

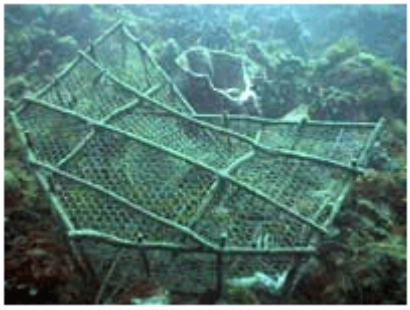
The "Antares" on her way to becoming a fish haven.

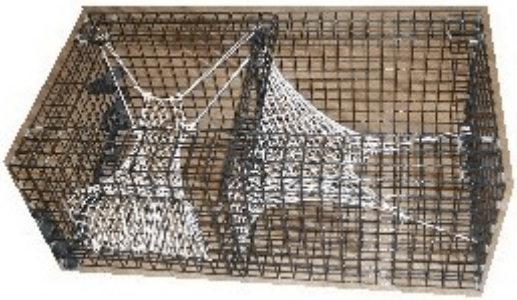
Photo courtesy of the "Scuba Shack" in Pennsicola.

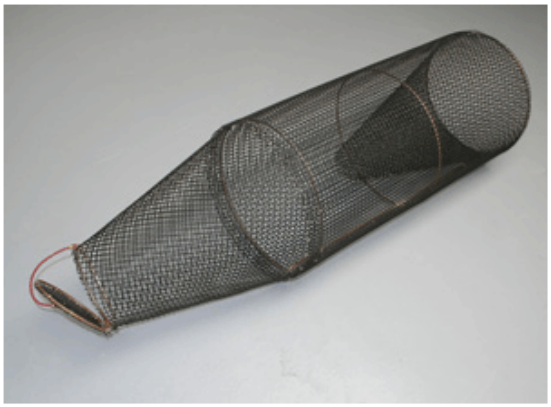
Sunken Culvert

Photo courtesy of the "Scuba Shack" in Pennsicola.

EXAMPLES OF FISH TRAPS







A Fish Trap Sits on a Dried-Up Lakebed

TURKEY: August 1, 2007

A fish trap sits on a dried-up lakebed in Istanbul.

Turkey is going through one of the most arid summers in the past seven decades, with cuts in the city water supply system scheduled to start in Turkish capital Ankara on Wednesday.

Story by Osman Orsal Photo by OSMAN ORSAL

REUTERS NEWS PICTURE SERVICE

4.13 Marine Structures

A chartable marine structure is a man-made structure anchored or otherwise fixed in position in a navigable waterway or foreshore area and stationary in that position at least through the normal boating season. These include platforms and cribs, fishing and hunting structures, drilling platforms and other oil and gas well paraphernalia, etc.

Sources for charting marine structures on NOS nautical charts consist of the LNM, USCG, USACE, USGS, other U.S. Government agencies, States, private organizations, USCGAUX, USPS, NOS field reports, Coast Pilot inspections, topographic and hydrographic surveys, etc. However, NOS shall remain the final authority for charting any marine structure that it considers to be potentially hazardous to marine navigation regardless of other recommendations.

A charted marine structure shall not be removed from a chart until there is conclusive evidence that it does not exist in the charted position. Non-authoritative sources, e.g., USCGAUX and USPS reports, photo revisions without field edit, etc., are not sufficient evidence of nonexistence for the removal of a charted structure.

Marine structures such as survey platforms, piles, etc., that exist along maintained channels shall not be charted where to do so would interfere with a light symbol. The following note shall be added to charts where this condition exists.

CAUTION

Survey platforms, signs, pipes, piles and stakes, some submerged, may exist along the maintained channels. Piles and platforms are not charted where they interfere with a light symbol

All marine structures shall be charted in black, with tints as specified. All labels shall be 6 pt. Swiss Light or Swiss Light Italic using initial caps and lowercase. Proper names or other proper identifiers shall be in all capitals. Labels stating clearances over submerged structures shall be enclosed in parentheses.

4.13.1 Platforms and Cribs

Platforms and cribs shall be shown outlined to scale when their charting size is greater than 1.3 mm in any dimension (see Figures 4-13a and 4-13b). The smallest dimension of this "to scale" symbol shall be at least 0.3 mm to ensure its recognition as a chart feature (see Figures 4-13c and 4-13d). Significant and potentially hazardous obstructions must be charted by a symbol and label that are easily recognized by

the mariner; consistent application of the symbols in Figures 4-13 and 4-14 will help ensure this recognition. These structures shall carry the primary label, e.g., "Platform" or "Crib." Labels for catwalks, various attached pipes, hardware, and similar appurtenances and should not be used.

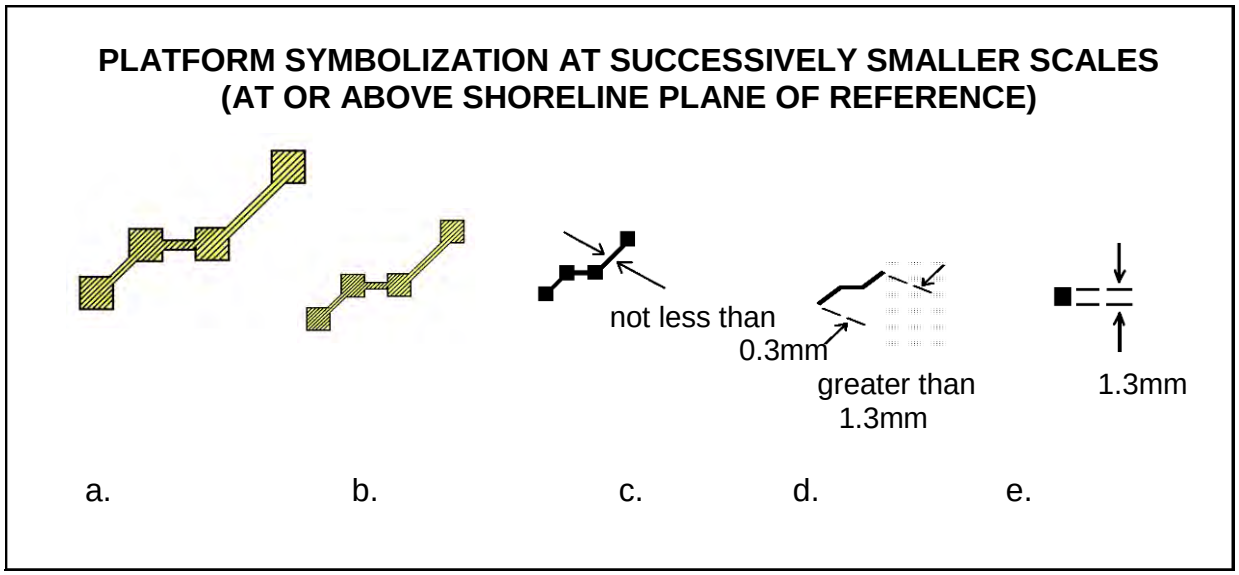


Figure 4-13

MINIMUM SIZE SYMBOLS (1.3mm square)					
ACTIVE			RUINS		
AT OR ABOVE SPOR[1]	COVERS AND UNCOVERS	BELOW SDPOR[2]	AT OR ABOVE SPOR[1]	COVERS AND UNCOVERS	BELOW SDPOR[2]
a. Platform Crib	**b.** *Crib*	**c.** *Subm crib*	**d.**[3] Platform (ruins) Crib (ruins)	**e.** *Platform (ruins)* *Crib (ruins*	**f.** *Subm platform (ruins)* *Subm crib (ruins)*

SYMBOLS FOR FEATURES CHARTED TO SCALE					
ACTIVE			RUINS		
AT OR ABOVE SPOR[1]	COVERS AND UNCOVERS	BELOW SDPOR[2]	AT OR ABOVE SPOR[1]	COVERS AND UNCOVERS	BELOW SDPOR[2]
g. Platform Crib	**h.** *Crib*	**i.** *Subm crib*	**j.**[3] Platform (ruins) Crib (ruins)	**k.** *Platform (ruins)* *Crib (ruins)*	**l.** *Subm platform (ruins)* *Subm crib (ruins)*

1

[1] SPOR - SHORELINE PLANE OF REFERENCE

[2] SDPOR - SOUNDING DATUM PLANE OF REFERENCE

[3] If the major portion of the structure is considered to be visible at the shoreline plane of reference (SPOR), the ruins symbol shall be shown with a black dashed outline, **gold tint**, and vertical type.

Figure 4-14

Platforms and cribs charted as hydrographic features (i.e., below the Shoreline Plane of Reference) shall be shown by a black dashed outline, slant label, and blue tint No. 1. A distinction should be made in labeling a structure that is below the sounding datum and is therefore submerged at all stages of tide (e.g., "*Subm crib*") and a structure that covers and uncovers (e.g., "*Crib*"). Where it is justified, the danger curve and blue tint may be added to a submerged feature if it is considered hazardous to navigation. This includes features near deep-draft vessel routes with depths greater than 11 fathoms (20 meters).

Outlines of platforms and cribs that are considered topographic features (i.e., they are at or above the Shoreline Plane of Reference) shall be shown by a solid black outline, filled with crosshatching and gold tint, and labeled with vertical type.

Where the datum of reference cannot be determined with reasonable certainty, the category that describes the most dangerous condition, the covers and uncovers criteria shall be used. In areas where numerous platforms are located, a selection of platforms shall be charted to avoid covering the area with overlapping symbols. The selection shall include the outermost platforms and a selection of the inner platforms, where necessary. Platforms may be adjusted half the symbol width to provide clarity and identification of important overlapping symbols.

Minimum-Size Platforms and Cribs

When the greatest dimension of a platform or crib at chart scale is 1.3 mm or less, a minimum size black filled square 1.3 mm on each side shall be charted (see Figure 4-13e and Figure 4-14). This square shall be oriented with the baseline of the chart where rotation is not considered significant, as in open water. For other applications, it may be important to rotate the square according to the source, as alongside channels and shoreline; this is a matter of cartographic judgment.

Minimum-size symbols representing platforms or cribs that cover and uncover or that are below the Shoreline Plane of Reference shall be outlined with black dashes, tinted blue, and labeled with slant type (e.g. "*Crib*" or "*Subm crib*", as appropriate).

Minimum-size symbols representing platforms or cribs that are at or above the SPOR shall be outlined with black, filled with gold tint, and labeled with vertical type.

Platforms and Cribs in Ruins

A ruined platform or crib that is sufficiently large to be outlined to scale shall be charted with a dashed outline. The word "*(ruins)*" in parentheses shall be added to the label and blue tint No. 1 shall be added to the symbol for ruins that cover and uncover or are totally submerged (see Figure 4-14). Ruined platforms and cribs that must be depicted using a minimum-size symbol shall be shown with a black dashed line.

4.13.2 Fishing Structures

Fish/Crab Pens

These are floating crib-like structures, usually in open water areas, anchored to the bottom in a fixed position to store live fish or crabs. They are charted with a black line and label in italic type.

Fish Stakes (K 44.1)

These are poles or stakes placed in shallow water to outline fishing grounds or as part of a structure built to catch fish.

Fish Traps; Fish Weirs; Tunny Nets (K 44.2, K 45)

These are fence-like structures, usually with netting set between supports, to catch fish. Fish traps reported to be substantial and permanent, located in an area charted with hydrography, and which could be considered an obstruction to navigation shall be individually charted on the largest-scale coverage where space permits along with the following "FISHING AND HUNTING STRUCTURE" note. This note shall also be shown on all other charts where these structures are known or suspected by means of field observations, provided hydrography is charted in these areas. Area limits where fishing and hunting structures are authorized shall be charted only as specified in Section 4.14.1.

FISHING AND HUNTING STRUCTURES

. Uncharted fish and wildlife harvesting devices and structures such as fish traps, pound nets, crab traps, and duck blinds, some submerged, may exist in the area of this chart, particularly in the near shore area. Mariners should proceed with caution

No objective criteria can be stated for definitively determining the permanent or nonpermanent status of a fish trap. The factors affecting this decision for the visible portion involve the cross-section dimensions of the fish trap's upright members, the durability of the material (pressure-treated wood, metal, etc.), cross-bracing or banding, location, and various other determinants. Additionally, the underwater portions of traps may remain a hazard for many years after the visible parts are gone. The final decision as to chartability should be based on the impression of permanence to a knowledgeable observer, recognizing that this involves subjective judgment. In case of doubt, fish traps should be charted in the interest of marine safety.

4.13.3 Floating Structures

Floats

A float is any buoyant structure anchored to the bottom so that its position is fixed.

Floats are generally considered temporary structures and are not usually charted. Where floats in an area of charted hydrography are determined by field observation to be permanent, but they are not listed in the Light List as an aid to navigation, they shall be shown to scale or with a minimum-size 1.3-mm black open square. They shall be labeled "*Float*" (which may be abbreviated "*Flt*" in congested areas) in 5 or 6 point Swiss Light Italic. The label "*lighted*" may be added if appropriate.

Floats which display lights, have Light List numbers, and are established as an aid to navigation, should be charted with a lighted open buoy symbol and labeled "*Float*" (P 7).

Floating Breakwaters (F 4.1)

These are floating structures anchored to the bottom in such a manner as to form a basin within which vessels may be protected from the violence of the waves. They are charted the same as fixed breakwaters, except for the label and the addition of any anchoring symbolization (see Section 3.5.2).

Floating Piers

These are floating pier-like structures fixed in position and extending into the water to afford a berthing place for vessels or to serve as a landing place or promenade. See Section 3.5.1 for charting specifications.

4.13.4 Floating Barriers
Revised on November 10, 2010 by Cartographic Order 002/10

Log Booms (N 61)

These are floating barriers of timber used to protect a river or harbor or to create an enclosed storage area for retaining logs during logging operations.

A log boom shall be represented by the dashed line and piles symbol (N 61). The label "*Log boom*" shall be shown in 6 point Swiss Light Italic.

Log booms shall not be removed from the chart until a follow-up permit has been received from the USACE stating that all logging operations have been terminated and all structures associated with these areas have been removed.

Security Barriers

Definition: **SECURITY BARRIER.** A moveable floating structure or cable linking buoys, floats or fixed structures and is used to block unauthorized vessel entry into specified federally regulated water areas, such as the water area adjacent to a military installation. [29]

Equivalent Terminology: Security barriers may also be referred to by various terms including the following: Naval Security Barriers, Floating Barriers, Naval Floating Security Barriers, anti-small boat barrier booms or Navy Asset Protection Barriers. All of these different terms or other equivalent terms shall be charted with the designated label - *Security barrier*.

General Requirements

A security barrier shall be charted at all scales where hydrography is charted.

Floating security barriers are being installed at various U.S. naval installations as a means to protect military assets. Entry into a zone/area, protected by a security barrier, is prohibited unless authorized by the cognizant authority – usually the U.S. Navy. A federally regulated area is typically codified in the Federal Register (FR) and/or Code of Federal Regulations (CFR). Security barriers used to secure federally regulated areas are located entirely within the geographic boundary of federally regulated areas such as Security Zones or Restricted Areas. To accommodate these structures, the geographic boundaries of many existing federally regulated areas have been modified and/or expanded. Changes to these federally regulated areas, including security barriers, are usually codified in the Federal Register (FR) and/or Code of Federal Regulations (CFR).

The primary purpose of these floating structures is to ensure the physical protection of naval vessels moored in the regulated area by providing adequate "stand-off distance" and to safeguard waterside facilities.

The variable configuration of security barriers typically consist of one or more floating booms, pontoons or cables connected to one or more buoys and/or fixed structures. Fences or nets may extend vertically above floating segments of a security barrier. Sections of the security barrier can be moved to allow authorized traffic to or from the secured installation. Gates and points of entry are not charted **UNLESS** specifically requested by the cognizant authority.

A security barrier is usually located, in its entirety, within a federally regulated area. Accordingly, when adding, revising/modifying an existing regulated area, specific attention **MUST** be given to examining the source for the existence of a security barrier.

Data from the U.S. Military is considered authoritative source for charting security barriers. Often, this information has been forwarded to NDB by the Navigation Services Division (NSD).

Other sources (USACE Condition Surveys, RSD imagery, etc.) indicating the existence of a security barrier shall be referred to the Nautical Data Branch for the acquisition and registration of source material/s necessary to correctly chart these features. This includes any issues related to differences in location.

The existence of a security barrier may be published/listed in the Local Notice to Mariners.

A security barrier published in a Notice to Mariners shall be immediately referred to the Nautical Data Branch for confirmation from the cognizant authority and includes the acquisition of the applicable permit and as-built drawings to ensure accurate charting of the feature. The Nautical Data Branch may need to coordinate with the Update Service Branch when there are issues related to Aids to Navigation.

For example:

> **Reference: Local Notice to Mariners (LNM 09/03), Monthly Edition, dated 04 Mar 2003, Page 3 of 8, Section VII. GENERAL INFORMATION**
>
> **SOUTHERN CALIFORNIA - SAN DIEGO BAY** – NAVY ASSET PROTECTION BARRIERS – The U.S. Navy has constructed protection barriers for its assets at North Island from position 32°42.3'N

117°10.8'W to 32°42.8'N 117°11.6'W, at Point Loma from position 32°41.4'N 117°14.4'W, and at the Naval Station from 32°41.0'N 117°08.1'W to 32°39.7'N 117°07.4'W. These barriers will be in place until further notice. For further comments or details, contact Lieutenant Henry P. Pierce, USN at (619) 556-3143.
Chart 18773 LNM 09/03 dated Mar 2003.

Buoys, floats or fixed structures (such as piles and markers) associated with a security barrier shall be charted in accordance with standards and specifications contained in applicable sections of the Nautical Chart Manual. Buoys or floats associated with a security barrier shall be labeled as to color(s) in all cases, light characteristic when lighted or shape if unlighted. The authority which maintains a security barrier buoy or float shall be charted, such as "*Navy*".

Feature Recommendation for a Notice to Mariners

A newly applied, revised or deleted security barrier shall be referred for a Notice to Mariners.

Line Type and Weight

A security barrier shall be charted with a dashed line, 0.20/2.00/0.75 mm (.008"/0.080"/0.030"). The dashed line indicates that this is a moveable, flexible, floating object and not a fixed structure.

ALL charted type shall be moved to clear a charted security barrier symbol to provide the mariner maximum visual recognition of the existence and location of a security barrier.

A security barrier symbol shall not be broken for buoy hull symbols or light flares when those symbols can be rotated to clear the barrier symbol.

A security barrier symbol shall not be broken for non-critical depth soundings.

Location and Orientation

A security barrier shall be charted in its exact geographic position as depicted in the source material. In most cases, a security barrier shall be assumed as being a straight line between adjacent buoys, floats or fixed structures.

A security barrier may be flexible and bow inward or outward from the straight axis between adjacent buoys, floats or fixed structures. In all cases, the straight line axis shall be charted.

A security barrier shall **ALWAYS** be charted in a closed position **UNLESS** specifically requested otherwise by the cognizant authority.
A security barrier shall not be charted when the cognizant authority requests that it not be charted. Such requests **MUST** be documented and registered as source material by the Nautical Data Branch.

Size and Shape

A security barrier shall be charted to scale as depicted in the source material.

Labels and Notes

Labels: A security barrier **MUST** be labeled. A security barrier label shall be aligned along the axis and inside the limiting line of the symbol. When not possible, a security barrier label shall be charted next to the symbol as close to the axis of the symbol as possible. As an absolute last option, a 0.15 mm (.006") black leader may be used.

A security barrier shall be labeled, "*Security barrier*" with black, 7 point Swiss Light Italic type.

Example: *Security barrier*

When space does not allow for a full label, the label "*Barrier*" shall be used and is the minimum label specification.

Example: *Barrier*

A security barrier charted from non-authoritative sources such as U.S. Power Squadron or U.S. Coast Guard Auxiliary reports, shall be labeled as a "reported" feature. A "reported" security barrier shall not have an associated note.

Example: *Security barrier reported*

A "reported" security barrier shall be immediately referred to the Nautical Data Branch for confirmation from the cognizant authority. The Nautical Data Branch may need to coordinate with the Update Service Branch when there are issues related to Aids to Navigation.

Notes: A note shall not be used to refer to a security barrier, security barrier or float characteristics or federally regulated areas such as Security Zones or Restricted Areas when those features are clearly charted and labeled on the chart. A note shall not repeat charted Code of Regulations (CFR) references. A security barrier note shall not offer advice on how to navigate through or past the barrier.

ONLY WHEN associated floating or fixed features cannot be adequately labeled due to chart congestion, a note shall be charted to provide that specific information. Note that the security barrier symbol and label **MUST** still be charted.

A note (when necessary, see paragraph above) shall be charted with black, 7 point Swiss Light type. The note shall be charted similar to the following example and located proximate to the charted security barrier:

NOTE ___

Floating security barriers have been installed at various U.S. Naval installations throughout (geographic name). Barriers are marked by quick flashing yellow (QY) lights and approximately mark the (type of area) surrounding the facility.

Color and Screening

A security barrier shall be charted in black.

A security barrier label shall be charted in black.

A security barrier note shall be charted in black.

Feature Removal from Chart

A charted security barrier shall not be removed or revised until the establishing authority provides conclusive evidence that the feature does not exist in the charted position. Non-authoritative

sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit), do not have sufficient authority to declare a security barrier nonexistent.

The establishing authority (usually the U.S. Navy) for a security barrier is designated in the Code of Federal Regulations (CFR) and contained within the citation for the specific federally regulated area in which the security barrier is located.

4.13.5 Mineral Development Structures

Mineral development structures shall include all fixed structures, whether temporary or permanent, for which a USACE permit is issued. It shall include, but is not limited to, drilling platforms, production platforms, quarters platforms, pipeline riser platforms, manifold platforms, loading platforms, boat landings, caissons, well protective structures, tank battery barges submerged on station, drilling barges submerged on location, breakwater barges submerged on location, artificial islands, and all other piles, pile clusters, pipes, or structures erected in the waters (33 CFR 67.01-5).

Mineral development structures shall be drawn to chart scale depicting the actual shape. When the chart scale is too small to show the actual shape of a structure, the following procedures shall apply:

For visible structures, the appropriate symbol shall be added to the chart with a label identifying the structure.

For submerged structures, in addition to the appropriate symbol and identifying label, a dotted danger curve shall enclose the symbol. Blue tint No. 1 shall be used for fill when the structure is considered a hazard to navigation, e.g., if it is covered by 11 fathoms or less of water. Depths over submerged structures shall be included in the label when available and when chart scale permits.

When the structure is covered by depths greater than 11 fathoms, the danger curve and blue tint are used only when the structure is considered hazardous to vessels transiting the area.

Figure 4-15 shows the various ways a well may be charted and should clarify nautical charting policies and procedures regarding the charting at small scales of underwater and above-water wells and those that are under construction. All wells located within a charted Fish Haven or Spoil Area shall be charted.

Wells (L 20)

These may be oil or gas wells that are seabed installations only. The installation may include underwater production facilities.

CHARTING OF WELLS

Chart Description	Description
■ Platform	An active visible well or above-water pipework. Often called a "Christmas Tree", these structures usually have catwalks or small platforms attached and appear more substantial than a simple "casing" or well pipe. Although these structures are smaller than most other structures charted as platforms, they may be seen for some distance.
○ Pipe	A visible well that appears to be inactive or abandoned.
Well (covered 35 ft)	An active well covered by 11 fathoms or less. The danger curve and tint shall be charted if the structure is considered a hazard to navigation.
○ *Well (covered 85 ft)*	An active well covered by more than 11 fathoms. The danger curve and tint may be added only if the structure is considered a hazard at these depths.
Obstn	An abandoned well that is covered by 11 fathoms or less and is considered a hazard to navigation.
○ *Obstn*	An abandoned well covered by more than 11 fathoms that is not considered a hazard to navigation. The danger curve and tint would be added if it were considered a hazard at these depths.
■ Platform (under construction PA)	A platform structure that is under construction.
	Submerged well. This symbol shall be used only when all submerged wells on a chart can be shown with this symbol. When this is the case, the label *"Well"* may be omitted, keeping the *"(covered ___ ft)"* notation.

Figure 4-15

Wellheads (L 21.1, L 21.2, L 21.3, L 23)

These are submarine structures projecting above the seabed and capping a temporarily abandoned or suspended oil or gas well.

Platforms (L 10, L 13)

These are permanently established structures used for surveying; oil, gas, and other mineral development and production purposes; research; and other purposes.

1. Sign Designations

Federal regulation 30 CFR 250.115 requires that a sign be displayed at fixed mineral development structures in the waters under the jurisdiction of the United States. These signs usually consist of four blocks of information, which include the following: the name of a company (usually abbreviated); the geographic area; the lease block number; and the structure number, letter, or name.

Sign designations shall not be charted adjacent to platforms within the jurisdictional area of the Eighth Coast Guard District. Sign designations shall be charted for platforms that fall within the areas of all other Coast Guard districts. Sign designations shall be added as they are announced in the LNM and Special Notice publications. Sign designations from other sources shall be forwarded through the NM Update Service to the Coast Guard for approval.

When sign designations are not charted adjacent to the platform symbols, the label “Platform” shall be added with black 6 point Swiss Light type.

The sign designation, when charted, shall be placed alongside the platform symbol using black 6 point Swiss Regular upper case letters and enclosed in quotation marks. No other label shall be used.

Examples: "MOBIL-SS-118-1"; "HILLHOUSE"; "HOM-VE-75-1"

A label is not required for all structures; only those that are isolated or selected outer structures of a group.

2. "Mineral Development Structures" Note

Obstruction lights and fog signals (audible sound signals) are required to be operated as privately maintained aids to navigation on all mineral development structures in the waters under the jurisdiction of the United States, subject to approval by the USCG District Commander. To improve the legibility of the charted detail around these structures, "(lighted)" and "HORN"

labels should be deleted from such structures on all charts going forward and shall be replaced by the following note placed in a prominent location on the chart:

MINERAL DEVELOPMENT STRUCTURES
Obstruction lights and sound (fog) signals are required for fixed mineral development structures shown on this chart, subject to approval by the District Commander, U.S. Coast Guard (33 CFR 67).

The note shall be in 7 pt. Swiss Light type, 2" or 3 1/2" wide, and in black.

Artificial Islands (L 15)

Artificial islands are being constructed off the north coast of Alaska for the purpose of mineral development. These artificial islands shall be depicted on large-scale charts with an 0.15-mm black line depicting the actual island configuration and with gold tint. The minimum-size island symbol (see Section 4.9) with no tint shall be used on small-scale charts. These islands shall be labeled "Artificial island". The second line of the label shall include the signboard name, in parenthesis, as published in the LNM. The label shall be in black 6 pt. Swiss Light type. The "Mineral Development Structures" note shall be added to all charts depicting artificial islands.

After mineral development activity ceases and an island is abandoned, the signboard label and the aid characteristics shall be deleted, leaving only the label "Artificial island". This label shall continue to be charted even if the island is reduced below the sounding datum to avoid future Federal-State boundary determination disputes. Artificial islands that are between the shoreline datum and the sounding datum shall be charted with a dotted curve, green tint, and labeled "*Obstn (artificial island)*" in 6 pt. Swiss Light Italic. Artificial islands that fall below the sounding datum shall be charted identically except using a blue tint in place of the green tint. Minimum-size islet symbols shall be used on small-scale charts (see Figure 4-16).

ARTIFICIAL ISLAND SYMBOLOGY

ACTIVE	
CHARTED TO SCALE	**MINIMUM SIZE**
 Artificial island (MUKLUK) Fl Lt (Priv)	Artificial island (MUKLUK) Fl Lt (Priv)

ABANDONED					
CHARTED TO SCALE			**MINIMUM SIZE**		
VISIBLE AT ALL TIMES	**COVERS AND UNCOVERS**	**SUBMERGED AT ALL TIMES**	**VISIBLE AT ALL TIMES**	**COVERS AND UNCOVERS**	**SUBMERGED AT ALL TIMES**
 Artificial island	 *Obstn (artificial island)*	 *Obstn (artificial island)*	Artificial island	 *Obstn (artificial island)*	*Obstn (artificial island)*

Figure 4-16

4.13.5.5 Offshore Wind Turbines

Last revised by Cartographic Order 006/14 on May 21, 2014

Definition: **WIND TURBINE.** A tower and associated equipment that generate electrical power from wind. They can be sited offshore and may be either fixed or floating. [103]

Definition: **WIND FARM.** A collection of wind turbines that are collocated and are organized as a single power generation unit. [103]

General Requirements

Wind turbines are generally tall, multi-bladed structures, usually with two or three blades and are often visible over long distances in good visibility. Their purpose is to generate electricity for large communities, or to feed a national power grid. They are often arrayed in groups, known as wind farms, and may be sited offshore or onshore.

If the mechanical energy produced by the structure is used directly by machinery, such as for pumping water, cutting lumber or grinding stones, the machine is called a **windmill**. If the mechanical energy is instead converted to electricity, the machine is called a **wind turbine**.

Offshore wind turbines and offshore wind farms may be dangerous to navigation and shall be charted in waters where hydrography and other navigational detail are shown.

A lease to build and operate an offshore wind turbine in navigable waters is required from the Bureau of Ocean Energy Management (BOEM). A permit may also be required from the USACE. The USCG provides the permitting agency with an evaluation of the potential impacts of the proposed facility on, navigation, safety and the traditional uses of the particular waterway. The location, configuration, and dimensions can usually be extracted for charting from the lease documentation, permit or the approved company's construction and operating plan. Offshore wind turbines and offshore wind farms shall be charted upon notification that construction has begun.

The Nautical Data Branch shall request a copy of the permit or lease from the appropriate authority in order to properly chart and label the feature when an offshore wind turbine or offshore wind farm is initially charted from non-government sources, or from data provided directly from the owner of the turbine(s). Offshore wind turbines and offshore wind farms shall be charted from data provided by RSD, NRT, HSD, LNM and NM, when leasing documents, permits or data directly from the owner are not available. These sources shall also be used when it is determined that the data provided is of higher accuracy than data provided by a permit or owner.

Soundings, depth curves and other features shall be shown within a wind farm when such hydrography would be shown if the wind farm did not exist.

Guidance for encoding offshore wind turbines and offshore windfarms is found in Nautical Chart Manual, Volume 3, Section E.1, Landmark (LNDMRK), Section L.1, Offshore Platform (OFSPLF), and Section L.6, Offshore Production Area, (OSPARE).

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted offshore wind turbine or offshore wind farm shall be recommended for a Notice to Mariners.

Line Type and Weight

Offshore wind farm limits shall be charted with a dashed limiting line: 0.20/2.00/0.75 mm (0.008/0.080/0.030 inches)

Location and Orientation

An offshore wind turbine or offshore wind farm shall be charted in its exact geographic position as depicted in the source material.

Size and Shape

Individual wind turbines are shown by the Chart No.1 symbol L 5.1, with the position circle at the base of the symbol indicating the location of the structure.

Example:

If a navigational light is attached to the wind turbine, a magenta light flare should be added to the base.

Example:

Floating wind turbines are held in position by ground tackle and consequently may be subject to significant lateral and some vertical movement. To distinguish them from fixed turbines, the symbol must be sloping by fifteen degrees from vertical.

Example:

When a navigational light is attached to the floating wind turbine, a magenta light flare shall be added to the base.

Example:

Wind farms may be shown by groups of individual wind turbine symbols in their actual positions if scale and available information allow. If necessary, especially when the symbols for individual wind turbines get too densely spaced, wind farm limits may also be shown in lieu of individual wind turbine symbols. A wind farm limiting line shall be shown using the Chart No. 1 symbol N 1.1, a black dashed limiting line (0.20/2.00/0.75 mm) (0.008/0.080/0.030 inches) that implies there are permanent physical obstructions present within the area.

Examples:

When navigation restrictions are published in the Federal Register (FR) and/or Code of Federal Regulations (CFR), the limit of the federally regulated area shall be shown by the Chart No. 1 symbol N 1.2, a magenta dashed limiting line (0.20/2.00/0.75 mm) (0.008/0.080/0.030 inches).

Example:

If the limits of the federally regulated area and the wind farm are coincident, the federally regulated area symbol shall take precedence.

When the greatest dimension of the wind farm at chart scale is 1.3 mm or less, a minimum-size open dashed square, 1.3 mm on a side shall be used to depict the wind farm limits.

Example:

Except for the minimum size symbol, wind farm limits may be broken for important non-displaceable features. Submarine cables leading from an offshore wind turbine to another turbine or the shore shall be charted, including those that are buried. A cable area shall be shown when the number of cables or their configuration negatively affects the chart depiction.

Labels and Notes

Individual offshore wind turbines shall not be labeled. The symbol is sufficient for recognition.

Any individual offshore wind turbine or offshore wind farm reported by a non-authoritative source (See Location and Orientation) shall be labeled as "Rep" in black; 6 pt. Swiss Light for stationary wind turbines and 6 pt. Swiss Light Italic type for floating wind turbines.

The labels "PA", "ED" and "Rep" shall be added to offshore wind turbines and offshore wind farms as appropriate. For more information on doubtful and questionable dangers and approximately positioned features, see Sections 4.11.2, 4.11.3 and 6.1.3.

Blade clearances shall not be charted on paper/raster charts. See Volume 3, for encoding blade clearances.

A wind farm consisting of stationary offshore wind turbines and charted with a black dashed limiting line symbol (N 1.1) shall be labeled, "Wind Farm" in black 7 pt. Swiss Light type. A wind farm consisting of floating wind turbines, or a mixture of stationary and floating wind turbines, shall be labeled, "*Wind Farm*" in black 7 pt. Swiss Light Italic type.

Preferred placement of the "Wind Farm" label is within the charted limits of the wind farm, but labeling adjacent to the limiting line is allowable when necessary.

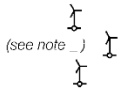
When the wind farm is charted as a federally regulated area, the label, "*WIND FARM*" shall be shown in all capital letters, magenta 8 pt. Swiss Regular Italic type with the primary title of the area (e.g., "*SAFETY ZONE*"), the CFR section number, and a reference to the standard Note A.

Example:

Characteristics of a navigation light attached to a stationary offshore wind turbine shall be charted in black 7 pt. Swiss Regular type. Characteristics of a navigation light attached to a floating wind turbine shall be charted in black 7 pt. Swiss Regular Italic type.

Labels referring to a charted note shall be placed within an area of individually charted offshore wind turbines under construction. The *"(see note _),"* label shall be printed in black 6 pt. Swiss Light Italic type.

Example:



The note for offshore wind turbines under construction shall be charted similar to the following example:

NOTE _
WIND TURBINES
The wind turbines charted in this area are under construction. Mariners are advised to use caution, as construction equipment may be moving in the area.

Any note referring to turbines under construction and reference labels shall be removed when completion is reported by the owner or by any federal government agency.

Color and Screening

All wind turbine symbols (except for a magenta light flare), labels and notes shall be charted in black except when the limits are coincident with a federally regulated area. In such cases, magenta limits and labeling shall be used.

The depth curves charted within a wind farm shall determine which portions of the wind farm are tinted or not tinted.

Feature Removal from Chart

A charted wind turbine shall be removed from the chart when it has been confirmed to be nonexistent in its charted position by HSD, NRT, USACE, BOEM, LNM or NM, and that source confirms that no submerged structure remains. Non-authoritative sources, e.g., geographic cells, Internet imagery, USPS, USCGAUX reports and other private reports, do not have sufficient authority to declare a wind turbine nonexistent.

In instances when non-authoritative sources identify a charted offshore wind turbine not visible in its charted position, the wind turbine shall be charted as a submerged obstruction until removal has been confirmed by an authoritative source.

4.13.6 Miscellaneous Marine Structures

Last revised on December 8, 2014 by Cartographic Order 012/14

Where symbol F 22 is given for the following marine structures, only the open symbol should be used in waters other than the Great Lakes. For structures visible at Low Water Datum on Great Lakes charts, the symbol F 22 (solid) should be used.

Markers (B 32, B 33, E 1, E 2, Q 90, Q 91)

These are signs or symbols erected on a post, pole, or stake specifically to mark or give direction to a channel entrance, waterway, or turning point or otherwise provide guidance to a similar navigation feature. Such signs are charted as landmarks (see 5.9).

Pipes (K 43.1, L 21.1, L 23)

Metal pipes of any diameter and length shall be charted if they are considered hazardous to vessels.

Poles (K 43.1, K 43.2, Q 90)

Poles are long lengths of wood or metal, usually smaller than a post, embedded in the bottom to support a sign or overhead wires. No diameter or length criteria has been established.

Posts (F 22, K 43.1, K 43.2)

Posts may be of solid wood, metal, or cement, embedded in the bottom, often serving as a small marker for marking a channel. No diameter or length criteria has been established.

Riprap (Pa)

Riprap consists of stones, rock, and rubble intended to act as a barrier to protect certain light structures against ice damage and scouring action. Blue tint shall be shown within the fluted riprap symbol. The following note shall be included on all charts that carry the riprap symbol around lights:

CAUTION
Mariners are warned to stay clear of the protective riprap surrounding navigational light structures shown thus:

Signs (B 32, B 33, F 22, K 43.2, Q 90)

Signs may be charted because they give information concerning something of interest to a mariner, e.g., a cable crossing, marina name, speed limit, etc., or a sign may be charted because it is a useful and conspicuous landmark.

Stakes (K 43.1, Q 90)

Stakes are lengths of wood or metal, usually smaller than posts or poles, which are embedded in the bottom. They are often used to mark fishing areas or may be used in the construction of a fish trap or weir.

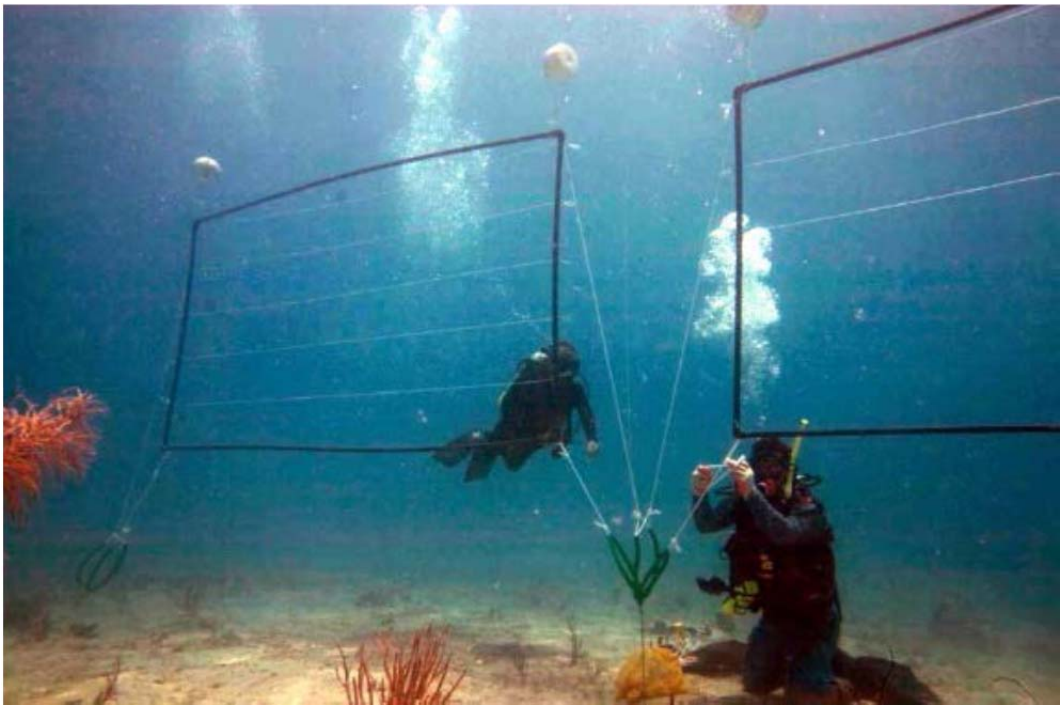
Coral Propagation Structures

Coral propagation structures are manmade submarine features that provide an environment for restoration of a coral reef ecosystem. Pieces of coral, broken from a natural coral reef, are attached to the structures to encourage growth until the coral can be reattached to the reef.

Some common types of coral propagation structures include:

- A plastic frame suspended in the water column or attached to a concrete base with coral attached to monofilament lines.

- A plastic pedestal, “tree” or tube inserted in a concrete base with coral attached to the base, or coral attached to concrete “reef balls”.



Above: Plastic Frame Coral Propagation Structure

Above: Plastic Tree Coral Propagation Structure

Above: Coral Growing on a Concrete Reef Ball

Above: Another Example of Coral Propagation Structures

Tens of thousands of these structures have been deployed without USACE permits. Additional structures will be subjected to the process for acquiring a USACE general permit.

Coral propagation structures and any associated buoys (floating or submerged) shall generally not be charted due to their proliferation, lack of positional data for most of these structures, relatively small dimensions and tendency to be located in shallow water near shore, away from highly trafficked areas. A buoy associated with a coral propagation structure shall be charted if listed in the USCG Light List.

In exceptional cases, a coral propagation structure may be charted as an obstruction in the unlikely event that it is comprised of an unyielding structure, near a navigation channel and at a depth that poses a danger to navigation. Any charting of a coral propagation structure must be approved by the Chief, Marine Chart Division.

In order increase awareness of coral propagation structures, the following note shall be added to all charts, 1:100,000 scale and larger, that cover any part of the U.S. Virgin Islands, Puerto Rico, and Florida from Hillsboro Inlet to Key West.

CORAL PROPAGATION
Uncharted submerged manmade structures, designed for the purpose of coral propagation, may exist within the limits of this chart, principally in shallow water areas.

A Notice to Mariners is not required.

4.13.7 Mooring Structures

Dolphins (F 20)

Dolphins are a group of piles, usually wrapped together with cable, used for mooring or warping a vessel or as an aid to navigation. Dolphins may be in the water, on a wharf, or on the beach. Dolphins are charted with a 1-mm circle and labeled "Dol". The pictorial symbol shall not be used.

Piles (F 22, K 43.1, K 43.2)

Piles are long, heavy timbers or section of steel, wood, concrete, etc., which are forced into the seabed to serve as a support for a pier, to resist lateral pressure (as for a pile fender), or to support an aid to navigation. A solid symbol F 22 should be used for piles visible at Low Water Datum on Great Lakes chart only with an open symbol used for a submerged pile. Piles visible at the Shoreline Plane of Reference shall be charted with a 1-mm circle and labeled "Pile" in 6 pt. Swiss Light. Submerged piles shall be labeled in 6 pt. Swiss Light italic.

4.13.8 Submarine Pipelines (L 40.1, L 41.1, L 43, L 44)

Revised on April 9, 2004 by Cartographic Order 009/04 and by February 20, 2009 and December 30, 2013 Memorandums

Submarine pipelines may be charted as an individual pipeline or included in a pipeline area. See Section 4.14.3 for a discussion of pipeline areas.

Sources for charting submarine pipelines on NOS nautical charts include the USACE, the Bureau of Safety and Environmental Enforcement (BSEE), other federal agencies, states, private companies, etc. NOS shall remain the final authority for charting any submarine pipeline that it considers to be potentially hazardous to marine navigation regardless of other recommendations.

The Bureau of Safety and Environmental Enforcement is the positioning authority for charting submarine pipelines servicing offshore oil and gas fields in the Gulf of Mexico. In this instance, offshore is considered to be seaward of the three nautical mile line. The U.S. Army Corps of Engineers remains the cognizant authority inside the three nautical mile line. The Bureau of Safety and Environmental Enforcement’s on-line digital database (text files) shall be the positioning authority for these structures. "As-built drawings" of submarine pipelines contained in this database are not required.

Submarine pipelines may represent formidable obstructions to mariners much the same as a submerged wreck, piling, crib, or similar man-made features.

The pipeline symbol shall be directional, the ball part of the symbol being placed at the end furthest from the assumed source of flow. A half-length symbol shall be the minimum size for charting a submarine pipeline.

Abandoned pipelines shall be charted in black using symbol L 44.

Submarine pipelines are classified for charting according to whether their contents are volatile or nonvolatile. All new or revised submarine pipelines located within or traversing a charted fish haven or spoil area shall be charted. This policy encompasses both volatile and nonvolatile classifications of submarine pipelines. Currently charted submarine pipelines that terminate at the limiting edge of a charted fish haven or spoil area shall be researched and reapplied.

1. Nonvolatile Material Transport

All pipelines transporting nonvolatile materials shall be shown on the chart in black using symbol L 41.1. Labels shall be shown in 6 pt. Swiss Light Italic.

Intake and Discharge Pipes (L 41.1)

These are conduits for the intake of non-potable water such as for cooling, irrigation, etc., and for the discharge of "clean" waste such as cooling water.

Intake and discharge pipelines shall be shown by symbol, but shall not be labeled. The term "outfall" as it applies to the offshore end of an artificial conduit or the mouth of a drain or sewer shall not be used to describe a pipeline or other conduit on NOS nautical charts.

Potable Water Intakes (PWI) (L 41.1, L 43)

These structures designed for the intake of drinking water are usually elevated above the bottom and are supported and protected by a debris-screening structure (a crib), which is separately charted. NOS charts PWI's in the Great Lakes and other freshwater inland lakes.

All potable water intakes shall be labeled "*PWI*".

The following note shall be added to all nautical charts which show potable water intakes:

CAUTION
POTABLE WATER INTAKE (PWI)

Vessels operating in fresh water lakes or rivers shall not discharge sewage, or ballast, or blige water within such areas, adjacent to domestic water intakes as are designated by the Commissioner of Food and Drugs (21 CFR 125 0.93). consult U.S. Coast Pilot 6 for important supplemental information.

This note shall be printed in black, either 2" or 3½" wide, in 7 pt. Swiss Light type, with the appropriate Coast Pilot reference.

Sewers (L 41.1)

Conduits for discharging waste effluents, e.g., industrial, chemical, sanitary, and storm water discharge, shall be labeled "*Sewer*" on the largest-scale chart and on smaller scales as space permits.

2. Volatile Material Transport

All pipelines transporting volatile materials (such as those transporting gas or oil from offshore platforms to shore) shall be shown on the chart in magenta using symbol L 40.1. These pipelines shall not be labeled.

Submarine Pipelines (L 40.1)

Conduits for conveying liquids and gases, usually petroleum or other mineral products of a hazardous nature, under high pressure, present the potential for pollution, explosion, or fire. These structures are often flexible, i.e., not anchored, buried in the bottom, or otherwise firmly fixed in position. Natural forces may move them away from the charted position, thereby increasing the potential danger to navigation.

The following caution note shall be shown on all new editions containing submarine oil and gas pipelines and submarine cable areas:

CAUTION
SUBMARINE PIPELINES AND CABLES

Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging or trawling.

Covered wells may be marked by lighted or unlighted buoys.

New and reconstructed charts shall use the symbol L 30.2 for submarine cable areas and L 40.2 for submarine pipeline areas. Accordingly, the following note shall be shown on all new and reconstructed charts:

CAUTION
SUBMARINE PIPELINES AND CABLES

Charted submarine pipelines and submarine cables and submarine pipeline and cable areas are shown as:

Additional uncharted submarine pipelines and submarine cables may exist within the area of this chart. Not all submarine pipelines and submarine cables are required to be buried, and those that were originally buried may have become exposed. Mariners should use extreme caution when operating vessels in depths of water comparable to their draft in areas where pipelines and cables may exist, and when anchoring, dragging or trawling.

Covered wells may be marked by lighted or unlighted buoys.

Both notes shall be in magenta, 7 pt. Swiss Light, set 2" or 2 1/2" wide.

4.13.9 Submarine Cables
Revised by December 30, 2013 Memorandum

Submarine cables may be charted as individual cables or included in a cable area. See Section 4.14.3 for a discussion of cable areas.

Sources for charting submarine cables on NOS nautical charts include the USACE, the Bureau of Safety and Environmental Enforcement (BSEE), other federal agencies, states, private companies (e.g., AT&T, ITT), etc. However, NOS shall remain the final authority for charting any submarine cable that it considers to be potentially hazardous to marine navigation, regardless of other recommendations.

Submarine cables shown on NOS nautical charts can be classified either as power cables or communication cables. Power cables are used to transmit electricity across a large expanse of water where overhead transmission is not feasible or in areas of heavy commercial shipping where greater danger would exist by use of overhead transmission. Communication cables are used to transmit messages. Submarine cables shall be charted within protected waters such as harbors, rivers, bays, estuaries, or other inland navigable waterways to warn the mariner of possible interference with navigation and to help prevent damage to cables from anchors.

Submarine cables established in ocean waters to provide electric power to offshore structures shall also be charted.

All new or revised submarine cables located within or traversing a charted Fish Haven or Spoil Area shall be charted. Currently charted submarine cables that terminate at the limiting edge of a charted Fish Haven or Spoil Area shall be researched and reapplied.

International Submarine Cables (L 30.1, L 32)

In addition, the International Cable Protection Committee has requested that NOS chart all known international (offshore) submarine cables to assist in preventing the disruption of world cable communications. All international submarine communications cables shall be shown in magenta using symbol L 30.1 when active and symbol L 32 when abandoned or inactive, to the neatline limit of the chart. Labels shall not be shown in conjunction with the symbols. NDB shallbe requested to obtain any additional information required.

Submarine Cables (L 30.1)

Submarine cables known to be active shall be charted using a magenta wavy line (L 30.1). The continuity of active cable symbols shall not be broken for soundings or other charting detail except where legibility of the overprinted feature is impaired. Abandoned and inactive cables shall be shown with a noncontinuous wavy line (L 32). These submarine cable symbols shall not be labeled, but cable area limits shall be labeled.

4.13.10 Recreational Structures

Duck Blinds

Duck blinds used in hunting waterfowl are often considered to be permanent structures. They are fixed in position with poles or stakes and are typically of substantial and durable construction. Duck blinds that are reported to be substantial and permanent, that are located in an area charted with hydrography, and that are considered an obstruction to navigation shall be charted. The minimum-size solid black 1.3-mm square shall be used on the largest-scale coverage of the area where space permits along with the "Fishing and Hunting Structure" note of Section 4.13.2. This note shall also be shown on all other charts where duck blinds are known or suspected to exist by means of field observations, provided hydrography is charted in these areas.

The determination of whether a duck blind is permanent or nonpermanent shall be a matter of judgment based on field observations subject to office and cartographic evaluation.

Ski Jumps

Because ski jumps are seasonal, they are considered to be a temporary feature and are not charted.

4.14 Marine Limits

4.14.1 Federally Regulated Areas

Revised by January 30, 2004 Memorandum, on December 1, 2001 by Cartographic Order 020/01, November 12, 2002 by Cartographic Order 015/02 and on February 19, 2013 by Cartographic Order 002/13.

1. Code of Federal Regulations

The Code of Federal Regulations (CFR) is a codification of the general and permanent rules published in the Federal Register (FR) by the executive departments and agencies of the federal government. The most pertinent sections are Title 33, "Navigation and Navigable Waters", which includes regulations of the USCG, USACE and St. Lawrence Seaway Development Corp.; and Title 40, "Protection of the Environment", containing dump site regulations of the Environmental Protection Agency (EPA). The CFR is constantly updated by the Federal Register. These two publications must be used together to determine the latest version of any given rule.

The following policies must be considered when using the CFR or the Federal Register as a source of cartographic data:

Textual statements and condensation of navigation regulations shall not be charted for regulated areas including military and privately authorized areas, where the complete regulations are published in the CFR and the Coast Pilot. An exception to this is when a specific regulation note is formally requested by the cognizant authority and approved by the Chief, Marine Chart Division for charting.

The charted areas shall be identified only by the primary title of the area, the assigned alphanumeric designator, the CFR section number, and a reference to the standard Note A. Note A shall be printed in 7 pt. Swiss Light type and in magenta.

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NOTE A
Navigation regulations are published in Chapter 2, U.S. Coast Pilot _____ Additions or revisions to Chapter 2 are published in the Notice to Mariners. Information concerning the regulations may be obtained at the Office of the Commander, _____ Coast Guard District in _____, _____, or at the Office of the District Engineer, Corps of Engineers in _____, _____.
Refer to charted regulation section numbers

On occasion, a rule published in the FR or CFR may appear to conflict with other charted information, such as when an anchorage area overlaps with a pipeline area, revetment area or dredged channel. In such cases, the current status of the charted feature must first be confirmed. For example, a charted dredged channel may have been realigned. When the charted information is confirmed as valid, the charted limits of the regulated area(s) shall be modified to reflect the safer condition. For example, if the codified limits of an anchorage area and a revetment area overlap, the limits of the anchorage area would be cut back to discourage the mariner from

anchoring over the revetment area. An anchorage area overlapping a pipeline area would only be charted outside of the pipeline area, to prevent an anchor from potentially damaging a pipeline.

NDB shall be notified by a Branch Chief or Team Lead whenever an area codified in the FR or CFR is modified in MCD to avoid conflict with other charted data. NDB shall then notify the cognizant authority (such as the USCG) of the action taken.

Regulations for the St. Lawrence Seaway (33 CFR 401) are not published in the Coast Pilot but are contained in the Seaway Handbook, issued jointly by and available from the St. Lawrence Seaway Development Corporation and the St. Lawrence Seaway Authority. Charts of the St. Lawrence Seaway shall include the following note in 7 pt. Swiss Light type and in black:

> Refer to THE SEAWAY HANDBOOK for the St. Lawrence Seaway Regulations and Circulars, special equipment, radio frequencies used in Traffic Control, and related information.

A regulated navigation area is a designated water zone defined by a specific boundary for which special regulations have been established to govern the navigation of vessels within the area.

Regulated areas are established to prevent damage or marine casualties, to protect waterfront facilities, and to safeguard ports, harbors, and the environment by restricting access to authorized persons and vessels. The establishment of these areas is under the jurisdiction of the USCG and USACE.

Regulations and limits governing and defining specific areas are published in Title 33, CFR after an initial announcement in the Federal Register and the NM.

Regulated area limits (as in prohibited areas symbolized by N 2.1, N 2.2, N 31) shall be shown on the chart according to the following criteria:

Safety Zones
Defense Areas/Zones
Security Zones

These area limits are shown by a dashed magenta line (0.20/2.0/0.75 mm) include:

Danger Areas
Firing Areas; Missile, Exercise
Prohibited Areas

These area limits are shown by a dashed magenta line (0.25/4.0/1.0 mm). To highlight the possibility of danger in these types of regulated areas, a 2.5 mm (20 percent, 120 LPI) magenta screened band can be added to highlight the dashed limiting line.

Seaplane Landing Area
Seaplane Restricted Area

These area limits are shown by a solid 0.20 mm magenta line.

Restricted Areas

These area limits are shown by a T-dashed magenta line (0.20/2.5/1.2 mm).

Regulated areas shall be identified only by the primary title of the area (e.g., "*DANGER AREA*", "*PROHIBITED AREA*", etc.), the assigned alphanumeric designator, the CFR section number, and a reference to the standard Note A. On nautical charts, Note A is reserved for the note listing the publications that contain navigation regulations relevant to that chart; other charted notes should begin with Note B or some other reference label even if there is no Note A on that chart. Cartographers must make certain that Note A contains the proper Coast Pilot and chapter numbers as well as identifying the USCG and USACE offices having jurisdiction in the referenced area.

Examples:

DANGER AREA
334.970 (see note A)

PROHIBITED AREA
334.80 (see note A)

4.14.1.1 No-Discharge Zones

Revised by June 14, 2004 Memorandum and on December 11, 2014 by Cartographic Order 016/14

No-Discharge Zones (NDZ) (N 1.2)

Definition: A **NO-DISCHARGE ZONE** is an area of a water body or entire water body into which discharge of sewage (whether treated or untreated) from all vessels is completely prohibited.

Background:

The Federal Water Pollution Control Act or "Clean Water Act" (CWA) was passed to restore and maintain the chemical, physical and biological integrity of our nation's waters. Section 312, entitled "Marine Sanitation Devices" gives the Environmental Protection Agency and States the authority to designate certain areas as No-Discharge Zones (NDZ) for vessel sewage. Freshwater lakes, freshwater reservoirs, or other freshwater impoundments whose entrances and exits prohibit traffic by the regulated vessels (those vessels with installed toilets) are by regulation NDZs. Rivers that do not support interstate vessel traffic are also NDZs by regulation. Water bodies that can be designated as NDZs by States and EPA include: coastal waters and estuaries, the Great Lakes and their inter-connected waterways, freshwater lakes and impoundments accessible through locks, and other flowing waters that support interstate navigation by vessels subject to regulation. In order for EPA to become involved, a State has to formally request that a specific portion of a water body or all of its water bodies, which are not NDZ by default, be designated a NDZ.

The Clean Water Act requires that if a state determines that waters of the state require greater protection by establishment of a NDZ, such a determination does not apply until EPA makes a determination that adequate pump-out facilities exist for such an area designated by the state. Alternatively, upon application by a state, EPA may by a regulation, establish NDZs which prohibit the discharge of sewage from vessels into waters.

General Requirements:

NDZs are established by an administrative determination, and that adequate pump-out facilities exist. NDZs designated by EPA through rulemaking are published in the Federal Register and then recorded in the U.S. Code of Federal Regulations (CFR), Title 40 which is updated annually. The Nautical Data Branch examines the Federal Register for NDZ information and evaluates it for charting. NDZs shall be charted when the EPA has made a "determination" that a state may designate a particular area as a No Discharge Zone.

A NDZ shall be charted at all chart scales. Those portions plotting within areas having no charted hydrography shall be omitted.

Feature Recommendation for a Notice to Mariners:

A newly designated, amended or revoked NDZ should be recommended for a Notice to Mariners.

Line Type and Weight:

NDZ limit symbol shall be charted with a dashed line: 0.20/2.00/0.75 mm (0.008"/0.08"/0.03").

The line symbol shall not routinely be broken for soundings, bottom characteristics or type. The line symbol may be broken only where it would cause confusion in the presentation of more important information.

Location and Orientation on the Chart:

NDZ limit lines shall be charted in their exact geographic positions. The NDZ limit symbol shall not be shown where it coincides with other charted maritime limits, such as international boundaries, COLREGS demarcation lines, the limiting lines for restricted areas, anchoring areas and civil reservations. The NDZ limit symbol shall not be charted where it coincides with shoreline or manmade features.

When the NDZ coincides with a state boundary, and the state boundary is generally not shown in water, the placement of the NDZ limit line shall be charted from a USGS quadrangle or other authoritative source denoting the state boundary. The state boundary symbol should not be added. The geographic location of the state boundary shall be the geographic location of the NDZ boundary.

When the NDZ coincides with the Three Nautical Mile Line, the NDZ limit line shall be offset one line width (0.20 mm/0.008") seaward of the charted Three Nautical Mile Line. On charts where the Three Nautical Mile Line is not shown, the position of the NDZ limit line shall be applied by using the alignment of the Three Nautical Mile Line from another scale chart.

Labels and Notes:

No-Discharge Zone labels shall be charted in capital letters, magenta 8 point Swiss Light Italic, within the limits of the NDZ and oriented with the baseline of the chart.

NO-DISCHARGE ZONE
(see note Z)

Note Z shall be charted in the vicinity of note A. The note shall be in 7 point Swiss Light type, either 2" or 2 1/2" wide and in magenta.

The following Note Z shall be charted on all charts, except the Great Lakes charts when part of that chart falls within a No-Discharge Zone:

NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140

Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

The following Note Z shall be charted on all charts, except for the Great Lakes charts when the entire chart falls within a No-Discharge Zone:

NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140

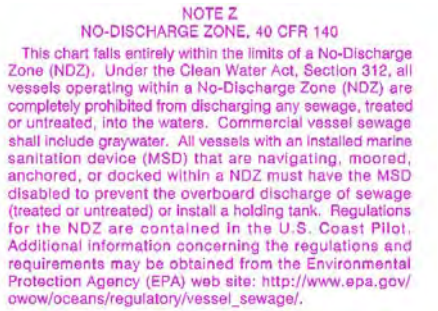
This chart falls entirely within the limits of a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

The following Note Z shall be added only to Great Lakes charts when part of that chart falls within a No-Discharge Zone:

NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140

Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. Commercial vessel sewage shall include graywater. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

The following Note Z shall be added only to Great Lakes charts when the entire chart falls within a No-Discharge Zone:

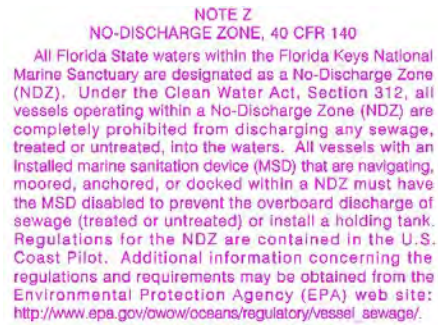


NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140

This chart falls entirely within the limits of a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. Commercial vessel sewage shall include graywater. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

The NDZ shall be identified and added textually at the beginning of a specialized Note Z, where the location of the seaward boundary is difficult to portray on a chart. The geographic area shall be changed to match the descriptive location of each specialized NDZ.

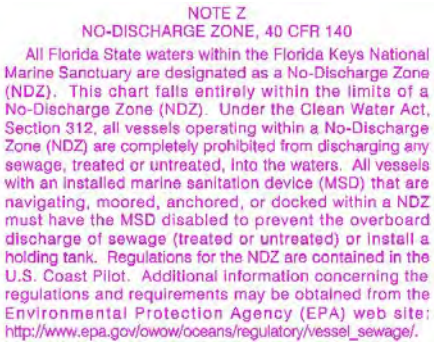
An example of a specialized Note Z that is portrayed on charts outside of the Great Lakes when part of the chart falls within a No-Discharge Zone:



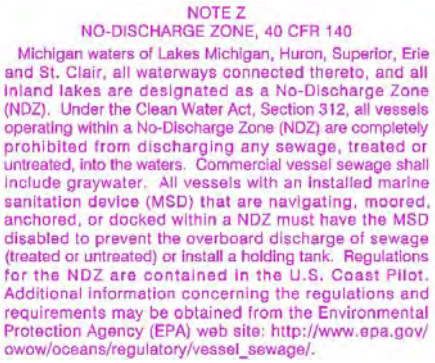
NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140

All Florida State waters within the Florida Keys National Marine Sanctuary are designated as a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

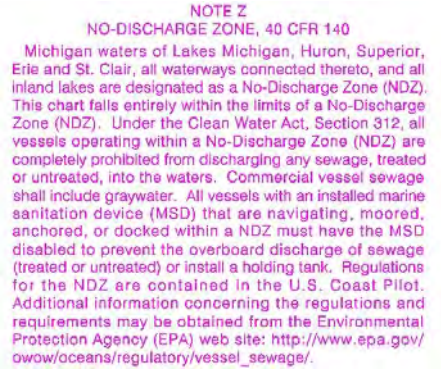
An example of a specialized Note Z that is portrayed on charts outside of the Great Lakes when the entire chart falls within a No-Discharge Zone:


NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140
All Florida State waters within the Florida Keys National Marine Sanctuary are designated as a No-Discharge Zone (NDZ). This chart falls entirely within the limits of a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

An example of a specialized Note Z that is portrayed only on Great Lakes charts when part of the chart falls within a No-Discharge Zone:.


NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140
Michigan waters of Lakes Michigan, Huron, Superior, Erie and St. Clair, all waterways connected thereto, and all inland lakes are designated as a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. Commercial vessel sewage shall include graywater. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

An example of a specialized Note Z that is portrayed only on Great Lakes charts when the entire chart falls within a No-Discharge Zone:


NOTE Z
NO-DISCHARGE ZONE, 40 CFR 140
Michigan waters of Lakes Michigan, Huron, Superior, Erie and St. Clair, all waterways connected thereto, and all inland lakes are designated as a No-Discharge Zone (NDZ). This chart falls entirely within the limits of a No-Discharge Zone (NDZ). Under the Clean Water Act, Section 312, all vessels operating within a No-Discharge Zone (NDZ) are completely prohibited from discharging any sewage, treated or untreated, into the waters. Commercial vessel sewage shall include graywater. All vessels with an installed marine sanitation device (MSD) that are navigating, moored, anchored, or docked within a NDZ must have the MSD disabled to prevent the overboard discharge of sewage (treated or untreated) or install a holding tank. Regulations for the NDZ are contained in the U.S. Coast Pilot. Additional information concerning the regulations and requirements may be obtained from the Environmental Protection Agency (EPA) web site: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/.

Color and Screening:

NDZ dashed limit line, associated notes and labels shall print in solid magenta.

Feature Removal from Chart:

A charted NDZ shall not be revised or removed until the Environmental Protection Agency (EPA) provides conclusive evidence that the NDZ designation has been changed or rescinded.

4.14.2 Miscellaneous Marine Limits

Revised on August 22, 2012 by Cartographic Order 005/12 and on November 11, 2010 by Cartographic Order 003/10

Limits of well-defined areas that are not CFR-regulated are shown on NOS nautical charts to identify certain hazardous and nonhazardous areas that have been established for a particular purpose. Fixed or floating structures and equipment can be expected in these areas at times. These areas may be established by USACE permit, State or local governments, private groups, associations, etc. (See also the discussion of civil reservations in Section 4.14.7, Maritime Boundaries.)

The NOS shall retain the final responsibility for charting any special-purpose navigation area that it considers to be of value to marine navigation, regardless of recommendations from other sources.

Labels for these areas shall be in capital and lowercase letters, Swiss Light Italic type, of a size appropriate to the size of the feature.

The following areas shall be tinted only as normally required by other chart detail, properly labeled as to purpose, and symbolized by a black dashed line (0.2/2.0/0.75 mm).

Breakers (C d, K 17)

A breaker is a wave which breaks either because it becomes unstable when it reaches shallow water, the crest toppling over or "breaking," or because it dashes against an obstacle. An isolated area of waves breaking consistently in the same location should be outlined provided there is no other charted indication of an existing shoal or reef.

Breaker limits are shown by the maritime limit symbol C d. The label "*Breakers*" shall be used in all instances where this feature is charted. See also Section 3.3.2, Foreshore.

Authorized Fishing/Hunting Areas (N b)

The USACE no longer publishes the geographic limits of areas where fishing and hunting structures (fish traps, duck blinds, gill nets, etc.) are authorized to be established and used. No comprehensive method exists to revise these limits which prior to 1983 were published in 33 CFR 206. Therefore, these limits shall be charted only where a specific agreement with a State or other authorizing agency exists for charting them, or where it is advisable to chart them because they are marked with buoys or other markers. See also Section 4.13.2, charting of actual fishing and hunting structures.

Degaussing Range (N 1.1)

A degaussing (or demagnetizing) range is not an aid to navigation. Rather, it is an area within which ships' magnetic fields may be measured. Sensing instruments and cables are installed on the sea bed in the range, with cables leading from the range to a control position ashore. The range is usually marked by distinctive buoys identifying the purpose of the range.

The significance of a charted degaussing range is that anchoring and trawling are prohibited in that area and that the range may have to be avoided when vessels are seen to be using it.

The limits of degaussing ranges and any associated submarine cables shall be shown on the chart in black with a dashed line delineating the limits of the area. Submarine cables extending from the shore to the degaussing range shall be charted in magenta.

The label "*DEGAUSSING RANGE*" shall be shown in capital letters, Swiss Light Italic, in a type size appropriate to the size of the feature.

Ruins (N 1.1)

Areas of unconsolidated ruins shall be outlined with a black dashed limit line when it is not considered practical to individually chart each object or where individual objects have not been identified.

Unsurveyed (I 25, N 1.1)

Unsurveyed areas are shown on the chart to alert the mariner to areas where the water depth is unknown and where passage may be conducted only with extreme caution. When hydrographic survey information is applied to these areas, the dashed limiting line and "*Unsurveyed*" label shall be removed.

Various other areas are designated on NOS charts either because they represent a hazard to navigationor because the information may be valuable to mariners. Such maritime limits are designated either by a black dashed line (when the feature is not considered dangerous to surface navigation) or by a black dotted danger line (when the feature is considered hazardous and must be emphasized). A blue tint No.1 shall be added to identify areas on the chart that are determined to be dangerous to navigation. Limiting lines (dashed or dotted) may be exaggerated for small-scale chart representation when deemed necessary.

Borrow Areas (N 1.1)

Borrow areas are established for the purpose of removing mineral materials, for use in landfill operations, for the creation of artificial islands, for obtaining sand and gravel, and for other commercial uses. Such areas can constitute significant dangers to swimming and anchoring by greatly increasing depths in otherwise shallow areas.

Borrow areas shall be charted using the dashed maritime limit symbol and labeled "*Borrow area*." Inactive borrow areas shall not be removed from the chart until survey information is available for chart updating.

Discolored Water (K e)

Unnatural colored areas in the sea which may or may not indicate the existence of shoals shall be charted with a black dashed line and labeled "*Discol water*."

Grass

An 0.15-mm black dashed line shall be used as the charting limit line for areas outlined and clearly identified on the source as grass growing seaward of the high-water line. The areas shall be labeled "*Grass*" if space permits, and blue tint shall be used except where preempted by green low water tint. Grass generally grows on a soft, yielding bottom with seasonal variations in its outer extremities and densities, and therefore does not represent the critical feature that is best emphasized with the danger curve.

Eelgrass

Definition: Eelgrass is a common name for a group or genus of plants called Zostera that grows under water in estuaries and in shallow coastal areas.

Eelgrass plants are vital components of coastal ecosystems, providing food and shelter to numerous aquatic species, cycling nutrients from the water and stabilizing marine sediments. Charted eelgrass assists fishermen in locating areas where fish and other aquatic species may be found. The charting of eelgrass is important to environmental management in developing strategies and policies to protect aquatic habitats.

General Requirements: The primary source for the application of eelgrass will be National Ocean Service (NOS) Hydrographic Surveys. Documents from other reliable sources, such as, Federal, State, or Local authorities shall also be used to chart eelgrass.

Eelgrass areas shown with limit lines shall be labeled *Eelgrass*. All hydrography and tints shall be retained in eelgrass areas. The eelgrass limit lines shall not be shown where it affects the clarity of more important chart features. The label shall be used only, if space permits. Under no circumstance shall limit lines be shown without the label *Eelgrass*.

Feature Removal from Chart: A charted eelgrass area or label shall not be removed until an established authority provides conclusive evidence that the feature does not exist in the charted area.

Non-authoritative sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports) do not have sufficient authority to declare this feature nonexistent.

Location and Orientation on the Chart: Eelgrass limit lines shall be charted in their exact geographical positions.

Size and Shape: The limit lines of eelgrass shall assume the shape of the area they are demarking. Eelgrass areas shall be charted with a black dashed line: 0.15/1.25/0.5 mm (0.006/0.050/0.020").

Labels: The label *Eelgrass* shall be charted with black 7 point Swiss Light Italic. Smaller type size may be used in congested areas.

Feature Recommendation for a Notice to Mariners: All newly applied, revised, or deleted eelgrass shall be evaluated for a Notice to Mariners.

Submerged Volcano (K d)

A seabed volcano submerged at the chart sounding datum and which may or may not be active is encircled with a dashed line and labeled "*Sub vol*".

Swimming, Scuba Diving Areas (N 1.1)

Areas established for recreational purposes of longer than seasonal duration may be charted with a dashed line and labeled.

Foul Areas (K 32)

Definition: **FOUL AREA.** An area of numerous uncharted dangers to navigation. The area charted serves as a warning to the mariner that all dangers are not charted individually and that navigation through the area may be hazardous. The term "foul" should not be applied to a soft continuum with indefinite boundaries such as mud or sand: to areas congested with marine vegetation such as ~~kelp or~~ grass in water; or to materials not likely to cause damage to a vessel. [52]

> **EXCEPTION:** For Marine Chart Division specifications, Kelp, located within a Foul Area, should not be confused with, or compiled as, other marine vegetation because it is frequently associated with rocky bottoms that are possible dangers to navigation. Heavy concentrations of kelp may obscure significant obstructions. It is this exception, when located within a Foul Area, that differentiates this definition from the International Hydrographic Organization definition. Note strikethrough in the above definition for a Foul Area. See also Section 4.7.2; Kelp, Seaweed.

Definition: **KELP.** This type is restricted to kelp (which is botanically a brown algae). Kelp is so frequently associated with rocky bottoms, and therefore possible dangers to navigation, that it should not be confused with, or compiled as, other marine vegetation. Kelp of one species or another is widely found in the cold oceans of the world. [31]

One of an order (Laminariales) of usually large, blade-shaped, or vinelike brown algae (principally American usage). Representative species are the giant kelp (Macrocysyis pyrifera), bull kelp (Nereocystis luetkeana or Durvillea Antarctica), elk kelp (Pelagophycus porra), and laminarians (species of Laminaria). [12]

NOTE: The following sections are applicable ONLY for objects/features that DO NOT have measured depths.

Associated Definitions

> Definition: **OBSTRUCTION.** Anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel or aircraft. The term is usually used to refer to an isolated danger to navigation, such as a submerged rock or pinnacle in the case of marine navigation, and a tower, tall building, mountain peak, etc., in the case of air navigation. [1]
>
> Definition: **FOUL BOTTOM.** A hard uneven, rocky or obstructed bottom having poor holding qualities for anchors, or one having rocks or wreckage that would endanger an anchored vessel. [17]

Definition: **FOUL GROUND.** An area over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. [103]

Definition: **WRECKAGE.** Goods or parts of a wrecked vessel washed ashore or afloat, remains of a WRECK. [52]

> **NOTE:** This definition is amplified and clarified in Section 4.10.2. The complete paragraph reads - The label "*Wreckage*" and a dotted danger curve should be used to identify areas where numerous wrecks are located or where the wreckage is scattered. Blue tint No. 1 shall be included within the danger curve (K 32).

General Requirements

Foul Areas exist where the bottom is known to be strewn with rocks, boulders, coral, obstructions or heavy concentrations of kelp that may obscure significant obstructions or other navigation impeding clutter and are not considered areas suitable for navigation. National Ocean Service (NOS) photogrammetric products, Hydrographic Surveys, United States Army Corps of Engineers (USACE) Surveys, and United States Coast Guard (USCG) Local Notice to Mariners are the primary sources for charting Foul Areas. Areas delineated and designated as a Foul Area by any of these authoritative sources shall **ALWAYS** be charted in accordance with the charting recommendation.

While not common, other sources may be used to chart Foul Areas. A Foul Area, originating from a non-authoritative source, that encompasses a large or significant area at chart scale shall be referred to the Chief, Cartographic Systems and Standards Branch for a specific charting action. This is to ensure that sizeable/important areas of hydrography are not unnecessarily deleted from the chart.

A required charting label for these areas should be consistent with labeling conventions in the **Labels and Notes** section.

> Foul Areas shall be charted with a limiting danger line and label. Depth curves and soundings shall not be charted within a Foul Area. Islets (bare rocks) shall **ALWAYS** be charted. Rocks with drying heights and important visible features considered useful as landmarks shall be selectively retained for charting and charted in accordance with standards and specifications contained in applicable sections of the Nautical Chart Manual. Note that an appropriate required descriptive label shall **ALWAYS** be charted to indicate the type/s of dangers present within the limits of a Foul Area (See **Labels and Notes**).

The term "selectively retained" is used to describe the charting of visible features located in a Foul Area. Foul Areas are not intended for navigation due to the high likelihood that they contain uncharted hazards. The purpose of charting these areas is to discourage mariners from entering these areas. Charting of many visible features may mislead the mariner by leaving the impression that those charted visible features represent the only dangers present.

A Foul Area limiting line shall not be charted inside the foreshore (See definition/s below). This is consistent with the applicable definition for a Foul Area. The last sentence of the definition states… The term "foul" should not be applied to a soft continuum with indefinite boundaries such as mud or sand: to areas congested with marine vegetation such as ~~kelp or~~ grass in water; or to materials not likely to cause damage to a vessel.

When a source designates that a Foul Area exists completely or partially within a foreshore area, the area within the foreshore is charted in accordance with charting specifications for an obstruction/s. Portions of the area located inside the foreshore shall retain green tint. This is typical of non-authoritative sources and probability increases as the range of tide increases – the vertical plane of reference for a Foul Area is the sounding datum of the chart.

> Definition: **FORESHORE.** In legal terminology, the strip of land between the high- and low-water marks that is alternately covered and uncovered by the flow of the tide. In coastal engineering work, it is defined as the part of the shore that lies between the crest of the berm and the ordinary low-water mark, which is ordinarily traversed by the uprush and backrush of the waves as the tide rises and falls; the foreshore would thus extend farther inshore than the shore. See Shore. [3]
>
> Definition: **FORESHORE (ACCORDING TO COASTAL ENGINEERING).** That part of the shore lying between the crest of the seaward berm (or the upper limit of wave wash at high tide) and the ordinary low-water mark. See Foreshore (according to Riparian Law. [3]
>
> Definition: **FORESHORE (ACCORDING TO RIPARIAN LAW).** The strip of land between the high- and low-water marks that is alternately covered and uncovered by the flow of the tide. See Foreshore (according to Coastal Engineering). [3]

Differentiation of Terminology

National Ocean Service (NOS) photogrammetric products, Hydrographic Surveys, United States Army Corps of Engineers (USACE) Surveys, and United States Coast Guard (USCG) Local Notice to Mariners are the primary sources for charting Foul Areas. Areas delineated and designated as a Foul Area by any of these authoritative sources shall **ALWAYS** be charted in accordance with the charting recommendation.

The use of the term "Foul" is an extremely common term used in navigation and cartography. The terms rock/s, Obstruction/s, Wreckage, Bottom and Ground are typically used in conjunction with term Foul. It is imperative to distinguish what is meant by the terminology used in the source document as it relates to applicable charting definitions. Applicable definitions have been inserted throughout these sections to assist in determining the type of area and for formatting the proper charting label. When questions or uncertainty exist, an email shall be sent to the Nautical Data Branch requesting a clarification or resolution of all relevant issues.

The terms Foul Area, Wreckage and Obstruction/s are all charted with the same symbology specification - a dotted danger line/area - charted either to scale or as a minimum size symbol (See **Size and Shape**). The **ONLY** charting difference is in the labeling and is based on the type and quantities of objects/features located within the designated limits of the area. Comparing and contrasting the basic elements contained in standard definitions provides these distinctions.

See Section 4.9 for Rocks.

The terms Foul Bottom and Foul Ground are both used in reference to the holding capacity of the bottom for the anchoring of vessels. See definitions below.

Definition: **FOUL BOTTOM.** A hard uneven, rocky or obstructed bottom having poor holding qualities for anchors, or one having rocks or wreckage that would endanger an anchored vessel. [17]

Definition: **FOUL GROUND.** An area over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. [103]

The following two sub-sections are provided to add additional clarity for differentiating the appropriate charting label. Each section simply consists of presenting the applicable charting definitions together to compare, contrast and differentiate the type of feature to be charted and formulate the associated charting label.

Significant phrases have been underlined to focus attention on key elements (See also **Labels and Notes**).

These sub-sections are the:

(1) Differentiation between a Foul Area and Wreckage, and the

(2) Differentiation between a Foul Area and an area of Obstructions

(1) Differentiation between a Foul Area and Wreckage – Using applicable definitions

Definition: **FOUL AREA.** An area of numerous uncharted dangers to navigation. The area charted serves as a warning to the mariner that all dangers are not charted individually and that navigation through the area may be hazardous. The term "foul" should not be applied to a soft continuum with indefinite boundaries such as mud or sand: to areas congested with marine vegetation such as ~~kelp or~~ grass in water; or to materials not likely to cause damage to a vessel. [52]

> **EXCEPTION:** For Marine Chart Division specifications, Kelp, located within a Foul Area, should not be confused with, or compiled as, other marine vegetation because it is frequently associated with rocky bottoms that are possible dangers to navigation. Heavy concentrations of kelp may obscure significant obstructions. It is this exception, when located within a Foul Area, that differentiates this definition from the International Hydrographic Organization definition. Note strikethrough in the above definition for a Foul Area. See also Section 4.7.2; Kelp, Seaweed.

Definition: **WRECKAGE.** Goods or parts of a wrecked vessel washed ashore or afloat, remains of a WRECK. [52]

> **NOTE:** This definition is amplified and clarified in Section 4.10.2. The complete paragraph reads - The label "*Wreckage*" and a dotted danger curve should be used to identify areas where numerous wrecks are located or where the wreckage is scattered. Blue tint No. 1 shall be included within the danger curve (K 32).

(2) Differentiation between a Foul Area and an area of Obstructions – Using applicable definitions

Definition: **FOUL AREA.** An area of numerous uncharted dangers to navigation. The area charted serves as a warning to the mariner that all dangers are not charted individually and that navigation through the area may be hazardous. The term "foul" should not be applied to a soft continuum with indefinite boundaries such as mud or sand: to areas congested with marine vegetation such as ~~kelp or~~ grass in water; or to materials not likely to cause damage to a vessel. [52]

EXCEPTION: For Marine Chart Division specifications, Kelp, located within a Foul Area, should not be confused with, or compiled as, other marine vegetation because it is frequently associated with rocky bottoms that are possible dangers to navigation. Heavy concentrations of kelp may obscure significant obstructions. It is this exception, when located within a Foul Area, that differentiates this definition from the International Hydrographic Organization definition. Note strikethrough in the above definition for a Foul Area. See also Section 4.7.2; Kelp, Seaweed.

Definition: **OBSTRUCTION.** Anything that hinders or prevents movement, particularly anything that endangers or prevents passage of a vessel or aircraft. The term is usually used to refer to an isolated danger to navigation, such as a submerged rock or pinnacle in the case of marine navigation, and a tower, tall building, mountain peak, etc., in the case of air navigation. [1]

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted Foul Area shall be evaluated for a Notice Mariners.

Line Type and Weight

The limits of a Foul Area shall be charted with a dotted danger line: 0.25/0.6 mm (0.010/0.025").

Location and Orientation

A Foul Area shall be charted in its exact geographic position as depicted on the source document.

A Foul Area limiting line shall be generalized or exaggerated to the side of safety on small-scale nautical charts (See **Size and Shape** for charting specifications).

When a Foul Area and foreshore overlap, the limits of a Foul Area shall not be shown inside the foreshore area (See **General Requirements**).

Size and Shape

A Foul Area limit shall be charted with the standard cartographic symbol in Chart No. 1, (K 32).

The size and shape of a Foul Area shall reflect the exact geographic limits as described in or shown on the source document when its charting size is greater than 2.55 mm in any dimension.

An isolated offshore Foul Area less than or equal to 2.55 mm in diameter at chart scale shall be charted with a minimum size symbol – a 2.55 mm circle.

Labels and Notes

A charted Foul Area MUST ALWAYS be labeled.

All labels shall be charted with black 6 point Swiss Light Italic.

Descriptive labels, such as "*Foul Area*", "*Foul*", "*Boulders*", "*Blds*", "*Kelp*", "*Danger line*", "*Reef line*", etc. shall be charted freely enough to adequately indicate the type of danger/s present. The source material may be used as a guide for which label to use.

Every effort should be made, based on the source document, to properly and specifically identify the type/s of features located within a Foul Area. The unknown nature of the area may prove that identifying features is extremely difficult. The following guidelines are provided to assist in this effort.

(1) See Section 4.9 for Rocks, Danger line and Reef line – typical label "*Foul with rocks*"

(2) "*Foul Area*" – Reference definition, "area of numerous uncharted dangers". Specific type/s of uncharted danger/s unknown or mostly unknown.

This label is the generic label used for charting.

The label "*Foul area*" can be truncated to "*Foul*" when space for a label is at a premium – "*Foul*" is the minimum label specification.

(3) Other uncharted dangers that exist assume the form:

"*Foul with (**insert type of danger**)*"

(4) Areas that contain Kelp

(a) When a Foul Area contains **ONLY** Kelp, the label "*Foul with kelp*", shall suffice.

(b) When a Foul Area contains uncharted dangers, in addition to Kelp, the label for the area shall be formulated based on the type/s of uncharted features. The label for Kelp shall also be added within the Foul Area as space permits. See Chart No. 1, (J 13.2 and J u).

Color and Screening

A Foul Area limiting line shall be charted with black.

All Foul Areas falling outside the foreshore shall be tinted blue.

Blue tint (Blue screened 8%) shall be added within the limit of a charted Foul Area, dangerous to navigation (66 feet or 20 m) or less, when enclosed by a dotted danger line and not supported by depth curves and soundings.

Feature Removal from Chart

A charted Foul Area shall not be removed or revised until an established authority provides conclusive evidence that the feature does not exist in the charted position. Non-authoritative sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, imagery without field edit), do not have sufficient authority to declare a Foul Area nonexistent.

In instances where non-authoritative sources identify a Foul Area not in its charted position, the feature shall remain charted until removal has been confirmed by an authoritative source (e.g., Field Investigations by the National Ocean Service (NOS), United States Army Corps Engineers (USACE), United States Coast Guard (USCG) Local Notice to Mariners).

Foul Ground (K31)

Revised on September 18, 2012 by Cartographic Order 005/12

Definition: **FOUL GROUND.** An area over which it is safe to navigate but which should be avoided for anchoring, taking the ground or ground fishing. [103]

General Requirements

Foul Ground is considered safe for surface navigation.

Foul Ground must not be confused with Foul Area, an area of numerous uncharted dangers to navigation. See Foul Area earlier in this sub-section.

When source data indicates Foul Ground, the cartographer must verify that this is in fact foul ground rather than a foul area.

Foul Ground shall only be charted on NOAA Nautical Charts if one of the two following conditions is met:

1. Foul Ground is located within an anchorage area, anchoring berth, or overlaps with any part of an anchorage without defined limits symbol (N 10).

2. The source provider (such as HSD) has provided a compelling reason for charting Foul Ground and approval has been obtained from the Chief, Marine Chart Division.

An occurrence of Foul Ground on any NOAA Nautical Chart shall be researched by accessing original source to determine if the charted Foul Ground should have been charted as Foul Area, platform in ruins, a wreck or another feature.

When a determination cannot be made by the compiler and reviewer, the Branch Chief shall be consulted.

When charted Foul Ground is changed to another feature, such as Foul Area or a wreck, a report shall be generated by the reviewer for registration as a source document, to assure that all products are in agreement.

Feature Recommendation for Notice to Mariners

Newly applied, revised or deleted Foul Ground shall be evaluated for a Notice to Mariners. In general, a Notice to Mariners will not be required, since Foul Ground is not considered dangerous to navigation.

Line Type and Weight

When charted as an area feature, the limits of Foul Ground meeting one of the conditions in the General Requirements above, shall be charted with a dashed limiting line: 0.15/1.25/0.50 mm (.006/.050/.020”).

Location and Orientation

Foul Ground shall be charted in its exact geographic position as depicted in the source data. A foul ground symbol may be displaced slightly to avoid overprinting an anchorage without defined

limits symbol or more important charted information such as a fixed aid to navigation or hazard to navigation.

Size and Shape:

Foul Ground, meeting one of the conditions in the General Requirements above, shall be charted with the standard cartographic symbol shown in Chart No. 1, (K 31):

#

This symbol shall be used either as a point symbol or within the geographic limits of an area shown by dashed lines.

Labels and Notes:

Foul Ground shall be indicated by the symbol and a label shall not be used.

Color and Screening:

A Foul Ground symbol or limiting line shall be shown in black.

Feature Removal from Chart:

Charted Foul Ground shall not be deleted until an established authority provides conclusive evidence that the feature does not exist in the charted position. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, imagery without field edit), do not have sufficient authority to declare Foul Ground non-existent.

Charted Foul Ground may be evaluated for revision to another feature. See General Requirements.

Natural Resource Areas (N 1.1)

Areas of natural resources, either living or mineral, may be charted using the dashed maritime limit line. Such areas are not bounded by a danger line or otherwise charted specifically as being hazardous to navigation. Although the symbol N 1.1 is generally used for artificial areas, it can also be used to define the limits of natural resources.

a. Living Resource Areas

Areas selected for the production of living marine resources may be charted using the dashed maritime limit. Examples of living marine resources that fall in this category follow.

Fish -- anadromous (salmon, striped bass), marine (mullet, tuna), freshwater.
Crustaceans -- shrimp, lobster, king crab.
Mollusks -- oysters, clams, scallops.
Marine Plants -- kelp when cultivated.
Area limits for holding, growing, or breeding pens, floating and submerged.

4.14.3 Cable and Pipeline Areas
Revised by December 30, 2013 Memorandum

NOS shall remain the final authority for charting submarine cable and pipeline areas in waters where they are considered to be potentially hazardous to marine navigation, regardless of recommendations from other sources for not charting.

The USACE is the regulatory authority for the placement of submarine pipelines or cables in the navigable waters of the United States (see Section 1.5.1).

Sources for charting submarine cables or pipelines in ocean waters are the USACE, Bureau of Safety and Environmental Enforcement (BSEE), other federal agencies, states, local governments, private companies (e.g., AT&T, and ITT), etc.

All new or revised submarine cables and submarine pipelines located within or traversing a charted fish haven or spoil area shall be charted. Currently charted submarine cables or submarine pipelines that terminate at the limiting edge of a charted fish haven or spoil area shall be researched and reapplied.

Submarine Cable and Pipeline Areas (L 40.2, L 41.2)

Submarine cables and pipelines have been positioned with varying degrees of accuracy. Within protected waters such as harbors, rivers, bays, estuaries, or inland waterways, the location of submarine pipelines or cables, not positioned by the Differential Global Positioning System (DGPS), shall be shown in magenta by dashed area limits and labeled "*Cable Area*" or "*Pipeline Area*". The extent of the limits of the area will be governed by local conditions (e.g., the number of pipelines or cables) but shall in all cases include the immediate area which overlies the pipelines or cables. In an effort to reduce the impact of cable and pipeline areas on maritime operations, the symbolization of previously uncharted areas will vary with the methods used to obtain positions of the cables or pipelines. No effort should be made to determine the positioning method utilized to chart existing submarine cable and pipeline limits.

The limiting lines of cable and pipeline areas shall be spaced 100 meters (330 feet) apart or 50 meters on each side of the pipeline or cable position or the outer ones of a group, for all previously uncharted pipeline and cable areas where positioning was accomplished utilizing the Global Positioning System (GPS). The limits shall not be shown if they fall entirely within the limits of an existing cable or pipeline area.

The limiting lines shall be spaced 1,000 feet apart or 500 feet on each side of the pipeline or cable position or from the outer ones of a group, for all previously uncharted submarine cable or pipeline areas where positioning was not accomplished utilizing GPS nor DGPS, or when the positioning method cannot be determined. Cable or pipeline areas shall be spaced a minimum of 5.0 mm at charting scale for small-scale charts. The limits shall not be shown if they fall entirely within the limits of an existing cable or pipeline area.

All submarine pipelines positioned by DGPS and not falling within an existing pipeline area shall be symbolized by an individual pipeline symbol. See Section 4.13.8 for a discussion of submarine pipelines. All submarine cables positioned by DGPS and not falling within an existing cable area shall be symbolized by a continuous magenta wavy line (L 30.1). See Section 4.13.9 for a discussion of submarine cables.

Cable and pipeline areas shall be labeled in Swiss Light Italic type, capital and lowercase letters, with type size appropriate to the size of the feature or scale of the chart.

Cable and pipeline areas should not be charted in large areas void of hydrography, except to show the terminus of a line. Note: This does not refer to a fish haven or spoil area that may be extremely large when charted to scale.

Cable and pipeline area limits shall not be charted for certain submarine cables and pipelines described in Sections 4.13.8 and 4.13.9 where these features are charted by symbols, i.e., L 40.1, L 41.1, L 44).

Abandoned Cable and Pipeline Areas

Abandoned cable and pipeline areas shall be identified by the addition of the label “Abandoned”.

The limiting lines and labels shall continue to be charted until the removal of all existing features has been verified by a reliable source.

4.14.4 Anchorage Areas
Revised on October 1, 2001 by Cartographic Orders 017/01 and 018/01

Definition: **ANCHORAGE**. (1) An area where a ship anchors or may anchor, either because of suitability or designation. (2) Explosives anchorage-an area set apart for anchored ships discharging or receiving explosives. (3) Exposed anchorage-an anchorage that is unprotected from such dangers as weather, sea, or ice. (4) Prohibited anchorage-a section of a harbor kept free of anchored ships. (5) Temporary anchorage-a place where ships can anchor only under favorable conditions and where ships must have power ready to get under way. [12]

A place where a ship anchors or may anchor. An area set apart for anchored vessels in a harbor. A suitable place for anchoring is sheltered from wind and sea, does not interfere with harbor traffic, and has a sea bottom that gives good holding to anchors. The anchorage space allotted to a vessel should include a circle with a radius equal to the combined length of anchor cable and ship. A depth of 7 to 8 fathoms at low water is usually considered sufficient for ordinary requirements. [36]

An area in which vessels, seaplanes, etc., may anchor. An anchorage is usually a sheltered position in which the depth, and nature of the bottom is suitable for ships or planes to anchor. [35]

Definition: **ANCHORAGE AREA**. A designated area where vessels may anchor.

Definition: **ANCHORAGE CHART.** A nautical chart showing prescribed or recommended anchorages. Such a chart may be a harbor chart overprinted with a series of circles, each indicating an individual anchorage. [1]

> No Anchoring Areas, Nonanchorages, Forbidden Anchorages, Prohibited Anchorages, Restricted Anchorages and other equivalent areas are by convention classified as types of Anchorage Areas.
>
> No Anchoring Areas adopted by the International Maritime Organization (IMO) shall adhere to the specifications for No Anchoring Areas contained in Section 4.14.4.3, “International Maritime Organization (IMO) Adopted No Anchoring Areas”.

4.14.4.1 Federally Regulated Anchorages

Generally, Federally Regulated Anchorages are established by the U.S. Coast Guard but may also be established within other regulated areas by cognizant federal agencies.

4.14.4.1.1 U.S. Coast Guard Authorized Anchorages

The USCG is authorized to define and establish anchorage grounds for vessels in all harbors, rivers, bays, and other navigable waters of the United States whenever they are required for safe navigation by maritime or commercial interests. The establishment of such anchorage grounds is coordinated with the USACE. Anchorage regulations must be published in the Federal Register, Local Notice to Mariners or the Code of Federal Regulations before anchorage limits and labels can be charted. Information concerning anchorages under USCG jurisdiction received prior to such publication shall not be considered an adequate source for charting purposes. The limits and labels of USCG-authorized anchorage grounds are charted in magenta.

For these federally regulated areas, condensed versions of USCG anchorage regulations may be charted ONLY if the condensation originates with or is approved by signature of the authorizing agency. Complete regulations are published in the CFR and in the Coast Pilot. The charted area shall be identified with a magenta label that includes the primary title of the area as given in the CFR, the assigned alphanumeric designator, the CFR section number and a reference to the standard Note A. Labels for special anchorage areas shall also include reference to CFR section number 110.1, which provides additional rules and regulations for anchoring in these areas. The type or use of the anchorage area is generally found within the text of their regulations rather than categorized by the authorizing agency. Reference to 110.1 shall precede the CFR number assigned to the specific area.

Examples:

SPECIAL ANCHORAGE
110.1, 110.126a (see note A)

EXPLOSIVE ANCHORAGE NO. 12
110.224 (see note A)

Examples of types of Anchorage Areas:

Commercial Anchorages
Dead Ship
Deep Draft
General Anchorages
Military Anchorages
Seaplane Anchorages
Small Craft
Special Anchorages
Temporary Anchorages

Limits for these types of anchorages are charted with a 0.2 mm solid magenta line. Military anchorages include Naval, and Naval and General.

Explosive Anchorages
Quarantine Anchorages

These anchorage limits are shown by a dashed magenta line (0.2/2.0/0.75 mm). Explosive anchorages include Commercial Explosive, Emergency Explosives, Naval Explosive, and Temporary Explosives.

Nonanchorages
Forbidden Anchorages
Prohibited Anchorages
Restricted Anchorages

Area limits shall be symbolized with a T-dashed magenta line (0.20/2.5/1.2 mm). The top of the T represents the actual limit of the area. The base of the T is always inside the area.

Fairway Anchorages

Fairway anchorage limits are shown by a 0.5 mm solid magenta line.

4.14.4.1.2 No Anchoring Areas Authorized by Federal Agencies Other Than the U.S. Coast Guard

See also Section 4.14.4.3, "International Maritime Organization (IMO) Adopted No Anchoring Areas".

No anchorage or equivalent areas may be established by federal agencies other than the U.S. Coast Guard. These areas exist within other established areas and are authorized by the cognizant federal government agency. These agencies include the National Oceanic and Atmospheric Administration, the Department of Interior and others. For example, Prohibited and Restricted anchorages may exist in a NOAA National Marine Sanctuary or within other Federal Marine Protected Areas.

A No Anchoring Area is charted as either: (1) a Prohibited Anchorage (or equivalent area), when anchorage is PROHIBITED for ALL vessels, or (2) as a Restricted Anchorage, when anchorage is RESTRICTED for SOME vessels. The type or use of the anchorage is generally contained within the text of the regulation.

EXAMPLE: Florida Keys National Marine Sanctuary, 15 CFR 922.164g, "Anchoring on Tortugas Bank.".

Excerpt of Applicable Regulations:

"Vessels 50 meters or greater in registered length, are prohibited from anchoring on the portion of Tortugas Bank within the Florida Keys National Marine Sanctuary west of the Dry Tortugas National Park that is outside of the Tortugas Ecological Reserve."

Even though the operative word "prohibited" is contained within the text, the use is qualified by "Vessels 50 meters or greater in registered length, ...". Therefore, the regulations are applicable to some vessels and the area charted as a Restricted Anchorage.

If there was no qualifier, the area would be charted as a Prohibited Anchorage because the regulations would be applicable to ALL vessels.

Federal anchorage regulations must be published in the Federal Register, Local Notice to Mariners or the Code of Federal Regulations before anchorage limits and labels can be charted. Information concerning anchorages received prior to such publication shall not be considered an adequate source for charting purposes. Condensed versions of anchorage regulations may be charted ONLY if the condensation originates with or is approved by signature of the authorizing agency.

No Anchoring areas are classified as either mandatory or voluntary. Both mandatory and voluntary anchorage areas shall be charted. Mandatory regulations are published in the Federal Register, Local Notice to Mariners, the Code of Federal Regulations and in the Coast Pilot. Voluntary measures (not regulations) are published in the Federal Register, the Coast Pilot and in Local Notice to Mariners.

Symbolization: A No Anchoring Areas limits shall be symbolized in magenta.

Boundary Lines: Area limits shall be symbolized with a T-dashed magenta line (0.20/2.5/1.2 mm). The top of the T represents the actual limit of the area. The base of the T is always inside the area.

Coincidental Lines: When a No Anchoring Area is established within another regulated area, such as a National Marine Sanctuary (See Section 4.14.7, Civil Reservations), these separate features commonly share selected turning points and complete or partial coincidental lines. When this occurs, both features shall be charted in their exact published geographic positions. Neither feature symbolization will be offset.

Two features: The following rules shall apply when the limits of a No Anchoring Area and the limits of a civil reservation coincide:

(1) The T-dashed magenta limit line of the No Anchoring Area shall be charted.

(2) The coincidental blue long-short dashed limit line of the civil reservation symbol shall not be charted.

(3) The (optional) blue screened band of the civil reservation symbol shall be charted along the inside edge of the T-dashed magenta limit line.

The differences in charted colors and symbolization distinguishes each feature as a separate entity with specific regulatory significance.

Three or more features: When three or more features share coincidental lines, the feature/s of lesser importance to navigation shall be offset (outward) one line weight at the scale of the chart.

> See also, **Size and Shape**, for symbolization of minimum size symbols and alternative symbolization for small No Anchoring Areas larger than the minimum size symbol.

Location: A No Anchoring Area shall be located in its officially published geographic position.

Size and Shape: A No Anchoring Area shall conform to the shape of the feature it is demarking.

On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed magenta square. Note that the minimum size symbol is symbolized by a dashed magenta square and not a T-dashed magenta square. The 2.0 mm dashed magenta square shall always be used when the greatest dimension of the No Anchoring Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape.

Small No Anchoring Areas that do not meet the minimum size symbol specification may be symbolized using the 0.2 mm solid magenta line, the "Anchorage area in general" symbol. This symbol should be used when the solid line pattern provides increased graphic clarity and recognition of the feature by the mariner.

Orientation: A No Anchoring Area that conforms to the size and shape of a feature is by definition correctly oriented.

A No Anchoring Area that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

Labels:

General: No Anchoring Areas shall be labeled in magenta.

Location: Labels shall be located within the designated area, or when the scale of the chart does not permit charting labels within the limits of a No Anchoring Area, the label may be located adjacent to the charted feature.

Textual label/s: There are three required labels. They are: (1) the Feature Name, (2) the Code of Federal Regulations reference and section number, and (3) a reference to the standard Note A.

Textual labels shall be 7 pt. Swiss Light Italic. Smaller type may be used in congested areas. Authorized abbreviations may be used when formulating the label.

(1) The Feature Name Label is always in capital letters (e.g., *PROHIBITED ANCHORAGE*, *PROHIB ANCHORAGE*, *PROHIB ANCH*, *RESTRICTED ANCHORAGE*, *RESTRICT ANCHORAGE*, *RESTRICT ANCH).*

(2) The Code of Federal Regulations reference and section number is always capital letters, **except** for an alphabetical letter when it follows a numeric section number (e.g., *15 CFR 922.164g*).

(3) The reference to the standard Note A [e.g., *(see note A)*], is always lowercase letters, except for the letter A, which is always a capital letter.

Line Type and Weight:

Area limits shall be symbolized with a T-dashed magenta line (0.20/2.5/1.2 mm).

The minimum size symbol, a 2.0 mm dashed magenta square, shall be used on small scale charts. Note that the minimum size symbol is shown by a dashed magenta square and not a T-dashed magenta square.

The alternate “Anchorage area in general” symbol, a 0.2 mm solid magenta line, may be used to chart small areas that are larger than the minimum size symbol specification.

Color and Screening:

Color: A No Anchoring Area shall be symbolized in magenta. All labels and references shall be in magenta.

Screening: Not applicable.

Feature Removal from Chart: A charted No Anchoring Area shall not be removed until the cognizant federal government agency provides conclusive evidence that the No Anchoring Area designation has been rescinded.

Feature Recommendation for a Notice to Mariners: A newly applied, revised or deleted No Anchoring Area shall be recommended for a Notice to Mariners.

4.14.4.2 Nonfederally Regulated Anchorages

Last revised by Cartographic Order 001/16 on January 6, 2016

Nonfederally Regulated Anchorages (N 12.1)

Definition: **CIVIL ANCHORAGE.** An anchorage under the jurisdiction of State or Local Governments. Sources of charting include Local Notice to Mariners, chart letters, blueprints, etc. These are classified as general anchorages.

State and local governments may establish anchorage areas in waters under their jurisdiction. These areas shall not be charted until the USCG has evaluated the request and recommended a charting action, although USCG approval is not required. The charting source could be a Chart Letter, Blueprint or Digital Data approved by the legislative unit having jurisdiction over the area. Recommended labels and notes shall be in black and shall be modified by the production branches as required to conform to standard charting practices. The limiting lines shall be charted with a black dashed (0.2/2.0/0.75 mm) line.

Anchoring Berths

Definition: **ANCHORING BERTHS.** Circular areas designated within anchorage grounds which are intended as a convenience in assigning anchorage locations for both military **and** commercial vessels.

Anchoring berths are usually circular areas charted within established anchorage areas and are intended as a convenience in assigning anchoring locations for both military and commercial vessels. Information concerning anchoring berths may be published in the CFR (see 33CFR 110.168) but is generally developed by local users. The charting source could be a Chart Letter, Blueprint or Digital Data approved by the commander of the local military base or by the legislative unit having jurisdiction over the area.

Anchoring berths are charted as solid line (0.2 mm) or dashed line (0.2/2.0/0.75 mm) circles of specified diameter with a small center-position circle (solid or dashed to correspond to the berth limit symbol), and a designator. The position circle is 2.6 mm in diameter and the designator is in 7 pt. Swiss Regular. The circles and designators normally shall be printed in unscreened green. If another color is required for clarity they may be printed in black with a 49 percent, 200 LPI biangle screen.

Harbor of Refuge

Definition: **HARBOR OF REFUGE**. A harbor provided as a temporary refuge on a stormy coast for the convenience of passing shipping, also called a port of refuge. It may or may not be part of a shipping port. [36]

Harbors of refuge are not indicated on NOAA Nautical Charts except as part of a geographic name. Chart No. 1 symbol N10 does not symbolize a harbor of refuge. See Reported Anchorage.

Reported Anchorage (N10)

A reported anchorage is an area described as being suitable for anchoring, but is not regulated by an established authority. The Marine Chart Division does not typically show reported anchorages on nautical charts, unless they have been requested by an authoritative source, such as the USCG,

and verified with the Nautical Data Branch. Therefore, if existing reported anchorages cannot be verified, they must be removed from the nautical chart.

If a reported anchorage is shown on a nautical chart it is shown by the double fluke anchor symbol (N10), the center of the symbol being its position. Reported anchorages do not have defined limits and should not be charted with a limiting line.

4.14.4.3 International Maritime Organization (IMO) Adopted No Anchoring Areas

> No Anchoring or equivalent areas NOT adopted by IMO shall adhere to the specifications for Anchorage Areas contained in Sections 4.14.4.1, "Federally Regulated Anchorages" and 4.14.4.2, "Nonfederally Regulated Anchorages".

These specifications apply ONLY when a No Anchoring Area has been **adopted** by IMO. The key words are "has been adopted by IMO". A designated area may be a No Anchoring Area but not IMO adopted and will therefore adhere to the specifications referenced above.

Regulations for No Anchoring Areas must be published in the Federal Register, Local Notice to Mariners or the Code of Federal Regulations before the No Anchoring Area limits and labels can be charted.

IMO adopted No Anchoring Areas are established in areas where anchoring is unsafe, unstable, particularly hazardous or could result in unacceptable damage to the marine environment. Unless specified in other regulations, transit through these areas is not prohibited.

IMO adopted No Anchoring Areas shall ONLY be charted when REQUESTED by the cognizant federal government agency **AND** ADOPTED by the IMO. They shall be shown at all chart scales, except for those located within areas that are charted without hydrography. These areas may be established within other regulated areas, such as a National Marine Sanctuary, or as an independent area.

> **No Anchoring Areas can be directly recommended to and adopted by the IMO without first being established under domestic law.**
>
> **Within other Regulated Areas:** Generally, No Anchoring or equivalent areas are initially established under domestic law and are charted in accordance with the specifications for Anchorage Areas contained in Section 4.14.4.1, "Federally Regulated Anchorages". These areas may then be recommended to and adopted by the IMO. For example, when established within another area, such as a National Marine Sanctuary, the applicable regulations are published in the Code of Federal Regulations, Title 15, "Commerce and Foreign Trade", Part 922, "National Marine Sanctuary Program Regulations", other CFR Titles and/or the Coast Pilot, as necessary. See also, Labels.

Independent Area: IMO adopted No Anchoring Areas may be established as independent areas. These areas must also be recommended to and adopted by the IMO. Applicable regulations are published in the Code of Federal Regulations, Title 33, "Navigation and Navigable Waters", Part 110, "Anchorage Regulations", other CFR Titles and/or the Coast Pilot, as necessary. See also, Labels.

Symbolization: IMO adopted No Anchoring Areas limits shall be symbolized in magenta.

Boundary Lines: Area limits shall be symbolized with a T-dashed magenta line (0.20/2.5/1.2 mm). The top of the T represents the actual limit of the area. The base of the T is always inside the area. This symbolization is consistent with International Hydrographic Organization symbolization (N 20) and some categories of NOS charted Anchorage Areas.

Coincidental Lines: When IMO adopted No Anchoring Areas are established within other regulated areas, such as a National Marine Sanctuary (See Section 4.14.7, Civil Reservations), these separate features commonly share selected turning points and complete or partial coincidental lines. When this occurs, both features shall be charted in their exact published geographic positions. Neither feature symbolization will be offset.

Two features: The following rules shall apply when the limits of a No Anchoring Area and the limits of a civil reservation coincide:

(1) The T-dashed magenta limit line of the No Anchoring Area shall be charted.

(2) The coincidental blue long-short dashed limit line of the civil reservation symbol shall not be charted.

(3) The (optional) blue screened band of the civil reservation symbol shall be charted along the inside edge of the T-dashed magenta limit line.

The differences in charted colors and symbols distinguishes each feature as a separate entity with specific regulatory significance.

Three or more features: When three or more features share coincidental lines, the feature/s of lesser importance to navigation shall be offset (outward) one line weight at the scale of the chart.

See also, **Size and Shape**, for symbolization of minimum size symbols and alternative symbolization for small No Anchoring Areas larger than the minimum size symbol.

Location: An IMO adopted No Anchoring Area shall be located in its officially published geographic position.

Size and Shape: A No Anchoring Area shall conform to the shape of the feature it is demarking.

On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed magenta square. Note that the minimum size symbol is symbolized by a dashed magenta square and not a T-dashed magenta square. The 2.0 mm dashed magenta square shall always be used when the greatest dimension of the IMO adopted No Anchoring Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape.

Small No Anchoring Areas that do not meet the minimum size symbol specification may be symbolized using the 0.2 mm solid magenta line, the "Anchorage area in general" symbol. This symbol should be used when the solid line pattern provides increased graphic clarity and recognition of the feature by the mariner.

Orientation: A No Anchoring Area that conforms to the size and shape of a feature is by definition correctly oriented.

A No Anchoring Area that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

Labels:

General: IMO adopted No Anchoring Areas shall be labeled in magenta.

Location: Labels shall be located within the designated area, or when the scale of the chart does not permit charting labels within the limits of the No Anchoring Area, the label may be located adjacent to the charted feature. The charted label shall be a combination of: (1) an IHO icon, and (2) associated textual labels.

Icon: ALL IMO adopted No Anchoring Areas shall be labeled with the existing internationally recognizable icon for "Anchoring prohibited" (see Chart No. 1, International symbol N 20). The standard No Anchoring Area Icon shall be one-quarter (1/4) inch in height.

Textual label/s: The pictorial representation shall be supplemented with two or three additional labels. This first two labels supplement the icon and are required. They are: (1) the Code of Federal Regulations reference and section number, and (2) a reference to the standard Note A.

A third label may be required based on the existence of a condition, contained within the text of the regulation, that qualifies the meaning of the unconditional icon. The condition is: (3) whether the charted No Anchorage Area is prohibited for ALL vessels or RESTRICTED for some vessels. When anchorage is prohibited for ALL vessels, there will be no third label. When anchorage is RESTRICTED for vessels greater than a prescribed length, also commonly referred to as LOA (length overall), an additional (third) label shall be added. This label is in fact a textual qualifier of the No Anchoring Area icon. When required, it shall be placed immediately below the icon and before all other required label components.

Textual labels shall be 7 pt. Swiss Light Italic. Smaller type may be used in congested areas. Authorized abbreviations may be used when formulating the label.

(1) The Code of Federal Regulations reference and section number is always capital letters, **except** for an alphabetical letter when it follows a numeric section number (e.g., *15 CFR 922.164g*).

(2) The reference to the standard Note A [e.g., *(see note A)*], is always lowercase letters, **except** for the letter A, which is always a capital letter.

(3) The Conditional Label is always in capital letters (e.g., *RESTRICTED ANCHORAGE*, *RESTRICT ANCH*, *RESTRICTED*, *RESTRICT*).

The following examples illustrate the use of each textual label in conjunction with the icon. In each example, a complete charted label is illustrated. **The specific element of the label being illustrated is in BOLD type.**

(1) Code of Federal Regulations reference and section number.

Example: An IMO adopted No Anchoring Area established within another Regulated Area (National Marine Sanctuary). The Code of Federal Regulations, Title 15, "Commerce and Foreign Trade", Part 922, "National Marine Sanctuary Program Regulations":

15 CFR 922.xxx
(see note A)

Example: An IMO adopted No Anchoring Area established as an independent area. The Code of Federal Regulations, Title 33, "Navigation and Navigable Waters", Part 110, "Anchorage Regulations":

110.xxx
(see note A)

(2) Reference to the standard Note A (the note listing the publications that contain navigation regulations relevant to the chart).

Example: *(see note A)*

15 CFR 922.xxx
(see note A)

(3) Conditional: whether the charted IMO No Anchorage Area is prohibited for ALL vessels or RESTRICTED for some vessels.

Example: IMO adopted No Anchoring Areas that prohibit anchorage of ALL vessels. Note that the resultant charted label (icon plus associated text) in this example is identical to the previous examples. When ALL vessels are prohibited from anchoring, the icon is self explanatory. The two textual labels are required.

15 CFR 922.xxx
(see note A)

Example: IMO adopted No Anchoring Areas that are RESTRICTED for vessels greater than a prescribed length. The conditional qualifier is required in addition to the two textual labels. The conditional qualifier is placed immediately below the icon.

RESTRICTED ANCHORAGE
15 CFR 922.xxx
(see note A)

OR

where space *is limited, the qualifying conditional label (RESTRICTED* ANCHORAGE) may be reduced to *RESTRICT ANCH*, *RESTRICTED* or *RESTRICT*.

RESTRICT ANCH
110.xxx
(see note A)

RESTRICTED
110.xxx
(see note A)

RESTRICT
110.xxx
(see note A)

Line Type and Weight:

Area limits shall be symbolized with a T-dashed magenta line (0.20/2.5/1.2 mm). This symbolization is consistent with IHO symbolization (N 20) and some categories of NOS charted Anchorage Areas.

The minimum size symbol, a 2.0 mm dashed magenta square, shall be used on small scale charts. Note that the minimum size symbol is shown by a dashed magenta square and not a T-dashed magenta square.

The alternate "Anchorage area in general" symbol, a 0.2 mm solid magenta line, may be used to chart small areas that are larger than the minimum size symbol specification.

Color and Screening:

Color: IMO adopted No Anchoring Areas shall be symbolized in magenta. All icons, labels and references shall be in magenta.

Screening: Not applicable.

Feature Removal from Chart: A charted IMO adopted No Anchoring Area shall not be removed until the cognizant federal government agency provides conclusive evidence that the IMO No Anchoring Area designation has been rescinded. Note that there are two possibilities: (1) that the No Anchoring Area should be deleted in its entirety, or (2) that the designation as an IMO adopted No Anchoring Area has been rescinded and the area may revert to a Federally Regulated Anchorage (Section 4.14.4.1), especially for IMO No Anchoring Areas originally established within other regulated areas.

Feature Recommendation for a Notice to Mariners: A newly applied, revised or deleted IMO adopted No Anchoring Area shall be recommended for a Notice to Mariners.

4.14.5 Dumping Areas – Overview

Revised on January 30, 2001 by Cartographic Order 002/01, on February 7, 2001 by Cartographic Order 003/01, on October 3, 2001 by Cartographic Order 019/01 and on April 1, 2004 by Cartographic Order 004/04.

Three general classes of dumping areas are shown on National Ocean Service (NOS) nautical charts. These classes are determined by the Federal regulatory authority [Environmental Protection Agency (EPA), Department of the Navy (Department of Defense) or U.S. Army Corps of Engineers (USACE)] that has jurisdiction over their establishment. Permits for dumping, other than dredged or fill materials, in Dump Sites are issued by the Environmental Protection Agency. Dumping dredged or fill material in Dump Sites, Spoil Areas, Disposal Areas and Dumping Grounds is illegal without authorization from the USACE. Dumping Areas are reserved for Department of the Navy (Department of Defense) use.

All three classes of dumping areas shall be charted in **ALL** cases where hydrography and other navigational detail are charted in the area.

(1) The Environmental Protection Agency (EPA) has authority for establishing Ocean Dumping Sites for the purpose of disposing of toxic and nontoxic wastes and dredged materials. See **Section 4.14.5.1, "Environmental Protection Agency (EPA) - Established Dump Sites".**

(2) The Department of the Navy (Department of Defense) has authority to establish Ammunition, Explosives and Chemical Dumping Areas. See **Section 4.14.5.2, "Department of the Navy (Department of Defense) - Established Dumping Areas"** and

Section 4.14.5.2.1 Ammunition and Explosives Dumping Areas

Section 4.14.5.2.2 Discontinued (*DISUSED*) Chemical Munitions Dumping Areas

(3) The U.S. Army Corps of Engineers (USACE) has authority to establish dumping areas in the navigable waters of the United States with the approval of the Environmental Protection Agency (EPA). These include Spoil Areas, Disposal Areas and Dumping Grounds. See **Section 4.14.5.3, "U .S. Army Corps of Engineers (USACE) - Established Dumping Areas"** and

Section 4.14.5.3.1 Spoil Areas

Section 4.14.5.3.2 Disposal Areas

Section 4.14.5.3.3 Dumping Grounds

CAUTION

Due primarily to the purpose of these areas and the similarity of the feature labels, these areas are commonly referred to interchangeably. It is imperative that the specific type of dumping area be known to properly chart the feature. While similar, they are charted differently.

4.14.5.1 Environmental Protection Agency (EPA) - Established Dump Sites
Revised on April 1, 2004 by Cartographic Order 004/04

Definition: **DUMP SITE.** Area established by Federal regulation in which dumping of dredged and fill material and other nonbuoyant objects is allowed with the issuance of a permit. Dump Sites are shown on nautical charts. See also DISPOSAL AREA, DUMPING GROUND, SPOIL AREA. [1]

> The ocean dumping permit program of the Environmental Protection Agency provides that except when authorized by permit, the dumping of any material into the ocean is prohibited by the "Marine Protection, Research, and Sanctuaries Act of 1972, Public Law 92-532," as amended (33 U.S.C. 1401 et seq.).

The Environmental Protection Agency (EPA) has established Ocean Dumping Sites, commonly referred to as Dump Sites, for the purpose of disposing of toxic and nontoxic materials including dredged material, industrial waste, acid waste, municipal waste, sludge, etc. Ocean Dump Sites are established in locations considered by the EPA to be nonpolluting to the environment and are not intended to interfere with navigation.

> "(a) Wastes which may present a serious obstacle to fishing or navigation may be dumped only at disposal sites and under conditions which will insure no unacceptable interference with fishing or navigation"...
>
> "(3) Containers are dumped at depths and locations where they will cause no threat to navigation, fishing, shorelines, or beaches."
>
> Source: Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Part 227.10, "Hazards to fishing, navigation, shorelines or beaches.".

Dump Sites are generally located in the vicinity of major entrance channels and are most commonly used for depositing dredged material associated with maintenance dredging of channels and harbors.

> "(a) Dredged materials are bottom sediments or materials that have been dredged or excavated from the navigable waters of the United States, and their disposal into ocean waters is regulated by the U. S. Army Corps of Engineers using the criteria of applicable sections of parts 227 and 228. Dredged material consists primarily of natural sediments or materials which may be contaminated by municipal or industrial wastes or by runoff from terrestrial sources such as agricultural lands."...
>
> Source: Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Part 227.13, "Dredged materials.".

The criteria for all ocean dumping areas are established by the Administrator, EPA, and are published in the Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Part 227, "Criteria for the Evaluation of Permit Applications for Ocean Dumping of Materials".

Dump Sites shall be charted in **ALL** cases where hydrography and other navigational detail are shown in the area.

Dump Sites are also commonly referred to by the applicable section number of the Marine Protection, Research, and Sanctuaries Act of 1972 (i.e., a 102 Site or 103 Site). Individual Dump Sites are approved for dumping of indicated materials only (See 40 CFR 228.15).

> Permits for the dumping of **dredged material** into waters of the United States, including the territorial sea, and into ocean waters are issued by the U. S. Army Corps of Engineers.
>
> Permits for the dumping of **fill material** into waters of the United States, including the territorial sea, are also issued by the U. S. Army Corps of Engineers. U. S. Army Corps of Engineers regulations are contained in 33 CFR 323-324.
>
> > "Applications and authorizations for Dredged Material Permits under section 103 of the Act [the Marine Protection, Research, and Sanctuaries Act of 1972] for the transportation of dredged material for the purpose of dumping it in ocean waters will be evaluated by the U. S. Army Corps of Engineers ..."
> >
> > Source: Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Part 225.1, "General.".

> Permits for the dumping of **other material** in the territorial sea and ocean waters are issued by the Environmental Protection Agency. Environmental Protection Agency regulations are contained in 40 CFR 220-229. Procedures and criteria for the issuance of permits by the EPA are issued pursuant to section 102 of the Marine Protection, Research, and Sanctuaries Act of 1972.

There are two primary components of a charted Dump Site: (1) the charting authority (EPA), which establishes, revises or discontinues the site, including the geographic limits of the site, and (2) whether or not hydrography is charted within the limits of the designated area. These two components determine the feature symbolization, location and the composition of the charted label(s).

In accordance with EPA regulations, the following procedures shall apply when charting ocean dumping areas:

Initial Establishment of Dump Sites

Prior to 1977, ocean dumping areas (dumping grounds, disposal areas) were described in the Code of Federal Regulations (CFR), Title 33, "Navigation and Navigable Waters", Part 205. These regulations were revoked in their entirety by the Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Parts 220-229, "Ocean Dumping", designating the Environmental Protection Agency as the cognizant agency for these matters. The change in regulatory authority resulted in the charting of two distinct categories of EPA Dump Sites: (1) the **conversion** of selected existing dumping grounds and disposal areas to Dump Sites, and (2) **newly established** Dump Sites. See also, "**Dumping and Disposal Areas NOT Converted to EPA Dump Sites**".

Conversion of Pre-1977 Dumping Grounds and Disposal Areas

The following information has been condensed and reformatted from prior documentation and provided as a historical reference for interpreting currently charted information. See also prior documentation, Cartographic Order 010/77, dated November 15, 1977, SUBJECT: Dump Sites and Memorandum, dated August 1, 1989, SUBJECT: Cartographic Policy Concerning Charted Dump Site Area Limit Revisions.

Conversion of Dumping Grounds and Disposal Areas to EPA Dump Sites

Procedures:

(1) Limiting lines bounding existing Dumping Grounds and Disposal Areas charted from a source prior to EPA control (1977) were removed from the chart **ONLY** when they were **enclosed by** or **coincidental with** an EPA-regulated area.

(2) Non-overlapping portions or detached areas were removed from charts **ONLY** on recommendation by a NOS survey evaluation unit **AND/OR** when such removal was supported by new hydrographic survey data. See also, **"Dumping and Disposal Areas NOT Converted to EPA Dump Sites"**.

All existing hydrography and tints were retained in these areas since there was/is no intent to produce unacceptable interference to navigation. The date(s) of the charted hydrography within these areas was researched and charted as part of the label. The formulation of the initial label(s) for a Dump Site is identical to the current specification. See "Labels and Note", for labeling requirements.

Converted areas not containing charted hydrography (generally blue tint) shall remain as charted until new hydrographic survey data is received. When supported by new hydrographic survey data, hydrography shall be charted in these Dump Sites and the existing label reformulated in accordance with the labeling specifications contained in "Labels and Note".

Dumping and Disposal Areas NOT Converted to EPA Dump Sites

Definition: **DUMPING GROUND.** An area used for the disposal of dredge spoil. Although shown on nautical charts as dumping grounds in United States waters, the Federal regulations for these areas have been revoked and their use for dumping discontinued. These areas will continue to be shown on nautical charts until they are no longer considered to be a danger to navigation. See also DUMP SITE, SPOIL AREA, DISPOSAL AREA. [1]

Procedures:
(1) Previously charted dumping and disposal areas or portions thereof not superseded by the EPA-designated areas were additionally labeled *(discontinued)*. All references to Note A, (a specification at that time), were deleted.

(2) Previously established military disposal areas (ammunition, explosives, and chemicals) were additionally labeled *DISUSED* (note that the label is not enclosed by parentheses). Labels were in all capital letters and in magenta, parallel with the specification for the Feature Name Label for these areas. (See NM 6/71 and NM 9/71 for examples of Chemical Munitions Dumping Areas revised to *DISUSED*) These areas shall be retained except where specifically superseded by EPA limits or regulations, as the explosives and materials may be expected to remain a danger to trawlers and others until removed. All references to Note A, (a specification at that time), were deleted. A Dumping Area classified as *DISUSED*, also requires the addition of a Reference label to a generic note and the associated generic note. See Section 4.14.5.2, "Department of the Navy (DOD) - Established Dumping Areas" and "Labels and Note".

Example: *CHEMICAL MUNITIONS DUMPING AREA*

was revised to

CHEMICAL MUNITIONS DUMPING AREA DISUSED (see note _)

Newly Established Dump Sites

Newly established Dump Sites are transmitted to NOS through the Federal Register (FR) as a "Final Rule" and are designated as Chart Letters. Prior to January 1, 1997, newly established Dump Sites were designated by EPA as either (1) on an interim basis, or (2) on a final basis. For charting purposes, both designations were considered to be active Dump Sites and were charted.

In 1992, the Marine Protection, Research and Sanctuaries Act (MPRSA) was amended to disallow the utilization of those EPA Dump Sites designated as "interim" sites (40 CFR, Part 228.14) for ocean dumping after January 1, 1997. See also the Code of Federal Regulations (CFR), Title 40, "Protection of Environment", Part 228.15, "Dumping sites designated on a final basis.". There were twenty-nine (29) Dump Sites designated as "interim" sites. There were/are two exceptions:

(1) The EPA "interim" Dump Site off the coast of Newport Beach, California, which is known as "LA-3", was retained as charted. Dumping was allowed to continue in this site until January 1, 2003. EPA advises that this site is currently (September, 2003) in the process of being designated as a "final" Dump Site, or

(2) those existing Dump Sites selected for dumping by the U. S. Army Corps of Engineers under MPRSA section 103(b). An EPA "interim" Dump Site selected by the U. S. Army Corps of Engineers under MPRSA, Section 103(b) is cartographically designated as a Disposal Area and requires a change to the charted label. See Nautical Chart Manual, Section 4.14.5, b, Disposal Areas.

For reference, background and implementation information, see prior documentation, Cartographic Order 019/03, dated October 10, 2003, SUBJECT: EPA Established "Interim" Dump Sites.

Reports from non-authoritative sources (any source other than the EPA) shall be forwarded to the Nautical Data Branch for confirmation by the EPA.

The following extracted information represents a typical description of a Dump Site. The original source contains other additional narrative information, not printed here, that effects the charting of the feature; the horizontal datum, etc. (Source: 40 CFR 228.15)

(9) Cold Spring Inlet, NJ Dredged Material Disposal Site.
(i)L*ocation:*38°55'52"N.,74_53'04"W.; 38°55'37"N., 74°52'55"W.;38°55'23"N., 74°53'27"W.;38°55'36"N.,74°53'36"W.
(ii) *Size:* Approximately 0.13 square nautical miles.
(iii) *Depth:* Approximately 9 meters.
(iv) *Primary Use:* Dredged material disposal.
(v) *Period of Use:* Continuing use.
(vi) *Restrictions:* Disposal shall be limited to dredged material from Cold Spring Inlet, New Jersey

Figure 4.14.5.1-1
Typical Description of a Dump Site
(Source: 40 CFR 228.15)

Note that **depth information provided** in the Federal Register (FR) or the Code of Federal Regulations (CFR) is for general narrative descriptive purposes only and **is NOT to be used for charting.** See description, "Charted Hydrography", for detailed specifications and "Labels and Note".

Geographic Limits - A newly established Dump Site shall be located in its officially published geographic position.

Symbolization - See “Symbolization”.

Hydrography - All hydrography and tints currently charted within the limits of a newly established Dump Site shall be retained. All new hydrographic survey data shall be applied within an area designated as a Dump Site, unless the charted Dump Site is located in an area where hydrography and other navigational detail is not shown.

A newly established Dump Site not containing charted hydrography (generally blue tint) shall remain as charted until new hydrographic survey data is received.

When supported by new hydrographic survey data, hydrography shall be charted in the Dump Site and the existing label reformulated in accordance with the labeling specifications contained in “Labels and Note”.

Labeling - See “Labels and Note”. See the specific requirement for adding Note S to the chart when the Dump Site being added is the first Dump Site added to that nautical chart. Specifications for Note S are contained in “Labels and Note”.

Revisions to Charted Dump Sites

Revisions to a charted Dump Site are precipitated either: (1) from the charting authority, the Environmental Protection Agency (EPA), or (2) based on the revision of charted hydrography.

Charting Authority, Environmental Protection Agency (EPA) - Federal Register

Revisions to an established Dump Site are transmitted to the National Ocean Service through the Federal Register (FR) as a “Final Rule” and are designated as Chart Letters. The Code of Federal Regulations contains a codification of the general and permanent rules published in the Federal Register. These two publications must be used together to determine the latest version of any given rule. Revisions from the Federal Register include changes in: (1) the geographic limits, (2) the status (from active to discontinued), and (3) the primary use of a Dump Site. Reports originating from non-authoritative sources (any source other than the EPA) shall be forwarded to the Nautical Data Branch for confirmation by the EPA.

(1) Geographic Limits:

Existing charted Dump Site limits which are superseded by new limits shall be removed when they are completely **enclosed by** the new limits. This is consistent with the procedure(s) originally established for the "Conversion of Dumping Grounds and Disposal Areas to EPA Dump Sites". Any revision to the areal limits of a charted Dump Site requires a re-evaluation of the composition of the charted label and the content of any charted hydrography label, (i.e., the "*Depths from survey of ....*" label).

When the "old" area limits are not specifically superseded in the Federal Register or more commonly, portions of the "old" area limits are located outside the limits of the "new" Dump Site limits, the Nautical Data Branch shall be notified for confirmation and clarification by the EPA. Any revision to the areal limits of a charted Dump Site requires a re-evaluation of the composition of the charted label and the content of any charted hydrography label, (i.e., the "*Depths from survey of ....*" label).

Nonoverlapping portions or detached areas created by the charting of new limits (and not specifically superseded by the Federal Register) shall be retained. Any, or all, of the retained area(s) must be individually re-evaluated for required labeling and specifically the content of the label.

(2) Status: [from active to *(discontinued)*], See "Discontinuance and Removal of Dump Sites". A charted label **WITHOUT** the status label *(discontinued)* is presumed to be an active Dump Site. See "Labels and Note".

(3) Primary Use: Contained within the textual description of the Dump Site in the Federal Register or Code of Federal Regulations. See previous Figure 4.14.5.1-1 for an example of a typical description of a Dump Site, specifically line 9 (iv), *Primary Use*. See "Labels and Note" for charting requirements.

Charted Hydrography

All new hydrographic survey data shall be applied within an area designated as a Dump Site, unless the charted Dump Site is located in an area where hydrography and other navigational detail is not shown. It should be noted that the existence of a Dump Site has no impact/effect on the charting, or not charting, of hydrography within the areal dimensions of a Dump Site. Hydrography within the limits of a charted Dump Site is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Dump Site were non-existent. There are, however, two linkages **WHEN** hydrography is charted within a Dump Site. They are:

(1) the composition and content of the charted label of the Dump Site, and

(2) the deletion of a charted Dump Site that has been discontinued

A symbolized Dump Site, once charted, is generally stable and rarely subject to change. Changes occur most frequently when USACE revisions of charted hydrography within the limits of a Dump Site precipitate changes to the charted label. The specifications contained in "Labels and Note" delineate the differences and provide detailed charting specifications for the composition and content of the charted label.

Special/Unique Requirements for U. S. Army Corps of Engineers Surveys

(That Depict Dump Sites on the Survey Background Base)

U. S. Army Corps of Engineers condition surveys are the primary source for charting and revising hydrography within Dump Sites. These graphic surveys are registered by the Nautical Data Branch as Blueprints. The purpose of these surveys is to provide hydrographic data for charting. The following section delineates additional special/unique requirements and recommended procedures for resolving any differences **WHEN** a Dump Site is contained on the source document.

Background

U. S. Army Corps of Engineers graphic hydrographic survey data is typically displayed on a standard analog background base. The purpose of a background base is to act as the medium for conveying the superimposed hydrographic data. Background bases usually contain other features that are commonly shown on nautical charts and may include high water line, channels, Spoil Areas, etc. Dump Sites may also be displayed on these bases. The date(s) that the survey(s) was/were conducted, applicable state plane grid information and other pertinent information is generally contained in the title block of the survey. This/these date(s) refer **ONLY** to the survey date of the hydrography and not to the other features that comprise the background base. Features (except hydrography) depicted on background bases are usually added to the base when the base was originally constructed. These other features are in fact part of the background base. Once constructed, a background base is not normally subject to revision and consequently neither are these other features depicted on the original base. The background base (unrevised) is used repetitively to display current hydrographic data. The title block is also amended to reflect the date(s) the current survey was conducted. Again, the only purpose of the background base is to serve as a medium for conveying the hydrographic data.

Standard background bases may be repetitively used for an extended period of time. In certain instances multiple, but geographically different, background bases may be alternately used. New background bases are generated on an infrequent basis that may extend over a multi-year time frame. Unfortunately, due to the extended use of these background bases, other features comprising the background base may not always match or reflect the current updated nautical chart. Generally, there is/are no date(s) associated with the "time origin" of the background base. Occasionally, when an imagery background is used, there may be a date referencing the date of the imagery. However, this has no impact on the existence or non-existence of a Dump Site which is below all water levels.

Sites used for depositing dredge and fill material, the most common usage, are permitted by the U.S. Army Corps of Engineers. The Environmental Protection Agency is the authoritative source for charting/revising a Dump Site.

When applying U. S. Army Corps of Engineers surveys, there are four (4) possible conditions or scenarios that may exist, in respect to a Dump Site, when comparing the survey and the corresponding nautical chart. Any differences routinely require further investigation and resolution. Each scenario is listed below with the required action necessary to resolve any differences between the survey and the nautical chart.

(1) A Dump Site is on the current nautical chart and not on the survey.

No Charting Action. The purpose of the U. S. Army Corps of Engineers survey is to provide hydrographic data for charting. Existing Dump Sites may or may not be on a U. S. Army Corps of Engineers survey as part of the background base. Differences between a survey and a nautical chart are required **WHEN** a Dump Site is depicted on the survey and not on the current nautical chart.

(2) A Dump Site on the survey matches the depiction on the current nautical chart.

No Charting Action.

(3) The configuration of a Dump Site on the survey is different than the depiction on the current nautical chart.

No correction to the chart. The chart shall not be revised to match the portrayal of the Dump Site on the survey. While the survey is not the source for charting/revising of a Dump Site, the differences in the configuration of the Dump Site **MUST** be resolved to ensure that the current nautical chart is correct.

There are three (3) similar but slightly different methods.

Method (A): Examine the current Standard to determine if any yet unapplied source document(s) exist that affect the configuration of the currently charted Dump Site. **WHEN** an applicable source document(s) exists, it/they should be immediately applied to the chart and the resulting portrayal re-evaluated in comparison to the U.S. Army Corps of Engineers survey. If differences still remain unresolved, proceed to Method (B).

Method (B): This method is used **WHEN** it is suspected that this same issue has previously occurred on prior documents/surveys and is due to the repetitive use of the background base, as previously discussed. Examine the Standard(s) and/or Histories of Cartographic Work to determine prior U. S. Army Corps of Engineers surveys covering the area of the Dump Site.

Historically, when this same type of condition existed on prior U. S. Army Corps of Engineers source document(s) and was previously resolved, the prior source document(s) was/were annotated with a handwritten annotation concerning a resolution. That annotation should have been signed and dated by personnel of the Nautical Data Branch. When this is the case, the current source containing the different configuration of the Dump Site should be returned to the Nautical Data Branch. The Nautical Data Branch shall annotate the current source (carry forward
the annotation) with the prior annotation.

WHEN the prior annotation indicates that there was a charting action, there usually is another source document that must be independently examined. **WHEN** no prior annotation is indicated, use Method (C).

Method (C): Examine the Standard(s) and/or Histories of Cartographic Work to determine the specific source document for charting the Dump Site. This source will be a citation from the Federal Register (FR). Ensure that the document was properly applied to the nautical chart. **WHEN** a difference still remains, the issue with all supporting materials should be returned to the Nautical Data Branch for resolution. The Environmental Protection Agency is the authoritative source for charting/revising a Dump Site.

(4) A Dump Site on the survey is <u>not on the current nautical chart</u>.

No correction to the chart. The chart shall not be revised to match the portrayal of the Dump Site on the survey. However, the identical methods delineated in item (3) above **MUST** be employed to resolve any differences.

The following three sections deal with the discontinuance and removal of a Dump Site.

Discontinuance and Removal of Dump Sites

The removal of a charted Dump Site is normally a two step process.

> (1) the Dump Site is discontinued by the Environmental Protection Agency, See "Discontinued Dump Sites" **AND**
>
> (2) new hydrographic survey data more recent than the discontinued date of the Dump Site has been applied to the chart. See "Feature Removal from Chart".

A charted active Dump Site shall not be removed until the responsible establishing authority (EPA) designates or provides documentation that the Dump Site is no longer active (see Discontinued Dump Sites) **AND** when such removal is supported by new hydrographic survey data (see Feature Removal from Chart). **Note that discontinued does not necessarily mean that the feature shouldbe removed from the chart at that time.** Removal is **ALWAYS** contingent on new hydrographic survey data that:

> (1) has a survey date more recent than the discontinued date of the Dump Site. The date the Dump Site was discontinued is determined by researching the original source document that changed the status of the Dump Site from active to discontinued and extracting **the "effective" date**, and
>
> (2) the coverage of the new hydrographic survey data completely encompasses the areal dimensions of the charted Dump Site.

Generally, when a Dump Site is discontinued, it is not accompanied by a "post-discontinuance" condition survey. Receipt of such a survey may take months or years. Because of this condition, the process of removing a Dump Site has been separated into two distinct sequential steps. They are: (1) "Discontinued Dump Sites", and (2) "Feature Removal from Chart".

> Reports originating from non-authoritative sources (any source other than the Environmental Protection Agency) indicating that a Dump Site has been discontinued, removed, etc. shall be forwarded to the Nautical Data Branch for confirmation by the Environmental Protection Agency. A charted Dump Site shall not be revised from a non-authoritative source.

Discontinued Dump Sites

A change in the status (from active to discontinued) of an existing Dump Site is generally transmitted to NOS through the Federal Register (FR) as a "Final Rule" and is designated as a Chart Letter.

A discontinued Dump Site and associated labeling shall not be removed until new hydrographic survey data, generally USACE, NOS or equivalent, of the area is available for chart updating. The date(s) of the hydrographic survey(s) **MUST** be more recent than the date that the Dump Site was discontinued and provide complete hydrographic coverage. See "Feature Removal from Chart".

A Dump Site designated as discontinued, **WITHOUT** new hydrographic survey data, requires **ONLY** the addition of an additional label. The limits of the Dump Site and the charted hydrography shall be retained as charted.

When the status of a charted Dump Site is revised from active to discontinued, the label *(discontinued)* shall be added to the existing charted label immediately after (below) the charted Feature Name label. Figure 4.14.5.1-2 and Figure 4.14.5.1-3 illustrate this basic revision. See "Labels and Note" for labeling requirements.

Dump Site
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-2
Typical Label for an Active Dump Site

Dump Site
(discontinued)
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-3
Corresponding Label for a Discontinued Dump Site
(**WITHOUT** new hydrographic survey data)

When the survey date of the hydrography is **prior to the date that the Dump Site was discontinued**, the hydrography shall be revised and the "*Depths from survey of ....*" label revised. See "Revisions to Charted Dump Sites, Charted Hydrography". The Dump Site shall not be removed from the chart.

The date the Dump Site was discontinued is determined by researching the original source document that changed the status of the Dump Site from active to discontinued and extracting the "effective" date.

Feature Removal from Chart

When a Dump Site is/has been discontinued by the EPA, the Dump Site and associated labeling shall be removed from the chart **contingent on** receipt and application of new hydrographic survey data. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Dump Site.

The date the Dump Site was discontinued is determined by researching the original source document that changed the status of the Dump Site from active to discontinued and extracting the "effective" date.

When the date of a hydrographic survey(s) is **NOT** more recent than the discontinued date of the Dump Site, the Dump Site cannot be removed from the chart. However, the hydrography contained on the survey shall be applied to the chart and the depth label "*Depths from survey of ....*" revised according to the specification. See previous section, "Discontinued Dump Sites".

When the date of a hydrographic survey(s) **IS** more recent than the discontinued date of the Dump Site, the area limit and all associated labeling shall be removed from the chart. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Dump Site.

Standard Note S: When the Dump Site being removed from the chart is the only charted Dump Site, Note S shall also be removed from the chart. See also the specifications for Note S contained in "Labels and Note".

Relationship of Dump Sites to Other Nautical Chart Features

The existence of a Dump Site has no impact/effect on the charting, or not charting, of any other nautical chart feature.

The most common relationship between a Dump Site and other nautical chart features is with charted hydrography. As noted earlier, "the existence of a Dump Site has no impact/effect on the charting, or not charting, of hydrography within the areal dimensions of a Dump Site. Hydrography within the limits of a charted Dump Site is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Dump Site were non-existent. There are, however, two linkages **WHEN** hydrography is charted within a Dump Site. See **Charted Hydrography**.

Note that the above relationship is in only one direction. The Dump Site has no effect on hydrography. However, the existence of hydrography within the areal limits of a charted Dump Site effects the composition and content of the charted label associated with the Dump Site and the deletion of a charted Dump Site that has been discontinued.

Symbolization: A Dump Site designated in the Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Part 228.15 and subsequent updating material from the Federal Register shall be shown by a black dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches) The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information. See also, Chart No. 1, Section Designation: N 24 and N g.

Location: A Dump Site shall be located in its officially published geographic position.

When a minimum size symbol is used to represent a Dump Site, the minimum size symbol shall be centered on the exact geographic position of the feature it represents. See "Size and Shape".

Size and Shape: A Dump Site shall conform to the shape of the feature it is demarking.

Minimum Size Symbol: On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed square. The 2.0 mm dashed square shall **ALWAYS** be used when the greatest dimension of the Dump Site is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. **A controlling depth shall be charted** within the limits of the Dump Site when hydrography and other navigational detail are shown in the area.

Special Charting Requirements: When the minimum size symbol **MUST** be used **for ALL Dump Sites shown on a particular chart (WITHOUT controlling depths)**, the symbols shall be identified only by a minimum label. The minimum label shall consist of the Feature Name label and the Primary Use of the Dump Site label when the Dump Site has a status of active. See Figure 4.14.5.1-4. When the Dump Site described above has a status of discontinued, the label *(discontinued)* shall be added as part of the minimum label. See Figure 4.14.5.1-5. Standard Note S and the reference label *(see note S)* shall not be charted.

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

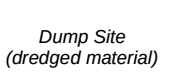


Figure 4.14.5.1-4
Minimum Size Symbol Label Requirements
Primary Use = dredged material
Status = active

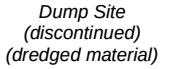


Figure 4.14.5.1-5
Minimum Size Symbol Label Requirements
Primary Use = dredged material
Status = discontinued

Orientation: A Dump Site that conforms to the size and shape of a feature is by definition correctly oriented.

A Dump Site that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

Labels and Note:

Specifications for the formulation of the charting label of a Dump Site and a Disposal Area are identical **EXCEPT** for the Feature Name, the additional Primary Use label for a Dump Site and the Note S requirement for a Dump Site.

There are four (4) standard components of the label of a charted Dump Site and one (1) additional label (a status qualifier) when the status of the Dump Site (Feature Name) is discontinued. The components of the label are listed and charted in the following vertical sequence:

(1) Feature Name label, **always** *Dump Site*
The charted label "*Dump Site*" presumes an active status.

(1a) Status qualifier, **always** *(discontinued)*, when required

(2) Primary Use of the Dump Site label, **always charted**, variable content

(3) Reference to standard Note S, **generally always charted**, See **exception** contained in **Labels:,** (3) Reference to standard Note S. See also **Size and Shape, Special Charting Requirements**.

(4) "*Depths from survey of....*" label, **charted when** hydrography is charted within a Dump Site, variable content, See **exception** contained in **Labels:,** (3) Reference to standard Note S.

The following example illustrates the use of all the various label components of a charted Dump Site.

Dump Site
(discontinued)
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-6
Standard Label Components of a Dump Site

Figure 4.14.5.1-9 is an example of a complete label for an active Dump Site with no charted hydrography (generally blue tint) resulting from the 1977 conversion of dumping areas or a newly established Dump Site located in an area with no charted hydrography. Note that the only difference is that the "*Depths from survey of ....*" label has been omitted because there is no charted hydrography. See also the requirements and exception for Note S and the reference to Note S.

Dump Site
(dredged material)
(see note S)

Figure 4.14.5.1-9
Dump Site Label
Status = Active, No Charted Hydrography

The remainder of this section provides the specifications and charting options for the labeling of a Dump Site. In each example, a complete charted label is illustrated. **The specific component of the label being illustrated is in BOLD type.** The numeric paragraph numbers (1), (1a), (2), (3) and (4) are linked to the numbering scheme provided at the beginning of this section, Labels and Note.

(1) Feature Name label designating the area a Dumping Site (Dump Site) - designated by the Federal Register. The Feature Name label is capital and lowercase letters. The first letter of each word is capitalized.

Dump Site
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-10
Feature Name Label
Status = Active

(1a) Feature Name label with Status qualifier *(discontinued)*. Dump Sites are charted as either: (1) active, or (2) discontinued. This designation is specified in the Federal Register (Chart Letter). An active Dump Site contains only the Feature Name label "*Dump Site*" as illustrated in the previous example. An active status is presumed. A discontinued Dump Site contains the Feature Name label "*Dump Site*" and the status qualifier "*(discontinued)*". The status qualifier label is always lowercase letters, enclosed by parentheses and immediately follows the Feature Name label.

Dump Site
(discontinued)
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-11
Feature Name Label with
Status Qualifier *(discontinued)*

(2) Primary Use of a Dump Site. This information is contained in the Federal Register and also published in the Code of Federal Regulations (See Figure 4.14.5.1-12). The label should reflect the primary use of the area as stated in the regulations. The primary use of the Dump Site label is always lowercase letters, enclosed by parentheses and immediately follows the Feature Name label. When the status of a Dump Site is *(discontinued)*, the Primary Use label shall immediately follow the status qualifier *(discontinued).*

Dump Site
(dredged material)
(see note S)
Depths from survey of 2001

Dump Site
(chemical waste)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-12
Primary Use of a Dump Site

(3) Reference to standard Note S. Standard Note S shall be added, see also the following **exception**, to a chart that contains at least one Dump Site. One Dump Site can include either an active or discontinued Dump Site. The reference *(see note S)* to the standard Note S is always lowercase letters, **except** for the letter S, which is always a capital letter. The reference *(see note S)* is enclosed by parentheses and immediately follows the primary use of the Dump Site label. When the Dump Site being added to a nautical chart is the only charted Dump Site, see the specification for adding Note S to the chart. See also **Size and Shape, Special Charting Requirements**.

Dump Site
(dredged material)
(see note S)
Depths from survey of 2001

Figure 4.14.5.1-13
Reference to standard Note S

Conversely, when a Dump Site is being removed from a nautical chart **AND** it is/was the only Dump Site charted, Note S shall be removed from the chart. See **Feature Removal from Chart**. The following exception is applicable, generally to smaller scale charts, when the minimum size square symbol is used for all Dump Sites on a particular chart. See also, "Labels and Note, Standard Note S". See also the Figures contained in **Size and Shape**.

> **EXCEPTION:** When the minimum size symbol **MUST** be used **for ALL Dump Sites shown on a particular chart (WITHOUT controlling depths)**, the symbols should be identified only by a minimum label. The minimum label shall consist of the Feature Name label and the Primary Use of the Dump Site label. Standard Note S and the reference label *(see note S)* shall not be charted. The "*Depths from survey of....*" label shall not be charted.

Dump Site
(dredged material)

Figure 4.14.5.1-14
Minimum Size Symbol used for
ALL Dump Sites shown on a particular chart
(**WITHOUT** controlling depths)
Primary Use = dredged material

(4) "*Depths from survey of ....*" label - determined by researching the source(s) of the charted hydrography and extracting the survey date(s). The date of the hydrography within a Dump Site shall be charted, unless the charted Dump Site is located in an area where hydrography and other navigational detail is not shown. Multiple surveys and/or survey dates affect the format of the basic label (*Depths from survey of ....*) and are discussed below.

The "*Depths from survey of....*" label shall not be charted when hydrography is not charted within the area limits of a Dump Site. See Figure 4.14.5.1-14. The label shall be charted when new hydrographic data is applied to the chart.

The format and content of the label is determined by the number of surveys and the associated survey date(s). The "*Depths from survey of ....*" label is a combination of two elements:

(1) the alphabetical element, and

(2) the numeric date element

Alphabetical Element:

By convention, even when just one sounding is charted within the limits of a Dump Site, the first word *Depths* is always plural. The label is always lowercase letters, **EXCEPT** for the first letter (*D*), which is always a capital letter.

There are six (6) possible combinations based on the number of surveys and the associated survey date(s) for the Alphabetical Element of the label. The combinations below also incorporate the resultant "Numeric Date Element" for each condition. Note that when only one survey is applicable, the alphabetical element is "*Depths from survey of ....*" or "*Depths from survey of ....-....*", depending on whether a single hydrographic survey was conducted in just one or possibly over two calendar years, respectively. For all other instances the Alphabetical Element is identical, **EXCEPT** that the word survey is revised to the plural surveys, "*Depths from surveys of ....*" or "*Depths from surveys of ....-....*".

Possible combinations are, when charted hydrography originates from:

(1) A single survey, conducted within one calendar year

Example: *Depths from survey of ....*

(2) A single survey, conducted during two different calendar years

Example: *Depths from survey of ....-....*

(3) Two or more surveys conducted within the same calendar year

Example: *Depths from surveys of ....*

(4) Two surveys conducted during different calendar years

Example: *Depths from surveys of ....-....*

(5) More than two surveys conducted during two different calendar years

Example: *Depths from surveys of ....-....*

(6) More than two surveys conducted during more than two different calendar years

Example: *Depths from surveys of ....-....*

Therefore,

When charted hydrography originates from only one survey, the alphabetical element of the label is always *"Depths from survey of...."* or *"Depths from survey of ....-...."*, contingent on whether the hydrographic survey was conducted during one calendar year or possibly over two calendar years (i.e., July 2000, or December 1999 through January 2000, respectively).

In **ALL** other circumstances, the alphabetical element of the label is always the plural *"Depths from surveys of ...."* or *"Depths from surveys of ....-...."*.

Numeric Date Element: See also the previous section, "Alphabetical Element", for combinations of the number of hydrographic survey(s) and associated survey date element(s).

(1) Year dates are expressed **ONLY** as the complete four-digit calendar year (i.e., 1999)

Calendar months are not charted

Numeric day(s) of the month are not charted

(2) When surveys from two different calendar years are applicable, the numeric date element of the label shall consist of the complete four-digit calendar year of each survey – separated by a hyphen (dash).

The oldest survey date is **ALWAYS** listed first

(3) When surveys from three or more different calendar years are applicable, the date element of the label shall consist of the complete four-digit calendar year of **ONLY** the oldest and most recent surveys - separated by a hyphen (dash).

The oldest survey date is **ALWAYS** listed first

Interim calendar year date(s) is/are **ALWAYS** omitted

The following examples illustrate the various options for formulating the "*Depths from survey of ....*" label for a Dump Site.

Examples:

A Dump Site where the charted hydrography originates from a single survey conducted within one calendar year.

Survey date of the source document is 28 April 2001

Use the four-digit calendar year only, i.e. 2001

Depths from survey of 2001

Examples (continued):

A Dump Site where the charted hydrography originates from a single survey conducted during two different calendar years (unusual circumstance).

Survey date of the source document is 28 December 2000 and 3 January 2001

Use the four-digit calendar year only, i.e. 2000 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from survey of 2000-2001

A Dump Site where the charted hydrography originates from two or more surveys conducted within the same calendar year.

Survey dates of the source documents are 11 January 2001, 28 April 2001 and 21 May 2001 - ALL within the same calendar year.

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar year only, i.e. 2001

Depths from surveys of 2001

Examples (continued):

A Dump Site where the charted hydrography originates from two surveys conducted during different calendar years.

Survey dates of the source documents are 11 January 1999 and 28 April 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years only, i.e. 1999 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1999-2001

A Dump Site where the charted hydrography originates from more than two surveys conducted during two different calendar years. This is a slight variation of the previous example. Note that the charted label is the same as in the prior example.

Survey dates of the source documents are 11 January 1999, 28 April 2001 and 21 May 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years only, i.e. 1999 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1999-2001

Examples (continued):

A Dump Site where the charted hydrography originates from more than two surveys conducted during more than two different calendar years.

Survey dates of the source documents are 15 June 1995, 11 January 1999 and 28 April 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years for only the oldest survey and most recent survey, i.e. 1995 and 2001 (interim dates, i.e. 1999, are not included)

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1995-2001

Collective Label (Alternative Labeling)

On smaller scale charts, a collective (single) label may be used to identify multiple proximate symbolized Dump Sites. Using a collective label provides a degree of simplification, reduces the redundant clutter of identical labels and still retains the identity of charted features.

Generally, Dump Sites are charted on the full range of nautical charts. This includes smaller scale charts, in areas of blue tint, with no charted hydrography. The purpose of charting these features is to provide the mariner with a general configuration of the area in the vicinity of major entrance channels. Charting these areas also provides additional emphasis to the mariner of the need to use a larger scale chart when entering or transiting these areas.

Multiple Dump Sites may be symbolized to scale or as a minimum size symbol. Typically, on smaller scale charts, individual Dump Sites are symbolized and labeled with the minimum label “*Dump Site*” (See Symbolization). Whether a Dump Site is charted to scale or as a minimum size symbol has no bearing on the use of a collective label.

WHEN the following conditions exist, individual labels may be combined into one collective label. The only modification is that the singular Feature Name label "*Dump Site*" is revised to the plural "*Dump Sites*".

(1) Identical Labels: The charted content of individual Dump Site labels **MUST** be identical. This requirement almost always limits the use of a collective label to smaller scale charts where the identical label criteria is equal to the minimum label.

(2) Labeling Preference: A collective label is generally used when multiple individual labels are placed adjacent to charted features. An individual label that can be located inside the limits of a symbolized Dump Site is not normally a candidate for a collective label.

(3) Proximity: Multiple Dump Sites that are charted in close proximity to each other and the use of a single collective label clearly identifies/associates a charted single label being applicable to each corresponding charted feature.

(4) Clarity: It is imperative that a collective label used for identifying multiple Dump Sites not be subject to confusion with other symbolized features, such as Spoil Area limits, which are also common along most major entrance channels and symbolized in the same manner.

Location of Labels: The label for a Dump Site shall be located inside the limits of the symbolized feature. When the label cannot be located within the limits of a Dump Site, it shall be placed adjacent to the feature so that the mariner will associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted Dump Site is discouraged.

Standard Note S: Standard Note S **MUST** be charted on charts that contain at least one Dump Site (see exception below for use of the minimum size symbol) and includes either an active or discontinued Dump Site.

Note S shall be charted in the vicinity of Note A, preferably directly following it. The note shall be in 7 point Swiss Light type, 2" (Preferred) or 31/2" (Optional) wide, and in black.

NOTE S
Regulations for Ocean Dumping Sites are contained in 40 CFR, Parts 220-229. Additional information concerning the regulations and requirements for use of the sites may be obtained from the Environmental Protection Agency (EPA). See U.S. Coast Pilots appendix for addresses of EPA offices. Dumping subsequent to the survey dates may have reduced the depths shown

Figure 4.14.5.1-15
2 inch (Preferred) Version of Note S

NOTE S
Regulations for Ocean Dumping Sites are contained in 40 CFR, Parts 220-229. Additional information concerning the regulations and requirements for use of the sites may be obtained from the Environmental Protection Agency (EPA). See U.S. Coast Pilots appendix for addresses of EPA offices. Dumping subsequent to the survey dates may have reduced the depths show

Figure 4.14.5.1-16
3 1/2 inch (Optional) Version of Note S

EXCEPTION: When the minimum size symbol **MUST** be used **for ALL Dump Sites shown on a particular chart (WITHOUT controlling depths)**, the symbols should be identified only by a minimum label. The minimum label shall consist of the Feature Name label and the Primary Use of the Dump Site label. Standard Note S and the reference label *(see note S)* shall not be charted. The *"Depths from survey of...."* label shall not be charted. See also **Size and Shape, Special Charting Requirements**.

Dump Site
(dredged material)

Figure 4.14.5.1-17
Minimum Size Symbol used for
ALL Dump Sites shown on a particular chart
(WITHOUT controlling depths)
Primary Use = dredged material

Line Type and Weight: A Dump Site shall be symbolized with a black dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The minimum size symbol, a 2.0 mm dashed black square, shall be used on small scale charts. The 2.0 mm dashed black square shall always be used when the greatest dimension of the Dump Site is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. A controlling depth shall be charted within the limits of the Dump Site when hydrography and other navigational detail are shown in the area.

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Color and Screening:

Color: A Dump Site shall **ALWAYS** be symbolized in black. **ALL** labels and standard Note S shall be in black.

Screening: Not applicable.

Feature Recommendation for a Notice to Mariners: A newly applied, revised or deleted Dump Site shall be evaluated for a Notice to Mariners.

4.14.5.2 U. S. Navy (Department of Defense) - Established Dumping Areas
Revised on April 1, 2004 by Cartographic Order 006/04

U.S. Navy (Department of Defense) Dumping Areas SHALL NOT BE REMOVED from National Ocean Service charts. These areas are expected to remain a danger due to the extremely hazardous nature of the materials contained within these areas and the remote likelihood that these materials would be recovered. No documentation has been found that indicates that one of these features has ever been removed from a National Ocean Service chart.

For all practical purposes, these features shall be considered permanent.

Original source documents (Department of Defense) generally classify these areas as a specific type of Dumping Ground (ammunition, explosives or chemical). By convention, for National Ocean Service charting purposes, **these areas are labeled as Dumping Areas and NOT as Dumping "Grounds"**. The term Dumping Grounds is used in conjunction with a specific type of U. S. Army Corps of Engineers Dumping Area. See Section 4.14.5.3, "U.S. Army Corps of Engineers (USACE) - Established Dumping Areas" and Section 4.14.5.3.3, "Dumping Grounds". See also, "Labels and Note".

Additionally, these areas should **NOT**, based of the contents of the described area, be confused with Unexploded Ordnance or Unexploded Ordnance Areas. Unexploded Ordnance or Unexploded Ordnance Areas, as the definition below indicates, refers to many of the same type of materials but these materials are located "outside the charted limits of established regulated explosives dumping areas" and are charted using different specifications.

Definition: **UNEXPLODED ORDNANCE.** Unexploded ordnance refers to any undetonated explosive material which is reported to be outside the charted limits of established regulated explosives dumping areas. (Unexploded bombs, depth charges, torpedoes, ammunition, pyrotechnics, etc.) [29]

Background

Prior to 1977, ocean dumping areas (dumping grounds, disposal areas, etc.) were described in the Code of Federal Regulations (CFR), Title 33, "Navigation and Navigable Waters", Part 205. These regulations were revoked in their entirety by the Code of Federal Regulations (CFR), Title 40, "Protection of the Environment", Parts 220-229, "Ocean Dumping", designating the Environmental Protection Agency as the cognizant agency for these matters. U.S. Navy (Department of Defense) Dumping Areas, previously established in Title 33, were classified as DISUSED. For additional background information, See Section 4.14.5.1, "Environmental Protection Agency (EPA) - Established Dump Sites" and "Dumping and Disposal Areas NOT Converted to EPA Dump Sites".

General

The U.S. Navy designates certain areas, generally in deep water at considerable distance offshore, for disposal, under Naval policies and by Naval facilities only, of ammunition, explosives and chemicals. These areas are shown on National Ocean Service (NOS) nautical charts both to help Naval personnel identify the areas and to inform chart users, notably trawlers who might tangle with dangerous materials. To emphasize the importance of these charted areas to the mariner, a U. S. Navy Dumping Area is the **ONLY** type of dumping area that is symbolized and labeled in magenta. Also, the entire charted label, **EXCEPT** for the "*see note* _" reference for *DISUSED* Chemical Munitions Dumping Areas, consists of all capital letters. For charting purposes, U.S. Navy Dumping Areas are separated into two categories. They are:

(1) Ammunition and Explosives Dumping Areas, and

(2) Discontinued (*DISUSED*) Chemical Munitions Dumping Areas

The U.S. Navy uses the following criteria in selecting areas for dumping these types of materials:

(1) Ammunition and Explosives Dumping Areas are established in depths of water not less than 500 fathoms and are located at least 10 miles from any shore. See Section 4.14.5.2.1, Ammunition and Explosives Dumping Areas.

(2) Chemical Munitions Dumping Areas were previously established in depths of water not less than 1,000 fathoms and were located at least 10 miles from any shore. The use of these areas was discontinued in 1971. (Reference NM 6/71) See Section 4.14.5.2.2, Discontinued (*DISUSED*) Chemical Munitions Dumping Areas. U.S. Navy Dumping Areas shall **ALWAYS** be charted.

There is one component of a charted U. S. Navy Dumping Area: (1) the charting authority (Department of Defense), which establishes, revises or discontinues the site, including the geographic limits of the site. The charting authority determines the feature symbolization, location and the composition of the charted label(s).

Whether or not hydrography is charted within the limits of the designated area is independent of and has no effect on the charting of the feature or the associated label. Unlike Environmental Protection Agency (EPA) Dump Sites and U. S. Army Corps of Engineers Disposal Areas (other than Spoil Areas), there is no requirement for a Depths from survey of.... label. This due to the extreme depth of the water in which these areas are established (see prior section for criteria in selecting areas for dumping) and the unavailability of necessary contemporary hydrographic surveys.

See Section 4.14.5.2.1 for Ammunition and Explosives Dumping Areas.

See Section 4.14.5.2.2 for Discontinued (*DISUSED*) Chemical Munitions Dumping Areas.

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4.14.5.2.1 Ammunition and Explosives Dumping Areas
Revised on April 1, 2004 by Cartographic Order 006/04

Ammunition and Explosives Dumping Areas are established in depths of water not less than 500 fathoms and are located at least 10 miles from any shore.

> The designation of the Feature Name Label for these areas is determined by the charting authority, i.e., the U. S. Navy (Department of Defense). Explosives Dumping Areas are the most common of these areas and are generally uniformly designated. However, individual sites may be designated with other similar labels. When other similar labels are used to designate these types of areas, the charted label shall conform to the label provided by the charting authority. This is consistent with the policy of charting these areas as described by the government agency establishing these areas.
>
> **WHEN** it has been determined or suspected that the published label requires/needs revision to be consistent with other already charted areas, all relevant materials shall be forwarded to the Nautical Data Branch for resolution/confirmation by the Department of Defense.

These areas should not be confused with U. S. Navy (Department of Defense) Chemical Munitions Dumping Areas. The differentiating characteristic is that Chemical Munitions Dumping Areas were established primarily for the deposition of chemical munitions and have been subsequently discontinued (*DISUSED*). See Section 4.14.5.2.2, Discontinued (*DISUSED*) Chemical Munitions Dumping Areas. U. S. Navy Dumping Areas that contain ammunition or explosives shall conform to the following specifications.

U.S. Navy (Department of Defense) Ammunition and Explosives Dumping Areas **SHALL NOT BE REMOVED** from National Ocean Service charts. These areas are expected to remain a danger due to the extremely hazardous nature of the materials contained within these areas and the remote likelihood, due to the extreme depth of the water, that these materials would be recovered. No documentation has been found that indicates that one of these features has ever been removed from a National Ocean Service chart.

For all practical purposes, these features shall be considered permanent.

Newly Established Ammunition and Explosives Dumping Areas

Newly established U.S. Navy (Department of Defense) Ammunition and Explosives Dumping Areas are generally transmitted to the National Ocean Service (NOS) through Weekly Notice to Mariners (NM), the Federal Register (FR), or the Code of Federal Regulations (CFR). The limits and type of dumping are most commonly specified in the Weekly Notice to Mariners (NM). Note that the U.S. Coast Pilots include only those areas established through the Code of Federal Regulations (CFR).

Geographic Limits - A newly established Ammunition or Explosives Dumping Area shall be located in its officially published geographic position.

Symbolization - See “Symbolization”.

Hydrography - All hydrography and tints currently charted within the limits of a newly established Dumping Area shall be retained.

Labeling - See “Labels and Note”.

Revisions to Charted Ammunition and Explosives Dumping Areas

Great care should be exercised when making revisions to these areas due to the potentially hazardous nature of the contents to navigation.

Revisions to a charted Ammunition or Explosives Dumping Area are precipitated **ONLY** from the charting authority, the U.S. Navy (Department of Defense). Revisions to charted hydrography located within a charted Dumping Area have no impact on and are independent of the charting of the Dumping Area.

Charting Authority (U. S. Navy, Department of Defense)

Revisions to an established Ammunition or Explosives Dumping Area are generally transmitted to the National Ocean Service through Weekly Notice to Mariners (NM), the Federal Register (FR), or the Code of Federal Regulations (CFR).

Revisions include changes in: (1) the geographic limits, and (2) the status [from active to *DISUSED*]. **Note that the term (discontinued) shall not be used AND that the charted label is not enclosed by parentheses. See (2) Status, below.**

(1) Geographic Limits

Existing charted Ammunition or Explosives Dumping Area limits which are superseded by U.S. Navy (Department of Defense) established "new" limits shall be removed **ONLY** when they are completely enclosed by the new limits. Any change in the type/s of materials contained within an expanded Dumping Area should result in a re-evaluation of the type of dumping area and the charted label based on the contents of the area. Note that the types of materials included in the label can increase but never decrease.

When portions of the "old" area limits are located outside the limits of the "new" Dumping Area limits, the Nautical Data Branch shall be immediately notified for confirmation and clarification by the charting authority. Retention of areas outside the new limits shall be in accordance with previously established (1977) procedures. See Section 4.14.5.1, "Conversion of Pre-1977 Dumping Grounds and Disposal Areas".

(2) Status (from active to *DISUSED*), See "(*DISUSED*) Ammunition and Explosives Dumping Areas" and "Feature Removal From Chart". By convention, the term *DISUSED* is used to describe a Dumping Area that is no longer active. For clarity, the term "discontinued" **SHALL NOT** be used. A charted label without the status label *DISUSED* is presumed to be active. See "Labels and Note".

Charted Hydrography

While not common due to the water depth and the generally unavailability of contemporary hydrographic surveys, all new hydrographic survey data shall be applied within an area designated as a Dumping Area.

(*DISUSED*) **Ammunition and Explosives Dumping Areas**

When advised through the Weekly Notice to Mariners or other official U.S. Navy sources that a Ammunition or Explosives Dumping Area is no longer in use, the limits and charted label shall be retained with the status label *DISUSED* added to (following) the existing charted label. See "Labels".

Example of a properly formatted label for an **active** Explosives Dumping Area:

EXPLOSIVES DUMPING AREA

When the status of a charted Ammunition and Explosives Dumping Area is revised from active to *DISUSED*, the label *DISUSED* shall be added to the existing charted label immediately after the charted Feature Name label.

Example of a properly formatted label for a *DISUSED* Explosives Dumping Area:

EXPLOSIVES DUMPING AREA DISUSED

Reports of U.S. Navy (Department of Defense) Ammunition and Explosives Dumping Areas that are no longer in use, *DISUSED*, from non-authoritative sources [any source other than the U.S. Navy (Department of Defense)] shall be forwarded to the Nautical Data Branch for confirmation by the Department of Defense.

Feature Removal From Chart

U.S. Navy (Department of Defense) Ammunition and Explosives Dumping Areas **SHALL NOT BE REMOVED** from National Ocean Service charts. These areas are expected to remain a danger due to the extremely hazardous nature of the materials contained within these areas, the unavailability of necessary hydrographic surveys and the remote likelihood that these materials would be recovered. No documentation has been found that indicates that one of these features has ever been removed from a National Ocean Service chart.

For all practical purposes, these features shall be considered permanent.

If authoritative documentation [U.S. Navy (Department of Defense)] indicates that an Ammunition or Explosives Dumping Area has been removed, the Nautical Data Branch and the Quality Assurance, Plans and Standards Branch shall recommend a final charting action.

Symbolization A U.S. Navy (Department of Defense) established Ammunition or Explosives Dumping Area shall be shown by a magenta dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Location An Ammunition or Explosives Dumping Area shall be located in its officially published geographic position.

When a minimum size symbol is used to represent a Ammunition or Explosives Dumping Area, the minimum size symbol shall be centered on the exact geographic position of the feature it represents. See “Size and Shape”.

Size and Shape An Ammunition or Explosives Dumping Area shall conform to the shape of the of the shape of the feature it is demarking.

Minimum Size Symbol: On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed square. The 2.0 mm dashed square shall **ALWAYS** be used when the greatest dimension of the Dumping Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. **A controlling depth shall be charted** within the limits of the Dumping Area when hydrography and other navigational detail are shown in the area.

Orientation An Ammunition or Explosives Dumping Area that conforms to the size and shape of a feature is by definition correctly oriented.

A Dumping Area that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

Labels and Note

There is one (1) standard label (with variable content) of a charted Ammunition or Explosives Dumping Area and one (1) additional label (a status qualifier) when the status of the Dumping Area (Feature Name) is no longer active (*DISUSED*). **Note that the term (discontinued) shall not be used AND that the charted label is not enclosed by parentheses.** The black underbar represents a variable/s based on the type/s of material contained within the area. The components of the label are:

(1) Feature Name label, _____ DUMPING AREA

(1a) Status qualifier, **ALWAYS** *DISUSED*, when required

Labels A label shall be added in magenta to identify the area in 7 point Swiss Light Italic type. Labels are **ALL** capital letters.

> **EXCEPTION:** When the areal dimension of an Ammunition or Explosives Dumping Area is extremely large at chart scale, the label shall not be charted multiple times. Charting the label multiple times serves no practical purpose and may obscure other navigational detail. The label shall be charted with a size appropriate to the feature being charted and the scale of the chart. The maximum type size shall not exceed 10 point Swiss Light Italic.

Examples of labels for active Dumping Areas:

EXPLOSIVES DUMPING AREA

OR, when space within a Dumping Area is limited, the type may be stacked. Individual elements of the label are centered vertically when the label is stacked.

EXPLOSIVES
DUMPING AREA

Examples of labels for (*DISUSED*) Dumping Areas:

EXPLOSIVES DUMPING AREA DISUSED

OR, when space within a Dumping Area is limited, the type may be stacked. Individual elements of the label are centered vertically when the label is stacked.

EXPLOSIVES DUMPING
AREA DISUSED

Location of Labels The label for a Dumping Area shall be located inside the limits of the feature. When the label cannot be located within the limits of a Dumping Area, it shall be placed adjacent to the feature so that the mariner will associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted Dumping Area is discouraged.

Line Type and Weight An Ammunition or Explosives Dumping Area shall be symbolized with a magenta dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The minimum size symbol, a 2.0 mm dashed magenta square, shall be used on small scale charts. The 2.0 mm dashed magenta square shall always be used when the greatest dimension of the Dumping Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. A controlling depth shall be charted within the limits of the Dumping Area when hydrography and other navigational detail are shown in the area.

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Color and Screening

Color: A U.S. Navy (Department of Defense) Ammunition or Explosives Dumping Area shall **ALWAYS** be symbolized in magenta. **ALL** labels shall be in magenta.

Screening: Not applicable.

Feature Recommendation for a Notice to Mariners A newly applied or revised or Ammunition or Explosives Dumping Area shall be evaluated for a Notice to Mariners.

See section, “Feature Removal From Chart”:

"If authoritative documentation [U.S. Navy (Department of Defense)] indicates that an Ammunition or Explosives Dumping Area has been removed, the Nautical Data Branch and the Quality Assurance, Plans and Standards Branch shall recommend a final charting action."

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4.14.5.2.2 Discontinued (*DISUSED*) Chemical Munitions Dumping Areas
Revised on April 1, 2004 by Cartographic Order 007/04

The use of these areas was discontinued in 1971.

> The following information has been retained/reformatted from prior documentation and provided as a historical reference for interpreting currently charted information.

These areas should not be confused with U. S. Navy (Department of Defense) Ammunition and Explosives Dumping Areas. The differentiating characteristic is that these areas were established primarily for the deposition of chemical munitions and have been subsequently discontinued (*DISUSED*). U. S. Navy Dumping Areas that contain ammunition or explosives shall conform to the specifications in Section 4.14.5.2.1, Ammunition and Explosives Dumping Areas.

Note that these discontinued chemical munitions dumping areas are referred to and labeled as *DISUSED*, not discontinued, as is common with other types of dumping areas. The text of the associated note designates the use as discontinued. This usage is consistent with the prescribed labeling provided in the original source documentation (NM 9/71) from the authoritative source. Example of a properly formatted label for a Chemical Munitions Dumping Area:

CHEMICAL MUNITIONS DUMPING AREA DISUSED (see note _)

U.S. Navy (Department of Defense) Chemical Munitions Dumping Areas **SHALL NOT BE REMOVED** from National Ocean Service charts. These areas are expected to remain a danger due to the extremely hazardous nature of the materials contained within these areas and the remote likelihood, due to the extreme depth of the water, that these materials would be recovered. No documentation has been found that indicates that one of these features has ever been removed from a National Ocean Service chart.

For all practical purposes, these features shall be considered permanent.

Chemical Munitions Dumping Areas were previously established in depths of water not less than 1,000 fathoms and were located at least 10 miles from any shore. The use of these areas was discontinued in 1971.

> "1. The use of United States Chemical Munitions Dumping Areas has been discontinued. Designation of such areas on navigational charts in no way constitutes authority for dumping.

> 2. Future Notice to Mariners will at an early date promulgate information regarding the actual notations to be placed on each navigational chart amending the present charted legends and reference notes, as required, and in accordance with paragraph (1) above." (Source Reference: NM 6/71)

The changes noted above were published in NM 9/71. This documentation included charts, applicable geographic areas and the reference/charting note. The format and content of the reference/charting note was revised to its final form by Chart Letter 120/71. There are eleven (11) distinct Chemical Munitions Dumping Areas, mostly charted in the Pacific Ocean.

Revisions to charted hydrography located within a charted *DISUSED* Chemical Munitions Dumping Area have no impact on the charting of the dumping area. While not common due to the water depth and the generally unavailability of contemporary hydrographic surveys, all new hydrographic survey data shall be applied within an area designated as a Dumping Area.

Symbolization A *DISUSED* Chemical Munitions Dumping Area shall be shown by a magenta dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Location A *DISUSED* Chemical Munitions Dumping Area shall be located in its officially published geographic position.

Size and Shape A *DISUSED* Chemical Munitions Dumping Area shall conform to the shape of the feature it is demarking.

There are no minimum size specifications for *DISUSED* Chemical Munitions Dumping Areas. All currently charted *DISUSED* Chemical Munitions Dumping Areas exceed the standard "greatest dimension" criteria.

Orientation A *DISUSED* Chemical Munitions Dumping Area that conforms to the size and shape of a feature is by definition correctly oriented.

Labels and Note

Labels A label shall be added in magenta to identify the area in 7 point Swiss Light Italic type. **Note that the charted label is not enclosed by parentheses.**

There is one (1) standard label for a *DISUSED* Chemical Munitions Dumping Area. The label is:

CHEMICAL MUNITIONS DUMPING AREA DISUSED (see note _)

Labels are **ALL** capital letters, **EXCEPT** for the reference to the associated note (i.e., *see note*). The black underbar represents a variable uppercase alphabetical character identical to the standard note associated with the *DISUSED* Chemical Munitions Dumping Area.

OR, when space within a Dumping Area is limited, the type may be stacked. Individual elements of the label are centered vertically when the label is stacked.

CHEMICAL MUNITIONS
DUMPING AREA DISUSED (see note _)

EXCEPTION: When the areal dimension of a Dumping Area is extremely large at chart scale, the label shall not be charted multiple times. Charting the label multiple times serves no practical purpose and may obscure other navigational detail. The label shall be charted with a size appropriate to the feature being charted and the scale of the chart. The maximum type size shall not exceed 10 point Swiss Light Italic.

Location of Labels The label for a *DISUSED* Chemical Munitions Dumping Area shall be located inside the limits of the feature. When the label cannot be located within the limits of the area, it shall be placed adjacent to the feature so that the mariner will readily associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted dumping area is discouraged.

Associated Note for *DISUSED* Chemical Munitions Dumping Areas: The following note shall be placed on charts containing a U.S. Navy (Department of Defense) Chemical Munitions Dumping Area that is classified as (*DISUSED*).

The note shall be in 7 point Swiss Light type, 2" (Preferred) or 3 ½" (Optional) wide, and in magenta. The black underbar represents a variable uppercase alphabetical character identical to the charting label reference.

NOTE _
CHEMICAL MUNITIONS DUMPING
AREA – RESTRICTION
Site was formerly used or designated for U.S.
Chemical munitions dumping. Such use has been
discontinued. Designation of such area in no way
constitutes authority for dumping.

NOTE _
CHEMICAL MUNITIONS DUMPING AREA – RESTRICTION
Site was formerly used or designated for U.S. Chemical munitions dumping. Such use has been discontinued. Designation of such area in no way constitutes authority for dumping.

Line Type and Weight A *DISUSED* Chemical Munitions Dumping Area shall be symbolized with a magenta dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Color and Screening

Color: A *DISUSED* Chemical Munitions Dumping Area shall **ALWAYS** be symbolized in magenta. **ALL** labels shall be in magenta.

Screening: Not applicable.

Feature Recommendation for a Notice to Mariners Not applicable. The use of these areas was discontinued in 1971. For all practical purposes, these features shall be considered permanent.

4.14.5.3 U.S. Army Corps of Engineers (USACE) - Established Dumping Areas Revised on April 1, 2004 by Cartographic Order 008/04

These areas should not be confused with "Department of the Navy (DOD) - Established Dumping Areas". See Section 4.14.5.2.

"227.13 Dredged materials.

(a) Dredged materials are bottom sediments or materials that have been dredged or excavated from the navigable waters of the United States, and their disposal into ocean waters is regulated by the U.S. Army Corps of Engineers using the criteria or applicable sections of parts 227 and 228. Dredged material consists primarily of natural sediments or materials which may be contaminated by municipal or industrial wastes or by runoff from terrestrial sources such as agricultural lands. (b) Dredged material which meets the criteria set forth in the following paragraphs (b)(1), (2), or (3) of this section is environmentally acceptable for ocean dumping..."(Source: 40 CFR 227.13)

The U.S. Army Corps of Engineers (USACE) has authority to establish dumping areas in the navigable waters of the United States with the approval of the Environmental Protection Agency (EPA). These dumping areas are classified variously as Spoil Areas, Disposal Areas or Dumping Grounds.

See Section 4.14.5.3.1, **"Spoil Areas"**.

Content = Dredged material only

See Section 4.14.5.3.2, **"Disposal Areas"**.

Content = Dredged material only

See Section 4.14.5.3.3, **"Dumping Grounds"**.

Content = Dredged material **AND** various types of other materials [e.g., wreckage (not wrecks), building materials]

Many Spoil Areas, Disposal Areas and Dumping Grounds established and charted prior to Environmental Protection Agency (EPA) authority for approval (1977) have since been discontinued by EPA. See Section 4.14.5.1, “Environmental Protection Agency (EPA) - Established Dump Sites”, “Initial Establishment of Dump Sites” and “Conversion of Pre-1977 Dumping Grounds and Disposal Areas”.

In accordance with U. S. Army Corps of Engineers and Environmental Protection Agency regulations, the following procedures shall apply when charting USACE-regulated dumping areas.

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4.14.5.3.1 Spoil Areas
Revised on September 3, 2014 by Cartographic Order 010/14

Definition: **SPOIL AREA.** Area for the purpose of disposing dredged material, usually near dredged channels. Spoil areas are usually a hazard to navigation and navigators should avoid crossing these areas. Spoil areas are shown on nautical charts. See also DISPOSAL AREA, DUMPING GROUND, DUMP SITE. Also called SPOIL GROUND. [1]

Associated Definitions:

SPOIL. Mud, sand, silt or other deposit obtained by dredging, excavating, mining, etc. [17]

SPOIL BANKS. Submerged accumulations of dumped material dredged from channels or harbors. [17]

SPOIL GROUND. See SPOIL AREA. [1]

General Requirements

> **Spoil Areas are uniquely distinguished as the ONLY type of dumping area where HYDROGRAPHY (soundings and/or depth curves) AND submerged features are NOT charted within the limits of the charted area.**
>
> **EXCEPTION/S**: Hydrography and submerged features may be charted within specifically designated Spoil Areas **ONLY** with the approval of the Chief, Marine Chart Division. See sub-section **"Charting Hydrography and Submerged Features within the Limits of a Spoil Area"**.

Spoil Areas are established by the U. S. Army Corps of Engineers (USACE) for the purpose of disposing of dredged material/s removed from the bottom of channels and harbors during dredging operations. They are typically located adjacent and parallel to a dredged/improved channel and are potentially dangerous to navigation due to the accretion of these materials. Soundings and depth curves shall **ALWAYS** (see exception/s, **Charting Hydrography and Submerged Features within the Limits of a Spoil Area**) be omitted within Spoil Area limits. Submerged features (other than submarine pipelines, submarine cables and wells) located within a Spoil Area are not charted and Blue tint No.1 is **ALWAYS** (see exception/s, **Charting Hydrography and Submerged Features within the Limits of a Spoil Area**) added within the limits of a Spoil Area to accentuate the potentially hazardous nature of entering or transiting these areas. See definition for **SPOIL AREA** above. See also sub-section, **Relationship of Spoil Areas to Other Nautical Chart Features.**

Charting Authority

Most Spoil Area limits are derived from after-dredge/condition surveys (graphics or coordinates) provided by the USACE, though they may originate from other Government agency surveys or private sources. See sub-section, **Special/Unique Requirements for U. S. Army Corps of Engineers Surveys (That Depict Spoil Areas on the Survey Background Base)**, for specific requirements for charting/revising/deleting Spoil Areas originating from USACE surveys. Surveys from other Government agencies or private sources **MUST** be referred to the Nautical Data Branch (NDB) for confirmation and verification by the USACE before the limits of a Spoil Area can be charted and/or revised. Conversely, the absence of a charted Spoil Area on a contemporary after-dredge/condition survey is not sufficient to remove a currently charted Spoil Area and **MUST** be referred to the Nautical Data Branch. The following sub-sections detail possible conditions and resultant actions.

Special/Unique Requirements for U. S. Army Corps of Engineers Surveys

(That Depict Spoil Areas on the Survey Background Base)

USACE surveys are registered by the Nautical Data Branch as either Blueprints or digital data (DDs). The purpose of these surveys is to provide hydrographic data for charting. The following section delineates additional special/unique requirements and recommended procedures for resolving any differences **WHEN** a Spoil Area is contained on the source document.

Background

U. S. Army Corps of Engineers graphic hydrographic survey data is typically displayed on a standard analog background base and/or within the digital form of the source document and/or as a support file of the source document. The purpose of a background base is to act as the medium for conveying the superimposed hydrographic data. Background bases usually contain other features that are commonly shown on nautical charts and may include high water line, channels, Disposal Areas, etc. Spoil Areas may also be displayed on these bases. The date(s) that the survey(s) was/were conducted, applicable state plane grid information and other pertinent information is generally contained in the title block of the survey. This/these date(s) refer **ONLY** to the survey date of the hydrography and not to the other features that comprise the background base. Features (except hydrography) depicted on background bases are usually added to the base when the base was originally constructed. These other features are in fact part of the background base. Once constructed, a background base is not normally subject to revision and consequently neither are these other features depicted on the original base. The background base (unrevised) is used repetitively to display current hydrographic data. The title block is also amended to reflect the date(s) the current survey was conducted. Again, the only purpose of the background base is to serve as a medium for conveying the hydrographic data.

Standard background bases may be repetitively used for an extended period of time. In certain instances multiple, but geographically different, background bases may be alternately used. New background bases are generated on an infrequent basis that may extend over a multi-year time frame. Unfortunately, due to the extended use of these background bases, other features comprising the background base may not always match or reflect the current updated nautical chart. Generally, there is/are no date(s) associated with the "time origin" of the background base. Occasionally, when an imagery background is used, there may be a date referencing the date of the imagery. However, this has no impact on the existence or non-existence of a Spoil Area which is below all water levels.

When applying U. S. Army Corps of Engineers surveys, there are four (4) possible conditions or scenarios that may exist in respect to a Spoil Area when comparing the survey and the corresponding nautical chart. Any differences routinely require further investigation and resolution. Each scenario is listed below with the required action necessary to resolve any differences between the survey and the nautical chart.

(1) A Spoil Area is on the current nautical chart and not on the survey.

No Charting Action. The purpose of the U. S. Army Corps of Engineers survey is to provide hydrographic data for charting. Existing Spoil Areas may or may not be on a U. S. Army Corps of Engineers survey as part of the background base.

(2) A Spoil Area on the survey matches the depiction on the current nautical chart.

No Charting Action.

(3) The configuration of a Spoil Area on the survey is different than the depiction on the current nautical chart.

No correction to the chart. The chart shall not be revised to match the portrayal of the Spoil Area on the survey. While the survey is not the source for charting/revising of a Spoil Area, the differences in the configuration of the Spoil Area **MUST** be resolved to ensure that the current nautical chart is correct.

There are three (3) similar but slightly different methods.

Method (A): Examine the current Standard or DREG to determine if any yet unapplied source document(s) exist that affect the configuration of the currently charted Spoil Area. **WHEN** an applicable source document(s) exists, it/they should be immediately applied to the chart and the resulting portrayal re-evaluated in comparison to the U.S. Army Corps of Engineers survey. If differences still remain unresolved, proceed to Method (B).

Method (B): This method is used **WHEN** it is suspected that this same issue has previously occurred on prior documents/surveys and is due to the repetitive use of the background base, as previously discussed. Examine the Standard(s) and/or Histories of Cartographic Work to determine prior U. S. Army Corps of Engineers surveys covering the area of the Spoil Area.

Historically, when this same type of condition existed on prior U. S. Army Corps of Engineers source document(s) and was previously resolved, the prior source document(s) was/were annotated with a handwritten annotation concerning a resolution. That annotation should have been signed and dated by personnel of the Nautical Data Branch. When this is the case, the current source containing the different configuration of the Spoil Area should be returned to the Nautical Data Branch. The Nautical Data Branch shall annotate (with a "redline" whether the document is a digital pdf or word document) the current source (carry forward the annotation) with the prior annotation.

WHEN the prior annotation indicates that there was a charting action, there usually is another source document that must be independently examined. **WHEN** no prior annotation is indicated use Method (C)

Method (C): Examine the Standard(s) and/or Histories of Cartographic Work to determine the specific source document for charting the Spoil Area. This source will be a citation from the U. S. Army Corps of Engineers. Ensure that the document was properly applied to the nautical chart. **WHEN** a difference still remains, the issue with all supporting materials should be returned to the Nautical Data Branch for resolution. The U. S. Army Corps of Engineers is the authoritative source for charting/revising a Spoil Area.

(4) A Spoil Area on the survey is not on the current nautical chart.

No correction to the chart. The chart shall not be revised to match the portrayal of the Spoil Area on the survey. However, the identical methods delineated in item (3) above **MUST** be employed to resolve any differences.

Charting Specifications

The following specifications for a Spoil Area are provided in their entirety. Spoil Areas are similar to the specifications pertaining to Environmental Protection Agency (EPA) Dump Sites and USACE Disposal Areas in symbolization. Differences exist in labeling and the content of the area enclosed within a Spoil Area.

Spoil Areas shall be charted in **ALL** cases where hydrography and other navigational detail are shown in the area. In this specific case, hydrography refers to the area outside the limits of the designated Spoil Area. By convention, hydrography is **NOT** charted (see also exception/s, **Charting Hydrography and Submerged Features within the Limits of a Spoil Area**) inside the limits of a Spoil Area.

4.14.5.3.1.1 Newly Established Spoil Areas

See Chart No. 1, (N 62.1)

Authoritative Source - U. S. Army Corps of Engineers (USACE)

Historically, most currently charted Spoil Area limits have been derived from U. S. Army Corps of Engineers (USACE) graphic after-dredge/condition surveys. Spoil Areas may, although infrequently, be provided in the form of permits, the Federal Register (FR), the Code of Federal Regulations (CFR) or Local Notice to Mariners (LNMs). The controlling principle is that a Spoil Area **MUST** be established and approved by the cognizant government agency - the U. S. Army Corps of Engineers (USACE). A symbolized Spoil Area, once charted, is generally stable and rarely subject to change.

Non-authoritative Sources

Reports from non-authoritative sources (any source other than the USACE) shall be forwarded to the Nautical Data Branch for confirmation and verification by the U. S. Army Corps of Engineers.

Relationship of Spoil Areas to Other Nautical Chart Features

(1) Land areas (including islets) and areas bare at the sounding datum, typically mean lower low water, shall be charted.

(2) Important visible features considered useful as relative landmarks shall be charted in accordance with standards and specifications contained in applicable sections of the Nautical Chart Manual.

(3) **ALL** new or revised submarine pipelines located within or traversing a charted Spoil Area shall be charted. Currently charted submarine pipelines that terminate at the limiting edge of a charted Spoil Area shall be researched and reapplied. See Nautical Chart Manual, **Section 4.13.8 Submarine Pipelines**.

(4) **ALL** new or revised submarine cables located within or traversing a charted Spoil Area shall be charted. Currently charted submarine cables that terminate at the limiting edge of a charted Spoil Area shall be researched and reapplied. See Nautical Chart Manual, **Section 4.13.9 Submarine Cables**.

(5) **ALL** wells located within a charted Spoil Area shall be charted. See Nautical Chart Manual, **Section 4.13.5 Mineral Development Structures.**

Geographic Limits:

A newly established Spoil Area shall be located in its officially published geographic position.

The geographic limits of a Spoil Area are provided to the National Ocean Service in the form of either (1) as a graphic, or (2) as Geographic Positions.

(1) From Graphic Source - A newly established Spoil Area located from a graphic source document shall be charted in its exact geographic position.

A State Plane Coordinate scaled (derived) from a graphic source document and then converted to a geographic position is not considered to be the equivalent of a published geographic position.

(2) From Published Geographic Positions - A newly established Spoil Area shall be located in its officially published geographic position.

A numeric State Plane Coordinate contained (provided) in an analog or digital source document that requires only conversion to a geographic position is considered to be the equivalent of a published geographic position.

Unresolved/Undefined Spoil Area Limits

Although not required, Spoil Areas are most commonly configured as rectangular areas but may be irregular in shape. Spoil Areas previously charted from USACE after-dredge/condition surveys (graphics) have not always been provided as completely enclosed areas. Especially along channels, USACE source/s historically provided graphics that delineated the channel side limit and the perpendicular sides of a Spoil Area – typically the side farthest from an improved channel was not defined. Cartographically, the defined sides of the area were symbolized by a black dashed limiting line (0.2/2.0/0.75 mm) (0.008/0.08/0.03 inches). Unresolved or undefined

limits were symbolized with **ONLY** a blue tint line which is consistent with the standard charting specification for charting a blue tint line approximating the undefined limits of the Spoil

Area. Additionally, charting specifications for a standard Spoil Area prescribe **ALWAYS** adding Blue tint No.1 within a Spoil Area, unless specified as an exception.

Symbolization - See sub-section, **"Symbolization"**

Hydrography - **ALL** hydrography (soundings and/or depth curves) currently charted within the limits of a newly established Spoil Area shall be deleted. Submerged features located within a Spoil Area are not charted and Blue tint No.1 is **ALWAYS** added within the limits of a Spoil Area to accentuate the potentially hazardous nature of entering or transiting these areas. See also sub-section, **Relationship of Spoil Areas to Other Nautical Chart Features**, for special rules for submarine pipelines, submarine cables and wells.

> **EXCEPTION/S**: Hydrography and submerged features may be charted within specifically designated Spoil Areas **ONLY** with the approval of the Chief, Marine Chart Division. See sub-section **"Charting Hydrography and Submerged Features within the Limits of a Spoil Area"**.

Labeling - See sub-section, "**Labels and Note"**

Charting Hydrography and Submerged Features within the Limits of a Spoil Area

> **The following section has been specifically added to provide specifications for a Spoil Area that is charted as an EXCEPTION. It contains sub-sections that specify the addition, revisions to and the deletion of a Spoil Area that meets the exception criteria.**

General

Spoil Areas are uniquely distinguished as the **ONLY** type of dumping area where HYDROGRAPHY (soundings and/or depth curves) **AND** submerged features are NOT charted within the limits of the charted area.

> **EXCEPTION/S**: Hydrography and submerged features may be charted within specifically designated Spoil Areas **ONLY** with the approval of the Chief, Marine Chart Division.

Nautical Charts 11415 and 11416, Tampa Bay, Florida provide excellent examples of the charting of standard Spoil Areas and those Spoil Areas that have been designated as an exception. These charts contain numerous examples for comparison.

Newly Established Spoil Areas Charted as an Exception

Standards and specifications pertinent to the content of a Spoil Area prescribed in **Section 4.14.5.3.1.1 Newly Established Spoil Areas** are not applicable **WHEN** a Spoil Area has been designated as an **EXCEPTION**.

A Spoil Area that has been designated as an exception is charted using simplified specifications. See also Chart No. 1, (N 62.1). There are **ONLY** two revisions required:

(1) the limits of the area are symbolized with a black dashed limiting line, See **Symbolization**, **AND**

(2) the label "*Spoil Area*" is added within the delimited area, See **Labels and Note**

WHEN designated as an **EXCEPTION**, **ALL** other features and hydrographic survey data within an area designated as a Spoil Area, unless the charted Spoil Area is located in an area where hydrography and other navigational detail is not shown, shall be retained. It should be noted that the existence of a Spoil Area has no impact/effect on the charting, or not charting, of hydrography within the areal dimensions of a Spoil Area. Hydrography within the limits of a charted Spoil Area is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Spoil Area is non-existent.

Revisions to a Spoil Area Charted as an Exception

Revisions to a charted Spoil Area are authorized **ONLY** by the charting authority, the U.S. Army Corps of Engineers (USACE), **OR** when designated as an **EXCEPTION**, based on the revision of charted hydrography.

Revisions to the limits of charted Spoil Area shall be in accordance with specifications contained in **Section 4.14.5.3.1.2 Revisions to Charted Spoil Areas**.

WHEN designated as an **EXCEPTION**, **ALL** other features and new hydrographic survey data shall be applied within an area designated as a Spoil Area, unless the charted Spoil Area is located in an area where hydrography and other navigational detail is not shown. It should be noted that the existence of a Spoil Area has no impact/effect on the charting, or not charting, of

hydrography within the areal dimensions of a Spoil Area. Hydrography within the limits of a charted Spoil Area is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Spoil Area were non-existent.

Discontinuance and Removal of a Spoil Area Charted as an Exception

The standards and specifications prescribed in **Section 4.14.5.3.1.3 Discontinuance and Removal of a Spoil Area** are not applicable **WHEN** a Spoil Area has been designated as an **EXCEPTION**.

A charted Spoil Area that falls under the exception rule, **AND** is designated as "*Discontinued*" by the USACE shall be immediately removed from the chart. This includes **ONLY** the black dashed limiting line symbolization representing the area and the associated label "*Spoil Area*". **ALL** currently charted hydrography and other features shall remain as charted. Note that the text, "*Discontinued*", is never charted for a Spoil Area charted as an exception.

4.14.5.3.1.2 Revisions to Charted Spoil Areas

Revisions to a charted Spoil Area are authorized **ONLY** by the charting authority, the U.S. Army Corps of Engineers (USACE), **OR** when designated as an **EXCEPTION**, based on the revision of charted hydrography.

Charting Authority, U. S. Army Corps of Engineers (USACE)

Revisions to an established Spoil Area are generally transmitted to the National Ocean Service from after-dredging/condition surveys provided by the U. S. Army Corps of Engineers, though they may originate from other types of sources from the U. S. Army Corps of Engineers. Reports from non-authoritative sources (any source other than the USACE) shall be forwarded to the Nautical Data Branch for confirmation and verification by the U. S. Army Corps of Engineers. Revisions include changes in: (1) the geographic limits, and (2) the status (from active to discontinued).

(1) Geographic Limits:

Existing charted Spoil Area limits which are superseded by new limits shall be removed when they are completely enclosed by the new limits. This is consistent with the procedure(s) originally established for the **"Conversion of Dumping Grounds and Disposal Areas to EPA Dump Sites"**. See Section 4.14.5.1.

When the "established" area limits are not specifically superseded, or more commonly, portions of the "established" area limits are located outside the limits of the "revised" Spoil Area limits, the Nautical Data Branch shall be notified for confirmation and clarification by the U. S. Army Corps of Engineers.

Non-overlapping portions or detached areas created by the charting of "revised" limits (and not specifically superseded) shall be retained. Any, or all, of the retained area(s) must be individually re-evaluated for required labeling and specifically the content of the label.

(2) Status:

From active to Discontinued, See "Discontinuance and Removal of Spoil Areas".

4.14.5.3.1.3 Discontinuance and Removal of a Spoil Area

The removal of a charted Spoil Area is normally a two-step process.

(1) the Spoil Area is discontinued by the U. S. Army Corps of Engineers, See "**Discontinued Spoil Areas**" **AND**

(2) new hydrographic survey data more recent than the discontinued date of the Spoil Area has been applied to the chart. See "**Feature Removal from Chart**".

A charted active Spoil Area shall not be removed until the responsible establishing authority (USACE) designates or provides documentation that the Spoil Area is no longer active (see **Discontinued Spoil Areas**) **AND** when such removal is supported by new hydrographic survey data (see **Feature Removal from Chart**). **Note that discontinued does not necessarily mean that the feature should be removed from the chart at that time.** Removal is **ALWAYS** contingent on new hydrographic survey data that:

(1) has a survey date more recent than the discontinued date of the Spoil Area. The date the Spoil Area was discontinued is determined by researching the original source document that changed the status of the Spoil Area from active to discontinued and extracting **the "effective" date**, and

(2) the coverage of the new hydrographic survey data completely encompasses the areal dimensions of the Spoil Area.

Generally, when a Spoil Area is discontinued, it is not accompanied by a "post-discontinuance" condition survey. Receipt of such a survey may take months or years. Because of this condition, the process of removing a Spoil Area has been separated into two distinct sequential steps. They are: (1) "**Discontinued Spoil Areas**", and (2) "**Feature Removal from Chart**".

Reports from non-authoritative sources (any source other than the USACE) indicating that a Spoil Area has been discontinued, removed, etc. shall be forwarded to the Nautical Data Branch for confirmation by the U. S. Army Corps of Engineers. A charted Spoil Area shall not be revised from a non-authoritative source.

Discontinued Spoil Areas

See Chart No. 1, (N 62.2)

A change in the status (from active to discontinued) of an existing Spoil Area is generally transmitted to NOS through a Chart Letter (USACE source) but may be contained on a USACE Survey Blueprint or DD as a label. A change of status appearing on a USACE Blueprint or DD

shall be forwarded to the Nautical Data Branch for confirmation by the USACE. The USACE response is generally annotated (signed and dated) on the specific Blueprint or DD (with a "redline" whether the document is a digital pdf or word document) by Nautical Data Branch personnel. See also the previous section, "**Special/Unique Requirements for U. S. Army Corps of Engineers Surveys (That Depict Spoil Areas on the Survey Background Base)**".

A discontinued Spoil Area and associated labeling shall not be removed until new hydrographic survey(s) data, generally USACE, NOS or equivalent, of the area is available for chart updating. The date(s) of the hydrographic survey(s) **MUST** be more recent than the date that the Spoil Area was discontinued and provide complete hydrographic coverage. See also, "**Feature Removal from Chart**".

A Spoil Area designated as discontinued, **WITHOUT** new hydrographic survey data, requires **ONLY** the revision of the existing label – from "*Spoil Area*" to "*Spoil Area Discontinued*". The limits of the Spoil Area shall be retained as charted.

When the status of a charted Spoil Area is revised from active to discontinued, the text "Discontinued" shall be added to the existing charted label immediately after the charted Feature Name label. Figure 4.14.5.3.1.3-1 and Figure 4.14.5.3.1.3-2 illustrate this basic revision. See "**Labels and Note**" for labeling requirements.

Spoil Area

Figure 4.14.5.3.1.3-1
Typical Label for an **Active** Spoil Area

Spoil Area Discontinued

Figure 4.14.5.3.1.3-2
Corresponding Label for a **Discontinued** Spoil Area

The Spoil Area shall not be removed from the chart.

Feature Removal from Chart

When discontinued by the USACE, a Spoil Area and associated labeling shall be removed from the chart contingent on receipt and application of new hydrographic survey data. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Spoil Area.

The date the Spoil Area was discontinued is determined by researching the original source document that changed the status of the Spoil Area from active to discontinued and extracting **the "effective" date**.

When the date of a hydrographic survey(s) is **NOT** more recent than the discontinued date of the Spoil Area, the Spoil Area cannot be removed from the chart.

When the date of a hydrographic survey(s) **IS** more recent than the discontinued date of the Spoil Area, the area limit and all associated labeling shall be removed from the chart. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Spoil Area.

Symbolization: A Spoil Area shall be shown by a black dashed limiting line (0.2/2.0/0.75 mm) (0.008/0.08/0.03 inches).

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Location: A Spoil Area shall be located in its officially published geographic position or when located from graphic source in its exact geographic position.

When a minimum size symbol is used to represent a Spoil Area, the minimum size symbol shall be centered on the exact geographic position of the feature it represents. See "Size and Shape".

Size and Shape: A Spoil Area shall conform to the shape of the feature it is demarking.

> **Minimum Size Symbol:** On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed square. The 2.0 mm dashed square shall **ALWAYS** be used when the greatest dimension of the Spoil Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape.

Orientation: A Spoil Area that conforms to the size and shape of a feature is by definition correctly oriented.

A Spoil Area that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

A Spoil Area located adjacent and parallel to an improved channel shall be rotated to maintain the existing parallel relationship between the improved channel and the Spoil Area.

Labels and Note:

A Spoil Area **MUST** be labeled. A Spoil Area label shall be aligned along the axis and inside the limiting line of the symbol. When not possible, a Spoil Area label shall be charted next to the symbol as close to the axis of the symbol as possible. The use of an arrow is discouraged.

There is **ONLY** one standard label for a charted Spoil Area and one (1) additional label (a status qualifier) **WHEN** the status of the Spoil Area (Feature Name) is Discontinued.

(1) Feature Name label, **ALWAYS** *Spoil Area*

The charted label "*Spoil Area*" presumes an active status.

(1a) Status qualifier, **ALWAYS** *Discontinued*, when required. The text "*Discontinued*" is appended to the end of the existing label.

Example: *Spoil Area Discontinued*

The Feature Name label is capital and lowercase letters. The status qualifier "*Discontinued*" is capital and lowercase letters. The first letter of each word is capitalized.

A Spoil Area shall be labeled, "*Spoil Area*" with black, 7 point Swiss Light Italic type.

Example: *Spoil Area*

When space does not allow for a full label, the label "*Spoil*" shall be used and is the minimum label specification.

Example: *Spoil*

A "Discontinued" Spoil Area shall be labeled, "*Spoil Area Discontinued*" with black, 7 point Swiss Light Italic type.

Example: 

Labels: A label shall be added in black to identify the area in 7 point Swiss Light Italic type. See also the following section, "Collective Label".

> **EXCEPTION:** When the areal dimension of a Spoil Area is extremely large at chart scale, the label shall not be charted multiple times. Charting the label multiple times serves no practical purpose and may obscure other navigational detail. The label shall be charted with a size appropriate to the feature being charted and the scale of the chart. The maximum type size shall not exceed 10 point Swiss Light Italic.

Collective Label (Alternative Labeling)

On smaller scale charts, a collective (single) label may be used to identify multiple proximate symbolized Spoil Areas. Using a collective label provides a degree of simplification, reduces the redundant clutter of identical labels and still retains the identity of charted features.

Generally, Spoil Areas are charted on the full range of nautical charts. This includes smaller scale charts, in areas of blue tint, with no charted hydrography. The purpose of charting these features is to provide the mariner with a general configuration of the area in the vicinity of major entrance channels. Charting these areas also provides additional emphasis to the mariner of the need to use a larger scale chart when entering or transiting these areas.

Multiple Spoil Areas may be symbolized to scale or as a minimum size symbol. Typically, on smaller scale charts, individual Spoil Areas are symbolized and labeled with the minimum label "*Spoil*" (See **Symbolization**). Whether a Spoil Area is charted to scale or as a minimum size symbol has no bearing on the use of a collective label.

WHEN the following conditions exist, individual labels may be combined into one collective label. The only modification is that the singular Feature Name label "*Spoil Area*" is revised to the plural "*Spoil Areas*".

(1) Identical Labels: Charted individual Spoil Area labels **MUST** be identical.

(2) Labeling Preference: A collective label is generally used when multiple individual labels are placed adjacent to charted features. An individual label that can be located

inside the limits of a symbolized Spoil Area is not normally a candidate for a collective label.

(3) Proximity: Multiple Spoil Areas that are charted in close proximity to each other and the use of a single collective label clearly identifies/associates a charted single label being applicable to each corresponding charted feature.

(4) Clarity: It is imperative that a collective label used for identifying multiple Spoil Areas not be subject to confusion with other symbolized features, such as Disposal Area limits, which are also common along most major entrance channels and symbolized in the same manner.

Location of Labels: The label for a Spoil Area shall be located inside the limits of the symbolized feature. When the label cannot be located within the limits of a Spoil Area, it shall be placed adjacent to the feature so that the mariner will clearly associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted Spoil Area is discouraged.

Notes: Not applicable

Line Type and Weight: A Spoil Area shall be symbolized with a black dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The minimum size symbol, a 2.0 mm dashed black square, shall be used on small scale charts. The 2.0 mm dashed black square shall **ALWAYS** be used when the greatest dimension of the Spoil Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Color and Screening:

Color: A Spoil Area shall **ALWAYS** be symbolized in black. **ALL** labels shall be in black.

Screening: Not applicable

Feature Recommendation for a Notice to Mariners: A newly applied, revised or deleted Spoil Area shall be evaluated for a Notice to Mariners.

4.14.5.3.2 Disposal Areas
Revised on April 1, 2004 by Cartographic Order 008/04

Definition: **DISPOSAL AREA.** Area designated by the Corps of Engineers for depositing dredged material where existing depths indicate that the intent is not to cause sufficient shoaling to create a danger to surface navigation. Disposal areas are shown on nautical charts. See also DUMPING GROUND, DUMP SITE, SPOIL AREA. [1]

Disposal Areas, like Spoil Areas, are established by the U. S. Army Corps of Engineers (USACE) for the purpose of disposing of dredged materials. However, Disposal Areas are located further offshore and in deeper water where, as the definition above indicates, "the intent is not to cause sufficient shoaling to create a danger to surface navigation.". From a charting standpoint, the charting specifications for a U. S. Army Corps of Engineers (USACE) Disposal Area closely resemble those of an Environmental Protection Agency (EPA) Dump Site. See Section 4.14.5.1, **"Environmental Protection Agency (EPA) - Established Dump Sites"**. Differences between the charting of a U. S. Army Corps of Engineers (USACE) Disposal Area and an Environmental Protection Agency (EPA) Dump Site include the following:

(1) the establishing authority (USACE vis-a-vis the EPA),

(2) the type of source [historically, U. S. Army Corps of Engineers (USACE) permits, the Federal Register (FR), the Code of Federal Regulations (CFR), Local Notice to Mariners (LNMs), and graphic after-dredge/condition surveys provided by the U. S. Army Corps of Engineers (USACE)] vis-a-vis the Code of Federal Regulations),

(3) Feature Name label (Disposal Area vis-a-vis Dump Site),

(4) Primary Use of the Area

Disposal Area = **ALWAYS** dredged material, a Primary Use label is **NEVER** charted

vis-a-vis a

Dump Site = variable material, Primary Use label **ALWAYS charted**

(5) a Disposal Area does not have an associated note vis-a-vis a Dump Site, i.e., (see note S)

The following specifications for a Disposal Area are provided in their entirety. The format and content are similar to the specifications of an Environmental Protection Agency (EPA) Dump Site with the previous exceptions (differences) incorporated into the text as and where necessary for a Disposal Area.

Disposal Areas shall be charted in **ALL** cases where hydrography and other navigational detail are shown in the area.

There are two primary components of a charted Disposal Area: (1) the charting authority (USACE) which establishes, revises or discontinues the site, including the geographic limits of the site, and (2) whether or not hydrography is charted within the limits of the designated area. These two components determine the feature symbolization, location and the composition of the charted label(s).

Newly Established Disposal Areas

Historically, most currently charted Disposal Area limits have been derived from U. S. Army Corps of Engineers (USACE) permits, the Federal Register (FR), the Code of Federal Regulations (CFR), Local Notice to Mariners (LNMs), and graphic after-dredge/condition surveys provided by the U.S. Army Corps of Engineers (USACE). The controlling principle is that a Disposal Area MUST be established and approved by the cognizant government agency - the U. S. Army Corps of Engineers (USACE).

> Reports from non-authoritative sources (any source other than the USACE) shall be forwarded to the Nautical Data Branch for confirmation by the U. S. Army Corps of Engineers.

Geographic Limits:

> The geographic limits of a Disposal Area are provided to the National Ocean Service in the form of either (1) Geographic Positions, or (2) as a graphic.
>
> (1) From Published Geographic Positions - A newly established Disposal Area shall be located in its officially published geographic position.
>
> > A numeric State Plane Coordinate contained (provided) in an analog source document that requires only conversion to a geographic position is considered to be the <u>equivalent</u> of a published geographic position.

(2) From Graphic Source - A newly established Disposal Area located from a graphic source document shall be charted in its exact geographic position.

A State Plane Coordinate scaled (derived) from a graphic source document and then converted to a geographic position is not considered to be the equivalent of a published geographic position.

Symbolization - See “Symbolization”.

Hydrography - All hydrography and tints currently charted within the limits of a newly established Disposal Area shall be retained. All new hydrographic survey data shall be applied within an area designated as a Disposal Area, unless the charted Disposal Area is located in an area where hydrography and other navigational detail is not shown.

A newly established Disposal Area not containing charted hydrography (generally blue tint) shall remain as charted until new hydrographic survey data is received.

When supported by new hydrographic survey data, hydrography shall be charted in the Disposal Area and the existing label reformulated in accordance with the labeling specifications contained in “Labels and Note”.

Labeling - See “Labels and Note”.

Revisions to Charted Disposal Areas

Revisions to a charted Disposal Area are precipitated either: (1) from the charting authority, the U.S. Army Corps of Engineers (USACE), or (2) based on the revision of charted hydrography.

Charting Authority, U. S. Army Corps of Engineers (USACE)

Revisions to an established Disposal Area are generally transmitted to the National Ocean Service from after-dredging/condition surveys provided by the U. S. Army Corps of Engineers, though they may originate from other types of sources from the U. S. Army Corps of Engineers. Reports from non-authoritative sources (any source other than the USACE) shall be forwarded to the Nautical Data Branch for confirmation by the U. S. Army Corps of Engineers. Revisions include changes in: (1) the geographic limits, and (2) the status [from active to (discontinued)].

(1) Geographic Limits:

Existing charted Disposal Area limits which are superseded by new limits shall be removed when they are completely **enclosed by** the new limits. This is consistent with the procedure(s) originally established for the "Conversion of Dumping Grounds and Disposal Areas to EPA Dump Sites". Any revision to the areal limits of a charted Disposal Area requires a re-evaluation of the date of the charted hydrography label, (i.e., the "*Depths from survey of* ...." label).

When the "old" area limits are not specifically superseded, or more commonly, portions of the "old" area limits are located outside the limits of the "new" Disposal Area limits, the Nautical Data Branch shall be notified for confirmation and clarification by the U. S. Army Corps of Engineers. Any revision to the areal limits of a charted Disposal Area requires a re-evaluation of the date of the charted hydrography label, (i.e., the "*Depths from survey of* ...." label).

Nonoverlapping portions or detached areas created by the charting of new limits (and not specifically superseded) shall be retained. Any, or all, of the retained area(s) must be individually re-evaluated for required labeling and specifically the content of the label.

(2) Status: [from active to (discontinued)], See "Discontinuance and Removal of Disposal Areas".

Charted Hydrography All new hydrographic survey data shall be applied within an area designated as a Disposal Area, unless the charted Disposal Area is located in an area where hydrography and other navigational detail is not shown. It should be noted that the existence of a Disposal Area has no impact/effect on the charting, or not charting, of hydrography within the areal dimensions of a Disposal Area. Hydrography within the limits of a charted Disposal Area is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Disposal Area were non-existent. There are, however, two linkages **WHEN** hydrography is charted within a Disposal Area. They are:

(1) the composition and content of the charted label of the Disposal Area, and

(2) the deletion of a charted Disposal Area that has been discontinued

A symbolized Disposal Area, once charted, is generally stable and rarely subject to change. Changes occur most frequently when USACE revisions of charted hydrography within the limits of a Disposal Area precipitate changes to the charted label. The specifications contained in "Labels and Note" delineate the differences and provide detailed charting specifications for the composition and content of the charted label.

Special/Unique Requirements for U. S. Army Corps of Engineers Surveys

(That Depict Disposal Areas on the Survey Background Base)

U. S. Army Corps of Engineers condition surveys are the primary source for charting and revising hydrography within Disposal Areas. These graphic surveys are registered by the Nautical Data Branch as Blueprints. The purpose of these surveys is to provide hydrographic data for charting. The following section delineates additional special/unique requirements and recommended procedures for resolving any differences **WHEN** a Disposal Area is contained on the source document.

Background

U. S. Army Corps of Engineers graphic hydrographic survey data is typically displayed on a standard analog background base. The purpose of a background base is to act as the medium for conveying the superimposed hydrographic data. Background bases usually contain other features that are commonly shown on nautical charts and may include high water line, channels, Spoil Areas, etc. Disposal Areas may also be displayed on these bases. The date(s) that the survey(s) was/were conducted, applicable state plane grid information and other pertinent information is generally contained in the title block of the survey. This/these date(s) refer **ONLY** to the survey date of the hydrography and not to the other features that comprise the background base. Features (except hydrography) depicted on background bases are usually added to the base when the base was originally constructed. These other features are in fact part of the background base. Once constructed, a background base is not normally subject to revision and consequently neither are these other features depicted on the original base. The background base (unrevised) is used repetitively to display current hydrographic data. The title block is also amended to reflect the date(s) the current survey was conducted. Again, the only purpose of the background base is to serve as a medium for conveying the hydrographic data.

Standard background bases may be repetitively used for an extended period of time. In certain instances multiple, but geographically different, background bases may be alternately used. New background bases are generated on an infrequent basis that may extend over a multi-year time frame. Unfortunately, due to the extended use of these background bases, other features comprising the background base may not always match or reflect the current updated nautical chart. Generally, there

is/are no date(s) associated with the "time origin" of the background base. Occasionally, when an imagery background is used, there may be a date referencing the date of the imagery. However, this has no impact on the existence or non-existence of a Disposal Area which is below all water levels.

When applying U. S. Army Corps of Engineers surveys, there are four (4) possible conditions or scenarios that may exist in respect to a Disposal Area when comparing the survey and the corresponding nautical chart. Any differences routinely require further investigation and resolution. Each scenario is listed below with the required action necessary to resolve any differences between the survey and the nautical chart.

(1) A Disposal Area is on the current nautical chart and not on the survey.

No Charting Action. The purpose of the U. S. Army Corps of Engineers survey is to provide hydrographic data for charting. Existing Disposal Areas may or may not be on a U. S. Army Corps of Engineers survey as part of the background base. Differences between a survey and a nautical chart are required **WHEN** a Disposal Area is depicted on the survey and not on the current nautical chart.

(2) A Disposal Area on the survey matches the depiction on the current nautical chart.

No Charting Action.

(3) The configuration of a Disposal Area on the survey is different than the depiction on the current nautical chart.

No correction to the chart. The chart shall not be revised to match the portrayal of the Disposal Area on the survey. While the survey is not the source for charting/revising of a Disposal Area, the differences in the configuration of the Disposal Area **MUST** be resolved to ensure that the current nautical chart is correct.

There are three (3) similar but slightly different methods.

Method (A): Examine the current Standard to determine if any yet unapplied source document(s) exist that affect the configuration of the currently charted Disposal Area. **WHEN** an applicable source document(s) exists, it/they should be immediately applied to the chart and the resulting portrayal re-evaluated in comparison to the U.S. Army Corps of Engineers survey. If differences still remain unresolved, proceed to Method (B).

Method (B): This method is used **WHEN** it is suspected that this same issue haspreviously occurred on prior documents/surveys and is due to the repetitive use of the background base, as previously discussed. Examine the Standard(s) and/or Historiesof Cartographic Work to determine prior U. S. Army Corps of Engineers surveys covering the area of the Disposal Area.

Historically, when this same type of condition existed on prior U. S. Army Corps of Engineers source document(s) and was previously resolved, the prior source document(s) was/were annotated with a handwritten annotation concerning a resolution. That annotation should have been signed and dated by personnel of the Nautical Data Branch. When this is the case, the current source containing the different configuration of the Disposal Area should be returned to the Nautical Data Branch. The Nautical Data Branch shall annotate the current source (carry forward the annotation) with the prior annotation.

WHEN the prior annotation indicates that there was a charting action, there usually is another source document that must be independently examined. **WHEN** no prior annotation is indicated use Method (C)

Method (C): Examine the Standard(s) and/or Histories of Cartographic Work to determine the specific source document for charting the Disposal Area. This source will be a citation from the U. S. Army Corps of Engineers. Ensure that the document was properly applied to the nautical chart. **WHEN** a difference still remains, the issue with all supporting materials should be returned to the Nautical Data Branch for resolution. The U. S. Army Corps of Engineers is the authoritative source for charting/revising a Disposal Area.

(4) A Disposal Area on the survey is not on the current nautical chart.

No correction to the chart. The chart shall not be revised to match the portrayal of the Disposal Area on the survey. However, the identical methods delineated in item (3) above **MUST** be employed to resolve any differences.

The following three sections deal with the discontinuance and removal of a Disposal Area.

Discontinuance and Removal of Disposal Area

The removal of a charted Disposal Area is normally a two step process.

(1) the Disposal Area is discontinued by the U. S. Army Corps of Engineers, See "Discontinued Disposal Areas" **AND**

(2) new hydrographic survey data more recent than the discontinued date of the Disposal Area has been applied to the chart. See "Feature Removal from Chart".

A charted active Disposal Area shall not be removed until the responsible establishing authority (USACE) designates or provides documentation that the Disposal Area is no longer active (see Discontinued Disposal Areas) **AND** when such removal is supported by new hydrographic survey data (see Feature Removal from Chart). **Note that discontinued does not necessarily mean that the feature should be removed from the chart at that time.** Removal is **ALWAYS** contingent on new hydrographic survey data that:

(1) has a survey date more recent than the discontinued date of the Disposal Area. The date the Disposal Area was discontinued is determined by researching the original source document that changed the status of the Disposal Area from active to discontinued and extracting **the "effective" date,** and

(2) the coverage of the new hydrographic survey data completely encompasses the areal dimensions of the Disposal Area.

Generally, when a Disposal Area is discontinued, it is not accompanied by a "post-is continuance" condition survey. Receipt of such a survey may take months or years. Because of this condition, the process of removing a Disposal Area has been separated into two distinct sequential steps. They are: (1) "Discontinued Disposal Areas", and (2) "Feature Removal from Chart".

Reports from non-authoritative sources (any source other than the USACE) indicating that a Disposal Area has been discontinued, removed, etc. shall be forwarded to the Nautical Data Branch for confirmation by the U. S. Army Corps of Engineers. A charted Disposal Area shall not be revised from a non-authoritative source.

The removal of a Disposal Area is normally a two step process.

(1) the Disposal Area is discontinued by the USACE, See "Discontinued Disposal Areas" **AND**

(2) new hydrographic survey data more recent than the discontinued date of the Disposal Area has been applied to the chart. See "Feature Removal from Chart".

Discontinued Disposal Areas

A change in the status (from active to discontinued) of an existing Disposal Area is generally transmitted to NOS through a Chart Letter (USACE source) but may be contained on a USACE Survey Blueprint as a label. A change of status appearing on a USACE Blueprint shall be forwarded to the Nautical Data Branch for confirmation by the USACE. The USACE response is generally annotated (signed and dated) on the specific Blueprint by Nautical Data Branch personnel. See also the previous section, "Special/Unique Requirements for U. S. Army Corps of Engineers Surveys (That Depict Disposal Areas on the Survey Background Base)".

A discontinued Disposal Area and associated labeling shall not be removed until new hydrographic survey(s) data, generally USACE, NOS or equivalent, of the area is available for chart updating. The date(s) of the hydrographic survey(s) **MUST** be more recent than the date that the Disposal Area was discontinued and provide complete hydrographic coverage. See also, "Feature Removal from Chart".

A Disposal Area designated as discontinued, **WITHOUT** new hydrographic survey data, requires **ONLY** the addition of an additional label. The limits of the Disposal Area and the charted hydrography shall be retained as charted.

When the status of a charted Disposal Area is revised from active to discontinued, the label (discontinued) shall be added to the existing charted label immediately after (below) the charted Feature Name label. Figure 4.14.5.1-1 and Figure 4.14.5.1-2 illustrate this basic revision. See "Labels and Note" for labeling requirements.

Disposal Area
Depths from survey of 2001

Figure 4.14.5.1-1
Typical Label for an Active Disposal Area

Disposal Area
(discontinued)
Depths from survey of 2001

Figure 4.14.5.1-2
Corresponding Label for a Discontinued Disposal Area
(**WITHOUT** new hydrographic survey data)

When the survey date of the hydrography is **prior to the date that the Disposal Area was discontinued**, the hydrography shall be revised and the *"Depths from survey of ...."* label revised. See "Revisions to Charted Disposal Areas, Charted Hydrography". The Disposal Area shall not be removed from the chart.

The date the Disposal Area was discontinued is determined by researching the original source document that changed the status of the Disposal Area from active to discontinued and extracting the "effective" date.

Feature Removal from Chart

When a Disposal Area is/has been discontinued by the USACE, the Disposal Area and associated labeling shall be removed from the **chart contingent on** receipt and application of new hydrographic survey data. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Disposal Area.

The date the Disposal Area was discontinued is determined by researching the original source document that changed the status of the Disposal Area from active to discontinued and extracting the "effective" date.

When the date of a hydrographic survey(s) is **NOT** more recent than the discontinued date of the Disposal Area, the Disposal Area can not be removed from the chart. However, the hydrography contained on the survey shall be applied to the chart and the depth label *"Depths from survey of ...."* revised according to the specification. See previous section, "Discontinued Disposal Areas".

When the date of a hydrographic survey(s) **IS** more recent than the discontinued date of the Disposal Area, the area limit and all associated labeling shall be removed from the chart. This presumes that the coverage of the survey(s) encompasses the areal limits of the charted Disposal Area.

Relationship of Disposal Areas to Other Nautical Chart Features

The existence of a Disposal Area has no impact/effect on the charting, or not charting, of any other nautical chart feature.

The most common relationship between a Disposal Area and other nautical chart features is with charted hydrography. As noted earlier, "the existence of a Disposal Area has no impact/effect on the charting, or not charting, of hydrography within the areal dimensions of a Disposal Area. Hydrography within the limits of a charted Disposal Area is independent of the symbolized feature. Soundings, depth curves and associated tints are applied as if the Disposal Area were non-existent. There are, however, two linkages **WHEN** hydrography is charted within a Disposal Area. See **Charted Hydrography.**

Note that the above relationship is in only one direction. The Disposal Area has no effect on hydrography. However, the existence of hydrography within the areal limits of a charted Disposal Area effects the composition and content of the charted label associated with the Disposal Area and the deletion of a charted Disposal Area that has been discontinued.

Symbolization: A Disposal Area shall be shown by a black dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Location: A Disposal Area shall be located in its officially published geographic position or when located from graphic source in its exact geographic position.

When a minimum size symbol is used to represent a Disposal Area, the minimum size symbol shall be centered on the exact geographic position of the feature it represents. See "Size and Shape".

Size and Shape: A Disposal Area shall conform to the shape of the feature it is demarking.

Minimum Size Symbol: On small-scale charts, it may be necessary to use a minimum size symbol; a 2.0 mm dashed square. The 2.0 mm dashed square shall **ALWAYS** be used when the greatest dimension of the Disposal Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. **A controlling depth shall be charted** within the limits of the Disposal Area when hydrography and other navigational detail are shown in the area.

Orientation: A Disposal Area that conforms to the size and shape of a feature is by definition correctly oriented.

A Disposal Area that is exaggerated to the minimum size symbol shall be oriented to the baseline of the specific chart piece.

Labels and Note:

Specifications for the formulation of the charting label of a Dump Site and a Disposal Area are identical **EXCEPT** for the Feature Name, the additional Primary Use label for a Dump Site and the Note S requirement for a Dump Site.

There are two (2) standard components of the label of a charted Disposal Area and one (1) additional label (a status qualifier) when the status of the Disposal Area (Feature Name) is discontinued. The components of the label are listed and charted in the following vertical sequence:

(1) Feature Name label, **always** *Disposal Area*
The charted label "*Disposal Area*" presumes an active status.

(1a) Status qualifier, **always** *(discontinued)*, when required

(2) "*Depths from survey of....*" label, **charted when** hydrography is charted within a Disposal Area, variable content.

The following example illustrates the use of all the various label components of a charted Disposal Area.

Disposal Area
(discontinued)
Depths from survey of 2001

Figure 4.14.5.3.2-3
Standard Label Components of a Disposal Area

Labels: A label shall be added in black to identify the area in 7 point Swiss Light Italic type. Component labels are centered vertically. See also the following section, "Collective Label".

EXCEPTION: When the areal dimension of a Disposal Area is extremely large at chart scale, the label shall not be charted multiple times. Charting the label multiple times serves no practical purpose and may obscure other navigational detail. The label shall be charted with a size appropriate to the feature being charted and the scale of the chart. The maximum type size shall not exceed 10 point Swiss Light Italic.

Example of a complete label (without status qualifier) for an active Disposal Area:

Disposal Area
Depths from survey of 2001

Figure 4.14.5.3.2-4
Disposal Area Label
Status = Active

Example of a complete label **with status qualifier** (a discontinued Disposal Area):

Disposal Area
(discontinued)
Depths from survey of 2001

Figure 4.14.5.3.2-5
Disposal Area Label
Status = Discontinued

Figure 4.14.5.3.2-6 is an example of a complete label for a Disposal Area with no charted hydrography (generally blue tint) resulting from a newly established Disposal Area located in an area with no charted hydrography. Note that the only difference is that the *"Depths from survey of ...."* label has been omitted because there is no charted hydrography.

Disposal Area

Figure 4.14.5.3.2-6
Disposal Area Label
Status = Active, No Charted Hydrography

The remainder of this section provides the specifications and charting options for the labeling of a Disposal Area. In each example, a complete charted label is illustrated. **The specific component of the label being illustrated is in BOLD type.** The numeric paragraph numbers (1), (1a) and (2) are linked to the numbering scheme provided at the beginning of this section, Labels and Note.

(1) Feature Name label designating the area a Disposal Area. The Feature Name label is capital and lowercase letters. The first letter of each word is capitalized.

Disposal Area
Depths from survey of 2001

Figure 4.14.5.3.2-7
Feature Name Label
Status = Active

(1a) Feature Name label with Status qualifier *(discontinued)*. Disposal Areas are charted as either: (1) active, or (2) discontinued. An active Disposal Area contains only the Feature Name label *"Disposal Area"* as illustrated in the previous example. An active status is presumed. A discontinued Disposal Area contains the feature name label *"Disposal Area"* and the status qualifier *"(discontinued)"*. The status qualifier label is always lowercase letters, enclosed by parentheses and immediately follows the Feature Name label.

Disposal Area
(discontinued)
Depths from survey of 2001

Figure 4.14.5.3.2-8
Feature Name Label with
Status Qualifier *(discontinued)*

(2) "*Depths from survey of ....*" label - determined by researching the source(s) of the charted hydrography and extracting the survey date(s). The date of the hydrography within a Disposal Area shall be charted, unless the charted Dump Site is located in an area where hydrography and other navigational detail is not shown. Multiple surveys and/or survey dates affect the format of the basic label (*Depths from survey of ....*) and are discussed below.

The *"Depths from survey of...."* label shall not be charted when hydrography is not charted within the area limits of a Disposal Area. See Figure 4.14.5.3.2-6. The label shall be charted when new hydrographic data is applied to the chart.

The format and content of the label is determined by the number of surveys and the associated survey date(s). The *"Depths from survey of ...."* label is a combination of two elements:

(1) the alphabetical element, and

(2) the numeric date element

Alphabetical Element:

Specifications for the formulation of the Alphabetical Element component of the *"Depths from survey of...."* label are identical to those for a Dump Site.

By convention, even when just one sounding is charted within the limits of a Disposal Area, the first word Depths is always plural. The label is always lowercase letters, **EXCEPT** for the first letter (*D*), which is always a capital letter.

There are six (6) possible combinations based on the number of surveys and the associated survey date(s) for the Alphabetical Element of the label. The combinations below also incorporate the resultant "Numeric Date Element" for each condition. Note that when only one survey is applicable, the alphabetical element is *"Depths from survey of ...."* or *"Depths from survey of ....-...."*, depending on whether a single hydrographic survey was conducted in just one or possibly over two calendar years, respectively. For all other instances the Alphabetical Element is identical, **EXCEPT** that the word survey is revised to the plural surveys, *"Depths from surveys of ...."* or *"Depths from surveys of ....-...."*.

Possible combinations are, when charted hydrography originates from:

(1) A single survey, conducted within one calendar year

Example: *Depths from survey of ....*

(2) A single survey, conducted during two different calendar years

Example: *Depths from survey of ....-....*

(3) Two or more surveys conducted within the same calendar year

Example: *Depths from surveys of ....*

(4) Two surveys conducted during different calendar years

Example: *Depths from surveys of ....-....*

(5) More than two surveys conducted during two different calendar years

Example: *Depths from surveys of ....-....*

(6) More than two surveys conducted during more than two different calendar years

Example: *Depths from surveys of ....-....*

Therefore,

When charted hydrography originates from only one survey, the alphabetical element of the label is always "*Depths from survey of....*" or "*Depths from survey of ....-....*", contingent on whether the hydrographic survey was conducted during one calendar year or possibly over two calendar years (i.e., July 2000, or December 1999 through January 2000, respectively).

In ALL other circumstances, the alphabetical element of the label is always the plural "*Depths from surveys of ....*" or "*Depths from surveys of ....-....*".

Numeric Date Element: See also the previous section, "Alphabetical Element", for combinations of the number of hydrographic survey(s) and associated survey date element(s).

Specifications for the formulation of the Numeric Date Element component of the *"Depths from survey of...."* label are identical to those for a Dump Site.

(1) Year dates are expressed **ONLY** as the complete four-digit calendar year (i.e., 1999)

Calendar months are not charted

Numeric day(s) of the month are not charted

(2) When surveys from two different calendar years are applicable, the numeric date element of the label shall consist of the complete four-digit calendar year of each survey – separated by a hyphen (dash).

The oldest survey date is **ALWAYS** listed first

(3) When surveys from three or more different calendar years are applicable, the date element of the label shall consist of the complete four-digit calendar year of **ONLY** the oldest and most recent surveys - separated by a hyphen (dash).

The oldest survey date is **ALWAYS** listed first

Interim calendar year date(s) is/are **ALWAYS** omitted

The following examples illustrate the various options for formulating the "*Depths from survey of ....*" label for a Disposal Area.

Examples:

A Disposal Area where the charted hydrography originates from a single survey conducted within one calendar year.

Survey date of the source document is 28 April 2001

Use the four-digit calendar year only, i.e. 2001

Depths from survey of 2001

A Disposal Area where the charted hydrography originates from a single survey conducted during two different calendar years (unusual circumstance).

Survey date of the source document is 28 December 2000 and 3 January 2001

Use the four-digit calendar year only, i.e. 2000 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from survey of 2000-2001

A Disposal Area where the charted hydrography originates from two or more surveys conducted within the same calendar year.

Survey dates of the source documents are 11 January 2001, 28 April 2001 and 21 May 2001 - ALL within the same calendar year.

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar year only, i.e. 2001

Depths from surveys of 2001

A Disposal Area where the charted hydrography originates from two surveys conducted during different calendar years.

Survey dates of the source documents are 11 January 1999 and 28 April 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years only, i.e. 1999 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1999-2001

Examples (continued):

A Disposal Area where the charted hydrography originates from more than two surveys conducted during two different calendar years. This is a slight variation of the previous example. Note that the charted label is the same as in the prior example.

Survey dates of the source documents are 11 January 1999, 28 April 2001 and 21 May 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years only, i.e. 1999 and 2001

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1999-2001

A Disposal Area where the charted hydrography originates from more than two surveys conducted during more than two different calendar years.

Survey dates of the source documents are 15 June 1995, 11 January 1999 and 28 April 2001

The singular “survey” is revised to the plural “surveys”

Use the four-digit calendar years for only the oldest survey and most recent survey, i.e. 1995 and 2001 (interim dates, i.e. 1999, are not included)

The oldest survey date is always presented first

The dates are separated by a hyphen

Depths from surveys of 1995-2001

Collective Label (Alternative Labeling)

On smaller scale charts, a collective (single) label may be used to identify multiple proximate symbolized Disposal Areas. Using a collective label provides a degree of simplification, reduces the redundant clutter of identical labels and still retains the identity of charted features.

Generally, Disposal Areas are charted on the full range of nautical charts. This includes smaller scale charts, in areas of blue tint, with no charted hydrography. The purpose of charting these features is to provide the mariner with a general configuration of the area in the vicinity of major entrance channels. Charting these areas also provides additional emphasis to the mariner of the need to use a larger scale chart when entering or transiting these areas.

Multiple Disposal Areas may be symbolized to scale or as a minimum size symbol. Typically, on smaller scale charts, individual Disposal Areas are symbolized and labeled with the minimum label “*Disposal Area*” (See Symbolization). Whether a Disposal Area is charted to scale or as a minimum size symbol has no bearing on the use of a collective label.

WHEN the following conditions exist, individual labels may be combined into one collective label. The only modification is that the singular Feature Name label "*Disposal Area*" is revised to the plural "*Disposal Areas*".

(1) Identical Labels: The charted content of individual Disposal Area labels **MUST** be identical. This requirement almost always limits the use of a collective label to smaller scale charts where the identical label criteria is equal to the minimum label.

(2) Labeling Preference: A collective label is generally used when multiple individual labels are placed adjacent to charted features. An individual label that can be located inside the limits of a symbolized Disposal Area is not normally a candidate for a collective label.

(3) Proximity: Multiple Disposal Areas that are charted in close proximity to each other and the use of a single collective label clearly identifies/associates a charted single label being applicable to each corresponding charted feature.

(4) Clarity: It is imperative that a collective label used for identifying multiple Disposal Areas not be subject to confusion with other symbolized features, such as Spoil Area limits, which are also common along most major entrance channels and symbolized in the same manner.

Location of Labels: The label for a Disposal Area shall be located inside the limits of the symbolized feature. When the label cannot be located within the limits of a Disposal Area, it shall be placed adjacent to the feature so that the mariner will associate the label with the charted feature. The use of an arrow or leader to associate a label with a charted Disposal Area is discouraged.

Notes: Not applicable

Line Type and Weight: A Disposal Area shall be symbolized with a black dashed limiting line (0.2/2.0/0.75 mm). (0.008/0.08/0.03 inches)

The minimum size symbol, a 2.0 mm dashed black square, shall be used on small scale charts. The 2.0 mm dashed black square shall always be used when the greatest dimension of the Disposal Area is 2.0 mm or less at chart scale. The square 2.0 mm dashed symbol shall be used even when the charted larger scale symbolization is circular or irregular in shape. A controlling depth shall be charted within the limits of the Disposal Area when hydrography and other navigational detail are shown in the area.

The line symbol shall be broken **ONLY** where it would cause confusion in the presentation of more important information.

Color and Screening:

Color: A Disposal Area shall **ALWAYS** be symbolized in black. **ALL** labels shall be in black.

Screening: Not applicable

Feature Recommendation for a Notice to Mariners: A newly applied, revised or deleted Disposal Area shall be evaluated for a Notice to Mariners.

(The remainder of this page is intentionally blank.)

4.14.5.3.3 Dumping Grounds
Revised on April 1, 2004 by Cartographic Order 008/04

Dumping grounds are area designated by the USACE for dumping, by permit, various types of materials. Generally, dumping grounds are located well offshore in deep water.

Sources for dumping grounds are derived from USACE permits and from publication in the Federal Register, CFR, LNM, etc.

Dumping Grounds (N c)

Dumping ground area limits shall be shown by a black dashed line (0.2/2.0/0.75 mm).

When existing depths in dumping grounds indicate that future dumping will not cause sufficient shoaling to create a danger to navigation, soundings and depth curves shall be charted within the limits. Blue tint No. 1 shall be added to a dumping ground when justified by the charted hydrography.

The label “Dumping Ground” shall be added inside the limits of the dumping ground. It shall be in black 7 point Swiss Light Italic type, capital and lowercase letters, with size appropriate to the feature being charted and the scale of the chart. When a dumping ground is determined to be inactive, it shall be retained on the chart and labeled “Discontinued Dumping Ground”. The hydrography, if charted shall be retained. Dumping ground limits shall not be removed from the chart until a new survey done after all dumping has ceased is available for chart updating.

4.14.6 COLREGS Demarcation Line
Revised on January 23, 2013 by Cartographic Order 001/2013

Definition: **COLREGS**. Acronym for International Regulations for Preventing Collisions at Sea. [1]

Definition: **COLREGS Demarcation Lines**. Lines of demarcation delineate those waters upon which mariners must comply with the International Regulations for Preventing Collisions at Sea, 1972 (72 COLREGS) and those waters upon which mariners shall comply with the Inland Navigation Rules. The waters outside of these demarcation lines are COLREGS waters. [1]

General Requirements

The USCG is the authority for COLREGS lines of demarcation.

Regulations designed to govern vessel operations in waters under the jurisdiction of the United States are divided into two categories, International and Inland Navigation Rules. The International Rules are the result of the Convention on the International Regulations for Preventing Collisions at Sea, 1972, (COLREGS), 28 U.S.T. 3459 as amended. The Inland Rules are given in the Inland Navigational Rules Act of 1980 (Pub. L. 96-591, 94 Stat. 3415, 33 U.S.C. 2001, December 24, 1980) as amended. The regulations establishing the lines of demarcation delineating those waters upon which mariners shall comply with the international rules and those waters upon which mariners shall comply with the inland rules are given in 33 CFR 80. These lines are referred to as COLREGS demarcation lines. The inland rules apply in waters landward the line and the COLREGS apply in waters seaward of the line.

The United States Coast Guard publishes International and Inland navigation regulations and rules in Navigation Rules, International- Inland (COMDTINST M16672.2D).

Applicable Chart Scales

COLREGS demarcation lines shall be charted on all coastal series nautical charts (1:150,000 and larger). Deviations shall be coordinated through the Chief, Marine Chart Division.

Notification of COLREGS Issues

When a COLREGS demarcation line is revised or deleted due to the application of other source such as a geographic cell, or when clarification from the USCG is needed regarding a demarcation line, the Nautical Data Branch (NDB) shall be contacted by a branch chief or team lead. NDB shall contact the USCG by sending an electronic mail message to:

cgnav@uscg.mil

Minimum information required shall include the CFR section number of the COLREGS demarcation line, why the currently published COLREGS definition is not appropriate and what charting action MCD intends to take pending additional information from USCG. Attachment of a graphic showing the condition would be appropriate in most cases.

Feature Recommendation for Notice to Mariners

A newly applied, revised or deleted COLREGS demarcation line shall be evaluated for a Notice to Mariners.

Line Type and Weight

A COLREGS demarcation line shall be charted with a dashed magenta line: 0.2/2.0/0.75 mm (.008/.080/.030").

Location and Orientation

Establishing the location and orientation of COLREGS demarcation lines is the responsibility of the U.S. Coast Guard (USCG). COLREGS demarcation lines shall be charted as described in the appropriate section of 33 CFR 80.

- When a COLREGS demarcation line is defined using a landmark or other fixed object as a reference and that feature is deleted or renamed due to other charting actions, the COLREGS demarcation line shall remain as charted. Even though deletion or renaming of the object may be published in the LNM, the renaming shall be brought to the attention of the Nautical Data Branch (NDB) by a branch chief or team lead. NDB shall contact the USCG by sending an electronic mail message to:

  cgnav@uscg.mil

- When a COLREGS demarcation line is defined using a landmark or other fixed object as a reference and that feature is relocated to a new position, the COLREGS demarcation line shall be relocated according to the regulation establishing the line. For example, if the COLREGS line is referenced to a jetty light and that light is relocated, then the COLREGS demarcation line shall be realigned to reflect the new location of the light. If the landmark or fixed object is destroyed, the COLREGS demarcation line shall remain as charted. In either case, the status of the landmark or fixed object shall be brought to the attention of the Nautical Data Branch (NDB) by a branch chief or team lead. NDB shall contact the USCG by sending an electronic mail message to:

  cgnav@uscg.mil

- When a COLREGS demarcation line is defined using shoreline (high water line) as a reference and that shoreline has moved due to other charting actions, the line shall be relocated or extended according to the regulation establishing the line, **PROVIDED THAT:**

    1. The regulation makes it clear where the positioning of the line is intended.

    and

    2. The relocated line will continue to clearly delineate where COLREGS and Inland rules apply.

- A COLREGS demarcation line shall be deleted when:

    1. It is unclear from the regulation how the COLREGS demarcation line relates to the newly revised shoreline.

    or

    2. The relationship between the regulation and the revised shoreline makes it difficult to determine where COLREGS and Inland Rules apply.

    or

    3. The water passage no longer exists.

Deletion of a COLREGS line should always be considered as a last resort.

Deletion of a COLREGS demarcation line shall be brought to the attention of the Nautical Data Branch (NDB) by a branch chief or team lead. NDB shall contact the USCG by sending an electronic mail message to:

cgnav@uscg.mil

Size and Shape

A COLREGS demarcation line shall be charted using U.S. Chart No. 1 symbol N a.

Labels and Notes

The label "*COLREGS DEMARCATION LINE*" shall be placed along the seaward side of the symbolized dashed line if possible. The label shall be shown in magenta on each chart at least once at the geographic limits for each separate CFR referenced section and subsection.

The second line of the label shall be the CFR section number and the reference to Note A, e.g., "*80.325a (see note A)*." Note that the subsection letter is shown without a space or parenthesis.

These labels should be 6 point Swiss Light Italic. For example:

COLREGS DEMARCATION LINE
80.325a (see note A)

Labels may be shown with 5 point Swiss Light Italic where space is limited.

Where labels cannot be placed along the COLREGS demarcation line, they may be placed on land or within the COLREGS area (seaward of the demarcation line) and parallel to the chart base. Leaders may be used for clarification, but should be avoided, if possible.

The label abbreviation, "*COLREGS*" may be used where space is limited and where labeling may be critical (such as in an important navigational area), or where it is otherwise necessary to emphasize the demarcation line. This abbreviated label should be in 7 point Swiss Light Italic, but may be reduced to 6 point or 5 point. The abbreviated label may be judiciously omitted (retaining only the symbolized line) where the labels would be extremely close together or where several short lines are shown close together.

An explanation of the term "COLREGS" shall be added to those nautical charts that carry the Symbols and Abbreviations note or line reference to Chart No.1 and to which the COLREGS demarcation line has been applied.

Immediately below the Symbols and Abbreviations note, the following shall be added in black 6 point Swiss Light. The dashes shall be magenta.

COLREGS: International Regulations for Preventing Collisions at Sea, 1972.
Demarcation lines are shown thus: – – – –

The following note shall be used on charts that do not show the full Abbreviations note and show the line reference in its place. This note shall be charted with black 7 point Swiss Light. The dashes shall be magenta.

For Symbols and Abbreviations see Chart No. 1
COLREGS: International Regulations for Preventing Collisions at Sea, 1972.
Demarcation lines are shown thus: – – – –

Some nautical charts that fall within the COLREGS area will be completely seaward of the demarcation line. This includes certain areas of New England, Florida, Puerto Rico, the Aleutians, and other areas. Nautical Charts in these areas must contain the following note shall be added in lieu of the addition to the Symbols and Abbreviations note or line reference to Chart No.1:

COLREGS, 80._____ (see note A)

International Regulations for Preventing Collisions at Sea, 1972
The entire area of this chart falls seaward of the COLREGS Demarcation Line.

This note must be "customized" with the proper CFR section and subsection reference(s) and shall be printed in magenta, 3½" wide, in 7 point Swiss Light type.

The following note shall be added to any new edition where a COLREGS demarcation line, still defined in the CFR, is omitted:

COLREGS _____

COLREGS demarcation lines have been omitted from this chart due to the migration of shoreline. Mariners should refer to Chapter 2, U.S. Coast Pilot for the demarcation line definitions.

This note must be “customized” with the proper CFR section and subsection references and shall be printed in magenta, in 7 point Swiss Light type. The reason for the omission may be altered, as appropriate.

Color and Screening

A COLREGS demarcation line shall be charted in magenta.

See Labels and Notes for guidance on colors of COLREGS labels and notes.

Feature Removal from Chart

A COLREGS demarcation line shall be removed when an announcement is placed in the Federal Register or published in the Code of Federal Regulations (CFR) removing the regulation.

See Location and Orientation for other instances where removal of a COLREGS demarcation line is warranted.

A COLREGS label shall be removed when the associated COLREGS demarcation line is removed.

4.14.7 Boundaries and Zones
Revised on October 13, 2009 by Cartographic Order 011/09

Introduction

The United States (U.S.) maritime zones are based on a legally-defined baseline. The U.S. recognizes a normal baseline, which is defined as the low-water line along the coast as portrayed on large-scale charts. In 1970, the United States established the U.S. Baseline Committee. The Committee is chaired by the Department of State and includes members from NOAA, Department of Justice, United States Coast Guard (USCG), Department of the Navy, and Department of the Interior.

The Committee set forth that NOAA's nautical charts shall be used to determine the baseline from which the maritime zones are measured. Generally speaking, the baseline includes offshore islands, rocks and/or rocks awash that are naturally formed and bare at MLLW, and the coastal land/sea interface along the open ocean-facing coastline (mean high water line, MHW). The baseline also includes closing lines across legal bays, rivers, and harbors.

The Committee also established that NOAA's nautical charts shall contain the official depiction of the U.S. maritime limits and boundaries, and be the only legal graphic depiction of maritime zones and boundaries for the United States.

Any chart application that results in displacement of the baseline at chart scale shall be referred to the Office of Coast Survey's Chief Geographer for consideration of possible movement of charted maritime zones, other marine boundaries coincident with the zones, or other marine boundaries derived from the baseline.

The following is a brief outline of how the remainder of the boundaries and zones section 4.14.7 is organized. Detailed information and charting specifications for each sub-section are contained in that sub-section.

4.14.7.1 International Boundaries [Non-Maritime Water Areas]

4.14.7.2 International Maritime Boundaries

4.14.7.3 International Maritime Zones

- 4.14.7.3.1 - Territorial Sea Closing Line
- 4.14.7.3.2 - Territorial Sea
- 4.14.7.3.3 - Contiguous Zone
- 4.14.7.3.4 - Exclusive Economic Zone (EEZ)

4.14.7.4 Marine Boundaries

4.14.7.4.1 - Three Nautical Mile Line

4.14.7.4.2 - Natural Resources Boundary (9 nautical mile line)

4.14.7.4.3 - Civil Reservation - [Marine Protected Area (MPA) and Marine Managed Area (MMA)]

4.14.7.4.4 - Particularly Sensitive Sea Area (PSSA)

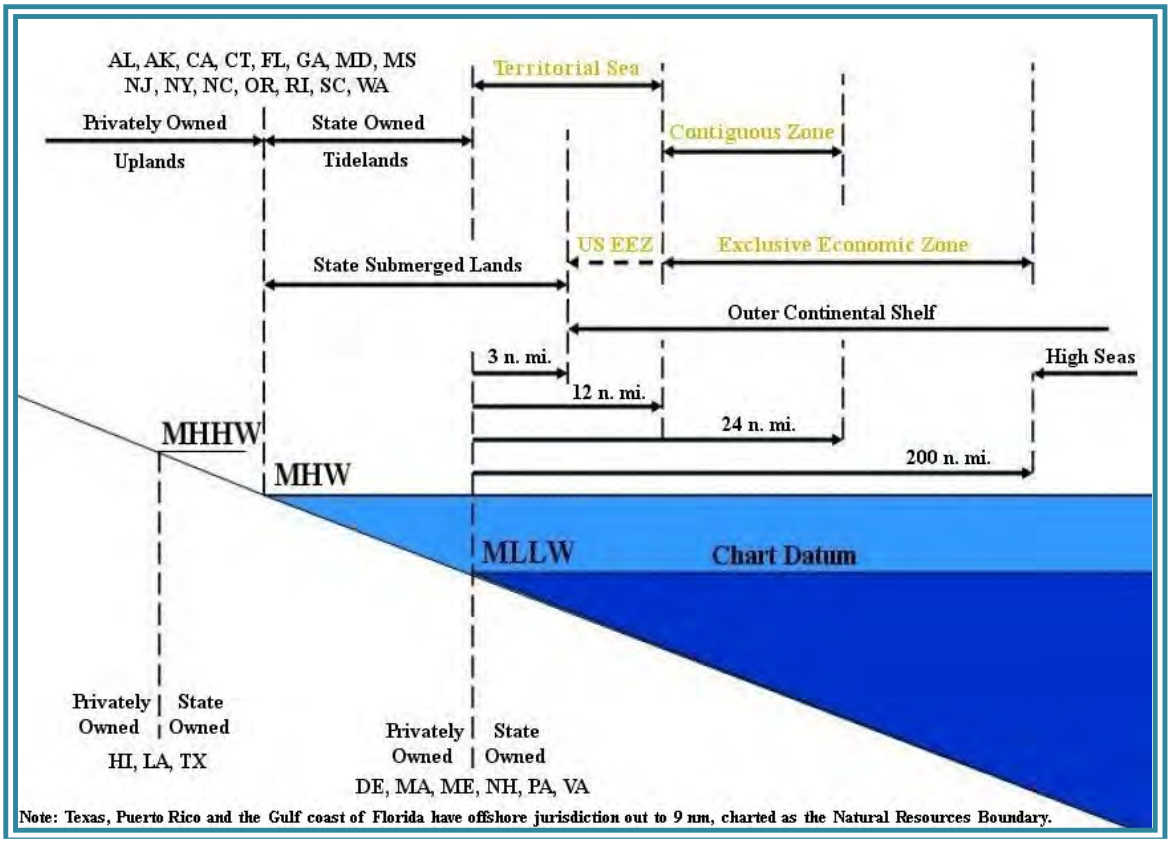


Figure 4.14.7-1

4.14.7.1 INTERNATIONAL BOUNDARIES - [NON-MARITIME WATER AREAS] (N40)

The term "international boundary" refers to land and non-maritime inland water boundaries that are between two opposite or adjacent States (countries). Certain international boundaries in water that are not considered maritime boundaries and should be symbolized the same as land boundaries.

Definition: **INTERNATIONAL BOUNDARY.** Territorial political delimiting lines in areas established by agreement between two adjacent and opposite States. [16]

General Requirements:

International boundaries in non–maritime water areas are charted at the request of the U.S. Department of State, and are added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer.

The international boundary between the United States and Canada, including the interior nonmaritime water boundaries through the Great Lakes, should be symbolized using Chart No. 1 symbol N40, as directed by the Office of Coast Survey's Chief Geographer.

The international boundary between the United States and Mexico, extending through the Rio Grande to the Gulf of Mexico, should be symbolized using Chart. No. 1 symbol N40, as directed by the Office of Coast Survey's Chief Geographer.

See Section 3.7 for international boundaries on land.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted international boundary shall be evaluated for a Notice to Mariners.

Line Type and Weight:

An international boundary shall be symbolized by a black line of alternating crosses using Chart No.1 symbol N40: cross 2.00 mm wide, 1.00 mm tall; space 0.75 mm; lineweight 0.20 mm (0.008").

Example - International Boundary Symbol:

Location and Orientation on the Chart:

An international boundary shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

Size and Shape:

An international boundary shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

The names of the States (countries) on either side of the international boundary shall be charted in 8 point Swiss Light type, with all capital letters at intervals appropriate to the scale of the chart.

The names shall be placed adjacent to and aligned with the international boundary line. Every effort shall be made to align national names directly opposite each other on opposite sides of the line.

The names of States (countries) labels for an international boundary may be combined with other maritime zone labeling, as directed by the Office of Coast Survey's Chief Geographer.

Any note pertaining to an international boundary shall be charted in 7 point Swiss Light type, and only at the direction of the Office of Coast Survey's Chief Geographer.

Color and Screening:

An international boundary shall be charted in black.

Labels and notes associated with an international boundary shall be charted in black.

Feature Removal from the Chart:

An international boundary shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.2 INTERNATIONAL MARITIME BOUNDARIES (N41)

The term "international maritime boundary" refers to offshore boundaries in which an agreement exists, either in-force or provisionally applied between two opposite or adjacent coastal States (countries). Examples of maritime boundaries of the U.S. include those between the U.S. and Canada (Gulf of Maine), Mexico, Russia, Cuba, New Zealand, Venezuela, Japan, United Kingdom, and Niue.

Definition: **INTERNATIONAL MARITIME BOUNDARY.** The jurisdictional limits of political water areas seaward of the U.S. baseline and established by agreement between two adjacent and opposite States. [16, 29]

General Requirements:

International maritime boundaries are charted at the request of the U.S. Department of State, and are added, revised, deleted or may be combined with other maritime zone or marine boundary symbols on the chart only at the direction of the Office of Coast Survey's Chief Geographer. An international maritime boundary with no overlapping marine boundary symbols is charted using Chart No. 1 symbol N41 in the following situations at the direction of the Office of Coast Survey's Chief Geographer.

U.S.- Canada (Gulf of Maine): Within the Three Nautical Mile Line
U.S.- Mexico (western Gulf of Mexico): Baseline to 9 nm Natural Resources Boundary.
U.S.- Mexico (Pacific): Baseline to the Three Nautical Mile Line.
U.S.- Russia: Baseline to the Three Nautical Mile Line.
U.S.- UK (Carribean): Baseline to the Three Nautical Mile Line.

Alternatively, an international maritime boundary may be coincident with the EEZ (Fishery Zone) boundary, seaward of the state's jurisdiction - Three Nautical Mile Line or 9 nautical mile Natural Resources Boundary. In the following situations, international maritime boundary symbols may be modified to include interspersed magenta fish symbols, using a combination of Chart No. 1, symbols N41 and N45, at the direction of the Office of Coast Survey's Chief Geographer. (See Exclusive Economic Zone section 4.14.7.3.4)

U.S.- Canada (Gulf of Maine): Seaward of the Three Nautical Mile Line.
U.S.- Mexico (western and central Gulf of Mexico): Seaward of the 9nm Natural Resources Boundary off of Texas, and the Three Nautical Mile Line off of Louisiana and Mississippi.
U.S.- Mexico (Pacific): Seaward of the Three Nautical Mile Line.
U.S.- Russia: Seaward of the Three Nautical Mile Line.
U.S.- UK (Caribbean): Seaward of the Three Nautical Mile Line off of U.S. Virgin Islands.
U.S.- Cuba: In the Carribean, at the specific direction of the Office of Coast Survey's Chief Geographer.

Feature Recommendation for a Notice to Mariners:
A newly applied, revised or deleted international maritime boundary shall be evaluated for a Notice to Mariners.

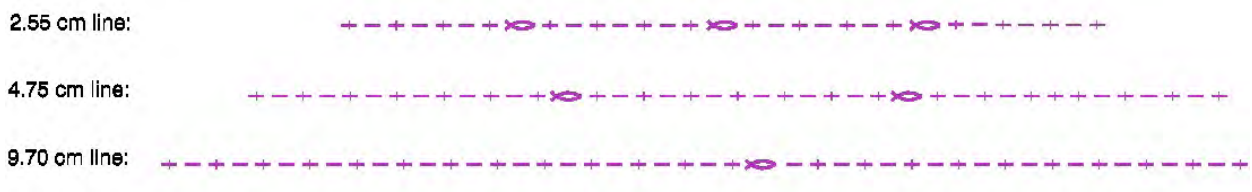
Line Type and Weight:

The international maritime boundary Chart No. 1 symbol N41 shall be symbolized by a magenta line of alternating crosses and dashes: cross 2.50 mm wide, 1.25 mm tall; space 1.25 mm; dash 2.50 mm wide; lineweight 0.20 mm (0.008").

Example - International Maritime Boundary Symbol:

The international maritime boundary coincident with the EEZ (Fishery Zone) boundary using combined Chart No. 1 symbols N41 and N45, is symbolized at the direction of the Office of Coast Survey's Chief Geographer, by a magenta line of alternating crosses and dashes: cross 2.50 mm wide, 1.25 mm tall; space 1.25 mm; dash 2.50 mm wide; lineweight 0.20 mm (0.008"), interspersed at regular intervals by a magenta fish symbol. The length of line between the magenta fish may be either 2.55 cm (1.0"), 4.75 cm (1.85") or 9.70 cm (3.8") in a series; but only one size shall be used to depict any one charted limit. (See Exclusive Economic Zone Section 4.14.7.3.4)

Example - Combined International Maritime Boundary using Chart No. 1 symbols N41 and N45:



Location and Orientation on the Chart:

An international maritime boundary shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

When the international maritime boundary is coincident with the EEZ limit, the magenta fish symbol on the combined Chart No. 1 symbols N41 and N45 limit is considered directional. The

boundary symbol shall be applied so as to point the fish in a clockwise direction around land masses.

Size and Shape:

An international maritime boundary shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

When Chart No.1 symbol N41 or the combined symbols N41 and N45 with interspersed magenta fish symbols are used to chart an international maritime boundary; the names of the coastal States (countries) on either side of the international maritime boundary shall be charted in 8 point Swiss Light Italic type, with all capital letters at intervals appropriate to the scale of the chart.

The names shall be placed adjacent to and aligned with the international maritime boundary line. Every effort shall be made to align coastal States (countries) names directly opposite each other on opposite sides of the line.

The names of coastal States (countries) labels for an international maritime boundary may be combined with other maritime zone labeling as directed by the Office of Coast Survey's Chief Geographer.

Any note pertaining to an international maritime boundary shall be charted in 7 point Swiss Light type, and only at the direction of the Office of Coast Survey's Chief Geographer.

Color and Screening:

An international maritime boundary shall be charted in magenta, when Chart No.1, symbol N41 or the combined symbols N41 and N45 are used.

Labels and notes associated with an international maritime boundary shall be charted in magenta, when Chart No.1, symbol N41 or the combined symbols N41 and N45 are used.

The labeling of coincident maritime zones shall be the same color as the coastal States (countries), names, and both will be the same as the color of the symbol used to depict the international maritime boundary at chart scale, only at the direction of the Office of Coast Survey's Chief Geographer.

Feature Removal from the Chart:

An international maritime boundary shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.3 INTERNATIONAL MARITIME ZONES

The term "maritime zone" refers to an international zone of jurisdiction that is rooted in customary international law and set forth in the United Nations Convention on the Law of the Sea (UNCLOS). Since the U.S. is not a party to UNCLOS, the maritime zones are established by Presidential Proclamations.

The Office of Coast Survey is responsible for determining and depicting the following maritime limits or zones on its charts: Territorial Sea at 12 nautical miles, Contiguous Zone at 24 nautical miles, and Exclusive Economic Zone at 200 nautical miles. (See Figure 4.14.7-1).

4.14.7.3.1 TERRITORIAL SEA CLOSING LINE (N 42)

Definition: **CLOSING LINE.** The line dividing inland waters and the territorial sea at the mouth of a river, bay or harbor. [Shore and Sea Boundaries, Volume 3]

Definition: **MARGINAL SEA.** The maritime belt over which a coastal State asserts sovereignty (see Territorial Sea). [Shore and Sea Boundaries, Volume 3]

Definition: **TERRITORIAL SEA.** The offshore belt in which a coastal State has exclusive jurisdiction. The territorial sea may not extend more than 12 nautical miles from the baseline (see Marginal Sea). [Shore and Sea Boundaries, Volume 3]

General Requirements:

For charting purposes, the terms "Marginal Sea" and "Territorial Sea" shall be synonymous.

The baseline from which the territorial sea is measured is set forth in UNCLOS and determined by NOAA through its role in the U.S. Baseline Committee (see Maritime Boundaries and Zones, under Section 4.14.7). The baseline generally consists of charted features that are, at a minimum, dry at MLLW. The most seaward limit of offshore islands, rocks and/or rocks awash that are naturally formed and bare at MLLW, and the mainland land/sea interface along the open ocean facing coastline (mean high water line, MHW), comprise the baseline.

Closing lines as set forth in UNCLOS are also considered a part of the baseline from which the territorial sea is measured. Closing lines across legal bays, rivers, and harbors comprise the inner limit of the territorial sea, and depending on their orientation and extent, closing lines may also serve to extend the outer limits of the 12 nautical mile territorial sea.

Closing Lines are charted at the request of the U.S. Department of State, and are added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer. Any chart application that results in displacement to the baseline at chart scale shall be referred to the Chief Geographer for consideration of possible movement of charted maritime limits, other marine boundaries coincident with the charted maritime limits, or other marine boundaries derived from the baseline.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted closing line shall be evaluated for a Notice to Mariners.

Line Type and Weight:

A closing line shall be charted with Chart No. 1 Symbol N42 as a continuous line: 0.50 mm lineweight (0.020").

A Closing Line shall not be broken for charted detail, except in the case where the Closing Line intersects a charted island or an area of MLLW that is connected to a charted island.

Example - Territorial Sea Closing Line:

Location and Orientation on the Chart:

A Closing Line shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

Size and Shape:

A Closing Line shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

A Closing Line shall be labeled, "*TERRITORIAL SEA (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed seaward of the Closing Line, preferably parallel and adjacent to the charted line. In congested areas the label may be offset with an arrow to the charted Closing Line.

A "*TERRITORIAL SEA (see note X)*" label associated with a closing line shall not be broken for charted detail.

The following note shall be charted 3 ½" wide in 7 point Swiss Light type on charts showing the Closing Line. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X." All prior versions of Note X are superseded:

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

A Closing Line shall be charted with black 25% 200 LPI bi-angle screen.

Labels associated with a Closing Line shall be charted with black 25% 200 LPI bi-angle screen.

Note X shall be charted in solid black.

Feature Removal From the Chart:

A Closing Line shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.3.2 TERRITORIAL SEA (N43)

Definition: **TERRITORIAL SEA.** The offshore belt in which a coastal State has exclusive jurisdiction. The territorial sea may not extend more than 12 nautical miles from the baseline (see Marginal Sea). [Shore and Sea Boundaries, Volume 3]

General Requirements:

The Territorial Sea is delimited either from base points on the land mass (normally at the low water line along the coast) or from baselines connecting such points in accordance with international law. The coastal state enjoys sovereignty and jurisdiction over the Territorial Sea subject to the right of innocent passage of foreign vessels. The maximum breadth of the Territorial Sea allowed under international law as reflected in the UNCLOS is 12 nautical miles, and is the extent of the water area within the 12 nautical mile zone extending seaward from the baseline.

See Section 4.14.7.3.1 for information pertaining to charting the shoreward limit of the Territorial Sea.

A Territorial Sea limit is charted at the request of the U.S. Department of State, and is added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted Territorial Sea limit shall be evaluated for a Notice to Mariners.

Line Type and Weight:

A Territorial Sea limit shall be charted with Chart No. 1 Symbol N43 as a continuous line: 0.50 mm line-weight (0.020").

A Territorial Sea limit shall not be broken for charted detail, except in the case of chart title block areas, LORAN-C linear interpolators, and when chart notes cannot be moved.

Example - Territorial Sea limit:

Location and Orientation on the Chart:

The Territorial Sea limit shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

Size and Shape:

The Territorial Sea limit shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

A Territorial Sea limit shall be labeled "*TERRITORIAL SEA (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed shoreward of the seaward limit of the territorial sea, preferably parallel and adjacent to the charted line.

Any limit line labeled, *Territorial Sea and Contiguous Zone (see note X)"*, shall be re-labeled, "*TERRITORIAL SEA (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label "*TERRITORIAL SEA (see note X)*" shall not be broken for charted detail.

The following note shall be charted 3 ½" wide in 7 pt. Swiss Light type on charts showing a Territorial Sea limit. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X". All prior versions of Note X are superseded:

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

The Territorial Sea limit shall be charted with black 25% 200 LPI biangle screen.

Labels associated with a Territorial Sea limit shall be charted with black 25% 200 LPI biangle screen.

Note X shall be charted in solid black.

Feature Removal From the Chart:

A Territorial Sea limit shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.3.3 CONTIGUOUS ZONE (N 44)

Definition: **CONTIGUOUS ZONE.** Is defined as set forth in Presidential Proclamation No. 7219 on August 2, 1999, a contiguous zone is a belt of water adjacent to and seaward of the territorial seas of the United States. In international law, an area contiguous to the territorial sea but not beyond 24 nautical miles from the baseline from which the breadth of the territorial sea is measured. [3, Shore and Sea Boundaries Volume 3]

General Requirements:

Presidential Proclamation No. 7219 on August 2, 1999 extended the Contiguous Zone from its prior limit of 12 nautical miles from the baseline to 24 nautical miles. Under international law, a contiguous zone is an area contiguous to a coastal State's Territorial Sea in which a nation may exercise the control necessary to prevent infringement of its customs, fiscal, sanitation, or immigration laws and regulations within its territory or territorial sea. It may also exercise the control necessary to punish infringement of the above laws and regulations committed within its territory or territorial sea.

A Contiguous Zone limit shall be charted at the request of the U.S. Department of State, and is added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted Contiguous Zone limit shall be evaluated for a Notice to Mariners.

Line Type and Weight:

The Contiguous Zone limit shall be charted with Chart No. 1 symbol N44 as a continuous line: 0.50 mm line-weight (0.020").

A Contiguous Zone limit symbol shall not be broken for charted detail, except in the case of chart title block areas, LORAN-C linear interpolators and when chart notes cannot be moved.

Example - Contiguous Zone limit

Location and Orientation on the Chart:

A Contiguous Zone limit shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

Size and Shape:

A Contiguous Zone limit shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

A Contiguous Zone limit shall be labeled "*CONTIGUOUS ZONE (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed shoreward of a Contiguous Zone limit, preferably parallel and adjacent to the charted line.

The label "*CONTIGUOUS ZONE (see note X)*" shall not be broken for charted detail.

The following note shall be charted 3 ½" wide in 7 point Swiss Light type on charts showing a Contiguous Zone limit. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X." All prior versions of Note X are superseded:

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

A Contiguous Zone limit shall be charted with black 25% 200 LPI bi-angle screen.

Labels associated with a Contiguous Zone limit shall be charted with black 25% 200 LPI bi-angle screen.

Note X shall be charted in solid black.

Feature Removal from the Chart:

A Contiguous Zone limit shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.3.4 EXCLUSIVE ECONOMIC ZONE (N45, N47)

Definition: **EXCLUSIVE ECONOMIC ZONE (EEZ) OF THE UNITED STATES.** Presidential Proclamation 5030 created the 200-nautical-mile exclusive economic zone (EEZ) in 1983. The EEZ of the U.S. is an area beyond and adjacent to the territorial sea of the U.S., or, for purposes of domestic fisheries laws, extending from the state seaward boundary. Within the EEZ, the U.S. has (a) sovereign rights for the purpose of exploring, exploiting, conserving, and managing natural resources, whether living and nonliving, of the seabed and subsoil and the superjacent waters, and with regard to other activities for the economic, exploitation and exploration of the zone, such as the production of energy from the water, currents, and winds; (b) jurisdiction as provided for international law with regard to the establishment and use of artificial islands, installations and structures, marine scientific research, and the protection and preservation of the marine environment, and (c) other rights and duties provided for under international law. [29, Coastal Services Center]

General Requirements:

The EEZ, established by Presidential Proclamation on March 10, 1983 and was subsequently defined in the Magnuson-Stevens Fishery Conservation and Management Act (MSA), is a zone with a 200 nautical mile outer limit that is coincident with the Fishery Conservation Zone. The Fishery Conservation Zone is not labeled on the paper and raster charts.

Within the EEZ, the United States has, to the extent permitted by international law, sovereign rights for the purpose of exploring, exploiting, conserving and managing natural resources, both living and non-living, of the seabed and subsoil and the superjacent waters and with regard to other activities for the economic exploitation and exploration of the zone, such as the production of energy from the water, currents and winds; and jurisdiction with regard to the establishment and use of artificial islands, and installations and structures having economic purposes and the protection and preservation of the marine environment.

An EEZ limit is charted at the request of the U.S. Department of State, and is added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer.

The 200 nautical mile EEZ limit may be combined with the international maritime boundary, where the Office of Coast Survey's Chief Geographer determines that the limits coincide.

See International Maritime Boundaries section 4.14.7.2 for specifications on charting the EEZ boundary when it is coincident with an international maritime boundary.

Any addition, revision or deletion of an EEZ limit shall be submitted to the Office of Coast Survey's Chief Geographer for approval after compilation review has been completed.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised, or deleted EEZ boundary shall be evaluated for a Notice to Mariners.

Line Type and Weight:

An EEZ limit shall be shown using Chart No.1 symbols N45 or N47, by black screened line segments 0.40 mm line-weight (0.016") interspersed at regular intervals by a fish symbol. The length of line between the fish may be either 2.55 cm (1.0"), 4.75 cm (1.85") or 9.70 cm (3.8") in a series; but only one size shall be used to depict any one charted limit. The fish shall be spaced less frequently for long limits with little variation, and vice versa. The fish may be moved along the line to avoid an area where the line changes direction.

The fish symbol shall be 5.2 mm (0.21") long. There shall be a minimum 0.75 mm (0.030") space between the line segment and the fish symbol at both ends of the fish.

The fish symbol is composed of 2 intersecting arcs 3.7 mm (0.15") in radius. The arcs shall be attached at opposite ends of a line segment 3.1 mm (0.12") apart.

The body and tail section of the fish shall be 1.7 mm (0.068") in height. The body of the fish shall be 4.25 mm (0.17"). The tail section shall be 0.95 mm (0.038").

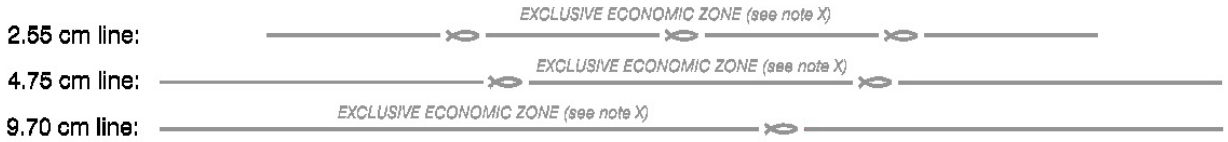
The fish symbols shall be aligned so that each fish is centered on the axis of the EEZ boundary and all fish symbols point in a clockwise direction around land masses, positioning and rotating the fish along the line axis as needed. The fish may be moved along the line to avoid arc intersections of the boundary.

The same line lengths shall be used when charting a section of the EEZ limit. The shorter segments should be used for short sections of the limit and longer segments for longer limit sections.

When the EEZ limit is combined with an international maritime boundary, Chart No. 1 symbol N41 or combined symbols N41 and N45, the symbol shall be broken to accommodate the magenta fish symbols at regular intervals, at the direction of the Office of Coast Survey's Chief Geographer. (See International Maritime Boundaries section 4.14.7.2)

An EEZ boundary, including the fish symbols, shall not be broken for charted detail, except in the case of chart title block areas, LORAN-C linear interpolators and when chart notes cannot be moved.

Examples of EEZ Boundaries:



Location and Orientation on the Chart:

An EEZ limit shall be charted in its exact geographic positions, as approved by the Office of Coast Survey's Chief Geographer.

The fish symbol on the EEZ limit is considered directional. The boundary symbol shall be applied so as to point the fish in a clockwise direction around land masses.

Size and Shape:

An EEZ limit shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

An EEZ limit shall be labeled "*EXCLUSIVE ECONOMIC ZONE (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed shoreward of an EEZ limit, preferably parallel and adjacent to the charted line.

The label "*EXCLUSIVE ECONOMIC ZONE (see note X)*" shall not be broken for charted detail.

The EEZ labeling may be combined with international maritime boundary, or other maritime zone labeling, at the direction of the Office of Coast Survey's Chief Geographer.

The following note shall be charted 3 ½" wide in black 7 pt. Swiss Light type on charts showing an EEZ limit. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X." All prior versions of Note X are superseded:

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

An EEZ limit line, including the fish symbol shall be charted in black 25 percent 200 LPI bi angle screen.

Labels associated with a EEZ limit shall be charted with black 25% 200 LPI bi-angle screen.

When the EEZ limit is combined with the international maritime boundary, Chart No. 1, symbol N41or combined symbols N41 and N45, magenta fish symbols shall be interspersed along the international maritime boundary, and all associated labeling shall be solid magenta, at the direction of the Office of Coast Survey's Chief Geographer. (See International Maritime Boundary section 4.14.7.2).

Note X shall be charted in solid black.

Feature Removal From the Chart:

An EEZ limit shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.4 MARINE BOUNDARIES

The term “marine boundary” is an all-inclusive term that broadly refers to any marine jurisdiction. For the purposes of this document, the term marine boundary will be used to describe anything that is not strictly maritime, per customary international law and UNCLOS.

4.14.7.4.1 THREE NAUTICAL MILE LINE (N42)

Definition: **THREE NAUTICAL MILE LINE.** Previously the territorial sea, until it was extended to 12 nautical miles in 1988, the Three Nautical Mile Line is retained on NOAA’s nautical charts because it marks the seaward limit of territorial waters in some domestic laws, such as the Clean Water Act and Oil Pollution Act. It is also utilized by NOAA Fisheries and the USCG to enforce federal fisheries jurisdiction, and it is used by some states within the U.S. to enforce some state jurisdictional areas. The Three Nautical Mile Line is measured from the territorial sea baseline. [3, 29]

General Requirements:

The Three Nautical Mile Line, previously identified as the outer limit of the Territorial Sea, is retained on NOAA’s Nautical Charts because it continues to depict the jurisdictional limit of other laws.

The Territorial Sea was extended from three nautical miles to twelve nautical miles by Presidential Proclamation No. 5928 on December 27, 1988; however, some domestic laws were unchanged by this proclamation and still use the term territorial sea to describe a 3 nautical mile belt of waters.

The Three Nautical Mile Line is added, revised or deleted on the chart only at the direction of the Office of Coast Survey’s Chief Geographer.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted Three Nautical Mile Line shall be evaluated for a Notice to Mariners.

Line Type and Weight:

The Three Nautical Mile Line shall be charted with Chart No. 1 symbol N42 as a continuous line: 0.50 mm line-weight (0.020").

The Three Nautical Mile Line shall not be broken for charted detail, except in the case of chart title block areas, LORAN-C linear interpolators and when chart notes cannot be moved.

Example - Three Nautical Mile Line:

Location and Orientation on the Chart:

The Three Nautical Mile Line shall be charted in the exact geographic positions, as provided by the Office of Coast Survey's Chief Geographer.

Size and Shape:

The Three Nautical Mile Line shall conform to the extent and shape of the area that it is delineating.

Labels and Notes:

The Three Nautical Mile Line shall be labeled "*THREE NAUTICAL MILE LINE (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed shoreward of the Three Nautical Mile Line, preferably parallel and adjacent to the charted line.

The label "*THREE NAUTICAL MILE LINE (see note X)*" shall not be broken for charted detail.

The following note shall be charted 3 ½" wide in 7 point Swiss Light style type, on charts showing the Three Nautical Mile Line. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X." All prior versions of Note X are superseded.

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

The Three Nautical Mile Line shall be charted with black 25% 200 LPI bi-angle screen.

Labels associated with a Three Nautical Mile Line shall be charted with black 25% 200 LPI bi-angle screen.

Note X shall be charted in solid black.

Feature Removal from the Chart:

The Three Nautical Mile Line shall be removed from the chart only at the direction of the Office of Coast Survey's Chief Geographer.

4.14.7.4.2 NATURAL RESOURCES BOUNDARY (N42) - 9 Nautical Mile / 3 League Line

Definition: **NATURAL RESOURCES BOUNDARY.** The Natural Resources Boundaries off of Texas, Puerto Rico and the west coast of Florida is 3 marine leagues, or 9 nautical miles seaward of the coastline as defined in the Submerged Lands Act. [3, 29, Shore and Sea Boundaries Volume 3]

General Requirements:

The 9 nautical mile Natural Resources Boundary off the west and Gulf coast of Florida, Texas and Puerto Rico, and the Three Nautical Mile Line elsewhere, remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. A Natural Resources Boundary, where shown, is the seaward limit of submerged lands controlled by Florida (on its Gulf coast), Texas and Puerto Rico.

The Natural Resources Boundary is added, revised or deleted on the chart only at the direction of the Office of Coast Survey's Chief Geographer.

Feature Recommendation for a Notice to Mariners:

A newly applied, revised or deleted Natural Resources Boundary shall be evaluated for a Notice to Mariners.

Line Type and Weight:

The Natural Resources Boundary shall be charted with Chart No.1 symbol N42 as a continuous line: 0.50 mm line-weight (0.020").

The Natural Resources Boundary shall not be broken for charted detail, except in the case of chart title block areas, LORAN interpolators and when chart notes cannot be moved.

Example - Natural Resources Boundary:

NATURAL RESOURCES BOUNDARY (see note X)

Location and Orientation on the Chart:

The Natural Resources Boundary shall be charted in the exact geographic positions, as approved by the Office of Coast Survey's Chief Geographer.

Size and Shape:

The Natural Resources Boundary shall conform to the extent and shape of the area it is delineating.

Labels and Notes:

The Natural Resources Boundary shall be labeled "*NATURAL RESOURCES BOUNDARY (see note X)*". The label shall be in 7 point Swiss Regular Italic type.

The label shall be placed shoreward of the Natural Resources Boundary, preferably parallel and adjacent to the charted line.

The label "*NATURAL RESOURCES BOUNDARY (see note X)*" shall not be broken for charted detail.

The following note shall be charted 3½" wide in 7 point Swiss Light style type, on charts showing the Natural Resources Boundary. This note shall always be labeled as "NOTE X" and no other note shall be labeled as "NOTE X." All prior versions of Note X are superseded.

NOTE X

Within the 12-nautical mile Territorial Sea, established by Presidential Proclamation, some Federal laws apply. The Three Nautical Mile Line, previously identified as the outer limit of the territorial sea, is retained as it continues to depict the jurisdictional limit of the other laws. The 9-nautical mile Natural Resource Boundary off the Gulf coast of Florida, Texas, and Puerto Rico, and the Three Nautical Mile Line elsewhere remain in most cases the inner limit of Federal fisheries jurisdiction and the outer limit of the jurisdiction of the states. The 24-nautical mile Contiguous Zone and the 200-nautical mile Exclusive Economic Zone were established by Presidential Proclamation. Unless fixed by treaty or the U.S. Supreme Court, these maritime limits are subject to modification.

Color and Screening:

The Natural Resources Boundary shall be charted with black 25% 200 LPI bi-angle screen.

Labels associated with the Natural Resources Boundary shall be charted with black 25% 200 LPI bi-angle screen.

Note X shall be charted in solid black.

Feature Removal from the Chart:

The Natural Resources Boundary shall be removed from the chart only as directed by the Office of Coast Survey's Chief Geographer.

4.14.7.4.3 CIVIL RESERVATIONS - [MARINE PROTECTED AREA (MPA); MARINE MANAGED AREA (MMA)] (N22)

Revised by Cartographic Order 002/11 on August 4, 2011

Definition: **CIVIL RESERVATION**. A civil reservation is a tract of land and / or a water area set aside for the conservation and / or preservation of natural or historic objects or wildlife therein. [DRG]

Definition: **MARINE PROTECTED AREA (MPA).** Executive Order 13158, signed on May 26, 2000, defined a marine protected area as, any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. [2]

Definition: **MARINE MANAGED AREA (MMA).** MMAs are geographic areas designed to protect or manage resources within the marine environment. The National Marine Protected Area Center adopted the term "marine managed area" (MMA) in 2002 as a more inclusive category of place- based management areas. [NOAA]

For charting purposes any tract of land and / or water set aside for conservation and / or preservation purposes, that has not been specifically designated by NOAA as and MPA or MMA, is broadly designated as a civil reservation.

NOAA has specially designated approximately 1800 domestic MPAs, that include national and state parks, fishery management zones, wildlife refuges, aquatic preserves, marine sanctuaries and historical areas, national seashores, national monuments, Indian reservations, protected areas, critical habitats and national estuarine research reserves. The MPA inventory is based on a previously developed MMA inventory, which was active from 2001-2007, sites from the MMA inventory that meet the criteria for an MPA have been included in the MPA inventory.

General Requirements:

Civil reservations, MMA's and MPA's shall be subdued in a blue color on paper and raster charts to reserve the use of magenta and black for charting features that are of greater navigational importance to the mariner.

Any conflicts in source data pertaining to civil reservation, MMA or MPA limits and designation must be resolved by the requesting authority and supported by appropriate documentation prior to chart application. Such conflicts shall be brought to the attention of the Chief, Nautical Data Branch.

Any chart application that results in the displacement of charted shoreline (baseline) at chart scale, shall be referred to the Office of Coast Survey's Chief Geographer for consideration of possible movement of charted maritime zones.

Newly charted civil reservations, MMA's or MPA's that are coincident with charted maritime zone boundaries, shall also be referred to the Office of Coast Survey's Chief Geographer for consideration of possible movement of charted maritime zones.

Questions concerning the application of civil reservations, MMA's and MPA's shall be referred to the Chief, CSSB, for disposition.

Civil Reservations, MMA's and MPA's shall only be charted according to the following criteria:

Civil Reservations Administered by Department of the Interior (DOI) Agencies

The U.S. Department of the Interior, administers various civil reservations including:

National Parks
National Monuments
National Seashores
National Lakeshores
National Historic Sites
Fish and Wildlife Refuges

Civil reservations administered by the Department of the Interior agencies shall be charted when all of the following conditions are met:

- Charting of the civil reservation has been requested by the Department of the Interior (DOI).

- There are navigation regulations within the DOI administered civil reservation that are published in Title 36 CFR and either restrict or prohibit entry by vessels.

- The limits of the civil reservation are defined and listed by geographic coordinates in the CFR.

DOI administered civil reservations meeting the above conditions for charting must be shown in their entirety at all scales larger than 1:500,000, including within 3E Areas, with the following exceptions:

- An DOI administered civil reservation shall not be charted when it is less than 5.0 mm in any dimension at chart scale.
- So as not to negatively impact the legibility of important charted features and information, the entire name of the civil reservation must fit wholly within the charted boundary of that civil reservation.

Currently charted civil reservations administered by DOI shall be retained, regardless of the above conditions for charting (August, 2011).

Protected Areas Managed by the National Marine Sanctuary Program

NOAA's National Marine Sanctuary Program (NMSP) administers National Marine Sanctuaries. National Marine Sanctuaries shall be charted when all of the following conditions are met:

- Charting of the sanctuary has been requested by the NMSP.

- There are navigation regulations within the NMSP administered sanctuary that are published in Title 15 CFR and either restrict or prohibit entry by vessels.

- The limits of the sanctuary are defined and listed by geographic coordinates in the CFR.

NMSP administered sanctuaries meeting the above conditions for charting must be shown in their entirety at all scales larger than 1:500,000, including within 3E Areas, with the following exceptions:

- A sanctuary shall not be charted when it is less than 5.0 mm in any dimension at chart scale.

- So as not to negatively impact the legibility of important charted features and information, the entire name of the sanctuary must fit wholly within the charted boundary of that sanctuary.

Currently charted sanctuaries administered by NMSP shall be retained, regardless of the above conditions for charting. (August, 2011)

Other Federally Administered Civil Reservations, MMA's and MPA's

Civil reservations, MMA's and MPA's administered by federal government agencies other than DOI and NOAA shall be charted when all of the following conditions are met:

- Charting of the civil reservation, MMA, or MPA has been requested by the cognizant federal government agency.

- There are navigation regulations within the federally administered civil reservation, MMA or MPA that are published in the CFR and either restrict or prohibit entry by vessels.

- The limits of the civil reservation, MMA or MPA are defined and listed by geographic coordinates in the CFR.
- Charting of this area will not seriously impact the legibility of important charted features.

Federally administered civil reservations, MMA's and MPA's meeting the above conditions for charting must be shown in their entirety at all scales larger than 1:500,000, including within 3E Areas, with the following exceptions:

- A federally administered civil reservation, MMA or MPA shall not be charted when it is less than 5.0 mm in any dimension at chart scale.

- So as not to negatively impact the legibility of important charted features and information, the entire name of the civil reservation must fit wholly within the charted boundary of that civil reservation.

Currently charted civil reservations, MMA's and MPA's, administered by Federal government agencies, shall be retained, regardless of the above conditions for charting, unless they impact the legibility of important charted features. (August, 2011)

Civil Reservations, MMA's and MPA's Administered by Foreign National Governments

Civil reservations, MMA's and MPA's administered by foreign National Governments, such as Canada, Mexico and Russia (not provincial or territorial governments) shall be charted when all of the following conditions are met:

- Charting of the civil reservation, MMA, or MPA has been requested by the cognizant Foreign National government agency.

- There are navigation regulations within the Foreign National government administered civil reservation, MMA or MPA that are published by the Foreign National government and either restrict or prohibit entry by vessels.

- The limits of the civil reservation, MMA or MPA are defined and listed by geographic coordinates in an official document provided to MCD.
- Charting of this area will not seriously impact the legibility of important charted features.

Foreign government administered civil reservations, MMA's and MPA's meeting the above conditions for charting must be shown in their entirety at all scales larger than 1:500,000, including within 3E Areas, with the following exceptions:

- A Foreign government administered civil reservation, MMA or MPA shall not be charted when it is less than 5.0 mm in any dimension at chart scale.
- So as not to negatively impact the legibility of important charted features and information, the entire name of the civil reservation must fit wholly within the charted boundary of that civil reservation.

Currently charted civil reservations, MMA's and MPA's, administered by Foreign National government agencies, shall be retained, regardless of the above conditions for charting, unless they impact the legibility of important charted features. (August, 2011)

State and Local or Privately Administered Civil Reservations, MMA's and MPA's

Civil reservations, MMA's and MPA's administered by the States, Local governments, Foreign government agencies at less than the National level or private interests shall not be added to nautical charts; even when navigation is restricted within the area.

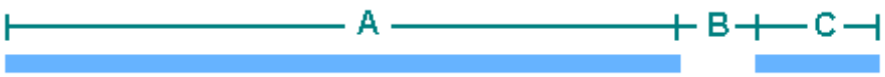
Currently charted civil reservations, MMA's or MPA's administered by the States, Local governments or private interests shall be retained unless they impact the legibility of important charted features. (August, 2011)

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted civil reservation, MMA, or MPA shall not be referred for a Notice to Mariners unless directed by the Chief, Marine Chart Division.

Line Type and Weight:

A civil reservation, MPA or MMA shall be charted with Chart No. 1 symbol N22, as a blue long-short dashed line: 0.15 mm line-weight (.006", SCARS line-weight 1). Spacing for the long short dashed line shall be charted : 8.00 mm long dash/1.00 mm space/1.50 mm short dash (0.32"/.040"/0.06").



A: 8.0 mm
B: 1.0 mm
C: 1.5 mm
Lineweight: 0.15 mm

Example:

The following rules shall apply when the limits of a civil reservation, MPA or MMA and the limits of a Particularly Sensitive Sea Area (PSSA) coincide: (See Section 4.14.7.4.4 Particularly Sensitive Sea Areas).

1. The blue long-short dashed limit line of the civil reservation, MPA or MMA symbol shall be charted.
2. The green long-short dashed limit line of the PSSA symbol shall not be charted.

3. The optional blue screened band of the civil reservation, MPA or MMA symbol shall not be charted.
4. The green screened band of the PSSA symbol shall be charted along the inside of the civil reservation, MPA or MMA symbol.

Location and Orientation on the Chart:

A civil reservation, MPA or MMA boundary shall be charted in the exact geographic positions, as provided by the cognizant requesting authority.

Size and Shape:

A civil reservation, MPA or MMA boundary shall assume the extent and shape of the area it is delineating.

Any new civil reservation, MMA or MPA shall not be charted when it is less than 5.0 mm in any dimension at chart scale.

So as not to negatively impact the legibility of important charted features and information, a civil reservation shall only be charted when the entire name of the area can fit wholly within the

charted boundary of that civil reservation, MMA or MPA. This does not apply to civil reservation, MMAs or MPAs charted prior to August, 2011.

Labels and Notes:

Civil reservation, MPA or MMA names and labels shall be charted in 10 point Swiss Light type if the boundary includes mostly land areas. Where the boundary is mostly water area, they shall be charted with 10 point Swiss Light Italic. Smaller type sizes may be used if necessary.

The area should be labeled consistently on overlapping charts, and smaller type sizes may be used in congested areas.

The label, "*protected area*", "*managed area"* or a similar description as determined from the regulations shall be added in parentheses if appropriate.

When a civil reservation, MPA or MMA is federally regulated, the Code of Federal Regulations (CFR) volume number, the initials "CFR", and the CFR section number shall be charted in parentheses below the area label. A reference to Note A shall be charted only if the Federal regulations governing the area are published in the Coast Pilot.

Normally these regulations will not be published if they do not affect navigation. The cartographer shall check with the Coast Pilot Branch to determine if the regulations are published or will be published in the Coast Pilot. The CFR and Note A references shall be charted in the same size and style as the area name. The following is an example:

When regulations governing non-Federally regulated civil reservation, MPA or MMA are published in the Coast Pilot prior to August, 2011, the reference " *(see Coast Pilot ___) "* shall be charted below the area name in the same type size and style.

For example:

A note giving the text of published regulations or a condensed version of those regulations shall not normally be charted. An exception is detailed in the following paragraph.

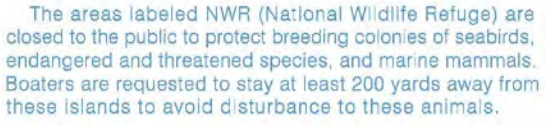
A note giving the text of published regulations with a CFR volume and section number reference shall NOT be charted unless (1) the regulations are published in their entirety or in a condensed version approved by the establishing agency, and (2) the regulations are NOT published in the Coast Pilot and (3) the note was charted prior to August, 2011. The text of the note, if charted, shall be as "NOTE __" in 7 point Swiss Light, set either 2" or 3 ½ " wide.

When a note giving a condensation of published regulations approved by the establishing agency is charted, the reference "*(see note __)*" shall be charted below the area name in the same type size and style. The CFR volume and section numbers shall be given in the note. The entire label shall be in the same type size and style as the area name. The following is an example:

When the charted civil reservation, MPA or MMA is not Federally regulated and no reference can be made to regulations published in the Coast Pilot or other public documents, and the area was charted prior to August, 2011, a brief note highlighting significant regulations may be charted as "NOTE __" in 7 point Swiss Light type, set either 2" or 3 ½ " wide.

When the charted civil reservation, MPA or MMA is not Federally regulated and a note giving significant regulations is charted, the note shall be referenced adjacent to the area name with "*(see note_)*" in the same type size and style as the area name.

Charts showing the boundaries of National Wildlife Refuges shall have a charted note in 7 point Swiss Light type, describing any restrictions for that specific Refuge as designated by the cognizant requesting authority. The following is an example for the San Juan Islands and Protection Island in Washington State:



Each individual National Wildlife Refuge area shall be labeled "NWR" in blue 10 point Swiss Light type with the reference *"(see note)"*.

Color and Screening:

A civil reservation, MPA or MMA long-short dashed limit line and associated labels and notes shall be charted in solid blue.

Civil reservations, MPAs or MMAs may be charted with a 1.0 mm, blue 10 percent, 120 LPI screened band on the inside edge of the entire civil reservation, MPA or MMA outline when needed to avoid potentially confusing portrayal.

For example, where different civil reservations, MPAs or MMAs overlap, the screened band may be used to denote the area of greater importance.

Feature Removal from the Chart:

A charted civil reservation, MPA or MMA shall not be removed until an established authority provides conclusive evidence that the designated area has been rescinded. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports) do not have sufficient authority to declare an area non-existent.

In instances where non-authoritative sources identify a civil reservation, MPA or MMA as not in its charted position, the existence of the feature shall be verified with the establishing authority.

4.14.7.4.4 PARTICULARLY SENSITIVE SEA AREA

Definition: **PARTICULARLY SENSITIVE SEA AREA (PSSA)**. An area that needs special protection through action by the International Maritime Organization (IMO) because of its significance for recognized ecological or socioeconomic or scientific reasons and which may be vulnerable to damage by international maritime activities. [45]

Currently, the only internationally recognized PSSA's in United States waters, established through action by the International Maritime Organization (IMO) are the Florida Keys PSSA and the Papahânaumokuâkea Marine National Monument PSSA.

General Requirements:

A Particularly Sensitive Sea Area (PSSA) shall only be charted when requested by a federal government agency and designated by the International Maritime Organization.

A PSSA is an environmentally sensitive area around which mariners should exercise extreme caution.

A PSSA shall be shown at all chart scales. Those portions plotting within areas that are charted without hydrography shall be omitted.

Any chart application that results in displacement of a shoreline or seaward boundary of a PSSA at chart scale, shall be evaluated in concurrence with the original source documents and other coincident marine boundaries, for consideration of possible movement of the charted PSSA.

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Feature Recommendation for a Notice to Mariners:

A newly designated, amended or revoked PSSA shall be recommended for a Notice to Mariners.

(The remainder of this page is intentionally blank)

Line Type and Weight:

The PSSA boundary symbol shall be charted with a green long-short dashed line, 0.15mm (0.006") in thickness. Spacing for the long-short dashed line shall be charted: 8.0mm dash/ 1.0mm space/ 1.5mm dash (0.32"/.04"/.06").

A green screened band shall be charted along the entire inside edge of the green long-short dashed line component of the PSSA boundary symbol. See "Color and Screening" below for specifications pertaining to the screened band component of the PSSA boundary symbol.
The line symbol and screened band shall be broken only where they would cause confusion in the presentation of more important information. The line symbol and band shall not routinely be broken for soundings, bottom characteristics, type or other detail.

The green long-short dashed line component of the PSSA boundary symbol shall not be charted where it coincides with other charted limit lines, such as the limiting lines for restricted areas, anchoring areas, MPAs, MMAs, etc. The green screened band component of the PSSA boundary symbol shall be charted in conjunction with these other limiting lines where the PSSA boundary coincides with other charted limiting lines.

The following rules shall apply when the limits of a PSSA and the limits of a civil reservation, MPA or MMA coincide:

1. The blue long-short dashed limit line of the civil reservation, MPA or MMA symbol shall be charted.
2. The green long-short dashed limit line of the PSSA symbol shall not be charted.
3. The optional blue screened band of the civil reservation, MPA or MMA symbol shall not be charted.
4. The green screened band of the PSSA symbol shall be charted.

Neither component of the PSSA boundary symbol shall be shown where it coincides with shoreline symbology.

Location and Orientation on the Chart:

A PSSA boundary shall be charted in the exact geographic position, as provided by the requesting federal government agency and the IMO.

Size and Shape:

A PSSA boundary shall assume the extent and shape of the area it is delineating.

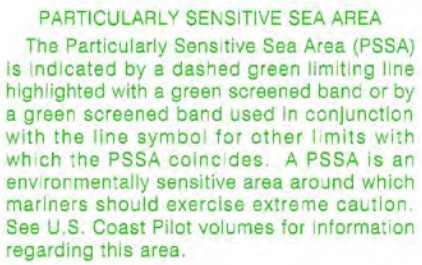
Labels and Notes:

"*PARTICULARLY SENSITIVE SEA AREA*" labels shall be charted in capital letters with 10 point Swiss Light Italic, within the limits of the PSSA, adjacent to the screened band and oriented along the screened band. When the scale of the chart does not permit charting PSSA labels within the PSSA limits, a label may be placed adjacent to the area, oriented with the baseline of the chart.

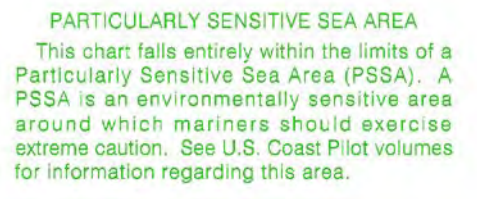
The area should be labeled consistently on overlapping charts, and smaller type sizes may be used in congested areas.

"*PARTICULARLY SENSITIVE SEA AREA*" labels shall be charted with 10 point Swiss Light Italic at three or more appropriate locations in the water area of a chart that falls completely within a PSSA.

A note in 7 point Swiss Light type shall be added to any chart showing any portion of a PSSA boundary line. The note shall be used to explain what the symbol represents and where relevant information can be accessed. The note shall read:


PARTICULARLY SENSITIVE SEA AREA
The Particularly Sensitive Sea Area (PSSA) is indicated by a dashed green limiting line highlighted with a green screened band or by a green screened band used in conjunction with the line symbol for other limits with which the PSSA coincides. A PSSA is an environmentally sensitive area around which mariners should exercise extreme caution. See U.S. Coast Pilot volumes for information regarding this area.

A note in 7 point Swiss Light type shall be added to any chart that falls completely within a PSSA. The note shall be used to alert the chart user to the existence of the PSSA and where relevant information can be accessed. The note shall read:



Color and Screening:

A PSSA long-short dashed limit line and associated labels and notes shall be charted in solid green.

A PSSA shall be charted with a required 1.0mm, green 10 percent, 120-LPI screened band on the inside edge of the entire PSSA boundary.

Feature Removal from Chart:

A charted PSSA shall not be revised or removed until a federal government agency provides conclusive evidence that the PSSA designation has been rescinded.

4.15 Wire-Drags and Wire Sweeps

4.15.1 Wire-Drag Surveys (WD)

Wire-drag surveys are no longer performed by NOS, having been supplanted by more modern methods such as side-scan sonar. However, the cartographer may occasionally encounter wiredrag surveys or field examinations.

A wire-drag is an apparatus used to survey areas where the normal sounding method is insufficient to ensure the discovery of all obstructions, pinnacles, rocks, wrecks, etc., above a given depth, or for establishing a cleared depth in an area over wrecks and obstructions. The drag consists essentially of a buoyed wire towed at the desired width and depth by two ships or launches. The area to be surveyed is usually completely covered with a system of overlapping strips, with the drag set at suitable depths, so that all obstructions within the area are discovered, located, and a minimum depth determined.

The purpose of a WD survey is to discover and chart all obstructions of small extent such as pinnacle rocks, boulders, sharp edges, coral formations, and wrecks which may be dangerous to navigation and which standard hydrographic surveys may fail to reveal.

In general, the drag is used for the following four classes of work:

(1) to determine whether or not apparently clear areas are free from obstructions;
(2) to find all obstructions in a shoal area;
(3) to obtain the controlling depth in a channel; and
(4) to locate and determine depths over submerged wrecks. WD information is used to supplement regular hydrographic surveys in charting.

4.15.2 Wire-Sweep Surveys

A wire-sweep is a modification of the wire-drag and is used in areas where the general depths are greater than the depths to be verified and where few, if any, obstructions are expected. The sweep must also be supplemented by the drag in the examination of obstructions discovered by the sweep. However, these disadvantages are outweighed by the speed of sweep investigations.

4.15.3 Wire-Drag Survey Sheets

The smooth sheets and field sheets for wire-drag and wire-sweep surveys are similar to the sheets used in regular hydrographic survey work. They have polyconic projections, the scale of which depends on the nature of the work. For inshore work, scales of 1:5,000, 1:10,000, and 1:20,000 are commonly used; for offshore work, scales of 1:30,000 or 1:40,000 are usually more suitable.

1. Depth of Drag

Drag depths are referred to the plane of MLLW on the Atlantic coast, the gulf coast, the Pacific coast, and in Alaska. An examination to a depth of 66 feet below the plane of reference is considered sufficient to safeguard surface navigation, but an examination to a depth of 300 feet may be necessary for submarine navigation. Therefore, it is NOS policy to drag inshore areas to an effective depth of 66 feet and in open areas, where general depths exceed 100 feet, to investigate suspected dangers by wire drag with a minimum effective depth of 100 feet.

On the Atlantic coast and in smooth waters elsewhere, a clearance of about 3 feet from the bottom is obtained. On the Pacific coast, where a significant ground swell is usually running, a clearance of about 5 feet is considered sufficient. Obstructions which are dangerous to surface navigation in channels, harbors, and approaches to harbors, are to be cleared by not more than 2 feet; in other areas having general depths of 60 feet or less, a clearance of 3 feet is to be obtained; in depths greater than 60 feet, clearances of 5 feet are acceptable. Obstructions are supposed to be cleared from opposing directions.

4.15.4 Area and Depth (A&D) Sheets

The area and depth sheet, called the "A&D sheet," is an overlay copy of the smooth sheet showing the outer limits of the various swept areas and the interior limits of sections cleared to various depths. It clearly and simply depicts the final results of drag operations and shall be used by the cartographer in place of the smooth sheet when applying a wire-drag survey to a chart.

The outline of each wire-drag strip is transferred directly from the smooth sheet to the A&D sheet. Where subsequent strips with greater depths cover all or part of the same area, the outlines are modified to show the maximum effective depths obtained over the area, as well as to show splits and other defects. The effective depth to which an area has been cleared is identified on the A&D sheet by a distinctive color (see color table). All pertinent soundings, groundings, and notes for each drag are shown.

When wire-dragging an area with overlapping strips, the overlaps at certain points may be insufficient or small areas called "splits" may remain uncovered due to temporary loss of horizontal control, discovery of shoals or obstructions, or drag failure. Where splits occur, they are depicted on the A&D by hachures; the area of the split shall be charted without green tint. Areas of insufficient overlap are outlined on the A&D sheet with a dotted line.

The maximum cleared effective depth is shown in the note, and the sounding is plotted. However, if the shoalest depth obtained is deeper than the effective depth of the drag where the grounding occurred, both the shoalest depth and the maximum cleared effective depth are shown in the note, and the effective depth of the shoalest grounding is plotted.

Cleared areas are surrounded by a line of the color of the effective depth cleared except where they adjoin an area of greater depth. In this case, the common boundary line takes the color of the greater depth. The colors used on A&D sheets to depict the effective depth of wire-dragged areas follows:

Effective Depth (in feet)	**Color**	**Effective depth (in meters)**
1 to 19	Brown	0.3 to 5.8
20 to 29	Green	6.1 to 8.8
30 to 39	Blue	9.1 to 11.9
40 to 59	Red	12.2 to 18.0
60 to 79	Purple	12.3 to 24.1
80 and over	Orange	24.4 and over

4.15.5 Charting of Sweep Areas (I 24)

The outer limits of wire-dragged or wire-swept areas selected for charting shall be shown by a dashed line of solid green color (0.25/4.0/1.0 mm).

Interior limits of sections cleared to various depths shall be shown by a more closely spaced dashed line of solid green color (0.20/2.0/0.75 mm).

Figures indicating the depths to which a section has been cleared shall be shown in 10 pt. Swiss Light Italic type, in solid green, with a solid green wire-drag basket symbol under each figure.

An overall screened (8 percent, 120-LPI) green tint shall be charted to identify swept areas. However, areas not cleared or areas of insufficient overlap shall be charted without green tint.

The following reference note shall be added to all charts showing areas swept by wire drag or wiresweep in solid green in 7 pt. Swiss Light type set 2" or 3½" wide:

WIRE-DRAGGED AREAS

The area tinted green was swept in 19___ for previously undetected dangers to navigation. All dangers found are shown on this chart.

4.15.6 Charting Cleared Depths (K 27, K 42, K f)

The maximum cleared depth over rocks, wrecks, obstructions, or shoals supersedes depths found by other means provided the specifications for clearance tolerances are met and shall be charted thus:

21 *Rk* 21 *Wreck* 21 *Obstn* 21 *h*

A dotted curve and blue tint should be shown as appropriate.

A cleared depth obtained by wire drag will take precedence over a sounding obtained by fathometer. However, a least depth obtained by measured methods, such as by a diver, shall take precedence for charting over a wire-drag cleared depth if it is confirmed as a least depth during final processing and approval.

To denote the maximum clearance obtained over small shoal areas (such as shoals along the coast of Maine), the basket symbol, and bottom characteristic (if available), shall be shown. If no bottom characteristic is available, the term "*shoal*" is to be used:

21 *Shoal*

The charted note under the Symbols and Abbreviations note shall read as follows:

21 Wreck, rock, obstruction, or shoal swept clear to the depth indicated.

For additional information on charting wire-drag and wire-sweep surveys, refer to the Wire-Drag Manual (NOS Publication 20-1) and the NOS Hydrographic Manual.

4.16 Side Scan Sonar

NOS has adopted the modern side scan sonar as an additional tool in the hydrographer's inventory of sensors with which to conduct complete and adequate hydrographic surveys. The basic system consist of a graphic recorder, an electromechanical tow cable, and a towfish containing the acoustic transducers. The transducer produces a sound signal that travels through the water until it strikes something and is reflected back to the transducer and recorded on a high resolution paper printout.

4.16.1 Basic Hydrographic Surveys

Side scan sonar may be required to supplement conventional echo sounding by searching the region between regular sounding lines for additional indications of dangers and topographic irregularities. Examples of features expected to be found are pinnacle rocks, coral heads, boulders, etc. A thorough examination may be required for charted vessel routing schemes, such as; traffic separation schemes, precautionary areas, traffic lanes, shipping safety fairways, etc.

4.16.2 Item Investigation

An item investigation is scheduled through the presurvey review process to examine a specific charted or reported feature. The purpose of the investigation is to prove or disprove the existence of the assigned feature at its charted or reported position, and if found, to determine its exact position, nature, extent, and least depth. Side scan sonar is being used for some item investigations as a tool to allow the hydrographer to determine a charting recommendation on the feature.

4.16.3 Charting Action

Side scan sonar is an acceptable method for detecting objects that have a high likelihood for acoustic detection. Once located, conventional hydrographic examination methods should be employed, including shoal development techniques, direct diver observation, or constant tension wire drag. Each complete examination must result in a positive and explicit recommendation for charting action in the Report of Item Investigation prepared by the hydrographer. Chart compilers will normally apply the results of the hydrographer's work to the charts only when the survey evaluator has concurred with the hydrographer's recommended disposition.

NAUTICAL CHART MANUAL - VOLUME 1 - POLICIES AND PROCEDURES

CHAPTER 5 - NAVIGATIONAL AIDS

U.S. Department of Commerce
Office of Coast Survey

5 NAVIGATIONAL AIDS

Revised on December 7, 2001 by Cartographic Order 021/01 and on December 21, 2001 by Cartographic Order 023/01

5.1 Aid to Navigation vs. Navigational Aid

An **"aid to navigation"** is a man-made structure or device external to a craft, and specifically designed to assist navigators in determining their position or a safe course, or to warn of dangers or obstructions. When the information is transmitted by light waves, the device is a visual aid to navigation; if by sound waves, an audible aid to navigation; and if by radio waves, a radio aid to navigation. Any aid to navigation using electronic equipment, whether or not radio waves are involved, may be considered an electronic aid to navigation. Lights, fog signals, buoys, daybeacons, landmarks, radiobeacons and LORAN-C lattices are the principal aids to navigation shown on MCD charts.

The term **"navigational aid**" is a general term which covers any instrument, device, chart, method, etc., intended to assist in the navigation of a craft. This category encompasses all *"aids to navigation"*, and also includes ranges, course lines, traffic separation schemes, vessel traffic services, ferries and rescue stations, etc.

The term "aid to navigation" should not be confused with the more general term "navigational aid".

5.2 Aids to Navigation

Authorities: The United States Coast Guard (USCG) is the principal authority for establishing and maintaining aids to navigation in U.S. waters. Complete information concerning aids and their characteristics can be found in the United States Coast Guard (USCG) Light Lists. Despite the title, the USCG Light Lists not only provide information on lighted aids, they also include information on fog signals, unlighted buoys, radio-beacons, RDF stations, daybeacons, racons, etc. The Canadian Coast Guard and the Saint Lawrence Seaway Development Corporation are equivalent authorities for waters under their jurisdiction.

Any aid to navigation to be charted which is not established and maintained by the USCG or equivalent authority, shall be identified on the charts either by the label "Priv" or by naming the agency that is responsible for its maintenance.

NOTE: The United Coast Guard Auxiliary is not an authoritative source for the addition or revision of aids to navigation.

Geographic Positions of Aids to Navigation Provided by an NOS Field Survey: NOS Field Party reports which list the geographic positions of lights or daybeacons on NOAA Form 76-40 (*see example on following page*) shall also be considered an official source of an aid revision. When fixed aids are reported as such, it shall be the responsibility of the cartographer to determine the most current and correct position of the aid. The official Date of Location and positional accuracy shall be the primary determinants. The Nautical Data Branch, upon the receipt of such a document, shall furnish USCG Headquarters and the affected USCG local district a copy of the respective form 76-40.

Documents from sources other than the USCG, NOS, the Canadian Coast Guard and the Saint Lawrence Seaway Development Corporation, and which report the addition, revision or deletion of aids to navigation shall be forwarded to the Nautical Data Branch (NDB) for verification with the USCG. Aid revisions reported from non-official sources shall not be applied before documentation citing USCG approval is received in NDB.

The Lateral System: Aids to navigation are not established in navigable waters haphazardly, but are deployed in accordance with a prescribed pattern. The United States has adopted the lateral system, IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities) in which the colors, shapes, and numbers of lights, buoys, and daybeacons are determined by their location in relation to safe water and by the general direction taken by the mariner when approaching port from seaward.

The lateral system of aid to navigation identification is also applied to (a.) offshore buoys and lights located along those coasts and (b.) traffic routes which do not lead distinctly *from* seaward or *toward* headwaters. However, the color and number designations are applied so that even-numbered aids mark the starboard side when proceeding in a southerly direction along the Atlantic coast, in a

northerly and westerly direction along the Gulf coast, and in a northerly direction along the Pacific coast. The aids in the Intracoastal Waterway are similarly marked in the direction proceeding from the north Atlantic states to the lower coast of Texas. These markings are regardless of the compass headings of individual sections of the waterway.

Local Notice to Mariners (LNM) vs. Weekly Notice to Mariner (NM): In general, most changes affecting newly established, revised, or deleted aids to navigation are first applied to a chart from the Local Notice to Mariners (LNM). The Local Notice to Mariners is a publication issued by each United States Coast Guard District for the purpose of disseminating information affecting navigation safety within the district. Although the LNM is usually published weekly, it may be published as often as required.

The LNM shall serve as the primary source document for the application and revision of all aids to navigation falling in United States waters and under the jurisdiction of the USCG.

Example of NOAA Form 76-40: NON FLOATING AIDS OR LANDMARKS FOR CHARTS
(Front)
(*NOTE: Form is not shown true to scale)*

NOAA FORM 76-40
(8-74)
Replaces C&GS Form 567.

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

ORIGINATING ACTIVITY
- ☐ HYDROGRAPHIC PARTY
- ☐ GEODETIC PARTY
- ☐ PHOTO FIELD PARTY
- ☐ COMPILATION ACTIVITY
- ☐ FINAL REVIEWER
- ☐ QUALITY CONTROL & REVIEW GRP.
- ☐ COAST PILOT BRANCH

(See reverse for responsible personnel.)

☐ TO BE CHARTED ☐ TO BE REVISED ☐ TO BE DELETED	REPORTING UNIT *(Field Party, Ship or Office)*	STATE	LOCALITY	DATE

The following objects HAVE ☐ HAVE NOT ☐ been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.	JOB NUMBER	SURVEY NUMBER	DATUM

CHARTING NAME	DESCRIPTION *(Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses.)*	POSITION LATITUDE ° ′	″ D.M. Meters	LONGITUDE ° ′	″ D.P. Meters	METHOD AND DATE OF LOCATION *(See instructions on reverse side.)* OFFICE	FIELD	CHARTS AFFECTED

Example of NOAA Form 76-40: NONFLOATING AIDS OR LANDMARKS FOR CHARTS
(Back)
(*Note: Form is not shown true to scale)*

RESPONSIBLE PERSONNEL		
TYPE OF ACTION	**NAME**	**ORIGINATOR**
OBJECTS INSPECTED FROM SEAWARD		☐ PHOTO FIELD PARTY ☐ HYDROGRAPHIC PARTY ☐ GEODETIC PARTY ☐ OTHER *(Specify)*
POSITIONS DETERMINED AND/OR VERIFIED		FIELD ACTIVITY REPRESENTATIVE
		OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		☐ REVIEWER ☐ QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'
(Consult Photogrammetric Instructions No.64)

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS
Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.
EXAMPLE: 75E (c) 6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED
Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field Identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.
EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.
EXAMPLE: P-8-V
8-12-75
74L (c) 2982

II. TRIANGULATION STATION RECOVERED
When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec. ' with date of recovery.
EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH
Enter 'V-Vis.' and date.
EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

NOAA FORM 76-40 (8-74) SUPERSEDES NOAA FORM 76-40 (2-71) WHICH IS OBSOLETE, AND EXISTING STOCK SHOULD BE DESTROYED UPON RECEIPT OF REVISION.

Newly established aids to navigation shall not be charted unless a Light List number has been assigned to the aid when it is first published in the LNM. As a general rule, only those aids which are now included or shall in the future be included in the USCG Light List, are to be charted on MCD charts. However, aids established by neighboring foreign countries, aids having reliable maintenance authorities (such as those established by the military), and environmental buoys which fall beyond Light List limits may also be charted. In addition, radar reflectors, lights, and sound signals shall continue to be charted for those features which are not specifically intended for use in navigation, whether or not the feature is listed in the Light List. Features in this category include floats, targets, platforms, dredging range markers and data-collecting buoys.

If a new edition of a Light List includes an aid change that was not published in a LNM, the change should be verified by the *Update Service Branch* before the chart is revised.

The Weekly Notice to Mariners (NM) is produced by the National Geospatial-Intelligence Agency (NGA) and is a weekly publication prepared jointly with the National Ocean Service and the USCG. Although this publication also contains information concerning changes in aids to navigation, items affecting navigation safety and selected items from the Local Notice to Mariners, it shall serve as a supplementary source for the application and revision of aids to navigation falling within the limits of MCD charts.

The Weekly Notice to Mariners (NM) shall be used primarily to:

- Apply any additions, revisions and deletions of aids to navigation (and other items) which were not previously reported in a USCG Local Notice to Mariners (LNM).

- Apply all additions, revisions and deletions affecting aids to navigation (and other items) falling under the jurisdiction of neighboring foreign authorities (e.g., Cuba, Mexico, the Bahamas, Russia). *NOTE: "Neighboring foreign authorities", as mentioned in this paragraph, does not include Canada and waters falling under the jurisdiction of the Saint Lawrence Seaway Development Corporation. Changes to aids in these waters shall be provided in the Canadian Notice to Mariners.*

ENC Bulletin. RE: Source Documents for ENC Aids to Navigation

USCG Local Notice to Mariners (LNM), NGA Weekly Notices to Mariners (NM) and fixed aids to navigation listed on NOAA Form 76-40 from NOS Field Party examinations shall serve as the official source documents for encoding all aids to navigation to be displayed on Electronic Navigational Charts. These documents shall not only serve as the official source of recently reported aid additions and revisions, but they shall also serve as the source of information acquired from historical document research, performed for the purpose of ensuring the current status of a previously charted aid is accurately encoded in the ENC database.

Symbolization: The symbols to be used in charting aids to navigation are illustrated in Sections P, Q, R and S of Chart No. 1, Nautical Chart Symbols Abbreviations and Terms. Additional information concerning the proper aid symbolization is provided in the back sections of Chart No.1, pages 96 through 99. The symbols and information presented on these (Chart No. 1) pages are to be used exclusively for charting those aids which are: (a) intended for use in normal navigation and, (b) are listed in the USCG Light List.

NOTE: To chart those aids which are not specifically intended for use in general navigation, and which are not in the USCG Light List, the appropriate landmark symbol and identifying label shall be used.

ENC Bulletin. RE: IHO S-57 Appendix B.1, Annex D

IHO S-57 Appendix B.1, Annex D, is the ENC equivalent to the National Ocean Service's Chart No. 1, Nautical Chart Symbols Abbreviations and Terms. It is the publication which contains the official library of symbols and color specifications of all ENC objects to be displayed on Electronic Chart Display and Information Systems (ECDIS).

Characteristics and Labels: The characteristics of an aid to navigation are the audible, visual or electronic signals displayed by an aid to navigation to assist in its identification. Generally all characteristics of an aid to navigation are charted, except for the specific omissions and exceptions described in this chapter. Characteristics shall be charted in the form of a label and shall be shown in black 7 pt. Swiss Regular Vertical type (fixed aids to navigation) or 7 pt. Swiss Regular Italic type (floating aids to navigation). In congested areas, a type size not less than 5 pt. Swiss Regular may be substituted.

ENC Bulletin. RE: Characteristics of ENC Aids to Navigation

Within the ENC environment, there are several general categories into which the characteristics of aids to navigation are encoded. These categories, called *attributes*, not only identify the characteristics typically portrayed on an MCD chart, they also provide a more thorough description (physical and informative) of the aid as it exists in the real world. For example, an attribute may provide the type of structure supporting the aid, the intended purpose of the aid, the name of the aid and the source (and source date) which establishes, revises or relocates an aid.

Location: All aids shall be charted in the true geographic positions reported in the official source document. **Aids shall not be charted in the positions provided in the USCG Light List.** Aids shall not be moved off ranges or natural objects.

Aids and their identifying characteristics must be charted so as to be readily identifiable by the chart user.

When buoys, daybeacons, and lights are to be charted along channels, the respective symbols (and labels) should be placed so that channel limits are kept clear. Those aids to navigation which are charted along dredged channels and which overprint due to being placed in their true positions, may, with the approval of the Production Branch Chief, be separated by a distance of 0.5 mm. This procedure, however, shall seldom be necessary for many aid symbols are still legible, even when overprinted.

Aids and their identifying characteristics must be charted so that they are identified readily by the chart user and are not obscured by less important information.

ENC Bulletin. RE: Geographic Positions of ENC Aids to Navigation

Within the ENC environment, all aids to navigation shall be encoded at the official geographic position provided in the source document and are not to be moved because of overprinting which may tentatively occur on a paper/raster chart.

Temporary and Seasonal Aids/Changes: Temporary aids shall not be charted unless they have been assigned a Light List number. Exceptions shall be handled on a case-by-case basis. Temporary changes or defects in aids to navigation are also not to be indicated on MCD charts. The following standard “temporary defects” CAUTION note stating this practice, shall be placed on all charts and shall be shown in black 7 pt. Swiss Light type, 2" wide format:

CAUTION
Temporary changes or defects in aids to navigation are not indicated on this chart. See Local Notice to Mariners.

Seasonal aids/changes are those aids and characteristics which are established or changed for the winter navigation season. These changes are also considered temporary and therefore shall not be charted. However, specific details for important aids, such as seasonal fog signals at major aids,

shall be charted in all geographic areas. The following paragraph pertaining to seasonal aids to navigation, shall be added to the "temporary defects" CAUTION note on all charts falling within the Great Lakes and on east coast charts from Cape Henry, Virginia, northward. The entire note shall be shown in black 7 pt. Swiss Light type, 2" wide format and shall read:

CAUTION
Temporary changes or defects in aids to navigation are not indicated on this chart. See Local Notice to Mariners.
During some winter months or when endangered by ice, certain aids to navigation are replaced by other types or removed. For details, see U.S. Coast Guard Light List.

The *Update Service Branch* shall ascertain when the above note is applicable for areas outside the designated geographic areas listed above.

ENC Bulletin. RE: Seasonal ENC Aids to Navigation

Although seasonal aids and changes are considered temporary, and are only provided for on an MCD paper/raster chart through the application of the "seasonal aids" note, seasonal information shall be encoded individually for each affected ENC aid to navigation. The attributes which shall contain the seasonal information are *Status (STATUS), Period Date Start (PERSTA) and Period Date End (PEREND). Status (STATUS)* shall be encoded with a value of five (5) to indicate a periodic/intermittent status of the aid. *Period Date Start (PERSTA)* shall be encoded with the starting date of the active season of the aid. *Period Date End (PEREND)* shall be encoded with the ending date of the active season.

On Alaskan charts, specific details published in Notice to Mariners concerning seasonal aids shall be charted by individual or general notes. Specific details for important aids, such as seasonal fog signals, shall be charted on major aids charted on Alaskan charts.

Radar Reflectors: A radar reflector is a special fixture or reflective material fitted to or incorporated into the design of certain aids. Its purpose is to enhance the aid's capability of reflecting radar energy. Since radar reflectors have been placed on nearly all USCG maintained floating aids, the label "Ra Ref" shall be omitted as part of the charted characteristics of floating aids, and the following general note shall be added to all MCD charts. The note shall be shown in black 7 pt. Swiss Light and shall read:

RADAR REFLECTORS
Radar Reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

Fixed aids to navigation which are equipped with radar reflectors, shall contain the label "Ra Ref" as part of the associated label.

For those features which are not specifically intended for navigation (e.g. floats, targets, platforms, dredging range markers and data collection buoys) and which are equipped with radar reflectors, the label "Ra Ref" shall also be charted as part of the associated label. The "Ra Ref" label shall be charted for these features whether the feature is listed in the Light List or not.

The radar reflector symbol S 4 in Chart No. 1 shall no longer be used on NOS nautical charts.

ENC Bulletin. RE: Radar Reflectors and Aids to Navigation

A radar reflector shall not be encoded as a separate ENC object when the reflector is attached to an aid to navigation. In this situation, the existence of the radar reflector shall be indicated by encoding (with the proper value), the *Conspicuous, radar (CONRAD)* attribute associated with the aid's structure.

Articulated Aids: Articulated aids are designed primarily to mark narrow channels in depths of up to 60 feet. They consist of a vertical pipe structure that oscillates around a universal coupling connected to a sinker. The structure is kept upright by the buoyancy of a submerged flotation chamber.

There are two types of articulated aids which are currently charted by MCD, an articulated light and an articulated daybeacon. See Sections 5.3.3 and 5.6 for more information.

ICW Aids: Where the Intracoastal Waterway (ICW) coincides with another waterway, the USCG uses yellow squares and triangles to indicate lateral significance on dual purpose aids to navigation.

Yellow triangles are used on all buoys and daymarks that should be passed on the starboard (right) side of the vessel.

Yellow squares are used on all buoys and daymarks that should be passed on the port (left) side of the vessel.

Non-lateral aids to navigation such as safewater marks, isolated danger marks and range marks will display a horizontal yellow band.

These yellow triangles, squares and horizontal bands do not affect the symbology of the charted red

or green aids. However, the following notes shall be shown on the appropriate charts depending upon the range of the ICW covered by the chart. The notes shall be shown in magenta, 7 pt. Swiss Light type.

New Jersey ICW - Charts: 12324, 12316

INTRACOASTAL WATERWAY AIDS

The U.S. Aids to Navigation System is designed for use with nautical charts, and the exact meaning of an aid to navigation may not be clear unless the appropriate chart is consulted.

Aids to navigation marking the Intracoastal Waterway exhibit unique yellow symbols to distinguish them from aids marking other waterways.

When following the Intracoastal Waterway southward from Manasquan Inlet to Cape May, NJ, aids with yellow triangles should be kept on the starboard side of the vessel and aids with yellow squares should be kept on the port side of the vessel.

A horizontal yellow band provides no lateral information, but simply identifies aids to navigation as marking the Intracoastal Waterway.

All lights and lighted buoys marking the Intracoastal Waterway on this chart show a flash every four seconds, unless otherwise specified.

The aids marking tributary channels, in general, are maintained by the state of New Jersey.

Norfolk, Va. to Cross Bank, FL. ICW - Charts: 12205, 12206, 11553, 11541, 11534, 11518, 11507, 11491, 11489, 11485, 11472, 11428, 11467, 11451, 11463, 11465

INTRACOASTAL WATERWAY AIDS

The U.S. Aids to Navigation System is designed for use with nautical charts, and the exact meaning of an aid to navigation may not be clear unless the appropriate chart is consulted.

Aids to navigation marking the Intracoastal Waterway exhibit unique yellow symbols to distinguish them from aids marking other waterways.

When following the Intracoastal Waterway southward from Norfolk, Va. to Cross Bank in Florida Bay, aids with yellow triangles should be kept on the starboard side of the vessel and aids with yellow squares should be kept on the port side of the vessel.

A horizontal yellow band provides no lateral information, but simply identifies aids to navigation as marking the Intracoastal Waterway.

Okeechobee Waterway - Charts: 11427, 11428, 11472

INTRACOASTAL WATERWAY AIDS

The U.S. Aids to Navigation System is designed for use with nautical charts, and the exact meaning of an aid to navigation may not be clear unless the appropriate chart is consulted.

Aids to navigation marking the Intracoastal Waterway exhibit unique yellow symbols to distinguish them from aids marking other waterways.

When following the Okeechobee Waterway westward from St. Lucie Inlet to Fort Myers, FL, aids with yellow triangles should be kept on the starboard side of the vessel and aids with yellow squares should be kept on the port side of the vessel.

A horizontal yellow band provides no lateral information, but simply identifies aids to navigation as marking the Okeechobee Waterway.

Caloosahatchee River to Anclote, FL. ICW - Charts 11427, 11425, 11411

INTRACOASTAL WATERWAY AIDS

The U.S. Aids to Navigation System is designed for use with nautical charts, and the exact meaning of an aid to navigation may not be clear unless the appropriate chart is consulted.

Aids to navigation marking the Intracoastal Waterway exhibit unique yellow symbols to distinguish them from aids marking other waterways.

When following the Okeechobee Waterway westward from the Caloosahatchee River to, Anclote, FL, aids with yellow triangles should be kept on the starboard side of the vessel and aids with yellow squares should be kept on the port side of the vessel.

A horizontal yellow band provides no lateral information, but simply identifies aids to navigation as marking the Intracoastal Waterway.

Carabelle, FL. to Brownsville, TX. ICW - Charts 11404, 11402, 11393, 11390, 11385, 11378, 11374, 11372, 11367, 11365, 11355, 11354, 11345, 11352, 11350, 11348, 11331, 11326, 11324, 11322, 11319, 11315, 11314, 11308, 11306, 11303, 11302

INTRACOASTAL WATERWAY AIDS

The U.S. Aids to Navigation System is designed for use with nautical charts, and the exact meaning of an aid to navigation may not be clear unless the appropriate chart is consulted.

Aids to navigation marking the Intracoastal Waterway exhibit unique yellow symbols to distinguish them from aids marking other waterways.

When following theIntracoastal Waterway westward from Carrabelle, FL to Brownsville, TX, aids with yellow triangles should be kept on the starboard side of the vessel and aids with yellow squares should be kept on the port side of the vessel.

A horizontal yellow band provides no lateral information, but simply identifies aids to navigation as marking the Intracoastal Waterway.

Feature Removal: An aid to navigation shall not be deleted from a chart until it has been published as discontinued in a Local Notice to Mariners (LNM), Notice to Mariners (NM) or NOS Field Party report (i.e. NOAA Form 76-40). Non-official sources (e.g., U.S. Power Squadron, U.S. Coast Guard Auxiliary reports and photo-revisions without a field edit) shall not have sufficient authority to declare a feature non-existent. Documents from these sources shall be forwarded to the Nautical Data Branch (NDB) for verification with the USCG. Aid revisions reported from non-official sources shall not be applied before documentation citing USCG approval is received in NDB.

When a fixed aid to navigation has been built on a rock or other isolated feature (i.e., foundation, shoal, ledge, wreck, etc.) and the LNM reports the aid as having been discontinued or relocated, care must be taken to restore these features to the affected nautical charts. The Light List should be consulted to identify any isolated features on which the aid to navigation may have been located. Subsequent verification with the NDB should also be obtained to validate the isolated feature's continued existence.

Automatic Identification System (AIS) Aids to Navigation
Revised by Cartographic Order 001/14 on February 3, 2014

Definition: **AUTOMATIC IDENTIFICATION SYSTEM (AIS).** An automatic communication and identification system intended to improve the safety of navigation by assisting the efficient operation of Vessel Traffic Services, (VTS), ship reporting, ship-to-ship and ship-to-shore operations. [103]

Definition: **VIRTUAL AID TO NAVIGATION.** A virtual aid to navigation does not physically exist but is a digital information object promulgated by an authorized service provider that can be presented on navigational systems. [104]

General Requirements

The Automatic Identification System (AIS) is increasingly being used as an aid to navigation. An AIS-equipped aid to navigation may provide a positive identification of the aid. It may also possess the capability to transmit an accurate position and provide additional information such as actual tide height and/or weather information.

Worldwide, an AIS signal may:

- Actually be transmitted from a physical aid to navigation.
- Appear to be transmitted from a physical aid to navigation, but is actually being transmitted from a remote site.

- Be transmitted from a remote site to appear to be coming from a physically non-existent aid to navigation. This is known as a **virtual aid to navigation.**

The USCG considers a **"Physical AIS Aid to Navigation"** to be an AIS Message representing an aid to navigation that physically exists. USCG considers a **"Virtual AIS Aid to Navigation"** to be a transmitted message representing an aid to navigation that does not physically exist.

AIS aid to navigation transmissions are primarily used to replace floating aids; however the technology has the capability to also represent fixed aids to navigation.

Permanently established AIS aids to navigation (whether associated with a physical aid to navigation or virtual) shall be charted. In congested areas, a selection may need to be made.

Temporary AIS aids to navigation (as identified in the Local Notice to Mariners) shall not be charted.

A station remotely transmitting an AIS signal shall not be charted.

Location and Orientation

AIS aids to navigation shall be charted in the exact geographic position provided by the USCG; typically through the Local Notice to Mariners. In foreign waters, the foreign government shall be the authority unless repeated in the Local Notice to Mariners.

For encoding guidance, see Nautical Chart Manual Volume 3.

Size and Shape

All AIS aids to navigation shall be charted with a 7.1-mm diameter magenta radio circle centered on the position circle of the aid.

For AIS signals transmitted from a physical aid to navigation, or that are remotely transmitted to appear to be transmitted from an aid that physically exists, the symbol for the physical aid (such as a lateral buoy symbol or fixed light) shall be charted with the magenta radio circle centered on the position of the physical aid.

Example:

Minor overlaps of the magenta radio circle are allowable. When congestion of symbols detracts from the readability of the chart, a selection may need to be made.

For a virtual AIS aid to navigation, where the aid does not physically exist, the symbol shall be constructed as follows:

The position of the symbol shall be indicated by a small position circle with central dot.

The position shall be surrounded by a radio circle to indicate that the aid to navigation is a transmitted signal.

The purpose of the aid to navigation shall be indicated with a topmark symbol, equivalent to the topmark that would be appropriate to the equivalent buoy or light (even if the USCG does not typically use a topmark on that particular type of aid). The topmark symbol shall normally be located immediately on top of the position circle. Exceptionally, the "X-shape" topmark should have a short stem separating the "X" from the position circle for clarity.

Examples of Virtual AIS Aid to Navigation Symbols:

Virtual aid to navigation with no known IALA function:

Virtual object marking the port side of a channel or preferred channel to starboard (such as replacing a can buoy):

Virtual object with marking the starboard side of a channel or preferred channel to port (such as replacing a nun buoy):

North Cardinal virtual object which indicates navigable water lies northwards:

East Cardinal virtual object which indicates navigable water lies eastwards:

South Cardinal virtual object which indicates navigable water lies southwards:

West Cardinal virtual object which indicates navigable water lies westwards:

Virtual object representing an isolated danger aid:

Virtual object representing a safe water aid:

Virtual object representing a special purpose mark:

Virtual object representing an emergency wreck marking aid:

Labels and Notes

A physical aid to navigation with an associated AIS signal shall show all the usual characteristic labels of the physical aid followed by the international abbreviation, “AIS”. The “AIS” label shall be magenta and shall be vertical or slanted depending on whether the physical aid if fixed or floating.

A virtual AIS aid to navigation, not associated with a physical aid, shall be labeled, “V-AIS” in magenta, 6 point Swiss Regular type. The type shall be vertical because this is not a physical floating aid to navigation and not subject to drifting.

Paint color (such as used on a green buoy) shall not be charted for a virtual AIS aid to navigation.

Color and Screening

The entire symbol and labeling for a virtual AIS aid to navigation shall be charted in magenta to distinguish the virtual aid to navigation from a physical aid to navigation.

The radio circle and the “AIS” label associated with a physical aid to navigation shall be charted in magenta; otherwise standards for charting the physical aid and characteristics apply.

A charted AIS aid to navigation shall only be deleted when directed by the USCG; typically through the Local Notice to Mariners. In foreign waters, the foreign government shall be the authority unless repeated in the Local Notice to Mariners.

Prudent Mariner and Aids to Navigation Notes:

Prudent Mariner Note - The following prudent mariner warning note shall be charted on all charts and shall be shown in magenta 7 pt. Swiss Light type:

WARNING
The prudent mariner will not rely solely on any single aid to navigation, particularly on floating aids. See U.S. Coast Guard Light List and U.S. Coast Pilot for details.

Aids to Navigation Note - The following aids to navigation note shall be charted on all charts and shall be shown in black 7 pt. Swiss Light type:

AIDS TO NAVIGATION
Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.

5.2.1 Application of Corrections from Notice to Mariners

All corrections applied to the raster chart files from the LNM/NM or other sources shall be shown using standard symbols, notes, and characteristics. Changes to aids are recorded in the NM Update Service CRIT database.

5.2.1.1 Update Service Branch (USB)

The Update Service Branch is responsible for the following:

- evaluating and taking appropriate corrective action in applying LNM/NM changes to the raster chart files.
- recording LNM/NM changes in a CRIT database
- marking each item in the LNM/NM to indicate that the appropriate corrective action has been taken in accordance with established procedures.

- keeping track of the number of corrections made to a chart from a LNM/NM in accordance with the following:

Correction	Numeric Count
(a) **adding** a symbol, its color and characteristics	1
(b) **deleting** a symbol, its color and characteristics	1
(c) **revising** an existing aid location or characteristic	2
(d) **history cross-referencing** (i.e., coordinating the published LNM with the originating source material, e.g., tabulations)	2

- returning the permanent record copy of the LNM or NM immediately to the Nautical Data Branch (NDB) for historic retention and future binding, once the marked copy has been applied to all raster chart files affected.

- retaining reference copies of LNMs/NMs for use in coordinating questionable items with the USCG and NGA.

- making a final determination as to whether items applied to the raster chart files from the production branches and which originated from the Marine Chart Division, should be published in the LNM/NM.

- applying the *Notice Writer* corrections to the Update Service Branch raster files

- performing a cursory check of aids before all raster chart files are sent to reproduction.

5.2.1.2 Production Branch Responsibilities

- The raster production branches shall be responsible for:

- incorporating (into the raster chart files to be forwarded to reproduction), the LNM/NM corrections applied by the Update Service Branch (USB).

- ensuring that there are no overprinted items upon the incorporation of LNM/NM corrections.

- bringing to the attention of the Chief, Update Service Branch any problems arising in the incorporation of LNM/NM corrections so that resolution with the appropriate USCG District and NGA may be made.

- (RE: Recommendations for publication in the LNM/NM): preparing the announcement for publication (i.e. *Notice Writer*), inspecting all recommended items and forwarding to the Update Service Branch items applied to the raster chart files from documents originating with the Marine Chart Division and which are recommended for publication in the LNM/NM. Both the raster chart files and the source document should be forwarded. The Update Service Branch shall make the final determination as to whether the information should be included in the LNM/NM.

- providing a final check of all aids and determining a print date of a chart after all necessary work has been performed by reproduction and the chart is ready for printing.

ENC Bulletin. RE: ENC Responsibilities

❑ **Initial Encoding of a Chart:**

During the initial encoding of a MCD chart, it may be necessary to perform historical document research to ensure the current status of a previously charted aid is accurately encoded in the ENC database. Although LNMs / NMs / NOAA Form 76-40 are the primary source documents for the position and characteristics of aids, two (2) MCD database listings exist which have incorporated changes reported in the LNM/NM /NOAA Form76-40 (and other official sources), and which may facilitate the encoding of all affected aids.

These database listings are the CRIT (Aid to Navigation **CRIT**ical Corrections) and the DIPFILE (**D**iscrete **I**ndependent **P**oint **FILE**).

The CRIT database began in 1987 incorporating aid changes reported in LNMs /NMs and continues today to serve as the official aids to navigation history of cartographic work.

The DIPFILE, established in1972 and maintained until1986 was a database which contained the source and geographic positions of not only all aids to navigation as they existed on MCD charts in 1972 through 1986, it also contained the source and geographic position of other cartographic features such as landmarks, wrecks and obstructions.

To perform the initial encoding of all aids to navigation which are currently charted on a MCD chart, the following resources shall be used and in accordance with the specified order:

(1) CRIT database listing
(2) DIPFILE
(3) the respective chart

❑ **Continual Maintenance:**

During the continual maintenance phase of an ENC, all LNM/NM corrections shall be applied to the ENC database by obtaining the appropriate CRIT database listing and applying all specified corrections. The actual LNM/NM may be obtained to encode aid attributes which are not available on the CRIT listing, but the LNM/NM shall not be used to apply changes independently of the CRIT listing and the Update Service Branch.

When fixed aids are reported on NOAA Form 76-40, it shall be the responsibility of the cartographer to determine the most current and correct position of the aid. The official Date of Location and positional accuracy shall be the primary determinants. The Nautical Data Branch, upon the receipt of such a document, shall furnish USCG Headquarters and the affected USCG local district a copy of the respective form 76-40.

5.2.2 Hurricane and Tropical Storm Warning Note

The following note shall be placed on charts covering any part of Biscayne Bay or Hawk Channel, Florida and the Gulf Coast from Longitude 89° West to Longitude 95° West.

CAUTION

Hurricanes and tropical storms disturb objects on the sea floor and cause considerable damage to offshore structures, aids to navigation and moored vessels resulting in extensive debris being submerged in unknown locations. Wrecks and submerged obstructions may have been displaced from charted locations, and pipelines may have become uncovered or moved due to the force of storm surge. Aids to navigation may not be reliable immediately following such storms. Mariners are urged to exercise extreme caution and are requested to report aids to navigation discrepancies and hazards to navigation to the nearest United States Coast Guard Unit.

This note shall print in black, 7 point Swiss Light style type, set 2 1/2 or 3 inches wide.

5.3 Lights

Lights on fixed structures are placed to assist the mariner in position determination, to mark channels, and to warn of dangers or obstructions to navigation. Lights are identified on charts both by their light characteristics and magenta flare. Lights of different colors and having different sequences and lengths of light and dark periods help mariners distinguish charted lights and locate their position. The source of new or revised light positions and characteristics are generally the LNM and NM, the USCG Light List, and the Canadian NM and List of Lights, Buoys and Fog Signals. See Section 5.4, Buoys, for changes in colors of lights (e.g., the phasing out of white lights) in conformance with the IALA Maritime Buoyage Systems. The symbols used to chart lights are shown in section P of Chart No. 1.

5.3.1 Charting Practices

The position of a light shall be shown by a black 0.75-mm dot, with a magenta flare drawn about 1 mm from the light dot (P 1). The orientation of the flare should be directed toward the label, if possible, and should avoid obscuring other detail. Flare orientation should, in general, be at the same angles as the orientation of buoy symbols (see Section 5.4.1). In the case of a leading light, the flare may be oriented seaward along the line (P 1).

When positions of fixed aids are listed on NOAA Form 76-40, Nonfloating Aids or Landmarks for Charts, the cartographer must determine their correct, current position. Date of location and positional accuracy are the primary determinants. NDB shall furnish USCG Headquarters and the affected USCG Local District with a copy of Form 76-40. MCD shall not initiate a NM in this instance.

The Light List should be consulted when the LNM reports a light has been discontinued or relocated and the light structure removed. If the Light List states that the light was located on a foundation, shoal, ledge, wreck, etc., this feature should be charted. In the case of a discontinued lighthouse, the lighthouse structure itself may be charted as a landmark, e.g., "TOWER (ABAND LT HO)". The symbol "PA" (position approximate) is added when a destroyed light is reported in the NM as having been reconstructed and the exact fixed position has not been established.

5.3.2 Light Characteristics

The characteristics and number of a light should be shown on the digital chart files in the exact position they will occupy on the finished chart. If the name of the light appears in the Light List in bold type and space permits, it should be shown above the characteristics. How the various characteristics of a light, which identify it as fixed or having a particular flash configuration, its visibility and its color, are charted as shown in P 10.1 through P 10.11 in Chart No. 1. Two lights on the same structure should be labeled by their separate characteristics even though both are the same, e.g.:

(Fl R)
(Fl R)

Large-scale charts shall provide complete information as to light characteristics. On smaller-scale-charts charts covering only coastal areas, complete information regarding characteristics should be given for those lights which will be used in coastwise navigation.

1. Charted Characteristics

The various identifying characteristics of lights that are charted are discussed below in general terms. For a complete list of characteristics and their charted abbreviations, see Chart No. 1 and the Light List.

Light Name

The characteristics and number of a light should be shown in 7 pt. Swiss Regular type except in congested areas where 6 pt. type may be used. The light name should be shown in 7 pt. Swiss Regular, vertical type.

Example:

SKUNK BAY LT
F R 210ft
Priv

Flash Characteristics (P 10.1 - P 10.11)

A **fixed light** shows continuously and steadily and is charted with the label "F".

An **occulting light** displays a total duration of light in a period longer than the total duration of darkness and the intervals of darkness (eclipses) are usually of equal duration. An occulting light is charted with the label "Oc".

An **isophase light** shows equal durations of light and darkness and is charted with the label "Iso".

A **flashing light** has a total duration of light in a period shorter than the total duration of darkness and the appearance of light (flashes) usually of equal duration. A flashing light is charted with the label "Fl".

A **group-flashing light** displays a group of flashes, specified in number, regularly repeated, and charted with the label "Fl (3)".

A **composite group-flashing light** is similar to a group-flashing light except that successive groups in a period have different numbers of flashes. A composite group-flashing light is charted with the label "Fl (3+1)".

A **continuous quick light** has regularly repeated flashes of not less than 50 flashes per minute but less than 80 flashes per minute. A continuous quick light is charted with the label "Q".

An **interrupted quick light** has sequences of flashes interrupted by regularly repeated eclipses of constant and long duration. An interrupted quick light is charted with the label "IQ".

An **alternating light** displays different colors alternating and is charted with the label "Al W R".

Color (P 11.1 - P 11.8)

The color of lights shall be shown using abbreviations (R, G, etc.). They shall be charted in 7 pt. Swiss Regular type.

Generally, white lights are not labeled as to color; thus charted lights with no color indication can be presumed to be white. However, where a light exhibits more than one color, including white (as in some sector lights and in alternating lights), the abbreviation "W" must be shown.

Amber lights are charted as yellow, i.e., "Y".

Period (P 12)

The period a light takes to exhibit a full sequence of phases is expressed in seconds, e.g., "15s". Periods will be charted to the nearest tenth of a second expressed as a decimal.

Height (P 13)

The height of a light is the vertical distance between the light source and the shoreline reference datum (normally MHW, see Section 2.8). Height is shown in feet using the abbreviation "ft" except on metric charts, where height is shown in meters using the abbreviation "m".

Visibility (P 14)

A light's visibility is expressed in the Light Lists as the "nominal range." This is the maximum distance a light may be seen in clear weather (meteorological visibility of 10 nautical miles) without regard for the height of the light or the height of the observer. The nominal range is charted in nautical miles in coastal areas, e.g., "10M". The nominal range is charted in statute miles on non-metric Great Lakes charts, e.g., "12StM". On Great Lakes metric charts, nominal range is given in nautical miles, e.g., "10NM". The visibility of range lights shall not be charted.

Converting a Nominal Range from Nautical Miles to Statute Miles

Conversion Value

When converting a nominal range from nautical miles to statute miles, a conversion value of 1.151 shall be used (i.e., 1.151 x (nominal range in nautical miles) = nominal range in statute miles – before rounding). This conversion value is the same value used by the U. S. Coast Guard and also contained in The American Practical Navigator, Publication No. 9, 1995.

> NOTE: The conversion value is computed by dividing the number of feet contained in 1 nautical mile (6,076.11548) by the number of feet contained in 1 statute mile (5,280) and rounding to three significant digits.

Rounding

Resultant decimal values are rounded, not truncated. Decimal values equal to or greater than .5 statute miles are rounded upward to the next whole unit. Decimal values less than .5 statute miles are rounded downward to the whole unit.

Conversion Table

The table on the following page is provided as an alternative to multiplying the nautical mile value by the conversion value. The table provides conversions for all nautical mile values (columns 1 and 3) to statute mile conversions (columns 2 and 4). The table contains statute mile conversions for all nautical mile values from 1 to 100 nautical miles. A value extracted from Table 9 must be rounded according to the established conventions provided in the previous section.

TABLE 9

Conversion Table for Nautical and Statute Miles

1 nautical mile = 6,076.11548 feet Statute mile = 5280 feet

Nautical Miles to Statute Miles				Statute Miles to Nautical Miles			
Nautical Miles	Statute Miles	Nautical Miles	Statute Miles	Statute Miles	Nautical Miles	Statute Miles	Nautical Miles
1	1.151	51	58.690	1	0.869	51	44.318
2	2.302	52	59.840	2	1.738	52	45.187
3	3.452	53	60.991	3	2.607	53	46.056
4	4.603	54	62.142	4	3.476	54	46.925
5	5.754	55	63.293	5	4.345	55	47.794
6	6.905	56	64.444	6	5.214	56	48.663
7	8.055	57	65.594	7	6.083	57	49.532
8	9.206	58	66.745	8	6.952	58	50.401
9	10.357	59	67.896	9	7.821	59	51.270
10	11.508	60	69.047	10	8.690	60	52.139
11	12.659	61	70.197	11	9.559	61	53.008
12	13.809	62	71.348	12	10.428	62	53.877
13	14.960	63	72.499	13	11.297	63	54.746
14	16.111	64	73.650	14	12.166	64	55.614
15	17.262	65	74.801	15	13.035	65	56.483
16	18.412	66	75.951	16	13.904	66	57.352
17	19.563	67	77.102	17	14.773	67	58.221
18	20.714	68	78.253	18	15.642	68	59.090
19	21.865	69	79.404	19	16.511	69	59.959
20	23.016	70	80.554	20	17.380	70	60.828
21	24.166	71	81.705	21	18.249	71	61.697
22	25.317	72	82.856	22	19.117	72	62.566
23	26.468	73	84.007	23	19.986	73	63.435
24	27.619	74	85.158	24	20.855	74	64.304
25	28.769	75	86.308	25	21.724	75	65.173
26	29.920	76	87.459	26	22.593	76	66.042
27	31.071	77	88.610	27	23.462	77	66.911
28	32.222	78	89.761	28	24.331	78	67.780
29	33.373	79	90.911	29	25.200	79	68.649
30	34.523	80	92.062	30	26.069	80	69.518
31	35.674	81	93.213	31	26.938	81	70.387
32	36.825	82	94.364	32	27.807	82	71.256
33	37.976	83	95.515	33	28.676	83	72.125
34	39.126	84	96.665	34	29.545	84	72.994
35	40.277	85	97.816	35	30.414	85	73.863
36	41.428	86	98.967	36	31.283	86	74.732
37	42.579	87	100.118	37	32.152	87	75.601
38	43.730	88	101.268	38	33.021	88	76.470
39	44.880	89	102.419	39	33.890	89	77.339
40	46.031	90	103.570	40	34.759	90	78.208
41	47.182	91	104.721	41	35.628	91	79.077
42	48.333	92	105.871	42	36.497	92	79.946
43	49.483	93	107.022	43	37.366	93	80.815
44	50.634	94	108.173	44	38.235	94	81.684
45	51.785	95	109.324	45	39.104	95	82.553
46	52.936	96	110.475	46	39.973	96	83.422
47	54.087	97	111.625	47	40.842	97	84.291
48	55.237	98	112.776	48	41.711	98	85.160
49	56.388	99	113.927	49	42.580	99	86.029
50	57.539	100	115.078	50	43.449	100	86.898

Source of Table: The American Practical Navigator, Publication No. 9, Defense Mapping Agency Hydrographic/Topographic Center, 1995, Table 9, Conversion Table for Nautical and Statute Miles, page 668.

Number

The assigned number or letter(s) of the structure, if any, should be shown in quotes, e.g., "2".

Privately Maintained (P 65)

In general only privately maintained lights that are listed in the USCG Light List should be charted. If lights established and maintained by private interests are charted, the same guidelines for adding characteristics to USCG lights apply, and they shall be labeled "Priv" in 7 pt. Swiss Regular type. The service name shall be charted on Military aids, e.g., "Navy". On small-scale charts, this information may be omitted if it is charted on one or more large-scale charts covering the area, or where space is extremely limited.

2. Order of Characteristics

On large-scale charts, the characteristics of lights shall be shown in the following order:

Characteristic	Charting Example	Explanation
1. Flash characteristic (including number of flashes in a group flash)	Fl (3)	group of 3 flashes
2. Color (omit if white)	R	red
3. Period	10s	10 seconds
4. Height	85ft	85 feet
5. Visibility	10M	10 miles

The complete legend would appear on the charts in this form:

Fl (3) R 10s 85ft 10M "2"

3. Omission of Characteristics

Small-scale charts should show complete information regarding characteristics for major seacoast lights expected to be used in coastal navigation. However, where congestion is a problem, less important lights may be shown in a more abbreviated format. When this is necessary, omissions of light characteristics shall be made in the following order:

1st, *height*:
Fl (3) R 10s 10M "2"

2nd, *period:*
Fl (3) R 10M "2"

3rd, *number of flashes in group:*
Fl R 10M "2"

4th, *daymark number:*
Fl R 10

5th, *visibility:*
Fl R

5.3.3 Types of Lights

Some of the more common lights shown on nautical charts are described below.

Aeronautical Lights (P 60)

Aeronautical rotating white-and-green navigation lights usually associated with airports are the most dependable lights during their hours of operation that can be shown on the nautical chart. They are often the most conspicuous of the nonstrobe lights and their visibility range is usually greater than that of the lights established for marine navigation. Therefore, when an aeronautical light is recommended for charting, it shall be charted as a light rather than as a landmark. Its position is indicated on the chart by a standard light dot with a magenta flare. The flare is used to emphasize a light's dependability, and thus is also used for USCG aids. The light symbol should be accompanied by its characteristics and the label "AERO".

Since these lights are rotating, they are shown on the chart as "Rot". The color is shown by the standard abbreviations used for nautical lights. The period, height, visibility, and number are not charted.

A file with data for each rotating aeronautical light is maintained in NDB. This file gives the location and color of these lights. The compiler should consult this file before making any changes to charted aeronautical lights. If changes are made, the file should be corrected accordingly and, if necessary, the change should be published in the NM.

Articulated Lights (P 5)

Articulated lights are floating lights. They are basically a vertical pipe structure that oscillates around a universal coupling connected to a sinker. The structure is kept upright by the buoyancy of a submerged floating chamber.

The introduction of this type of aid to navigation, which is neither buoy nor fixed light, required a new symbol for charting. A black open circle 1.0 mm in diameter (the "approximate position" landmark symbol) is centered on the published position with a magenta flare. The open circle is used instead of a dot because the top of the structure may be displaced by an amount exceeding third-order light position accuracy (within 10 feet of its true position or reported to 0.1 second). The articulated light shall be labeled "Art" in Swiss Regular Italic type. The format for charting its characteristics shall be the same as for buoys and daybeacons:

Art " 4"
Fl R 4s

An explanatory note shall be placed on all charts with articulated aids. The note shall be in black 7 pt. Swiss Light type, set 2" wide:

ARTICULATED AIDS
An articulated aid to navigation consists of a pipe structure that oscillates around a universal coupling connected to a sinker. the structure is kept upright by the buoyancy of a submerged flotation chamber. It is designed primarily to mark narrow channels in depths of up to 60 feet. All articulated aids are labeled *"Art"* .

Directional Lights (P 30)

Several types of directional lights are in use, all having a very narrow sector intended to mark a direction to be followed. The narrow sector may be flanked either by obscured or un-intensified light, or by lights of a different color or character.

When the main beam is flanked by obscured or un-intensified light, the central line of the sector shall be charted like a range line (see Section 5.8, Ranges). When the major beam is flanked by a light of a different color or character, the sector limits and arcs shall be charted, if possible.

A directional light normally shows three adjoining sectors of red, white, and green, in that order, reading clockwise. The center white beam is oriented to mark the preferred channel passage and is usually somewhat narrower than the red and green sectors. The bearings that define the arcs of visibility for these lights when looking from the mariner's point of view toward the light are

published in the NM and in the Light List. An easy way to plot these bearings is to place the center point of a compass on the light position dot, rotating the compass until 180E points true north. Then, reading clockwise, the bearings given for the sectors can be plotted. Specific bearings are sometimes not given in the NM or Light List. The bearings may be described as "White when on centerline of channel, red when right and green when left of white beam entering from seaward." In this case, a range line shall be charted down the center of the channel from the light, with red and green sectors shown on their respective sides of the range line.

The red and green sectors are obtained through the use of shields of these colors installed in the lens of the base light. They are shown on the chart by the legends "R SEC" and "G SEC" some distance from the light, within their arc of visibility. Where the chart scale is too small to show the directional light sector, the light symbol only is shown.

The label "Directional Light" should be charted if this term is used in the Light List.

Leading Lights (P 20.1)

A leading light is similar to a range light (Section 5.8), except that it marks a channel with a single light (without a range line or ray lines) rather than with two separate lights. It usually has a high-intensity beam marking the safe channel which diminishes to far less intensity around the remainder of the horizon. It differs from a directional light in that it shows only one color of light instead of the three color sectors of the directional light.

Preferred Channel Lights (Q 130.1)

The light and the dayboard colors on a preferred channel light have lateral significance and provide guidance to the mariner for the channels emerging from a junction point. Primarily, the dayboard is for day use and the light for night use. The light (which may also be a buoy or daybeacon) usually is placed in the "Y" formed by the merging channels. When the preferred channel in IALA Region B is to the left of the light, the light will be red (or white) and the dayboard will be red on top and green (or black) on the bottom. If the preferred channel is to the right of the light, the light will be green (or white) and the dayboard will be green (or black) above red. The colors would be reversed to indicate the preferred channel in IALA Region A.

Sector Lights (P 40, P 42, P 43)

Sector lights are used primarily to warn mariners of dangerous shoals or obstructions hazardous to surface navigation. They are usually red, but may also be white or green. They are charted from the perspective of the mariner looking toward the light and should be plotted in the same manner as described for directional lights, using dashed ray lines to show the limits of each sector. The ray lines should be a reasonable length, though not necessarily to the limits of visibility and in no instance greater than the visibility published in the Light List. The ray lines shall be discontinued when they intersect the shoreline and would no longer be useful.

For obscured sectors (P 43), two bearings are normally given to show the limits of the obscured sector. Both sector lines shall be charted even if part of the sector is obscured by an object higher than the light.

Sector lights aid in safe navigation because the mariner can easily determine whether the vessel is in a safe position based on whether the sector light is visible.

Where the Light List shows different nominal range distances for sectored lights, the shorter of the two distances is charted. The length of charted sector lines are shown to this shorter distance or to the terminating neatline or a land mass.

Strobe Lights

Many charted features are marked with very quick-flashing ultrabright lights. These are produced by a strobe-producing light device, usually a xenon gas condenser-discharge flash lamp or flash tube. Strobe lights are used on certain USCG-maintained aids to navigation and on aeronautical hazards such as stacks, towers, and buildings. The terms "flick" and "flash tube" as used in the LNM are labeled "Strobe" on NOS charts. Aids published in the NM and Light List as well as landmarks with strobe lights, shall include the label "Strobe" as well as the label of the particular feature.

The flash period of a strobe light is usually omitted because of its extremely short duration (considerably less than 1 second). Occasionally an incandescent light will produce a high-intensity short flash characteristic of a strobe light. This usually occurs when lights are equipped with rapidly rotating mirrors or special lenses. Incandescent lights of this type shall be charted as strobe lights. Other high-intensity lights of longer flash duration and not of exceptionally strong candlepower shall not be charted as strobe lights.

Charting Examples

1. A light listed in the LNM as follows:
   Oc (4+1) W, 30s = Fl, 1.0s; Fl, 1.0s; Fl, 1.0s;
   Fl, 1.0s; Fl, 26.0s. (5 flashes)

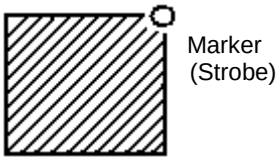
would be charted thus:

2. A lighted buoy listed in the Light List as follows:
   FL W, 4s; FL W, 2.5s (where the FL W, 2.5s is identified as a high-intensity flash tube in the remarks column)

would be charted thus:

3. A stack identified as a landmark with a strobe light would be charted thus:

4. A strobe light used as a marker would be charted thus:



5.4 Buoys

A buoy is a floating object, other than a lightship, moored or anchored to the bottom as an aid to navigation. Buoys may be classified according to:

Shape: spar, cylindrical or can, conical, nun, spherical, barrel, dan or pillar.

Color scheme: red, green, or checkered.

Topmark: fitted with a characteristic shape at the top to aid in its identification.

Sound: characteristic sound signal, may be further classified according to the manner in which the sound is produced, as a bell, gong, horn, trumpet, or whistle buoy.

Light: buoy with a light having definite characteristics for detection and identification during darkness. If the light is produced by gas, it may be called a gas buoy.

Radiobeacon buoy: equipped with a marker radiobeacon.

Sonobuoy: with equipment for automatically transmitting a radio signal when by an underwater sound signal is called a sonobuoy.

Combination buoy: has more than one means of conveying intelligence; it may be calleda lighted sound buoy if it is a lighted buoy provided with a sound signal.

Location: channel, mid-channel, middle ground, turning, fairway, bifurcation, junction, or sea buoy. A bar buoy marks the location of a bar. A buoy marking a hazard to navigation may be classified according to the nature of the hazard, as obstruction, wreck, telegraph, cable, fish net, dredging, or spoil ground buoy.

Special Use: classified according to their use, as anchor, anchorage, quarantine, mooring, warping, swinging, marker, station, watch, or position buoy. A light-weight buoy especially designed to withstand strong currents is called a river buoy. An ice buoy is a sturdy one used to replace a more easily damaged buoy during a period when heavy ice is anticipated.

IALA

The USCG has completed the conversion of U.S. Aids to Navigation to the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Maritime Buoyage System in both Region A and Region B. The IALA system is followed by most of the world's maritime nations. The significant changes are these: black buoys shall be green; black-and-white vertically striped buoys shall be red-and-white vertically

striped buoys; and white lateral lights shall be red or green, as appropriate. See also Section Q of Chart No. 1.

All navigable waters of the United States follow Region B, except U. S. possessions in the western Pacific Ocean west and south of a line extended in a southerly direction along the International Date Line to 10° N latitude, then easterly to 120° W longitude, which follow IALA Region A. Although there are differences in lateral aids to navigation between Region A and Region B, non-lateral aids to navigation are the same in both Regions.

Lateral marks define the port and starboard sides of a route to be followed when proceeding in the conventional direction of buoyage. On entering a channel from seaward, buoys on the starboard (right) side are green or black with even numbers in Region A and red with even numbers in Region B. Buoys on the port (left) side are red with odd numbers in Region A and green or black with odd numbers in Region B. Lights on red buoys may be red or white, while lights on green or black buoys may be green or white; however, white lights have been phased out of the lateral system. Safe Water buoys have red-and-white vertical stripes, are spherical or, in many instances, have a spherical topmark (see Chart No. 1, Q 11, Q d, Q e), and may be passed on either side. Preferred Channel buoys have red-and-green horizontal bands, the top band color indicating the preferred side of passage. Black may still be found in place of red on some safe water buoys, and in place of green on some preferred channel buoys.

Revision to charted aids shall be made on NOS charts from information published in the LNM, NM, Light List, and Canadian NM. Black buoys shall be changed to green and shall be depicted by an open buoy symbol with Green 225 (50 percent, 120-LPI) fill and labeled "G"; red-and-black horizontally banded buoys shall be changed to red-and-green and labeled "RG" or "GR" as appropriate (the top color indicating the preferred side of passage and listed first on the label); the changing of black-and-white vertically striped buoys to red-and-white will also require a change in the accompanying label. On lighted or sound red-and-white buoys only, a spherical topmark (see Chart No. 1, Q 11) may be added. The NM should be carefully examined for the announcement of the addition of such topmarks.

Charts in the process of conversion to the IALA Maritime Buoyage System shall carry one of the following notes. After a chart has been converted, the note shall be removed.

The following note shall be added to all Region A charts going forward:

CAUTION
CHANGES IN BUOYAGE

Mariners are advised that authorized aids to navigation are being changed to conform to maritime standards of the International Association of Marine Aids to Navigation and Lighthouse Authorities Maritime Buoyage System, Region A. Significant changes are: black or green port hand buoys to red with an even number, red starboard buoys to green with an odd number; black and white vertically striped buoys to red and white vertically striped buoys; and lateral lights from white to red and green as appropriate. Changes to aids to navigation will be announced in the National Geospatial-Intelligence Agency weekly Notice to Mariners and the U.S. Coast Guard 14th District Local Notice to Mariners.

The following note shall be added to all Region B charts going forward:

CAUTION
CHANGES IN BUOYAGE
Mariners are advised that authorized aids to navigation are being changed to conform to maritime standards of the International Association of Marine Aids to Navigation and Lighthouse Authorities Maritime Buoyage System, Region B. Significant changes are: black port hand buoys to green; black and white vertically striped buoys to red and white vertically striped buoys; and lateral lights from white to red or green as appropriate. Changes to aids to navigation will be announced in the National Geospatial-Intelligence Agency weekly Notice to Mariners and the U.S. Coast Guard Local Notice to Mariners.

The notes shall be in magenta, 7 pt. Swiss Light, set 3 1/2" wide, and shall be outlined with an 0.008" magenta border 1/8" from the text. The notes will preferably be placed in any prominent location in the top margin. If sufficient margin space is not available (as determined by examination of a trimmed copy of the chart), the notes may be placed anywhere within the chart that will not require the deletion (and later replacement) of charted detail. The notes shall be removed when all nonconforming charted aids to navigation have been converted to the IALA system.

The Canadian Coast Guard (CCG) has completed the implementation of the IALA Maritime Buoyage System in Canadian waters. All charted Canadian aids to navigation should be checked for IALA compliance.

5.4.1 Charting Practices

The position of a buoy is shown with a small circle, the "approximate position" symbol (Q 1), because of practical limitations in positioning and maintaining buoys and their sinkers in precise geographic locations.

Channel buoy symbols should be shown at a 65° angle from the channel lines, with the symbol pointing toward the top of the chart whenever possible. They should be shown in their published position on large-scale charts. A floating aid may be charted off position only on a small-scale chart where it marks the edge of a maintained channel which is charted larger than its true width (that is, one that is exaggerated in width to a minimum size). In this case, the floating aid shall be positioned on the charted channel limit line and not inside the channel. Where a buoy position would coincide with the symbol for another critical feature, such as a rock awash, the buoy may be charted slightly off position, for clarity, but always on the same azimuth to the feature it marks.

Buoy symbols marking the limits of fish trap areas (Section 4.14.2) should be oriented so as to fall inside the area and, in general, at an angle of 65° from the limiting lines.

Except as noted above, the orientation of buoy symbols should be about 25° from the vertical with the symbol inclined toward the label.

5.4.2 Buoy Characteristics

1. Charted Characteristics

The characteristics of buoys (their color and shape and the color and period of their light) should be shown on the digital chart files in the exact position they will occupy on the printed chart. All characteristics shall be abbreviated as shown in Chart No. 1 (Q 2 - Q 71, and a - u) and the Light List. Buoy characteristics shall be shown in 7 pt. Swiss Regular Italic. Buoy numbers and characteristics should be shown clear of rock symbols, shoals, least depths, etc.

Shape and Fog Signal (Q 20 - 26 & a - e, R 10 - 16, R 20 - 22)

Buoys are identified on charts by their shape (can, nun, spherical buoy, spar buoy, or pillar buoy) and by any audible signal they emit (bell, whistle, gong).

Color (Q 2 - 6 & a - n)

All buoys except mooring buoys and black buoys should show their color characteristic using the specified abbreviations. Red buoys are shown with magenta fill labeled "R", green buoys with green fill and "G" label, and black buoys with black fill. The black section of multi-colored buoys is labeled "B". The color of mooring buoys is never shown.

Number (Q 3, Q f, Q g)

The identifying number (or letter) which is painted on the buoy should be shown in quotes, e.g., "22".

Light Characteristics

Lighted buoys are charted with a magenta disc, 2.5 mm in diameter, centered on the circle at the base of the buoy symbol (Q 7). The light is identified by its flash characteristics and color.

Example: "Fl R 4s"

The period (cycle) of lights on lighted buoys is expressed in seconds using the abbreviation "s". Periods shall be given to the nearest tenth of a second as reported by the source.

Privately Maintained Buoys (Q 70)

Private buoys listed in the Light List shall be identified with the label "Priv" in 7 pt. Swiss Regular Italic. The service name shall be charted on military aids, e.g., "Navy". On small-scale charts, or when space is limited, this information may be omitted if it is charted on one or more large-scale charts covering the area. Privately maintained buoys not listed in the Light List generally are not charted.

Radar Reflectors

A radar-enhancing structure or reflective material has been installed on nearly all major buoys and many minor buoys. Reference to this radar reflector should not be charted as part of the buoys' characteristics, but the following note should be included on the chart:

RADAR REFLECTORS

Radar reflectors have been placed on many floating aids to navigation. Individual radar reflector identification on these aids has been omitted from this chart.

2. Order of Characteristics

On large-scale charts, the characteristics of buoys shall be shown in the following order:

1. Color of buoy (omit if black)
2. Number (or letter)
3. Flash character (if lighted)
4. Light color (if lighted)
5. Light period (if lighted)
6. Fog signal

The complete legend would be charted as follows:

Lighted buoy	Unlighted buoy
R "22" *Fl R 4s BELL*	*R* *N "22"*

3. Omission of Characteristics

In congested areas and on smaller-scale charts, omissions of buoy characteristics shall be made in the following order:

Lighted Buoys	Unlighted Buoys
1st, light period:	1st, color of buoy:
R "22" *Fl R 4s BELL*	*N "22"*
2nd, color of buoy:	2nd, number:
Fl R "22" *BELL*	*N*
3rd, number:	
Fl R *BELL*	
4th, light color and flash characteristic:	
BELL	

5.4.3 Types of Buoys

Cardinal Buoys

Cardinal buoys do not have a unique shape, but are normally pillars or spars. They are always painted with yellow and black horizontal bands, and their distinctive topmarks are always black. Lighted cardinal buoys also have a special system of flashing white lights. The rhythms are "very quick" or "quick" flashing, but the flashing phase is broken into varying lengths. Variations in the light characteristics, the order of the painted bands, and the arrangement of the topmarks all serve to identify the area of navigable water relative to the buoy (see Chart No. 1, pages 74 [Q 130.3 - 130.6] and 98 [IALA Maritime Buoyage System - Cardinal Marks Regions A and B]).

The USCG will not use cardinal buoys in its modification of the IALA Buoyage System in the foreseeable future. However, since Canada uses cardinal buoys, the pictorial buoy symbols are required for Great Lakes metric charts.

Nautical charts of the east coast, west coast, and Great Lakes waters that use traditional (non-metric) units shall chart cardinal buoys with a horizontally banded buoy symbol (Q 4). No color will be shown within the buoy symbol, nor will topmark symbols be used. Metric charts of the Great Lakes shall show cardinal buoys with a horizontally banded pictorial buoy symbol along with the proper arrangement of topmarks. See Q 130.3, page 74 of Chart No. 1 for further details concerning cardinal buoys, called "cardinal marks" therein.

Mooring Buoys (Q 40, Q s, Q t)

A **mooring buoy** is a buoy established for the purpose of mooring a vessel, usually by means of a ring fitted to the top of the buoy. For charting purposes, mooring buoys do not include superbuoys.

Small noncommercial, single-boat mooring buoys that are usually used for mooring pleasure craft and do not obstruct traffic or otherwise constitute a hazard to navigation shall not be charted.

Mooring buoys that are to be charted, whether they are lighted or unlighted cans, nuns, spars, or any other shape, shall be shown by the mooring buoy symbol.

Mooring buoys are not generally included in the Light List, but they are charted when they are published in the NM or at the request of the establishing agency.

Pictorial Buoys

NOS uses the CHS pictorial buoy symbols on metric charts of the Great Lakes co- produced with CHS. CHS has recently redesigned these pictorial buoy symbols so that they are now available in two sizes; the larger size is to be used except in congested areas. In addition, some of the buoy symbols are available with either a right-hand or a left-hand slope. The right-hand slope is considered the standard presentation. However, either symbol may be rotated, if necessary, to clear channels or adjacent charted detail. Port-side buoys retain a black fill despite the change of color of buoy itself from black to green. Starboard-side buoys retain a magenta fill. The other pictorial buoy symbols do not employ color fill. CHS also has introduced a new pillar buoy symbol for charting all lighted buoys, except lighted spars and superbuoys, and all sound buoys whether lighted or not. The magenta fog-signal symbol of three concentric arcs (R 1) is no longer used.

Preferred Channel Buoys (Q 4, Q h)

The USCG uses red-and-green horizontally banded buoys to aid in safe navigation at waterway junctions and to mark safe routes past hazardous obstructions. The color of the topmost band of a preferred channel buoy directs the mariner to the side of preferred passage. Thus, in IALA region B, green on the topmost band means the preferred channel is to starboard, while red on the topmost band means the preferred channel is to port. The colors would be reversed to mark the preferred channel in IALA Region A. The correct descriptive label "RG" (when the topmost band is red) or "GR" (when the topmost band is green) shall be shown as part of the charted label. Black may still be found on some aids and shall continue to be charted as such until the change to green for that aid is announced by the establishing authority.

Racing Buoys

These buoys are not usually included in the Light List and should not be charted except by special request. In certain areas where racing buoys are established, the following note shall be shown:

RACING BUOYS
Racing buoys within the limits of this chart are not shown hereon. Information may be obtained from the U. S. Coast Guard District Offices as racing and other private buoys are not all listed in the U.S. Coast Guard Light List.

Safe Water Buoys (Q 11, Q 130.5, Q d, Q e)

The black-and-white vertically striped midchannel, fairway, or safe water buoys are being changed to red-and-white vertically striped buoys. These changes are announced in the LNM. The NM also announces any additions of spherical topmarks on lighted or sound-equipped red and white vertically striped buoys. See Q 11 for the symbol for a spherical topmark.

Superbuoys (P 8, Q 26, Q 58)

The term "superbuoy" usually refers to one of three principal types of buoys:

SPM's (single-point moorings) are large mooring buoys (or tanker terminal buoys) used to moor tankers for offshore loading and unloading.

ODAS (Ocean Data Acquisition System) buoys are used for collecting oceanographic or meteorological information.

LNB's (Large Navigation Buoys) or LANBY's (Large Automatic Navigation Buoys) are usually designed to take the place of lightships.

These superbuoys vary in size from about 21 feet in diameter for some of the SPM's to 33 and 40 feet in diameter for ODAS buoys and 40 feet in diameter for LNB's. Because their large size renders them an unusual hazard to navigation, these buoys shall be emphasized on nautical charts by the use of the appropriate superbuoy symbol.

Superbuoys are identified in the LNM by the following notations:

"LNB" on all items concerning LNB's
"SPM" on all items concerning tanker terminal buoys
"ODAS" on all items concerning anchored oceanographic buoys.

Any buoy identified with the acronym "ODAS" in the source material shall be charted as a superbuoy, regardless of its size.

RY
ODAS "46005"
Fl (4) 20s PA

Non-circular buoys shall be charted as superbuoys if the largest dimension is greater than 16 feet.

The height and visibility of lights shall be charted for LNB's from USCG-supplied information.

Isolated Danger Buoys (Q 130.4, Q h)

These buoys will be erected on or moored above or near an isolated danger which has navigable water all around. The buoy will be horizontally banded black and red with a topmark consisting of two black spheres mounted atop one another. If lighted, isolated danger buoys will exhibit a white light with a group flashing (two flashes) five second characteristic (FL (2) W 5s).

Example: 

BR
Fl (2) 5s

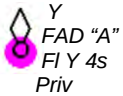
Fish Aggregating Devices (FADS)

In Hawaii, fishery biologists have developed Fish Aggregating Devices (FADS) to attract fish for recreational and commercial fishermen.

These are clusters of submerged hollow spheres tethered to 5-foot diameter spherical buoys, yellow in color, displaying a flashing amber light every 4 seconds. They are anchored to the bottom by heavy concrete blocks, and placed in depths of 480 to 9,000 feet at distances of 2 to 15 miles offshore.

They shall be shown on charts of the Hawaiian Islands.

Example:



5.5 Fog Signals

Fog signals are audible aids used to warn of danger and to provide the mariner with a means of determining a craft's position when visibility is obscured by fog, snow, rain, smoke, or thick weather. Among the devices in common use as fog signals are the following:

Diaphones produce sound by means of a slotted reciprocating piston actuated by compressed air. "Two-tone" blasts consist of two tones of different pitch, beginning with a high-pitched blast and ending on a low pitch.

Diaphragm horns produce sound by means of a disc diaphragm vibrated by compressed air or electricity. Sirens produce sound by means of either a disk or a cup-shaped rotor actuated by compressed air or electricity.

Whistles produce sound by compressed air emitted through a circumferential slot into a cylindrical bell chamber.

Bells produce a distinctive sound by the vibration of a hollow, cup-shaped metallic vessel which gives forth a ringing sound when struck.

Gongs produce a sound by the vibration of a resonant disc excited by a blow.

Each fog signal has specific characteristics by which it can be distinguished (see section R of Chart No. 1). The signal characteristic is the phase relationship of the recurring sound emissions. Fog signals on fixed stations and large navigational buoys produce a specific number of blasts and silent periods each minute, when operating, to provide positive identification. Fog signals on buoys are generally activated by the motion of the sea; therefore, they do not emit regular signal characteristics and, when the sea is calm, may emit no sound signals.

Fog signals are labeled as "DIAPHONE", "HORN", "SIREN", "WHISTLE", "BELL" or GONG". The appropriate designation should be spelled out as part of the characteristic of the aid. The characteristics of a grouped sound signal shall be charted using the same guidelines as for a grouped light, e.g., HORN (3) 20s.

5.5.1 Radio Activated Sound Signals (MRASS and RRASS)

Last revised by Cartographic Order 009/14 on June 16, 2014 and on August 13, 2015 by CO 004/15

Traditionally, USCG sound (fog) signals that were not wave actuated either sounded continuously or were activated by means of an electronic fog detector. The fog detector is a microprocessor controlled meteorological instrument capable of measuring visibility through the atmosphere. Continuous operating and electronic fog detector controlled sound signals have a large power consumption footprint. In addition, electronic fog detectors can be unreliable when their sensors become obscured by moisture, dirt, corrosion, or other substance.

To ensure a more reliable sound signal with smaller power consumption, the USCG has begun to replace continuously operating and electronic fog detector sound signals with Mariner Radio Activated Sound Signals (MRASS) and Remote Radio Activated Sound Signals (RRASS) devices.

An MRASS is activated by mariners keying their VHF radio 5 times on a designated channel (either 81A or 83A). Once activated, the sound signal will sound for a predetermined amount of time (30, 45 or 60 minutes) and then turn off.

An RRASS that requires mariner interaction is activated by contacting a USCG unit or local harbormaster on VHF-FM Channel 16 and requesting the sound signal be activated.

The procedure for activating MRASS and RRASS equipped sound signals is specified in the USCG Light List for each signal so equipped. The USCG shall be considered the authority for sound signals and MRASS and RRASS equipped sound signals shall be charted when they appear in the Local Notice to Mariners.

Mariner Radio Activated Sound Signals shall be labeled, "(MRASS)" immediately following the type of device, such as HORN or DIAPHONE and the characteristic of the sound signal.

Example:

RAVEN I LT
Fl 10s 90ft 10M
HORN (3) 30s (MRASS)

Remote Radio Activated Sound Signals shall be labeled, "(RRASS)" immediately following the type of device, such as a HORN or DIAPHONE and the characteristic of the sound signal.

Example:

JONES PT LT
Fl 10s 80ft 10M
HORN (3) 30s (RRASS)

Any chart indicating the presence of MRASS or RRASS shall carry a note describing the action the mariner needs to take to activate the signal. The note shall be deleted from the chart with the first new edition after December 31, 2018. Each note will need to be customized based on the

name of the aid, the number of user activated sound signals, the radio channel(s) used, and the types (MRASS or RRASS) charted. Notes referring to MRASS shall be titled, "MARINER ACTIVATED SOUND SIGNAL(S)." Notes referring to RRASS shall be titled, "REMOTE ACTIVATED SOUND SIGNAL(S)." Mariner activated sound signal notes and remote activated sound signal notes shall not be combined into one note.

Examples:

MARINER ACTIVATED SOUND SIGNAL

BLUE POINT LT - (MRASS) Horn is activated by keying the mic 5 times on VHF-FM Channel 83A. Horn will operate for 30 minutes.

MARINER ACTIVATED SOUND SIGNALS

BLUE POINT LT - (MRASS) Horn is activated by keying the mic 5 times on VHF-FM Channel 83A. Horn will operate for 30 minutes.

MILLER HEAD LT - (MRASS) Horn is activated by keying the mic 5 times on VHF-FM Channel 81A. Horn will operate for 45 minutes.

REMOTE ACTIVATED SOUND SIGNAL

JOHNSON ISLAND LT - (RRASS) The sound signal can be activated upon request to the USCG via VHF-FM Channel 16.

REMOTE ACTIVATED SOUND SIGNAL

OLD BAY ENTRANCE LT - (RRASS) The sound signal can be activated upon request to the harbormaster via VHF-FM Channel 16.

When five or more MRASS are located on one chart, the note shall refer to the USCG Light List.

Example:

MARINER ACTIVATED SOUND SIGNALS
Sound signals labeled with (MRASS) require user activation. See USCG Light List.

When there is limited space a generalized note pointing to the USCG Light List can be used when there are less than five MRASS buoys.

For the ENC the MRASS shall be encoded on each individual feature.

When five or more RRASS are located on one chart and all require a request to the USCG using the same radio frequency, the following note shall be used:

REMOTE ACTIVATED SOUND SIGNALS
Sound signals labeled with (RRASS) can be activated upon request to the USCG via VHF-FM Channel 16.

When five or more RRASS are located on one chart but require different actions such as a request to the USCG for four signals and a request to the harbormaster for another, the following note shall be used:

REMOTE ACTIVATED SOUND SIGNALS
Sound signals labeled with (RRASS) require user activation. See USCG Light List.

When there is limited space a generalized note pointing to the USCG Light List can be used when there are less than five RRASS buoys.

For the ENC the RRASS shall be encoded on each individual feature.

5.6 Daybeacons

Daybeacons are unlighted fixed aids to navigation placed either on shore or in the water. They are established and maintained by the USCG and are identified on charts by their color and shape. Some daybeacons have reflective borders to enable navigators using a searchlight to more readily locate them at night. These reflectors are the same color as the aids.

Daybeacons (Q 80 - 83, Q r)

Where daybeacons are charted, they shall be shown on the raster chart files in their true position by the standard square or triangular symbol. The center of the daybeacon symbol is the aid's correct geographic position.

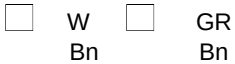
The standard symbol to depict triangularly shaped dayboards is a triangle 2.0 mm on each side. A 1.5-mm triangle may be used as an alternative. Non-triangular dayboards, i.e., square, rectangular, round, octagonal, or diamond-shaped dayboards, are all charted with the standard square daybeacon symbol. This is a square 1.65 mm on each side (or a smaller 1.3-mm square).

Examples: 

The larger symbols should be used wherever possible. The smaller symbols are to be used only in very congested areas to improve symbol legibility by reducing overlap with other symbols and detail and to avoid symbol displacement. The two sizes of symbols should not be used in close proximity to one another.

Triangular daybeacons marking the starboard (right) side of a channel shall be shown with a green fill in IALA Region A and a magenta fill in IALA Region B; triangular daybeacons of any other color shall be shown as open triangles with colors and identifying numbers or letters included in the label.

Square daybeacons marking the port (left) side of a channel shall be shown with magenta fill in IALA Region A and a green fill in IALA Region B. Square symbols for other colors of daybeacons will be shown as unfilled squares and labeled as to color and identifying numbers or letters.

Examples: 

The abbreviation "Bn" should be used only to depict beacons which do not have identifying numbers or letters. In congested areas, the legend "Bn" may be omitted, but the color designation should be retained. The color abbreviation shall be shown and placed above the identifying number, or above or after "Bn". Identifying numbers or letters are included in quotes.

Example:  G
Bn

A daybeacon's characteristics are shown in 7 pt. Swiss Regular type.

Private beacons listed in the Light List shall be charted and labeled "Priv" in 7 pt. Swiss Regular type. On small-scale charts or when space is limited, this information may be omitted if charted on one or more large-scale charts covering the area. Privately maintained beacons not listed in the Light List generally are not charted. However, see also Section 5.6, Markers.

Articulated Daybeacons

An articulated daybeacon is structurally similar to an Articulated Light. Both consist of a vertical pipe structure that oscillates around a universal coupling connected to a sinker, and is kept upright by the buoyancy of a submerged flotation chamber.

The introduction of this new type of aid to navigation requires a new chart symbol. Because of the structural similarities to the articulated light and the oscillating characteristics, the 1.0 mm diameter approximate position circle must be centered along the base of the fixed symbol representing the published position. The color fill for this new articulated daybeacon symbol shall be the same as the fill on the fixed daybeacon symbol; it shall not be broken for the 1.0 mm circle. The articulated daybeacon shall be labeled "Art", caps and lower case Swiss Regular Italic type style. The format f or charting characteristics shall be the same as for fixed daybeacons:

 *Art G*
"5"

 *Art R*
"12"

An explanatory note shall be placed on all charts with articulated aids. The note shall be in black 7 pt. Swiss Light type, set 2" wide:

ARTICULATED AIDS

An articulated aid to navigation consists of a pipe structure that oscillates around a universal coupling connected to a sinker. The structure is kept upright by the buoyancy of a submerged flotation chamber. It is designed primarily to mark narrow channels in depths of up to 60 feet. All articulated aids are labelled *"Art"*.

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5.7 Markers

The term **"marker"** generally refers to any private fixed aid to navigation (lighted or unlighted) erected to mark minor channels. Such markers are not established or maintained by the USCG and are not listed in the Light List.

The term may also refer to markers having other specific purposes, e.g., measured mile marks or dredging range markers.

A marker's purpose, status, position, date of establishment, the agency or person who established it, and whether the aid is maintained should be determined before a marker is charted.

The position of recently established markers should be confirmed by NOS field parties, but they may be charted during the interim without this confirmation if the source is deemed valid.

Markers (B 32, B 33, P 3, Q 101)

Markers established and maintained either privately or by State or local governments shall be charted with the accurate landmark symbol and the label "MARKER", if the position meets third-order triangulation standards (within 10 feet of its true location or reported to 0.1 second).

A marker that does not meet these accuracy standards may be charted with the "position approximate" symbol and label "Marker".

Example:  Marker

The label "(lighted)" shall be added if the marker is lighted (P 3).

5.8 Ranges

Revised on November 15, 2011 by Cartographic Order 005/11.

RANGE. Two or more objects in line. Such objects are said to be in range. An observer having them in range is said to be on the range. [17]

(a) In hydrographic surveying, a range formed by two objects on the shore, if suitably located, aids in keeping a boat moving in a straight line—the line defined by the range. (b) In navigation, specially placed structures or objects mark ranges delimiting channels which are to be followed by vessels so as to be clear of dangers. Such structures are often permanently placed and suitably lighted, and are given indentifying names, e.g., Honolulu Channel Front Range Light and Honolulu Channel Rear Range Light. [29]

LIGHTED RANGE. A range marked by lighted navigational aids. [29]

NATURAL RANGE. Two “natural” objects (e.g., tanks, steeples, towers, cupolas, etc.) directly in line used to delimit a range line of a channel. [29]

UNLIGHTED RANGE. A range marking a secondary channel by unlighted aids (i.e., marked by two aligned daybeacons forming the range pair as opposed to lights). [29]

Two or more objects in alignment can provide mariners with a very accurate and easily obtained line of position called a "range line" (often shortened to “range”) or "leading line." The usefulness of ranges in providing a course for the mariner has led to the establishment of man-made ranges. These usually take the form of two separate lights (a front light and a rear light) mounted on skeleton towers or poles, with vertically striped daymarks. These ranges may be further defined--some areas showing both the inbound and outbound courses of the channel.

Daybeacons and other charted objects forming the sight points on a range are often called "leading marks." Range lights are often called "leading lights."

Ranges are normally aligned with the center of the channel, but it is important to remember that this is not always the case. The USCG may offset ranges from the centerline of the channel for a variety of reasons. Thus, **only ranges published in the Light List shall be charted, and they shall be charted in the exact position given by the USCG**.

Charted ranges with positions that differ from the positions provided by the USCG shall be entered into the Office of Coast Survey’s internal Inquiry and Discrepancy Management System, whereupon a USB cartographer shall contact the USCG for further information. When the USCG verifies that the published positions are correct or provides updated positions, USB will relocate the aids and the range.

USB shall contact NDB when a change in the position of aids alters a range line in such a way that it follows bearings that make channel limits look suspect. NDB will in turn notify USACE with the data so that they may re-examine their channel framework.

Range Lines (M 1)

Range lines shall be extended from the midpoints of the aids to navigation that mark the range. The range line shall always be a straight line. The usable portion of ranges shall be shown by a solid line to the point where the vessel should leave the range. From that point, the range shall be continued with a short-dashed line to the rear navigational aid.

Bearings of ranges shall no longer be charted. Charted bearings shall be removed.

In the event of extreme shoaling or shoaling over a large area in an improved channel, range lines may be dashed or even omitted through a shoaling area that is depicted by hydrography.

Range Lights (P 20.1)

Range lights, or leading lights, are pairs of lights forming a range to mark a preferred channel or entrance to a harbor. The rear light is higher than the front light and a considerable distance behind it; the mariner uses the range by keeping the lights in line as the vessel progresses along the channel. High-intensity range lights are sometimes used to aid in daylight navigation. Otherwise, the range light structures are equipped with dayboards for daytime use.

Range lights may be of any standard light color or period, the principal requirement being that they stand out from their surroundings. Most range lights show a high-intensity beam within only a very narrow arc of visibility marking the channel centerline and are obscured around the remainder of the horizon. Most range lights appear to lose brilliance rapidly or become totally obscured as a ship diverges from the range line. Range-marking lights are often visible miles beyond the length of the channel they are marking. This strong beam is necessary to ensure

visibility in even the most adverse weather conditions. The visibility range of range lights shall not be charted.

Where the scale is too small to chart a pair of range lights individually, they should be shown with one light dot and labeled, for example, "2F".

Passing Lights

A passing light is generally used on the front light of a range whose structure is located in the water. It serves as an extra precaution to alert mariners to the existence of the range light structure when approaching the light from its dark side at night. (The range light normally is a strong narrow beam visible only along the channel being marked.) Not all range lights with structures physically located in the water have passing lights; usually they are placed light structures that are located some distance from other channel aids, where heavy traffic is expected, or at potential danger points. Since the passing light is of secondary importance to the range light, its characteristics are charted on a separate line below the range light label, thus making the charted label match the order used by the USCG in the Light List. A passing light's visibility as listed in the Light List should be included in the label. Passing lights on unlighted ranges formed by daybeacons are generally not charted. Those selected for charting shall be labeled ("lighted").

Unlighted Ranges (Daybeacons) (Q 120)

Some secondary channels have unlighted ranges marked by daybeacons. The range line shall be charted in the same way as a lighted range. Unlighted ranges may have passing lights.

Dredging Ranges

The USACE has established ranges in some areas to control channel maintenance dredging.

These ranges (often unlighted) are not intended for navigation and shall be identified only as a "DREDGING RANGE". Such structures should be charted as landmarks using the appropriate accuracy symbol and the identifying label. If the dredging structure is listed in the Light List, the label may carry listed light and fog signal information.

Natural Ranges

Tanks, steeples, towers, cupolas, etc., may form natural ranges which chart users sometimes recommend for charting. Natural ranges shall not be charted unless recommended by the USCG and published in the LNM.

Intracoastal Waterway Aids to Navigation

(See Section 5.2)

5.9 Courses

Courses, also called tracks, are a long-established feature on some nautical charts. They are usually established in rivers, bays, and other inshore waters and are used primarily to help mariners avoid shoal depths rather than to regulate shipping movement. The use of courses is generally left to the discretion of the mariner and will depend on the vessel's draft, the state of the water level, adequacy of navigational aids, etc. Charted courses shall not be repositioned on a chart unless recommended by the agency which has jurisdiction for establishing that particular course. When safe passage along certain parts of a course is questionable due to changing conditions, those sections shall be deleted from the chart. Courses may be part of general routing systems (see Section 5.10).

Bearings charted along courses must be true and not magnetic and shall be charted in degrees and tenths of a degree. However, quarters of degrees listed in the Light List shall be charted as given. Bearings measured from the chart must agree with bearings stated on the chart, in the Light List, and in Coast Pilots. Bearings charted along two-way courses must be reciprocal.

Distances along courses, if charted, may be in statute miles or nautical miles depending on the recommendation and the data submitted by the authorizing agency. Charted distances shall be given in miles and tenths of a mile. A 1/4 mile distance shall be charted as 0.2 mile and a 3/4 mile distance shall be charted as 0.7 mile.

Mileage ticks along courses have been charted in some areas and are usually furnished by the authorizing agency. Mileage ticks are generally charted in statute miles at either 1-mile or 5-mile intervals, depending on the scale of the chart. Other subdivisions of benefit to the chart user may also be charted. The distance between mileage ticks should be at least 5 cm but not greater than 25 cm. At scales larger than 1:30,000, 1-mile intervals should be used. At smaller scales, 5-mile intervals should be used. Mileage ticks shall be in magenta, 2 cm in length, 0.2-mm lineweight, perpendicular to and centered on the recommended course. The mileage designation shall be in 7 pt. Swiss Regular Italic and charted in this format "St M 125". The mileage label should be placed along the tick, but may be moved perpendicular to the recommended course to clear charted detail. Mileage ticks and labels shall be deleted when accompanying sections of recommended courses are deleted as the result of changing conditions.

For charts that show mileage ticks only, the orientation of the ticks shall be along the natural channel and shall follow the guidelines stated in the previous paragraph.

A magenta dot shall not be charted at the intersection of the mileage tick and the recommended course or to indicate the location of a natural channel where the mileage tick only is charted.

5.9.1 Recommended and Alternate Courses

Recommended Courses Marked by Aids (M 3)

Recommended courses marked by fixed or floating aids shall be charted with an 0.2-mm solid magenta line based on data furnished by the agency that has jurisdiction for establishing the course

(M 3 Supplementary National Symbol). Traffic-flow directional arrows may be inserted at regular intervals along the line, if recommended. A two-way course should have opposing pairs of arrows inserted at regular intervals.

Recommended Courses Not Marked by Aids (M 4)

Recommended courses that are not marked by fixed or floating aids shall be charted with an 0.2-mm dashed magenta line, again based on data furnished by the agency that has jurisdiction for establishing the courses. The dash length shall be 2.0-mm with an 0.75-mm space between dashes. The same criteria for adding arrows to indicate the direction of traffic flow apply as for courses marked with aids.

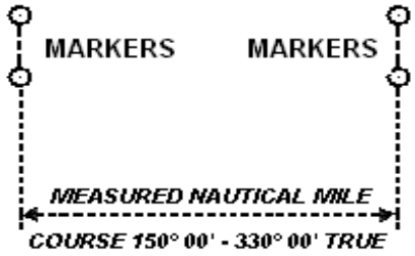
Alternate Courses (M c)

An alternate course is a secondary course available to shallower draft vessels. Usually an alternate course will rejoin the recommended course.

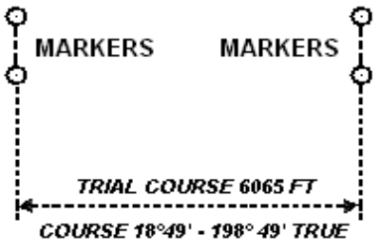
An alternate course shall be charted with a dashed magenta line whether or not it is marked by aids to navigation. Arrows should be used to indicate the direction of traffic flow if so recommended.

5.9.2 Trial Courses (Q 122)

A trial course is a course at sea, the ends of which are marked by ranges ashore and the length of which has been accurately measured. Trial courses are used by vessels to calibrate logs, engine revolution counters, etc., and to determine speed. Reciprocal bearings shall be charted. Standard landmark symbols shall be used to mark the ranges ashore. When the measured distance is within 6 feet of the standard value for a nautical mile (1,852 meters or 6,076.1 feet), a trial shall be charted as shown in figure below.



When the measured distance of the course differs from the standard value by more than 6 feet, the actual measured distance must be stated as shown in the figure below.



5.10 Routing Systems

Routing systems are measures aimed at reducing the risk of casualties. They include safety fairways, traffic separation schemes, course lines, and recommended tracks. Note that recommended tracks are discussed in Section 5.9.1.

5.10.1 Safety Fairways

Shipping safety fairways and fairway anchorages have been established to provide unobstructed approaches for vessels using U.S. ports. They will be charted with a solid magenta line and a magenta label which includes the appropriate CFR number.

1. Shipping Safety Fairways

Shipping safety fairways have been established to control the erection of structures in the approaches through oil fields in the Gulf of Mexico to entrances to the major ports. No artificial island or fixed structure, whether temporary or permanent, is permitted in these fairways. Temporary underwater obstructions may be permitted under certain conditions as described for specific areas in 33 CFR 166. USCG-approved aids to navigation may be established in a fairway.

2. Fairway Anchorages

A fairway anchorage is an anchorage area contiguous to and associated with a fairway. Fixed structures may be permitted within certain spacing limitations, as described for specific areas in 33 CFR 166. The limits of such an anchorage are shown by a solid 0.5-mm magenta line.

5.10.2 Traffic Schemes

The USCG is responsible for the design and development of routing systems under guidelines established by the IMO. Routing schemes adopted for international use by the IMO are published in Ships' Routing along with a description, geographic positions, and a map. A copy of Ships' Routing with current amendments is maintained in MCD.

The purpose of routing systems is to improve the safety of navigation in converging areas and in areas where the density of traffic is great or where the freedom of movement of shipping is inhibited by restricted sea room, the existence of obstructions to navigation, limited depths, or unfavorable meteorological conditions. The precise objective of any routing system will depend upon the particular hazardous circumstances which it is intended to alleviate. All traffic schemes described below shall be charted in magenta with magenta labels and notes.

5.10.2.1 Vessel Traffic Service Areas

Vessel Traffic Services (VTS), operated by the United States Coast Guard, enhances navigation, vessel safety, and environmental protection, and promotes safe vessel movement by reducing the potential for collisions, rammings, and groundings, and the loss of life and property associated with these incidents.

VTS provides the mariner with information related to safe navigation. This information coupled with the mariner's compliance with the provisions set forth in 33 CFR, Part 161, Vessel Traffic Management, enhances the safe routing of vessels through congested and hazardous seaways. Some of the information provided covers hazardous conditions, traffic density, aids to navigation status, anticipated vessel encounters, anchorage availability, temporary measures, and harbor operations.

The Marine Chart Division is responsible for identifying, labeling, and referencing VTS information on its nautical products.

CHART PORTRAYAL: VTS notes and labels will be included on all affected charts as new editions are printed. When appropriate, a Notice to Mariners will be issued.

BOUNDARIES AND GEOGRAPHIC AREAS. VTS boundaries are not recommended. Instead, VTS labels are judiciously located within VTS areas on the nautical chart. 33 CFR, 161.25 through 161.60 should be consulted for location of these areas. VTS Special Areas can be defined with a magenta dashed line: 0.2/2.0/0.75mm. Only the VTS Special Area labels should reference the CFR Section number.

MONITORING AREAS are not charted. Radio frequencies or call signs are not referenced except as written in VTS notes for San Francisco and Puget Sound.

All Radio **REPORTING POINTS** (Calling-in Points) showing direction(s) of vessel movement with designation shall be charted. Charts displaying the reporting points shall include a "call-in point" note. See Section 5.10.2.2, Traffic Separation Schemes, Calling-in Points for example notes.

Individual references to VTS CFR sections should not be charted in Precautionary Areas, Traffic Separation Schemes, and VTS labels. Individual references to VTS CFR sections should be charted in VTS Special Areas.

Notes and labels shall be magenta. Notes shall be 7 point Swiss Light and set 2 ½" wide. Labels should be Swiss Regular Italic, 7-10 points.

PUGET SOUND VTS NOTES

On Charts approaching the Strait of Juan de Fuca, 531, 18003, 18007, 18400, 18460, 18480, 18485, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in this area (Call Sign Seattle Traffic). The western boundary for VTS Puget Sound area is at 48° 23' 08"N, 124° 43' 37"W to 48° 23' 30"N, 124° 44 ' 12"W, then due west to the territorial sea boundary, thence northward to its intersection with the United States / Canadian International Boundary line. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual.

On charts with both U.S. and Canadian waters, 18421, 18423, 18431, 18432, 18433, 18465, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the U. S. waters covered by this chart. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual.

On charts approaching Strait of Juan De Fuca and with both US and Canadian waters, 18400, 18421, 18423, 18431, 18432, 18433, 18460, 18465, 18480, 18485, add:

NOTE _
A Cooperative Vessel Traffic Services (CVTS) system has been established by the United States and Canada within the adjoining waters in the Juan de Fuca Region. The appropriate Vessel Traffic Center (VTC) (Tofino Traffic, Seattle Traffic, Vancouver Traffic) administers the rules issued by both nations, however, it will enforce only its own set of rules within its jurisdiction.

Add label:

COOPERATIVE VESSEL TRAFFIC SERVICES
(see note _)

On charts with US waters exclusively 18424, 18427, 18428, 18429, 18430, 18434, 18441, 18443, 18444, 18445, 18446, 18447, 18448, 18449, 18450, 18452, 18453, 18456, 18457, 18458, 18464, 18468, 18471, 18473, 18474, 18476, 18477, 18484, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the Puget Sound area. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. The entire area of the chart falls within the Vessel Traffic Services (VTS) system.

Add label to all affected charts.

PUGET SOUND
VESSEL TRAFFIC SERVICES AREA
(see note _)

Add Special Area labels to charts 18400, 18421, 18423, 18427, 18429, 18430, 18431.

ROSARIO STRAIT
VTS Special Area: 161.55 (c)
(see note _)

GUEMES CHANNEL
VTS Special Area: 161.55 (c)
(see note _)

PRINCE WILLIAM SOUND VTS NOTES

Charts partly covered by VTS, 16709, 16700, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in Prince William Sound. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

Charts completely covered by VTS, 16707, 16708, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in Prince William Sound. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. The entire area of the chart falls within the Vessel Traffic Services (VTS) system.

Add label to all affected charts.

PRINCE WILLIAM SOUND
VESSEL TRAFFIC SERVICES AREA
(see note _)

Add Special Area label to charts 16707 and 16708.

VALDEZ NARROWS
VTS Special Area: 161.60 (c)
(see note _)

SAN FRANCISCO BAY VTS NOTES

Charts approaching San Francisco and partly covered by VTS, 18645, 18647, 18649, add:

NOTE _

The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the San Francisco Bay and surrounding areas. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate advance vessel traffic management within the VTS area.

The U. S. Coast Guard operates a Vessel Traffic Service Offshore Vessel Movement Reporting System covering the seaward approaches to San Francisco Bay. Vessels are requested to monitor VTSSF on Channel 12 at 15 and 45 minutes past each hour for broadcast reports of known shipping traffic in the area.

Charts completely covered by VTS, 18650, 18653, 18656, 18657, 18658, 18659, 18661, 18663, add:

NOTE _

The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the San Francisco Bay and surrounding areas. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. The entire area of the chart falls within the Vessel Traffic Services (VTS) system.

Charts partly covered by VTS, 18651, 18652, 18654, 18655, 18662, 18664, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the San Francisco Bay and surrounding areas. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual.

Charts with Petaluma River Entrance Channel, 18652, 18654, attach to the above notes:

All of the San Pablo Bay is within the VTS area with
the exception of the Petaluma River Entrance Channel.

Add label to all affected charts.

SAN FRANCISCO BAY
VESSEL TRAFFIC SERVICES AREA
(see note _)

ST. MARY'S RIVER VTS NOTES

Charts approaching St. Mary's River and partly covered by VTS, 14880, 14881, 14882, 18884, 14962, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the St. Mary's River. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

Chart completely covered by VTS, 14883, add:

NOTE _

The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the St. Mary's River. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual.

Add label to all affected charts.

ST. MARY'S RIVER
VESSEL TRAFFIC SERVICES AREA
(see note _)

HOUSTON/GALVESTON VTS NOTES

Charts approaching Houston/Galveston waterways and partly covered by VTS, 11323, 11324, 11330, 11340, 11300, add:

NOTE _
The U. S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the Houston and Galveston waterways. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate advance vessel traffic management within the VTS area.

Charts completely covered by VTS, 11322A, 11326A, 11327, 11328, 11329A, B, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the Houston and Galveston waterways. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual.

Add label to all affected charts.

HOUSTON / GALVESTON
VESSEL TRAFFIC SERVICES AREA
(see note _)

BERWICK BAY VTS NOTES

Charts approaching Berwick Bay and partly covered by VTS, 11351, 11352, 11354, 11355, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in Berwick Bay waterways. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate traffic management within the VTS area.

Add label to all affected charts.

BERWICK BAY
VESSEL TRAFFIC SERVICES AREA
(see note _)

Add Special Area label to charts 11354, 11355.

BERWICK BAY
VTS Special Area: 161.40 (b)
(see note _)

NEW YORK BAY VTS NOTES

Charts partly covered by VTS, 11350, 12324A, 12326, 12327, 12331, 12335, 12337, 12401, 12402, add:

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the New York Bay and surrounding areas. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. Mariners should consult these sources for applicable rules and reporting requirements. Although mandatory VTS participation is limited to the navigable waters of the United States, certain vessels are encouraged or may be required, as a condition of port entry, to report beyond this area to facilitate vessel traffic management within the VTS area.

Chart completely covered by VTS, 12333, 12334, add.

NOTE _
The U.S. Coast Guard operates a mandatory Vessel Traffic Services (VTS) system in the New York Bay and surrounding areas. Vessel operating procedures and designated radiotelephone frequencies are published in 33 CFR 161, the U.S. Coast Pilot, and/or the VTS User's Manual. The entire area of the chart falls within the Vessel Traffic Services (VTS) system.

Add label to all affected charts.

NEW YORK
VESSEL TRAFFIC SERVICES AREA
(see note _)

5.10.2.2 Traffic Separation Schemes
Revised on February 26, 2013 by Cartographic Order 003/13 and 004/13 and on December 21, 2015 by Cartographic Order 009/15.

A traffic separation scheme is a routing measure aimed at the separation of opposing streams of traffic by the establishment of traffic lanes. It may include inshore traffic zones or deep water routes.

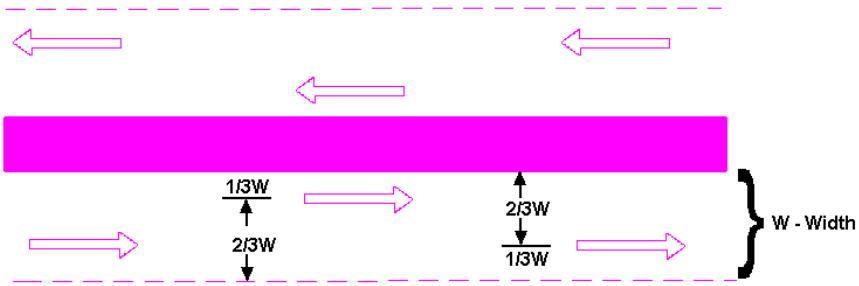
A separation zone or line separates the traffic lanes in which ships are proceeding in opposite or nearly opposite directions, separates a traffic lane from the adjacent sea area, or separates traffic lanes designated for particular classes of ships proceeding in the same direction. Separation lines shall be represented by a magenta-screened (20 percent, 120 LPI) line at least 3 mm wide.

Traffic Lanes (M 13)

A traffic lane is an area within defined limits in which one-way traffic is established. Natural obstacles, including those forming separation zones, may constitute a boundary. Arrows are shown in the traffic lanes to indicate the direction of traffic.

In traffic lanes wider than 5.0 mm at chart scale, arrows shall be staggered within the lane one-third the width from each side of the lane (see below).

In traffic lanes 5.0 mm or less in width at chart scale, arrows shall be placed in the center of the lane.



Roundabouts (M 21, M d)

This is a routing measure comprising a separation point or circular separation zone and a circular traffic lane within defined limits. Traffic within the roundabout is separated by moving in a counterclockwise direction around the separation point or zone.

Precautionary Areas (M 16, M 24)

This is a routing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended.

Areas to Be Avoided (M 29)

These are areas which are not recommended for navigation because of shoal hydrography, obstructions, or local and Federal regulations.

Pilot Boarding Areas

Definition: **PILOT BOARDING AREA.** A pilot boarding area represents a meeting or boarding place where vessels pick up or disembark pilots. A pilot vessel may either cruise in the area continuously or come out on request. [29]

General Requirements

Pilotage is compulsory for all foreign vessels and U.S. vessels under registration in the foreign trade.

A pilot boarding area shall be added to the chart or revised when verified by a state government, USCG, or NOAA Navigation Manager.

A pilot boarding area shall not be charted based solely on reports from individual pilot associations, shipping companies, foreign governments, U.S. Power Squadron or U.S. Coast Guard Auxiliary reports. These reports must be referred to NDB. NDB shall verify the pilot boarding area with the appropriate NOAA Navigation Manager before charting.

Feature Recommendation for a Notice to Mariners

A newly applied, revised or deleted pilot boarding area shall be evaluated for a Notice to Mariners. Generally, a notice shall not be required.

Line Type and Weight

The limits of a pilot boarding area shall be charted with a 2.5 mm (0.10”) band.

Location and Orientation on the Chart

A pilot boarding area shall be charted in its exact geographic position.

The outer edge of the 2.5 mm band shall mark the limits of a pilot boarding area.

Size and Shape

A pilot boarding area shall be charted to scale.

Alternatively, a pilot area may be shown only by the pilot boarding place symbol T 1.1 if the chart scale is too small to clearly show the pilot boarding area band symbol or if only a single position location is authorized.

Example: 

Labels and Notes

For charting purposes, pilot boarding area, pilotage area, pilot cruising area and pilot area are synonymous terms. These areas shall be labeled as recommended by the authorized source. The legend "Pilot Boarding Area" is preferred if a labeling recommendation is not clear. This may be shortened to "Pilot Area" when necessary due to chart congestion.

When a pilot boarding place symbol (T 1.1) is used, the label "Pilots" shall be used.

A "Pilot Boarding Area" label or "Pilots" label shall be charted in magenta, 8 point Swiss Italic. A larger size may be used if a Pilot Boarding Area is unusually large.

Generally, notes concerning pilot boarding areas will not be required, as that information is likely to be included in the Coast Pilot. Exceptions shall require approval of the Chief, Marine Chart Division. When required, any note concerning a pilot boarding area shall be charted with magenta, 7 point Swiss Light.

When a pilot boarding area and traffic separation scheme are charted in close proximity, a note explaining that the pilot area is outlined with a magenta screen shall be charted with magenta, 7 point Swiss Light. Approval of the Chief, Marine Chart Division, is not required. Where applicable, the note may be combined with a traffic separation scheme note.

Color and Screening

The limits of pilot boarding areas shall be charted with a 2.5 mm, 20 %, 120 LPI magenta screen.

A pilot boarding place symbol (T 1.1) shall be printed in magenta.

Pilot boarding area labels and notes shall be charted in magenta.

Feature Removal from Chart

A charted pilot boarding area shall not be removed until an established authority provides conclusive evidence that the pilot area does not exist in the charted position. Non- authoritative sources (e.g., competing pilot associations, shipping companies, foreign governments, U.S. Power Squadrons and U.S. Coast Guard Auxiliary reports) do not have sufficient authority to declare a pilot boarding are non-existent.

Pilot boarding areas reported discontinued shall remain charted until verified by a state government, foreign government (in foreign waters), USCG, or a NOAA Navigation Manager.

Course Lines

Some Great Lakes charts show course lines that are an unofficial traffic separation scheme devised by shipping interests for their own benefit. These course lines were not established by the USCG nor are the regulations published in the CFR.

The course lines are charted with a black dashed line on traditional charts and a magenta dashed line on metric charts. In either case, the labels for the course lines shall be magenta. The labels shall include distance (in statute miles and nautical miles) and bearings along the course. The point where a course changes direction is shown with a black dashed line to a point of land or object ashore. The bearing of the line and the distance offshore of the turning point are included in a black label along the dashed line.

The following sailing directions note shall be included on Great Lakes metric charts with Mercator projections that include course lines:

> SAILING DIRECTIONS. Bearings of sailing courses are true and distances given thereon are in statute miles (St M) and nautical miles (NM) between points of departure. The true bearing between any two points on this chart may be determined by connecting the two points with a straight line and measuring the angle of its intersection with a meridian line.

This note shall be in black, 7 pt. Swiss Light type, set 3½" wide. This note shall be included in the group of notes aligned under the chart title.

Intracoastal Waterway

Historically, magenta course lines have been charted on Intracoastal Waterway (ICWW) charts to indicate the general route the waterway follows. The lines were originally provided by the USACE.

The USACE rarely provides any revisions to the line to reflect changing alignments of the natural channels in the ICWW and the line may not be marking the best water. Some mariners have mistaken the ICWW course line as a recommended route or recommended track.

Based on mariner feedback, the magenta line indicating the suggested route of the ICWW shall be retained. Therefore, the line shall be restored to charts from which it was deleted using orthoimagery, AIS data, USACE surveys and other information. For those products where the magenta line appears to be misaligned with the waterway, best available sources, such as orthoimagery, AIS data, USACE surveys and other information will be used to adjust the line. The magenta line shall be positioned in the centerline of dredged channels and natural waterways, avoiding shoals and obstructions. The line shall be reviewed for potential adjustments at each new edition using the latest available information. If there is insufficient information available to generate the line or update the line, consult with the chief of MCD regarding the omission of the magenta line from that product.

The course line for the ICWW shall be charted as symbol: US Chart 1 M3, using 0.008 inches (0.20mm/0.008") in solid magenta.

The label, “INTRACOASTAL WATERWAY,” shall be charted within the waterway in black, 6 point Swiss Italic, at intervals adequate for a chart user to determine which waterway segments are parts of the ICWW. The label may be placed onshore, adjacent and parallel to the waterway, where space is limited. The Okeechobee Waterway, Morgan City to Port Allen Route, Morgan City to Port Allen Alternate Route, Morgan City to Port Allen Landside Route, and the Atchafalaya River Route shall also be labeled in the same font and size.

Statute Mile Indicators

Statute mile distance indicators and associated labeling shall be retained. Mileage ticks are generally charted in statute miles at either 1-mile or 5-mile intervals, depending on the scale of the chart. Other subdivisions of benefit to the chart user may also be charted. The distance between mileage ticks should be at least 5 cm but not greater than 25 cm. At scales larger than 1:30,000, 1-mile intervals should be used. At smaller scales, 5-mile intervals should be used.

Mileage ticks shall be in magenta, 2 cm in length, 0.2-mm lineweight, perpendicular to and centered on the recommended course. The mileage designation shall be in 7 pt. Swiss italic Regular 721 type and charted in this format "St M 210". The mileage label should be placed along the tick, but may be moved perpendicular to the recommended course to clear charted detail.

Example of Statute Mile Indicators

Charted notes referring to Aids to Navigation, controlling depths or project depths on the Intracoastal Waterway, or the waterways listed above, shall be retained. Portions of these notes referring to associated mileage distances and conversion of statue miles to international nautical miles shall be retained. Portions of notes referring to the magenta line indicating the waterway and course bearings shall be shown and reinstated where previously removed.

Calling-in Points (M 40)

Calling-in Points, requiring vessels to report to a traffic control center, have been established in certain waterways and port approaches to assist in traffic control. These calling-in points shall be shown on nautical charts with a magenta circle, designator if applicable, and an arrowhead or arrowheads as follows:

The arrowhead(s) shall be oriented to indicate the direction(s) of vessel movement. The single arrowhead indicates that a report is required only when a vessel is bound in that direction. The double arrowhead indicates a requirement to report in each of the directions designated.

The location of the symbol shall be in the center of the waterway if not otherwise specified. If the calling-in point has an alphanumeric designator, it shall be shown within the circle. Where each country has its own designator, the U.S. designator takes precedence. However, the Canadian designator shall be shown if no U.S. designator exists. Designators may be numerical, alphabetic, or

alphanumeric. Generally numeric or alphanumeric designator indicate mandatory calling-in points while alphabetic designators indicate voluntary calling-in points.

Whenever numeric or alphanumeric designators are charted, the following note shall be added in 7 pt. Swiss Light type. Both the symbol and the note shall be in magenta.

Vessel Traffic Services calling-in point; arrow indicates direction of vessel movement.

In areas where both numeric and alphabetic designators are used, the following note shall be shown:

Vessel Traffic Services calling-in point; arrow indicates direction of vessel movement. Mandatory calling-in points are identified numerically. Voluntary calling-in points are identified alphabetically. For additional information see U.S. Coast Pilot 6 and the U.S. and Canadian Notice to Mariners.

5.10.3 Ferries: (M 50, M 51)

Definition: A FERRY is a transportation system designed to carry passengers, vehicles or cargo across a body of water.

5.10.3.1 Ferry Slip:

Definition: A FERRY SLIP is a berthing space for a ferryboat between two piers; a dock for a ferryboat.

Definition: A FERRY TERMINAL is a destination for a ferryboat, consisting of one or more ferry slips.

General Requirements:

Piers used by ferries shall be classified as "essential" piers and shall be charted.

Roads, streets and highways connecting with ferry slips shall be charted.

Individual piles, dolphins, etc., associated with ferry slips shall be charted, if the scale of the chart allows.

Only those ferry slip lights and/or fog signals listed in the U.S. Coast Guard Light List shall be charted. If the aids are established and maintained by private interests, they shall be labeled "Priv."

Feature Removal from the Chart:

A charted ferry slip shall not be removed until an established authority provides conclusive evidence that the ferry does not exist in the charted position. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to declare ferry service non-existent.

In cases where non-authoritative sources identify a ferry as not operating in its charted position, the feature shall be retained as charted until removal has been confirmed by an established authority (e.g., Field Investigations by the National Ocean Service (NOS), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG) Local Notice to Mariners, a harbor master or port authority or the company that operated the ferry).

Feature Recommendation for Notice to Mariners:

A newly applied, revised, or deleted ferry slip shall be evaluated for a Notice to Mariners.

Line Type and Weight:

Ferry slips charted to scale shall be shown with a solid line: 0.15 mm (0.006").

Ferry piers less than 0.3 mm wide at chart scale shall be shown with a single solid line: 0.25mm (0.010").

Location and Orientation on the Chart:

Ferry slips shall be charted in their exact geographic positions.

Size and Shape:

Ferry slips shall be charted to scale and show actual shapes.

Labels and Notes:

Ferry slips shall be labeled "Ferry" with 6 point Swiss Light.

The label abbreviation "Fy" may be used where space is limited.

When lights or fog signals are associated with a ferry slip, appropriate aid characteristics shall be charted with 7 point Swiss Regular.

Roads, streets and highways connecting with ferry slips shall be labeled in black with 5 point Swiss Light.

Color and Screening:

Ferry slips and associated labels shall print in black.

5.10.3.2 Cable Ferry

Definition: A Cable Ferry is a ferry guided across navigable waters by a cable attached to each shoreline.

General Requirements:

All cable ferries shall be charted in navigable waters.

Cable ferries are considered hazardous features. In order to increase the mariner's awareness of cable ferries, the Chart No. 1 symbol [M 51] shall be supplemented with a warning screen and note.

Feature Removal from Chart:

A charted cable ferry shall not be removed until an established authority provides conclusive evidence that the cable ferry does not exist in the charted position. Non-authoritative sources (e.g. U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to declare a cable ferry non-existent.

In instances where non-authoritative sources identify a cable ferry not operating in its charted position, the feature shall be retained as charted until its removal has been confirmed by an established authority (e.g. , Field Investigations by the National Ocean Service (NOS), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG) Local Notice to Mariners, a harbor master or port authority or the company that operated the ferry).

Feature Recommendation for Notice to Mariners:

A newly applied, revised or deleted cable ferry shall be recommended for a Notice to Mariners.

Line Type and Weight:

Cable ferry crossings shall be charted with a dashed line: 0.15 mm thick /1.25 mm long dash/ with a 0.50 mm long space between dashes. (0.006/0.050/0.020").

Size and Shape:

Cable ferry crossings shall indicate actual courses.

Labels and Notes:

The following label shall be charted with 7 point Swiss Light:

Cable Ferry
(see note)

The following note shall be charted with 7 point Swiss Light, set either 2" or 3" wide:

CABLE FERRY
Cable across the river may be at or near the water surface. Mariners should exercise caution when navigating in this area.

Color and Screening:

Cable ferry crossings, associated labels and notes shall be charted with black.

Cable ferries are considered hazardous features. To emphasize the possibility of collision with the cable, which is raised when the ferry is in operation, a 2.0mm wide 20% 120 LPI magenta screened band shall be centered on the cable position.

5.10.3.3 Ferry Routes

Definition: A FERRY ROUTE is the path depicted on nautical charts to aid the mariner in avoiding lanes of regular transit of ferries.

General Requirements:

Ferry routes shall be charted when requested, in order to aid the mariner in avoiding accidents with these craft. Data and recommendations for charting shall originate from one or more of the following authoritative sources: federal, local or state agencies; private companies that provide ferry service or from pilot groups.

Ferry routes may be charted for short distances out from the slip or terminal. This alerts the mariner to the existence of ferry operations in the area. A ferry route shall be charted in its entirety when considered of navigational significance and recommended for charting by an authoritative source.

The Marine Chart Division shall not actively solicit ferry routing information unless charting has been recommended by an authoritative source. All ferry routing information shall be obtained via the Nautical Data Branch.

The routes of ferries that operate on a seasonal basis may be charted, subject to the guidelines above.

Ferry routes shall not be charted in areas where hydrography is not charted.

Ferry routes shall be charted with a dashed line [M50].

Traffic flow directional arrows may be charted at regular intervals along the line, if recommended by one of the above authorities. A two-way track shall have opposing pairs of arrows charted at regular intervals.

Ferry routes may be shown at any scale. The optional symbol also shown in Chart No. 1 (M50) may be used when appropriate on small-scale charts.

Feature Removal from the Chart:

A charted ferry route shall not be removed until an established authority provides conclusive evidence that the ferry does not exist in the charted position. Non-authoritative sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports, photo revisions without field edit) do not have sufficient authority to declare a ferry route non-existent.

In instances where non-authoritative sources identify a ferry as not operating in its charted position, the ferry shall be retained as charted until removal has been confirmed by an established authority (e.g., Field investigations by the National Ocean Service (NOS), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG) Local Notice to Mariners, a harbor master or port authority or the company that operated the ferry).

Feature Recommendation for Notice to Mariners:

A newly applied or revised ferry route shall be evaluated for a Notice to Mariners. In general, a Notice to Mariners shall be generated if the ferry route crosses major shipping lanes or dredged channels, enters congested ports or is identified as a safety hazard by the requesting authority.

Line Type and Weight:

Ferry routes shall be charted with a dashed line: 0.15 mm thick / 1.25 mm long dash/ with a 0.50 mm long space between dashes (0.006/0.050/0.020"). Directional arrows, when used, shall be charted with a solid line, 0.15 mm thick.

Size and Shape:

Ferry routes shall indicate actual courses.

Labels and Notes:

A ferry route shall be labeled "Ferry Route" and charted with 7 pt. Swiss Light Italic. See exceptions below.

A high speed ferry route shall be labeled "High Speed Ferry Route (see note ___)" and charted with 7 pt. Swiss Light Italic. This label shall also be used at appropriate points on a chart where a high speed ferry is known to operate, has been recommended by an authoritative source as being of navigational significance, but the route is not charted. A standard definition of "high speed" is under development by the International Maritime Organization (IMO), but to date, no standard definition of "high speed" is generally accepted by the IMO or U.S. Coast Guard. For the time being, the term, "high speed" shall be used when a ferry is identified as a high speed ferry by the requesting authority.

Charts displaying labels identifying high speed ferry service shall carry a note which must be customized to suit the needs of the local operators, authorities and chart users. Each note shall print in 7pt. Swiss Light, set either 2" or 3 1/2" wide. The note shall be modified, when necessary, from the following standard text:

NOTE ___
High speed ferries operate between _____ and _____.
Mariners are cautioned that these craft move very rapidly and may transit waterways at angles to the normal direction of traffic. Ferries may deviate from published routes.

The blanks in the note shall be replaced with the appropriate geographic names.

When charted, the small-scale symbol for ferry crossings shall not be labeled.

Color and Screening:

Ferry routes, labels and notes shall be charted with magenta.

NAUTICAL CHART MANUAL - VOLUME 1 - POLICIES AND PROCEDURES

CHAPTER 6 - LANDMARKS

U.S. Department of Commerce
Office of Coast Survey

6 LANDMARKS

6.1 General

A landmark is any fixed natural or artificial object, generally on land, which is prominent from seaward and can be used in determining a vessel's direction or position. The term excludes objects expressly erected for navigational purposes such as lights or daybeacons.

Prominence is the first requisite for a landmark. Landmarks selected for charting should be visible over a large area from the sea and should be easily identifiable. Because ease of positive identification is also important, an unusual or unique feature may qualify as a landmark because it is easy to identify even if it is not particularly prominent. Prominence of a landmark will vary with the location of the observer and with lighting and atmospheric conditions.

Landmark requirements for small-scale charts must be kept in mind when selecting landmarks for large-scale charts. Landmarks selected for smaller-scale charts must appear on larger-scale charts covering the same area.

6.1.1 General Charting Guidelines

A dense charting of many objects of the same type is seldom useful for navigation purposes. Such multiple charting of objects in close proximity or in a relatively small area without benefit of a discriminating field inspection (for example, the charting of numerous stacks in a large industrial area near a coastal city) could result in a very confusing display of "recommended" landmarks when viewed from seaward.

Every effort should be made to chart only those objects which are outstanding and readily identifiable by the mariner. The selection of a few easily identifiable stacks with appropriate descriptors may be more useful to the mariner than the charting of many closely spaced stacks. Similarly, the charting of a single radio structure, when part of an array, may be more desirable than the charting of all of the structures, provided the label identifies it as part of a group, e.g., tallest of four, northerly of three, etc. An object's shape may also be a useful identifier in some instances. A short description of an unusually shaped water tank (e.g., ball, oblong, ball on tee, etc.) will allow the mariner to distinguish between it and other nearby tanks.

Other sources such as USGS quadrangles and NOS aeronautical charts may be helpful in determining the seaward visibility of objects when in doubt, especially when those objects are not near the coastline and may be obscured by intermediate ground elevations.

Objects of a temporary nature should not be charted. A vertical elevating crane used in building

construction may be very prominent, but must be presumed to be nonpermanent. However, the building which is being constructed may qualify as a landmark and a field inspection for landmark evaluation should be obtained after construction is completed. Likewise, an exploratory oil-drilling rig must be considered a temporary structure and should not be charted as a landmark (however, it may be charted as a mineral development structure, see Section 4.13.5). Dredges are sometimes recommended for inclusion as landmarks, but they should not be charted since they are subject to relocation.

The charting of movable objects should be avoided. A gantry crane at a shipyard may be a very prominent feature, but it will not have a fixed geographic position and, therefore, is useless as an aid to the mariner in determining the vessel's position. Shipyards will usually contain other potential landmark objects, and a search should be made or a field inspection requested for suitable substitutes.

Colors describing painted objects are usually not charted because of their relative temporary nature.

The material from which an object is built should also not be charted since the mariner usually cannot identify an object in this way even at close range. A painted name on a tank, stack, etc., is charted only if the letters are large enough to be unusually conspicuous from seaward.

Signs, in general, are not recommended for charting as landmarks. However, an unusually conspicuous sign, especially in an area devoid of other suitable landmarks, may be suitable for charting. If a sign is not significantly elevated, a field inspection will be required to determine its value for daytime and, if brightly lighted, possible nighttime visibility.

Signboards supplying navigational information may be considered as landmarks if, for example, they are used to mark distances along a waterway. The location of signs giving water-level data will also be considered useful and should be charted using the landmark criteria, even if they are not visible from a distance.

Radio structures should be labeled with sufficiently complete information to provide a usable visual landmark as well as a radio aid, where desirable. The strength of AM radio signals, the hours of operation, and the height of radio structures should be taken into consideration when selecting these as landmarks for small-scale charts. This information can be obtained from the Broadcasting Yearbook and other reference material filed in NDB. See Section 6.2, Radio Stations.

Special-use objects shall be charted if requested by a competent authoritative source, even if they are not of landmark value to the mariner. Examples of this type of object would be a permanent survey tower, target, or dredging range marker established by the USACE for channel maintenance, or an object used by the USCG in buoy placement.

6.1.2 Evaluation of Recommended Landmarks

1. Sources

Landmark information is received in many forms. Sources acceptable for charting action will include NOS-originated data, as well as data from other organizations or individuals, including the following:

a. Field-inspected data from NOS surveys:

(1). NOS hydrographic and topographic survey data
(2). NOS Chart Evaluation Surveys
(3). NOS Coast Pilot inspections
(4). NOS small-craft facility field inspections

b. Recommendations by reliable sources as a result of an onsite observation:

(1). Foreign governments
(2). U.S. Navy and USCG
(3). NOS Aeronautical Chart Division obstruction file
(4). Cooperative charting organizations
(5). Merchant ships
(6). Specific data reported by individuals

c. Recommendations from documented sources routinely received by NOS:

(1). Triangulation data
(2). USGS quadrangle maps
(3). USACE surveys
(4). Miscellaneous letters and survey data

d. Recommendations initiated in MCD as a result of personal observation.

2. Initial Evaluation

An initial evaluation of a landmark recommendation is conducted by NDB to determine the proposed landmark's usefulness for charting. The recommendation will be accepted if it is the result of an onsite inspection by a reliable source and if the object has been located with sufficient accuracy to provide identification for the processing of any additional data. An inspection from seaward is always desirable.

A report that requires supplemental information (e.g., lacking onsite inspection or accurate location) will be forwarded on the Standard until the required information is received. When received,

the supplemental information should be attached to the original report to ensure that only one entry is made into the documentation system. Additional information can be obtained by a request to the source originator, by a request to another reliable party, or by an office examination of photos, quadrangles, or other sources.

3. Documentation

All landmark recommendations that are determined to be acceptable and are considered sufficiently complete shall be documented for chart application. However, see Section 3.10, Military Features, for security clearance procedures that must be followed for charting landmarks within a military installation.

4. Screening for Notice to Mariner Actions

Charted landmarks reported to be nonexistent shall be considered for announcement in NM. The availability of other landmarks in the vicinity and the prominence of the former landmark should be taken into account in determining the need for such an announcement.

The reporting of newly recommended landmarks or revision of critical data concerning charted landmarks shall be considered for announcement in the NM.

The accuracy of an object's geographic position must be considered when evaluating an item for publication in the NM.

Accurately located objects that are considered important for safe navigation, approximately located objects that are considered essential for safe navigation, and even less accurately located objects that are considered critical for safe navigation shall be considered for NM action.

Accurate positions of navigationally important objects, if not initially available, should be requested immediately. Requests should be made through the Chief, NDB.

5. Follow-Up Proceedings

The reported information shall be examined for completeness and for compliance with NOS policy and requirements. If serious deficiencies are found, this shall be noted and application delayed until the requirements are adequately satisfied.

An accurate position obtained during follow-up proceedings may indicate the need for a security clearance (see Section 3.10). The source for a feature requiring this clearance must be returned to NDB so that clearance is obtained before chart application.

Additional information on radio transmitting structures, such as the type of transmission, frequency,

and call letters, can be obtained through NDB.

A final evaluation as to the need for an NM action shall be made after considering all information available. If an NM announcement is required, the item shall be referred to NM Update Service after application to all charts.

Accurate positions must be obtained for all objects of landmark value having only approximate locations. The Chief, NDB, shall refer such objects to the RSD for a position.

6. Final Cartographic Evaluation

The final decision on the use of reported data rests with the cartographer at the time of chart application. Only after all the available data is assembled can a clearly useful and effective display of information for charting be determined. The cartographer should keep in mind the previously stated guidelines for charting landmarks.

If the cartographer doubts the value of proposed landmarks or if a more judicious selection of landmarks would increase the chart's usefulness, a field inspection by qualified NOS personnel should be made. A field inspection may also be obtained through the Cooperative Charting Program by request to NSD from the Chief, NDB.

An office evaluation will generally be required when an onsite inspection has not been made or when the objects being reported do not appear to meet the requirements for a navigationally useful landmark.

6.1.3 Accuracy of Position

1. Accurate Position (B 32)

The symbol denoting accurate position (an encircled dot) shall be used to chart an object considered to be located within 10 feet of its correct geographic location or reported accurate to within a tenth of a second (0.1").

The "accurate position" symbol shall be used for charting recommended landmarks whose geographic location has been established by any of the following accurate locating methods:

a. NOS triangulation and photogrammetric methods as required for listing a landmark on NOAA Form 76-40, Nonfloating Aids or Landmarks for Charts, are considered accurate (although a listing is not necessarily a recommendation for charting). Copies of completed NOAA Forms 76-40 should be forwarded to USCG headquarters and the appropriate USCG district office through NDB.

If determined by triangulation, a landmark must be carefully charted by its geographic coordinates using

as a source the geodetic control data file maintained by NDB. A reference file of triangulation diagrams is also available. These are overprintings of a set of nautical charts and certain USGS quadrangles covering the entire charted coastal areas. Diagrams of States may be requested through the Nautical Data Section.

If determined by photogrammetric methods, a landmark shall be charted using its geographic coordinates as listed on NOAA Form 76-40. Since landmark reports are generally received in advance of final data, the initial application of new landmark information from NOAA Form 76-40 should be clearly recorded by the compiler on the form.

b. NOS field surveys are routinely screened for objects of landmark value. Those determined useful are recorded on NOAA Form 76-40 and become part of the survey records. However, a feature to be charted as a landmark may on occasion be shown only on the NOS topographic or hydrographic survey and may have been located by sextant fix, planetable, or photo plot. Positions of features located in this manner must be carefully scaled for plotting and logging.

c. A landmark's position may be considered accurate if it is listed on a USACE or similarly reliable survey, or any other reliable graphic source (such as a USGS quadrangle).

d. A landmark's position may be based on a carefully scaled value of acceptable accuracy from a large-scale USACE or similarly reliable survey (other than NOS) with unquestioned control. However, it is far better to have the original numerical value used for plotting on the source than a geographic position derived by a scaling method. Thus, every effort should be made to obtain the original numerical value.

e. A landmark's position may be a recording determined by an accurately measured bearing and distance. A geographic position obtained from measurements made by a land surveyor, for example, may meet NOS accuracy standards.

f. A position derived from a scaling method shall be recorded on NOAA Form 76-40 to be documented as a numerical value source. This will provide file recovery for subsequent processing of required follow-up procedures.

The position source, scale, and date must be clearly recorded on NOAA Form 76-40 in the column headed "Method and Date of Location" with the notation "position scaled".

2. Approximate Position (B 33)

The symbol denoting approximate position (a small circle) shall be used to chart landmark objects that do not meet the accuracy guidelines described above, but which are generally considered to be within 100 feet of their correct geographic location. The position of such an object is considered to be of less

than third-order accuracy; usually the position will be reported to the nearest second. Note that the method of location may be used as an indication of the recorded accuracy of an object.

Objects of approximate position may be charted only if they are considered essential for safe navigation or of unusual importance.

Acceptable locating methods and sources for charting approximate position landmarks follow:

a. A report from any source determined to have been located by methods that meet the accuracy standards for an "approximate position" landmark may be used.

b. Sextant fix, planetable, and photo plot positions may be of approximate position accuracy and may be transferred by graphic methods. A scaled geographic position will be required for further processing.

c. A scaled value from a reliable source other than NOS, with adequate control, may be used. This source may be a USGS quadrangle or other relatively small-scale source. A scaled value from these sources will not be assumed to meet accurate position requirements according to the NMAS (see Section 2.16.2) and shall be charted with the approximate position symbolization.

A scaled value may be considered only for interim use until the original numerical value from the originating source can be obtained. It should be clearly indicated as a position requiring further refinement to meet position standards.

d. A position determined by a bearing and distance method will usually be considered an approximate position (or less) although a position accurately and carefully determined by these methods may qualify as an "accurate position".

e. If an object is charted as an accurate position and is reported by another source or NM that it is located in an approximate position, the accurate position shall be maintained unless the new source or NM states that the object has been moved.

3 Inexact Position

An object located with less accuracy than that required by the approximate position standards shall not be charted unless it meets a critical need.

An object determined to be critical for charting and considered to be within 101 to 300 feet of its correct geographic location shall be charted with the "approximate position" symbol. To emphasize the weak

position, the abbreviation "PA" shall be included as part of the label.

All related records must clearly indicate the requirement for an accurate position.

6.1.4 Labeling of Landmarks

1. Depiction of Accuracy

Not only the landmark symbol, but the landmark label, reflects the accuracy of a landmark's charted position.

a. Accurately Located Objects

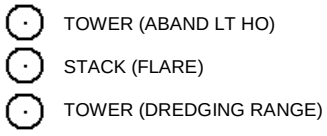
These shall be labeled using all capital letters for both the primary name, the description, and the secondary name. The secondary name and the description shall be enclosed in parenthesis.

The primary name is the name chosen as that most likely to identify the object for the majority of chart users. It shall be placed close to the landmark symbol so as to provide clear identification.

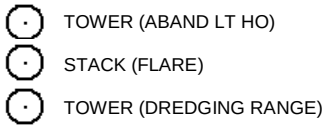
The secondary name is an alternate name for the object which may be useful to some marine interests.

The description is an explanatory term which elaborates on the primary name. Both a secondary name and a description are sometimes used for a single object.

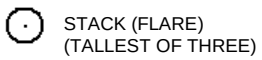
(1) Primary and Secondary Names:



(2) Primary Name and Description:



(3) Combination:



b. Approximately Located Objects

Objects charted with the "approximate" symbol shall be labeled using capital and lowercase letters for each word of the primary and secondary names. Only the first letter of the first word of the description shall be capitalized. The secondary name and the description shall be enclosed in parenthesis.

(1) Primary and Secondary Names:

- Building (R Lt)
- Tower (Aband Lt Ho)
- Tower (Dredging Range)

(2) Primary Name and Description:

- Marker (Lighted)
- Stack (Taller of two)
- Radio Tower (Center of five)

(3) Combination:

- Building (Custom house)
  (Westerly of two)

2. General Labeling Guidelines

a. Abbreviations

Names of landmarks should be abbreviated only if they fall in a very congested area. If abbreviated, they must conform to the list of abbreviations and terms in Section V of Chart No.1.

b. Names of Buildings

Names of buildings that are well known locally and which are considered important may be shown in parenthesis following the name of the landmark, e.g., "DOME (STATE HOUSE)". For an object that is both are well known and unusually prominent, the proper name of the object may be used as the primary charting name, e.g., "EMPIRE STATE BUILDING". The use of proper names, e.g."RITZ TOWER", for primary names should be avoided, but they may be useful as secondary names, e.g., "BUILDING (RITZ TOWER)".

c. Groups of Structures

When two similar, adjacent objects are shown with one landmark symbol, the word "TWIN" is used. If they are charted separately, the word "TWIN" is not used. When only one object of a group is to be charted, its name is followed by a descriptive legend in parentheses, including the number of objects in a group, e.g., "(TALLEST OF FOUR)", "(NORTHEAST OF THREE)", or "(CENTER OF FIVE)".

d. Use of Outline Shape

The outline shape of a prominent structure may be charted to scale if it is relatively large or of particular interest and of landmark value, e.g., the Pentagon or Fort McHenry. Care must be taken to show the shape and position precisely according to source data. Important structures may be charted by outline when considered useful at chart scale even though only a specific part of the structure is recommended as a landmark object.

e. Aeronautical Obstructions

Aircraft obstruction lights are generally considered of secondary importance as a navigational aid. Therefore, they shall not be charted with a light dot and magenta flare unless they are listed in the Light List and given a Light List number.

Nor shall these lights be charted as aeronautical lights. Obstruction lights on landmark objects shall not be labeled unless specifically requested by a reliable source. It is not necessary, in this case, to differentiate between occulting and fixed lights.

Examples:


RADIO TOWER
(R LTS)


STACK (FLARE)
(STROBE, R LTS)

An object recommended for charting as a landmark that is identified only as an aircraft obstruction light shall be charted with the appropriate landmark symbol and labeled "Obstruction Light".


OBSTN
(R LT)

6.1.5 Landmark Classifications

The following classifications of landmarks are defined here for the purpose of standardizing chart terminology and showing acceptable abbreviations (note references to Chart No. 1).

ANTENNA, ANT:

Usually reserved for large reflecting antennas of open or grid-type construction.

The telemetry antenna of a missile or satellite tracking station shall be labeled "ANTENNA (TELEM)", when this information is considered to be important.

Antennas of unknown purpose shall be charted with a description of their shape for visual identification by the mariner.

BUILDING: See HOUSE

CHIMNEY; CHY:

A relatively small, upright structure projecting above a building to convey smoke. A tall smokestack-type chimney is designated as a stack, not a chimney.

CUPOLA; CUP:

A turret or small dome-shaped tower which rises from a building and is small compared to the building.

DOME:

A large, hemispherical cupola, or a roof that is rounded or many sided.

A dome known to contain radar equipment shall be charted as "DOME (RADAR)". If the radar use is not known, reference to radar shall be omitted.

FLAGPOLE; FP:

A single-staff flagpole rising from the ground and not attached to a building.

FLAGSTAFF; FS:

A flagstaff rising from a building. It is not necessarily the most prominent part of a building for landmark recognition purposes, although it should be retained as a secondary label, when appropriate, e.g., "BUILDING (FLAGSTAFF)".

FLAG TOWER; F TR

A scaffold-like tower on which flags are hoisted, such as a USCG skeleton steel flagpole. The term "signal tower" should not be used on NOS charts

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GAS TANK or OIL TANK:

Since gas and oil tanks differ in shape and size from water tanks, they should be identified by the label "GAS TANK" or "OIL TANK". An undesignated tank will be presumed to be water tank. Note, however, that gas and oil tanks are not usually charted with a landmark symbol, but with a solid filled outline or crosshatching.

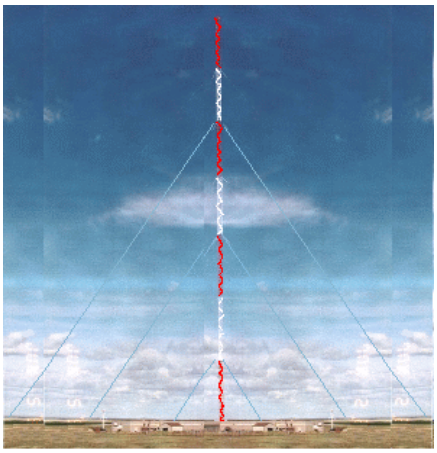
HOUSE or BUILDING; HO; BLDG:

When a building is itself a landmark, it is not desirable to chart a specific point, such as "west gable". The landmark symbol and label "HOUSE" or "BUILDING" may be followed by the description of the point located if it is recommended by the field party, e.g., "HOUSE (WEST GABLE)".

If the structure encloses equipment which may be of special or limited navigational use to the mariner, a one-word description of the use shall follow the primary label, such as "BUILDING (VOR)". ("VOR" stands for very high frequency omnidirectional range.)

LOOKOUT TOWER; LOOK TR:

A tower, usually of open construction, surmounted by a small house in which a watch is habitually kept, e.g., a USCG lookout tower or a fire lookout tower. Lookout towers must be differentiated from observation towers in which no watch is kept.



LORAN STATIONS:

LORAN stations shall be charted with the landmark symbol and appropriate label, e.g., "LORAN TOWER". They shall be shown on all LORAN charts, even when not recommended as a landmark.

MICROWAVE TOWER: See RADIO TOWER (MICROWAVE)

Washington Monument

MONUMENT; MON:

The label "MONUMENT" shall be used, rather than descriptive terms such as "obelisk".

OIL TANK: See GAS TANK

RADIO MAST; R MAST
RADIO TOWER; R TR:

Radio masts and radio towers are both structures used to elevate antennas. A radio mast is a very tall, slim structure which is held vertical by guylines. A radio tower is a tall structure, usually of open lattice construction, and always self-supporting. For further information concerning the charting of radio station structures, see 5.11, Radio Stations.

Star Tower
Cincinnati, Ohio

RADIO TOWER KAGT 1340 kHz:

AM commercial broadcast station structures shall include the station's call letters and frequency for use in radio direction finding, e.g., "KAGT 1340 kHz". Radio structures other than AM commercial broadcast stations shall not be labeled with either call letters or the frequency unless they are of known use for marine navigational assistance.

RADIO MAST 1015 FT (TV, FM) (STROBE, R LTS):

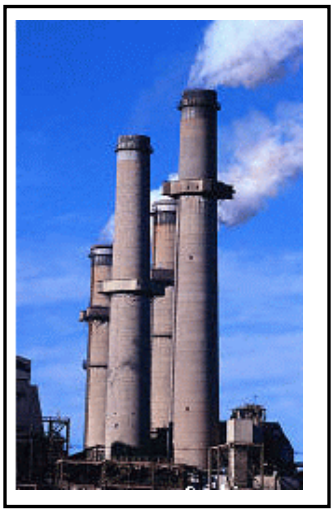
Aircraft obstruction lights may be identified in parentheses in the label, e.g., "(STROBE, R LTS)" if they are recommended for charting by a reliable source.

RADIO TOWER 215 FT (MICROWAVE) or MICRO TOWER

The height of a radio tower or mast above ground level should be included in the label where this information will prove useful, e.g.,"1015 FT".

SPIRE:

A slender pointed structure surmounting a building. It is rarely broken by stages or other features. The term "steeple" shall not be used. A short pyramid-shaped structure rising from a tower or belfry is not charted as a spire.



STACK

Any tall smokestack or chimney (regardless of color, shape or material) which is more prominent as a landmark than the building connected thereto. The term "chimney" shall not be used to signify this type of structure. Where waste gas is burned from the stack, as at a refinery or sewage disposal plant, the flame may be significant as a nocturnal landmark and shall be charted as "STACK (FLARE)".

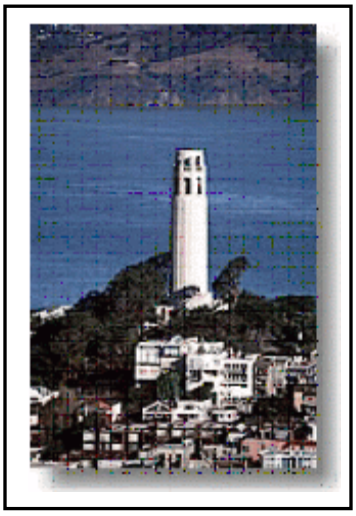
STANDPIPE; S'PIPE:

A tall cylindrical structure in a waterworks system, the height of which is several times greater than the diameter. See also "tank" and "water towers".

TANK:

A water tank elevated high above the ground by a tall skeleton framework or support. It shall be labeled "TANK". The word "Elevated" should not be used since a tank would not be a landmark unless it is elevated. See also "water towers".

REVISED JUNE 12, 2002



TOWER; TR:

A tower is that part of a structure that is higher than the rest, but having vertical sides for the greater part of the height.

Any enclosed structure, whether or not its sides are vertical, with its base on the ground and high in proportion to its base, is called a tower. See also separate discussions of flag towers, lookout towers, LORAN towers, radio towers, and water towers.

TREE:

Trees are sometimes recommended for charting as a landmark. Such phrases as "lone tree" or "conspicuous tree" should be omitted since only conspicuous trees would be selected as landmarks.

WATER TOWER:

A decorative structure enclosing a water tank or standpipe. Its appearance may prevent its being recognized as a water tank or standpipe.

WINDMILL:

A wind-driven mechanism that is both conspicuous and easily recognized.

WIND TURBINE:

A wind-driven mechanism for generating electricity that is both conspicuous and easily recognized.

6.2 Radio Stations (E 28, E 29)

1. General

Radio towers and masts used to elevate antennas are particularly useful landmarks on nautical charts. They are usually accurately located, conspicuously tall, and easy for the mariner to identify even at night; moreover, they are generally found outside of congested areas. AM radio stations are also charted because they are useful for radio direction finding. Weather broadcast stations are charted because they provide valuable information to mariners.

A radio tower is a self-supporting latticed structure while a radio mast is a tall structure held vertical by guylines. Radio signals can be transmitted or received from similarly shaped structures or from a single structure.

The purpose of a structure cannot always be ascertained by observing its size and shape nor the configuration of the antennas.

Structures more than 200 feet (61 meters) above ground level are usually marked with aircraft obstruction lights, thereby increasing their value as aids in nighttime navigation. These may be fixed or occulting red lights or strobe lights. The obstruction lights may be included in parentheses in the accompanying label, e.g., "(STROBE, R LTS)", if recommended for charting by a reliable source.

2. References

Information concerning radio stations may be obtained from various references maintained by NDB for chart planning and general evaluation, including the following:

1. Standard Broadcast Stations, U.S., lists data for AM broadcast stations; it is issued by the Federal Communication Commission (FCC) every 6 months.

2. "AM Change List" provides revisions to the above and is issued by the FCC every week.

Since the information listed in both these publications originates from construction permits, it may be pending or unreliable and should be used with caution.

3. Directional Antenna Sheets," another FCC publication, lists the stations composed of more than one antenna and shows array specifications and other data.

4. The privately published "Broadcasting Yearbook" and the "TV Fact Book" are also useful references.

6.2.1 AM Station
Revised on June 24, 2002 by Cartographic Order 010/02

Transmitting structures for commercial AM broadcast stations shall be charted and labeled with call letters and frequency for use in radio direction finding. When provided with this identification, mariners with radio direction finders can determine their position by taking bearings to these structures. However, the distance an AM radio wave must travel over land before reaching water distorts the wave, making it less accurate for taking bearings than waves from marine radiobeacons. The height above ground level shall be included in the label when it is significant for visual recognition.

Examples of charted AM broadcast stations are shown below:

Accurate Position	Approximate Position
 RADIO TOWER WMAL 630 kHz (R LTS)	 Radio Mast 483 Ft WSSO 1230 kHz (RLts)

On smaller-scale charts, AM broadcast stations shall be selected for charting that will provide the mariner with both visual assistance and radio direction finding in coastal navigation. On charts smaller than 1:250,000 scale on the west coast and smaller than 1:150,000 scale elsewhere, the selection shall be made from stations shown on larger-scale charts that have higher-powered omnidirectional transmissions and that broadcast 24 hours a day. Where possible, at least one transmitting structure should be selected for every 30 to 40 miles of coast.

In very congested areas, a list of AM radio stations may be included on the chart to prevent the elimination of important topography or hydrography. In this case, only the landmark symbol, station call letters, and height (when significant) shall be charted at the position of the transmitter. The list shall include the station call letters, frequency, locality, and any critical special information, such as "daytime only," etc.

COMMERCIAL RADIO BROADCAST STATIONS			
Call Letters	Frequency (kHz)	Locality	Remarks
		CONNECTICUT	
WFIF	1500	Milford	
WICC	600	Bridgeport	
WNAB	1450	Bridgeport	
WMMM	1260	Norwalk	
WNLK	1350	Norwalk	
WSTC	1400	Stamford	
WGCH	1490	Greenwich	
		NEW YORK	
WVOX	1460	New Rochelle	
WCBS	880	New York City (High Island)	
WNBC	660	New York City (High Island)	
WGSM	740	Huntington (Long Island)	

The following caution note shall be included on all charts showing AM radio broadcast stations:

CAUTION

Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial-Intelligence Agency Publication 117.

Radio direction-finder bearings to commercial broadcasting stations are subject to error and should be used with caution.

Station positions are shown thus:

⊙ (Accurate location) o (Approximate location)

CAUTION

Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial Intelligence Agency Publication 117.

Radio direction-finder bearings to commercial broadcasting stations are subject to error and should be used with caution.

Station positions are shown thus:

⊙ (Accurate location) o (Approximate location)

The note shall be in 7 pt. Swiss Light type, 2" (Preferred) or 3 1/2" (Optional) wide, and in black.

6.2.2 Other Commercial Stations

All radio structures should be labeled as to type of use where this information can be obtained. This will advise the mariner of their possible use for radio direction finding. A radio structure that serves several purposes should be labeled for each known purpose.

The height above the shoreline datum of all commercial radio structures should be included in the identifying label when this is considered significant for visual sighting.

Radio structures other than commercial AM broadcast stations shall not be labeled with either call letters or the frequency unless they are of known use for marine navigational assistance.

Examples of how commercial stations other than AM stations are charted are shown below:

6.2.3 Weather Broadcast Stations
Revised on July 15, 2003 by Cartographic Order 017/03

Definition: **WEATHER BROADCAST STATIONS.** Weather broadcast stations are radio transmittal sites that continuously broadcast NOAA Weather Service weather reports.

General Requirements

NOAA weather radio broadcast station positions shall be charted if they fall within the limits of a chart.

NOAA's National Weather Service operates a network of VHF-FM weather broadcasting stations known as NOAA Weather Radio along the coast that provides mariners with broadcasts of warnings, watches, forecasts, and other hazard information 24 hours a day. The range of reception for most stations is 20 to 40 nautical miles, but may vary due to the line-of-sight transmission characteristics of the frequency, the transmitting and receiving antenna heights, intervening obstructions, signal strength, receiver sensitivity, etc. Under favorable conditions, a station's broadcast range may extend to more than 100 nautical miles (e.g., Hawaii and U.S. Coast Guard sites in Alaska).

The National Weather Service is of the opinion that stations need not be distinguished based on potential operating range.

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted NOAA radio weather station position or NOAA weather station information shall be evaluated for a Notice to Mariners.

Location and Orientation on the Chart

Weather radio towers shall be charted in their exact geographic positions as depicted in the source material.

Size and Shape

NOAA weather radio station positions shall be charted with the appropriate Chart No. 1 symbol (B32, B33).

Labels and Notes

When a NOAA weather radio broadcast antenna position on a tower is charted, a secondary label indicating that it is a weather radio antenna and the station call letters shall be charted without parentheses. The label for an accurate positioned landmark shall be charted with black 6 pt. Swiss Regular type. The label for an approximate positioned landmark shall be charted with black 6 pt. Swiss Light type.
For example:

RADIO TOWER 262 FT
WEATHER KAC-64
630 MHz
(R LTS)

o Radio Tower
Weather KHB-43
162.55 MHz
(R Lts)

The following note, 2" wide, shall be included on all coastal charts (1:150,000 scale and larger) and other charts that provide the only coverage for a particular area of U.S. waters. The stations listed in the note would include all those broadcasting to navigable areas of the chart. The note shall be charted with black 7 pt. Swiss Light type.
Example:

NOAA WEATHER RADIO BROADCASTS

The NOAA Weather Radio stations listed below provide continuous weather broadcasts. The reception range is typically 20 to 40 nautical miles from the antenna site, but can be as much as 100 nautical miles for stations at high elevations.

Seattle, Wash.	KHB-60	162.55 MHz
Puget Sound, Wash.	WWG-24	162.425 MHz

This note shall not be charted on Small-Craft Nautical Charts except for cases where a Conventional Nautical Chart is also used as a base for a Small-Craft Nautical Chart.

Weather information notes shall be added or revised when necessary.

The minimum receivable transmitting range shall be used when charting radio information.

Color and Screening

NOAA weather radio station location symbols and NOAA WEATHER RADIO BROADCASTS notes shall be charted with black.

Feature Removal from Chart

The secondary label indicating that it is a weather radio antenna and the station call letters shall be removed from a chart if the National Weather Service or another authoritative source provides conclusive evidence that the broadcasting antenna doesn't exist on the supporting feature. Remove remaining symbolization and label, if supporting feature is no longer of landmark value. Nonauthoritative sources (e.g., U.S. Power Squadron and U.S. Coast Guard Auxiliary Reports) do not have sufficient authority to declare this feature nonexistent or related weather information incorrect.

6.3 Marine Radio Aids

Radionavigation systems are important because they extend navigational assistance to areas that are beyond the range of visual aids to navigation and they replace visual observations at closer distances when fog or other thick weather exists. Such systems allow mariners to fix a vessel's position at sea far from coastal lights and landmarks. Many radionavigation systems provide more accurate position fixing than celestial observations, but their real advantage is that they do not require clear skies and a visible horizon to be effective.

Medium-frequency radio direction finders onboard ships enable measurement of the bearings of radio transmission from other ships, aircraft, shore stations, aeronautical radiobeacons and coastal radio stations.

In general, good radio bearings will not be in error by more than 2° for distances under 150 nautical miles. However, due to differences in the conducting and reflecting properties of land and water, radio waves crossing a coastline at an oblique angle or passing over rough terrain undergo distortion. These factors should be considered when charting radio aids for use in marine navigation.

See also Section 6.2.1, AM Stations; Section 6.4, Aeronautical Radio Aids; Section 6.4.1, Aeronautical Radiobeacons.

6.3.1 Section no longer exists

6.3.2 Racons (S 3.6)

A racon (from "**RA**dar bea**CON**") is a radar transponder beacon which emits a characteristic signal when activated by the emissions of a ship's radar. This distinctive signal can provide bearing, range and identification information. The signal may be coded to provide a Morse code or other identification symbol on the radar display.

Generally, the racon antenna will be located on an existing light structure and shall be charted with a 7.1-mm diameter magenta circle centered on the light dot. If the antenna is not located on a light structure, it shall be charted with a black "position accurate" landmark symbol and a 7.1-mm diameter magenta circle centered on the landmark symbol. When located on a fixed structure, a label in 6 pt. Swiss Regular black type shall be placed adjacent to the symbol. The label shall be in 6 pt. Swiss Regular Italic black type when the racon is located on a floating aid. The label shall include "RACON" followed by the Morse identification code as stated in the Light List.

6.4 Aeronautical Radio Aids

Aeronautical radio aids should be carefully evaluated for their value as a radio aid or landmark for marine navigation. Usually these aids are some distance from the shoreline and would be of limited value.

6.4.1 Aeronautical Radiobeacons (S 16)

Aeronautical radiobeacons may be of value for fixing a position at sea in areas void of other radio aids. They are most useful if the service is available continuously or at least at specified hours, if they are located in coastal areas, and if there is no rough terrain between the radiobeacon and the coast since a nonuniform propagation path may render bearings unreliable.

It is impossible to predict the extent to which land effect may render mariners' receptions of the bearings of these beacons unreliable. The inclusion of aeronautical radiobeacons in National Geospatial-Intelligence Agency Publication No. 117 does not imply that the beacons have been found reliable for marine use. An aeronautical radiobeacon antenna shall be charted with a black "position accurate" landmark symbol and a 7.1-mm diameter magenta circle centered on the landmark symbol. A label in 6 pt. Swiss Regular black type shall be placed adjacent to the symbol and clear of the magenta circle. The label shall include the abbreviation "AERO R Bn" and the frequency and characteristics of the radiobeacon.

Example:

6.4.2 VHF Omnidirectional Ranges

VHF Omnidirectional Range ("Omni" for short), is an aircraft navigation system that has some application to marine navigation. Omni signals are, as the name suggests, radiated in all directions, thus enabling the user to get a very precise bearing on the transmitting station.

Ranges are quite limited for surface vessels due to their use of VHF frequencies. Nevertheless, many Omni stations are close enough to the coastline that they can be received at sea. Omni is thus most useful for "landfall navigation" or for obtaining a line of position during coastal passage.

Due to their limited range, Omni stations shall not be charted unless recommended by a reliable source. Moreover, they shall be charted as a visual aid rather than a radio aid.

The appropriate landmark symbol shall be charted with the label "ANTENNA (VOR)." (VOR stands for "very high frequency omnidirectional range.) Accurate positions for the antennas of omni stations are available from the National Geodetic Survey Division.

6.5 Radionavigation Systems

6.5.1 LORAN-C

Revised on February 16, 2010 by Cartographic Order 001/10

LORAN-C was a low-frequency, pulsed, hyperbolic navigation system managed and operated by the USCG. LORAN-C lines of position were shown on selected nautical charts for many years.

The USCG terminated transmission of LORAN-C signals on February 8, 2010.

LORAN-C lines of position shall be deleted from all new editions on which LORAN-C is charted. All notes referring to LORAN, including LORAN linear interpolators, and "LORAN-C OVERPRINTED" marginal legends shall also be deleted.

Care must be exercised to connect projection lines that had been broken to accommodate LORAN notes or interpolators. Chart detail such as shoreline, piers, obstructions, depth curves and soundings must also be restored where previously obscured by LORAN notes and interpolators.

As they serve as prominent landmarks, individual LORAN transmission towers shall remain as charted, and continue to be labeled as "LORAN TOWER" until notification is received of their dismantling or when reported as no longer prominent from the sea.

6.5.2 Global Positioning System

The Federal Radionavigation plan has designated the Global Positioning System (GPS) as the primary navigation system of the U.S. Government.

GPS position fixes are available continuously and worldwide.

The GPS uses a series of satellites operating in various nominally circular orbital planes and ground control stations. The satellites transmit on two frequencies, thus permitting a correction to be made for propagation delays in the ionosphere.

The position fix is achieved by determining the distance from the user to selected satellites. The pseudo range measurement is the propagation time from the satellite to the user based on the predicted time of transmission. Three pseudo range measurements are sufficient to define a position for a user who is restricted to the earth's surface.

GPS is operated by the U.S. Air Force and provides extremely accurate positioning.

Differential GPS (DGPS)

The U.S. Coast Guard operates marine DGPS in U.S. coastal waters. DGPS enhances GPS using an additional correction (differential) signal. This correction signal improves the accuracy of the GPS and can be broadcast over any authorized communication channel.

DGPS compares the GPS determined position of a reference station with the station's surveyed geodetic position. The differential information, obtained from the error in fix position is transmitted to user receivers by radio or other means.

NAUTICAL CHART MANUAL - VOLUME 1 - POLICIES AND PROCEDURES

CHAPTER 7 –
OTHER CHARTING INFORMATION

U.S. Department of Commerce
Office of Coast Survey

7 OTHER CHARTING INFORMATION

7.1 Tides

Revised on September 5, 2006 by Cartographic Order 009/06

Definition: TIDE is the periodic rise and fall of the water resulting from gravitational interactions between the sun, moon and earth. Tide is the vertical component of the particulate motion of a tidal wave. Although the accompanying horizontal movement of the water is part of the same phenomenon, it is preferable to designate this motion as tidal current. [1]

The Height of Tide should not be confused with Depth of Water. For measuring the height of tides, a charting plane of reference is selected. The depth of water (i.e., soundings) shown on the charts are the vertical distances from the charting plane of reference to the bottom. At any time the actual depth is the charted sounding plus or minus the height of tide. For example a charted sounding of 15 feet, the actual depth is 15 feet plus or minus the height of tide. If the height of tide is 3 feet, the actual depth would be 18 feet, or if the height of tide is negative 1, the actual depth would be 14 feet. [1]

7.1.1 Coastal Charts

General Requirements

In coastal navigation in an area where the tidal range is appreciable, it is useful to know the approximate height of water above or below chart datum which may be expected at high and low tides. This information, which does not normally change from year to year, shall be shown on all charts of a scale larger than 1:200,000 in a tabulated form (see page 7.1.1.1, Figures 7-1 and 7-1a) or narrative note (see page 7.1.1.2). Selected Tide Table information is printed on Small-Craft Charts to aid mariners who may not be equipped with Tide Tables (see Section 7.5, Small-Craft Information).

When requested by the Nautical Data Branch (NDB), tidal information is furnished by the Center for Operational Oceanographic Products and Services (COOPS). This would include observed t tides in the vicinity of reported dangers considered critical to navigation. COOPS is the authority for adding new tide stations and removing existing tide stations that are depicted in tabulated tide notes or narrative tide notes on nautical charts. Tide information for Canadian waters should be obtained from Canadian Nautical Charts.

7.1.1.1 Tabulated Tide Note

The tabulated tide note provides tidal datum values for Mean Low Water (MLW), Mean High Water (MHW) and Mean Higher High Water (MHHW). The values given in the tabulated tide note of a chart are referred to the plane of reference of the soundings on that chart. As an example, the value

stated under Mean High Water is the mean of all high waters observed at the station named. The tidal datum for Extreme Low Water (ELW) is no longer supported by COOPS and shall be removed from all charted tabulated tide notes. Additional information describing the various tidal datums is available in the Nautical Chart Manual (see Section 2.8.2, Vertical Datums).

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
South Bight, Amchitka Island	(51°23'N/179°23'W)	3.5	---	---
Constantine Harbor	(51°25'N/179°17'W)	2.8	2.4	0.9
Dashes (- - -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov				

(Sep 2004)

Figure 7-1

TIDAL INFORMATION

PLACE		Height referred to datum of soundings (MLLW)		
NAME	(LAT/LONG)	Mean Higher High Water	Mean High Water	Mean Low Water
		feet	feet	feet
Ocracoke Inlet	(35°04'N/76°01'W)	2.2	2.0	0.1
Ocracoke	(35°07'N/75°59'W)	1.2	1.0	0.1
NOTE: In Pamlico Sound, except near the inlets, the periodic tide has a mean range of less than one-half foot.				
Dashes (- - -) located in datum columns indicate unavailable datum values for a tide station. Real-time water levels, tide predictions, and tidal current predictions are available on the Internet from http://tidesandcurrents.noaa.gov				

(Oct 2005)

Figure 7-1a

Tidal Information

Chart tidal information values should be requested through the Nautical Data Branch (NDB) for each new edition printing of a nautical chart. The date of the tabulated tide note shall be the date on which the latest information was obtained from COOPS.

Feature Recommendation for Notice to Mariners

A newly applied, revised, or a deleted tabulated tide note typically will not require a Notice to Mariners.

Location and Orientation

The tabulated tide note on Conventional Nautical Charts shall be charted in the title block area.

Size and Shape

Tabulated tide notes on Conventional Nautical Charts shall be fixed in format with a width of inches, but variable in length to accommodate the necessary tide station information.

Labels and Notes

The tabulated tide note shall be charted with 6 pt. Swiss Light. The tabulated tide note on Conventional Charts shall be portrayed with a tabulated listing of the tide range for selected locations on the charts. Preformatted cells in the Microstation cell library shall always be used when adding new tabulated tide notes to a chart. The cartographer may modify a cell to add more tide stations when a COOPS source indicates that more than ten tide stations should be included in a tabulated tide note for a chart.

The tabulated tide note shall use the primary location name for each tide station. For example, the COOPS source lists a tide station name as Smith Point Light, Chesapeake Bay, Western Shore, Virginia, the tabulated tide note will list only the Smith Point Light section of the name.

The approximate geographic position, if available, shall be charted for each tide station listed in the tabulated tide note.

Tabulated tide notes for metric charts shall be charted in meters.

The date shall be shown in the lower left corner of the tabulated tide note, giving the abbreviation of the month and the year in parentheses. Thus: (Jan 2006)

Color and Screening

Tabulated tide notes on Conventional Nautical Charts shall be charted with black.

Feature Removal from Chart

Where there is no active tide station in the area of the chart as reported from COOPS, the tabulated tide note shall be removed from the chart and replaced by the following note.

TIDAL INFORMATION
No tidal observations are available for the area
covered by this chart.

Chart tidal information values should be checked for every new chart edition in order to replace this note as new information becomes available.

7.1.1.2 Narrative Tide Note

Charts of rivers where the tidal influence is diminished shall chart tidal information with a narrative note. Example:

TIDES
The diurnal range of the tide at Vancouver (45°37'N/ 122°40'W) during low river stages is 1.8 feet. The range becomes progressively smaller with higher stages of the river.
Apr 2005

Charts of rivers not subject to tidal influence may be charted with a profile graph and explanatory note.

Selective charts where the area covered by the chart have a periodic tide where the mean range is less than one half foot, shall chart tidal information with the following narrative note.

TIDAL INFORMATION
In the areas covered by this chart the periodic tide has a mean range of less than one half foot.

Tidal Information

Chart tidal information values should be requested through the Nautical Data Branch (NDB) for each new edition printing of a nautical chart. For narrative tide notes that contain a date, the date shall be updated using the latest information obtained from COOPS.

Feature Recommendation for Notice to Mariners

A newly applied, revised, or a deleted narrative tide note typically will not require a Notice to Mariners.

Location and Orientation

The narrative tide note on Conventional Nautical Charts shall be charted in the title block area.

Size and Shape

Narrative tide notes on Conventional Nautical Charts shall be fixed in format, but variable in size to accommodate the necessary tidal information.

Labels and Notes

Tidal information shown with a narrative note shall be charted with 7 pt Swiss Light.

The narrative tide note shall use the primary location name for each tide station. For example, the COOPS source lists a tide station name as Vancouver, Columbia River, Oregon, the narrative tide note will list only the Vancouver section of the name.

The approximate geographic position, if available, shall be charted for each tide station listed in the narrative tide note.

Narrative tide notes for metric charts shall be charted in meters.

For narrative tide notes that contain a date, the date shall be shown in the lower right corner of the note, giving the abbreviation of the month and the year. Thus: Jul 2005

Color and Screening

Narrative tide notes on Conventional Nautical Charts shall be charted with black.

Feature Removal from Chart

Where there is no active tide station in the area of the chart as reported from COOPS, the narrative tide note shall be removed from the chart and replaced by the following note.

TIDAL INFORMATION
No tidal observations are available for the area covered by this chart.

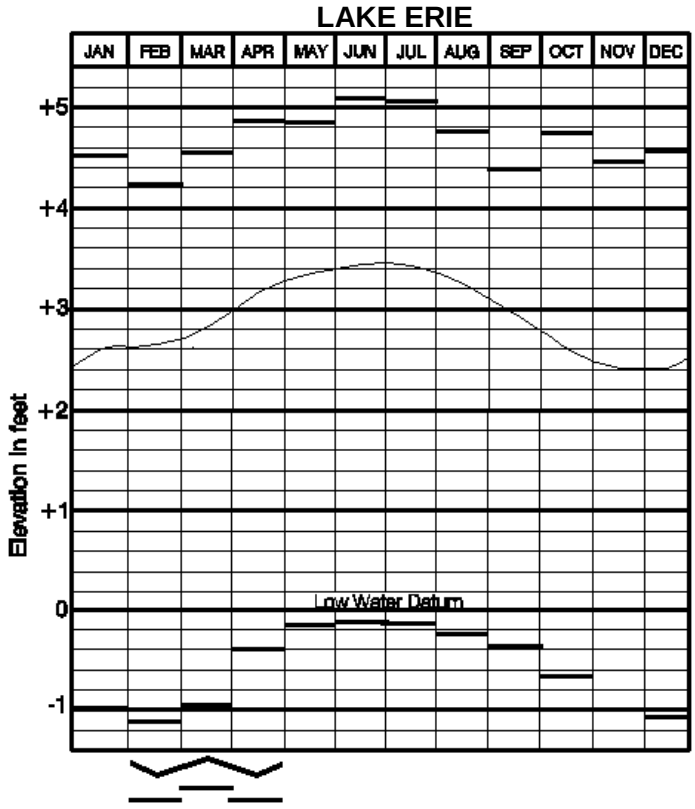
Chart tidal information values should be checked for every new chart edition in order to replace this note as new information becomes available.

7.1.2 Great Lakes Charts

In the Great Lakes, where the monthly fluctuation of the water level is discernible, a hydrograph (Figure 7-2) is charted. The hydrograph shows average and extreme water levels. The curve depicting average water level is based on a 10-year average. The extreme water level shows the highest and lowest monthly mean stages for the entire period of record (from 1900 to the present).

A separate hydrograph is furnished for all metric charts of the Great Lakes and the reference to elevations is shown in meters.

The Low Water Datum (LWD), which is the plane of reference for the levels shown on the hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below LWD, the existing depths will be correspondingly greater or lesser than the charted depths.



Average levels (1987-1996)
Extreme Levels (period of record)
Low Water Datum, which is the plane of reference for the levels shown on the above hydrograph, is also the plane of reference for the charted depths. If the lake level is above or below Low Water Datum, the existing depths are correspondingly greater or lesser than the charted depths.

Figure 7-2

When requested by NDB, a 10-year lake-level tabulation is furnished by the Center for operational Oceanographic Products and Services. A revised tabulation should be available each February. The cartographer compiles the hydrograph from the lake-level tabulation. This hydrograph should be updated for each New Edition of the chart.

7.2 Currents

Currents and their peculiarities often make narrow waterways extremely hazardous for the mariner. Numerous ocean inlets are difficult and dangerous to navigate when certain combinations of current and onshore surf conditions exist. In many narrow bodies of water, the maximum current velocities are so great that passage is impossible for vessels of limited power and is substantially slowed for most others. In addition, adverse currents can make it difficult for a vessel to maintain steerage in areas where known dangers exist. Thus sufficient warning of such currents must be given to allow mariners to adequately prepare and plan for safe transit. Areas where currents exist that are considered dangerous to navigation during certain stages of tide should be emphasized with a note describing the unsafe conditions. The note should be placed in the vicinity of the hazardous conditions.

Where currents of particular importance to navigation are found to exist during survey operations, they are noted on the survey sheet or in the DR. Such notes may indicate areas where submerged obstructions exist and where clear chart notation can give mariners advance warning of such dangers.

The following current characteristics shall be transferred to the chart with as little displacement of position from the source as possible:

Eddies (H 45)

Eddies are circular movements of water that are formed between two adjacent currents flowing counter to each other or where currents pass over or around obstructions, especially on the downstream side. Eddies are charted with symbols H 45. A label is not recommended.

Strong Currents (H 40, H 41, H m)

Strong currents are produced by the movement of water in a horizontal direction and may be narrow, deep, and fast-moving. They usually gain their unusual velocity and depth from constriction of the waterway. Currents may be indicated with a note, a label, or symbols H 40, H 41, or H m.

Swirls

Swirls are circular movements of water formed where currents pass over obstructions. Swirls may be charted with a label.

Tide Rips (H 44)

Tide rips are waves formed on the water surface by the meeting of opposing tidal currents, or by a tidal current crossing an irregular bottom. Tide rips are charted with symbol H 44. A label is not recommended.

7.3 Magnetics
Revised on March 31, 2003 by Cartographic Order 005/03

Magnetic information is charted to provide mariners with the values necessary to make compass adjustments in order to plot true courses. The location of 'magnetic north' and 'true north' are not the same. Some means of reference between magnetic north and true north is needed on the charts (particularly for smaller scales). The magnetic values are charted with compass roses or isogonic lines. A North arrow symbol is used in some cases. An explanatory note is used in areas where local magnetic disturbances occur.

7.3.1 Compass Roses

Definition: A **COMPASS ROSE** is a circle graduated in degrees clockwise from 0° (north) to 360° printed on a chart for use as a protractor. Compass roses are placed at convenient locations to facilitate measurements of directions. They may be oriented to the true or the magnetic north.

General Requirements

A sufficient number of compass roses (see Figure 7-3) are placed on charts to help mariners plot bearings and lay out courses. They show the magnetic variation (or declination) for the charted area as of a specified date and state the annual increase or decrease which mariners must adjust for. This is necessary because magnetic declination is changing constantly due to the fluctuations of the Earth's magnetic fields. The compass roses used on NOS Charts consist of an outer circle in degrees, with zero at true north, and an inner circle in points and degrees with the arrow indicating magnetic north.

Compass roses shall be charted on all charts and insets. Where space is limited, a north arrow pointing to true north may be substituted.

In general, on charts showing isogonic lines (see Section 7.3.3), the compass rose consists of a compass circle with zero at true north and a center arrow oriented in accordance with the direction and amount of variation (see Figure 7-4). However, on charts 13200 and 13260, the full compass rose is shown (see Figure 7-3.) On International Charts and metric charts 14800 and 14820 only the outer rose is shown (see Figure 7-5).

The information concerning magnetic variation which appears on a compass rose shall be updated for each new edition of the chart. Data for generating compass roses are maintained and furnished to NOS by the National Geophysical Data Center (NGDC) of the National Environmental Satellite, Data, and Information Service, Boulder, Colorado. This information is generated using the PLACE ROSE computer program. The World Magnetic Model (WMM) is to be used for updating compass rose information for all NOS Charts. The current model is for the 2010 Epoch (WMM-2010). The model is updated every 5 years.

Cartographers should also note that when the magnetic model changes there may be unforseen changes in both the variation and annual change. These changes should be reported to QAPSG. Magnetic variations derived for a given year should be calculated to be January 1 of that year. They should be entered into the Model as year 3 (e.g., 2003).

Magnetic variations shown in the center of the rose shall be rounded to the nearest 15 minute interval. Annual change shown in the center of the rose shall be rounded to the nearest whole minute. If the new variation is larger than the previous one, the annual change is an increase regardless of direction. Conversely, if the new variation is smaller than the previous one, the annual change is a decrease.

Cartographers should be alert for areas where the variation has gone through 0. In these cases the change will go from a decrease to an increase.

Feature Recommendation for a Notice to Mariners

A newly applied, revised, or deleted compass rose shall be evaluated for a Notice to Mariners.

Location and Orientation on Chart

Compass roses cannot be placed in final position until the amount of rotation of the inner rose is known.

Compass roses should be positioned on a chart so as to be convenient to the most important navigational areas, and at such intervals that all water areas are within the reach of a parallel ruler. In some cases it will be necessary to remove topographic features when compass roses are placed on land areas. In no case should compass roses cover or even be placed close to any danger in the water area. Nor should they be placed at the entrance to a harbor. When placed in a water area, every effort must be made to assure that the rose's graduations and numbers do not fall on soundings or bottom characteristics; if necessary, a new selection of soundings should be made or move the rose. This applies to all charts. Compass roses can be repositioned at the discretion of the cartographer.

Projection lines shall be charted through compass roses. Projection intersections shall not be removed since they are used for plotting reference and control of various chart information.

Care must be taken not to place a compass rose on a projection intersection; this will assure that a compass rose construction line is not mistaken for a projection line. If a compass rose must be positioned on a projection line, as on Great Lakes charts with polyconic projections, the cartographer should attempt to align the compass rose on a meridian rather than a parallel.

There shall be one compass rose for each down fold of a small-craft nautical chart. They shall not be charted on the up or down folds.

Size and Shape

Compass roses shall be charted according to the standard cartographic symbols in Chart No. 1 (B 70) with one of the following diameters according to the space available: 2, 2-1/2, 3, 3-1/2, 4, 5". The largest diameter rose possible shall be used. Compass roses without the inner circle shall be charted with a 5" diameter outer circle.

Labels and Notes

The magnetic variation and annual change shall be charted on the inner rose with magenta 7 pt. Swiss Light on 5" roses. Magenta 5 pt. Swiss Light shall be used for inner roses less than 5". All letters shall be capitalized.

The magnetic variation shall be charted in degrees and minutes followed by the letter E or W (east or west as appropriate) immediately followed by the year of the computation in a parenthesis. An increase or decrease in the annual change shall be expressed in minutes. See Figures 7-3 and 7-4 for examples.

When the magnetic variation rounds to 0_00', the text, NO VARIATION, immediately followed by the year of the computation in a parenthesis shall be charted. When the annual change rounds to 0_00', the text, NO ANNUAL CHANGE shall be used. Where there is no variation the annual change shall be given as so many minutes E or W.

Color and Screening

Compass roses shall be charted with magenta on all new charts and all new editions.

Feature Removal from Chart

Compass roses shall not be removed from the chart without authorization by the Chief of Marine Chart Division.

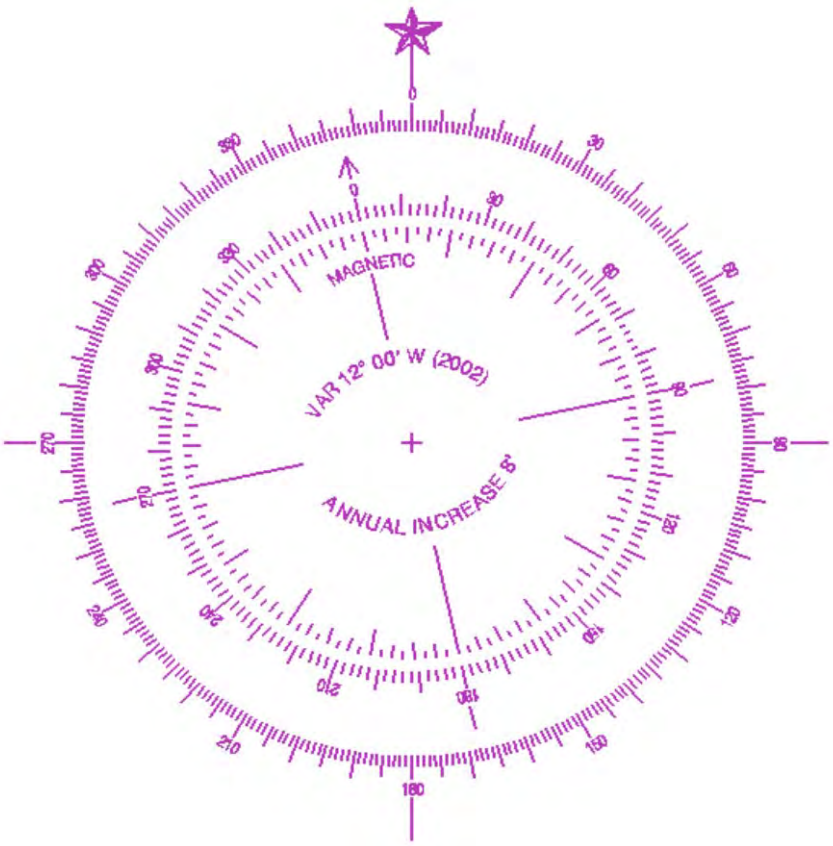


Figure 7-3

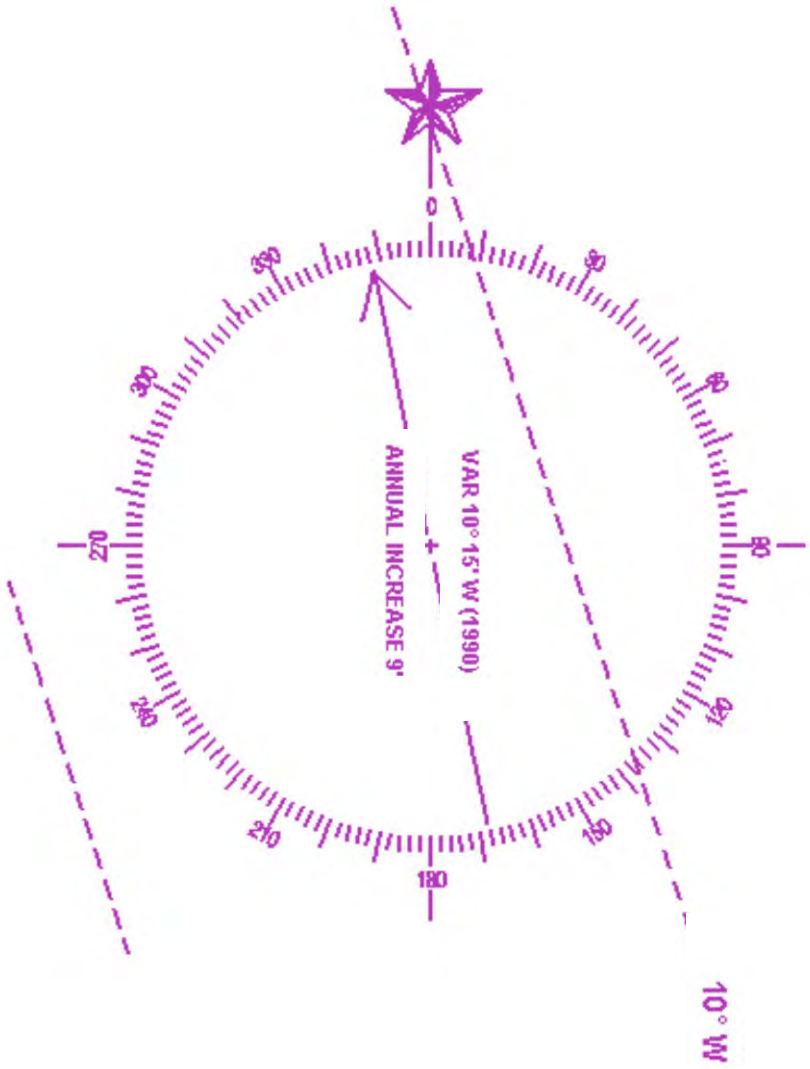


Figure 7-4

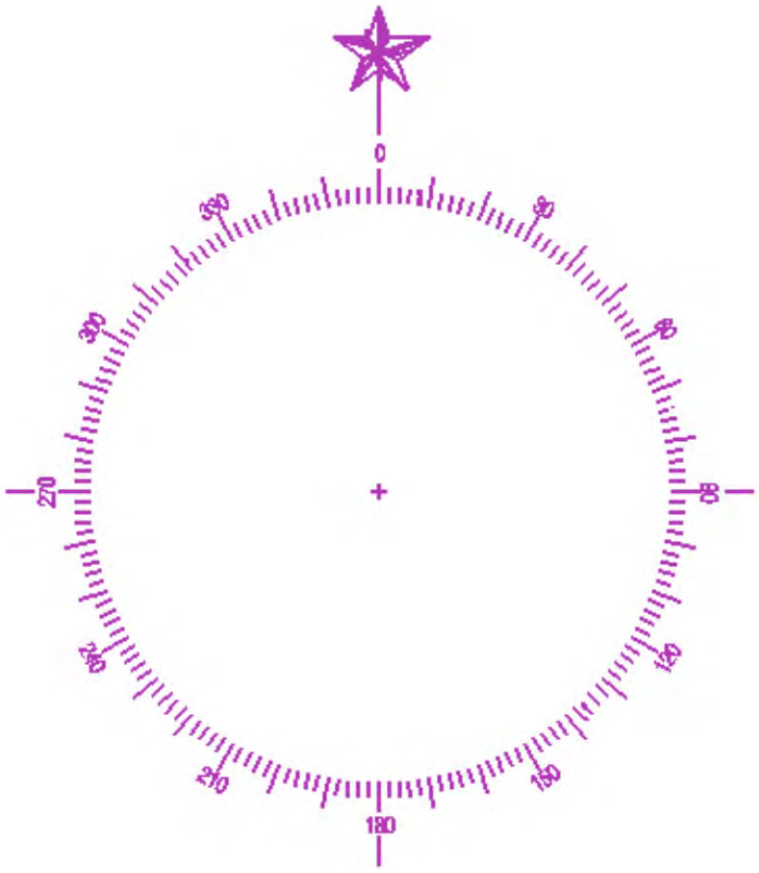


Figure 7-5

7.3.2 Local Magnetic Disturbance Notes

Definition: **LOCAL MAGNETIC DISTURBANCE** is an anomaly of the magnetic field of the earth, extending over a relatively small area, due to magnetic influences. It is also called local attraction, or magnetic anomaly.

General Requirements

Local magnetic disturbance, which causes noticeable deflections of the compass, is a fairly common occurrence in shallow water and near mountain masses. Notes shall be placed on charts to call attention to local magnetic disturbance. These notes should be based on information furnished by the NOS Hydrographic Field Party or by the National Geophysical Data Center (NGDC) of the National Environmental Satellite, Data, and Information Service, in Boulder, Colorado. The NGDC should be notified of information on magnetic anomalies that originates outside NOS.

Feature Recommendation for a Notice to Mariners

Newly applied, revised, or deleted local magnetic disturbances shall be evaluated for a Notice to Mariners.

Location and Orientation on Chart

Local magnetic disturbance notes shall be charted where deviations of 2° or more from the normal value of magnetic declination exist (3° more in Alaska).

Labels and Notes

All notes concerning local magnetic disturbances shall be charted with 7 pt. Swiss Light, set either 2" or 3- 1/2" wide.

Examples of notes follow:

LOCAL MAGNETIC DISTURBANCE

Differences from normal variation of as much as 5° have been observed in Gastineau Channel in the vicinity of Lat. 58°15'.

LOCAL MAGNETIC DISTURBANCE

Differences of 12° or more from normal variation may be expected in X Channel in the vicinity of Z Point.

When limited by space, the full note should be placed elsewhere on the chart and the following reference note shown (in magenta) in the area of the disturbance:

LOCAL MAGNETIC DISTURBANCE
(see note)

Color and Screening
All notes concerning local magnetic disturbances shall be charted with magenta.

Feature Removal from Chart

Notes concerning local magnetic disturbances shall not be removed until an established authority provides conclusive evidence that a magnetic disturbance no longer exists in the charted position.

7.3.3 Isogonic Lines

Definition: An **ISOGONIC LINE** is a line connecting points of equal magnetic variation.

General Requirements

Variations (declinations) may be shown by isogonic lines on smaller-scale charts. The line passing through points having zero variation is called the "agonic line."

Isogonic lines pass through all points where the magnetic needle is deflected from the geographic meridian by the same amount. Isogonic lines shall be shown on those charts on which a variation of 1° will, in general, result in a distance between the lines of less than 12 inches. Each line shall not be broken except for topographic features.

This information shall be updated for each new edition of the chart. Data for generating isogonic lines are maintained and furnished to NOS by the National Geophysical Data Center (NGDC) of the National Environmental Satellite, Data, and Information Service, in Boulder, Colorado. It is generated using the ISOGONIC2 computer program and is based on the WMM.

Isogonic lines shall not be charted on Small-Craft Nautical Charts.

Feature Recommendation for a Notice to Mariners

Newly applied, revised, or deleted isogonic lines shall be evaluated for a Notice to Mariners.

Location and Orientation on the Chart

Isogonic lines shall be charted inside the charts neatline and seaward of the shoreline.

Line Type and Weight

Isogonic lines on International Charts shall be charted with a solid line: 0.20 mm (0.008").

Isogonic lines on other charts shall be charted with a dashed line: 0.2/2.0/0.75 mm (0.008/0.080/0.030").

Labels and Notes

All notes concerning isogonic lines shall be charted with magenta 7 pt. Swiss Light, set either 2" or 3-1/2" wide.

Charts with isogonic lines shall carry the following magenta note near the title box stating the name of the model used and the year the model was computed. Because the position of the charted isogonic lines will vary to reflect annual variations, also include the year in which the lines were computed.

MAGNETIC VARIATION

Magnetic variation curves are for 2003 derived from 2000 World Magnetic Model and accompanying secular change. If annual change is in same direction as variation it is additive and the variation is increasing. If annual change is opposite in direction to variation it is subtractive and the variation is decreasing.

Isogonic lines shall be labeled with the amount and direction of variation in magenta 8 pt. Swiss Regular. On every fifth line, the amount and direction of variation shall be shown along with the date. In such cases, the compass rose shall consist of the outer rose oriented to true north with a center arrow aligned to the variation value. See Figure 7-4.

Example: 2_ W (2003)

International Charts and metric charts 14800 and 14820, only the outer rose is charted, the isogonic lines shall be labeled with the amount and direction of variation, amount and direction of annual change in magenta 8 pt. Swiss Regular. On every fifth line the date shall be shown as well. A label, denoting a shift in the amount or direction of annual change, shall be placed along the isogonic line where the change occurs.

Example: 2_ W (1' E) (2003)

The magnetic variation shall be charted in degrees followed by the letter E or W (east or west) as appropriate. The isogonic line of 0 shall by labeled NO VARIATION. The annual change shall be charted in minutes followed by the letter E or W (east or west) as appropriate. The annual change of 0 minutes shall by labeled NO ANNUAL CHANGE.

Color and Screening

Isogonic lines shall be charted with magenta.

Feature Removal from Chart

Isogonic lines shall not be removed from the chart without authorization by the Chief, Marine Chart Division.

7.4 Nomenclature

Revised on December 2, 2015 by CO 007/15

Definition: **NOMENCLATURE.** The system or set of names used in a specific branch of learning or activity. [29]

Definition: **GEOGRAPHIC NAMES.** The term “geographic names” refers to localities, natural features, and man-made waterways. It also applies to certain man-made objects or features such as airports, buildings, parks and tunnels. [29]

Definition: **TYPOGRAPHY.** The style, arrangement, or appearance of matter printed from type. [29]

This section sets forth rules on nomenclature--including geographic names--and typography. It should be noted that, while details on such things as orientation of type, capitalization, and so forth are found below, specific rules regarding type size and style are located in the various other chapters throughout this manual (e.g., information on the type size and style for lights is found in Section 5.3.2, Light Characteristics).

General Requirements

Geographic Names

The Geographic Names Information System (GNIS), a database developed and maintained by the U.S. Geological Survey for the U.S. Board on Geographic Names, is the official repository for all federally recognized physical and cultural geographic names found in the United States. This database, located on the Internet at http://geonames.usgs.gov/, shall be considered the authoritative source for geographic names used on all Coast Survey products.

Any primary name (i.e., Feature Name) found in the GNIS database can be used as a source for a chart name change, revision, or addition, without the approval of the Chief Geographer. When used as a source for a name change, documentation of the change must be provided for by way of a chart letter. This chart letter shall be created by the Nautical Data Branch from a GNIS query printout, provided to NDB by the cartographer.

If a request is received from an outside source (e.g., by way of NSD from a Nav Manager), a name found in the GNIS as a "Variant Name" may be charted at MCD's discretion. The request must pass through NDB, where it will be made into a chart letter. The variant name shall not replace the approved name, only used in addition to it. The variant must be placed in parentheses below the approved name (beside if space does not allow), and in a slightly smaller sized type.

New geographic names (i.e., names not found in the GNIS but found on new source documents) shall not be charted until they have been referred to the Chief Geographer, researched, and approved by the U.S. Board on Geographic Names.
Within the constraints outlined above, it is the responsibility of the cartographer to determine which names shall or shall not be charted. This determination will be based on the name's importance or usefulness on a particular nautical chart.

Should discrepancies arise, be aware of the fact that there are some names that the BGN does not generally make rulings on. These are as follows (adapted from their "Principles, Policies and Procedures: Domestic Geographic Names" document):

- Names Established by Act of Congress or Executive order--Geographic names and their applications specifically established by an act of Congress or Executive order are official by law. This does not apply to geographic names used incidentally in language of an act of Congress intended for other purposes, unless the language clearly indicates that naming is part of the intent of the act.

- Names established by an act of Congress or by Executive order may include any of the entities specified below. If not named by act of Congress or Executive order, such entities generally are named by the administering agency under the authority of an act of Congress (see next bullet).

    1. National Fish Hatcheries (Interior/Fish and Wildlife Service)
    2. National Forests (Agriculture/Forest Service)
    3. National Game Ranges (Interior/Fish and Wildlife Service)
    4. National Grasslands (Agriculture/Forest Service)
    5. National Historic Landmarks (Interior/National Park Service)
    6. National Historic Sites (Interior/National Park Service)
    7. National Marine Sanctuaries (Commerce/National Oceanic and Atmospheric Administration)
    8. National Monuments (Interior/National Park Service)
    9. National Parks (Interior/National Park Service)
    10. National Recreation Areas (Agriculture/Forest Service and Interior/National Park Service)
    11. National Recreation Trails (Agriculture/Forest Service and Interior/National Park Service)
    12. National Scenic Trails (Agriculture/Forest Service/Interior/National Park Service)
    13. National Seashores (Interior/National Park Service)
    14. National Wild and Scenic Rivers (Agriculture/Forest Service and Interior/National Park
    15. Service)
    16. National Wildlife Refuges (Interior/Fish and Wildlife Service)
    17. Wilderness Areas (Interior or Agriculture)
    18. The names of some reservoirs also have been established by Congress.

- Names Established by Other Authorities--Certain categories of names only rarely are the subject of decisions by the Board, generally because they fall within the purview of other authorities. These are specified at the end of this chapter. The Board may, however, decide to rule on such names if necessary to settle conflicts between different agencies.
- Independent of whether decisions are rendered, the Board may include such names in lists it issues from time to time, as part of its responsibility to promulgate standard names for U.S. Government use. (See Sec. 5 of Public Law 80-242.)

The following categories of names generally are not the subject of decisions by the Board:

- Facilities, offices, establishments, and bounded areas of administration of Federal agencies-- Examples are Forest Service stations and ranger districts (Department of Agriculture, Forest Service); military bases and reservations (Department of Defense); Coast Guard lighthouses and lifesaving stations (Department of Transportation); and post offices (U.S. Postal Service).

- However, the names adopted by these agencies apply to the facilities themselves, but not necessarily to similar names of adjacent communities or geographical features. Such names may be the subject of Board decisions.

- Facilities, offices, establishments, and bounded areas of administration of State and local governments--Examples are regional forest preserves, State parks, municipal buildings and parks, municipal airports, and public schools.

- Indian reservations--Names of these generally are specified in an act of Congress, a treaty, or an Executive order.

- Administrative geographic subdivisions (counties, cities, townships, and similar legally incorporated units)--These entities are created under State law, which typically prescribes procedures for establishing their names. Included are entities that generally have local self-government such as cities, towns, townships, boroughs, villages, and plantations (in Maine); districts, precincts, and similar entities established as administrative subdivisions of larger units; wards of cities; and municipios, barrios, and similar entities in Puerto Rico and the outlying areas. The Board frequently promulgates current information on such names but renders decisions only in rare instances of conflict or ambiguity between established sources.

- Local transportation, communication, navigational, and water-management features--Names of highways, streets, bridges, ferries, tunnels, airports, radio and television towers, buoys, artificial fishing reefs, dams, ditches, and canals that are constructed or administered by a government or quasi-government agency generally are named by the appropriate office. Only if a conflict arises does the Board become involved.

- Structures and other manmade features on private property--Examples are shopping malls, resorts, mines, oil rigs, churches, cemeteries and stations, stops, and sidings of railroads and other public transit facilities. As in the case of post offices, a railroad station name does not automatically apply to the adjacent community, whose name may be the subject of a Board decision. A Board decision also may be called for when several property owners are involved, or when a feature is no longer active (for example, an abandoned mine) if the correct name is in doubt.

Foreign Names, Undersea Features

Should questions arise regarding foreign place-names or undersea features, the GEOnet Names Server maintained by the National Geospatial-Intelligence Agency is the repository of foreign names approved by the BGN. This database covers names world-wide, but excludes the United States and Antarctica. It can be found at: http://geonames.nga.mil/gns/html/index.html.

Abbreviations

Abbreviations of names and terms on charts shall be avoided. It is standard practice, however, to abbreviate names of railroads and the word "Point" when the latter is part of the name of a geographic feature.

When abbreviations are necessary, only those listed in Chart No. 1 shall be used. *"Shl"* for shoal, *"Bk"* for bank, *"Str"* for stream, *"Cr"* for creek, or *"R"* for river shall not be used when space permits charting the full name.

When names of accurately located landmarks must be abbreviated, they are to be charted in caps, e.g., "APT", "HOSP". Standard abbreviations for landmarks may be used at the discretion of the cartographer.

Charted abbreviations shall not include periods. Periods are used only where needed for clarification, such as for punctuation in notes (exception, months in edition and corrected through dates – see below).

Abbreviations of Calendar Months

Calendar months are expressed on Marine Chart Division nautical products as either numeric values or as alphabetical characters. Alphabetical months are most commonly abbreviated in the titles of channel tabulations, channel legends and controlling depth notes, while numeric values can be found in the body of channel tabulations.

Except for the month of May, and in edition and corrected through dates, all calendar months shall be abbreviated using the first three alphabetical characters of the respective month, without a period.

Capitalization

These rules regarding the capitalization of type shall be observed:

The first letter of single-word labels shall be capitalized, e.g., *"Mud"*, "Tank", "Marsh", *"Uncovers"*, "Wooded".

Only the first letter of the first word in labels of two or more words shall be capitalized, e.g., "Oil tank", "Densely wooded", *"Sand and mud"*.

Similarly, only the first letter of the first word or terms referring to action areas shall be capitalized, e.g., *"Being filled"*, *"Proposed fill"*.

Exceptions to these rules are as follows:

All letters in the names of landmarks charted with the accurate landmark symbol, as well as the names of lights, shall be capitalized, e.g., "TANK", "STACK", "RADIO TOWER", "SKUNK BAY LT".

All letters in the names of outlined buildings, objects, and features that are known to be conspicuous (e.g., USS NEW JERSEY) shall be capitalized, except on small-scale charts or where space is limited.

Depth legends originating from authoritative source shall be capitalized, e.g., *39 FT DEC 2003*.

The first letters of all words identifying public buildings, parks, etc., shall be capitalized, e.g., "Post Office", "Municipal Stadium", "Central Park".

Unless they are in parenthesis, the first letter of all words in the following terms shall be capitalized, e.g., "See Inset", "See Extension", "See Caution".

The first letter of all words referring to a charted area shall be capitalized, e.g. *"Cable Area"*, *"Danger Area"*, *"Foul Ground"*, *"Tidal Flats"*, *"Prohibited Anchorage"*, *"Dump Site"*, *"Spoil Area"*.

Labels that are enclosed in parentheses shall be in all lowercase letters, e.g., "(snow-capped)", "(ruin)", "(marked by beacons)". An exception would be made if the label referred to a specific note, e.g., *"(see note A)"*.

Feature Recommendation for a Notice to Mariners

Newly applied, revised or deleted chart nomenclature shall be evaluated for a Notice to Mariners.

Line Type and Weight

None applicable

Location and Orientation

Vertical vs. Italicized Names

Vertical type is used for names of topographic features and fixed objects which extend above high water. Italicized (slant) type is used for names of hydrographic features, including names of water areas, underwater features, and floating aids.

Placement of Names

When feasible, names of land features shall be placed in land areas, and those of water features shall be placed in water areas. The name of a feature which covers a considerable area, such as an island or bay, shall be placed approximately in the center of the area.

However, names must not obscure anchorage areas in small bays or detailed hydrography in critical areas. To prevent this, the name of a water feature may be placed on an adjacent land area. A name must not be placed along the axis of the deepest water, nor across a channel, if it can be arranged otherwise. Names shall be placed to appear either entirely on a tinted area or entirely on an untinted area.

Town and city names shall be located near the place named, but should not interfere with other data on the chart.

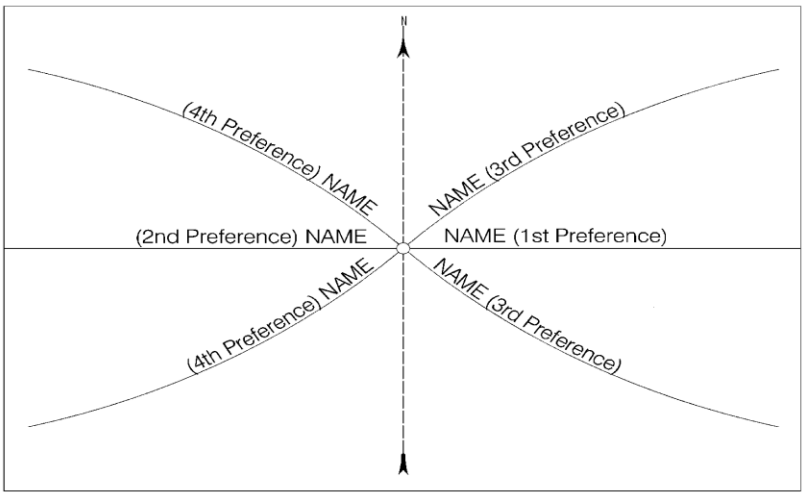
(The remainder of this page is intentionally blank.)

Orientation of Nomenclature

Chart nomenclature is generally oriented parallel to the bottom of the chart. When the axis of a channel is practically straight, the name should be on a line parallel to it. The name of a range should be parallel to the range line.

All terms and all names not parallel with the bottom of the chart, and not following a feature such as a channel or range line, shall be placed on a curve so as to read from the direction of the bottom of the chart. Such names shall be near, and point either to or from, the feature named (see diagram at the top of the next page).

A curved name is most legible if it begins approximately parallel to the bottom of the chart. Type shall not be curved beyond the vertical. Sharp (v-shaped and u-shaped) curves shall be avoided. Names and terms on nautical charts shall not be placed on double (s-shaped) curves.



Size and Shape

Letter Spacing

The letter spacing for charted names and labels shall be done in such a way as to clearly identify the charted feature. Except in cases where names follow a feature of unusual length (e.g., rivers, peninsulas), type shall be placed with an inter-character spacing of zero. When placing type along lengthy features, letters shall be spaced for easy reading. If necessary, the name can be repeated further along the feature.

When two or more words constitute a single name or term, they shall be separated by a single space.

Labels placed on unusually long features shall not be spaced with inter-character distances greater than three times the height of the letters.

Type Size

In determining the size of type to be used for labels and names, the main chart title shall be given the largest size. All other type shall be smaller. Minor names of local importance shall be the smallest type size. The space available on the chart and the relative importance of the feature to which the name or term applies shall also be considered in selecting the size and spacing of the type.

Labels and Notes

Notes on charts shall generally be set at 2 or 3.5 inches in width, though wider notes are permissible. The style, size, and spacing of labels and notes used on nautical charts can be found in the Nautical Chart Manual, Volume Two, Appendix IV.

Color and Screening

All topographic and hydrographic feature names shall be charted in black. See individual specifications for color and screening requirements of all other charted features.

Feature Removal from Chart

Geographic names shall be removed from the chart at the discretion of the cartographer.

7.5 Small-Craft Information
Revised on December 10, 2014 by Cartographic Order 015/14

The various types of small-craft charts are listed in Section 1.3.2, Small-Craft Charts. Special information inherent to small-craft charts are weather broadcast information, chart diagrams, and notes designed for the small-craft mariner.

1. Marine Facility Tabulations

For many years, small-craft charts included a tabulation of commercial marine facilities that were open to the public and found within the chart limits and had at least the following services and information available at each facility: fuel (gasoline and/or diesel), pumpout facility or access to a municipality facility, transient berths and/or moorings and alongside depth.

A number was assigned to each facility in the tabulation. This number was shown in magenta and was placed on land in the vicinity of the facility. A magenta leader pointed to the exact facility location.

Small-craft operators have other sources of marine facility information. Marine facility tabulations shall no longer be maintained or shown on NOAA Nautical Charts. Magenta facility numbers and associated leaders shall also be deleted from the charts.

2. Tide Tables

For many years, tide tables applicable to the charted area were added to small-craft charts. The tide tables selected for charting covered the period of expected use of the new edition. This information is available from the CO-OPS website and shall not be charted as a tide table.
Any charted tide table shall be replaced by a tabulated tide note (also known as a Tidal Information Box). See Section 7.1.1.1. NDB obtains tidal information from CO-OPS and registers the tabulated tide note as a source document.

3. USCG Radio Broadcast Note

USCG radio stations are listed on small-craft charts because they broadcast NM information and some stations also broadcast weather forecasts provided by the National Weather Service. The note will contain the name and call letters of the station, the channel and/or frequency, and the transmission times.

4. Nautical Chart Diagram

Each small-craft chart contains a diagram showing the limits of all nautical charts in the general area of the small-craft chart. These diagrams may be derived from the online Nautical Chart Catalog. The addition of new charts or the revision of existing chart limits shall be in agreement with the revised online Nautical Chart Catalog.

5. Special Small-Craft Notes

A series of special general information notes have been prepared for small-craft mariners. These notes include information concerning Intracoastal Waterway project depths and aids to navigation, safety hints, abridged rules of the road, weather radio broadcast information, public boating instruction programs, special information notes, etc. These notes shall be added within the charting limits. These notes should be included as space permits, with the Intracoastal Waterway notes receiving first priority on charts of the Intracoastal Waterway.

7.6 Miscellaneous Notes

7.6.1 Comments Request Note
Revised on August 20, 2013 by Cartographic Order 007/13

As an inducement to chart users to send in information for correcting the nautical charts and to submit comments or inquiries, the following note will be shown on all charts:

> NOAA encourages users to submit inquiries, discrepancies or comments about this chart at http://www.nauticalcharts.noaa.gov/staff/contact.htm.

The note shall be in black, 7 pt. Swiss Light. In addition, the note shall be outlined with a .008-inch black border.

Placement of this note shall be in the following order of preference.

On conventional charts:

1. Lower left margin, 15 mm to the right of the magenta "CAUTION" note;

2. Any prominent location in the lower margin;

3. Top left margin, aligned with the left outside border;

4. Any prominent location in the top margin.

On small-craft route charts:

1. Any prominent location within the chart along the base (bottom) on one side only;

2. Any prominent location within the chart along the top on one side only;

3. Omitted if note cannot be conveniently accommodated.

On folio and book charts, placement shall be in any prominent location on the cover.

On ENC's:

The note shall be incorporated into the general M_NPUB note for each ENC. See Volume 3.

7.6.2 KAPP Numbers

KAPP Numbers (not an acronym) shall be added to all nautical charts and navigational "pieces" of charts going forward for printing. Previously published charts incorporating the KAPP numbering system shall be re-examined to ensure that ALL chart pieces have a valid KAPP Number.

To avoid confusion with the reassignment of KAPP Numbers, the current in-place scheme is adopted for immediate use on all charts. Assignment of new KAPP Numbers shall be made by the Chief, Quality Assurance, Plans and Standards Branch in coordination with the Chief, Update Service Branch. A KAPP Number is a unique numeric identifier assigned to each chart or the component "pieces" of a chart (panel, inset, continuation, and extension). This numbering system was originally developed to facilitate the transitional interface between traditional manual compilation and automated chart compilation. Current and projected needs require the reimplementation and formalization of the numbering system.

KAPP Numbers are part of the Chart History and Plotting Parameters (CHAPP) File and are accessed by downloading the current version of the CHAPP file.

The KAPP Number shall be in black 6 pt. SWISS Light. The alphabetic "KAPP" shall be in all capital letters followed by a space and the unique numeric identifier.

Examples: KAPP 1
KAPP 24
KAPP 374
KAPP 1092

The KAPP Number shall be placed following the first edition note for charts not paneled (recentering this note is necessary). For paneled charts, the KAPP Number shall be placed in the upper left corner of all other appropriate bordered pieces of the chart. In all cases, the KAPP Number shall be oriented to the chart baseline, and may be placed either inside or outside the border, whichever is least confusing.

The KAPP Number shall be positioned 2.5 mm after the first edition note, from the panel corner or border.

NAUTICAL CHART MANUAL - VOLUME 1 - POLICIES AND PROCEDURES

LIST OF ACRONYMS

U.S. Department of Commerce
Office of Coast Survey

NAUTICAL CHART MANUAL

LISTING OF ACRONYMS

Acronym	Description
3-E	ECONOMY, EFFICIENCY, AND EFFECTIVENESS
A&D	AREA AND DEPTH SHEETS
ALWP	ADOPTED AVERAGE LOW WATER PLANE
AWOIS	AUTOMATED WRECK AND OBSTRUCTION SYSTEM
BOEM	BUREAU OF OCEAN ENERGY MANAGEMENT (see MMS)
BOEMRE	BUREAU OF OCEAN ENERGY MANAGEMENT, REGULATION, AND ENFORCEMENT (see MMS)
BSEE	BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCMENT (see MMS)
C&GS	COAST & GEODETIC SURVEY
CAB	CUSTOMER AFFAIRS BRANCH
CCG	CANADIAN COAST GUARD
CES	CHART EVALUATION SURVEYS
CFR	CODE OF FEDERAL REGULATIONS
CHS	CANADIAN HYDROGRAPHIC SERVICE
COE	CORPS OF ENGINEERS (SEE USACE)
COLREGS	INTERNATIONAL REGULATIONS FOR PREVENTING COLLISIONS AT SEA
CPB	COAST PILOT BRANCH
CS	CORRIDOR SURVEYS
CSC	CORRECTED SOUNDING COMPILATION
DGPS	DIFFERENTIAL GLOBAL POSITIONING SYSTEM
DMA	DEFENSE MAPPING AGENCY (SEE NIMA)
DMAHTC	DEFENSE MAPPING AGENCY HYDROGRAPHIC / TOPOGRAPHIC CENTER (SEE NIMA)
DOC	DEPARTMENT OF COMMERCE
DOD	DEPARTMENT OF DEFENSE
DOS	DEPARTMENT OF STATE
DR	DESCRIPTIVE REPORT
ECDIS	ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM
EEZ	EXCLUSIVE ECONOMIC ZONE
ENC	ELECTRONIC NAVIGATIONAL CHART
EPA	ENVIRONMENTAL PROTECTION AGENCY
FADS	FISH AGGREGATING DEVICES
FCC	FEDERAL COMMUNICATIONS COMMISSION
FE	FIELD EXAMINATIONS
GCLWD	GULF COAST LOW WATER DATUM
GEBCO	GENERAL BATHYMETRIC CHART OF THE OCEANS
GPS	GLOBAL POSITIONING SYSTEM
GRI	GROUP REPETITION INTERVAL
HDEG	HYDROGRAPHIC DATA EVALUATION GROUP
HSD	HYDROGRAPHIC SURVEYS DIVISION

NAUTICAL CHART MANUAL

Acronym	Description
ICW	INTRACOASTAL WATERWAY
IGLD	INTERNATIONAL GREAT LAKES DATUM
IHB	INTERNATIONAL HYDROGRAPHIC BUREAU
IHO	INTERNATIONAL HYDROGRAPHIC ORGANIZATION
IMCO	INTERGOVERNMENTAL MARITIME CONSULTATION ORGANIZATION
IMO	INTERNATIONAL MARITIME ORGANIZATION
LANBY	LARGE AUTOMATIC NAVIGATION BUOYS
LNB	LARGE NAVIGATION BUOYS
LNM	LOCAL NOTICE TO MARINERS
LWD	LOW WATER DATUM
MCD	MARINE CHART DIVISION
MHHW	MEAN HIGHER HIGH WATER
MHW	MEAN HIGH WATER
MLLW	MEAN LOWER LOW WATER
MLW	MEAN LOW WATER
MMS	MINERALS MANAGEMENT SERVICE (see also BSEE, BOEM, and BOEMRE)
MOA	MARINE OPERATIONS - ATLANTIC
MOP	MARINE OPERATIONS - PACIFIC
MSL	MEAN SEA LEVEL
MWL	MEAN WATER LEVEL
NAD	NORTH AMERICAN DATUM
NALL	NAVIGABLE AREA LIMIT LINE
NANCI	NEW AERONAUTICAL AND NAUTICAL CHARTING INVESTIGATIONS
NAS	NAVIGABLE AREA SURVEYS
NAVOCEANO	U.S. NAVAL OCEANOGRAPHIC OFFICE
NDB	NAUTICAL DATA BRANCH
NGDC	NATIONAL GEOPHYSICAL DATA CENTER
NGA	NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY
NGS	NATIONAL GEODETIC SURVEY
NIMA	NATIONAL IMAGERY AND MAPPING AGENCY (SEE NGA)
NM	NOTICE TO MARINERS
NMAS	NATIONAL MAP ACCURACY STANDARDS
NNSS	U.S. NAVY NAVIGATION SATELLITE SYSTEM
NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOS	NATIONAL OCEAN SERVICE
NSD	NAVIGATIONAL SERVICES DIVISION
NTSB	NATIONAL TRANSPORTATION SAFETY BOARD
OCS	OFFICE OF COAST SURVEY
ODAS	OCEANOGRAPHIC DATA ACQUISITION SYSTEMS
OSO	ORIGIN OF SOUNDING OVERLAY
OSS	OCEAN SURVEY SHEETS
POD	PRINT ON DEMAND
QAPSB	QUALITY ASSURANCE, PLANS AND STANDARDS BRANCH
RSD	REMOTE SENSING DIVISION

Acronym	Description
SCC	SHIPPING COORDINATING COMMITTEE
SDB	SATELLITE DERIVED BATHYMETRY
SF	SECONDARY PHASE FACTOR
SOLAS	SUBCOMMITTEE ON SAFETY OF LIFE AT SEA
SPM	SINGLE-POINT MOORINGS
SPOR	SHORELINE PLANE OF REFERENCE
TP SHEET	TOPOGRAPHIC-PHOTOGRAMMETRIC MAP
TSS	TRAFFIC SEPARATION SCHEMES
UPS	UNIVERSAL POLAR STEROGRAPHIC (GRID)
USACE	U.S. CORPS OF ENGINEERS (SEE COE)
USCG	U.S. COAST GUARD
USCGAUX	U.S. COAST GUARD AUXILIARY
USGS	U.S. GEOLOGICAL SURVEY
USO	UNCORRECTED SOUNDINGS OVERLAY
USPS	U.S. POWER SQUADRON
UTM	UNIVERSAL TRANSVERSE MERCATOR (GRID)
VLF	VERY LOW FREQUENCY
VOR	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE
VTS	VESSEL TRAFFIC SERVICE
WD	WIRE DRAG SURVEYS
WGS	WORLD GEODETIC SYSTEM
WMM	WORLD MAGNETIC MODEL

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