Web User Guide for EcoSpecies Life Histories

REVISION: 2012.08.30

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Introduction

The intended audience for this site includes Fishermen, Scientists, Fisheries Managers, Coastal Zone Managers, Consultants, Public Outreach, and Media.

Major components of data this system provides include the following: Taxonomy, Geographic Range, Benthic Habitat, Water Column Habitat, Food Habits, Reproduction, Growth, Value and Status, Stock Enhancement, Population, Ecological Interactions, and Human Impacts. Citations and references are available for each database entry.

The purpose of this site is to provide the species life history information to flexibly fill the needs of different users. The system is designed to allow the input of updated SLH profiles as they become available. Output can be in the following formats: Rich Text Format (RTF), Plain Text (TXT), or Web-based (HTML).

What Do the Various Components Of This Site Provide?

Why is the 'Organisms' section important to you? How do you use the 'Reports' section to your advantage? Is there a "Writer's Guide" for creating new SLH documents?

Each section is described below, with particular emphasis given to the Report section.

For a Writer's Guide to creating your own SLH profile, go directly to Documentation to Assist with Creating EcoSpecies Species Life History (SLH) Profiles.

EcoSpecies: Home

This area provides insight as to whom the site was designed for (intended audience), and the major components (data) this site provides to the public. It is informational only and produces no reports.


FWC-FWRI: EcoSpecies
curly/EcoSpecies
Search
South Atlantic
Fishery Management Council
conserving and managing America's fisheries from three to 200 miles
off the coasts of North Carolina, South Carolina, Georgia and East Florida
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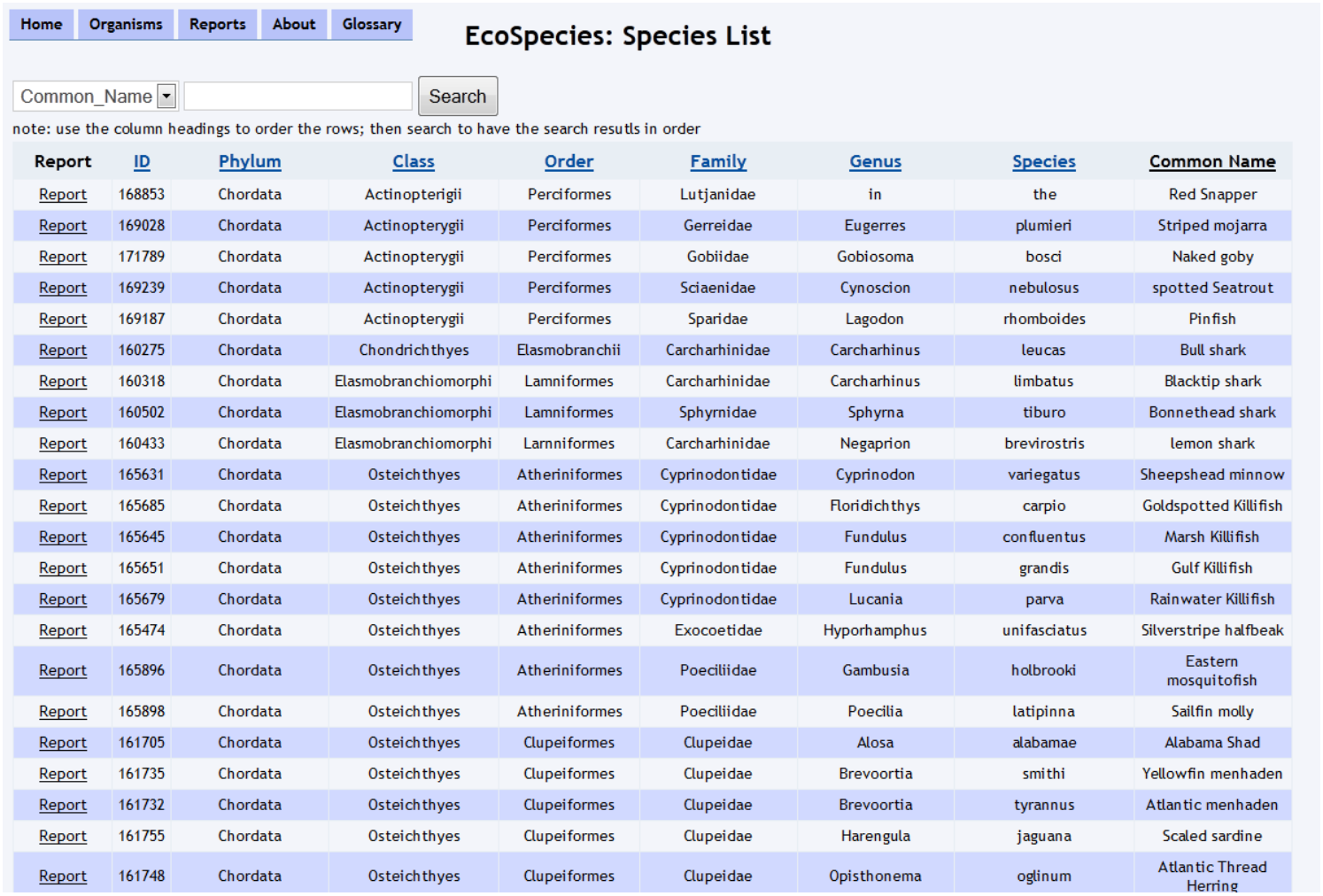
EcoSpecies: Home
Welcome to EcoSpecies
The intended audience for this site includes Fishermen, Scientists, Fisheries Managers, Coastal Zone Managers, Consultants, Public Outreach, and Media.
Florida needs a means to summarize and to assess biological diversity for many purposes. Among these, the data available on this web site help make Natural Resources Damage Assessments (NRDAs) for various chemical spills including oil spills. A NRDA assessment capability is needed in order to claim economic damages from the responsible parties. Diversity data can be used to calculate measures of biotic integrity and/or biological diversity to support pollution assessment under the Clean Water Act. Questions of "ecosystem health" can be approached with this data. The problems in Florida Bay, for example, indicate the need to understand what's out there, and for managers to be able to quickly retrieve information concerning the community of organisms associated with a zone, or benthic habitat within a zone, to support ecosystem management decision-making.
Major components of data this system provides include the following: Taxonomy, Geographic Range, Benthic Habitat, Water Column Habitat, Food Habits, Reproduction, Growth, Value and Status, Stock Enhancement, Population, Ecological Interactions, and Human Impacts. Citations and references are available for each database entry.
Fishermen will be interested in sections that indicate where fish might be located, both for fishing and for nursery areas. Scientists can use the basic information and the citations to locate more in-depth data in a particular area. Managers can have rapid access to concise summaries, as well as the ability to correlate proposed actions with species likely to be affected by those actions. Short summary and overview information is provided for more casual readers.

EcoSpecies: Organisms

This area provides a 'lookup' resource for organism / taxonomic classification, as well as common names. The REPORT column will take you directly to the appropriate report selection criteria. Columns can be sorted, as well as allowing search by common name or taxonomic classification.



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EcoSpecies: Species List

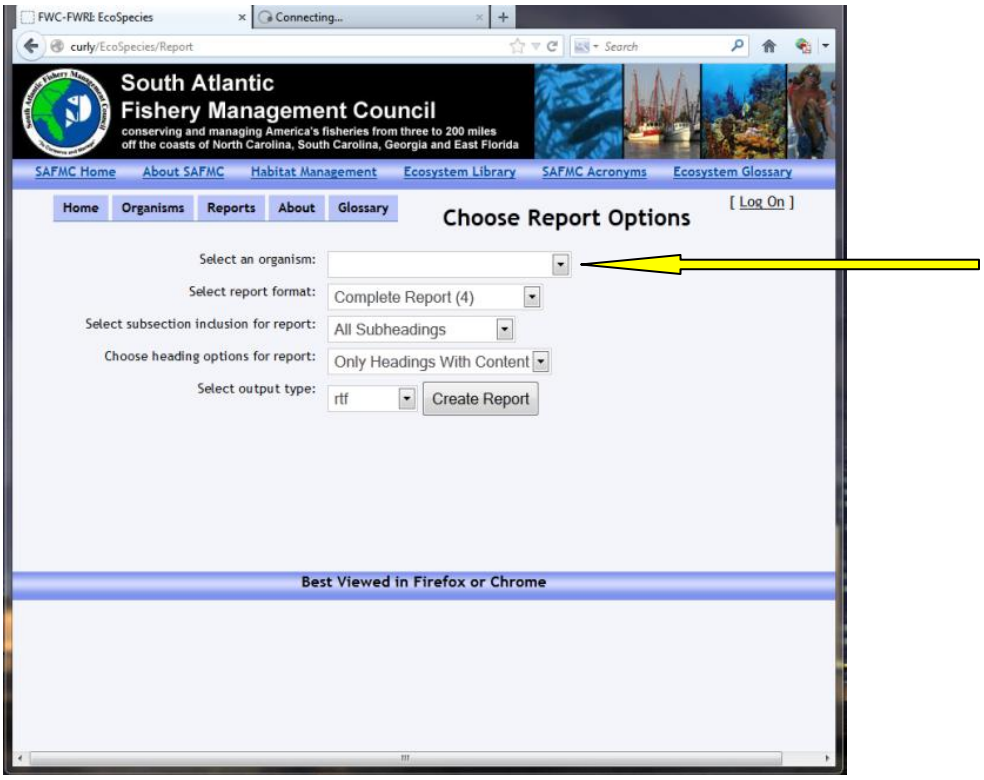
Common_Name | Search

note: use the column headings to order the rows; then search to have the search resutls in order

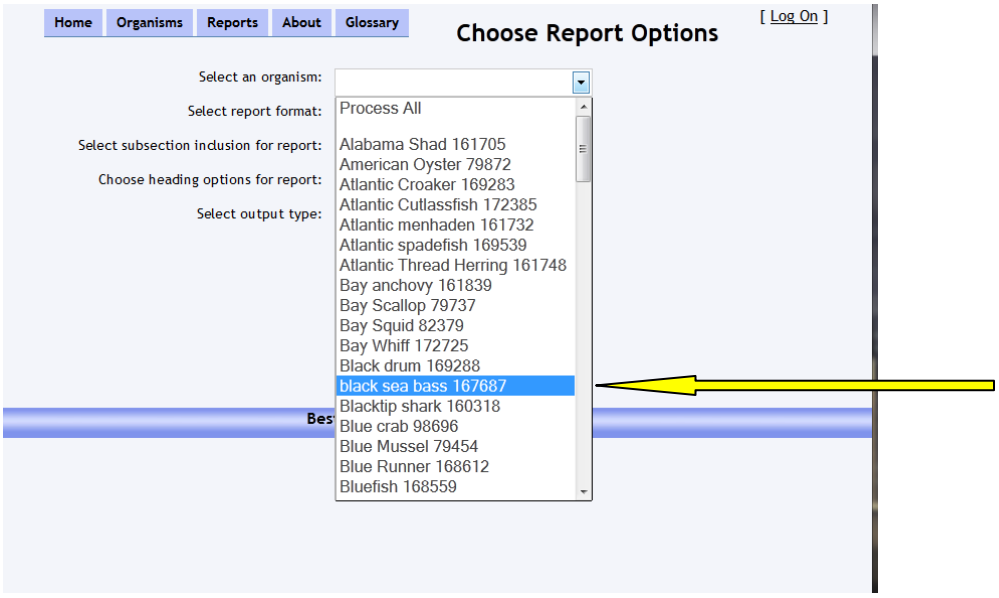
Report	ID	Phylum	Class	Order	Family	Genus	Species	Common Name
Report	168853	Chordata	Actinopterigii	Perciformes	Lutjanidae	in	the	Red Snapper
Report	169028	Chordata	Actinopterygii	Perciformes	Gerreidae	Eugerres	plumieri	Striped mojarra
Report	171789	Chordata	Actinopterygii	Perciformes	Gobiidae	Gobiosoma	bosci	Naked goby
Report	169239	Chordata	Actinopterygii	Perciformes	Sciaenidae	Cynoscion	nebulosus	spotted Seatrout
Report	169187	Chordata	Actinopterygii	Perciformes	Sparidae	Lagodon	rhomboides	Pinfish
Report	160275	Chordata	Chondrichthyes	Elasmobranchii	Carcharhinidae	Carcharhinus	leucas	Bull shark
Report	160318	Chordata	Elasmobranchiomorphi	Lamniformes	Carcharhinidae	Carcharhinus	limbatus	Blacktip shark
Report	160502	Chordata	Elasmobranchiomorphi	Lamniformes	Sphyrnidae	Sphyrna	tiburo	Bonnethead shark
Report	160433	Chordata	Elasmobranchiomorphi	Larnniformes	Carcharhinidae	Negaprion	brevirostris	lemon shark
Report	165631	Chordata	Osteichthyes	Atheriniformes	Cyprinodontidae	Cyprinodon	variegatus	Sheepshead minnow
Report	165685	Chordata	Osteichthyes	Atheriniformes	Cyprinodontidae	Floridichthys	carpio	Goldspotted Killifish
Report	165645	Chordata	Osteichthyes	Atheriniformes	Cyprinodontidae	Fundulus	confluentus	Marsh Killifish
Report	165651	Chordata	Osteichthyes	Atheriniformes	Cyprinodontidae	Fundulus	grandis	Gulf Killifish
Report	165679	Chordata	Osteichthyes	Atheriniformes	Cyprinodontidae	Lucania	parva	Rainwater Killifish
Report	165474	Chordata	Osteichthyes	Atheriniformes	Exocoetidae	Hyporhamphus	unifasciatus	Silverstripe halfbeak
Report	165896	Chordata	Osteichthyes	Atheriniformes	Poeciliidae	Gambusia	holbrooki	Eastern mosquitofish
Report	165898	Chordata	Osteichthyes	Atheriniformes	Poeciliidae	Poecilia	latipinna	Sailfin molly
Report	161705	Chordata	Osteichthyes	Clupeiformes	Clupeidae	Alosa	alabamae	Alabama Shad
Report	161735	Chordata	Osteichthyes	Clupeiformes	Clupeidae	Brevoortia	smithi	Yellowfin menhaden
Report	161732	Chordata	Osteichthyes	Clupeiformes	Clupeidae	Brevoortia	tyrannus	Atlantic menhaden
Report	161755	Chordata	Osteichthyes	Clupeiformes	Clupeidae	Harengula	jaguana	Scaled sardine
Report	161748	Chordata	Osteichthyes	Clupeiformes	Clupeidae	Opisthonema	oglinum	Atlantic Thread Herring

Ecospecies: Reports

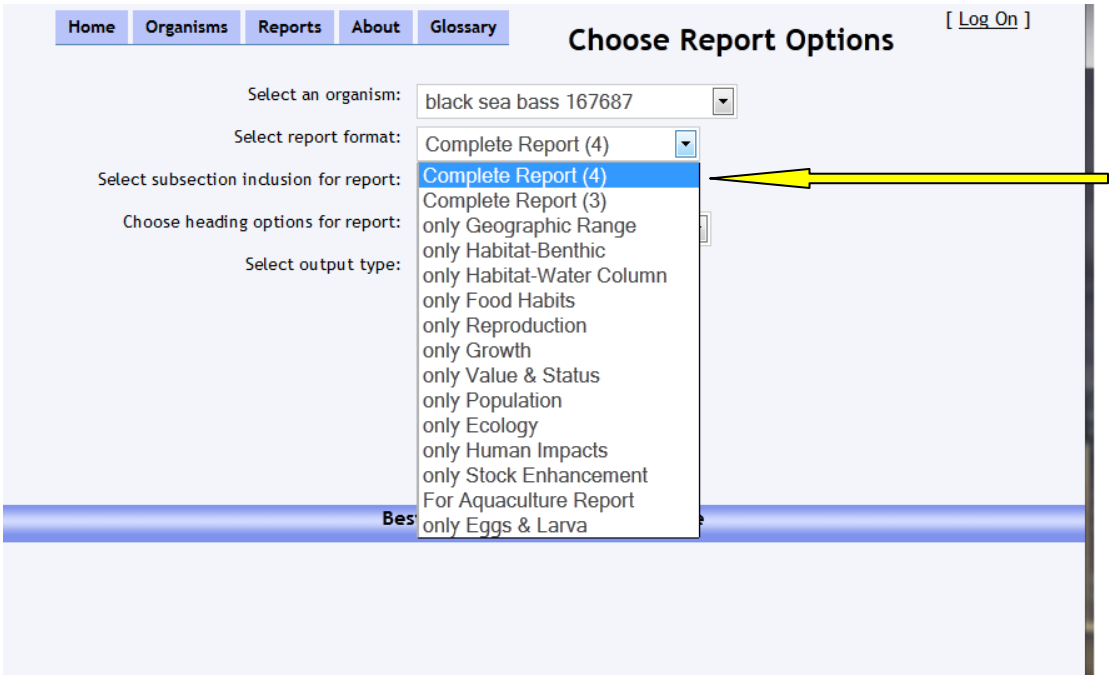
To create a report on existing species, you must first use the drop-down to select the organism you wish to generate a report for.



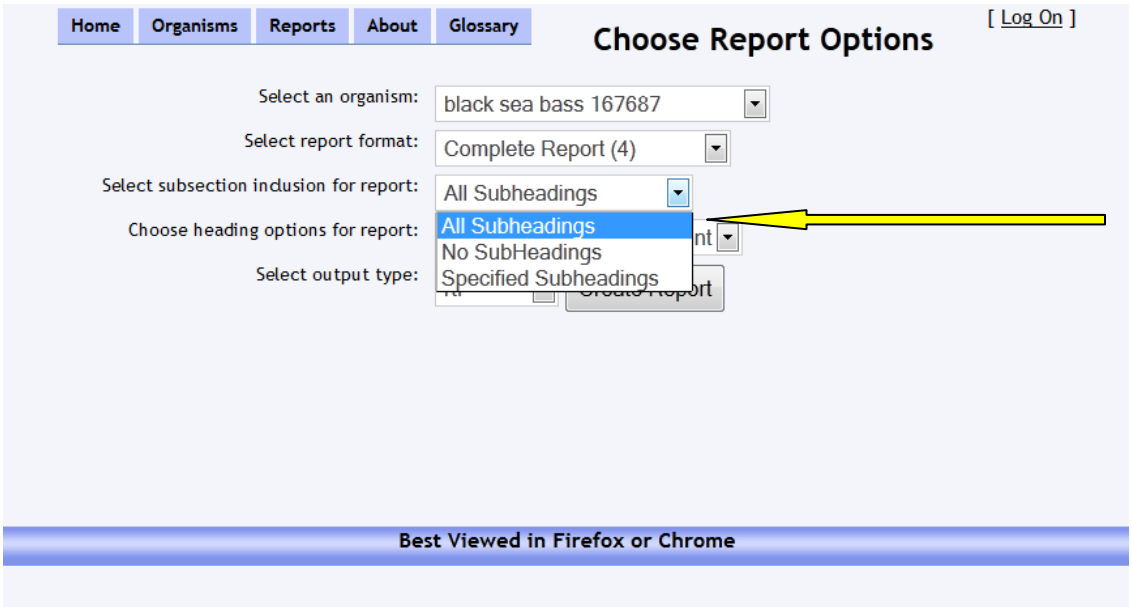
In this example, we'll chose, "Black Sea Bass."



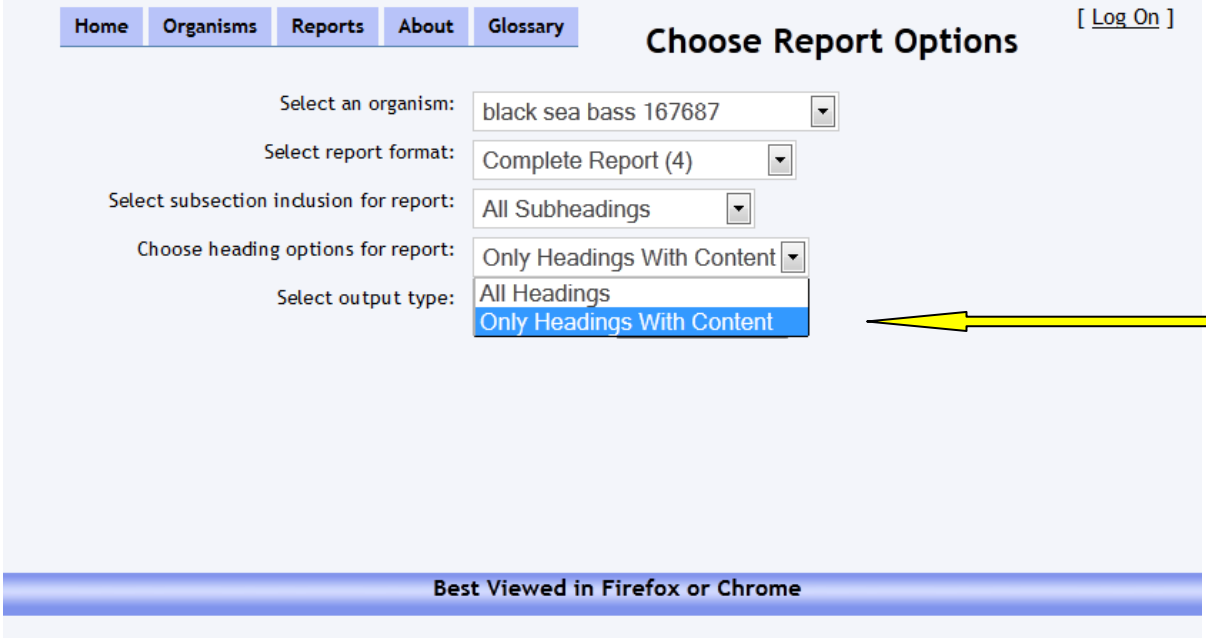
Next, use the drop-down to select the format of the report. You can obtain a 'complete' report, or narrow your choices to the section of the report desired. In this example, we've selected "Complete Report (4)." The difference between "Complete Report (4)" and "Complete Report (3)" is xxxxxxx



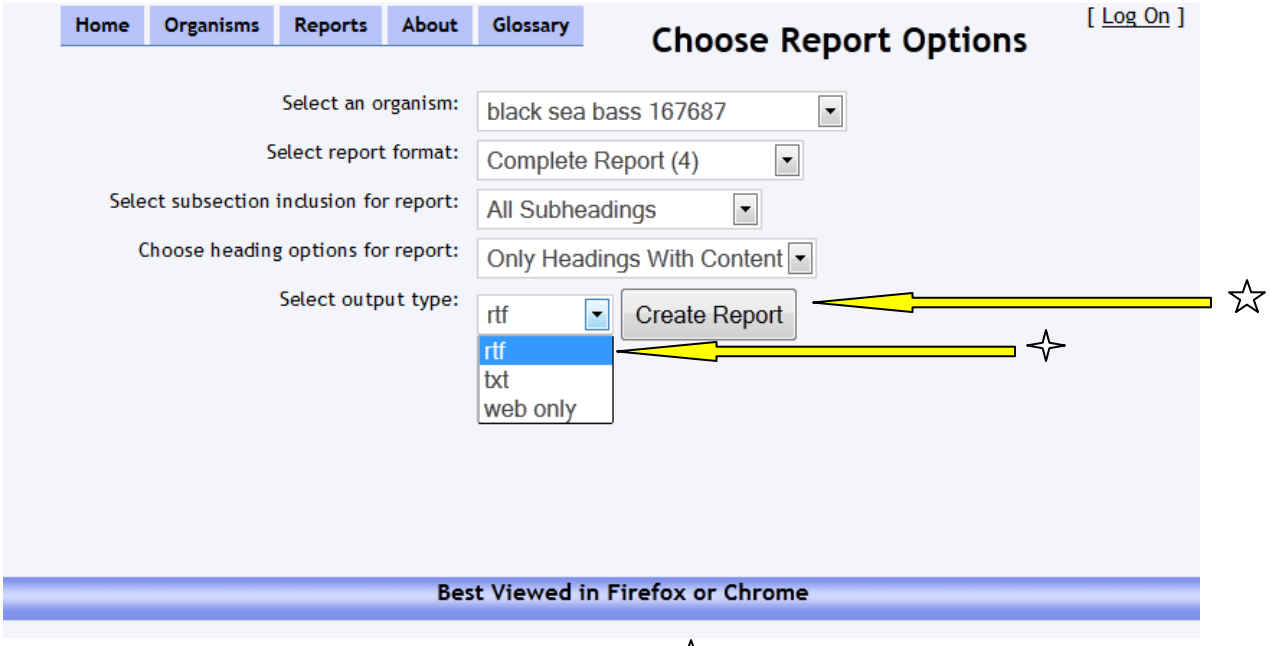
Next, select which subsections of the report you want to include. Here, we show someone selecting, "All Subheadings."



Many reports do not have all headings with content. You have a choice of obtaining a complete report with all Headings regardless of content, or a report with only the Headings that have content associated with them. Here someone is choosing to generate a report with only Headings that have content.

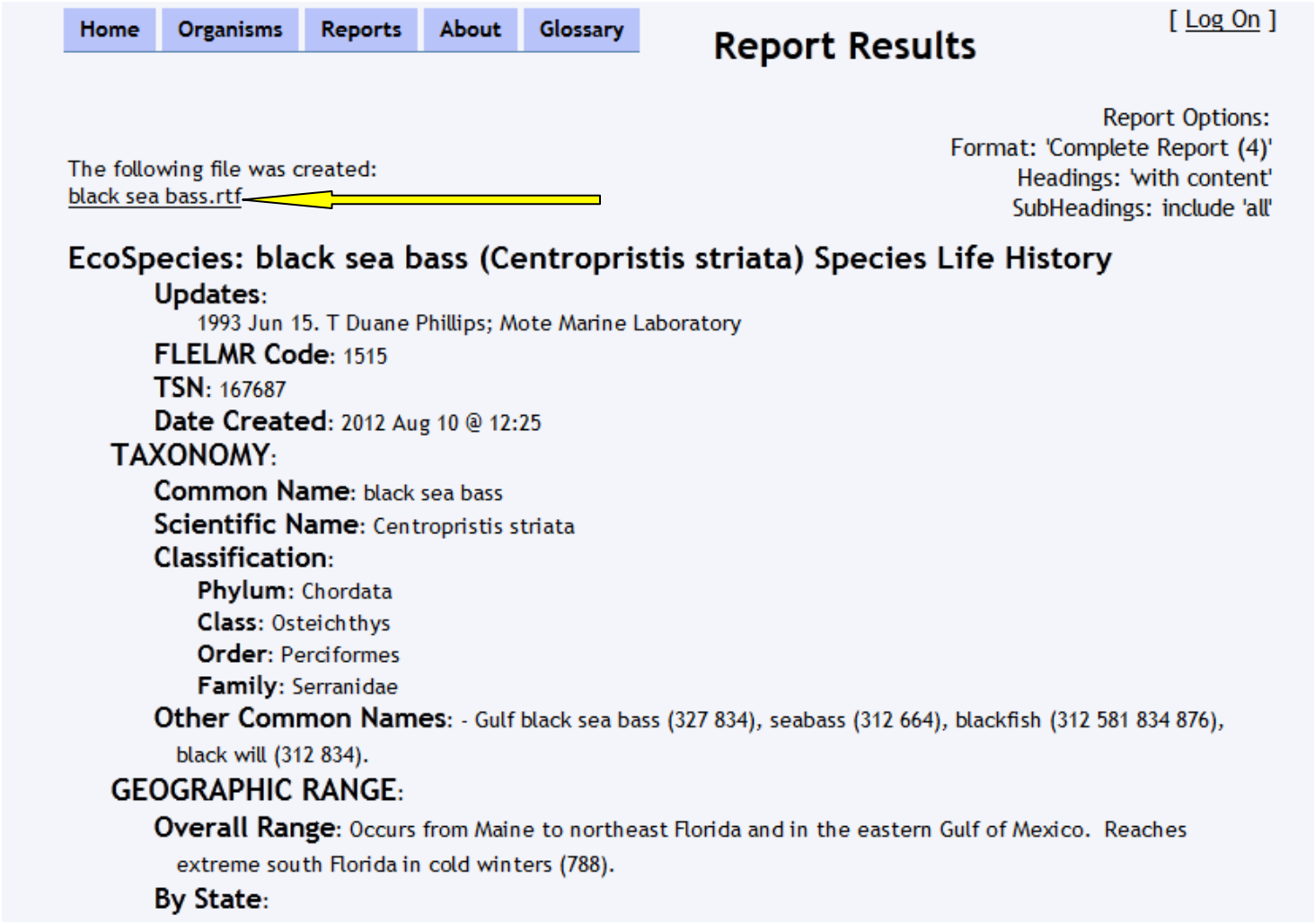


Finally, choose the format of the output: Rich Text (RTF), Text based (TXT), or HTML (Web Only). This example demonstrates someone who wants a rich text format as the report output format.



Once all options have been selected, use the “Create Report” button to complete the process.

A partial example of a RTF formatted SLH report for “Black Sea Bass.” You can select the “black sea bass.rtf” link to download / capture the report.



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[Log On]

Report Results

Report Options:
Format: 'Complete Report (4)'
Headings: 'with content'
SubHeadings: include 'all'

The following file was created:
black sea bass.rtf

EcoSpecies: black sea bass (Centropristis striata) Species Life History

Updates:
1993 Jun 15. T Duane Phillips; Mote Marine Laboratory
FLELMR Code: 1515
TSN: 167687
Date Created: 2012 Aug 10 @ 12:25

TAXONOMY:

Common Name: black sea bass
Scientific Name: Centropristis striata
Classification:
Phylum: Chordata
Class: Osteichthys
Order: Perciformes
Family: Serranidae
Other Common Names: - Gulf black sea bass (327 834), seabass (312 664), blackfish (312 581 834 876), black will (312 834).

GEOGRAPHIC RANGE:

Overall Range: Occurs from Maine to northeast Florida and in the eastern Gulf of Mexico. Reaches extreme south Florida in cold winters (788).
By State:

EcoSpecies: About

This area provides a bit of background concerning the development and history of EcoSpecies, ELMR, and FLELMR. It is informational only and produces no reports.

EcoSpecies: Glossary

http://atoll.floridamarine.org/EcoSpecies/Home/Glossary

For reference purposes, the Glossary section provides information on terms used in the SLH reports.

SAFMC (external site):

http://www.safmc.net/Home/tabid/139/Default.aspx

As a courtesy, we have included a bit of information to the 'sister site' of EcoSpecies, the South Atlantic Fisheries Management Council website. There is a link to this site on our web page, as well as additional links to the SAFMC Library, Habitat Management, Acronyms, and SAFMC Glossary.

The South Atlantic Fishery Management Council, headquartered in Charleston, S.C., is responsible for the conservation and management of fish stocks within the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia and east Florida to Key West.

When Congress passed Public Law 94-265, the Magnuson Fishery Conservation And Management Act of 1976 (MFCMA), it extended the U.S. jurisdiction of fisheries out to 200 miles and created a new form of regional government through the eight regional fishery management councils. The role of the councils is to develop fishery management plans needed to manage fishery resources within the 200-mile limit. This limit, sometimes referred to as the Exclusive Economic Zone or EEZ or "federal waters" extends offshore from state waters (three miles in the South Atlantic) to 200 nautical miles. Outer boundaries of the EEZ off the southeastern coast vary according to areas where jurisdictional boundaries meet with Bermuda, the Bahamas and Cuba.

In 1996 the Sustainable Fisheries Act (SFA) became law and amended the Magnuson Act and changing the name to the Magnuson-Stevens Fishery Conservation and Management Act. Congress passed the SFA to protect marine fish stocks with requirements to prevent and stop overfishing, minimize bycatch, and protect habitat.

On January 12, 2007, President Bush signed the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006. The new law is groundbreaking in several respects: it mandates the use of annual catch limits and accountability measures to end overfishing, provides for widespread market-based fishery management through limited access programs, and calls for increased international cooperation. For the latest information regarding the Reauthorization Act, visit: http://www.nmfs.noaa.gov/msa2007/index.html. Follow the link to access a copy of the Reauthorized Magnuson Act.

Council Members

Council members are citizens from each of these southeastern states who are knowledgeable of some aspects of the fisheries. They serve three-year terms and are appointed by the Secretary of Commerce from lists of nominees submitted by the governors of the states. Appointed members may serve a maximum of three consecutive terms. The official responsible for marine fisheries management in each state, as well as the regional director of the National Marine Fisheries Service are also voting members. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission.

Public Participation:

The Council meets four times each year, once in each of the southeastern states. Before final action on any proposed rule change is taken, the Council involves the public through informal public scoping meetings, public hearings and input at Council meetings. Proposed rule changes are then sent to NMFS for further review, public comment and approval before being implemented.

In addition, the Council receives input and recommendations from knowledgeable people from other state and federal agencies, universities and members of the public who serve on various committees and panels. These include Advisory Panels, the Scientific & Statistical Committee and Stock Assessment Panels.

Documentation to Assist with Creating EcoSpecies Species Life History (SLH) Profiles

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Levels of Outline

The levels of the outline have been named for convenience. ***Major headings*** (such as 1, or 2 with headings in all caps) are called PARTS. In most cases the next level down (such as 2.2 or 3.3 are called ***sections*** and are associated with tags which refer to the section name. In a few cases, a "Set" level has been inserted between the PART level and the Heading level. Two examples are 3.5 Spatial Strategy and 5.2 Salinity. The headings under Spatial Strategy are Areal, Vertical and Bathyl. The next organizational level is ***Subsections*** and primarily consists of ***life stages*** such as Juvenile or Adult. But, other Subsections are possible such as the name of a State (FL, GA, NC, SC, etc). The last organizational level is ***Assessment*** which is used with named stock assessments in the Population Part.

1. **HEADER**
   - **1.1 Title**
   - **1.2 Updates** (new entry for each new author (team) only list most current update for each author)
     - **1.2.1 Date of last update. Author(:Author); Affiliation** (repeat as needed; separate Authors with a colon ";")
   - **1.3 FLELMR Code**
   - **1.4 Summary/Abstract**

2 **TAXONOMY**
   - **2.1 Scientific Name**
   - **2.2 Subspecific Names**
   - **2.3 Synonyms**
   - **2.4 Common Name**
   - **2.5 Other Common Names**
   - **2.6 Classification:**

     Phylum:

     Class:

     Order:

     Family:
   - **2.7 Taxonomic Characteristics** (by life stage)
   - **2.8 Similar Species**
   - **2.9 Evolutionary Relationships**

3 **GEOGRAPHIC RANGE**
   - **3.1 Overall**
   - **3.2 By State**
   - **3.3 By Stock**
   - **3.4 By Estuary**
   - **3.5 Spatial Strategy (by Areal, Vertical and Bathyl Zone sets)** (by life stage)
   - **3.6 Mobility/Migration** (by life stage)
   - **3.7 Life Mode** (legacy) (by life stage)
   - **3.8 Symbiotic**
   - **3.9 Schooling**

3.10 Other

4 BENTHIC HABITAT
- **4.1 Substrate** (by life stage)
- **4.2 Submerged Vegetation** (by life stage)
- **4.3 Depth Distribution** (by life stage)
- **4.4 Habitat Type (by life stage)** (legacy)

5 WATER COLUMN HABITAT
- **5.1 Temperature** (by life stage)
- **5.2 Salinity**
  - 5.2.1 NOAA/NOS (by life stage)
  - 5.2.2 Venice (by life stage)
- **5.3 Dissolved Oxygen** (by life stage)
- **5.4 Turbidity**
- **5.5 Floating Habitat**
- **5.6 pH**
- **5.7 Light/Photoperiod**
- **5.8 Ammonia**
- **5.9 Currents/Tides**
- **5.10 Other**

6 FOOD HABITS
- **6.1 Trophic Mode**
- **6.2 Feeding** (by life stage)
- **6.3 Food Items** (by life stage)

7 REPRODUCTION
- **7.1 Gender**
- **7.2 Mode**
- **7.3 Domain**
- **7.4 Fertilization**
- **7.5 Spawning Strategy**
- **7.6 Reproductive Periodicity**
- **7.7 Parental Care**
- **7.8 Seasonal Energetics**
- **7.9 Maturation** (by life stage)
- **7.10 Fecundity**
- **7.11 Development** (by life stage)
- **7.12 Mating/Spawning**
- **7.13 Sex Ratio**

8 GROWTH
- **8.1 Length Range** (by life stage)
- **8.2 Length Conversions**
- **8.3 Weight-Length Conversions**
- **8.4 Wet-Dry Weight Conversions**
- **8.5 Length at Age** (male/female/both)

- **8.6 Longevity** (time at each life stage)
- **8.7 Aging Structures/Methods**
- **8.8 Growth Equations**
- **8.9 Other**

9 VALUE & STATUS

- **9.1 Commercial**
- **9.2 Recreational**
- **9.3 Ecological Role**
- **9.4 Species Stress**
- **9.5 Status**
- **9.6 Stock Status**
- **9.7 Management Status**
- **9.8 Societal Value**

10 STOCK ENHANCEMENT

- **10.1 Induced Breeding**
- **10.2 Rearing**
- **10.3 Feeding**
- **10.4 Stocking**
- **10.5 Disease Control**

11 POPULATION

- **11.1 Stock Assessments (by Assessment)**
  - **11.1.1 Assessment Name** (one or more)
    - **11.1.1.1 Total Mortality**
    - **11.1.1.2 Annual Mortality**
    - **11.1.1.3 Natural Mortality**
    - **11.1.1.4 Fishing Mortality**
    - **11.1.1.5 Annual Cohort Success**
    - **11.1.1.6 Recruitment Indices**
    - **11.1.1.7 Partial Recruitment**
    - **11.1.1.8 Population Biomass Criteria**
- **11.2 Abundance by Year**
- **11.3 Abundance by Month** (by life stage)
- **11.4 Abundance by Sex**
- **11.5 Abundance by Area**
- **11.6 Population Abundance**
- **11.7 Management Regulations** (by state & federal)
- **11.8 Biological Benchmarks**
- **11.9 Other**

12 ECOLOGICAL INTERACTIONS

- **12.1 Competition**
- **12.2 Predation**
- **12.3 Parasites/Diseases**
- **12.4 Perturbations**
- **12.5 Climate**
- **12.6 Other**

13 HUMAN IMPACTS
- **13.1 Oil Spills**
- **13.2 Contaminants**
- **13.3 Entrainment/Impingement**
- **13.4 Eutrophication**
- **13.5 Pollutant Toxicity**
- **13.6 Other**

14 REFERENCE NUMBERS

(Reference Numbers correspond to the following Citations)

15 CITATIONS

16 ADDENDA
- **16.1 Appendix 1**
- **16.2 Appendix 2 (etc.)**

SLH Content Documentation

This portion of the document will discuss many of the Parts, Sections and Subsections within SLHs.

Life Stage Definitions:

Egg/Parturition - The life stages Egg and Parturition were merged to become one life stage designation since both pertain to the release of reproductive products by adult fish or invertebrates. This tends to standardize the life stages across species. Eggs are gelatinous, usually spherical, multicellular reproductive propagules released from fish or invertebrates at the time of spawning. Parturition describes the ecological conditions wherein certain types of fish release live young.

Larvae - The life stage that usually occur after hatching of the egg. Larval fishes generally have finfolds, and/or other morphological, and pigmentary characteristics different from juvenile or adult life stages, that usually have been described in the literature. Larval invertebrates that are morphologically distinctive from adults generally also have been described in the literature. In the marine environment, the majority (with some exceptions) of larval fishes and invertebrates are planktonic.

Young-of-Year -This life stage is defined as fish or invertebrates in their first year of life. It is generally followed by juvenile and adult life stages. It may not exist in short-lived species which become sexually mature in their first year of life (e.g., there is only egg, juvenile and adult life stages for that organism).

Juvenile-Juveniles are less easy to define, but may have pigment differences from the Adult life stage, and are usually not sexually mature. Juvenile is defined herein as being younger fish or invertebrates with adult morphology, with less than 50% being sexually mature below a given age or size (length). It is recognized that life stages may be defined in different ways. The term juvenile may be based on taxonomic characters of individual fish or invertebrate animals. We still need the information concerning the life stage,

irrespective of how the term is defined in the literature being summarized. Hence, state how the term is being used in the Species Life History (SLH) outline and give the length range used in the literature being summarized. State whether the lengths mentioned are Standard Length (SL), Fork Length (FL), or Total Length (TL). You also need to clearly state whether the length units are metric (e.g., centimeters) or British units (e.g., inches).

Adult-Adult herein refers to individuals of the species where 50% or more are sexually mature at a given age. Adult is the age (or less preferably the length) at which 50% or more of the females of the population are sexually mature. Females were chosen for the definition since because it is more difficult to visually determine maturity in males and males may mature sooner. This definition ties in with the definition of Spawning Potential Ratio (SPR) used in fisheries management. The comments concerning the various definitions for life stages (e.g., juvenile life stage) and the need to summarize length ranges apply to all life stages in this SLH outline.

UPDATES This heading describes the history of the work done by staff and institutions involved in the development of the SLH.

Each person working on the profile gave their first initial and family name, their place of employment (e.g., Mote Marine Laboratory, FMRI), and the date of the last update of the SLH profile (e.g., 7/10/01). The date of previous work by the same person is replaced with each update. This allows the date to be entered after each update. Hence, the SLH profile has a means of tracking who worked on creating the information being added to the EcoSpecies database. Only the most recent date is maintained for each author (or author group). The format for Updates is strict and must be of the form: date followed by a period (.) Authors separated by a semicolon. The last author should be followed by a colon (:) and the affiliation.

TAXONOMY

This is a new major heading, which summarizes information concerning the naming and classification of species.

Common Name: The common name given in the AFS publication #20.

Scientific Name: The most recent scientific name accepted by the American Fisheries Society (AFS). The Genus and Species fish names given in the AFS Guide to Common and Scientific Names #20. (Invertebrate names would come from the AFS Guide To Invertebrates).

Synonyms: Scientific genus and species names. These may be previously used names or names being used that are not accepted by AFS. Where no synonyms are known to exist, that should be stated in the profile.

Synonyms: The most recent subspecies that occur in waters off NC, SC, GA or FL.

I'd like to change the names to www.itis.org.

Other Common Names: Common names used regionally or derived from other languages.

Classification: Names pertaining to Phylum, Class, Order, and Family.

Similar Species: Common and scientific names of similar species in the same family.

Comment- This subsection could also mention species similar in appearance, but not closely related (e.g. members of different families, such as members of the family Gerridae that look similar to Centropomidae).

Evolutionary Relationships: Publications that infer evolutionary relationships between species, genera, and/or higher levels of classification should be summarized. This could be studies that infer Phylogeny

using traditional taxonomy (e.g., comparative morphology or meristics), cladistic methods, numerical taxonomy, biochemistry and/or parasitology (host-parasite relationships) etc.
Stock Separation: There may be stocks (such as Gulf versus Atlantic) that have distinct characteristics and yet are not considered separate subspecies.
Other: Any other topic that is under this part, but is not covered elsewhere.
Notes: Notes about references or other issues.

GEOGRAPHIC RANGE

This section summarizes information concerning the geographic distribution of the species, subspecies, or stocks of the species.
Overall: This pertains to the complete geographic range of the species.
By State: Pertains to the geographic range of the species with in a state.
By Stock: This subheading pertains to studies that have defined the existence of genetically or morphologically distinct subpopulations or stocks of a species that can be geographically defined. The means by which the stock discrimination was determined, such as biochemical methods (mitochondrial or nuclear DNA, isozymes), tagging, or parasites can be mentioned as well as the geographic distribution of each stock defined within a species.
By Estuary: The estuaries where the species has been found in Florida and associated bibliographic citations should be given. It is preferable to cite as many papers as possible indicating the species presence by estuary.
Spatial Strategy: Defines whether the species is resident or migrant inhabitant of estuarine, marine, coastal or oceanic environments. Discuss the species home range if known. Discussion should include **Areal Zone, Vertical Zone and Bathyl Zone.**
Mobility/Migration: The movements and migratory behavior of a species/life stage between or within habitats (e.g. stationary, low mobility, high mobility, territorial, unknown).
Life Mode: The life history strategy of a species and its life stages (e.g., benthic, demersal, nektonic, pelagic, planktonic).
Symbiotic: List whether the species exhibits symbiotic behavior (e.g., mutualism, commenselism, parasitism etc.).
Schooling: List whether or not the species exhibits schooling behavior.

BENTHIC HABITAT (by life stage)

This section describes the physical habitat associated with the bottom. The terms habitat and environment have similar meanings and are often used interchangeably. Herein, we use benthic habitat to refer to physical environments generally associated with the bottom. Examples are seagrass habitat, oyster reef habitat, sediment types, vegetation types, depth ranges etc.
Substrate: This can be soft bottom, live/hard bottom or intertidal bottom. Soft Bottom refers to various fine-grained sand, silt, or mud bottom types in which fish may hide generally vegetation.
Live/Hard Bottom includes Rocky or limestone-based bottoms of geological or biological origin that may be either bare or covered with encrusting organisms. These habitats generally attract different fish species (e.g., grouper) than those that occur over soft bottom (e.g., flatfish). Intertidal Bottom includes areas that lie between the high and low tide marks. This varies from low relief areas with little wave action such as mudflats to high relief areas that may be exposed to strong currents and/or wave action such as rocky shorelines or seawalls.
Submerged Vegetation: The vegetation type where a species is found. This refers to leafy vegetation on the bottom where fish may seek cover from predation. Plants with true roots are termed Submerged

Rooted Vegetation (SRV). Macroalgae (such as *Caulerpa)* having runners similar in appearance to roots are more correctly termed Submerged Aquatic Vegetation (SAV). When both types occur together or where the literature or GIS maps don=t make any distinction, the term SAV is commonly applied.
Depth Distribution: Depth ranges across which a particular life stage of a species is found. If the literature gives the depths in British units (e.g., feet) it is OK to use those units in the SLH profile.
Habitat Type: (legacy) This is in some of the older SLHs, but should be phased out.

WATER COLUMN HABITAT (by life stage) This summarizes physical/chemical occurrence information of estuarine/marine fish or macro-invertebrate species by life stages.

The SLH summarizes information from the literature pertaining to the ranges for different environmental gradients across which a species is present. The environmental gradients include temperature, salinity, dissolved oxygen, turbidity, floating habitat, pH, light, and currents/tides.

The environmental ranges across which a particular species life stage is found based on field sampling should be summarized from either primary or grey literature. Bibliographic citation numbers should accompany the information in the SLH. Behavioral or physiological information concerning whether or not a life stage "prefers", "avoids", or is "physiologically adapted" to certain environmental ranges can also be summarized and cited from laboratory and/or field studies. The physiological/behavioral citations should be distinguished in the SLH from the presence of a particular life stage determined from field sampling. The species may occur in areas which are not optimal because of ecological factors such as food availability, or the availability of shelter that helps it avoid predation

Salinity: There are presently two salinity zone classification schemes that are not completely compatible with one another. A number of salinity zone schemes exist in the scientific literature. A good summary is presented in the *Biology of Brackish Water* by Remane and Schlieper (1971).

The **Venice System** was originally adopted at a Symposium on the Classification of Brackish Waters held in 1958. It defines the following salinity ranges: limnetic (0.0-0.5 o/oo), mixohaline 0.5-30 o/oo, euhaline (>30-40 o/oo), and hyperhaline (>40 o/oo). The Venice System further subdivides the mixohaline salinity range into subranges. These correspond to oligohaline (0.5-5 o/oo), mesohaline (>5-18 o/oo), and polyhaline (18-30 o/oo). The terms limnetic, oligohaline, mesohaline, polyhaline, euhaline, and hyperhaline appear in the WATER COLUMN HABITAT Table of the new FLELMR SLH and are defined in the FLELMR Glossary.

The **NOAA System-**The National Oceanic and Atmospheric Administration (NOAA)/ National Ocean Service recognizes the following salinity zones: Tidal Fresh (0.0-0.5 o/oo), Mixing (0.5-25 o/oo), and Seawater (>25 o/oo).
Egg/Parturition Summarize the range of salinities across which eggs or newly-expelled young *(E/P*) have been sampled after spawning has taken place. With mouth brooding species (e.g., Gafftopsail catfish) it is OK to summarize the salinity where adults carrying eggs were found. Similarly if information on this exists in the literature, summarize the salinity where the adult sharks release their young.
Larvae The range of salinities across which larvae (*L*) and/or postlarvae occur.
Young-of-Year The range of salinities across which young-of-year (Y) occur. Young-of-year are defined as the range of lengths of fish or macroinvertebrates (postlarval stages) which are age 0.
Juvenile The range of salinities across which juvenile (*J*) fish occur. Juveniles are defined as a population stock assessment analyses as the range of lengths of fish, which are age 1 and above, in which <50% of the population are sexually mature during the spawning period.

Adult The range of salinities across which adults (*A*) occur. This is defined from population stock assessment analyses as the minimum lengths, age 1 and above, in which >50% of the females in the population are sexually mature during the spawning period. The reason that males are not included is that it is often difficult to determine the stage of maturity from visual examination of the testes.

Temperature: The range of temperatures across which each species life stage occurs.

While there is a huge literature concerning the physiological tolerances, behavioral preferences, and ecological effects of temperature on estuarine and marine organisms, there is no generally accepted temperature classification scheme. Hence, the water temperature gradient has been rather arbitrarily divided into intervals of 10 degrees centigrade (^{o}C).

Egg/Parturition Summarize the temperature range across which eggs or newly released larvae have been sampled from the environment. This is sampling that generally has been done soon after spawning has occurred.

Larvae Summarize the temperature range across which larvae and postlarvae were found with literature citations.

Young-of-Year Summarize the temperature range across which young-of-year were found with literature citations.

Juvenile Summarize the temperature range across which juveniles occur.

Adult This section should describe the temperature range across which adult fish or adult macro-invertebrates have been found.

Dissolved Oxygen: The range of dissolved oxygen (D.O.) values across which species life stages occur.

Egg/Parturition The range of D.O. values where eggs have been sampled, if this information is available.

Larvae The range of dissolved oxygen values across which larvae and/or postlarvae have been found.

Young-of-Year Summarize the D.O. range across which young-of-year were found with literature citations.

Juvenile The range of D.O. values across which juveniles occur

Adult The range of D.O. values across which adults occur.

Turbidity: The range of turbidities (or possibly secchi disk readings) across which species life stages occur.

Egg/Parturition Give the range of turbidity values (preferably determined using a nephalometer) that the E/P life stage has been sampled (e.g., in nephalometer units, secchi units, Jackson Turbidity Units etc.). Otherwise, state no data was found.

Larvae Give the range of turbidity values where larvae of the species of concern have been sampled.

Young-of-Year Summarize the turbidity range across which young-of-year were found with literature citations.

Juvenile Give the range of occurrence.

Adult Give the range of occurrence.

Floating Habitat: Certain areas such as the Sargasso Sea and parts of the Gulf of Mexico have floating vegetation or macroalgae (e.g., sargassum) in which various species of fishes occur. Summarize the species life stages found respectively in wrack, macroalgae, or other floating aquatic vegetation.

pH: If the information is available, summarize the range of pHs across which each life stage of the species occurs.

Light: The range of light conditions or the time of day/night when each life stage of a species is active.

Ammonia: The range a ammonia that can be tolerated. This is an optional heading.

Currents/Tides: Provide information on whether the life stage of a species occurs in moving or static water conditions. Explain how each life stage utilizes currents or tides for movements, migrations and/or feeding.

FOOD HABITS

Trophic Mode: Trophic manner of feeding (e.g., detritivore, herbivore, carnivore, omnivore, planktivore, filter-feeder).
Feeding: Where it feeds in the water column (e.g. bottom, midwater, surface).
Food Items: The types of organisms or materials eaten (e.g., detritus, phytoplankton, zooplankton, epifauna).

REPRODUCTION This SLH section summarizes the various topics tied to the reproductive behavior, timing, location of spawning, and fecundity of the species. Information is sought on reproduction in Florida waters; but information from elsewhere is also acceptable. The categorical REPRODUCTION Table also should be completed.
Gender: State if sexes are separate, dioecious, sequential hermaphrodite; simultaneous hermaphrodite; asexual, etc.
Mode: Summarize whether the species is oviparous, ovoviviparous, or viviparous in its mode of reproduction. Refer to the glossary for definition of terms as needed.
Domain: This section describes where spawning occurs (e.g. riverine, estuarine, marine, unknown).
Fertilization: Describes whether fertilization is external, internal, or unknown. Additional information such as hermaphroditic (two sexes in one individual), protandric (sex reversal), viviparous (giving birth to live young rather than laying eggs), should also be described. Additional categories to cover these possibilities will be added to the REPRODUCTION Table.
Spawning Strategy: Refers to the mode and manner of spawning, reproductive behavior (monogamous, polygamous), method of spawning (broadcast or batch spawner), and the timing of spawning (iteroparous, semelparous). Additional information such as whether it is hermaphroditic (two sexes in one individual), protandric (sex reversal), viviparous (giving birth to live young rather than laying eggs) should also be described.
Reproductive Periodicity: This part of the SLH summarizes the literature pertaining to the months across which spawning occurs. This subsection can also summarize whether reproduction occurs more than once per year. Information on the time of day, associations with solar or lunar cycles can also be described. State the spawning period(s) by geographic localities (e.g., different states and/or different parts of Florida. State whether spawning is unimodal or multimodal (e.g., spring and fall). State the months over which spawning is known to occur.
Parental Care: Refers to whether or not the parent fish guard the eggs, larvae, or fry.
Seasonal Energetics: Summarize literature that describe changes in lipid content, changes in caloric content of the ovaries and/or testes etc during various times preceding, during, and following the spawning period.
Maturation: This section summarizes the age (or length) at which 50% or more of the population becomes sexually mature. The SLH should summarize fecundity relationships (regressions of age or length versus fecundity) from the literature where these exist.
Comment- These data may be taken from gonadosomatic index (GSI) plots or from sigmoid curves fitted to the percent maturation at age data to define the age when 50% or more of the female population are sexually mature. Tabular data should include changes in the GSI by month. Graphs presenting this information would be useful.
Fecundity: The number of eggs or young produced by an individual. Fecundity varies widely among various fish species.

Development: This section should give the morphometric, meristic, and pigmentary characteristics that distinguish the various life stages defined above, and that distinguish the species from other similar species. Drawings or images depicting the various life stages should be included in the SLH document.
Sex Ratio: Discuss whether the sex ratio is 1:1 or not, and whether the sex ratio changes with size or age of the species (e.g., groupers, snook).

GROWTH

This heading encompasses growth data and parameters useful for stock assessment and fisheries management in the south Atlantic. Where possible, the growth data summarized should pertain to south Atlantic fish or macroinvertebrate species. The key information should be summarized into the textual SLH outline from stock assessment documents and other literature.
Length Range (by life stage): This section summarizes the length range taken from the literature or from FMRI=s Fisheries Independent Monitoring (FIM) database that defines the range of lengths of a given life stage. The lengths taken from the literature may be in total length (TL), fork length (FL) or standard length (SL) either in the metric system (mm) or British system (inches). All measurements given should be metric. The measurements of each life stage of a species should be converted to Total Length (TL) in millimeters.
Length Conversions: Regression equations that allow conversion between metric units (SL, FL, and TL) should be summarized in the SLH. Conversion coefficients (slope and intercept of straight-line regressions) should be provided and used to convert FL to TL or SL to TL for entry of mean total length at age.
Weight-Length: This section summarizes weight-length relationships preferably those done in the metric system.

The weight-length relationships for the combined life stages Juvenile and Adult should be summarized in the SLH. It is important to present the range of lengths over which the weight-length regression was conducted. The correlation coefficient *r* or the coefficient of determination *r-squared* should also be presented. Weight-length regressions by sex should be presented where the sexes differ significantly from one another. All weights used to calculate these relationships pertain to wet weight. Sometimes weight-length regressions are calculated from frozen or chemically preserved (e.g., formalin or alcohol) specimens. These coefficients should only be summarized, if the author has determined the weight loss from preservation prior to calculating the regressions.
Wet-Dry Weight: Summarize any conversion factors between wet-weight and dry-weight presented in the literature. Bioenergetic studies often dry fish specimens in an oven to determine caloric content.
Aging Structures/Methods: Describe the bony structures used for age determination (e.g., scales, otoliths, spines, vertebrae) and the methods used to prepare the samples (e.g., diamond saw, resins etc.).
Length at Age: Literature that summarizes the growth in length of a marine fishery species should be cited and key findings discussed. Growth parameters by sex should be summarized in the textual SLH outline where these are significantly different. Otherwise only the growth parameters for the sexes combined are needed. Mean TL at age for the sexes combined should be included.
Longevity: Stock assessment models generally need information concerning the maximum age of adults (to calculate natural mortality M) of a species and the mean duration of each life stage for use in growth equations (von Bertalanffy, Gompterz). Provide the mean duration of the egg (hours), larvae (days), juvenile (years), and adult (years) life stages.
Growth Equations: The Von Bertalanffy growth parameters which should to be summarized include the Brody growth coefficient (K), total length to infinity (L_{oo}) in millimeters, and time at hatching (t_o) (days or fraction of a year).

VALUE & STATUS Value in this section refers primarily to the benefits accruing to man from the exploitation of the species in the south Atlantic. Status in this section pertains to whether the species "stock" is managed or not, and whether it is natural or introduced. Document the information in the textual SLH and then also fill in the categorical VALUE & STATUS Table.

Commercial: Information on commercial fishery harvest of the species of concern in Florida should be summarized using tables and graphs, including landings (in pounds), the total dollar value of the resource statewide and/or by county. Maps depicting landings by county obtainable from the Fisheries Assessment Section at FMRI should be included.

Recreational: Information on recreational fishery harvest of the species of concern should be summarized using tables and graphs, including landings (in pounds), the total dollar value of the resource statewide and/or by county. Maps depicting landings by county obtainable from the Fisheries Assessment Section at FMRI should be included.

Combined Fisheries: Summarize data where all types of fisheries data were combined.

Ecological Role: This refers to the role a species plays in marine/estuarine ecosystems. Summarize studies in the SLH that document the species as being either a top predator, forage fish (prey), scavenger (detritivore) or herbivore, symbiotic with other species, a filter-feeder (e.g., oysters, clams), or keystone species (an essential link in the food chain or component of the fish community).

Species Stress: This subsection should rank whether the species is under stress from fishing, pollution, or natural perturbations. Discuss whether the species is considered as being sensitive or insensitive to pollution, red tides, municipal or industrial waste etc. The literature documenting the response of the species to anthropogenic factors should be summarized and cited.

Status: of the species overall.

Stock Status: This subsection summarizes information pertaining to whether the landings are going up or down in relation to previous years. Pertinent information from stock assessments should be summarized. Information concerning whether populations are increasing, stable, decreasing, or unknown should be discussed. Interannual trends should be discussed from a graph, where this information is available. Indicate the general trends.

Management Status: Using state or federal documentation list whether the species is of concern for fisheries management or for the protection of threatened and/or endangered species. Information from other states or other countries is not required; except perhaps where this has a bearing on the management of the species in Florida.

Social Value: Discuss whether the species is important to the recreational and/or commercial fishery, or important as a biological indicator of pollution or ecosystem health (like the canary in a coal mine).

STOCK ENHANCEMENT

Induced Breeding: Summarize research pertaining to induced breeding including environmental manipulations (temperature, photoperiod) and hormonal manipulations causing sexual maturation etc.

Rearing: Environmental requirements for maintenance of eggs and larvae (e.g. temperature, photoperiod), rearing tank design, filtration requirements etc.

Feeding: Studies of the culture of food organisms or artificial diets that satisfy the nutritional requirements of the young under hatchery conditions should be described.

Stocking: Studies that have assessed the success or failure of stocking young fish into estuaries is especially important. Survival rates over time should be summarized, where these are available.

Disease Control: Parasites or pathogens that cause mortalities under hatchery condition, as well as chemical and other prophylactic (e.g. freshwater dips) treatments should be described.

POPULATION

This section summarizes key population parameters from stock assessment documents of the species conducted by state or federal agencies. Key parameters obtained from the literature should be summarized in the SLH profile.

Stock Assessments: Describe stock assessments in general.

By Assessment (named study): Describe the region and time period of the named stock assessment.

Total Mortality: Studies that have estimated total mortality (Z) should be summarized, including a brief description of the methods used to estimate the parameter. List the estimated Z values.

Annual Mortality: Studies that have estimated annual mortality (A) should be summarized including a brief description of the methods. List estimated A values for the population/stock.

Natural Mortality: Studies that have estimated natural mortality (M) should be summarized. List the M values used and state whether they were assumed or calculated from other population parameters (e.g., maximum age). Provide brief descriptions of the methods used to estimate M along with citations [e.g., M was calculated using the method described by Pauly (1978)].

Fishing Mortality: Studies that have estimated fishing mortality (F) across exploited age groups should be summarized, including a brief description of the methods used to estimate the parameter [e.g., Fs across ages 2-6 were estimated from virtual population analyses (VPA) and/or Fs were estimated from catch curves across ages 2-6].

Annual Cohort Success: List years with exceptionally large year classes or recruitment failure etc. Discuss recruitment patterns where these are known.

Recruitment Indices:

Partial Recruitment:

Population Biomass Criteria:

Biological Benchmarks: Discuss indices used to assess population status such as Spawning Potential Ratio (SPR), Fmsy, Fmax, and F0.1 (indices used as a benchmark in stock assessments).

Abundance By Month: Summarizes literature and/or stock assessment documents that present trends in catch-per-unit-effort (CPUEs) by month. The text in the SLH should summarize categorized abundances by month and salinity zones for different life stages.

Abundance By Year: Summarizes literature and/or stock assessment documents that present trends in CPUEs between years, for populations of each species in for which information exists in Florida. If mean CPUEs are available for various gear types, include them.

Abundance by Area: Summarize the stock assessment findings for the species by state region or area (e.g., present estimated population numbers and/or biomass derived from Virtual Population Analysis (VPA), production models etc.

Populations Abundance: Literature which describes trends in population abundance between years should be summarized from stock assessments, Fisheries Independent Monitoring reports and/or the primary scientific literature. The methods or models used to derive the estimates should be mentioned along with the citation.

Management Regulations: Information pertaining to bag limits, size (slot) limits, closed areas or closed seasons when fishing is not allowed for either the recreational or commercial fisheries should be summarized. Other information may pertain to the Allowable Biological Catch (ABC), or spawning potential ratio (SPR) for the species established by management councils responsible for Florida Territorial Sea

(FTTS) or the Exclusive Economic Zone (EEZ). Some of the councils making recommendations and setting regulations in Florida include the Florida Fish and Wildlife Conservation Commission (FWC), the former Florida Marine Fisheries Commission (FMFC), the Gulf of Mexico Fisheries Management Council (GMFMC), the South East Atlantic Fisheries Management Council (SEAFMC), the Gulf States Marine Fish Commission (GSMFC) and the Atlantic States Marine Fish Commission (ASMFC). Laws pertaining to freshwater species derived from the former Florida Game and Fish Commission (GFC) may also be summarized. State whether or not there are management regulations in place.

This subsection should also discuss how the fishery has changed with regulation and whether or not there is a high percentage of illegal harvest of the species being managed. Regulations should be presented both at the Federal and at the state level for FL, GA, NC, and SC.

ECOLOGICAL INTERACTIONS

This section summarizes information concerning the relationships between a species life stage and other life stages of the same species, and with other species. Many of the problems of concern to managers relate to anthropogenic or climatic stresses on the ecosystem. The species must be viewed in relation to its role within the ecosystem. This information is becoming of greater concern as we shift to ecosystem management.

Competition: Describes whether intraspecific or interspecific competition exists or is suspected. Name potential competing species.

Predation: Describes other species that prey upon the species in the SLH, or life stages (cannibalism) that prey upon the same species.

Parasites/Diseases: Describes the types of parasites that have been found or diseases that have been diagnosed (bacterial, viral, parasitic) on the host species. Of special interest are situations that lead to mass mortalities such as fish kills etc. An example might be the virus that caused widespread mortalities of hardhead catfish off of west Florida during 1995.

Perturbations: Short-term events such as freezes, or red tide outbreaks that have impacted fisheries populations by causing fish kills or other negative impacts should be described.

Climate: Abnormal climatic events or deviations from normal conditions that negatively impact marine communities should be described. Examples are hurricanes, tornadoes, El Ninos, flooding, droughts, and greenhouse warming (e.g. effects on coral reefs) should be described.

HUMAN IMPACTS

Oil Spills: Literature that describes the toxicity of oil types or oil fractions, or the actual mortalities from a Florida oil spill should be summarized.

Contaminants: Describe organic or heavy metal contaminants that are taken up by the species or life stage, that are a problem from the point of view of human consumption, or interfere with the species ability to complete its life history (e.g. reproduction).

Eutrophication: Describe impacts of nutrient inputs from municipal, industrial, and agricultural sources, or from natural sources, that lead to excessive growths of aquatic vegetation, plankton blooms, nuisance algae problems, tainting of fish etc. A variety of ecological impacts suspected or proven should be described. Concerns about effects or potential impacts on fisheries or aquatic communities should be briefly discussed.

Pollutant Toxicity: Describes man-made pollutants that have been shown to have adverse effects on the species. These may be various non-degradable or toxic chemicals released into the estuary from municipal, industrial, or agricultural point or non-point sources.

Entrainment/Impingement: Describes instances where kills of fish or invertebrates have occurred from the entrainement or impingement of organisms on water intakes of power plants or other industrial or municipal water users. Of particular interest are solutions that have been found to minimize or eliminate such mortalities. An example might be the design of a water intake system that eliminates the impingement problem. Specific situations where such problems have occurred in Florida estuaries can be mentioned.

Other: Events or conditions that influence marine fisheries or marine communities not mentioned above.

REFERENCE NUMBERS

Lists the reference numbers associated with the literature discussed above.

CITATIONS

List the bibliographic citations that have been referred to in the SLH, if these have not been added to the database elsewhere (Procite).

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