SAFMC Map Services and Digital Dashboard

Habitat and Ecosystem Workshop

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PROJECT BACKGROUND

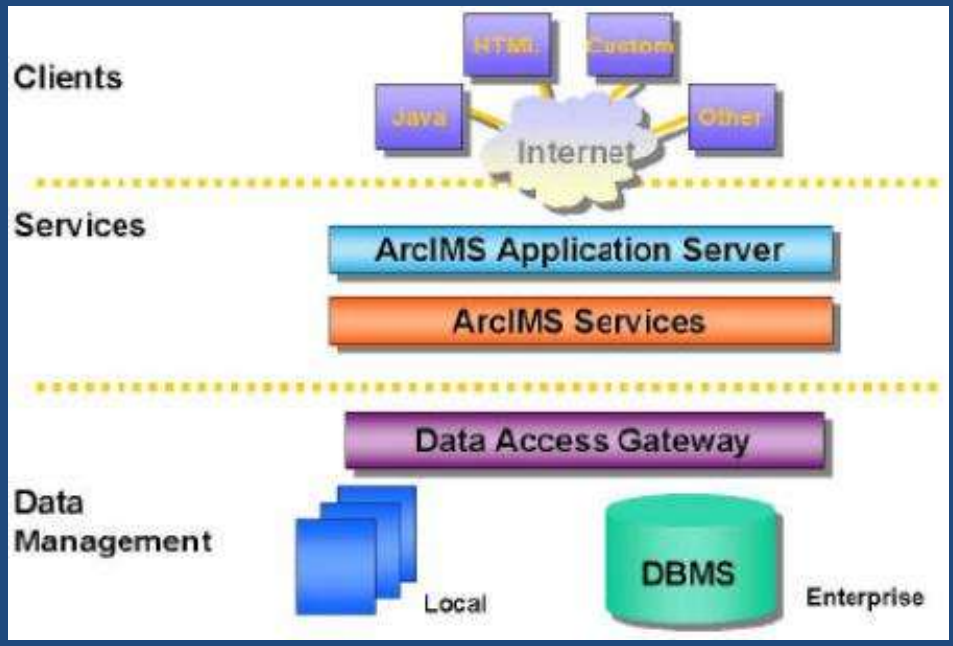
Ongoing Tech Support

Since 2003, the Fish and Wildlife Research Institute (FWRI) has collaborated with SAFMC staff to compile, create and host spatial and non-spatial data relevant to essential habitats, management zones, and fisheries in the South Atlantic ecosystem. Throughout the years, FWRI has improved SAFMC's web presence and data accessibility by employing the latest technologies.

- Phase 1 – develop and host an Internet Map Server (IMS) application to provide access to related GIS data
- Phase 2 – develop a Habitat and Ecosystem Homepage to distribute information concerning the Council's move to Ecosystem-Based Management, document conversion
- Phase 3 –transition homepage to a Portal application to facilitate development of a Fishery Ecosystem Plan
- Phase 4 – EcoSpecies and EcoResearch projects , GeoPDF maps
- Phase 5 – transition to ArcGIS Server
- Phase 6 – Create map services and develop .NET ADF web application
- Phase 7 – improve accessibility and performance by incorporating Flex technology for SAFMC web applications
- Phase 8 – develop a digital dashboard to enhance the accessibility, ease of use, and visibility of collaborative projects.

Phase 1 – Internet Mapping System (IMS)

- Develop and host an Internet Map Server (IMS) application to provide access to regional GIS data
- Create and compile GIS data layers relevant to the site
- Integrate digital documents (management plans, regulations, etc), video, and stills

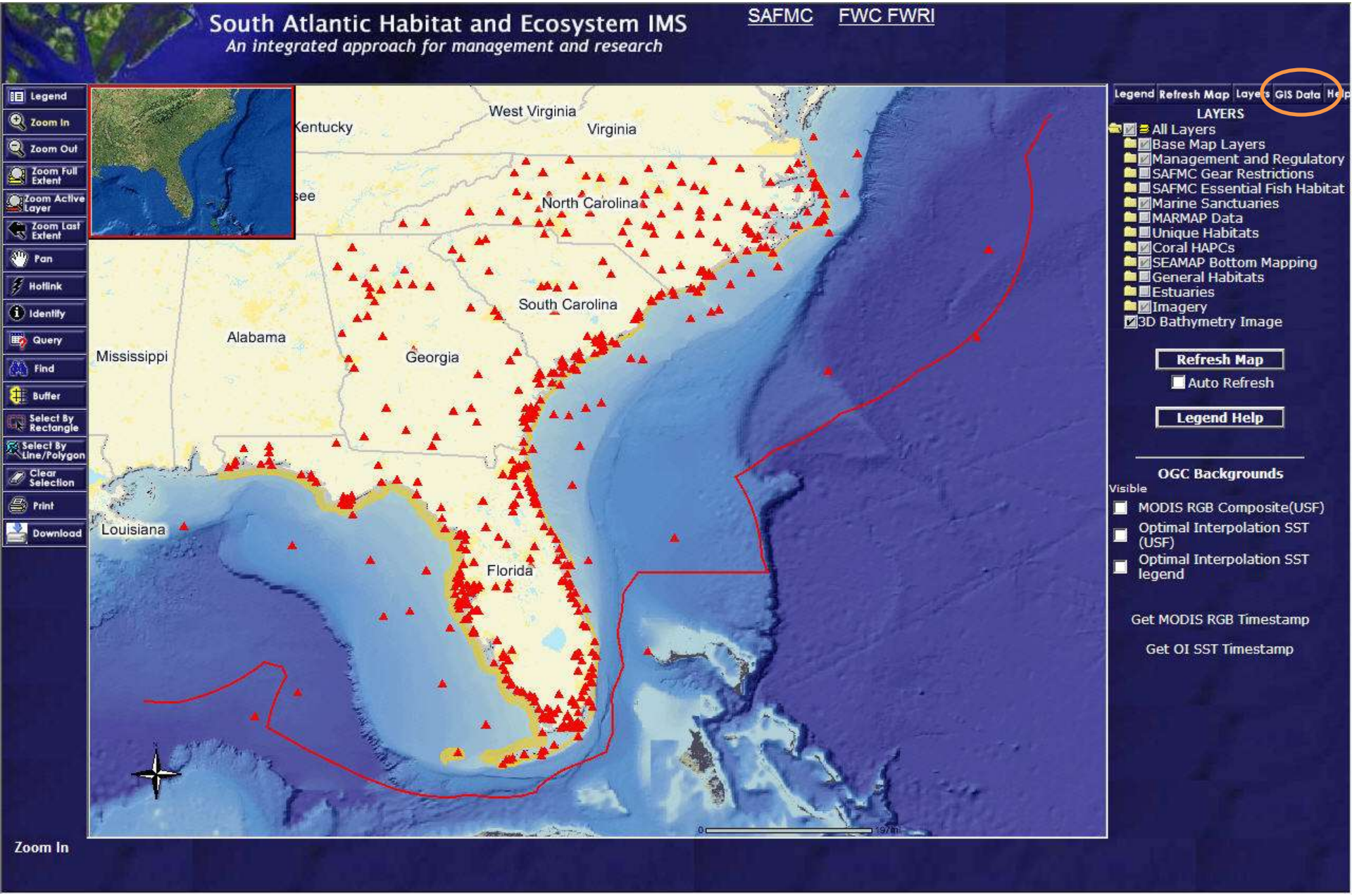


GIS Data Layers

- **Base Map Layers** – roads, states, counties, cities, Bathymetry, National Data Buoys, Marine Facilities, ATONS, Land Cover
- **Management and Regulatory** – special management zones, proposed marine protected areas, state waters, EEZ, sea turtle sanctuary, crab spawning sanctuary
- **SAFMC Gear Restrictions** – fish traps, sargassum, black seabass pots, octocorals, bottom longlines
- **Marine Sanctuaries** – data for Gray's Reef and Florida Keys
- **Species Occurrence** –MARMAP layers such as white grunt, vermillion snapper, red porgy, gray triggerfish, greater amberjack, and black seabass
- **Coral Habitat Areas of Particular Concern (HAPCs)** – Oculina studies: Cleila and ROV dive tracks, multimbeam survey
- **Unique Habitats** – Dolphin–Wahoo EFH-HAPC, Deep Water Coral, right whale critical habitat
- **General Habitats** – artificial reefs, fish nursery areas, seagrass, mangroves, salt marsh, tidal flats
- **Imagery** – various scales of nautical charts

GIS Data Sources

- FWRI Marine Resources GIS
- NOAA Coastal Services Center
- North Carolina Department of Natural Resources, Division of Marine Fisheries
- Grays Reef National Marine Sanctuary
- South Carolina Department of Natural Resources
- University of North Carolina, Wilmington
- Harbor Branch Oceanographic Institute
- Skidaway Institute of Oceanography
- National Benthic Inventory
- The Nature Conservancy
- ESRI
- SECOORA - Southeast Coastal Ocean Observing Regional Association



Access the IMS at http://ocean.floridamarine.org/efh_coral/ims

GIS Data

- IMS Shortcut
  http://ocean.floridamarine.org/efh_coral/ims/description_layers.htm
  - provides a short description of each layer with links to metadata and zipped shapefiles
  - access to Google Earth KMZ files
- SAFMC Mapping and GIS page
  http://www.safmc.net/EcosystemManagement/EcosystemBoundaries/MappingandGISData/tabid/632/Default.aspx
  - EFH
  - EFH-HAPC
  - Coral HAPCs
  - Restricted Gear

GIS Data

The South Atlantic Fishery Management Council in cooperation with the Fish and Wildlife Research Institute serves a variety of marine related data through the Habitat and Ecosystem Internet Map Server (IMS). This page provides a short description of each layer with links to Federal Geographic Data Clearinghouse (FGDC) compliant metadata and zipped files for download.

The zipped shapefiles provided below can be uncompressed using shareware programs Winzip or IZArc.ArcExplorer, a lightweight GIS data viewer, can be used to view these shapefiles. A free copy of ArcExplorer may be downloaded from the ESRI Web site.

Many GIS data layers served through this application have been converted to Google Earth files for easy viewing within the free Google Earth viewer. Google Earth requires an Internet connection. In order to view these files,you must have Google Earth installed on your computer. If you do not have Google Earth, you can download it from the Google Earth web site. Google Earth requires an Internet connection, so if you do not have one, you will not be able to view these files. If you currently have Google Earth installed on your computer, you can simply click on the highlighted KMZ links below and choose "open" when prompted.

Be aware that larger KMZ files (particularly those greater than ~10MB and the Nautical Charts)
can take a few moments to load.

Base Map Description Layers

Limited Access Privileges

SAFMC GIS Data

Essential Fish Habitat

The Sustainable Fisheries Act of 1996, identifying the contribution of habitat loss and degradation on fishery declines, amended the Magnuson-Stevens Act to create a program to protect "essential fish habitat." The statute defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The legislation authorized a regulatory program to provide detailed identification of such habitat and obligatory consultation regarding all fishery and non-fishery activities receiving federal funding, permitting, or authorization that could impact EFH. The Council has taken the first step with the approval of the Habitat Plan identifying and describing in detail EFH for species managed throughout the South Atlantic and with the approval of the Comprehensive Habitat Amendment amending all existing FMPs to include descriptions of EFH and EFH-habitat areas of particular concern (EFH-HAPCs).

EFH for the SAFMC jurisdictional area INCLUDES:

Dolphin-Wahoo EFH	in progress	Zip File ~21kb
Shrimp EFH	Metadata	Zip File ~46 mb
Spiny Lobster EFH	Metadata	Zip File ~29 mb
Coastal Migratory Pelagics EFH	Metadata	Zip File ~5 mb
Golden Crab EFH	Metadata	Zip File ~51 kb
Snapper Grouper EFH	Metadata	Zip File ~65 mb
Coral, Coral Reefs, Live or Hard Bottom EFH	Metadata	Zip File ~4 mb

EFH-Habitat Areas of Particular Concern

Essential Fish Habitat (EFH) that is particularly important to the long-term productivity of populations of one or more managed species, or particularly vulnerable to degradation, should be identified as "habitat areas of particular concern" (HAPC) to help provide additional focus for conservation efforts. As a result of the Sustainable Fisheries Act Amendment to the Magnuson-Stevens Fishery Conservation and Management Act in 1996 the Councils and the NMFS have been mandated to use an ecosystem approach in managing the Nation's Fisheries. The Council took the first step with the approval of the Habitat Plan identifying and describing in detail EFH for species managed throughout the South Atlantic and with the approval of the Comprehensive Habitat Amendment amending all existing FMPs to include descriptions of EFH and EFH-HAPCs. Due to their important ecological function, areas of the offshore pelagic environments discussed above and the associated benthic habitats represent EFH-HAPCs and were designated as such though previous Council actions.

EFH-HAPCs INCLUDE:

HABITAT	METADATA	SHAPEFILE	GOOGLE EARTH

SAFMC Fisheries

This prototype application dipslays fishery independent data collected by the SEAMAP - South Atlantic (SA) component and by the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) program. The application also contains several base layers and data from EcoGIS.

SAFMC EFH

This prototype application dipslays Essential Fish Habitat (EFH) and Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) for several species under SAFMC's jurisdiction. It also displays EFH for Highly Migratory Species (HMS) managed by NOAA Fisheries.

Phase 2 – Habitat and Ecosystem Homepage

- Design and develop a framework for the “Comprehensive Habitat and Fishery Ecosystem Plan” home page
- Iterative process for establishing layout and taxonomy
- Traditional HTML and JavaScript

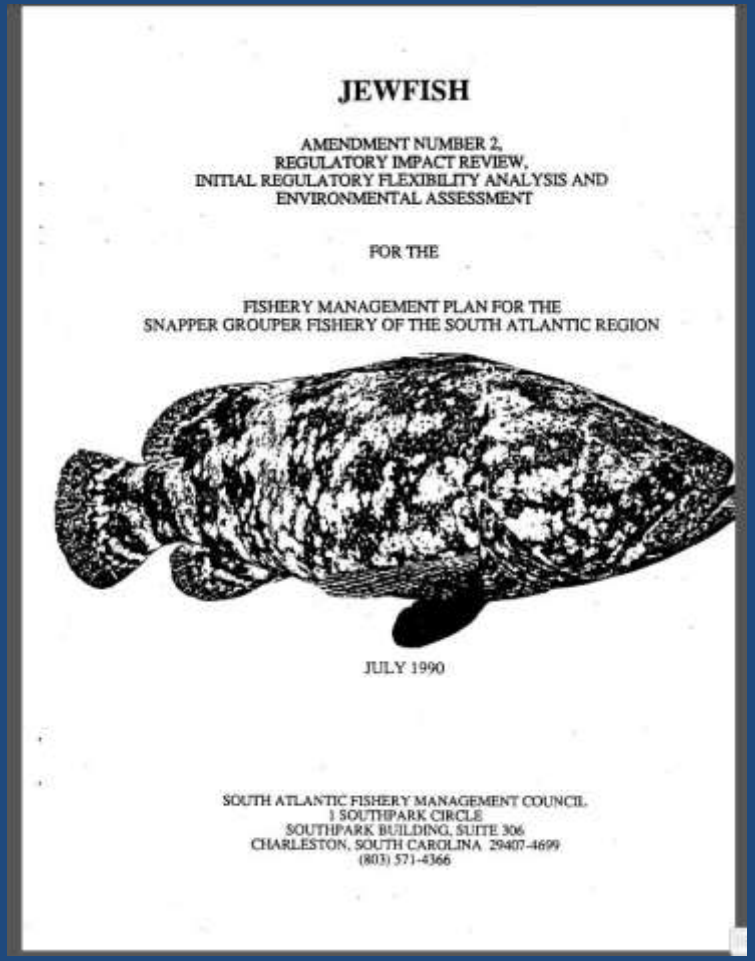
Phase 2 – Habitat and Ecosystem Homepage

Document Conversion

FWRI scanned a variety of historic and recent documents for inclusion in the site. Example documents include:

- Comprehensive Amendment Addressing Sustainable Fishery Act,
- Amendment 2 to the FMP for Coral and Coral Reefs of the Gulf and South Atlantic,
- FMP of the Snapper Grouper Fishery of the South Atlantic, and
- Developmental Patterns within a Multispecies Reef Fishery: Management Applications for Essential Fish Habitats and Protected Areas.

Over 300 documents were scanned during phases two and three.



JEWFISH

AMENDMENT NUMBER 2,
REGULATORY IMPACT REVIEW,
INITIAL REGULATORY FLEXIBILITY ANALYSIS AND
ENVIRONMENTAL ASSESSMENT

FOR THE

FISHERY MANAGEMENT PLAN FOR THE
SNAPPER GROUPER FISHERY OF THE SOUTH ATLANTIC REGION

JULY 1990

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
1 SOUTHPARK CIRCLE
SOUTHPARK BUILDING, SUITE 306
CHARLESTON, SOUTH CAROLINA 29407-4699
(803) 571-4366

Phase 2 Issues

- Chaotic process
- Questions about security and scalibility
- Difficult to update and maintain

Phase 3 - transition homepage to a Portal application

- Transition homepage to a Portal application
- Address Security issues
- Provide user groups and administrators security based roles
- Implement file sharing and uploading
- Grant SAFMC staff privileges to edit or create pages as necessary
- Facilitate development of the Fishery Ecosystem Plan

Portal Software

- **Open Source** product : DotNetNuke
- built on a Microsoft ASP.NET platform
- SQL Server backend (can also use MySQL)
- Modular Design – easily add modules for contacts, calendar of events, discussions, forums, FAQs, links, image galleries, etc.
- Web-based interface for anytime, anywhere updates

SAFMC Comprehensive Habitat and Fishery Ecosystem Plan

EFH | Habitats | EcoPath | Partners | GIS Data | About Us

Moving towards Ecosystem-based Management

From deepwater canyons off the Carolinas to the shallow tropical waters surrounding the Florida Keys, marine habitats found in the South Atlantic region are as diverse as the species that inhabit them. The South Atlantic Council is at the forefront of habitat conservation and risk-averse management through three broad actions:

- Adoption of a proactive approach to protect and enhance Essential Fish Habitat (EFH) for all managed species under its jurisdiction.
- Adoption of precautionary and proactive management plans.
- Pioneering application of an ecosystem-based approach to fisheries management in the South Atlantic region.

Ultimately, by broadening the scope of management, the Council will achieve long-term sustainability of fisheries and of the ecosystem as a whole.

Deep water coral habitats are becoming internationally recognized for their value as unique fish habitat and high biodiversity.

With the Habitat Plan as a cornerstone, the South Atlantic Fishery Management Council is developing an ecosystem-based approach to resource management. Evolution of the Habitat Plan into a Fishery Ecosystem Plan (FEP), and transition from single species management to **ecosystem-based management**, will require a greater understanding of the South Atlantic Bight ecosystem and the complex relationships among humans, marine life and essential fish habitat.

The **Habitat Plan** presents a snapshot of the biological, social and economic characteristics of South Atlantic Region ecosystem from the headwaters of the river systems to off the Continental Shelf.

The Fishery Ecosystem Plan updates, expands and relates species, habitat (EFH and EFH-HAPCs) and fishery information to include available biological, social and economic information. The FEP specifies research and monitoring needed to fully address ecosystem-based management. The FEP will also support a Comprehensive Amendment and Environmental Impact Statement for all Fishery Management Plans (FMP).

Ultimately, the FEP will:

1. Define the geographical boundaries of the ecosystem, including characterization of its biological, chemical and physical dynamics;
2. Assess ecological, human and institutional elements of the ecosystem;
3. Develop a conceptual model of the food web;
4. Describe the habitat needs of different life history stages for all managed species;
5. Calculate and characterize total removals (i.e., landings, discards, bycatch);
6. Develop indices of ecosystem health;
7. Establish long-term monitoring;
8. Develop appropriate management including catch limits, gear regulations, zoning, etc.

Related Documents

- Ecosystem-Based Fishery Management
  A report to Congress by the Ecosystems Principles Advisory Panel
- A National Coral Reef Action Strategy
  Report to Congress by NOAA
- The Ecosystem Approach to Fisheries
  FAO Fisheries Technical Paper

For More Information Contact:
Roger Pugliese
roger.pugliese@safmc.net

We invite you to contact us with your ideas, questions, and suggestions.

Before

South Atlantic Fishery Management Council

Habitat and Ecosystem Homepage

Home | Ecosystem Management | Map Catalog | Habitat Management | Ecosystem Library | Search

Thursday, October 13, 2005 ..:: Home ::.. Register Login

Quick Links

- Mapping and GIS Data
- Deep Water Corals
- Sargassum
- Protected Species
- Ecosystem Linkages
- Fishery Management Plans
- Glossary
- Partners
- About Us

Moving Towards Ecosystem Management

From deepwater canyons off the Carolinas to the shallow tropical waters surrounding the Florida Keys, marine habitats of the South Atlantic are as diverse as the species that inhabit them. To address this diversity, the South Atlantic Council is adopting an ecosystem approach to fisheries management with the development of a Fishery Ecosystem Plan and Comprehensive Ecosystem Amendment that will amend all the Council's Fishery Management Plans. The South Atlantic Council continues to be at the forefront of habitat conservation and risk-averse management through:

- Adoption of a proactive approach to protect and enhance Essential Fish Habitat for all managed species under its jurisdiction
- Adoption of precautionary and proactive management plans

Ultimately, by broadening the scope of management, the Council will achieve long-term sustainability of fisheries and of the ecosystem as a whole (Photo credit: NURC/UNCW).

The Fishery Ecosystem Plan will evolve from the Council's Habitat Plan. The transition from single species management to ecosystem management will involve incremental steps to better characterize the system and understand the complex relationships among humans, harvested fish and prey, all marine life and essential habitat and environmental characteristics of the South Atlantic Ecosystem. This effort will provide the Council with a foundation from which to attain a more comprehensive understanding of habitat and biology of species, fishery information, social and economic impacts of management and ecological consequences of conservation and management. The Fishery Ecosystem Plan will specify research and monitoring needed to fully address ecosystem management.

Building on the recommendations outlined in the Ecosystem Report to Congress, the Council's Fishery Ecosystem Plan and Comprehensive Ecosystem Amendment will include the following:

1. Define the ecosystem boundaries;
2. Characterize the ecological (biological, chemical and physical), human and institutional elements of the ecosystem;
3. Describe the habitat needs of different life history stages for all managed species;
4. Develop a conceptual model of the food web;
5. Calculate and characterize total fishery removals (i.e., landings, discards, bycatch);
6. Develop indices of ecosystem health;
7. Recommend research and monitoring activities (Council FMP needs, searchable databases, federal and state programs, ocean observing systems/fisheries oceanography)
8. Develop appropriate management such as catch limits, gear regulations and area management.

Related Documents

SAFMC Action Plan for Ecosystem-Based Management
Evolution of the Habitat Plan to a Fishery Ecosystem Plan

Ecosystem-Based Fishery Management
A report to Congress by the Ecosystems Principles Advisory Panel

Strategic Guidance for Implementing a Ecosystem-based Approach to Fisheries Management
A report prepared for MAFAC by the Ecosystem Approach Task Force

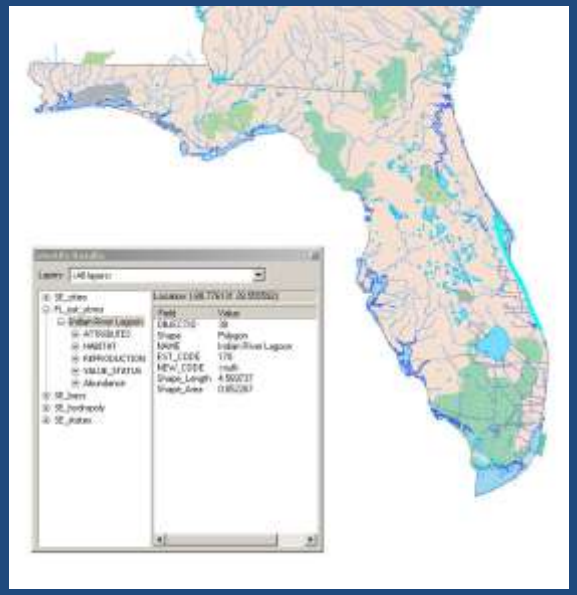
The Ecosystem Approach to Fisheries
FAO Fisheries Technical Paper

Managing Our Nation's Fisheries Conference
proceedings Washington, D.C., Nov 13-15, 2003

Conservation in a Fish-Eat-Fish World by Ken Hinman, National Coalition of Marine Conservation

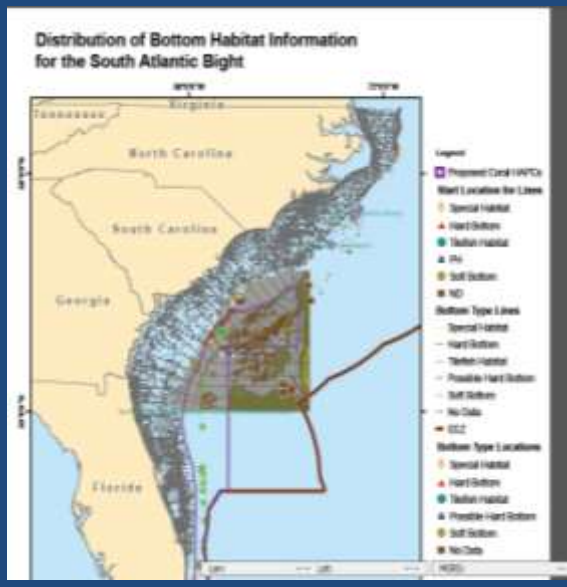
After

Phase 4 – EcoSpecies, EcoResearch and GeoPDFs



EcoSpecies Data Tables

EcoResearch footprints



GeoPDFs

EcoSpecies

- geospatially enabling the Florida Estuarine Marine Living Resources (FLEMLR) database
  - FWRI collaboration with NOAA to develop a more Florida-specific ELMR System
- could be used to eventually integrate spawning or distribution information into SEDAR stock assessments

Indian River Lagoon

Selected Attributes of ATTRIBUTES

OBJECTID *	FLELMR_EST_CODE *	FLELMR_CODE	LIFE_STAGE	EPIBENTHIC	BENTHIC	DEMERSAL	NEKTONIC	PLANKTONIC	LIFE_MODE_UNKNOWN	FRESHWATER_RESIDENT	ESTUARINE_RESIDEN
836	Indian River Lagoon	jewfish	L	0	0	0	0	1	0	0	
837	Indian River Lagoon	jewfish	E	0	0	0	0	1	0	0	
838	Indian River Lagoon	red grouper	A	0	0	1	1	0	0	0	
839	Indian River Lagoon	red grouper	S	0	0	1	1	0	0	0	
840	Indian River Lagoon	red grouper	J	0	0	1	1	0	0	0	
841	Indian River Lagoon	red grouper	L	0	0	0	0	1	0	0	
842	Indian River Lagoon	red grouper	E	0	0	0	0	1	0	0	
843	Indian River Lagoon	mutton snapper	A	0	0	1	0	0	0	0	
844	Indian River Lagoon	mutton snapper	S	0	0	1	1	0	0	0	
845	Indian River Lagoon	mutton snapper	J	0	0	1	0	0	0	0	
846	Indian River Lagoon	mutton snapper	L	0	0	0	1	1	0	0	
847	Indian River Lagoon	mutton snapper	E	0	0	0	0	1	0	0	
848	Indian River Lagoon	lane snapper	A	0	0	1	1	0	0	0	
849	Indian River Lagoon	lane snapper	S	0	0	1	1	0	0	0	
850	Indian River Lagoon	lane snapper	J	0	0	1	1	0	0	0	
851	Indian River Lagoon	lane snapper	L	0	0	0	0	1	0	0	
852	Indian River Lagoon	lane snapper	E	0	0	0	0	1	0	0	
928	Indian River Lagoon	snook	A	0	0	1	1	0	0	0	
929	Indian River Lagoon	snook	E	0	0	0	0	1	0	0	
930	Indian River Lagoon	snook	J	0	0	1	1	0	0	1	
931	Indian River Lagoon	snook	L	0	0	0	0	1	0	0	
932	Indian River Lagoon	snook	S	0	0	0	1	0	0	0	
933	Indian River Lagoon	spotted seatrout	A	0	0	1	0	0	0	0	
934	Indian River Lagoon	spotted seatrout	E	0	0	0	0	1	0	0	
935	Indian River Lagoon	spotted seatrout	J	0	0	1	1	0	0	0	
936	Indian River Lagoon	spotted seatrout	L	0	0	1	0	1	0	0	
937	Indian River Lagoon	spotted seatrout	S	0	0	0	1	0	0	0	
938	Indian River Lagoon	red drum	A	0	0	0	1	0	0	0	
939	Indian River Lagoon	red drum	E	0	0	0	0	1	0	0	
940	Indian River Lagoon	red drum	J	0	0	0	1	1	0	0	
941	Indian River Lagoon	red drum	L	0	0	0	0	1	0	0	
942	Indian River Lagoon	red drum	S	0	0	0	1	0	0	0	
947	Indian River Lagoon	Alabama shad	E	0	0	0	0	1	0	1	
951	Indian River Lagoon	Alabama shad	L	0	0	0	0	1	0	1	
955	Indian River Lagoon	Alabama shad	<Null>	0	0	0	0	0	0	0	
956	Indian River Lagoon	Alabama shad	S	0	0	0	0	0	0	0	
962	Indian River Lagoon	Alabama shad	A	0	0	0	1	0	0	1	
963	Indian River Lagoon	bonnethead shark	<Null>	2	2	2	2	2	2	2	

Record: 1 | Show: All | Selected | Records (271 out of 1108 Selected) | Options

Ecospecies Issues

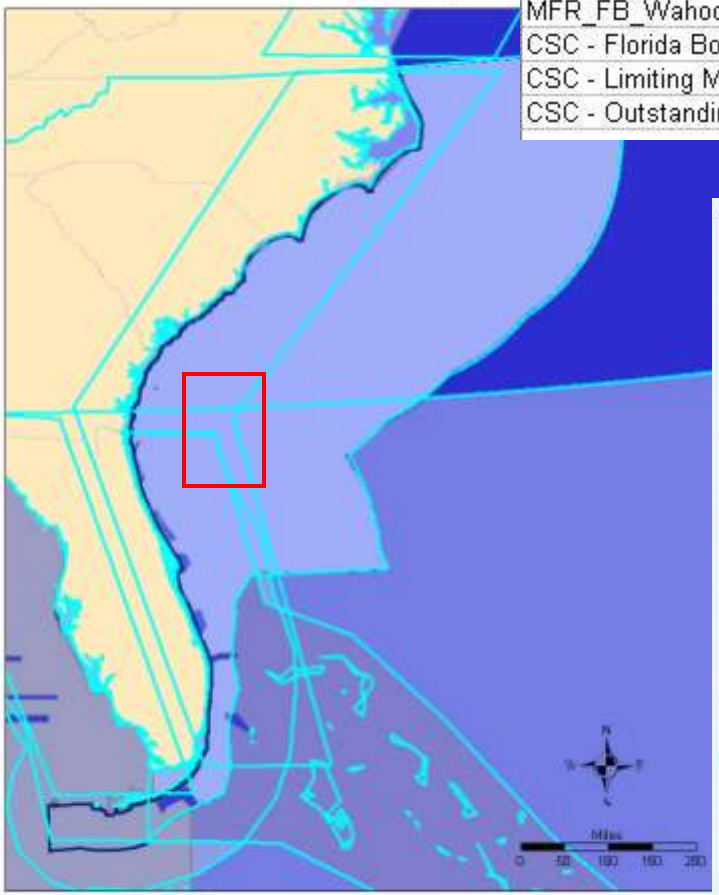
- Only 4 estuaries populated with Species Life History profiles :
  - **Florida Bay**,
  - Tampa Bay,
  - Sarasota Bay,
  - **Indian River Lagoon**
- Not Comprehensive for the Region
- ArcIMS identify or query tools would not display the domains or relationships established within the geodatabase.
- Lack of confidence for data quality.

EcoResearch Database

- will provide a catalogue of relevant ecosystem research in the South Atlantic region
- designed to determine science information needs and potential data gaps occurring in SAFMC's jurisdiction
- serve the spatial footprints of the EcoResearch Database as a GIS layer in the IMS application

NAME	RECORD_ID
CSC - Florida Manatee Sanctuary Act	78728182252765184
USF - SeaWiFS Sea Surface Temperature	78743990331179008
NOAA - Estuarine Living Marine Resources (ELMR)	78728131240198144
AOML - ENVIDS Atlantic Tropical Storm Tracking by Year and Storm	78728130748350464
NRL - Intra-Americas Sea Ocean Nowcast/Forecast System	78743996577284096
WR_MTR_sea turtle_Florida statewide nesting beach survey 1979- present	77322836872986624
WR_MTR_Florida Sea Turtle Stranding and Salvage Network (1986-2004)	77725981517807616
WR_MTR_sea turtle_Florida sea turtle stranding and salvage network	77322836640137216
MFR_FB_Wahoo_Life History	77322672112402432
CSC - Florida Boating Restricted Areas	78728182032236544
CSC - Limiting Marine Net Fishing in Florida	78728182143778816
CSC - Outstanding Florida Waters	78728182350807040

EcoResearch Footprints



Record Title: Florida Sea Turtle Stranding and Salvage Network, Stranding Locations, 1986-2004	Full Metadata
Originator: Florida Fish and Wildlife Conservation Commission-Fish and Wildlife Research Institute-Marine Turtle Program	Browse Graphic

Abstract: Coordinated by the Florida Fish and Wildlife Conservation Commission - Fish and Wildlife Research Institute (FWRI), the Florida Sea Turtle Stranding and Salvage Network (STSSN) is responsible for gathering standardized data on stranded marine turtles throughout the state. The Florida STSSN functions as a part of an eighteen state network led by NOAA"s National Marine Fisheries Service (NMFS). In Florida, strandings are documented by FWRI staff biologists and by a network of permitted participants located around the state. Live strandings are rescued and transported to properly permitted rehabilitation facilities. Data from strandings are collected on a standardized reporting form and include date, species, location, carapace length and width, carcass condition, carcass disposition, and information on anomalies (e.g., entanglement, propeller damage, fibropapillomas). Additionally, certain carcasses are regularly collected by FWRI staff for gross or detailed necropsy. Each week, FWRI reports Florida strandings to NMFS as a part of a management plan that is intended to reduce the incidental take of turtles in the shrimp fishery. FWRI also generates monthly and yearly stranding summary reports to monitor mortality and to detect and describe any unusual stranding events. Stranding data collected through the Florida STSSN have been used extensively in the identification of mortality factors and in the development of recovery actions (e.g., Turtle Excluder Device (TED) requirements, gill net regulations).

Purpose: The purpose is to monitor marine turtle mortality and identify mortality factors in Florida by documenting stranded marine turtles.

Start Date: 1986	**End Date:** 2004
Status - Progress: Complete	**Status - Update:** As needed
Contact:	**Contact Organization:**
Contact E-mail:	Data

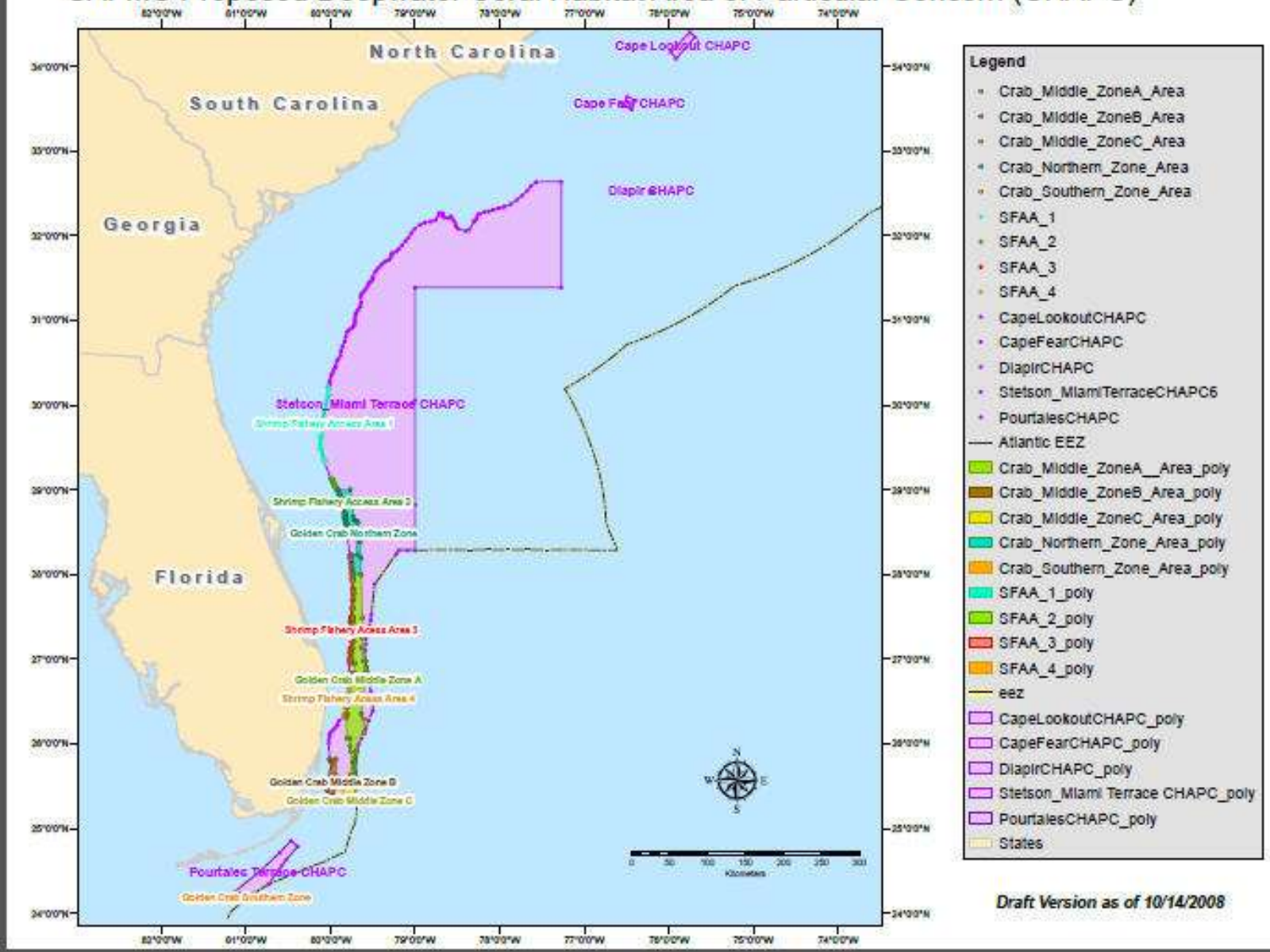
Phase 4 – GeoPDF

- MAP2PDF (now called TerraGo) software
  - publish and distribute spatially aware maps with no need for the recipients of the GeoPDF to have any knowledge of GIS.
- Clients only need the free GEOPDF toolbar to access the extended PDF tools.
- GEOPDF delivers complex layered mapping data in a single portable document.

GeoPDF

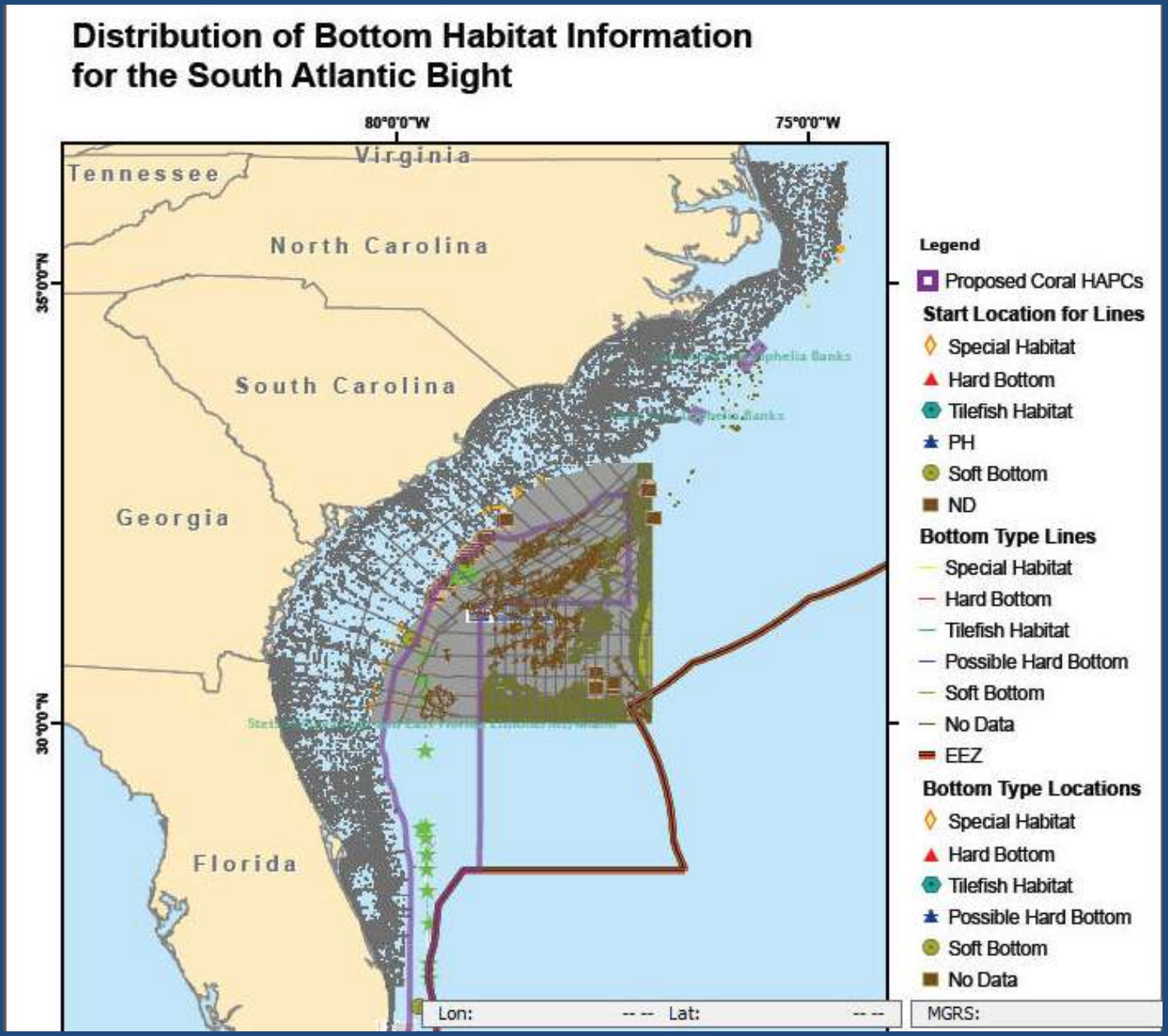
- Automatic embedding of coordinate systems within PDF files
- Display of coordinates in alternate projections and Datums
- Displays point, line and area attributes of map objects with query capabilities
- Displays map coordinates in lat/long, utm or x/y
- Allows for zoom to points and objects by coordinates
- Displays locations and tracks from GPS units
- Maintains layers within maps
- Allows for measuring of distance, area, bearing and azimuth
- Allows users to print to any desktop printer
- Users just download the free GeoPDF toolbar.
- Leverages Adobe tools most people already have installed and know how to use

SAFMC Proposed Deepwater Coral Habitat Area of Particular Concern (CHAPC)



Lon: 77 27.689 W Lat: 30 27.860 N MGRS: 18R TU 63672 72814

Distribution of Bottom Habitat Information for the South Atlantic Bight



Phase 5 -Transition to ArcGIS Server

- Although the IMS application is still a useful tool, the technology for online mapping is changing!
- The ArcIMS software will not be available after the current release version of 10.0
- ArcGIS Server (AGS) is now the recommended software for distributing and sharing GIS data and map products on the web.
- The transition to the AGS platform, will enhance SAFMC's online suite of tools to support fisheries management in their region.

ArcGIS Server Benefits

- leverages FWRI's hardware, software and personnel
- reduces software deployment costs for SAFMC
- disseminates the geographic knowledge needed to improve decision making
- promotes SAFMC ecosystem data in the form of shared maps

Image source: ESRI

Phase 6 – Create map services and develop .NET ADF web applications

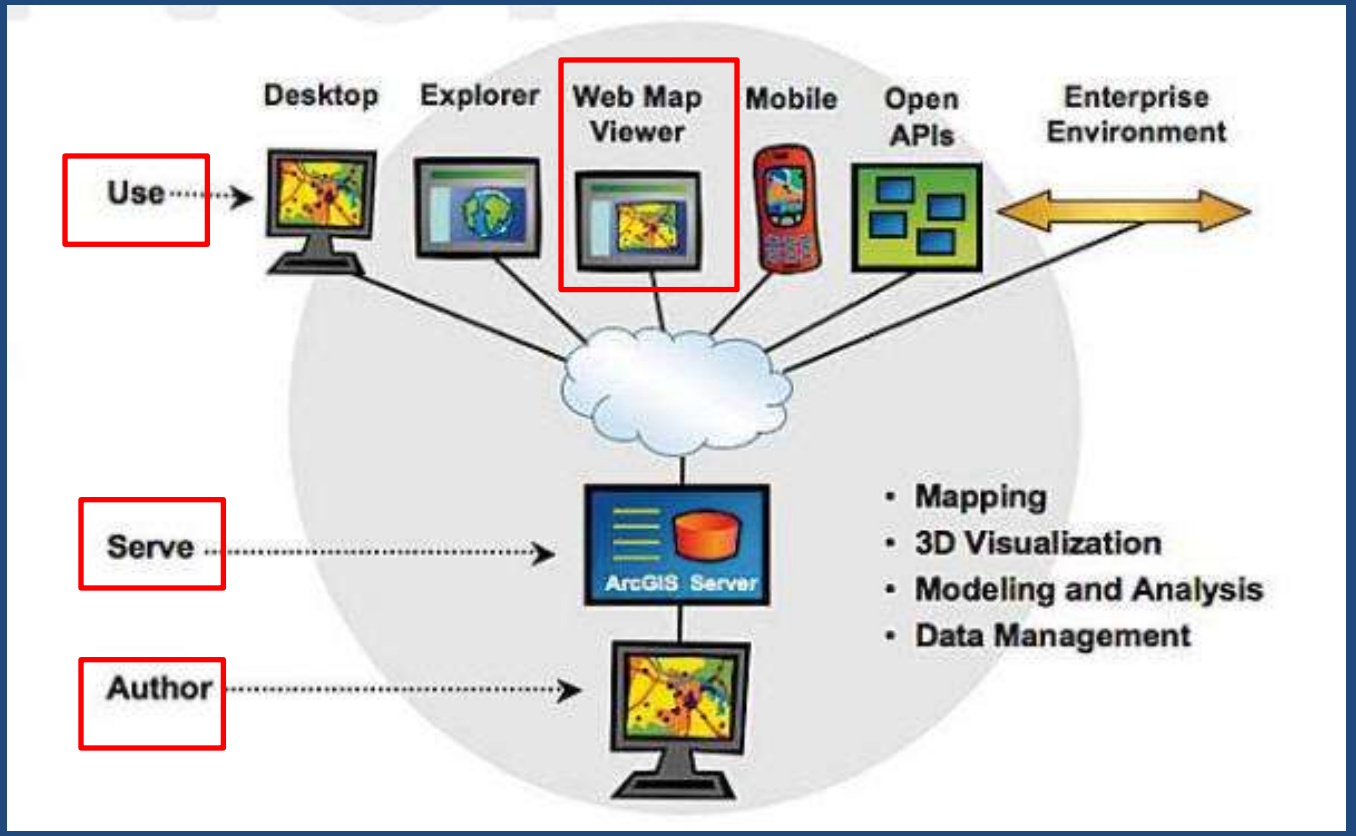


Image source: ESRI

What is a map service, anyway?

- A map service makes maps, features, and attribute data available inside many types of client applications:
  - Web applications – **.NET Web ADF, Flex**, Silverlight, JavaScript
  - ArcMap, ArcView
  - ArcGIS Explorer (Free!)
  - Mobile Devices (iPhone, Android devices)
  - Google Earth (as KML)
  - OGC platforms (as WMS or WFS)

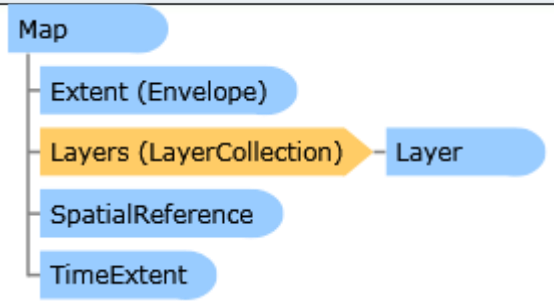
GIS layers available through the SAFMC Fishery Service (167 layers)

ocean.floridamarine.org/ArcGIS/rest/services/SAFMC_Fishery/MapServer/3

ArcGIS Services Directory

Home > SAFMC_Fishery (MapServer) > Catch Data

Layer: Catch Data (ID: 3)



Parent Layer: SEAMAP-SA Data

Display Field: COMMON_NAM

Type: Feature Layer

Geometry Type: esriGeometryPoint

Description: This GIS data set represents catch by trawl information from the SEAMAP-SA database for all species.

Definition Expression:

Copyright Text:

Min. Scale: 0

Max. Scale: 0

Extent:

XMin: -81.4501
YMin: 28.756
XMax: -75.57
YMax: 35.85
Spatial Reference: 104199

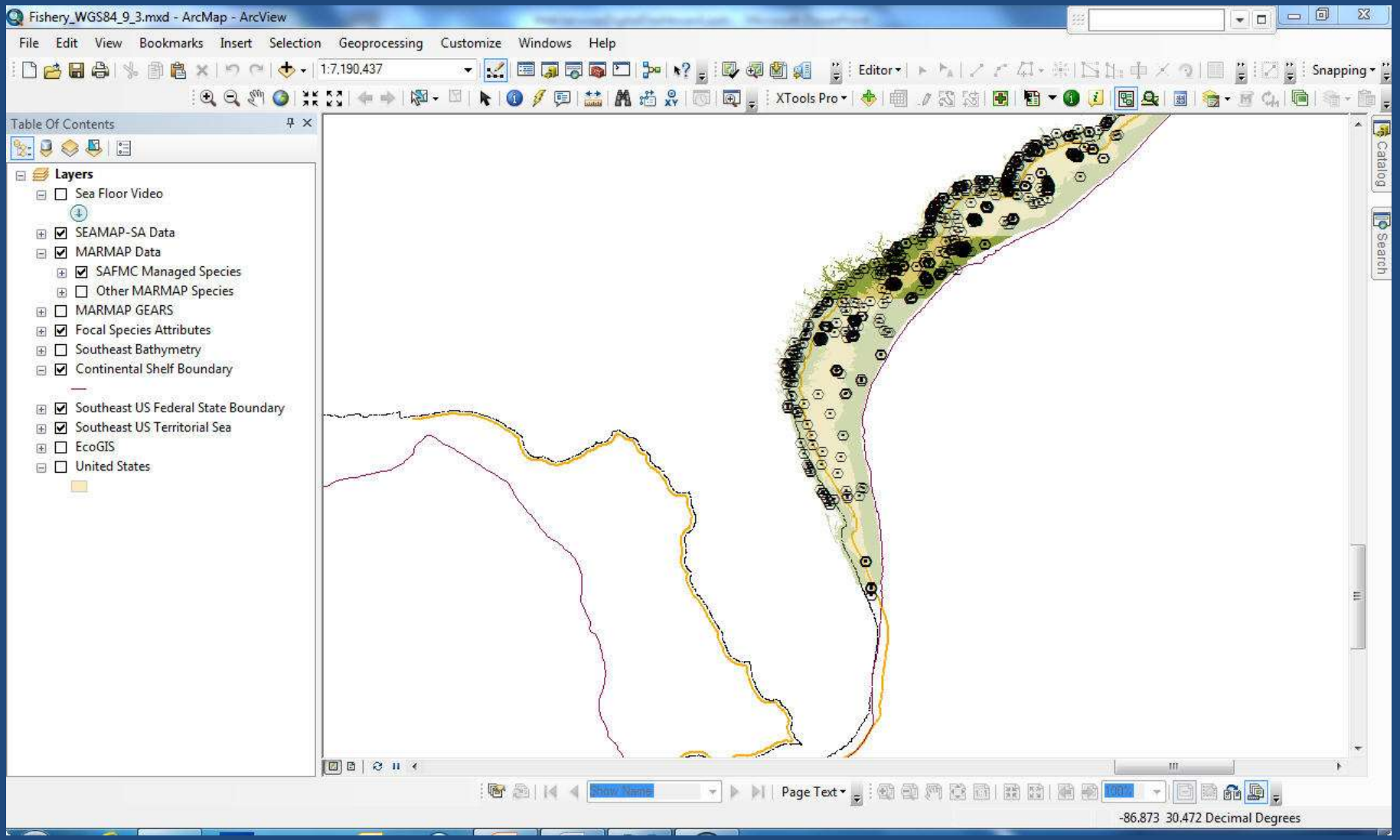
Descriptive information for the SEAMAP-SA Catch Data layer

Fields:

- FID *(Type: esriFieldTypeOID, Alias: FID)*
- Shape *(Type: esriFieldTypeGeometry, Alias: Shape)*
- LATITUDEST *(Type: esriFieldTypeDouble, Alias: Latitude)*
- LONGITUDES *(Type: esriFieldTypeDouble, Alias: Longitude)*
- DATE *(Type: esriFieldTypeDate, Alias: Date)*
- EVENT *(Type: esriFieldTypeString, Alias: Event)*
- COLLECTION *(Type: esriFieldTypeString, Alias: Collection)*
- SPECIESCOD *(Type: esriFieldTypeString, Alias: Species Code)*
- COMMON_NAM *(Type: esriFieldTypeString, Alias: Common Name)*
- NUMBERTOTA *(Type: esriFieldTypeDouble, Alias: Total Number)*
- SPECIESTOT *(Type: esriFieldTypeDouble, Alias: Total Weight (kg))*

Supported Operations: Query Layer

Phase 6 – Create map services



All map services begin inside ArcMap where you create your map

SAFMC Map Services

Essential Fish Habitat (EFH) – displays EFH and EFH-HAPCS for SAFMC managed species and NOAA Fisheries Highly Migratory Species

Fisheries - displays Marine Resources Monitoring, Assessment, and Prediction (MARMAP) and Southeast Area Monitoring and Assessment Program South Atlantic (SEAMAP-SA) data .

Managed Areas - displays a variety of regulatory boundaries (SAFMC and Federal) or management boundaries within SAFMC's jurisdiction.

Habitat – displays habitat data collected by SEADESC, Harbor Branch Oceanographic Institute (HBOI) and Ocean Exploration dives, as well as the SEAMAP shallow and ESDIM deepwater bottom mapping projects, multibeam imagery, and scientific cruise data.

Multibeam Bathymetry - displays a variety of multibeam data sources and scanned bathymetry charts

Nautical Charts – displays coastal, general, and overview nautical charts for the SAFMC's jurisdictional area

.NET ADF web application

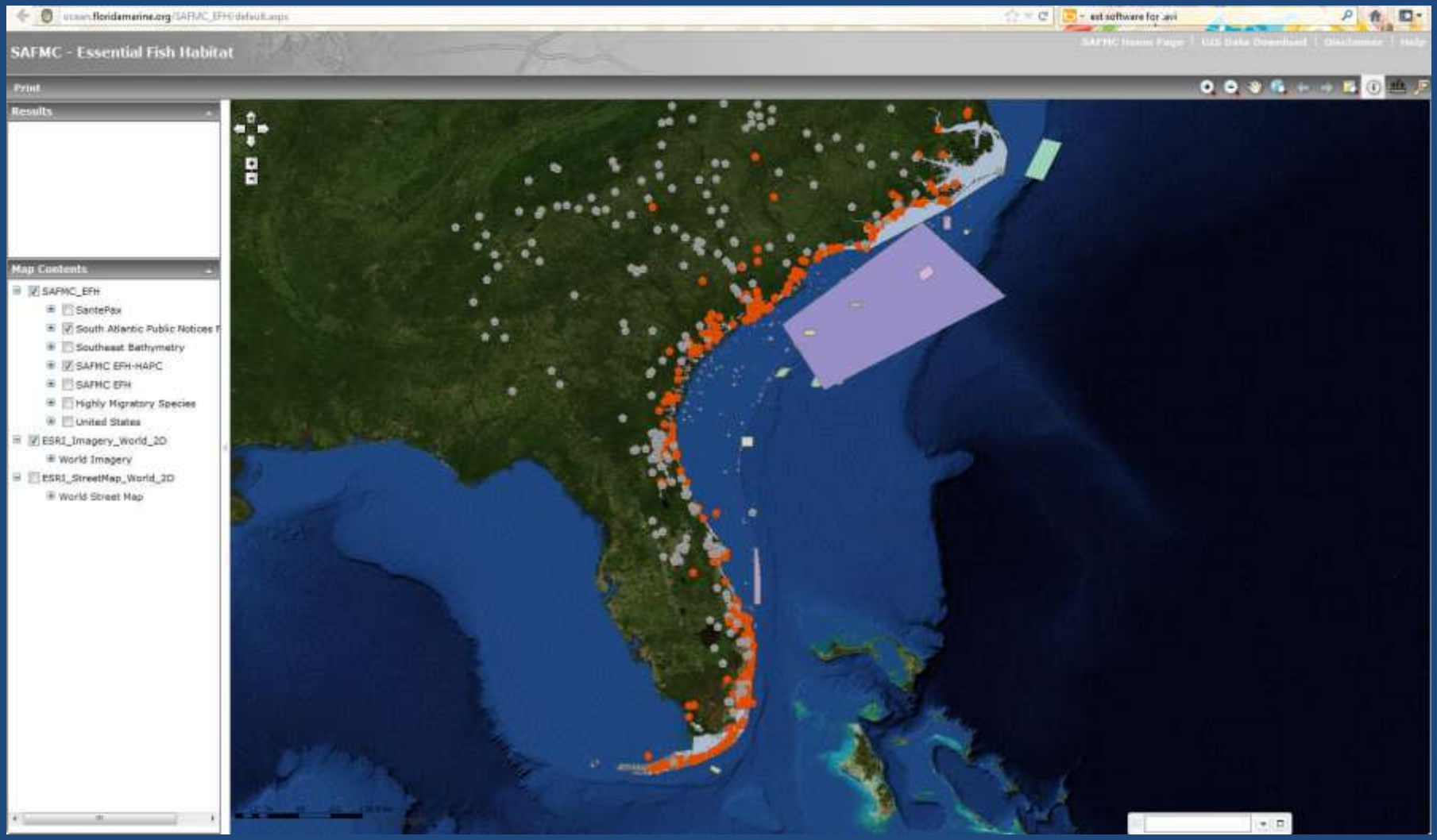
PROS

- Simple to develop with menu driven interface
- Easy to add GIS capabilities, no coding required

CONS

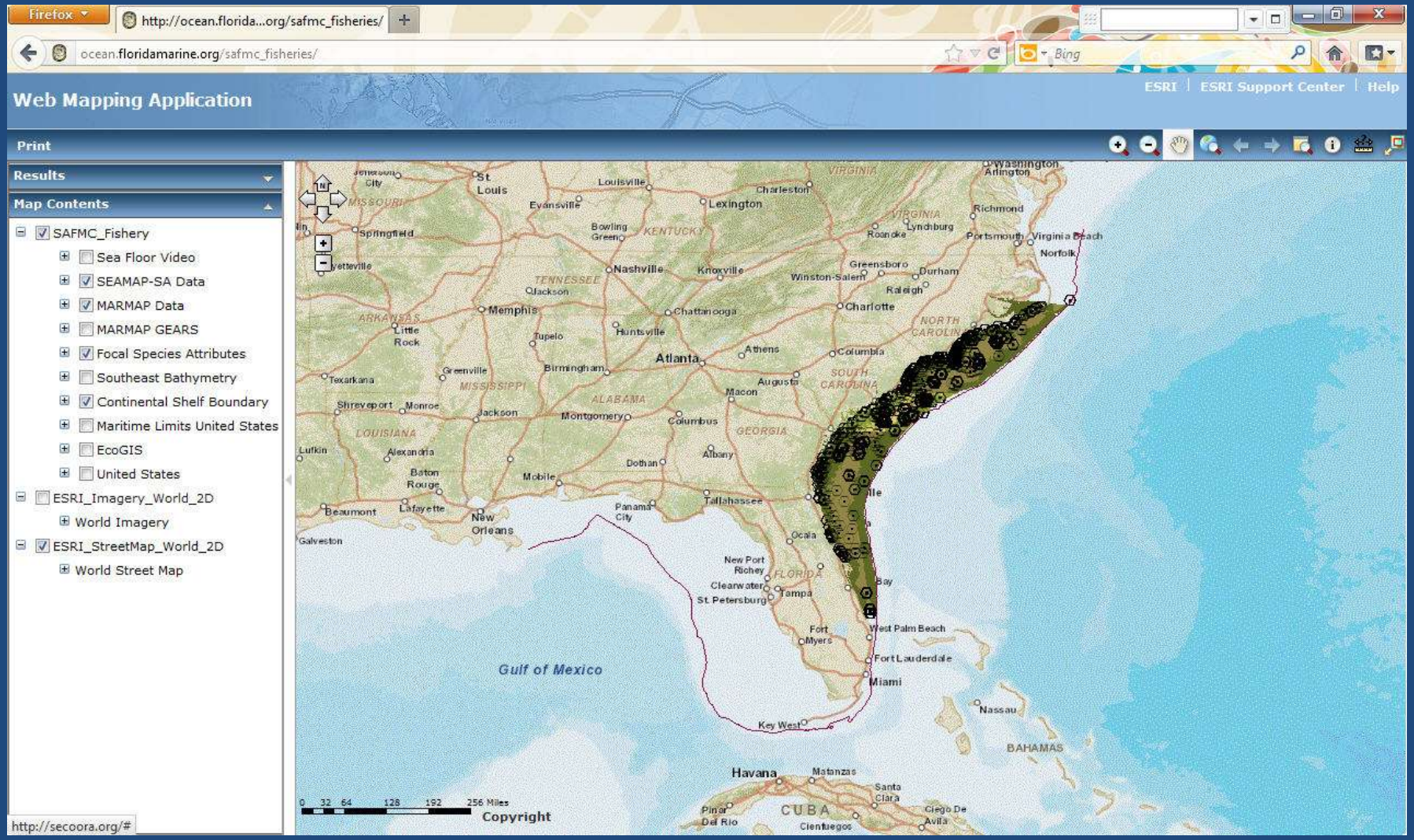
- Difficult to update, customized queries lost easily
- Slow to draw initial map
- Will be ***deprecated at next software release***

.NET Web ADF



The SAFMC Essential Fish Habitat application is displaying the Snapper Grouper EFH-HAPC, and the South Atlantic Public Notices 2011. http://ocean.floridamarine.org/SAFMC_EFH/default.aspx

.NET Web ADF



http://ocean.floridamarine.org/safmc_fisheries/

Web Mapping Applications

.NET Web ADF

- customized **tasks** to query specific GIS data layers
- Zoom, pan and identify tools
- ArcWeb Services to display cached base maps
- print capabilities
- Measuring tools
- and **quick links** to SAFMC.net, help pages, and GIS data

ArcGIS Viewer for Flex

- customized **widgets** to query specific GIS data layers
- Zoom, pan and identify tools
- ArcWeb Services to display cached base maps
- print capabilities
- Measuring tools
- **Splash page** for overview of data and sources

Phase 7 – transfer web applications to Flex Viewer

- improve accessibility and performance by incorporating Flex technology for SAFMC web applications

ArcGIS Viewer for Flex

- Precompiled and ready to deploy
- Easy to add data or tools
- Many custom widgets available
- Intuitive and responsive interface
- Requires flash player (98% PCs already have)

Adobe Flash Player PC Penetration

Worldwide Adobe Flash Player penetration

	June 2008	September 2008	December 2008	March 2009
Total number of PCs using the Internet worldwide (IDC) [1]	904 million	915 million	958 million	1.01 billion
Percentage who can view Flash Player content version 7 and higher worldwide [2]	98.4%	98.1%	99.0%	98.9%
Worldwide Adobe Flash Player penetration - estimate[3]	890 million	898 million	947 million	1 billion

Notes

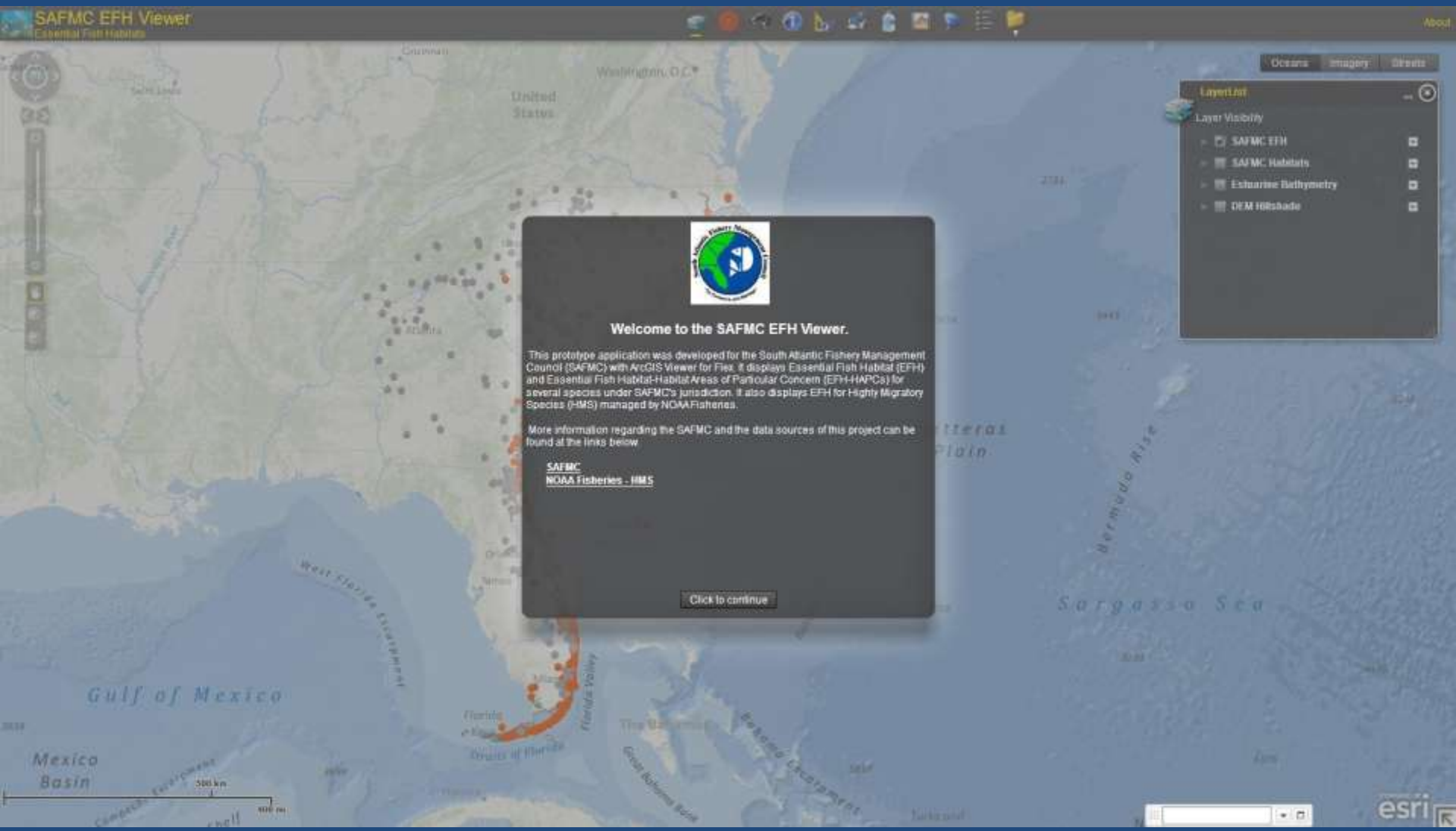
1. Forecasted number of PCs using the Internet - IDC Digital Marketplace Model and Forecast, December 2008
2. Weighted average percentage of mature and emerging markets.
3. Total Player penetration is a calculation of the total number of PCs connected to the internet, multiplied by the weighted percentage of worldwide penetration from the Millward Brown study. This is an assumption made by Adobe.

http://www.adobe.com/products/player_census/flashplayer/PC.html

SAFMC Essential Fish Habitat

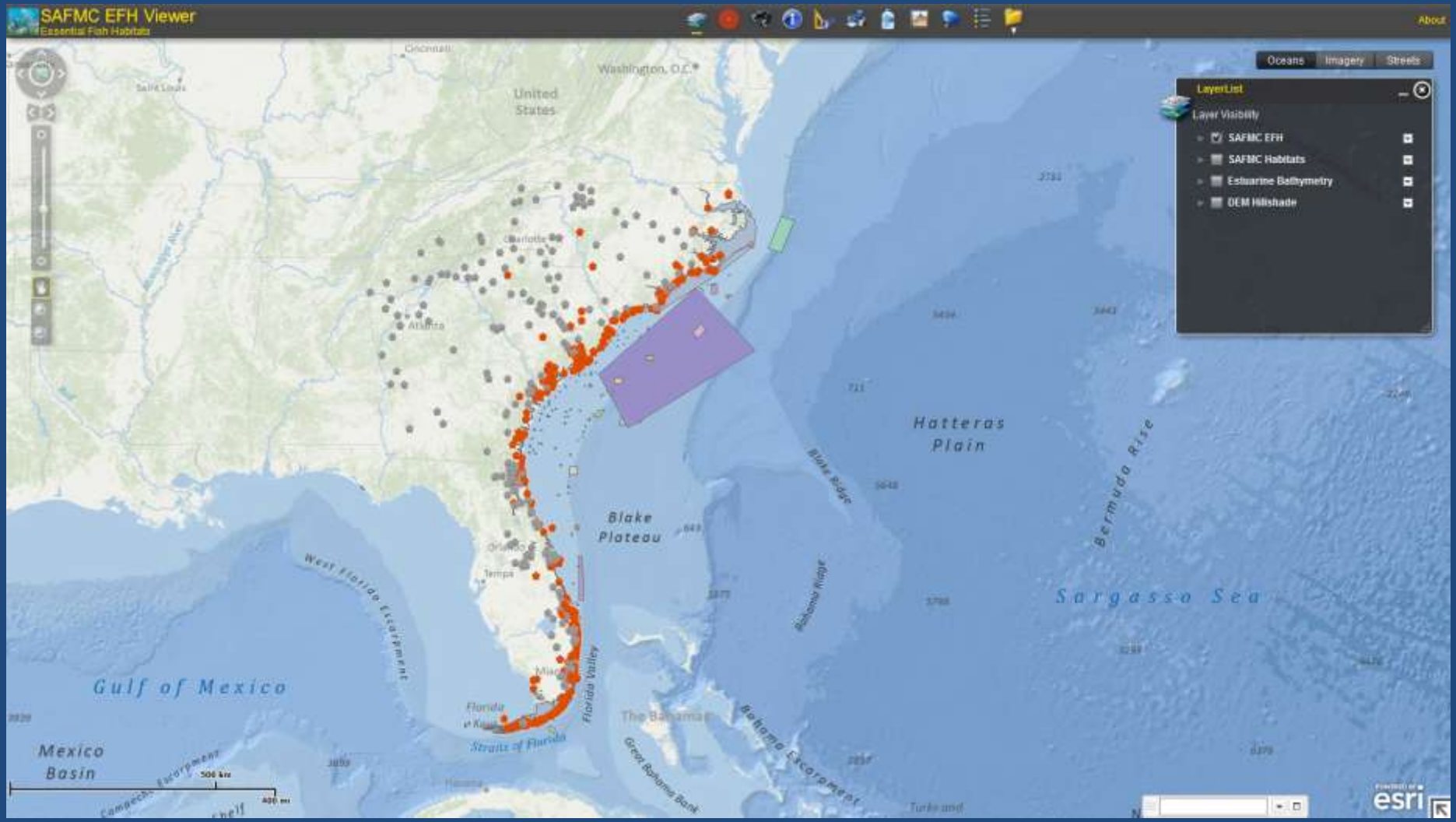
- contains EFH and EFH-HAPC data layers for species managed by the SAFMC.
- also includes NOAA Fisheries Highly Migratory Species
  - Atlantic Tunas
  - Sharks
  - Sailfish
  - Sword Fish
  - Blue or White Marlins

ArcGIS Viewer for Flex



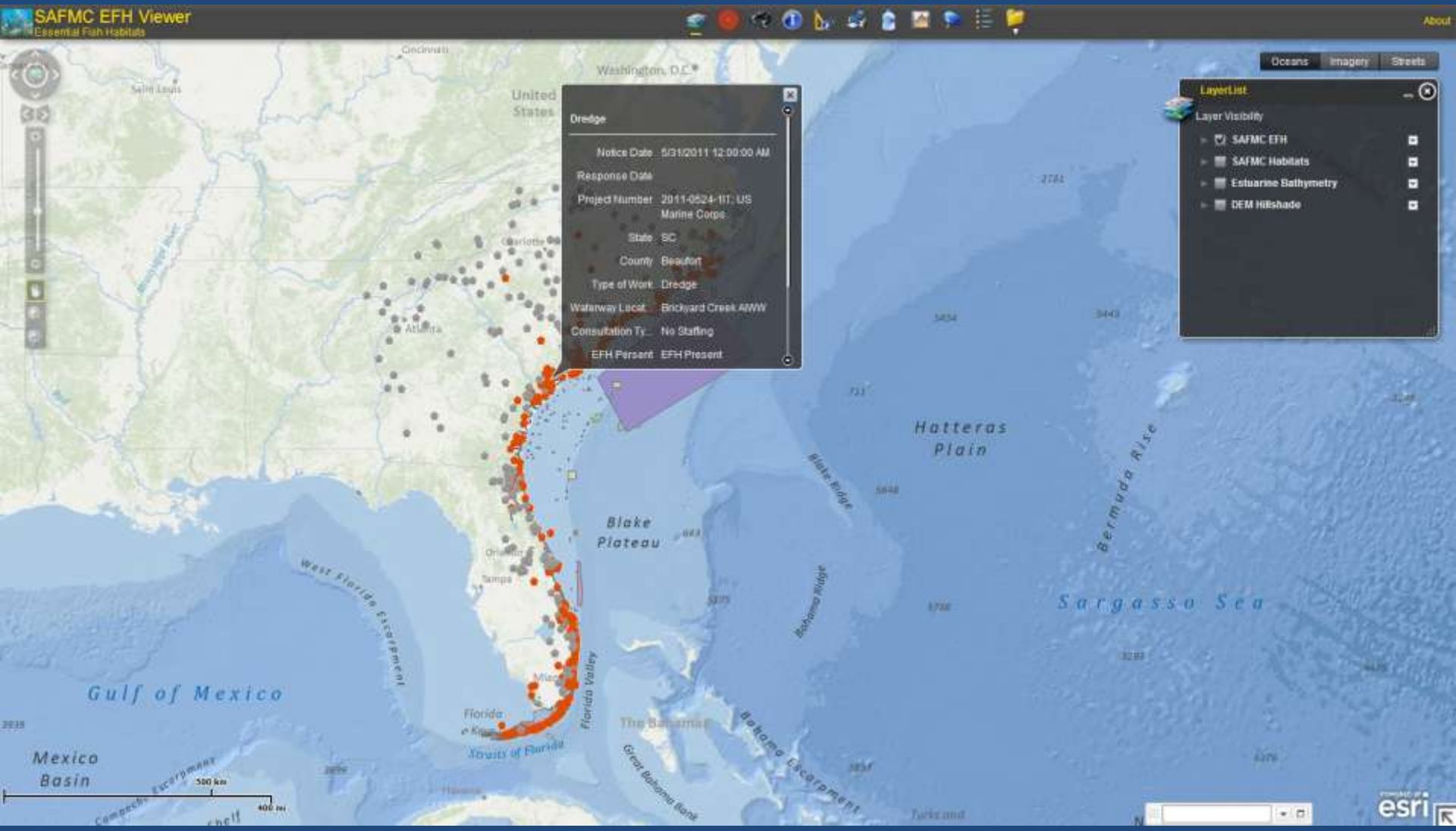
SAFMC EFH Viewer is accessible via http://ocean.floridamarine.org/sa_efh

SAFMC EFH Viewer

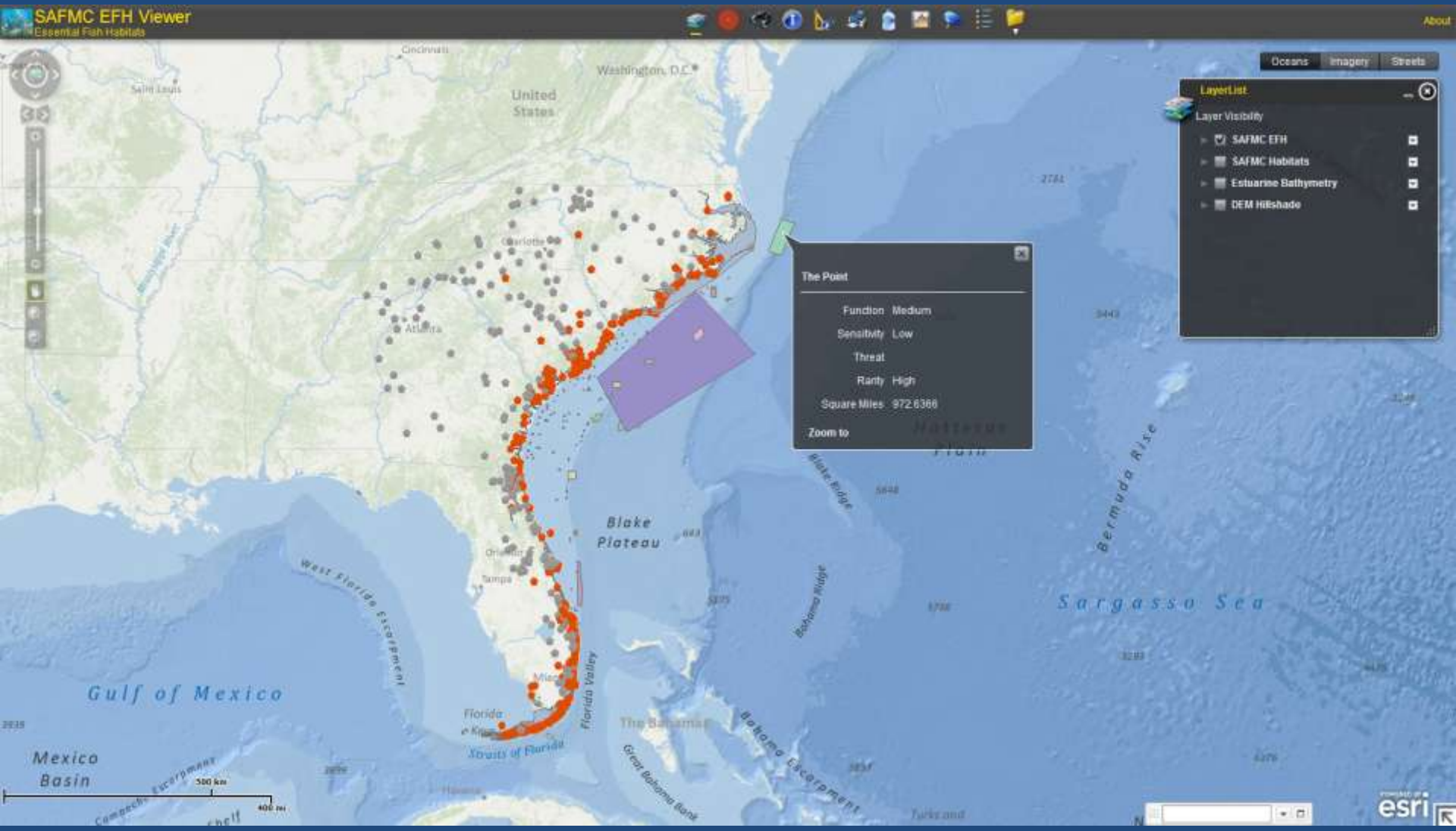


Initial extent displays Snapper Grouper EFH-HAPC and the South Atlantic Public Notices for FY 2011. Options to view SAFMC Habitats, Estuarine Bathymetry, and DEM Hillshade services.

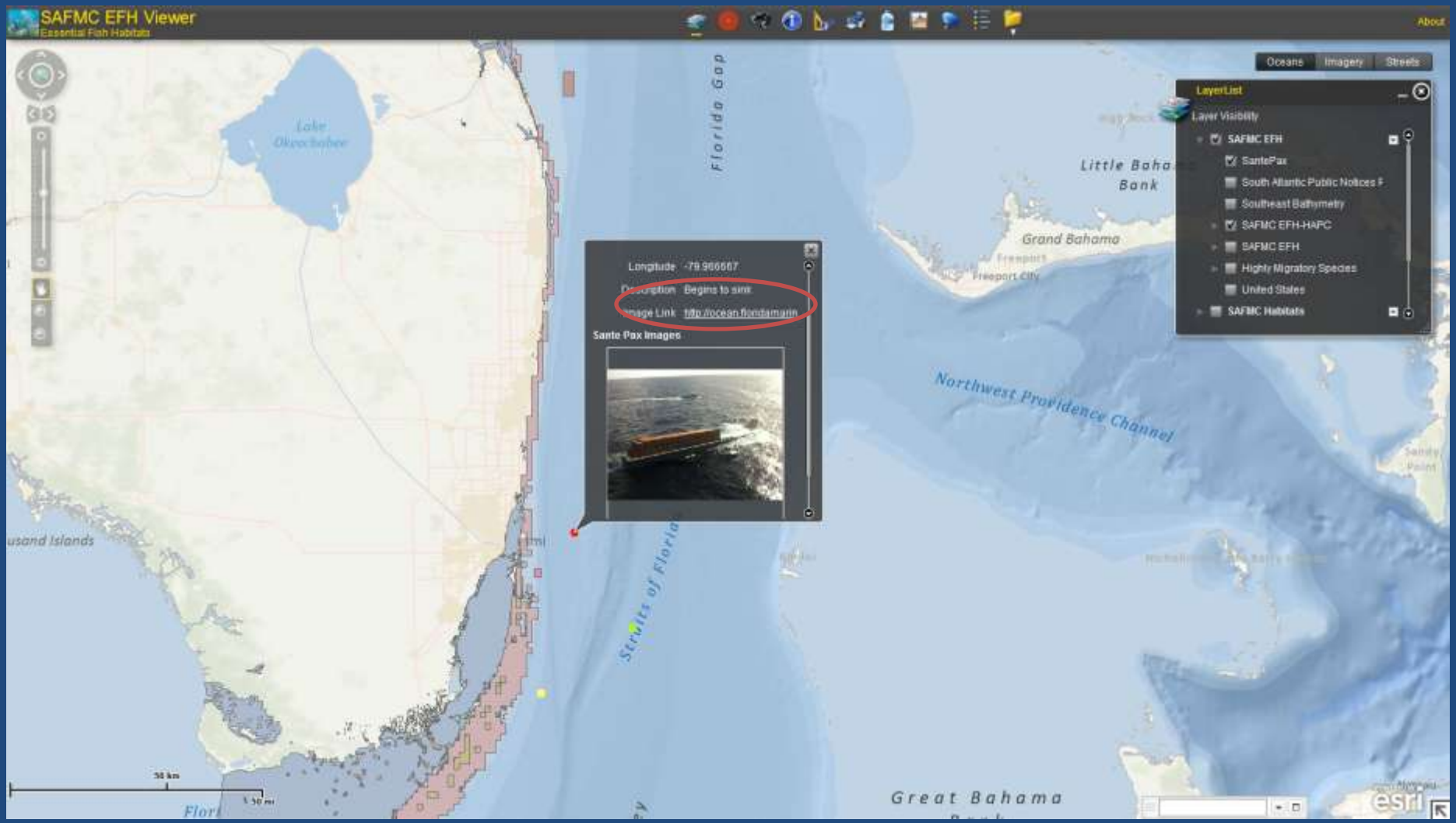
Click map for information



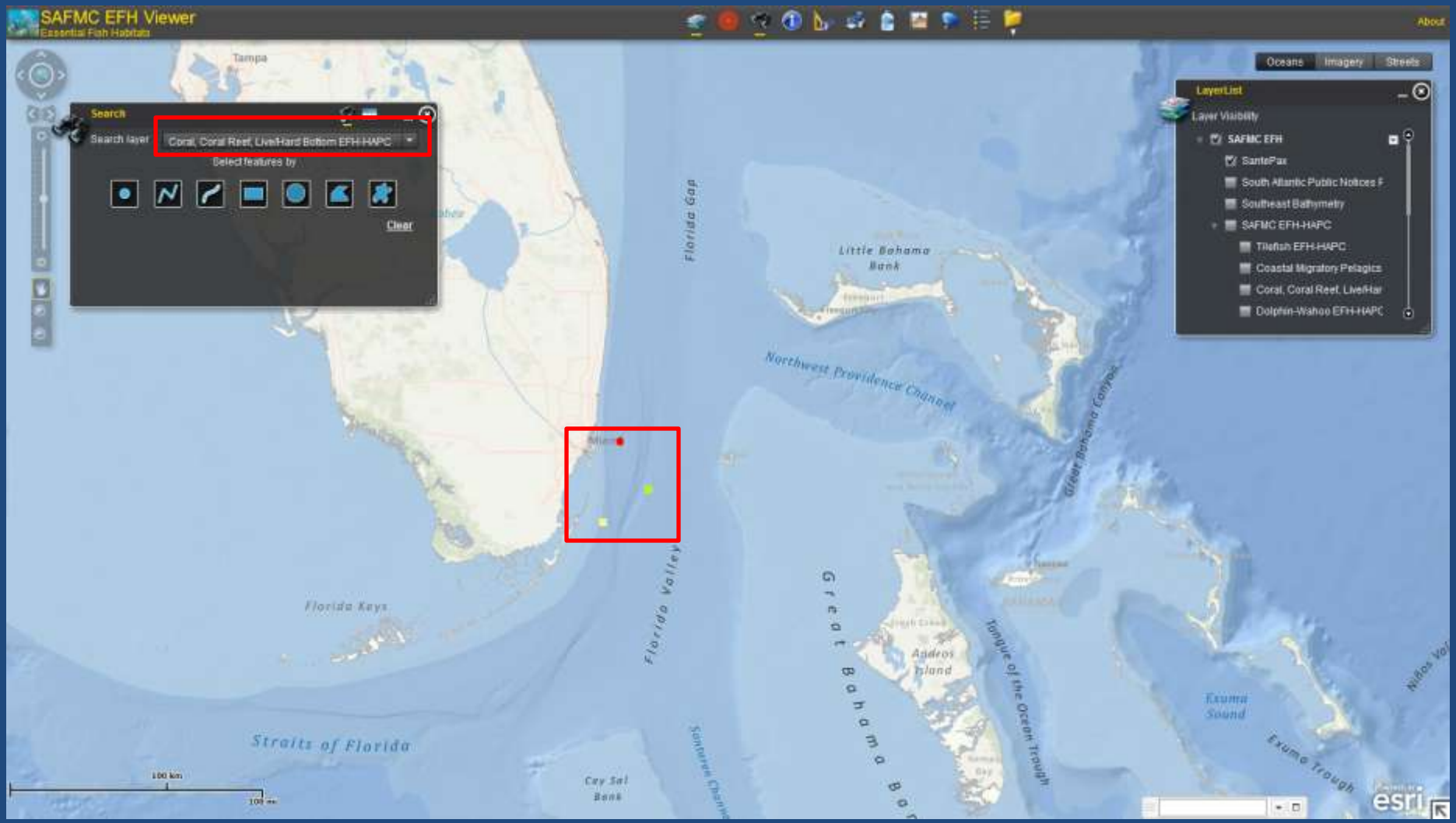
Click map for information



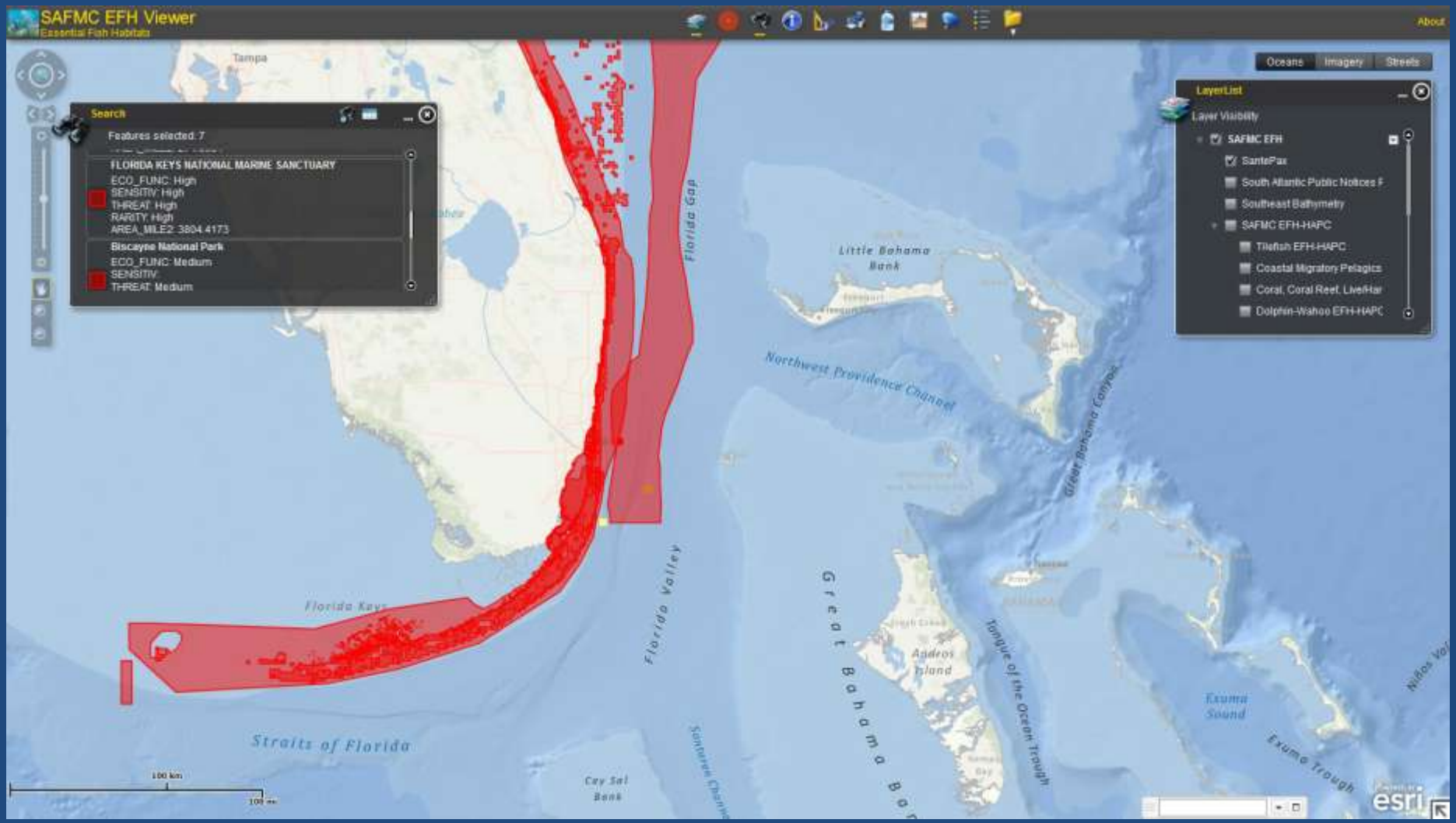
Click map for information



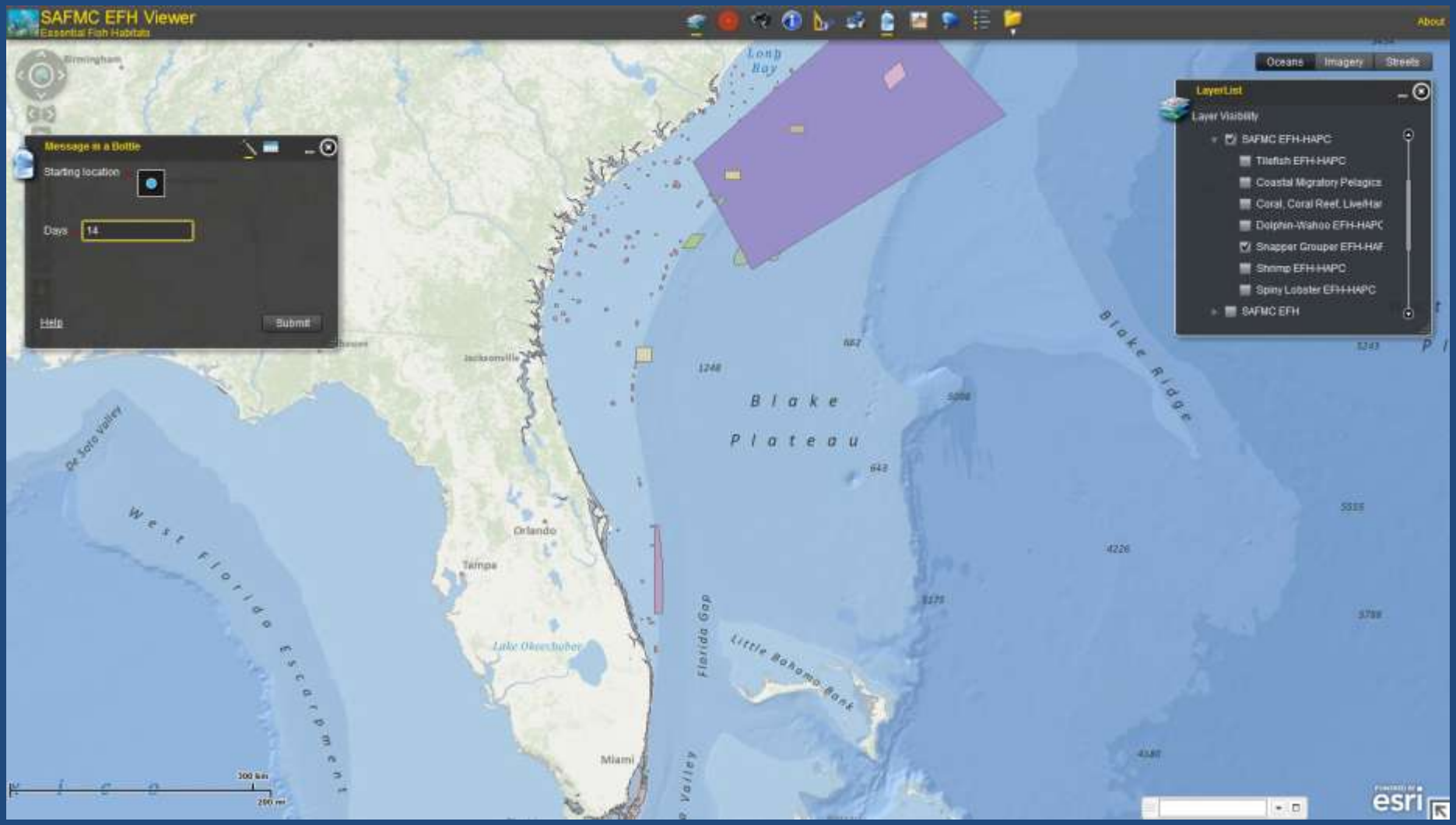
Search Coral EFH-HAPCs in area



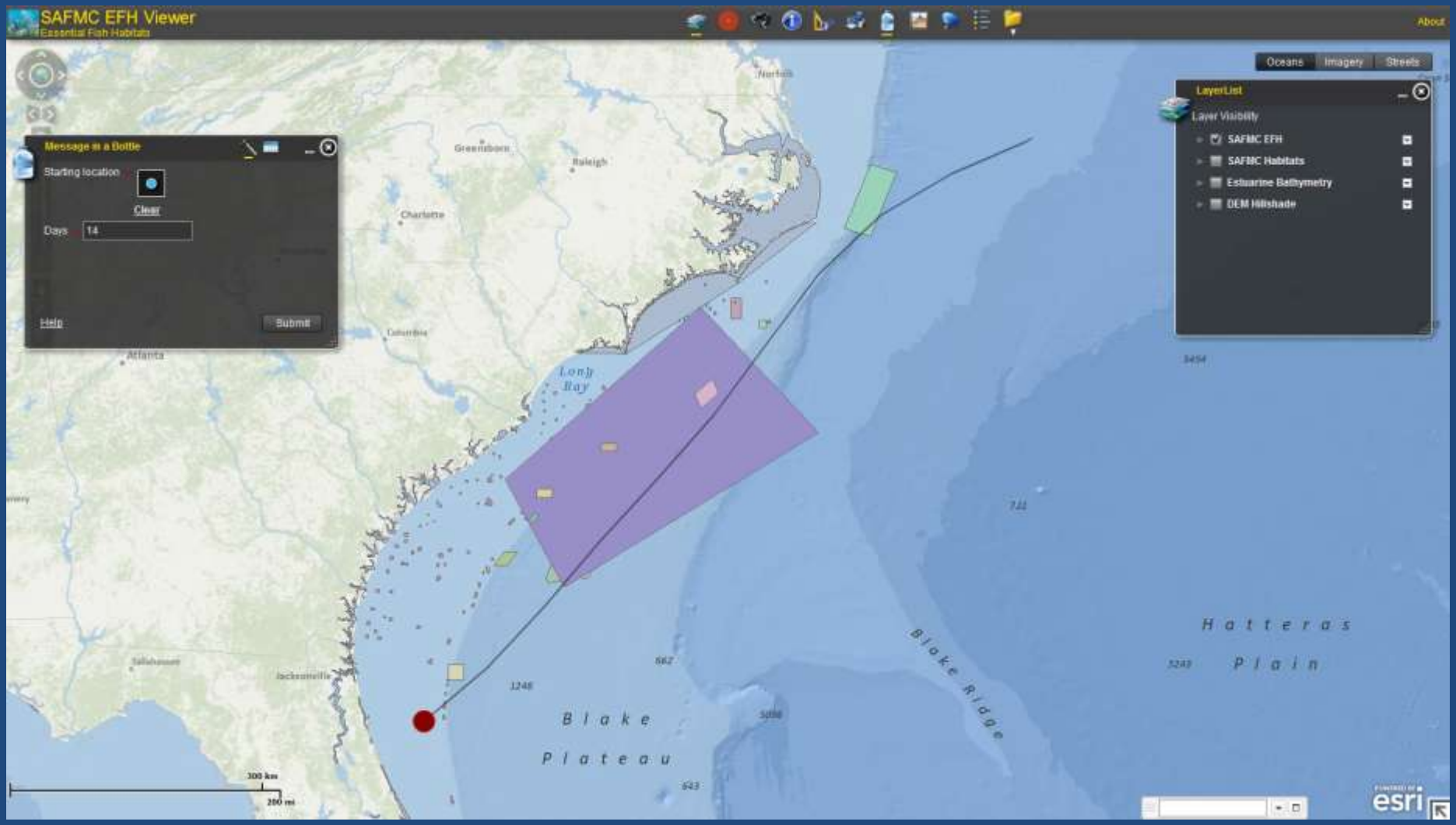
Search CHAPCs in area



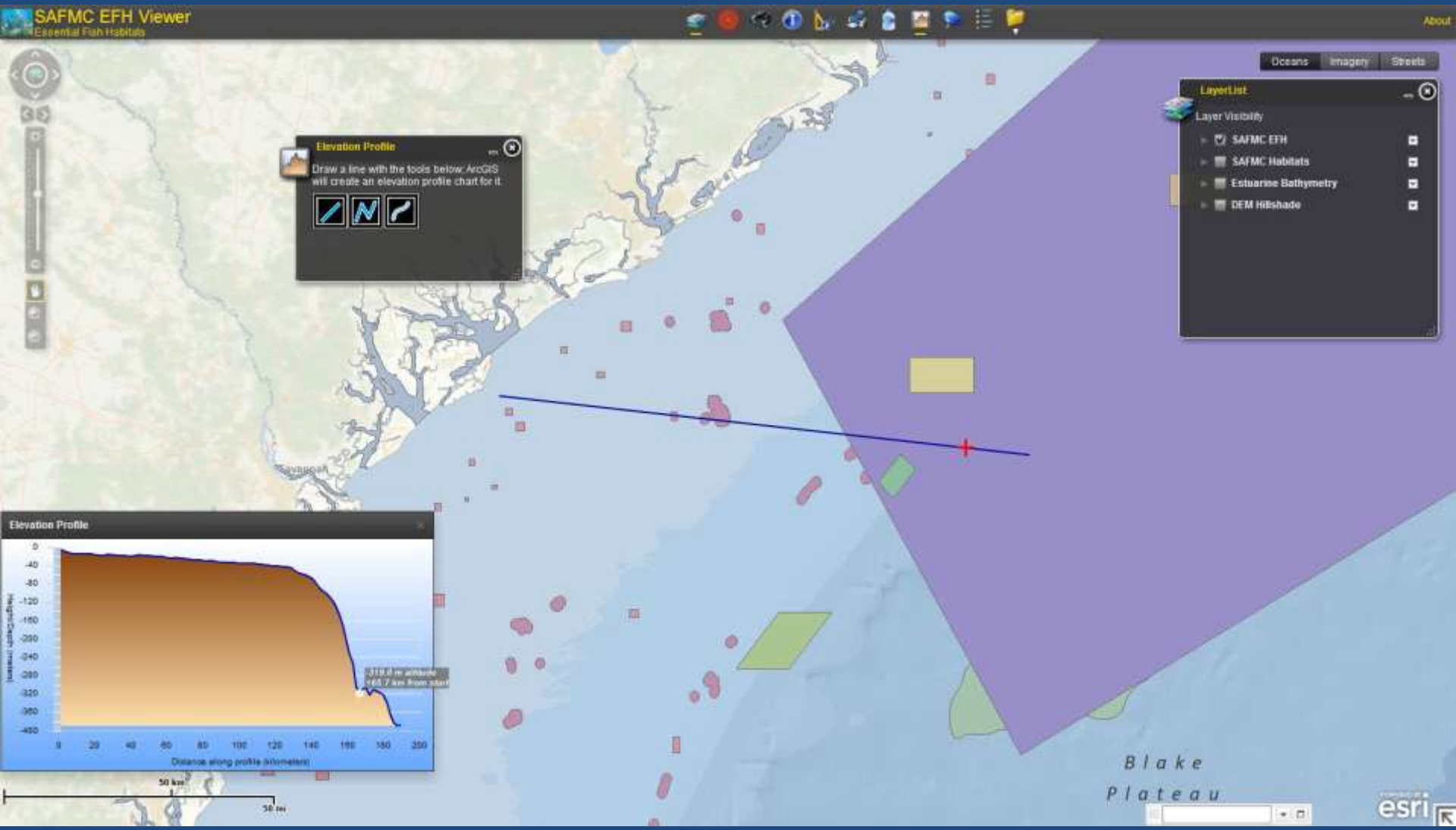
Message in a Bottle



larvae in a bottle?



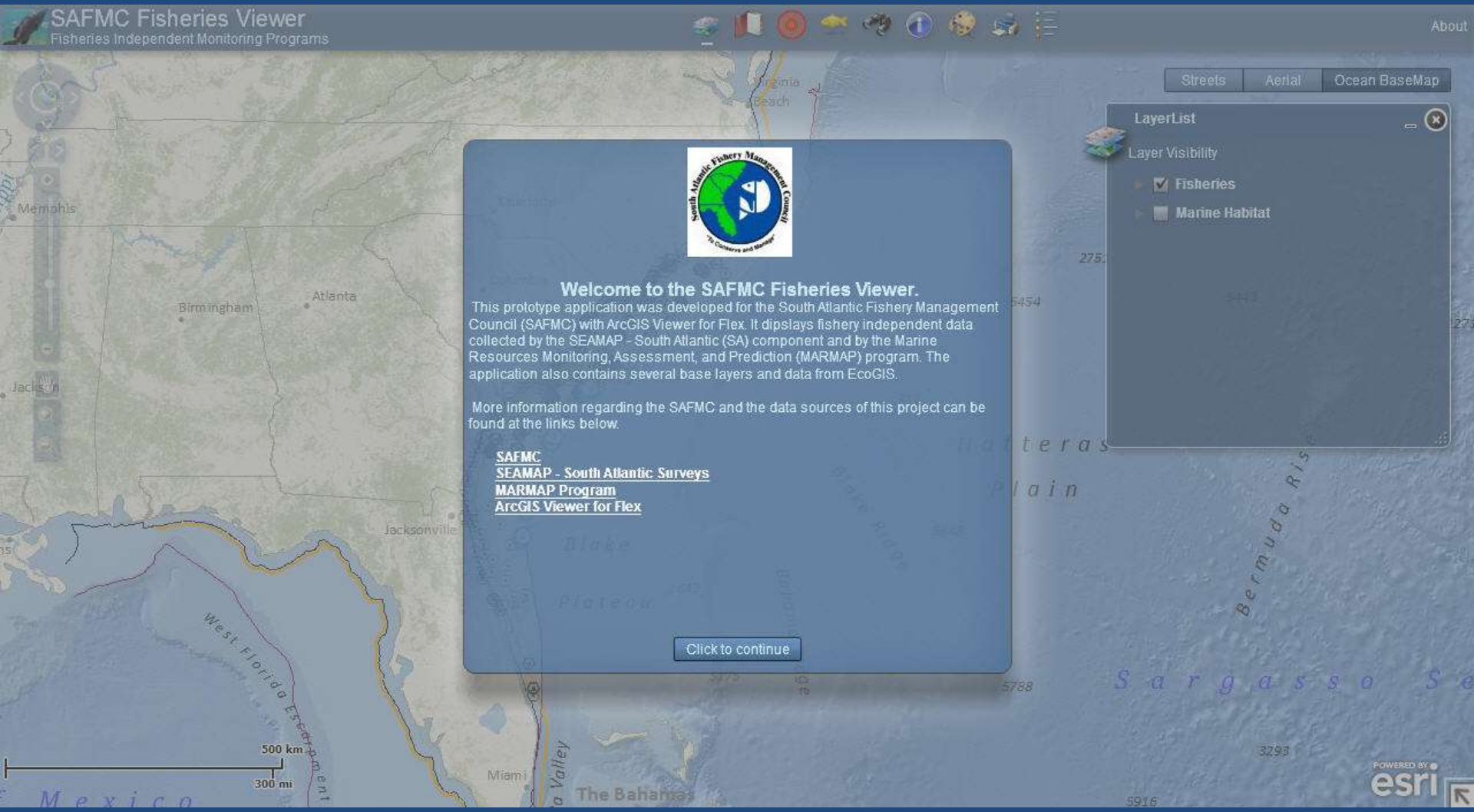
Elevation Profile



SAFMC Fisheries

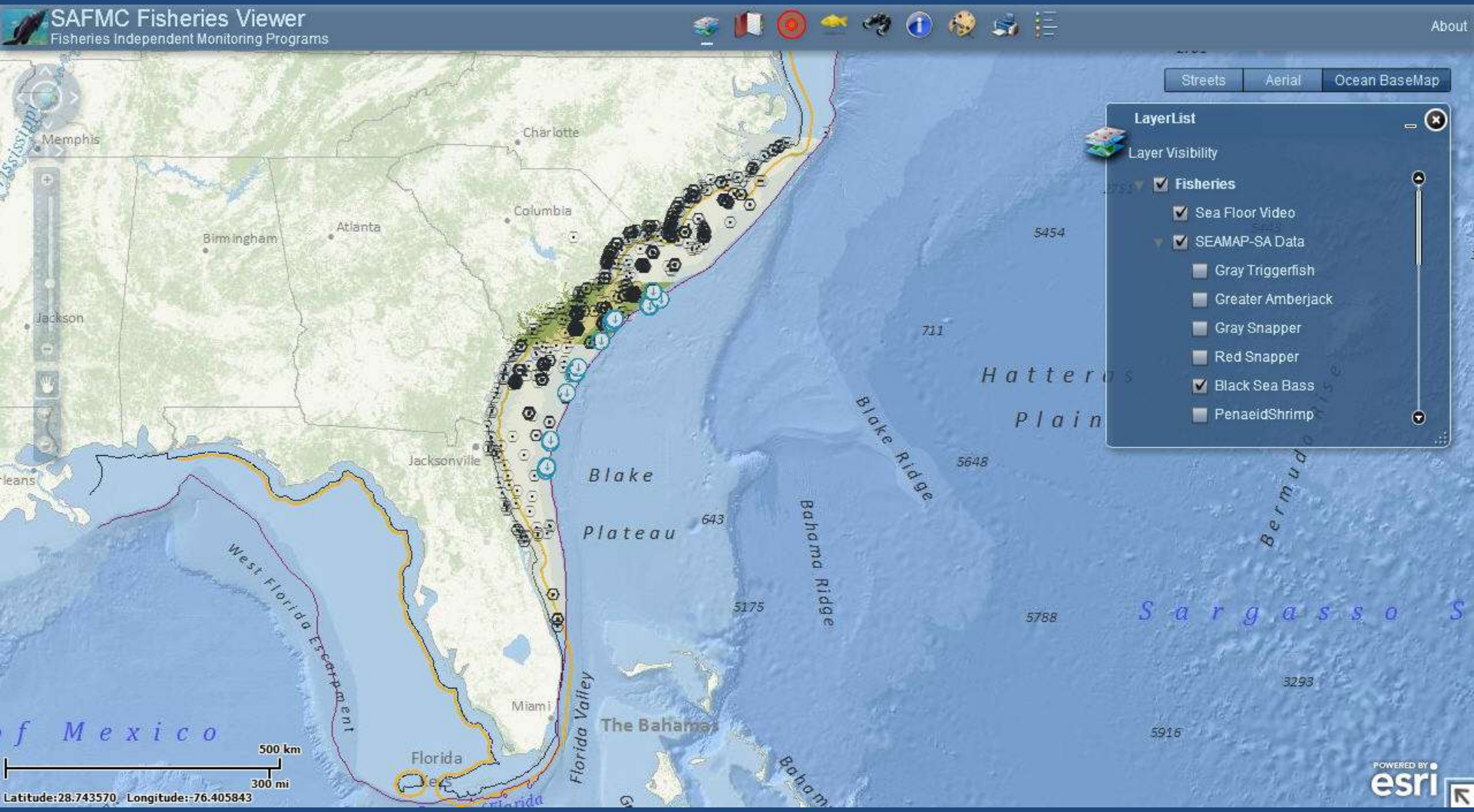
- currently serves SEAMAP-SA species data, MARMAP species data, MARMAP gear types, focal species distributions, bathymetry, and boundaries for the continental shelf, US Federal State and US Territorial Seas.

SAFMC Fisheries

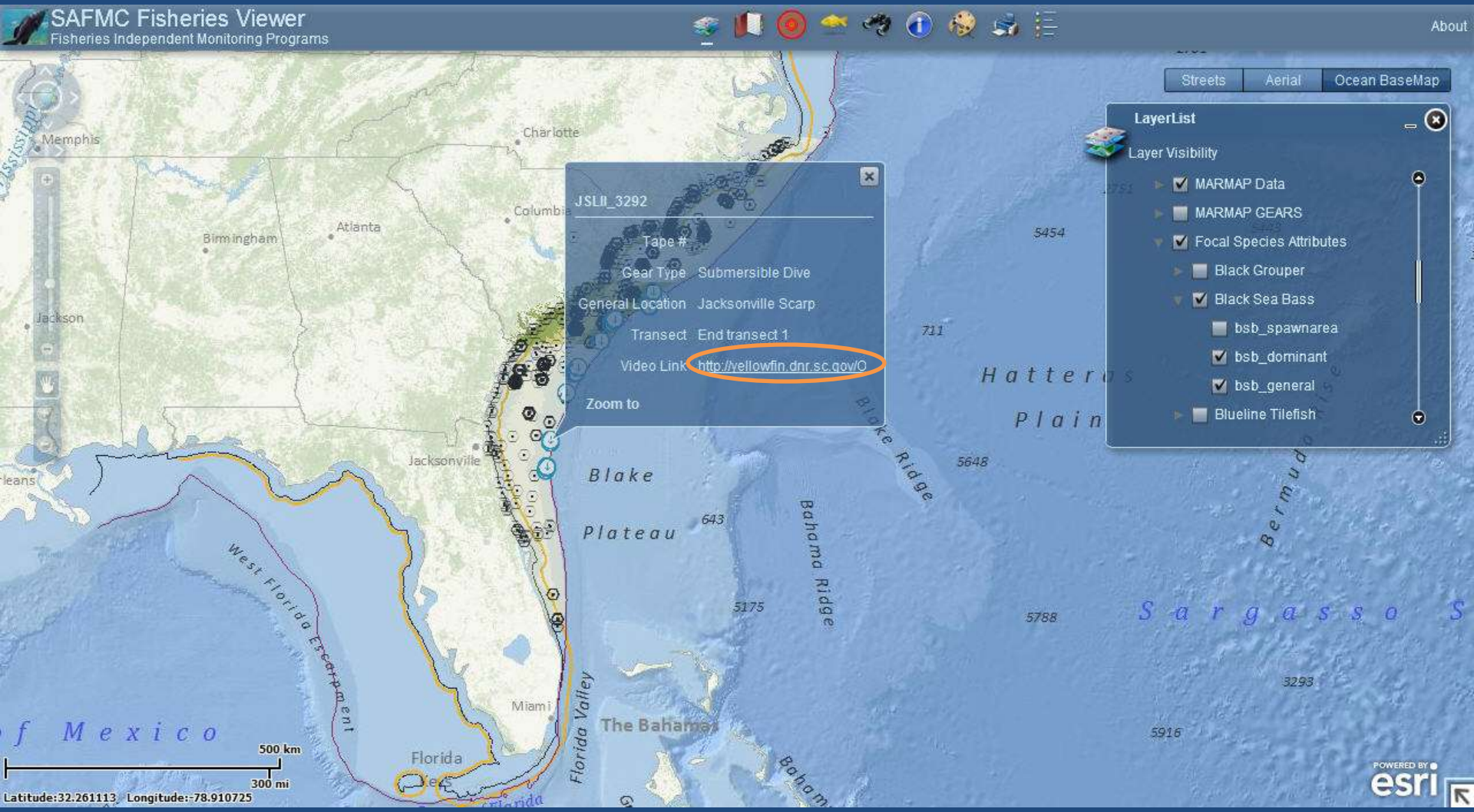


accessible via the following URL:
<http://ocean.floridamarine.org/SA_Fisheries>

SAFMC Fisheries



Initial map shows data points for Black Sea Bass from the SEAMAP-SA and MARMAP projects. The map also displays general depth ranges of Black Sea Bass and Sea Floor Videos.

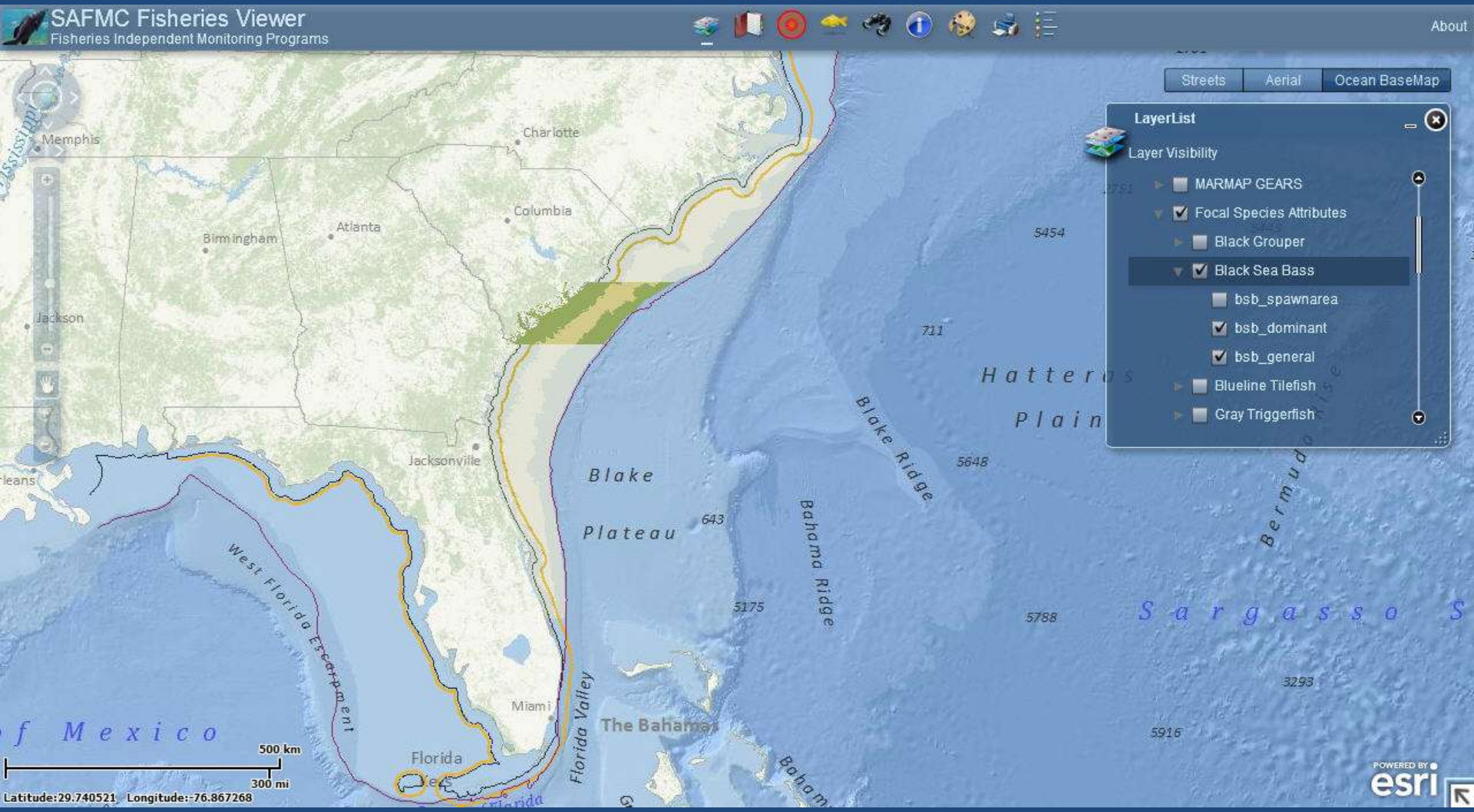

SAFMC Fisheries Viewer
Fisheries Independent Monitoring Programs
About
Streets
Aerial
Ocean BaseMap
LayerList
Layer Visibility
MARMAP Data
MARMAP GEARS
Focal Species Attributes
Black Grouper
Black Sea Bass
bsb_spawnarea
bsb_dominant
bsb_general
Blueline Tilefish
JSLII_3292
Tape #
Gear Type Submersible Dive
General Location Jacksonville Scarp
Transect End transect 1
Video Link http://yellowfin.dnr.sc.gov/O
Zoom to
Memphis
Charlotte
Birmingham
Atlanta
Jackson
Jacksonville
Miami
Florida
The Bahamas
Blake Plateau
Blake Ridge
Bahama Ridge
Florida Valley
West Florida Escarpment
Hatteras Plain
Sargasso S
Bermuda Rise
5454
711
5648
643
5175
5788
3293
5916
500 km
300 mi
Latitude:32.261113, Longitude:-78.910725
POWERED BY esri

SCDNR Submersible Dives

Jacksonville Scarp
02_3291_eT7.mpg

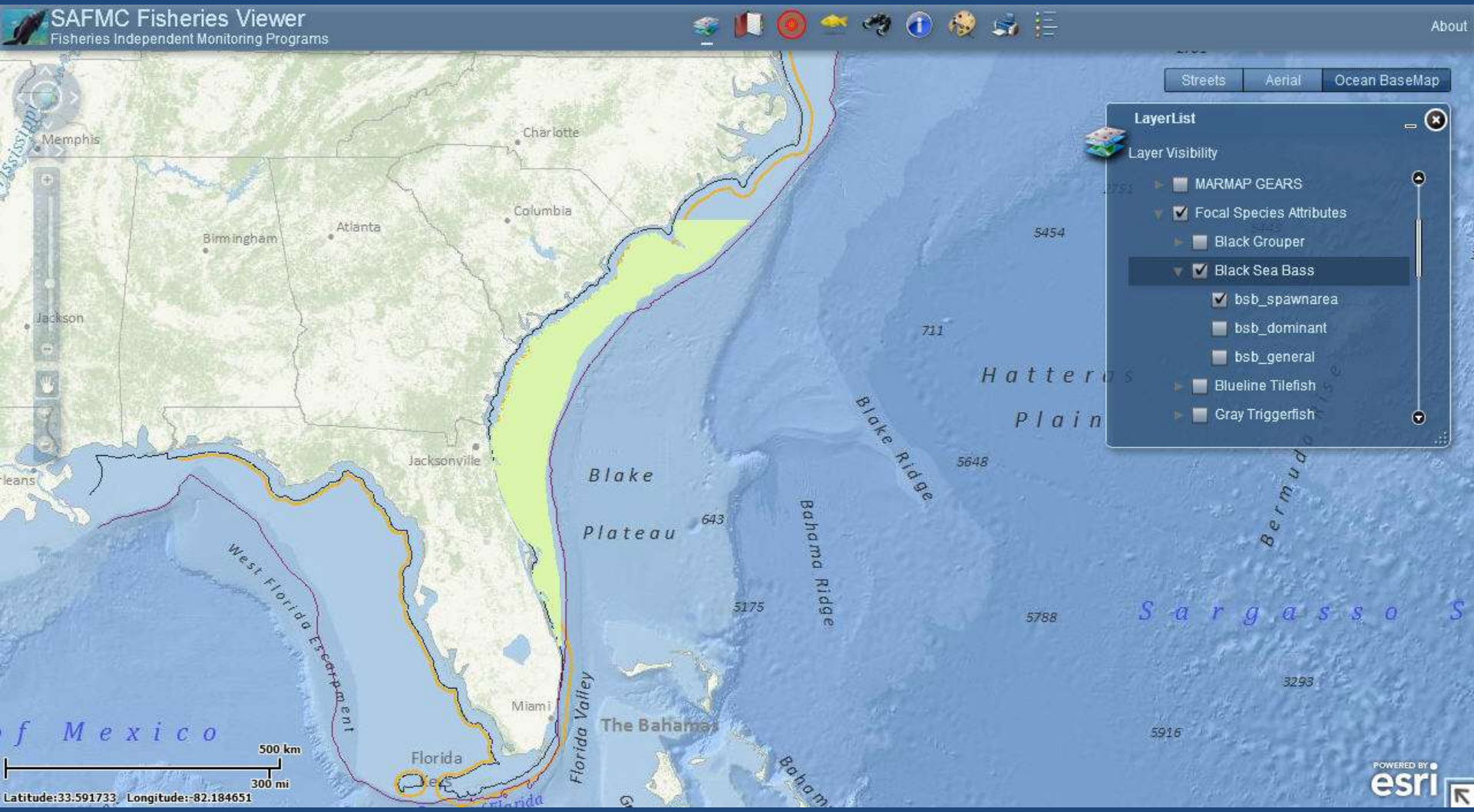
Razorback
03_3413_eT5.mpg

Focal Species Attributes



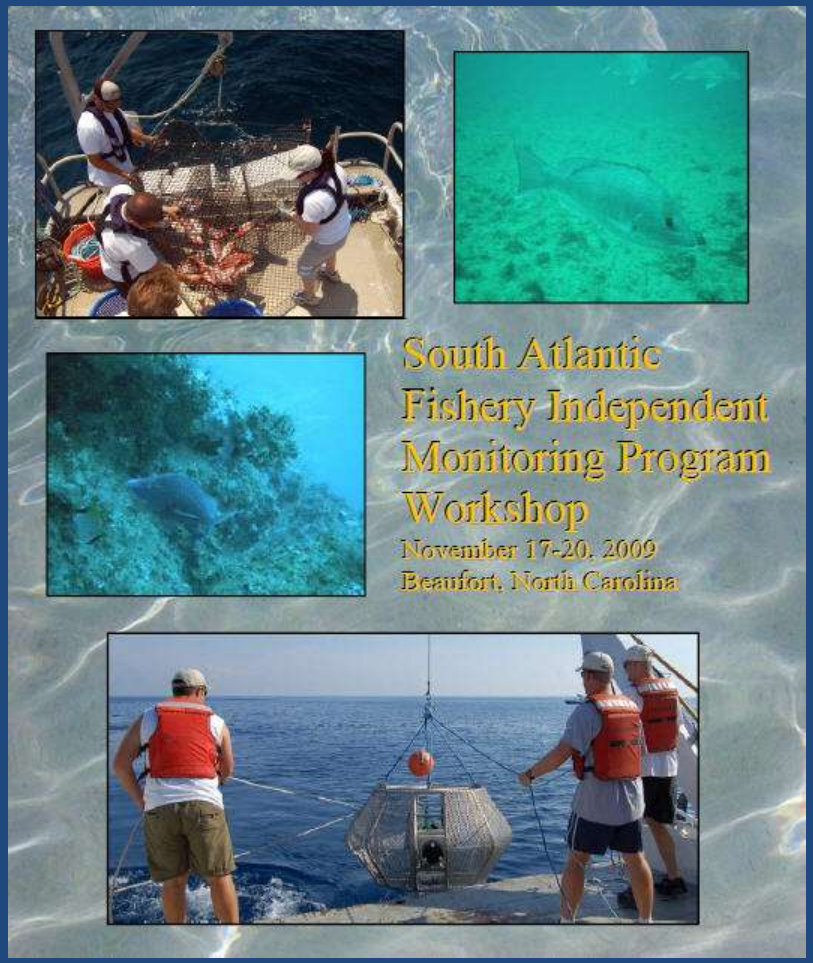
General depth range distribution for Black Sea Bass. Depth Range = 2-130m, Mean Depth = 20 -35m. Darker shading indicates the dominant area for this species 32-33° N.

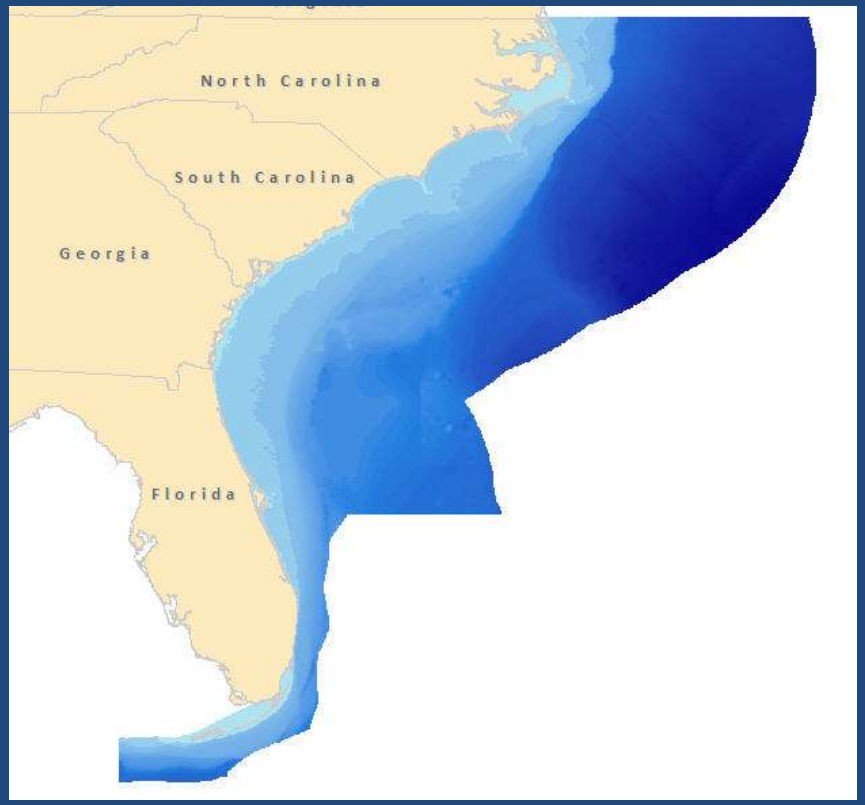
Focal Species Attributes



Black Sea Bass Spawning depths 15-56m between 27-34°

Focal Species Distribution Sources





ETOPO1 Global Relief Model– clipped and reclassified

Life History Report

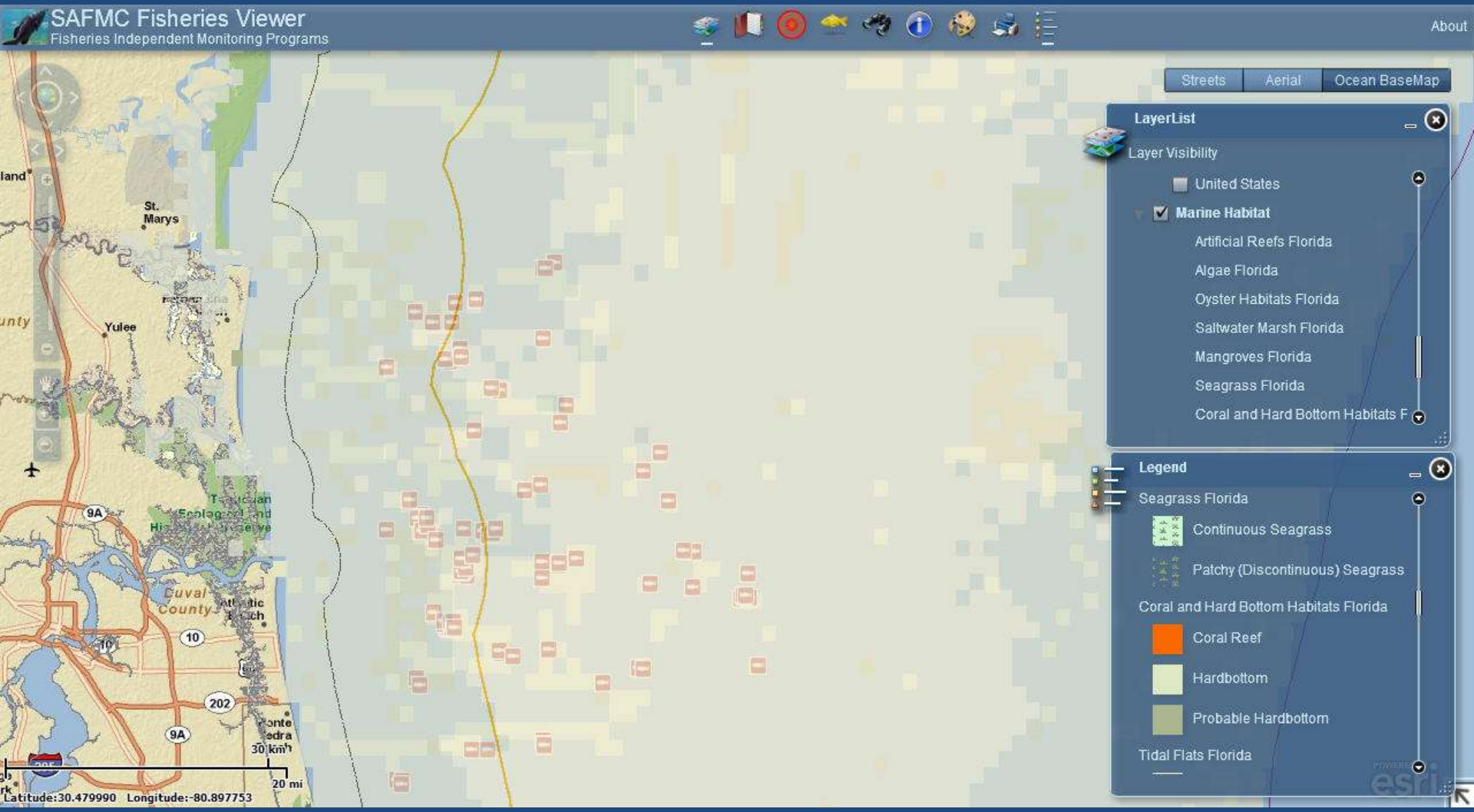
South Atlantic Fishery Independent Monitoring Program Workshop, November 17-20, 2009, Beaufort, NC

Table 1. Attributes of focal species. Abbreviations: CH = Cape Hatteras; Atl = Atlantic; LB = live bottom; AR = artificial reef; Est = estuary; NA = not available; NS = not significant; SAV = submerged aquatic vegetation.

Stock	Stock Genetic Diff in SA	Home Range or Migration	Depth Effect	Area Found	Dominant Area	Adult habitat	Juvenile Habitat	Peak Spawning	Female Spawning Season	Spawning Depth (m)	Spawning Area	Mean depth caught (m)	Min	Max
Black Sea Bass	NS	Small (larger move more)	NA	Fort Pierce to CH/Atl Coast	32-33 N	LB/AR	Reef, Oyster, SAV	Feb-Apr	Feb-Jul, Sep, Nov	15-56	27-34 N	20-35	2	130
Gag	Ongoing	Large	Male Female Separation Larger offshore	SA	SA	LB/Ledge	Est/Reef	Mar-Apr	Dec-May	24-117	26-33 N	20-50	2	152
Snowy Grouper	NA	Unknown	Larger offshore	SA plus VA	SC/NC	Rock, Ledge, Wreck	Inshore of Adult 50 m	Unknown	Apr-Sep	176-232	24-34 N	100-200	30-50	525
Red Grouper	NS	Small	Larger offshore	Keys to NC	Keys and NC	Live, Rock, Sand, AR	Reef, Lesser extent Est with SAV	Feb-Apr	Dec-Jun	30-90	Keys and NC	30-45	20	95
Black Grouper	NS	Small	Larger offshore	Keys to Cape Lookout	Keys	Live, Rock, Ledges, AR	Reef, SAV, Oyster	Jan-Mar	Possibly Year Round	<100	Keys	30-40	9	60
Speckled Hind	NA	Unknown	Larger offshore	Keys to CH	Unknown	Ledges, Rock	Ledges, Rock	Unknown	May-Oct	Unknown	Unknown	75-100	28	165
Scamp	NA	Seasonal Possible	Larger offshore	Keys to Cape Hatteras	Carolinas	Live, Rock, Ledges, AR	Unknown in SA rarely in Estuaries	Mar-May	Feb-July	33-93	29-32 N (sampling effect)	30-50	17	113
Warsaw Grouper	NA	Unknown	Larger offshore	Keys to CH	Unknown	Live, Rock, Ledges, Pinnacles	Live, Rock, AR, Ledges	Unknown	Aug-Oct			70-110	30	500
Goliath Grouper	NA	Moderate	Juveniles use estuaries adults offshore	Keys to Cape Lookout	Keys	Mangroves, Bridges, Coral, AR	Mangroves and Estuaries	Jul	Jun-Dec			20-50	7	100
Yellowedge Grouper	NA	Unknown	Larger offshore	Keys to Cape Hatteras	N FL to SC	Rock and Ledges	Unknown		Apr-Oct	160-194	31 N (sampling effect)	100-200	64	275
Vermilion Snapper	NA	Small	Larger offshore	Cape Canaveral to CH	N FL to Cape Lookout	LB/Rock/AR	20-30 m depth AR &LB	May-Aug	Apr-Dec	18-97	27-34 N	<76	14	163
Red Snapper	Ongoing	Small	May move inshore to form spawning aggregation	Fort Pierce to CH	Fort Pierce to GA	LB/Rock/AR	Live Bottom Low relief	Jun-Sep	May-Oct	24-67	27-33 N	20-50	10	150
Yellowtail Snapper	NA	Unknown	Unknown	Keys to Cape Lookout	FL	Live, Rock, Reefs, AR	Back reefs and SAV	May-Jul	Feb-Oct		S FL	20-40	10	70

14 species processed

- Black Sea Bass
- Gag
- Snowy Grouper
- Red Grouper
- Black Grouper
- Scamp
- Red Snapper
- Tilefish
- Blueline Tilefish
- Red Porgy
- Greater Amberjack
- Gray Triggerfish
- White Grunt
- Wreckfish

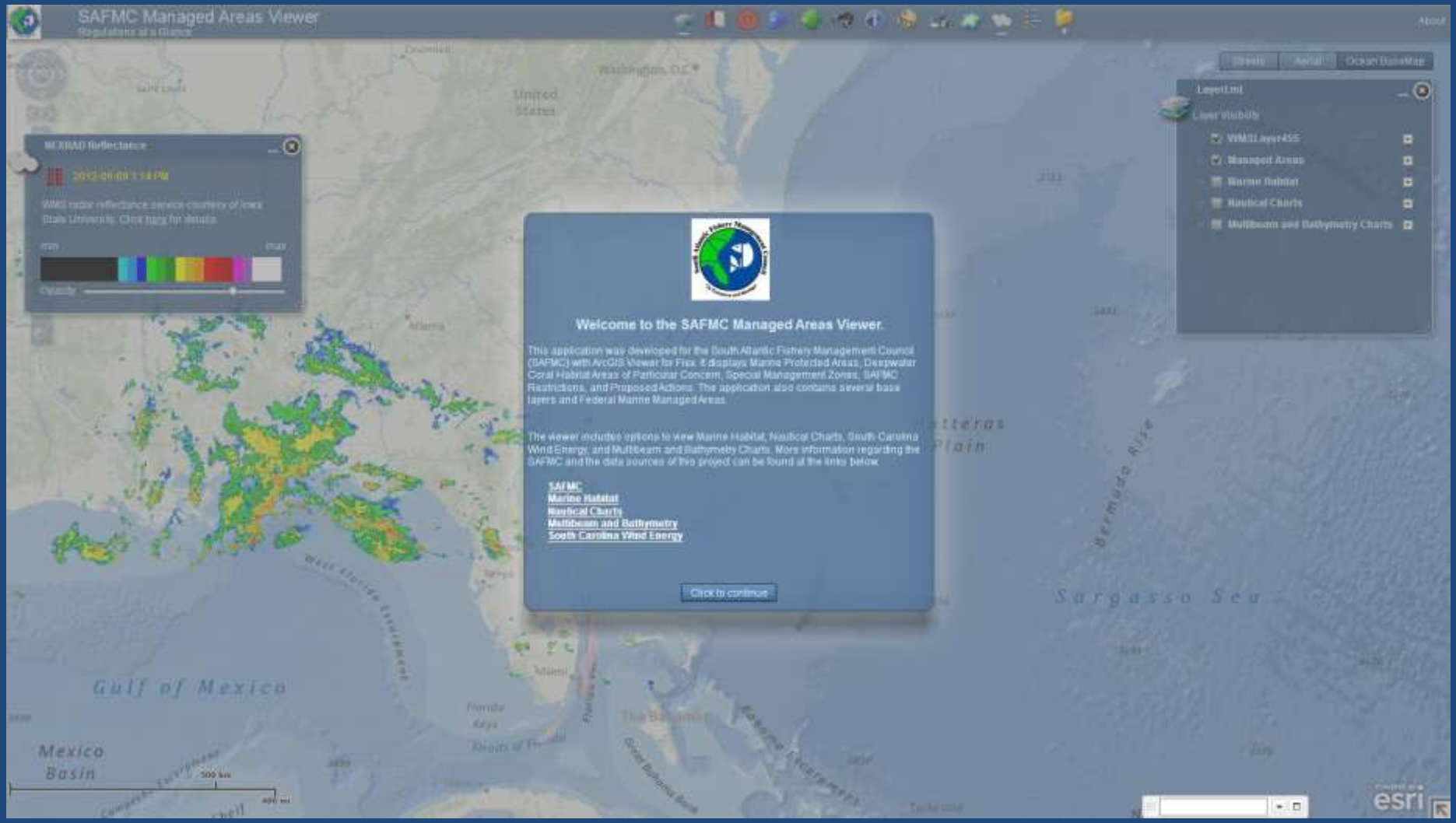


Black Sea Bass general depth range overlaying the FWC cached Marine Habitat map service.

SAFMC Managed Areas

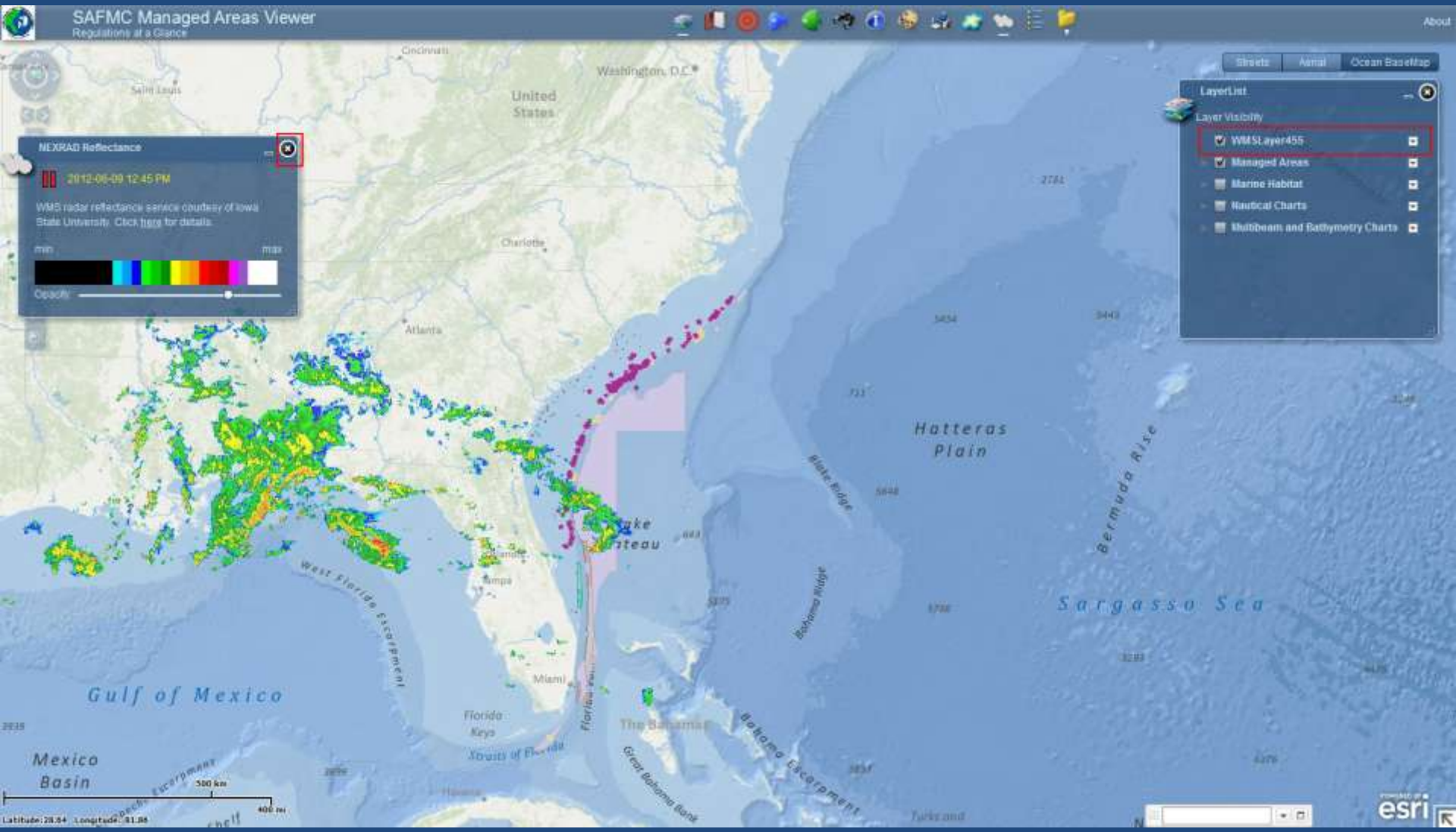
- contains data for the Allowable Golden Crab Fishery Areas, Shrimp Fishery Access Areas, and Deepwater Coral HAPCs.
- also includes SAFMC Restrictions, Marine Protected Areas, Oculina CHAPC, Special Management Zones, Danger Zones, and other Federal Marine Managed Areas.

SAFMC Managed Areas

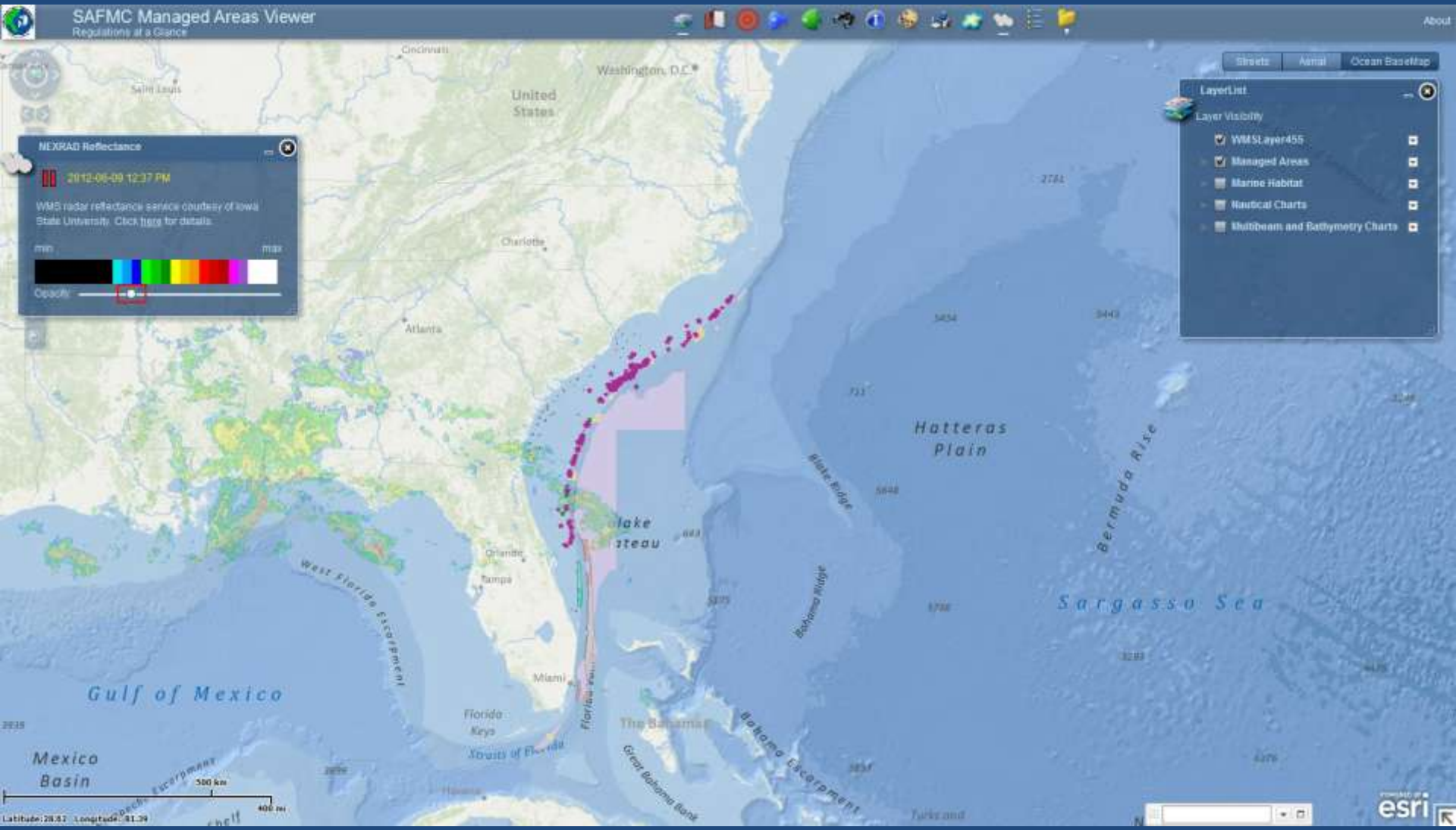


The graphic displays the initial view of the SAFMC Managed Areas viewer.
<http://ocean.floridamarine.org/safmc_managedareas>

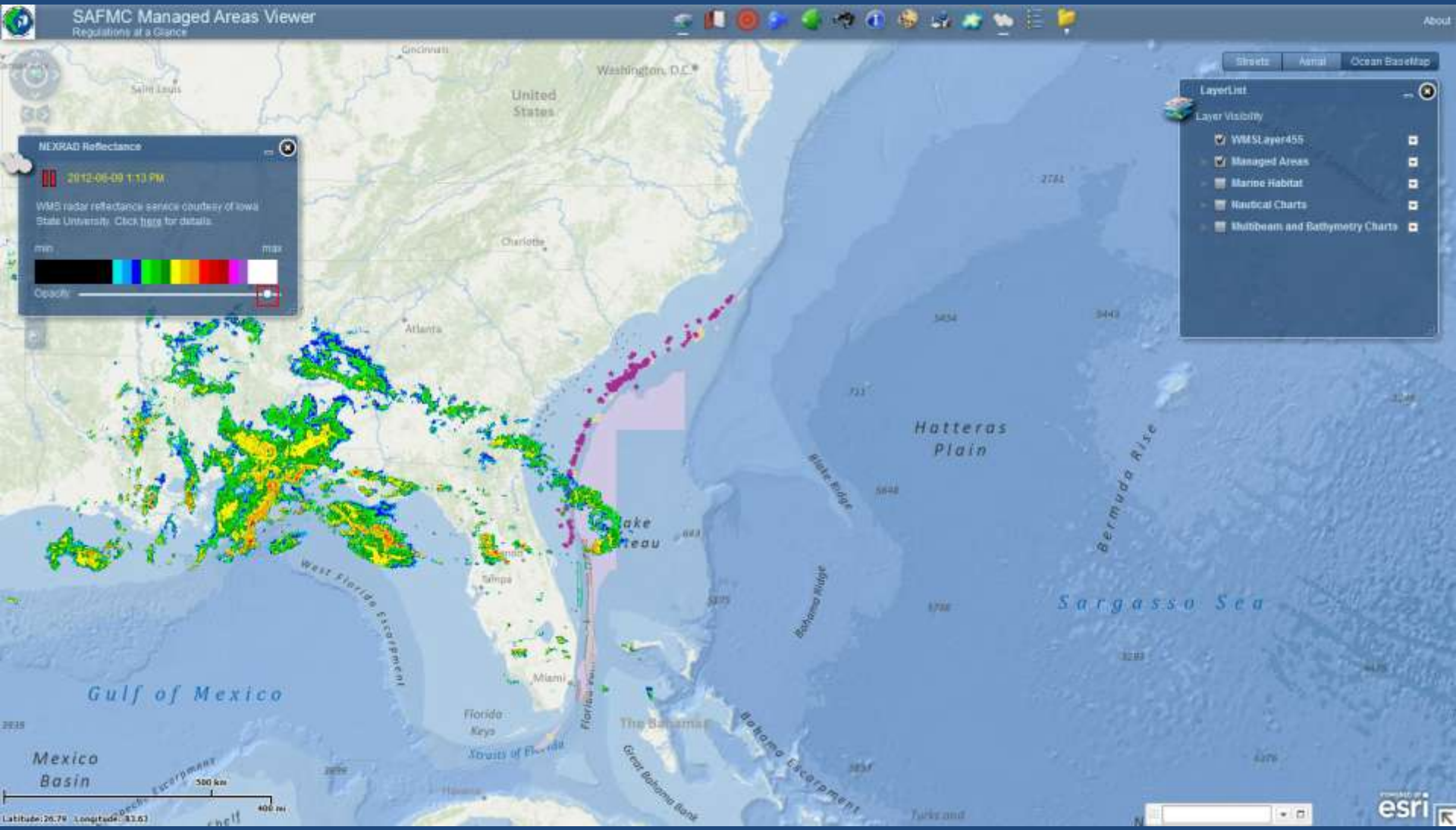
How's the weather?



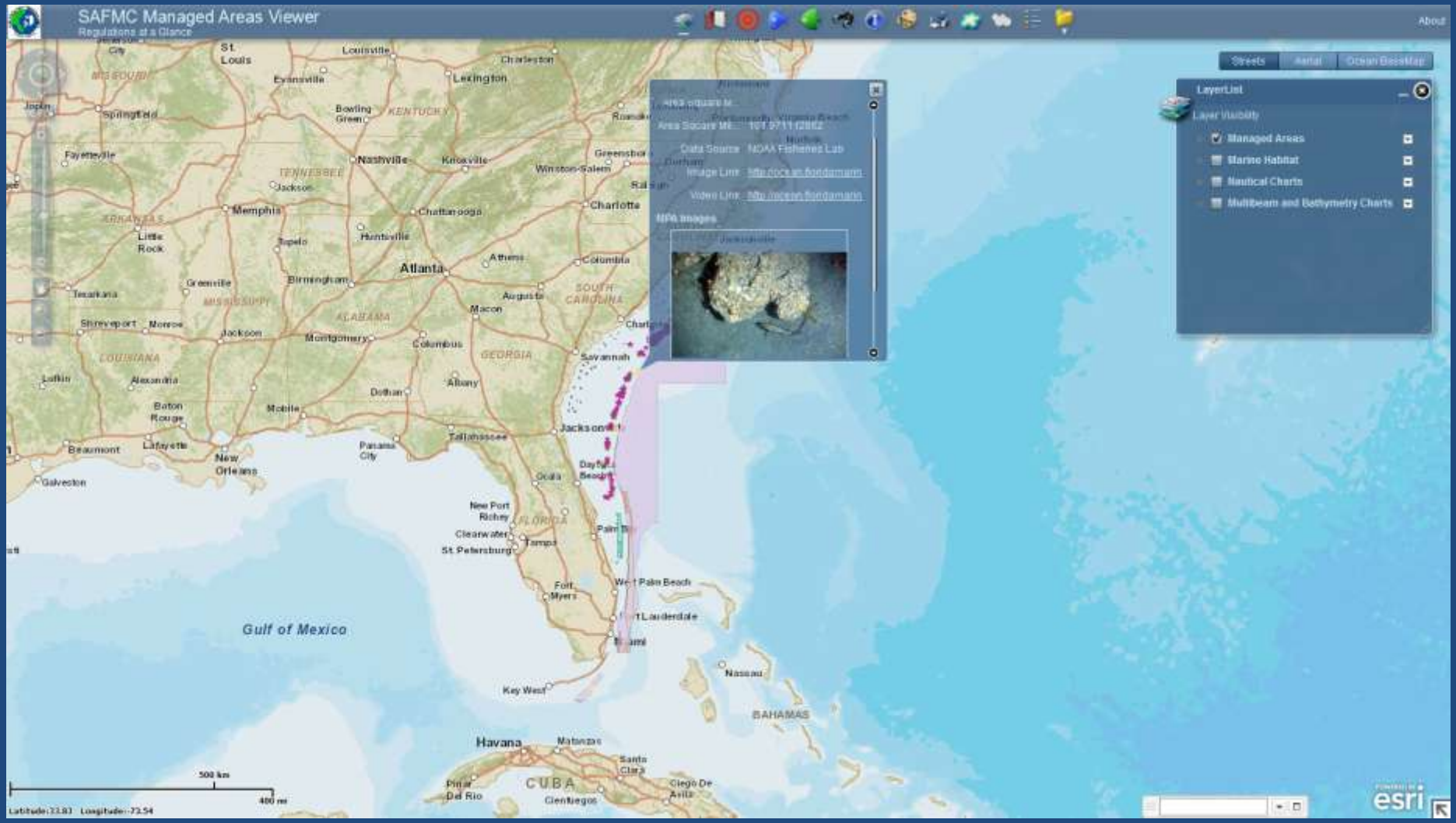
Why not change it?



By adjusting trasnparency

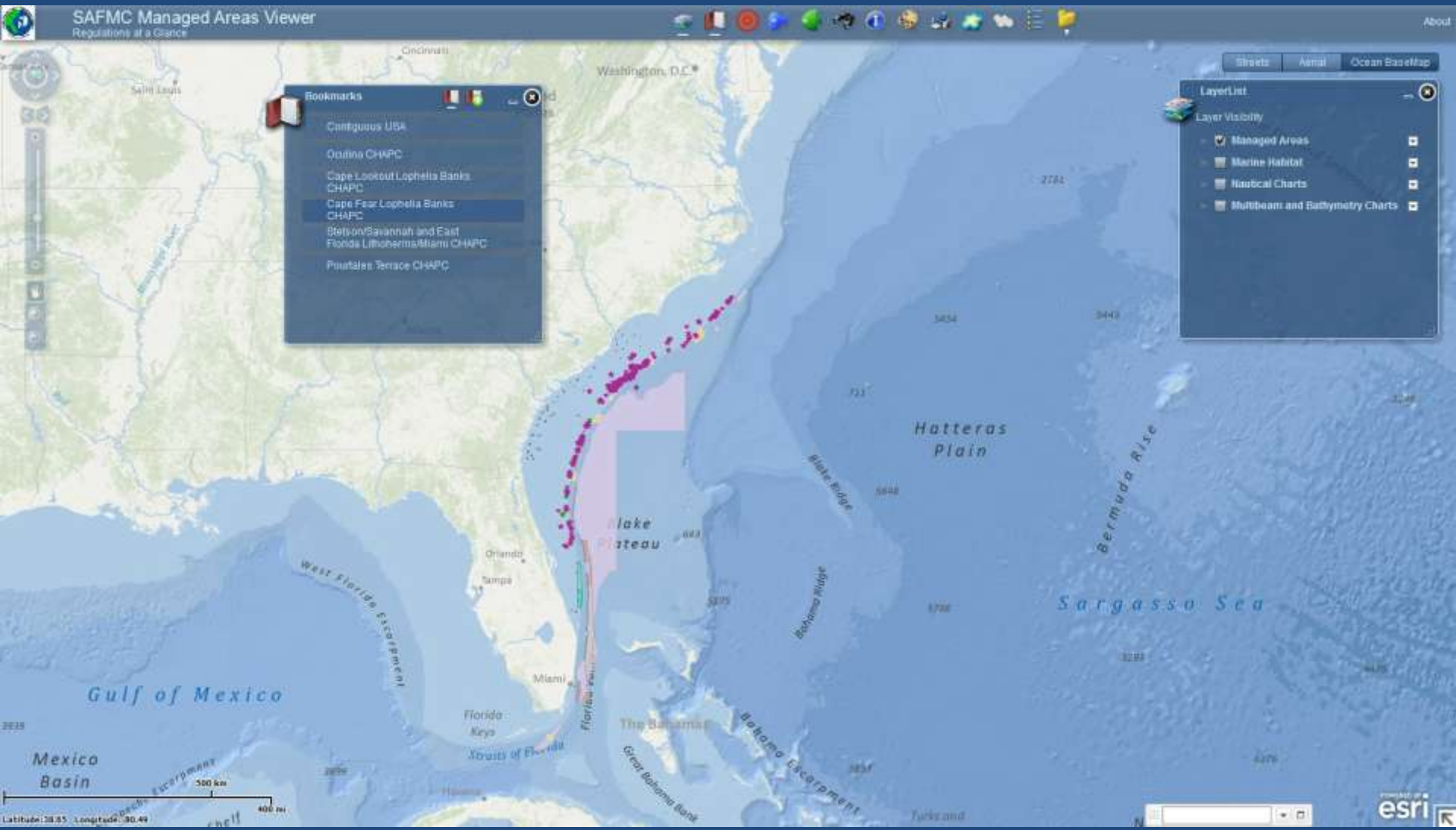


Integrated hyperlinks

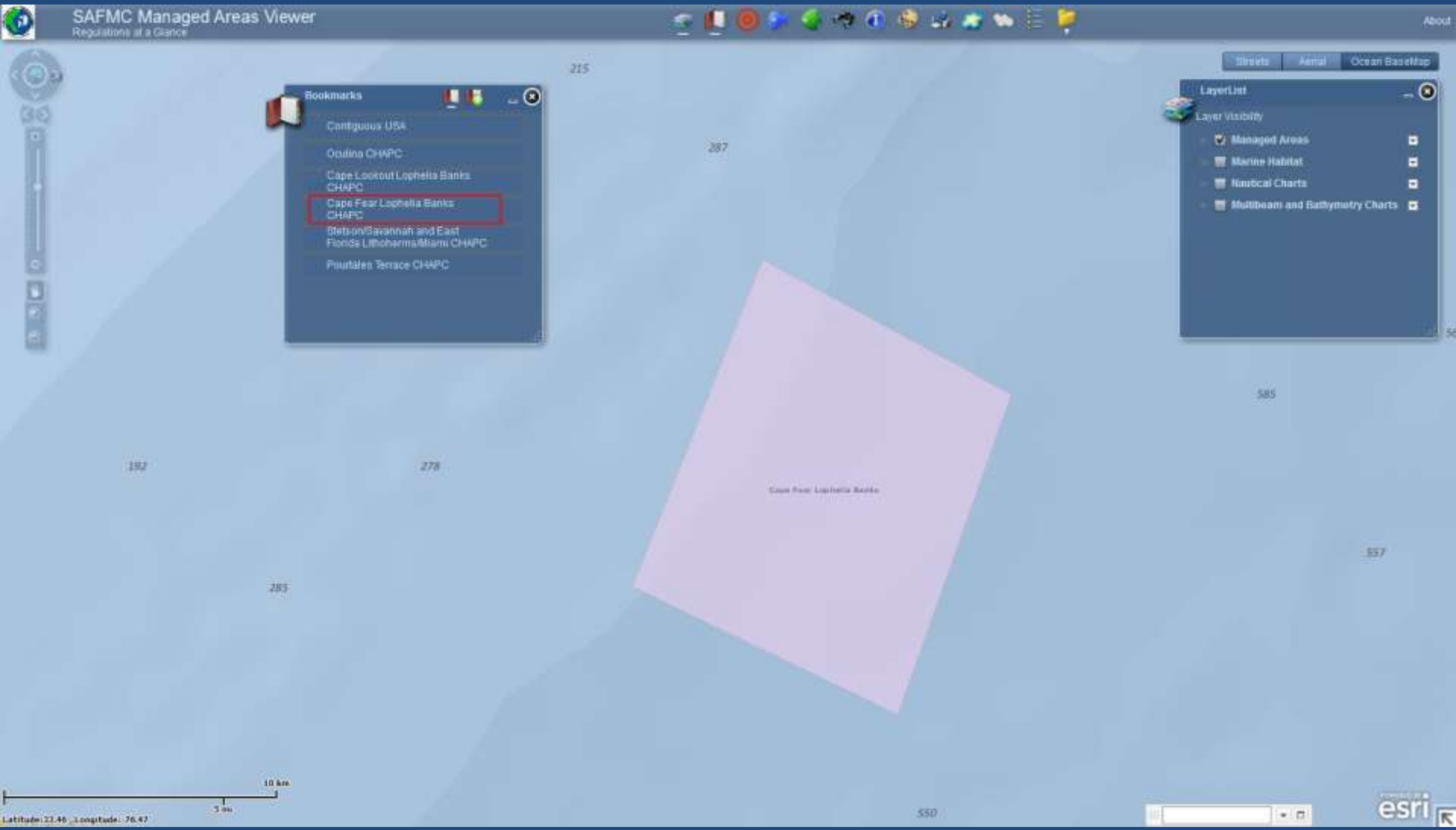


Georgia MPA video

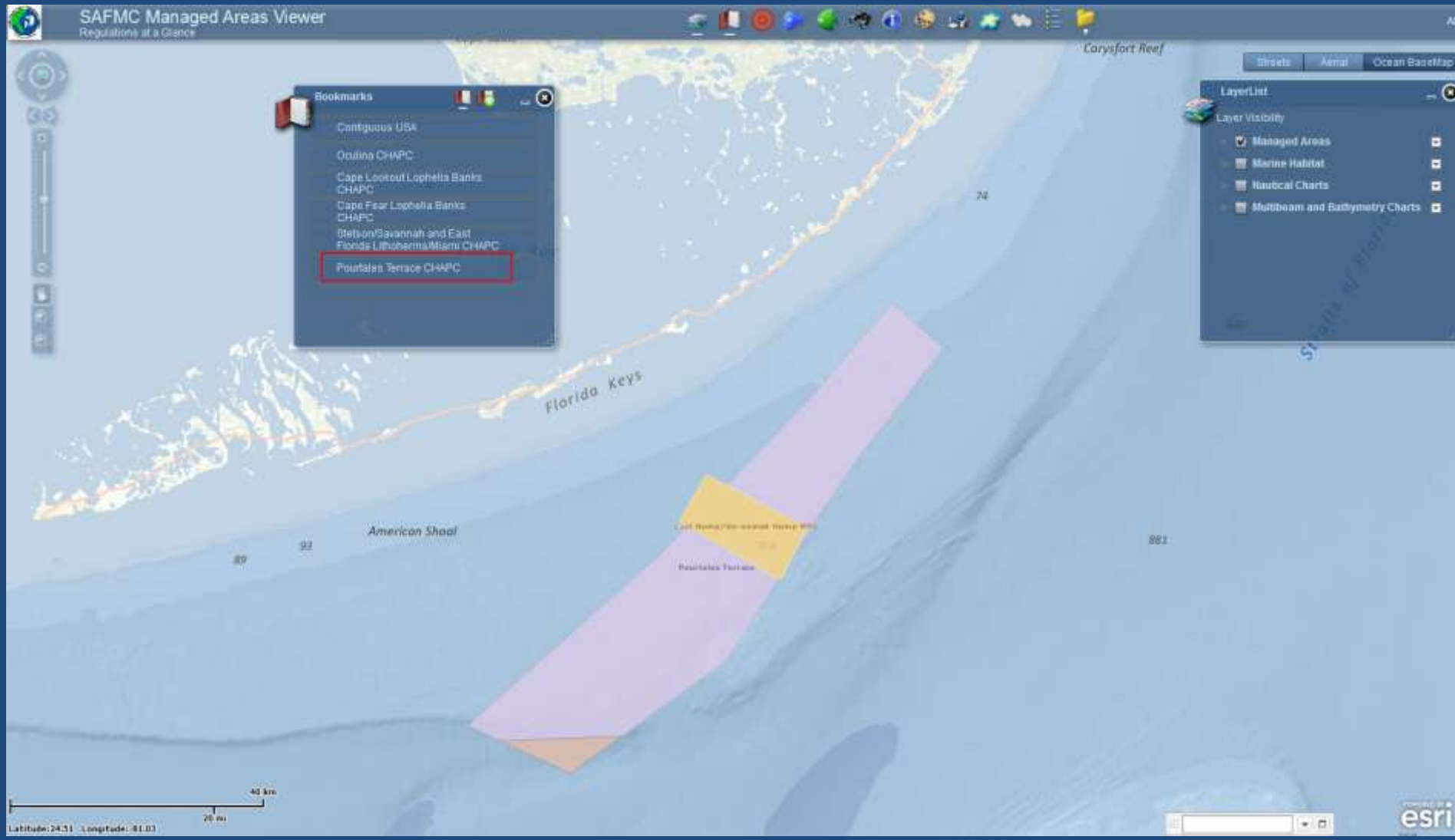
CHAPC Bookmarks



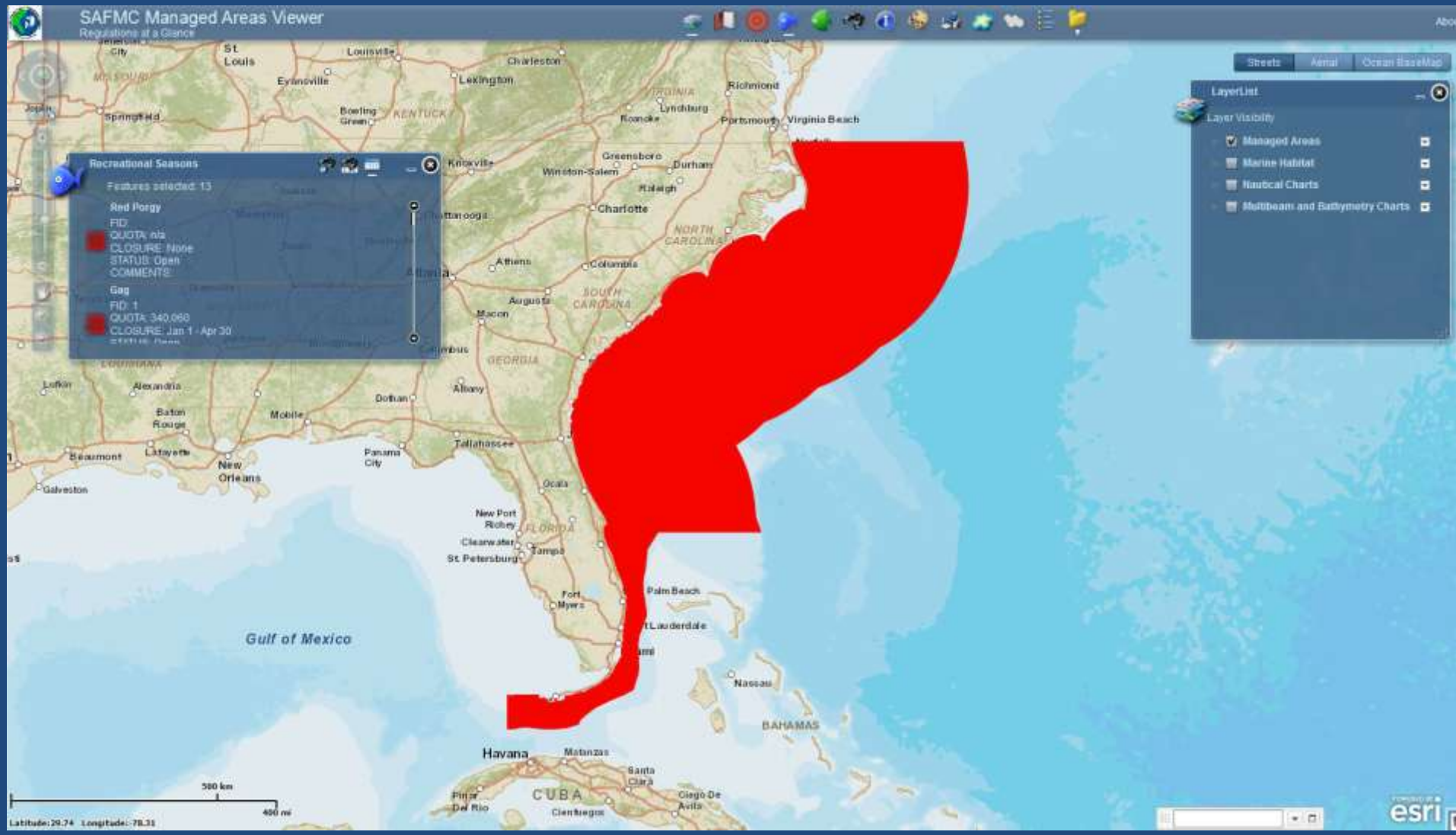
Cape Fear CHAPC



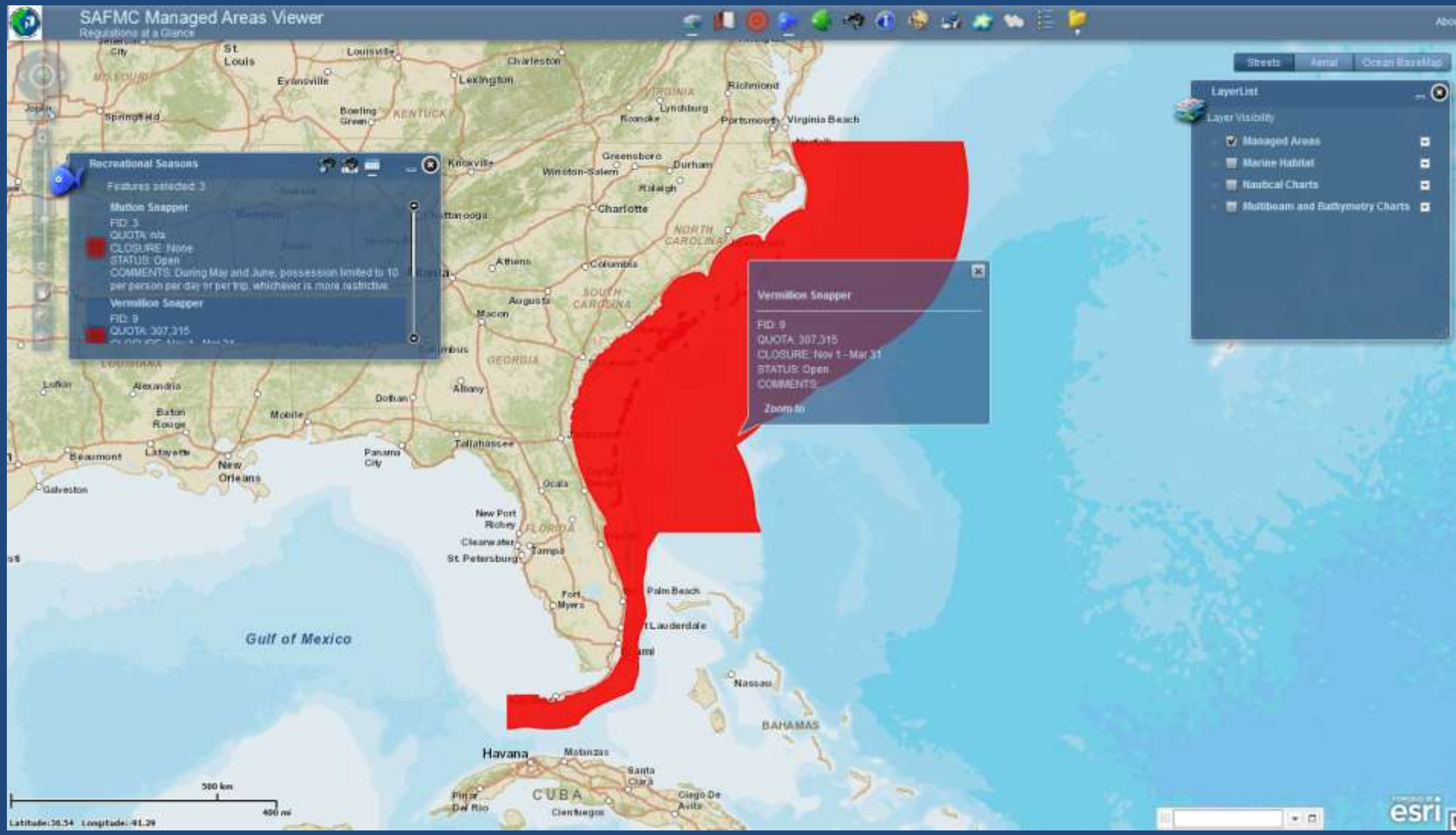
Pourtales Terrace CHAPC



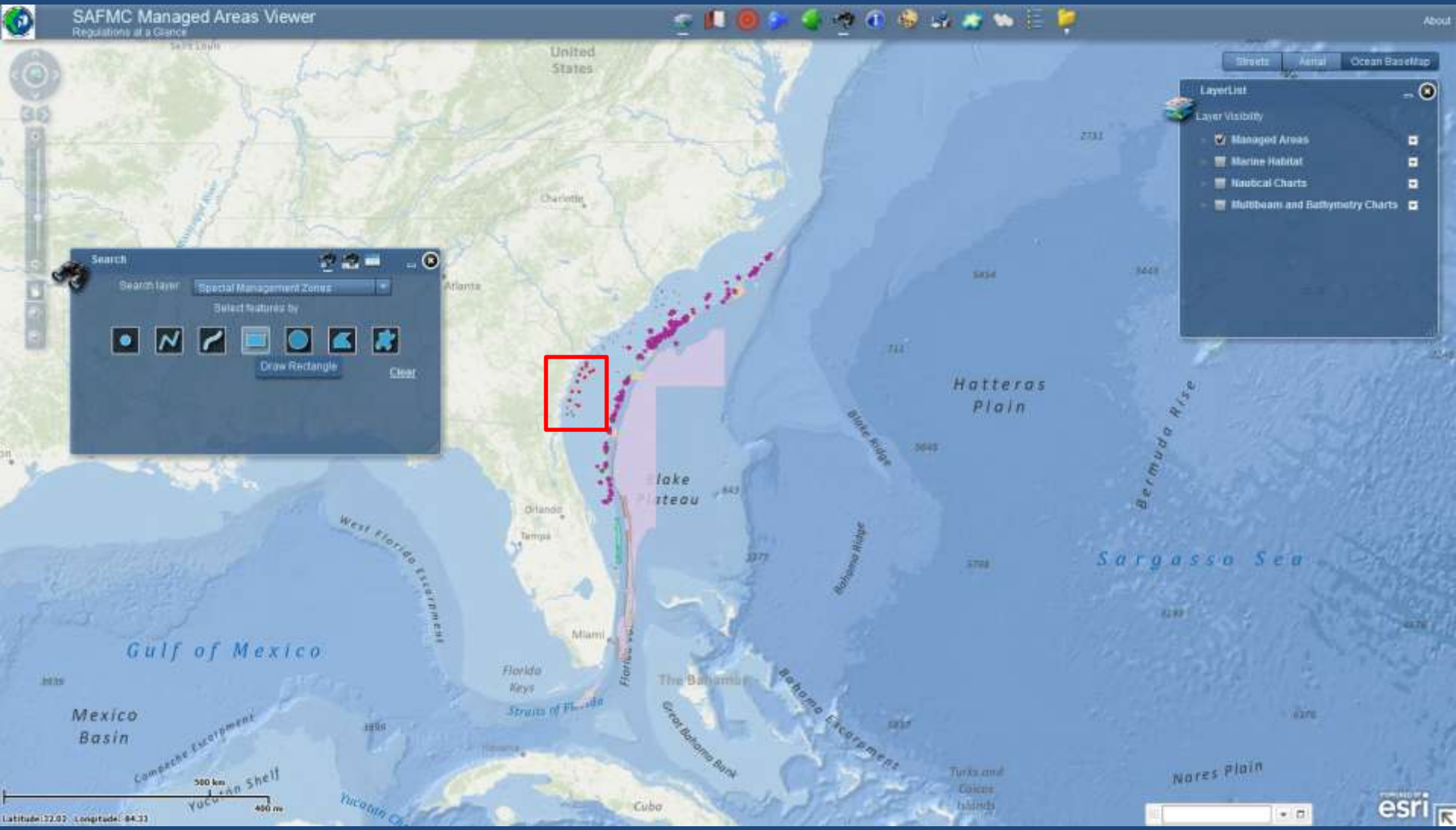
Recreational Restrictions



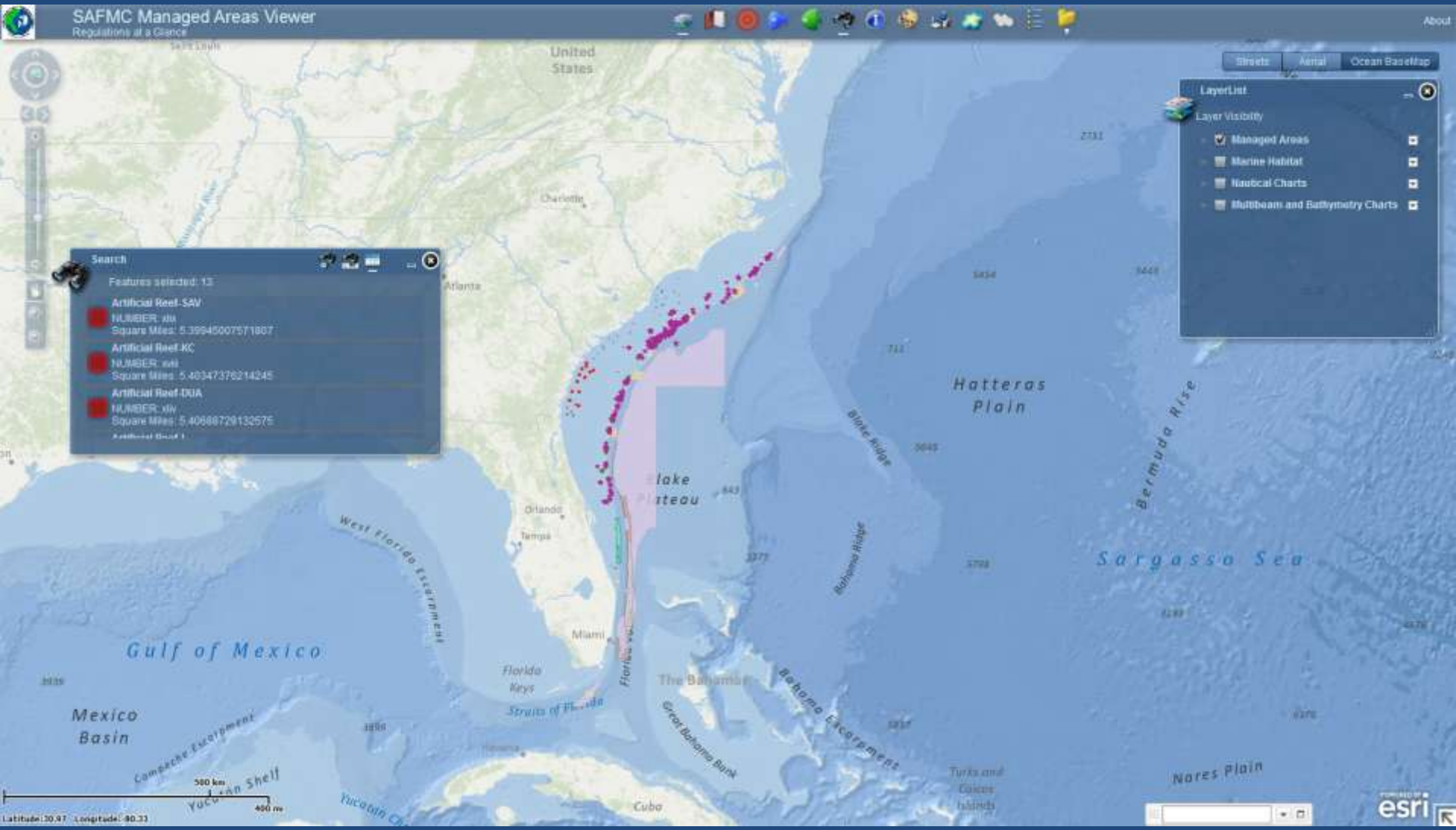
Recreational Restrictions



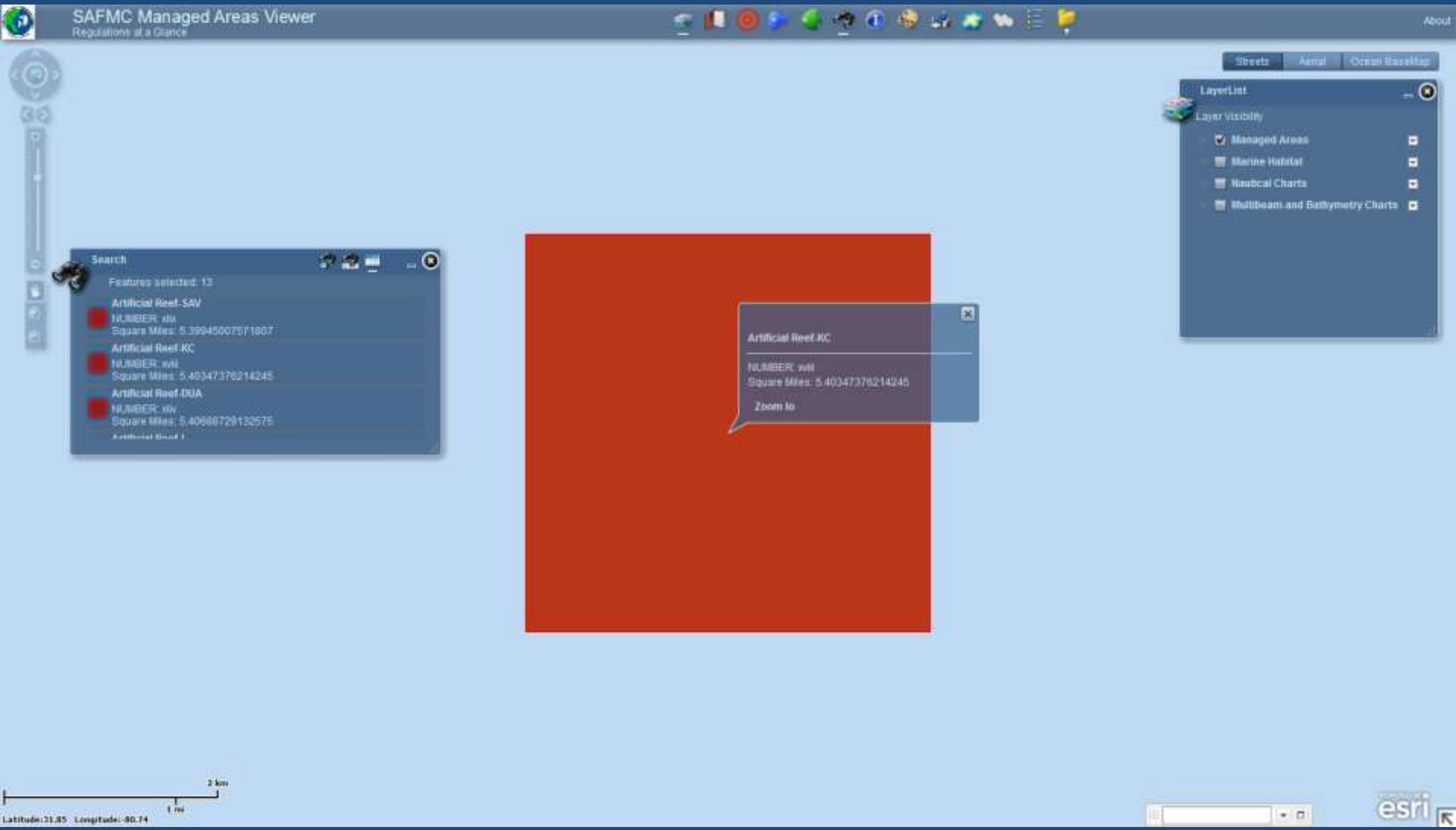
Search - graphical



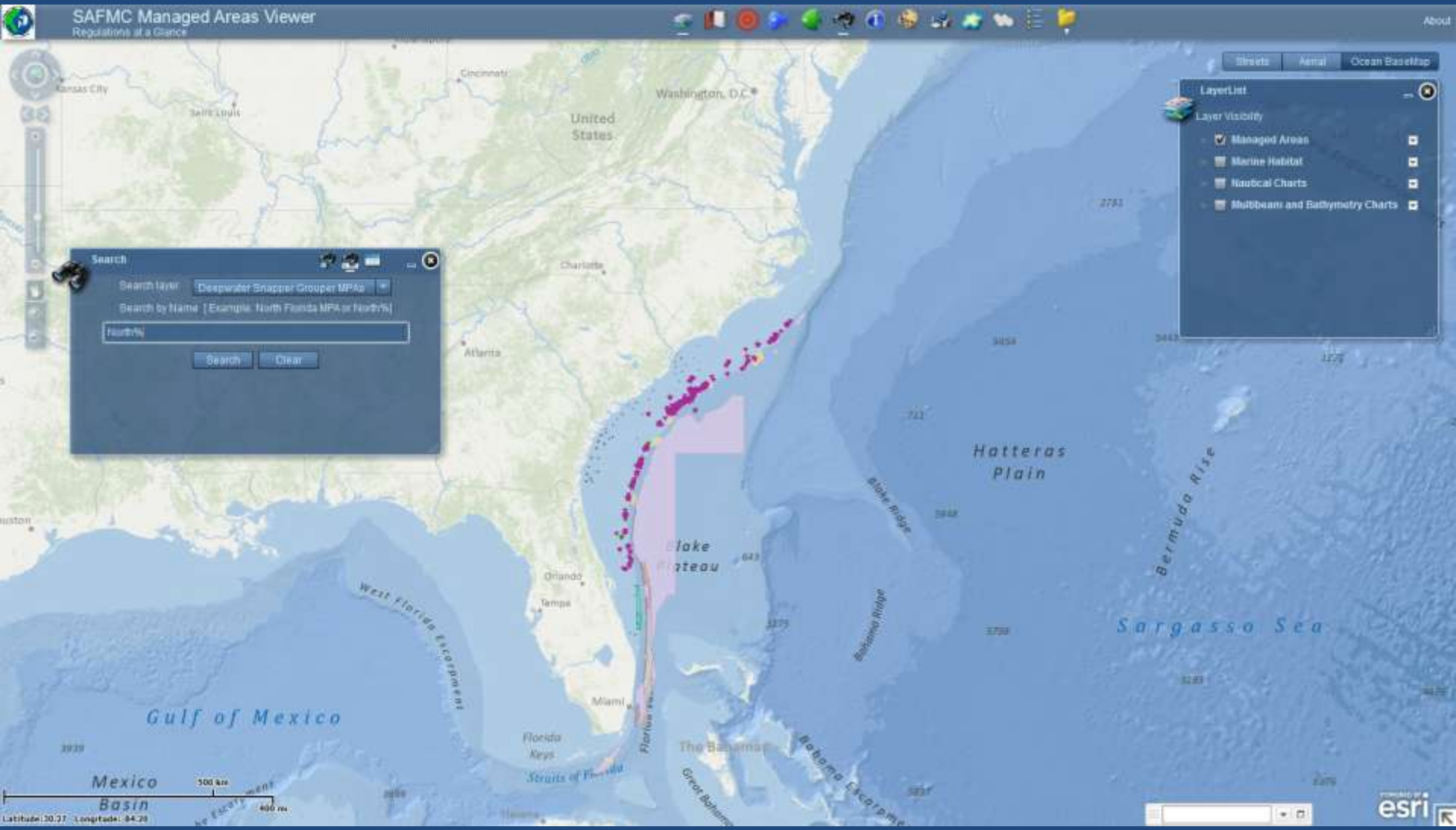
Search results



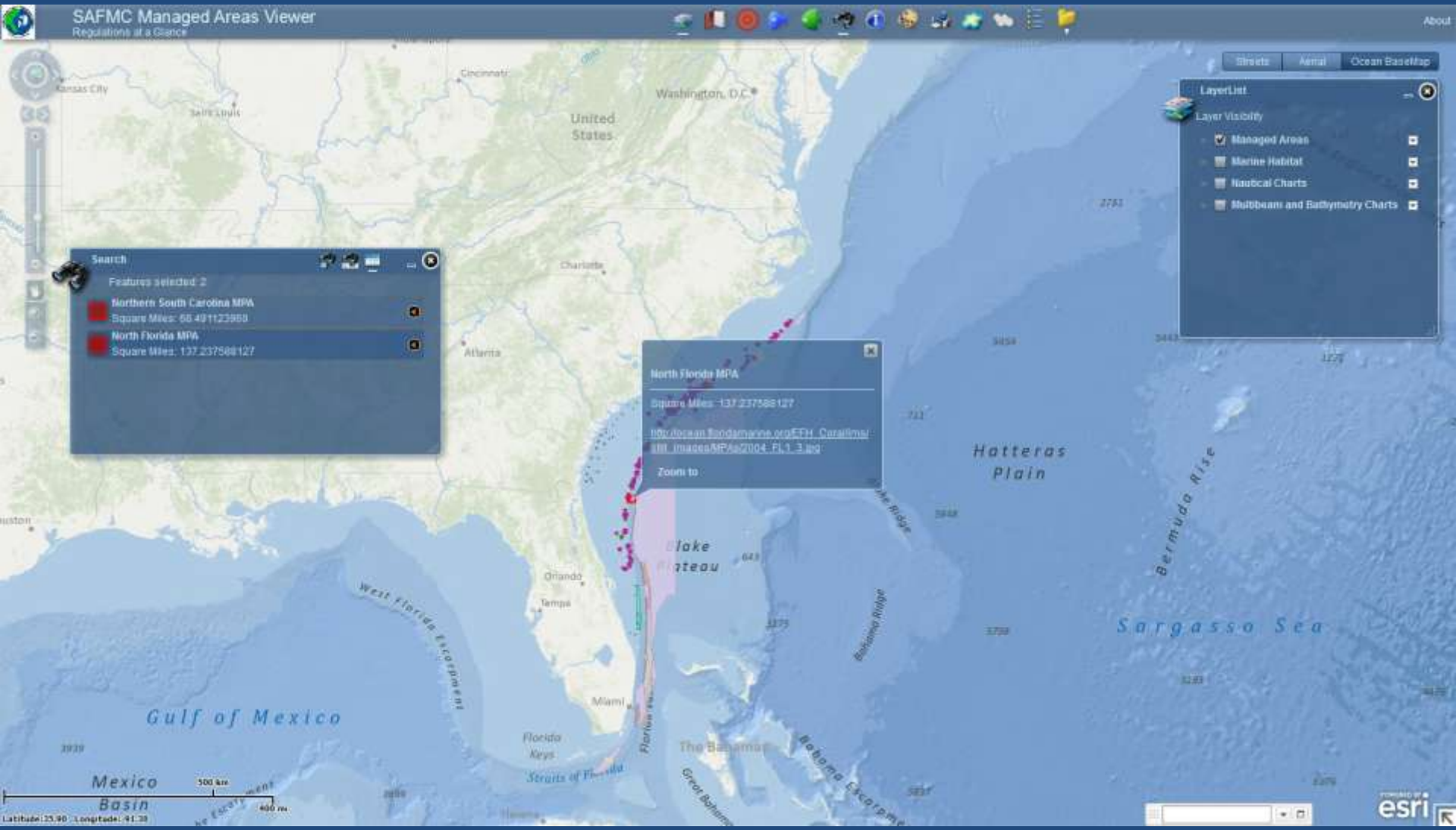
Search results



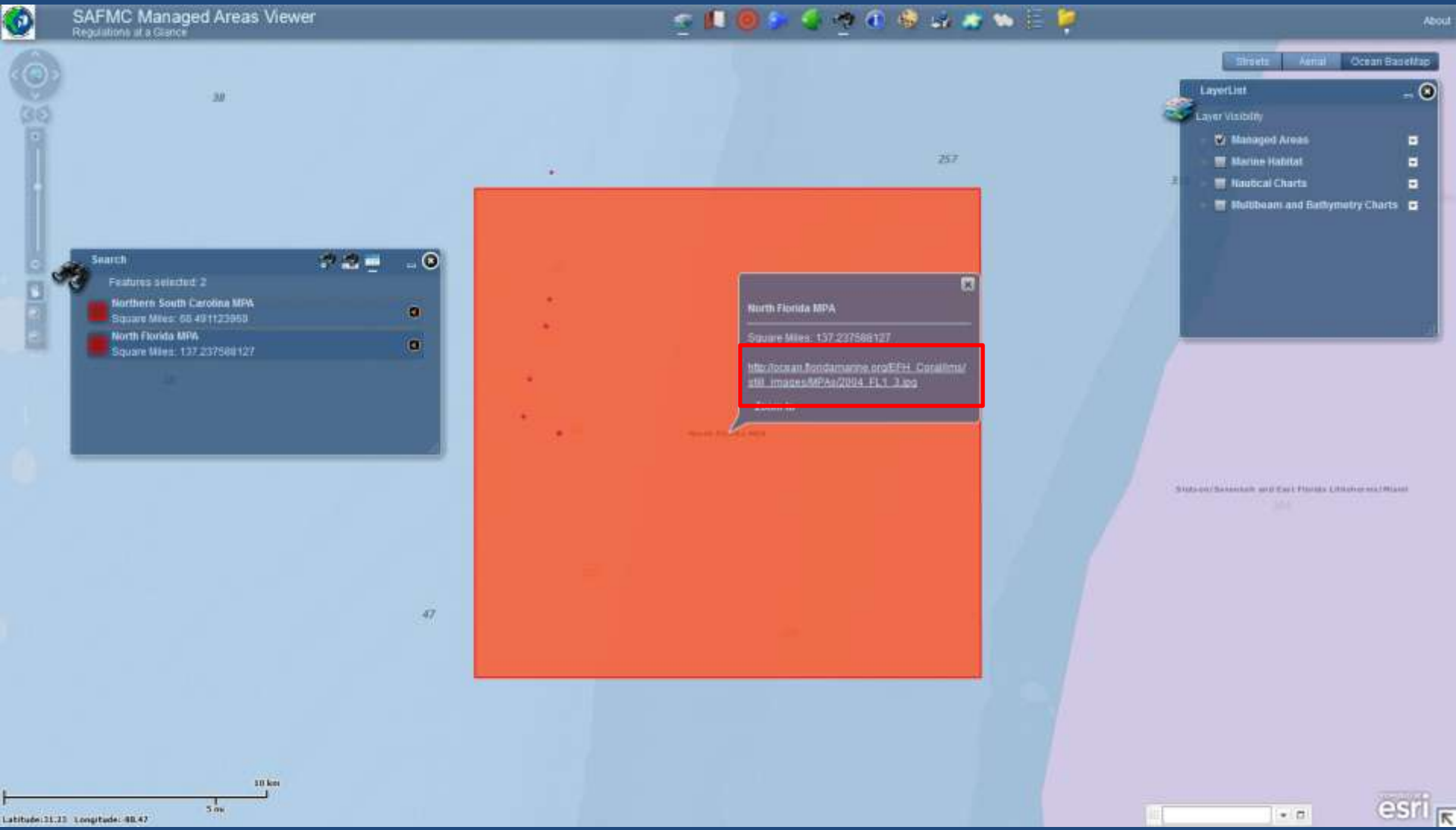
Search by attribute



Search by attribute

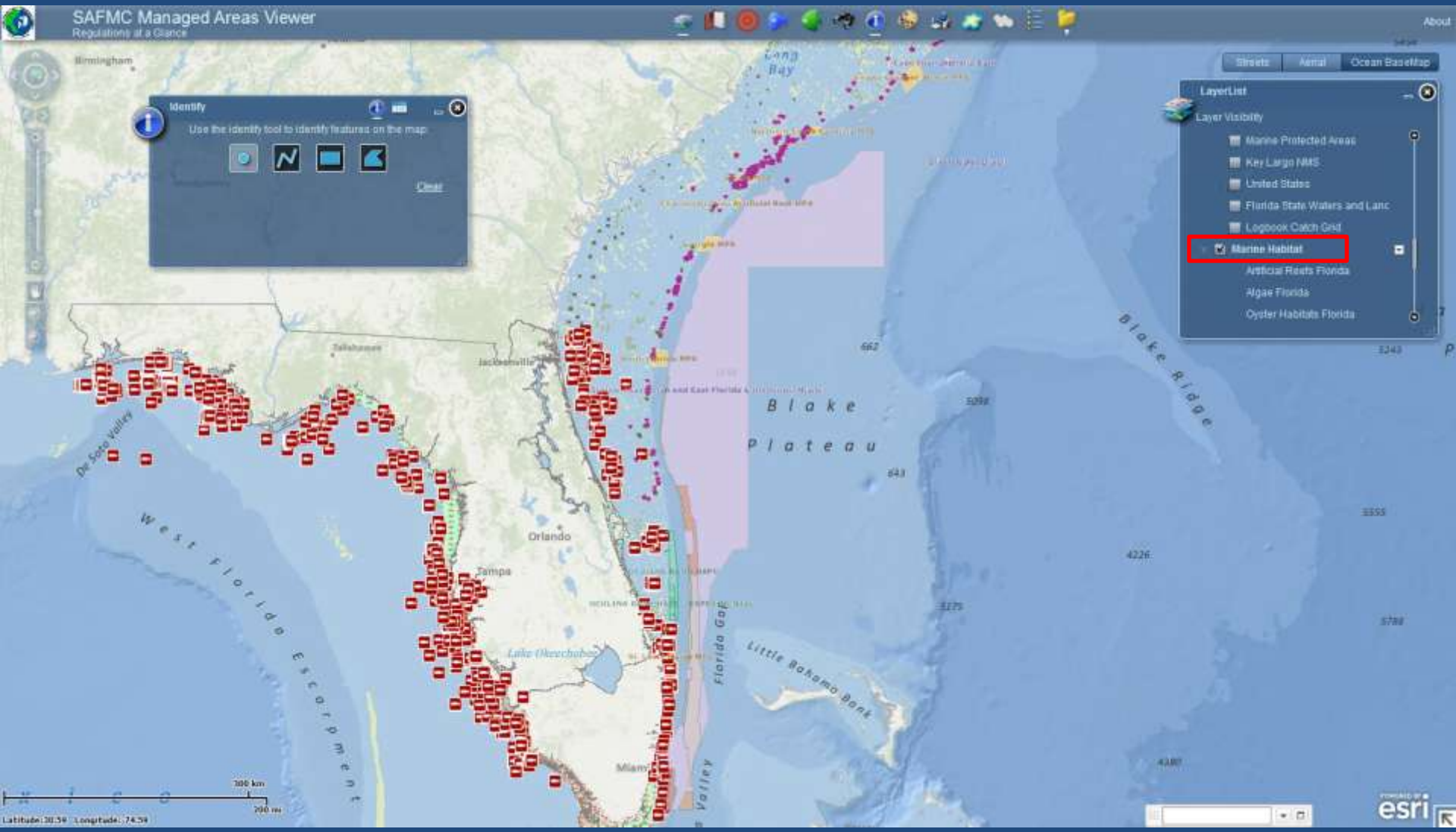


North Florida MPA

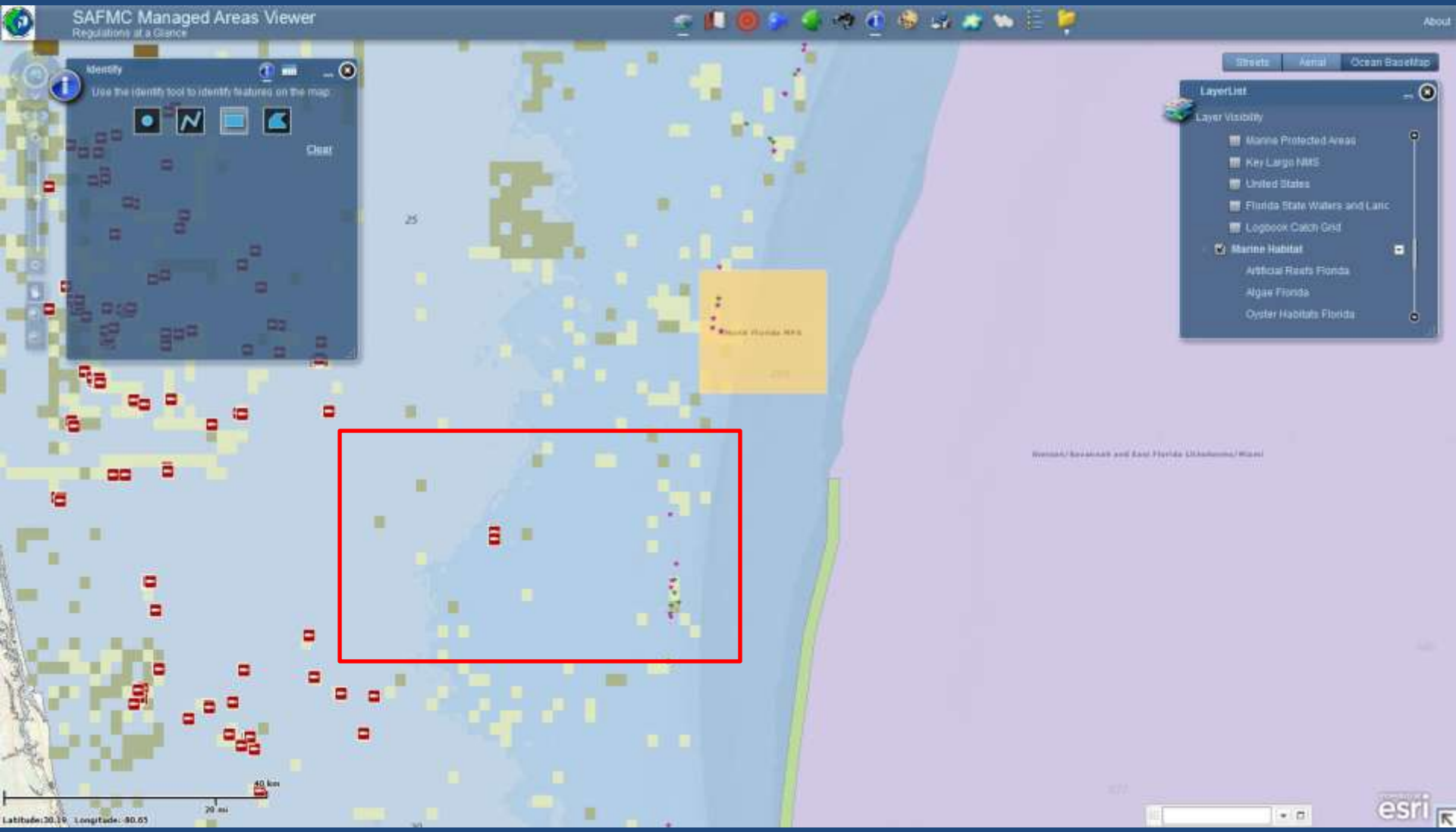


North Florida MPA - link

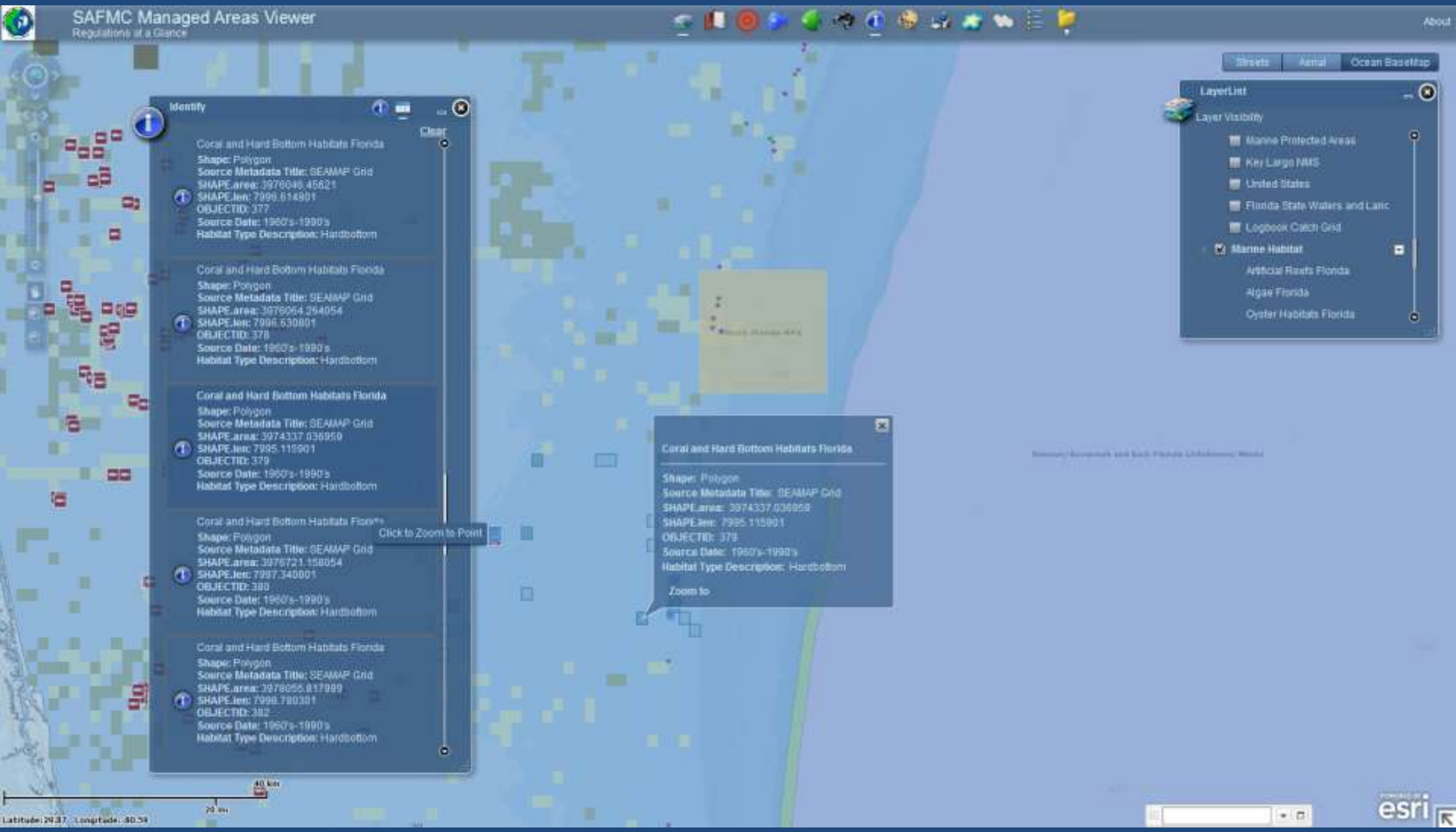
Identify – add Marine Habitats



Identify features with a rectangle

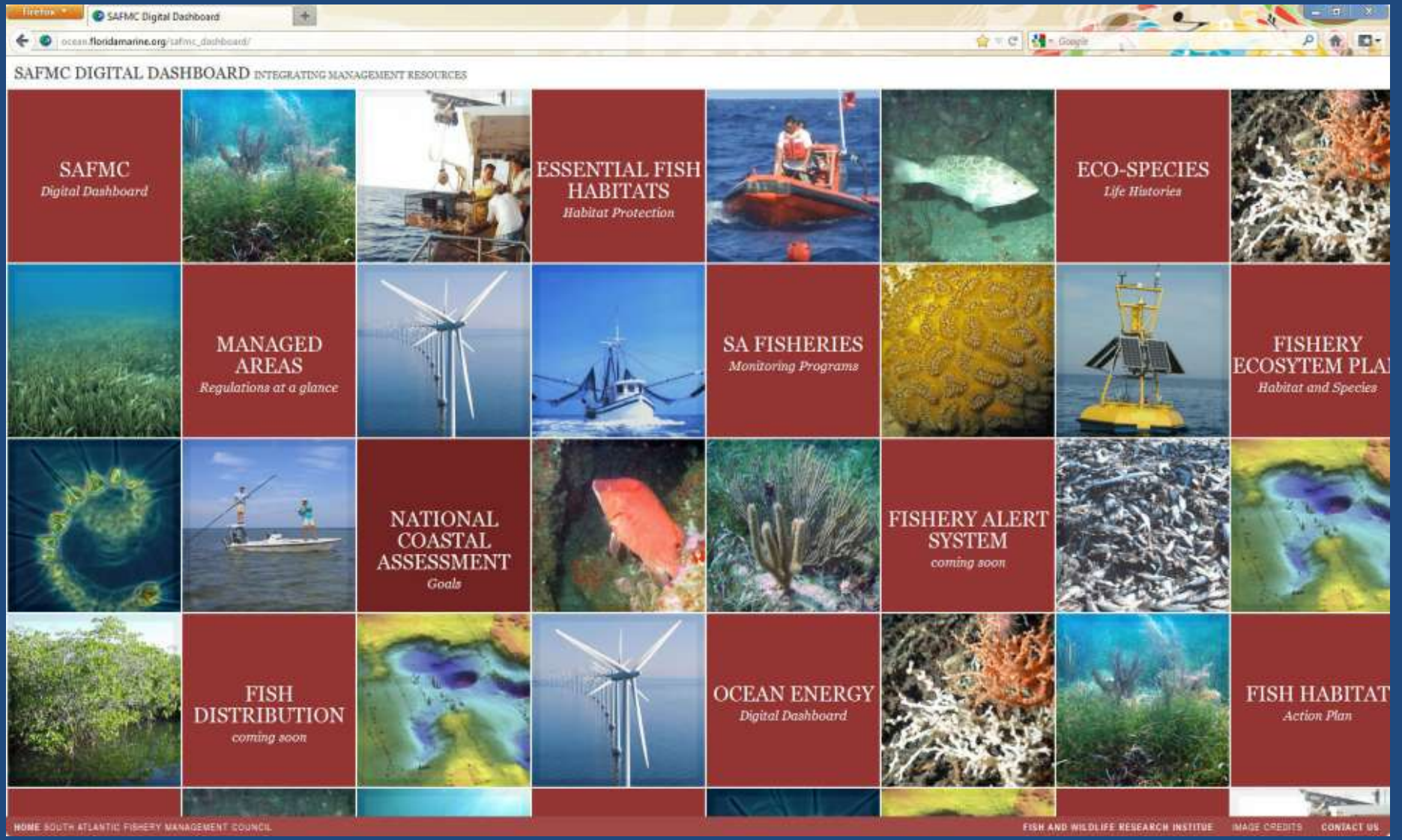


Identify results

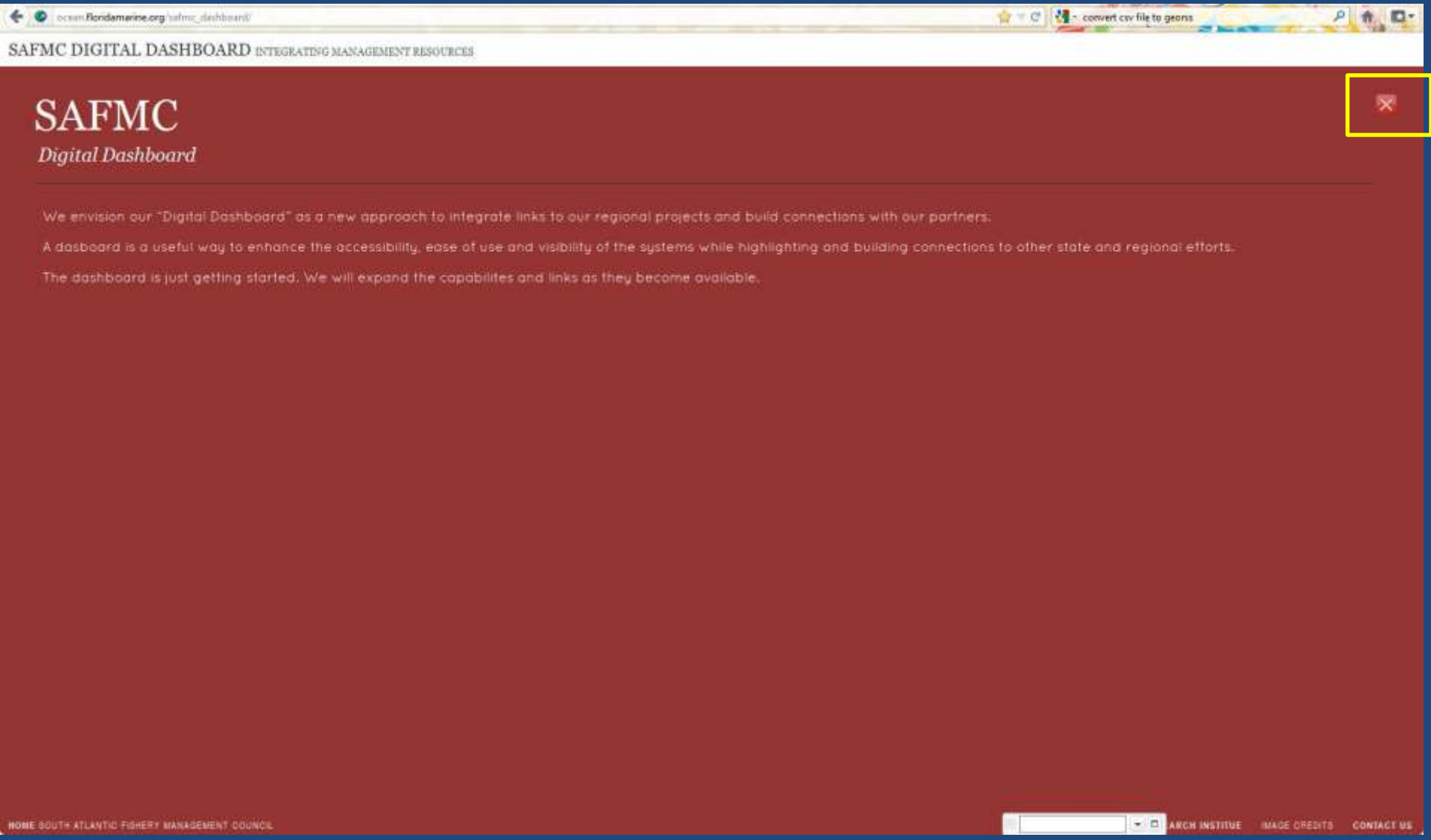


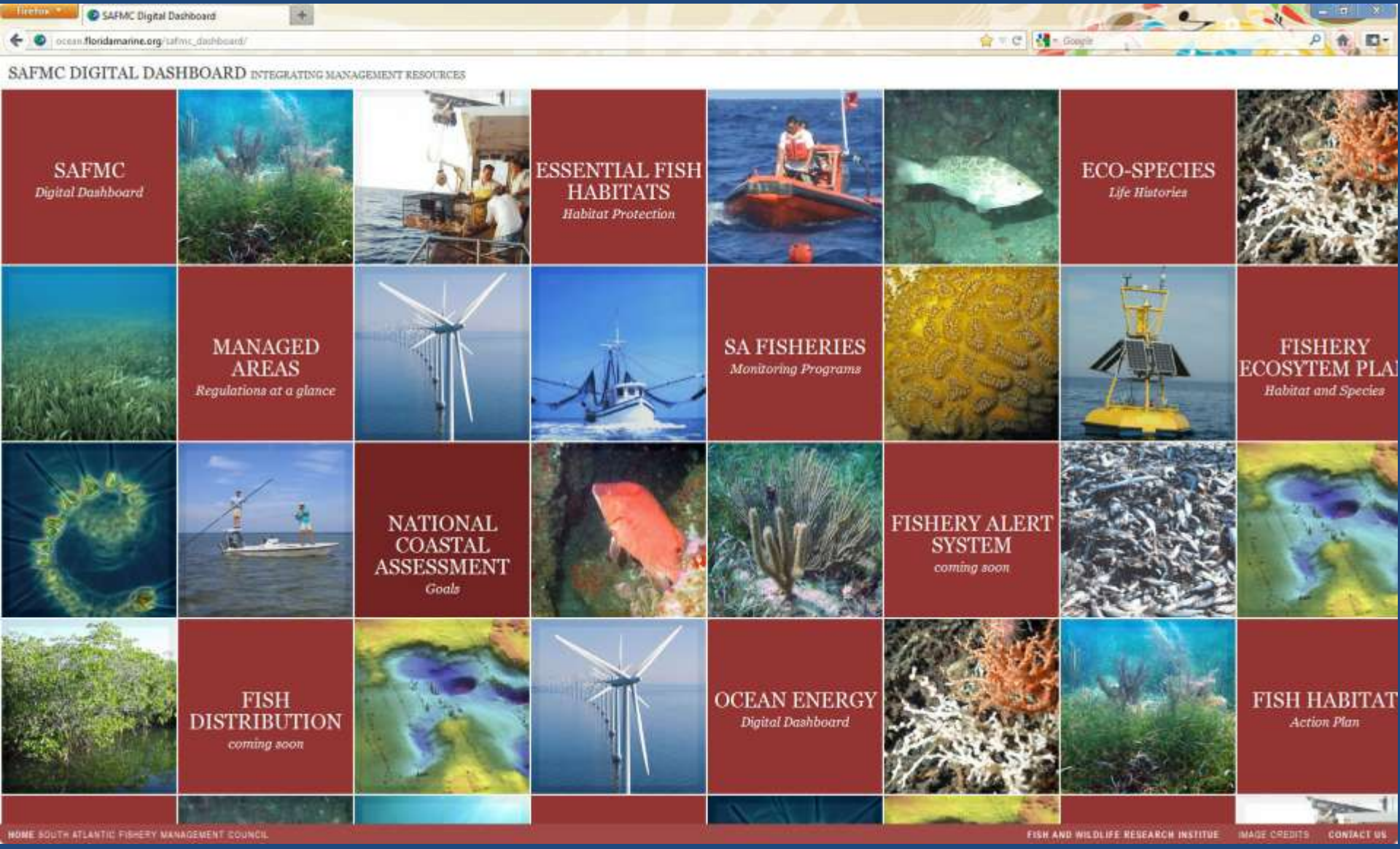
Phase 8 - SAFMC Digital Dashboard

- SAFMC requested a “Digital Dashboard” to integrate links to all their collaborative projects and build connections to regional partners.
- The dashboard approach is a useful way to enhance the accessibility, usability, and visibility of state and regional efforts



http://ocean.floridamarine.org/safmc_dashboard


SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
SAFMC
Digital Dashboard
We envision our "Digital Dashboard" as a new approach to integrate links to our regional projects and build connections with our partners.
A dasboard is a useful way to enhance the accessibility, ease of use and visibility of the systems while highlighting and building connections to other state and regional efforts.
The dashboard is just getting started. We will expand the capabilites and links as they become available.
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
ARCH INSTITUE
IMAGE CREDITS
CONTACT US


SAFMC Digital Dashboard
ocean.floridamarine.org/safmc_dashboard/
SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
SAFMC
Digital Dashboard
ESSENTIAL FISH HABITATS
Habitat Protection
ECO-SPECIES
Life Histories
MANAGED AREAS
Regulations at a glance
SA FISHERIES
Monitoring Programs
FISHERY ECOSYTEM PLA
Habitat and Species
NATIONAL COASTAL ASSESSMENT
Goals
FISHERY ALERT SYSTEM
coming soon
FISH DISTRIBUTION
coming soon
OCEAN ENERGY
Digital Dashboard
FISH HABITAT
Action Plan
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
FISH AND WILDLIFE RESEARCH INSTITUTE
IMAGE CREDITS
CONTACT US

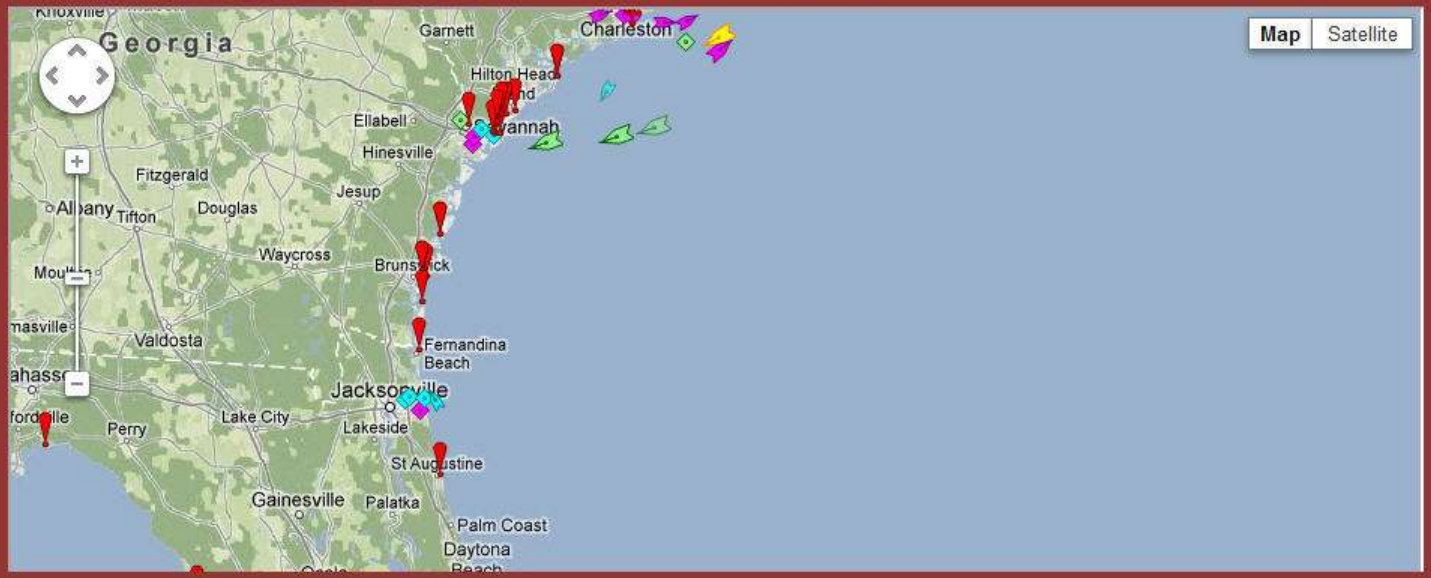
ocean.floridamarine.org/safmc_dashboard/

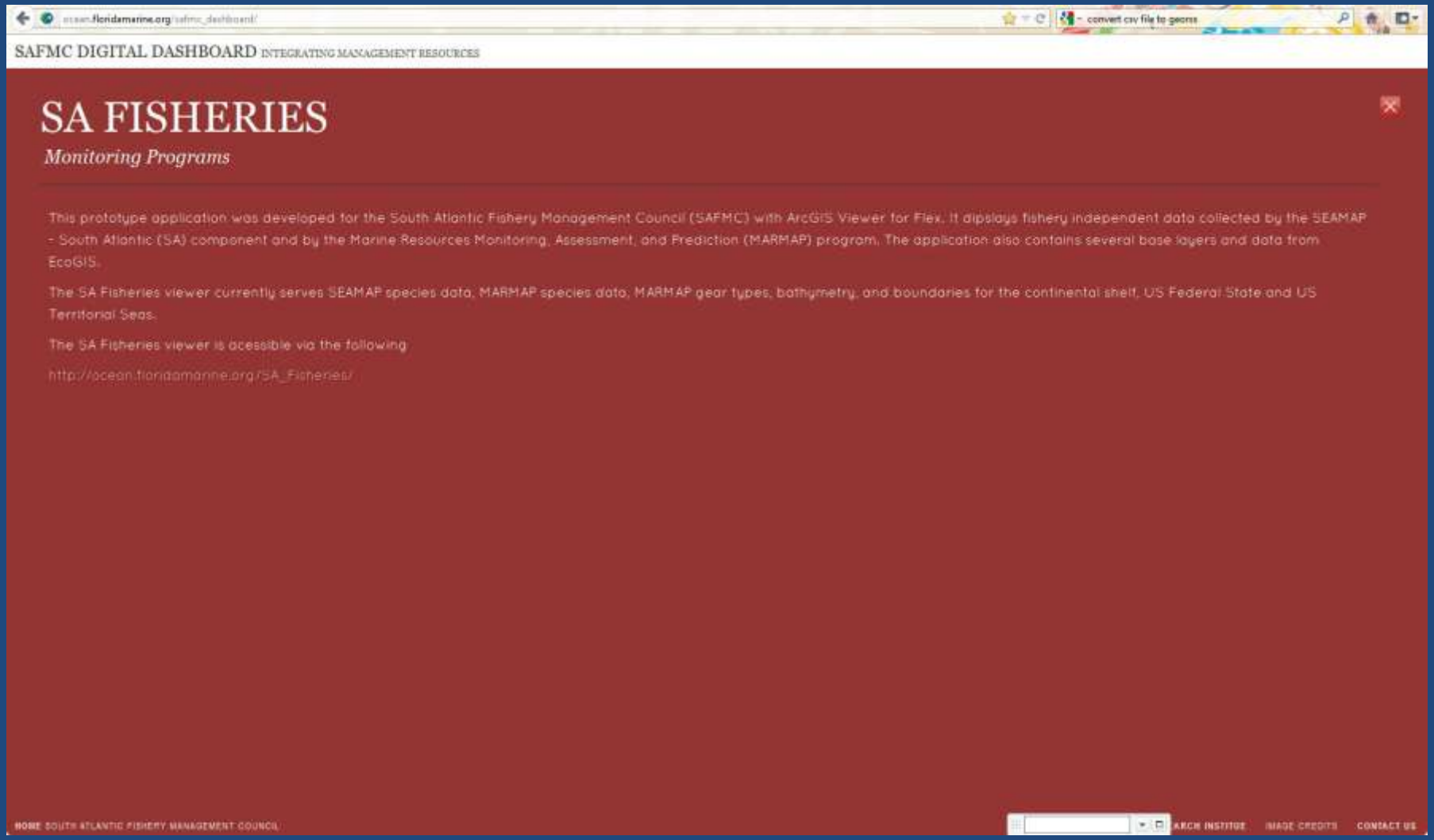
SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES

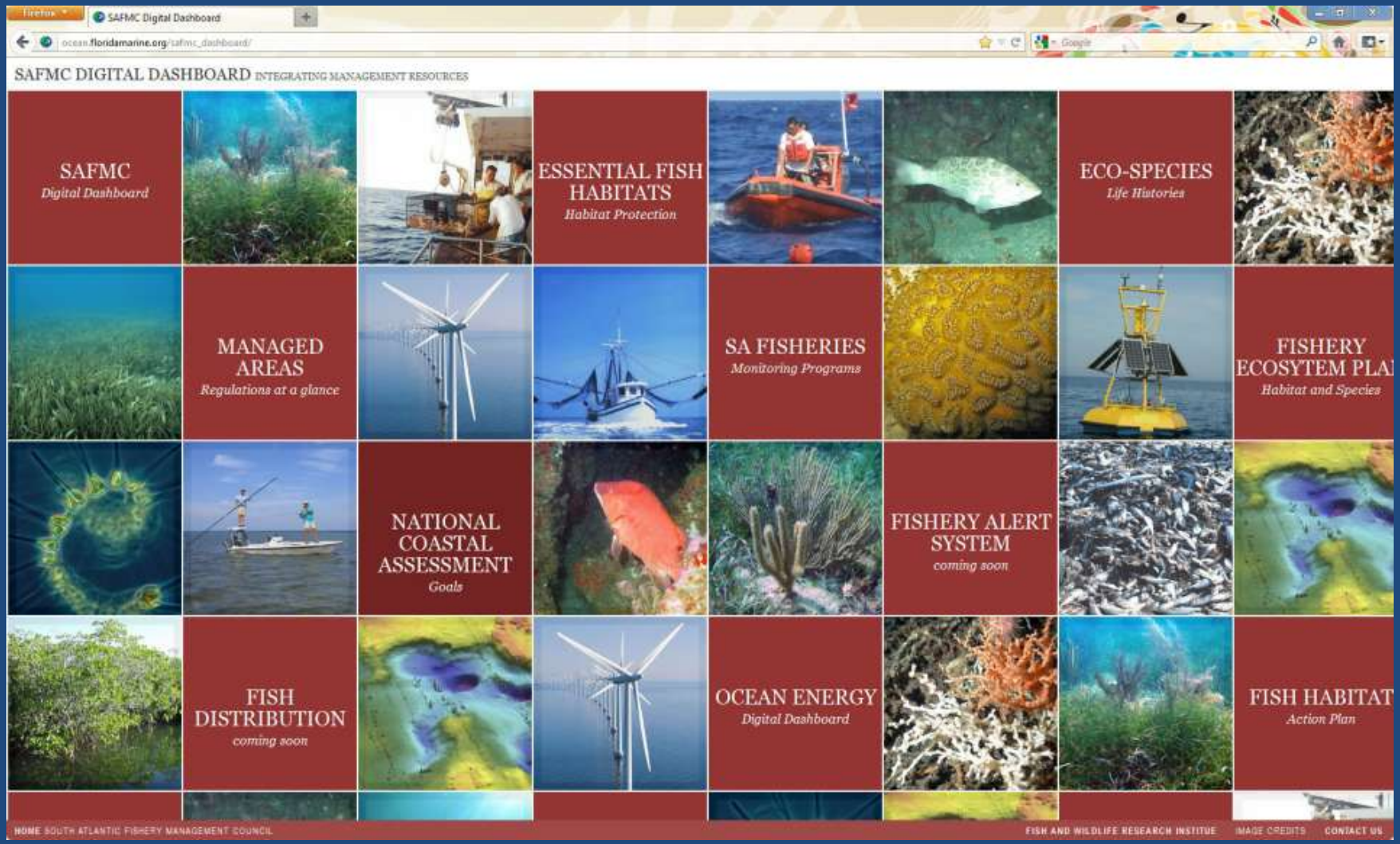
MARINE TRAFFIC

Southeast Atlantic Coast

This map provides information about current geographical positions of ships as well as other related information, whenever available, such as ships' details, their destination, estimated time of arrival, or photographs.




ocean.floridamarine.org/safmc_dashboard/
convert csv file to geoms
SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
SA FISHERIES
Monitoring Programs
This prototype application was developed for the South Atlantic Fishery Management Council (SAFMC) with ArcGIS Viewer for Flex. It dipslays fishery independent data collected by the SEAMAP - South Atlantic (SA) component and by the Marine Resources Monitoring, Assessment, and Prediction (MARMAP) program. The application also contains several base layers and data from EcoGIS.
The SA Fisheries viewer currently serves SEAMAP species data, MARMAP species data, MARMAP gear types, bathymetry, and boundaries for the continental shelf, US Federal State and US Territorial Seas.
The SA Fisheries viewer is acessible via the following
http://ocean.floridamarine.org/SA_Fisheries/
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
ARCH INSTITUTE
IMAGE CREDITS
CONTACT US


SAFMC Digital Dashboard
ocean.floridamarine.org/safmc_dashboard/
SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
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ESSENTIAL FISH HABITATS
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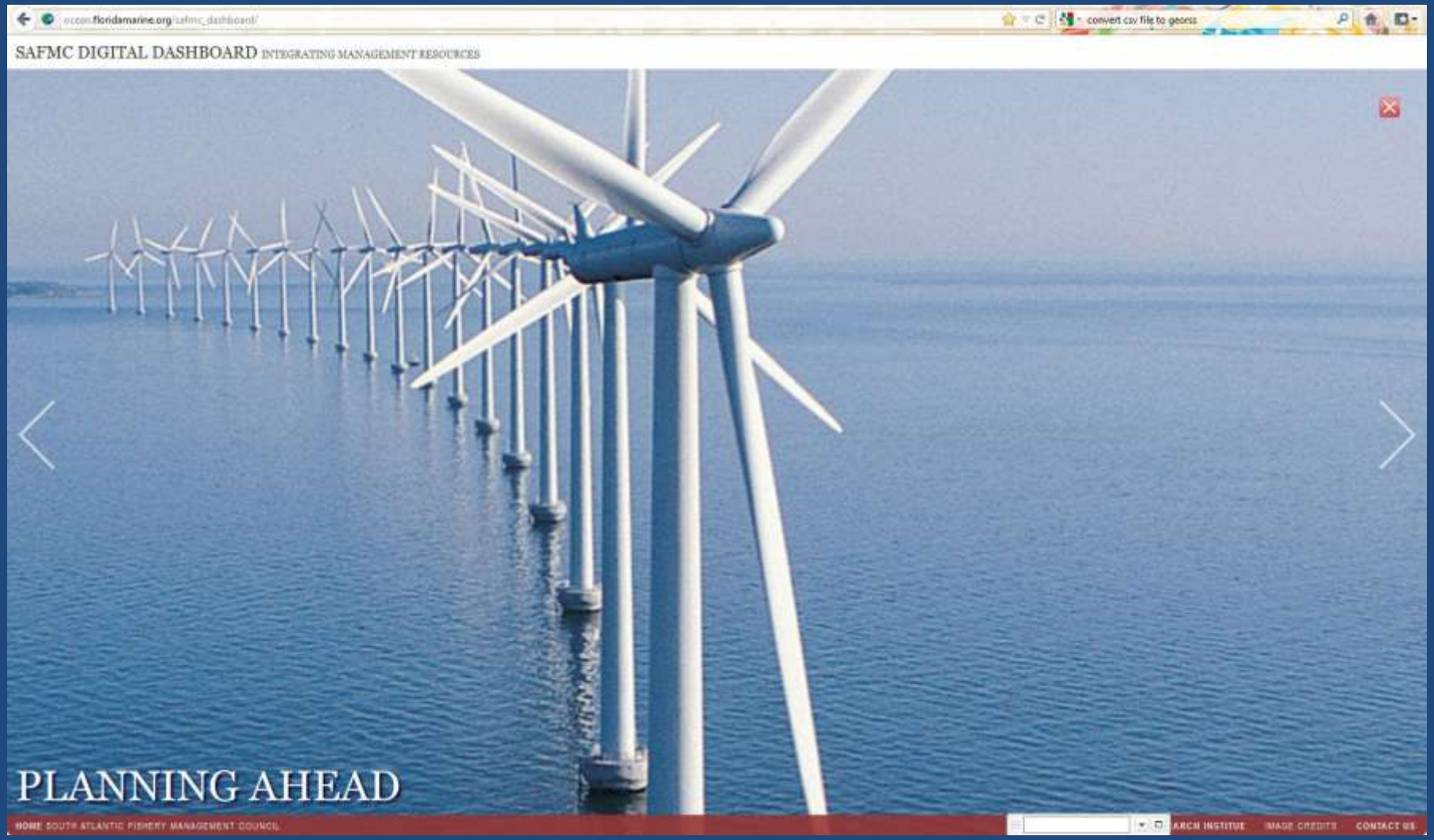
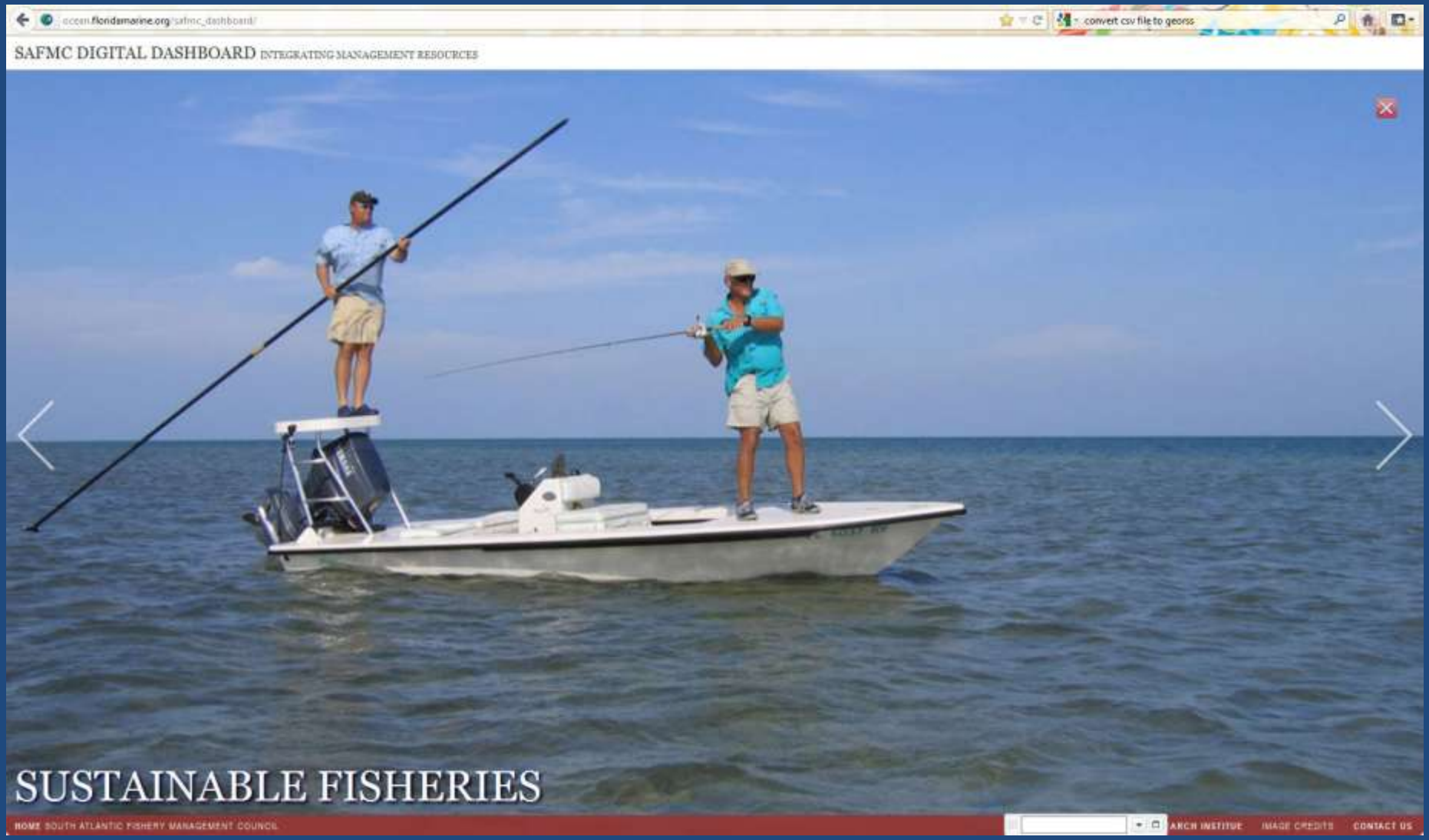
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
FISH AND WILDLIFE RESEARCH INSTITUTE
IMAGE CREDITS
CONTACT US


SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
PLANNING AHEAD
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
ARCH INSTITUTE
IMAGE CREDITS
CONTACT US


ocean.floridamarine.org/safmc_dashboard/
convert csv file to geoss
SAFMC DIGITAL DASHBOARD INTEGRATING MANAGEMENT RESOURCES
SUSTAINABLE FISHERIES
HOME SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL
ARCH INSTITUE
IMAGE CREDITS
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Recent Updates

- Created polygon shapefile to represent the new Tilefish EFH-HAPC
- Created new focal species general and spawning areas based on ETOPO1 DEM
- Created SEAMAP-SA data points for select SAFMC managed species
- Updated MARMAP species data for SAFMC managed species
- South Atlantic Public Notices for FY 2011
- Sante Pax locations
- Ideas for sharing map services on ESRI iPhone app

Accessing FWC GIS layers with your iPhone

- Install the free ‘ESRI ArcGIS’ application from the App Store.
- Tap the magnify glass to find maps
- Search for ‘FWC Marine’
- Tap to open the map
- Adjust data layer visibility with the ‘i’ button
- Toggle layers on and Off

Coming Soon

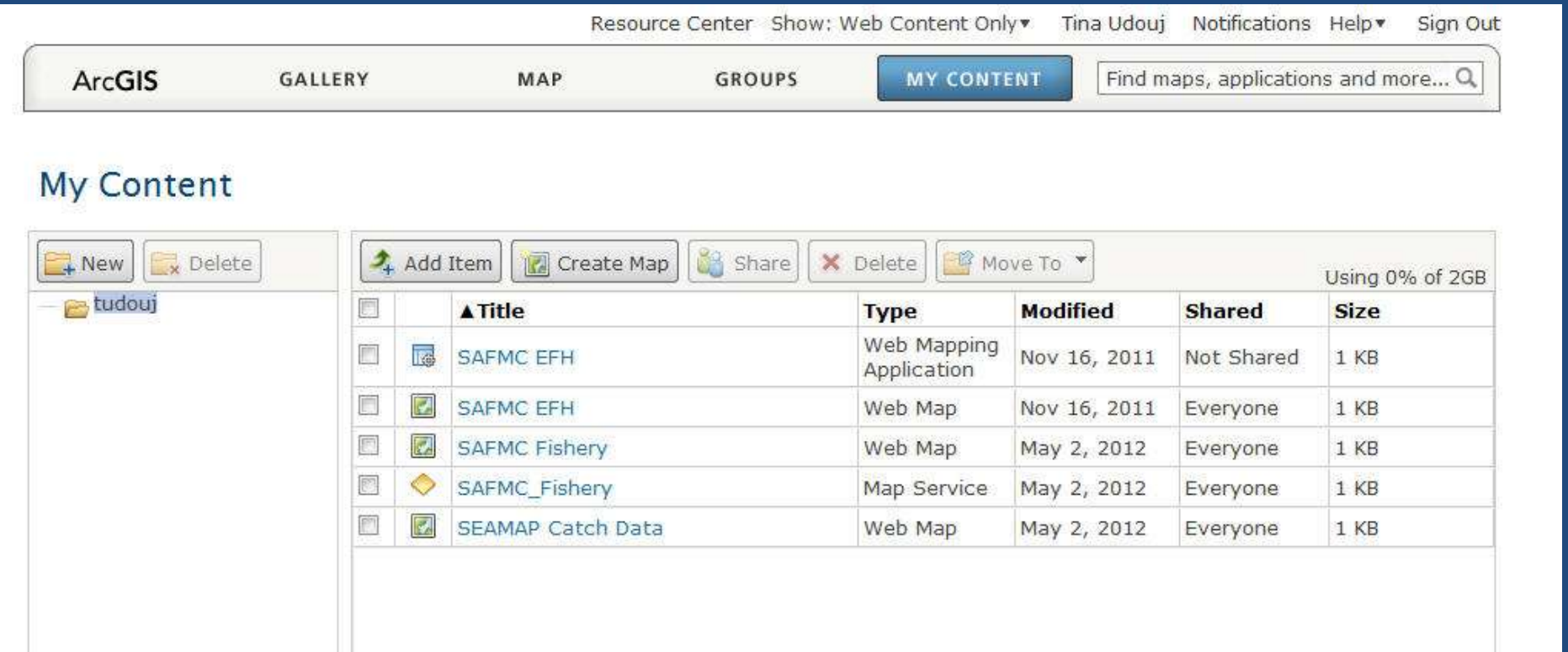
- **Map services expose feature attachments**
  - upload and associate files with certain geographic features in your map. Examples of attachments could include TXT, PDF, or image files that contain supplemental information about the feature. When you publish your map as a service, clients can see and download the attachments.
- **Map services can expose relates and stand-alone tables**
  - Map services now expose information about relates and stand-alone tables. (with EcoSpecies)
- **Security for map services (?) – via ArcGIS Online subscription service or Security certificate on production server**
- **Cached services for Multibeam and Nautical Charts**
- **More Widgets! – code sample at ESRI growing**

Benefits of caching

Nautical charts and multibeam services could be cached to improve performance

ArcGIS Online

- ArcGIS Online is a cloud-based, collaborative content management system for maps, apps, data, and other geographic information.

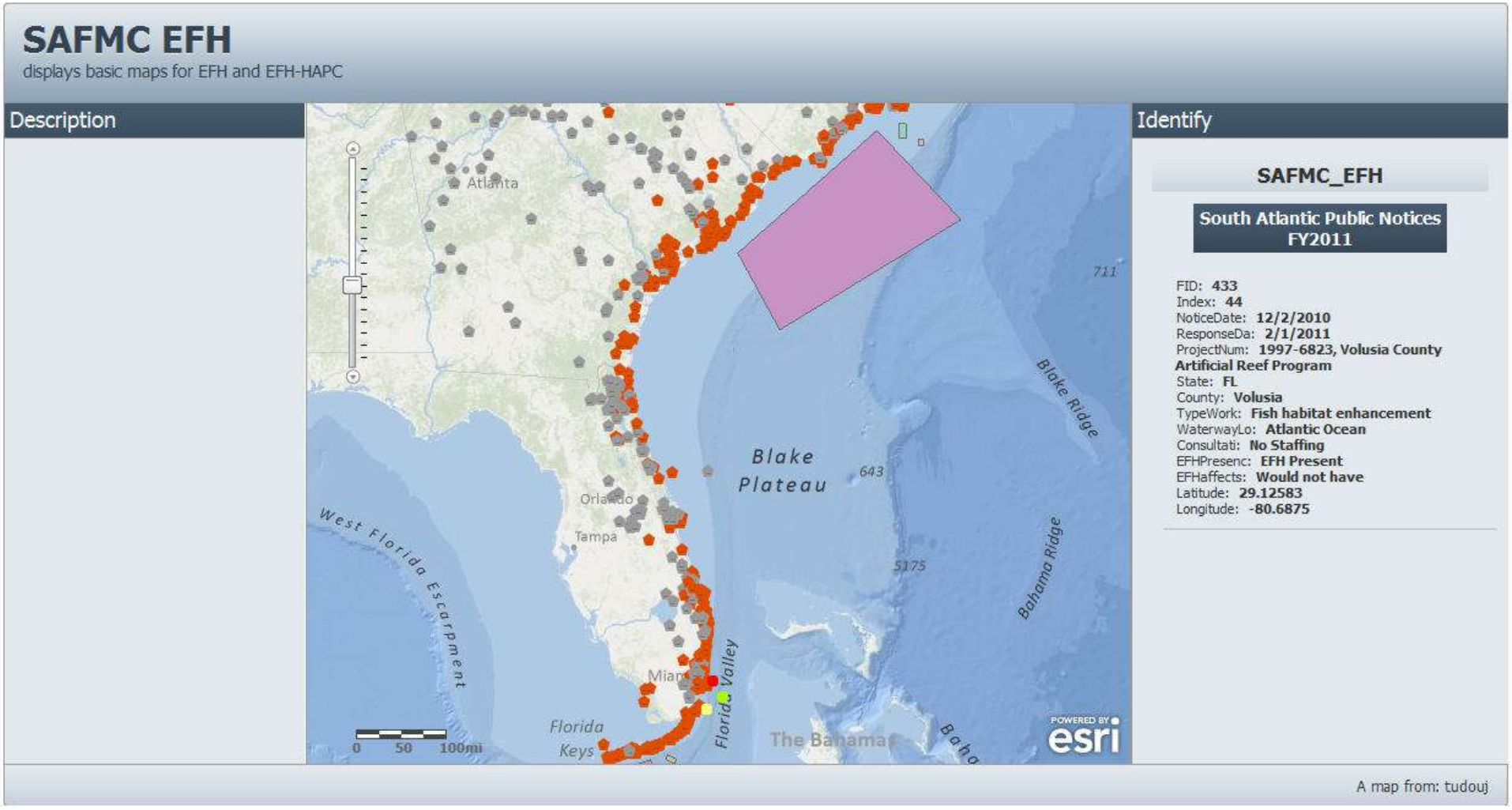


ArcGIS Online Subscription Services

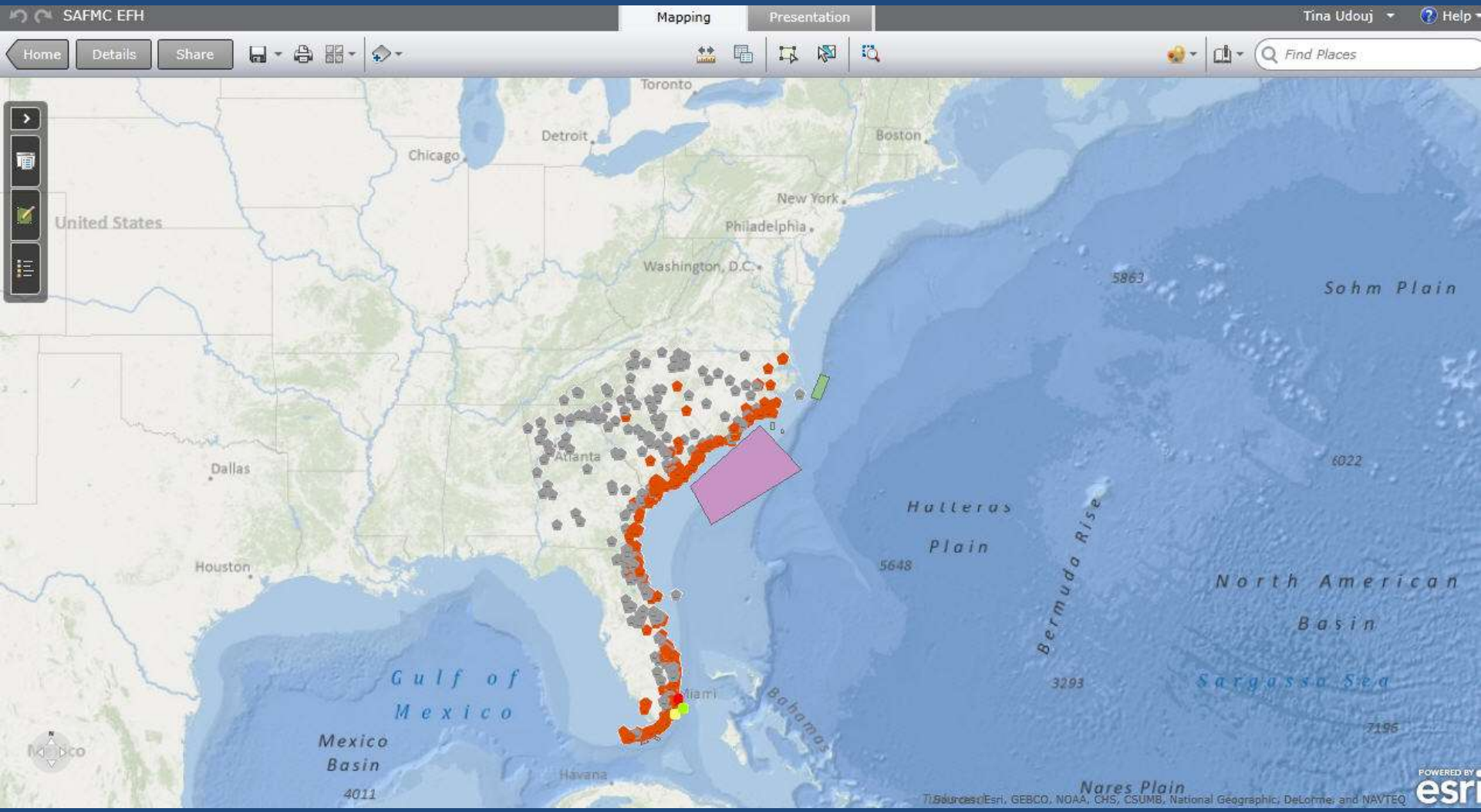
ArcGIS Online Plan	Named Users Included	Credits Included	Annual Subscription
Small Workgroup	5	2500	$2,500
Medium Workgroup	50	10,000	$10,000
Large Workgroup	100	17,500	$17,500
Department	250	37,500	$37,500
Large Department	500	62,500	$62,500
Multi-Department	1000	110,000	$110,000

Credits are used to perform many common functions with AGOL maps, apps, and data, such as mass geocoding, creating tiled services, data transfers, and so forth. From Keith Cooke [mailto:kcooke@esri.com] ESRI Rep in SE

ArcGIS.com – EFH web app



ArcGIS Online Explorer



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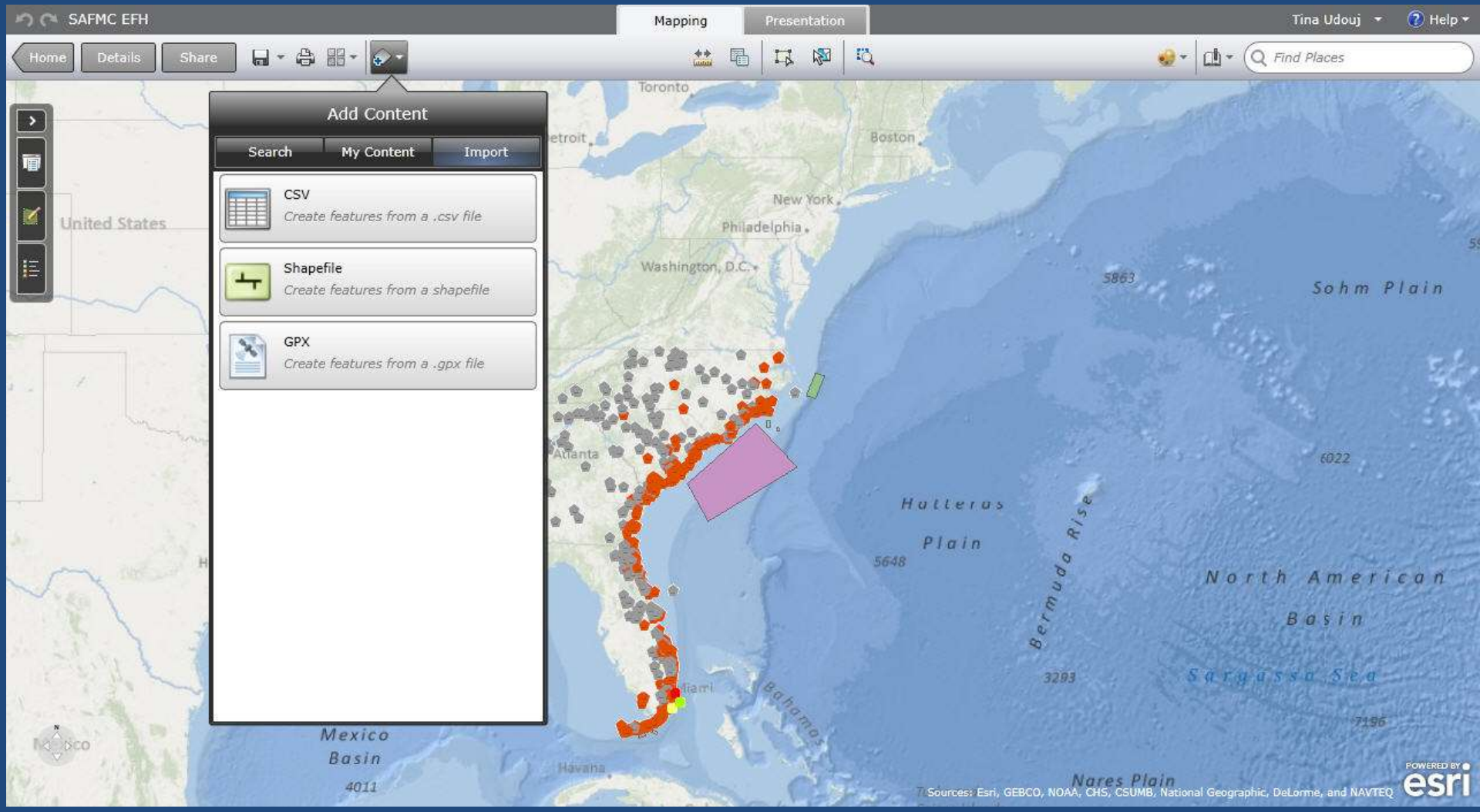
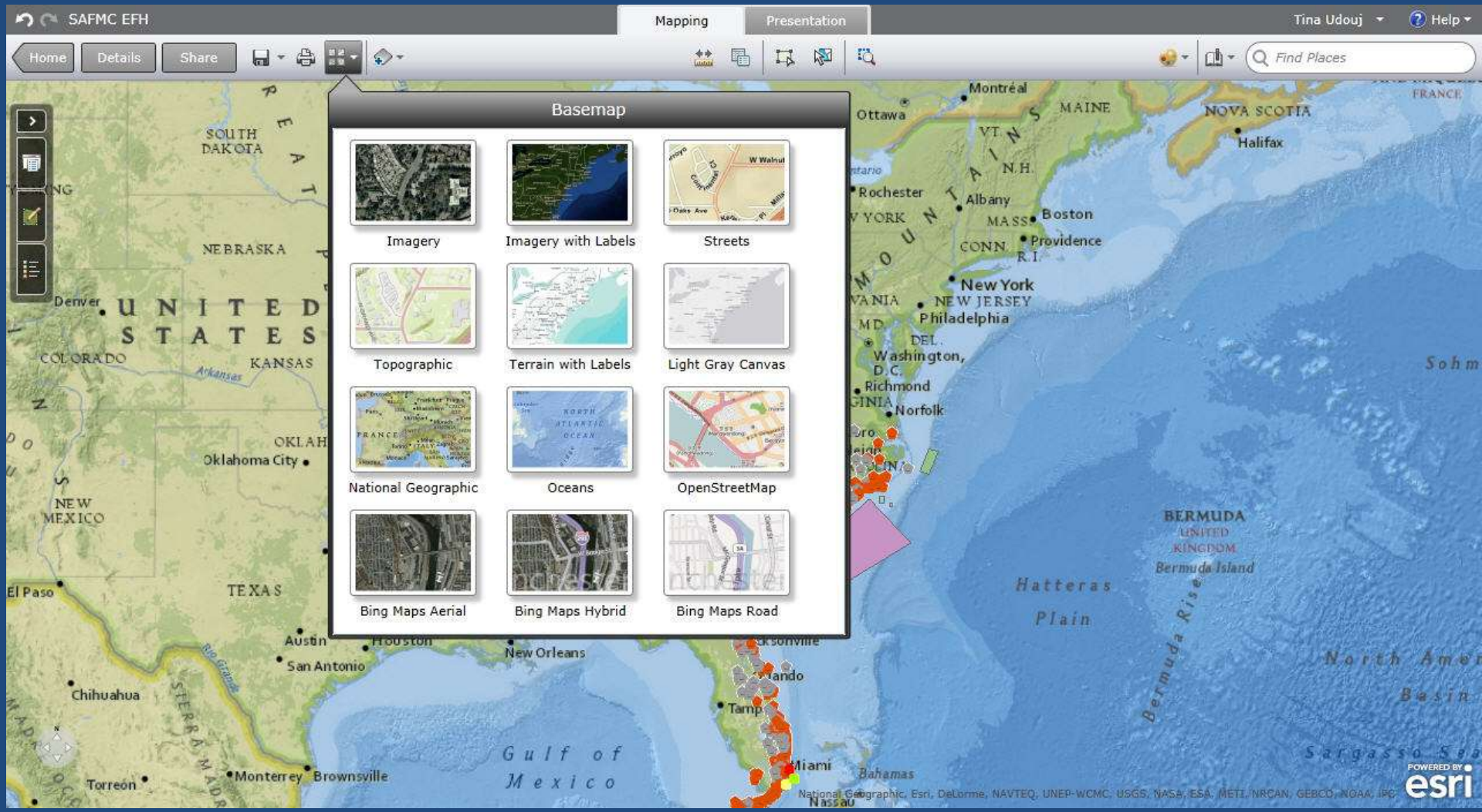


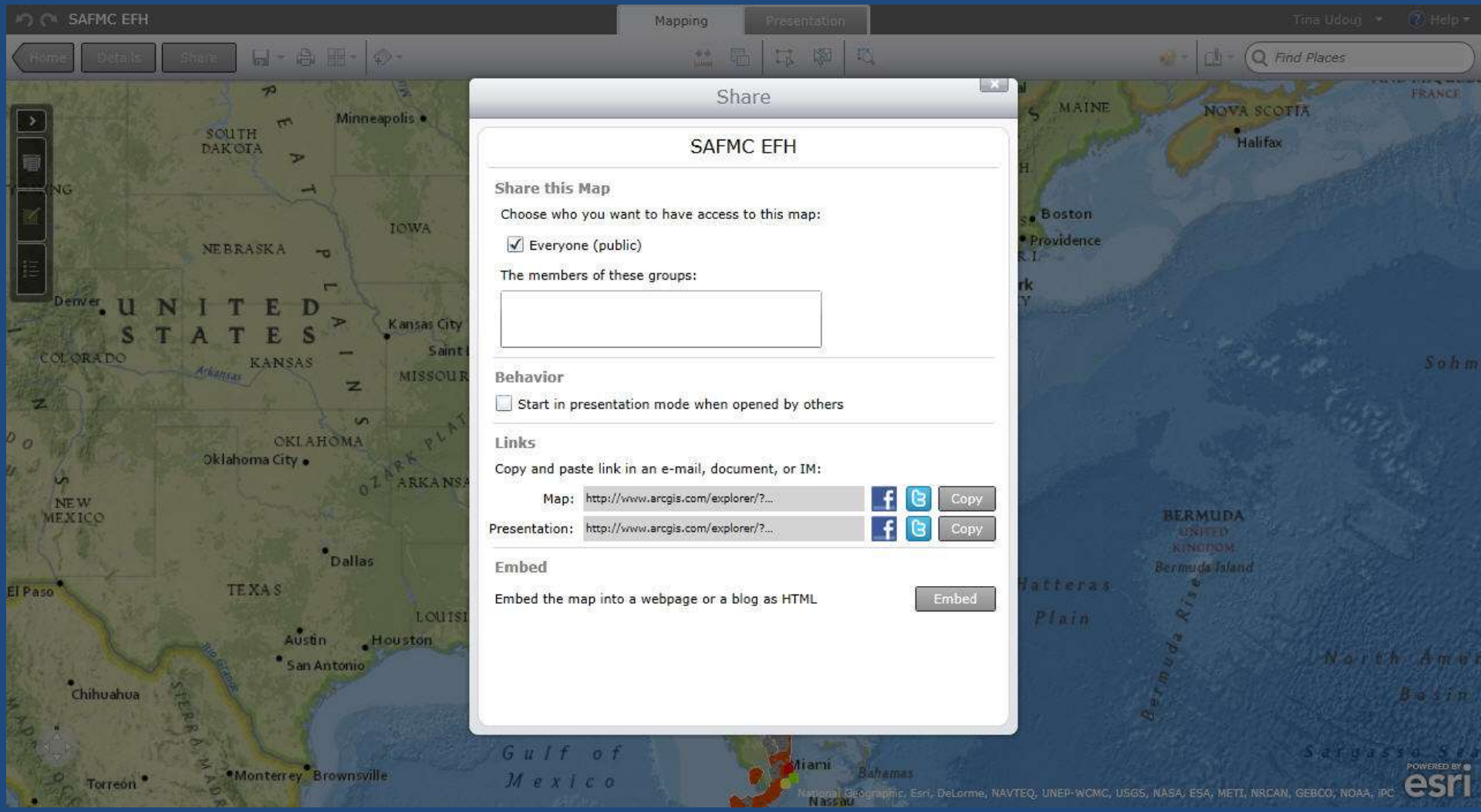
Add content from .csv, shapefile or a GPS file

ArcGIS Online Explorer



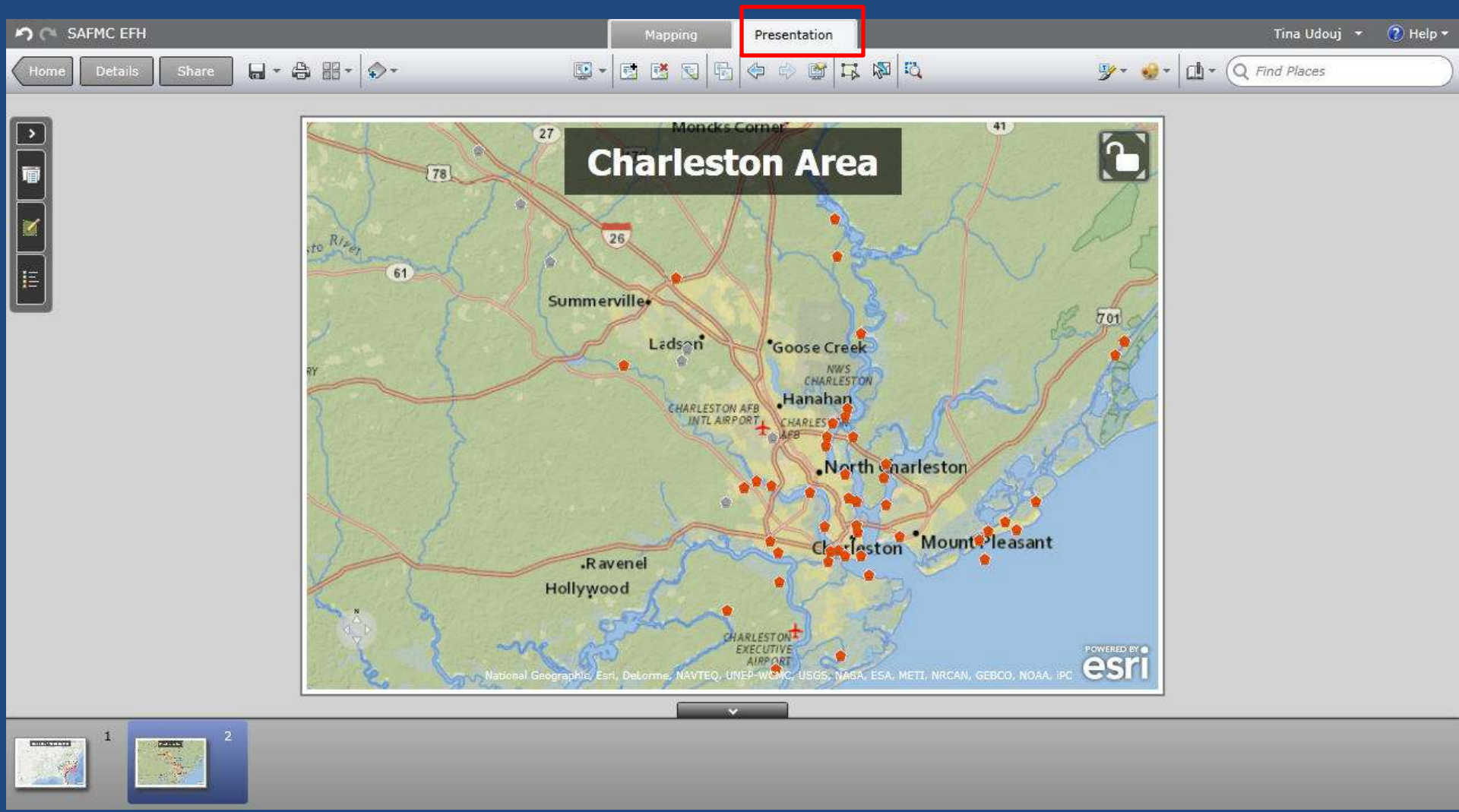
Change basemaps

ArcGIS Online Explorer



Share map via social media

ArcGIS Online Explorer



Switch to presentation mode to make a slide show

Let’s Explore

SAFMC HABITAT AND ECOSYSTEM VIEWER