ESI and other NOAA data sources to assist DOT's delineation of Coastal Ecological Unusually Sensitive Areas

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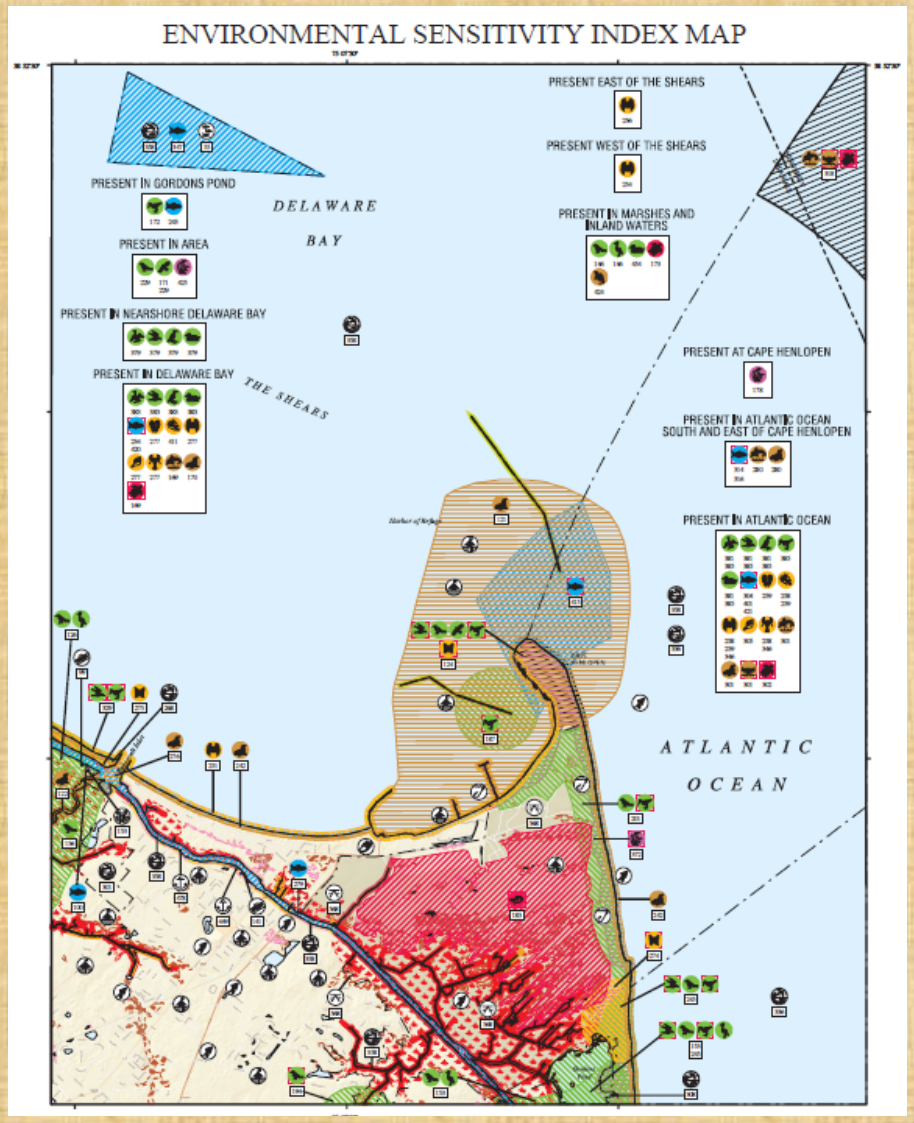
David Moe Nelson and Dan Dorfman
NOAA/NOS National Centers for Coastal Ocean Science
Jill Petersen
NOAA /NOS Office of Response and Restoration

Potentially Useful Spatial Data Sources from NOAA

- Environmental Sensitivity Index (ESI) products
  - State atlases (ESI, biology, human-use features)
  - National shoreline (ESIL lines)
  - Tidal flats and coastal wetlands (ESIP polygons)
- Environmental Response Management App (ERMA®)
- NGS' Continually Updated Shoreline Product (CUSP)
- Digital Coast, Marine Cadastre, other data portals
- Coastal and Marine Ecological Classification Standard (CMECS) and other benthic habitat maps
- ShoreZone (Alaska and West Coast)
- Coastal Change Analysis Program (C-CAP)
- Storm Surge Inundation Areas
- Essential Fish Habitat and HAPCs, Critical Habitat
- Coastal Assessment Framework and National Estuarine Inventory (1990s)

ESIs are a standard mapping approach for oil spill and other hazard planning and response.



Shoreline types ranked for sensitivity to spilled oil and other hazards.

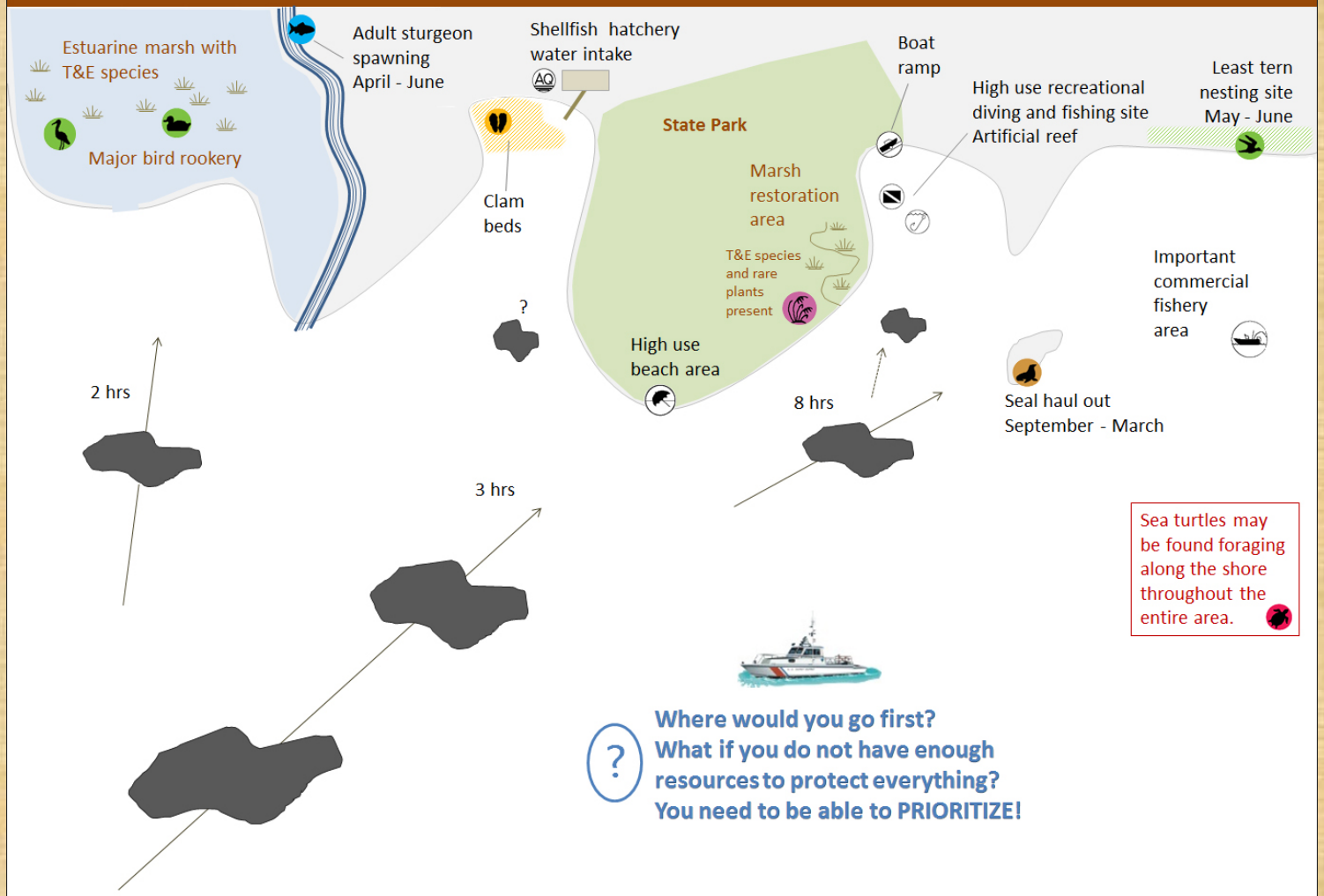
Biological resources at risk.

Human-use resources at risk.

Delivered in multiple formats: paper, pdf, GIS geodatabase, ERMA and other apps

What Would You Protect?

ESI Maps Provide Information to Aid in Prioritizing Protective Measures



Shoreline type is important in determining protection and response strategies

RIPRAP **ESI = 6B**

DESCRIPTION

- Riprap structures are composed of cobble- to boulder-sized rock fragments
- Riprap structures are placed for shoreline protection and inlet stabilization
- They are steep and often fronted by beaches or tidal flats
- Attached biota may be common at lower intertidal levels, whereas biota along the upper intertidal zones is sparse
- Found in harbors and along developed areas along the open coast

PREDICTED OIL BEHAVIOR

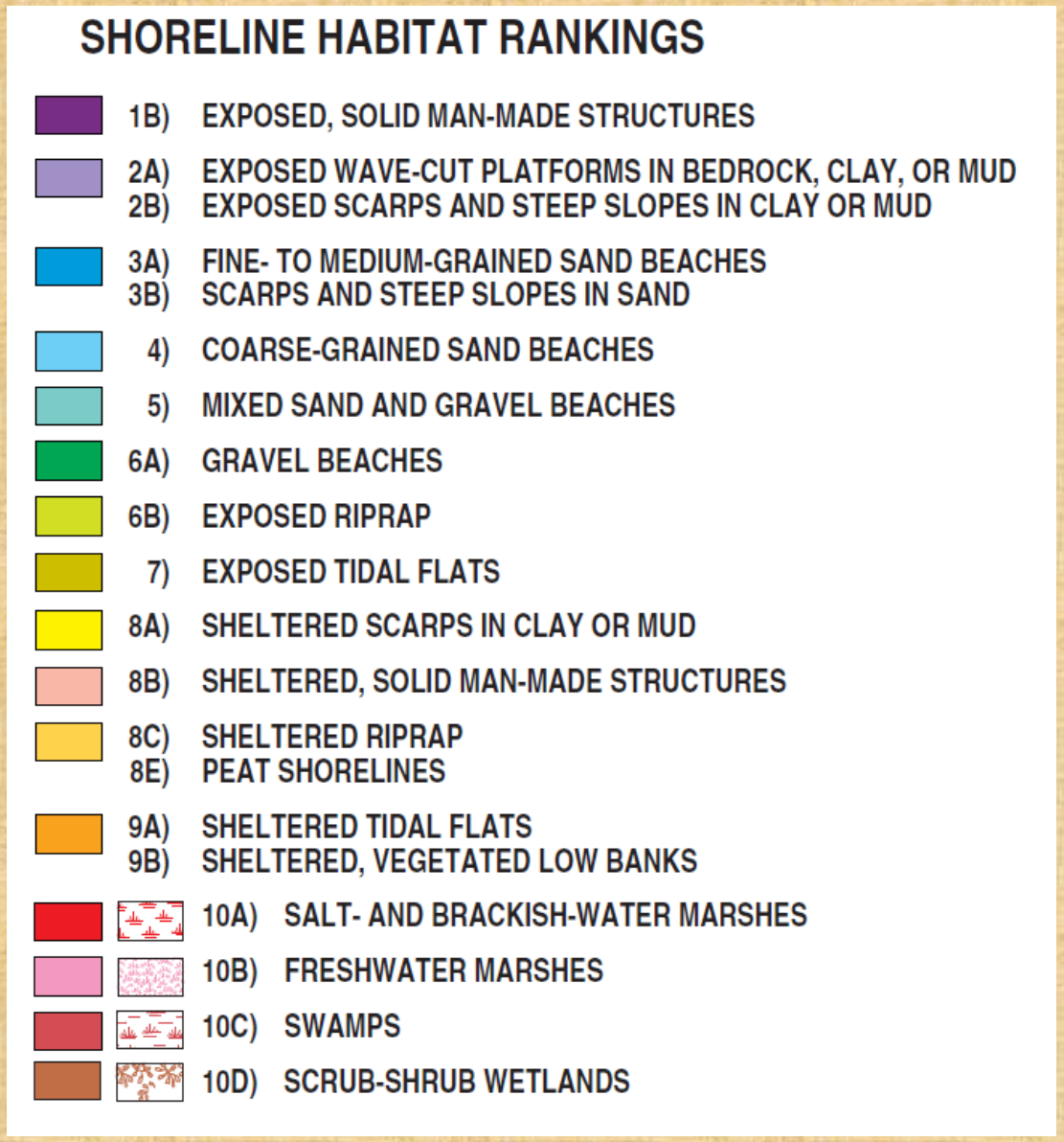
- Deep penetration of oil between the clast is likely
- Oil adheres readily to the rough rock surfaces
- If oil is left uncleaned, it may cause chronic leaching until the oil hardens
- Resident fauna and flora may be killed by the oil

RESPONSE CONSIDERATIONS

- When the oil is fresh and liquid, high-pressure spraying and/or water flooding may be effective, making sure to recover all released oil

- Heavy and weathered oils are more difficult to remove, requiring scraping and/or hot-water spraying
- It may be necessary to remove heavily oiled riprap and replace it in high-use areas

ESI shoreline depicted with pre-defined classifications:



ESI Shoreline rankings are based on sensitivity to spilled oil and other hazards.

- **Shoreline type**
- **Wave exposure**
- **Biological activity**
- **Ease of cleanup**

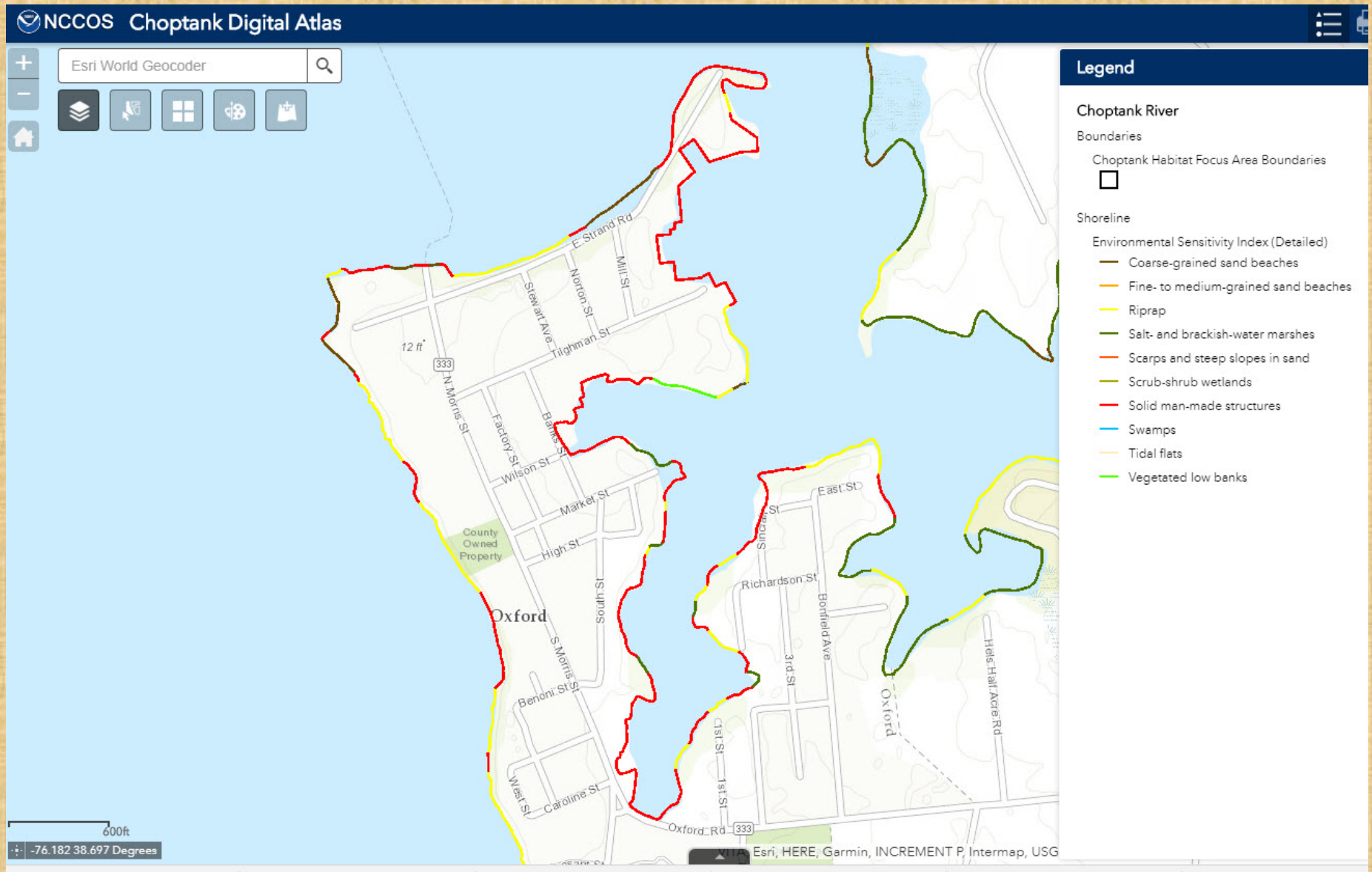
ESI Polygons include tidal flats and coastal wetlands.

Other feature classes include Biology and Human Use Resources.

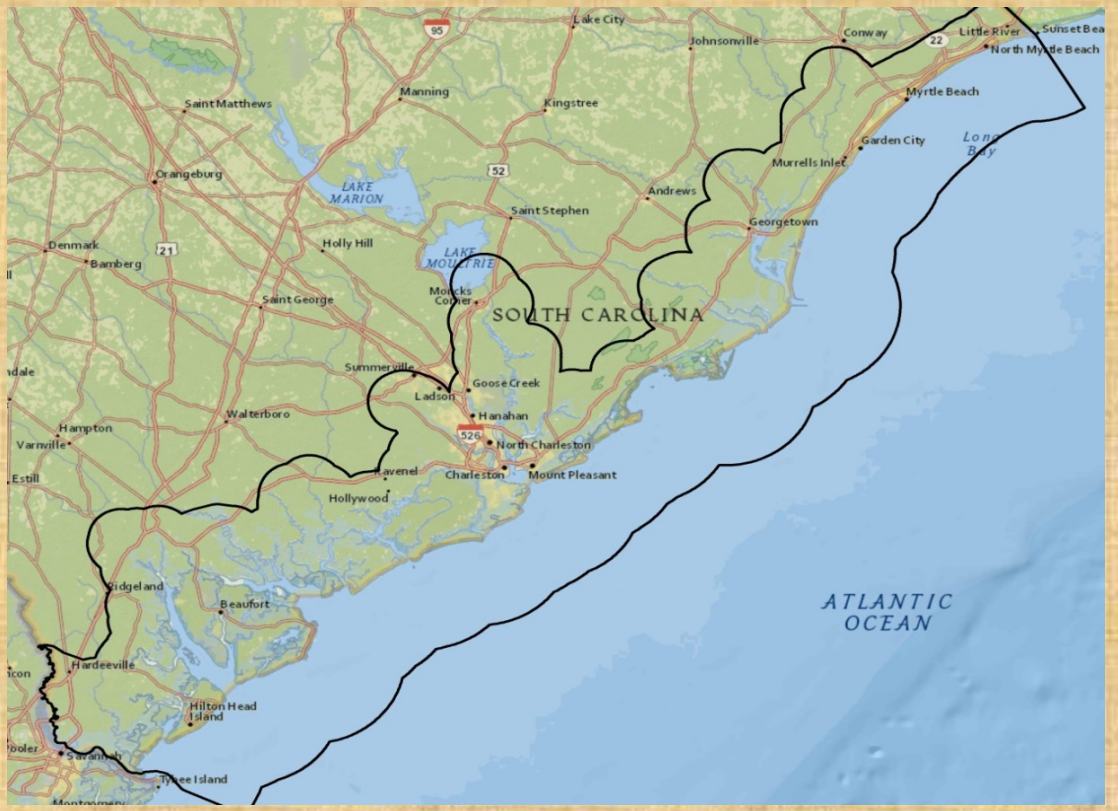
ESI Shoreline

- The “backbone” of the ESI data – all data are matched to finalized shoreline.
- Mapped at mean-high water; classified to mean lower-low
- Use best-available existing shoreline and/or extract shoreline from satellite imagery, lidar, ortho-rectified aerial imagery… (min. scale 1:24K, pref. 1:15K); updated as needed during classification phase.
- Classify ESI shoreline via (oblique) imagery, over-flights, ground surveys.
- Integrate wetland and tidal flat boundaries.
- In addition to using the base shoreline for delineating water/land boundary, classified shoreline can be used to map habitat-specific biological occurrences.
- The shoreline layers are the only part of ESI content that is “original”.

ESI shoreline as a GIS feature class:



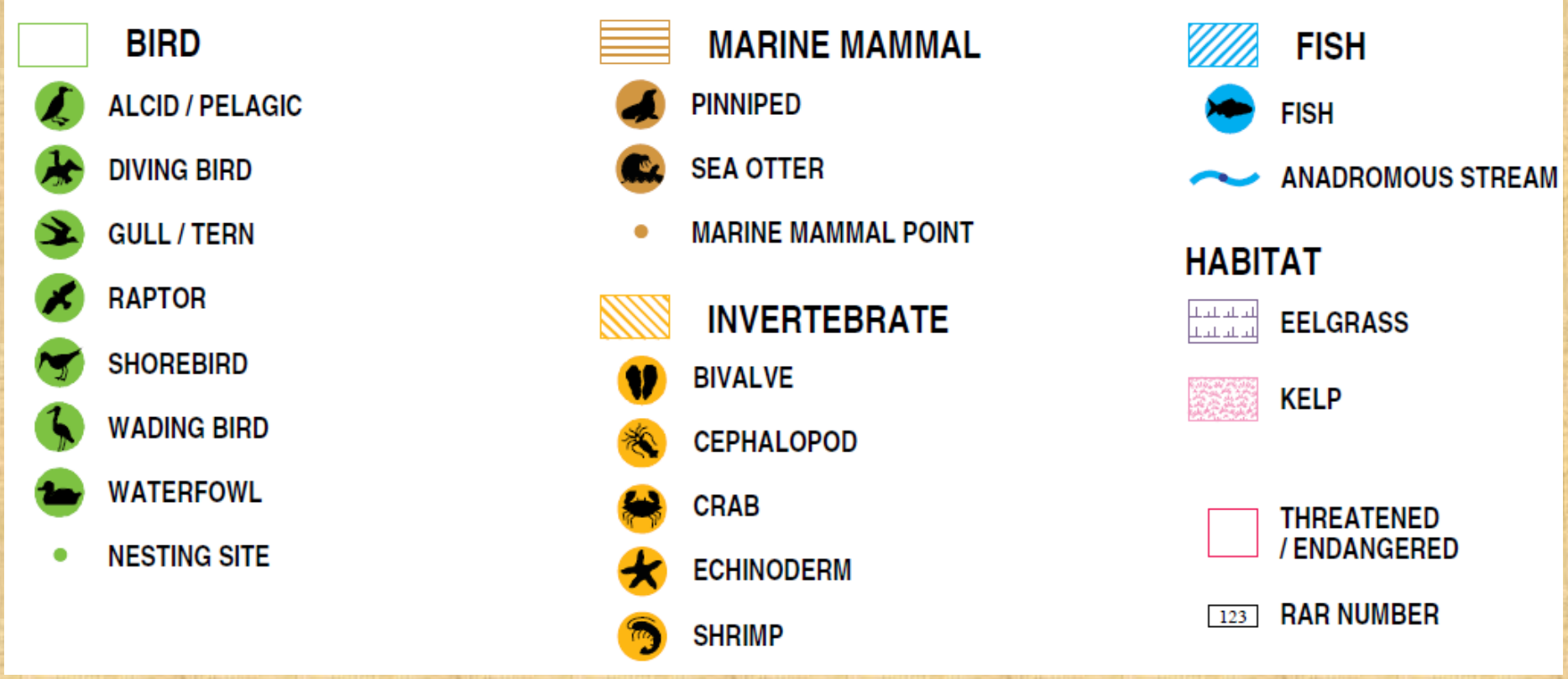
Mapping Extent for biology and human-use data



5 nautical miles inland to the territorial water line, approximately 12 nautical miles off shore

Biology Elements: Benthic, Birds, Fish, Habitats, Herp (reptiles & amphibians), Invertebrates, Marine Mammals, Reptiles, Terrestrial Mammals

Biology Subelement: species are grouped based on common characteristics or life habits



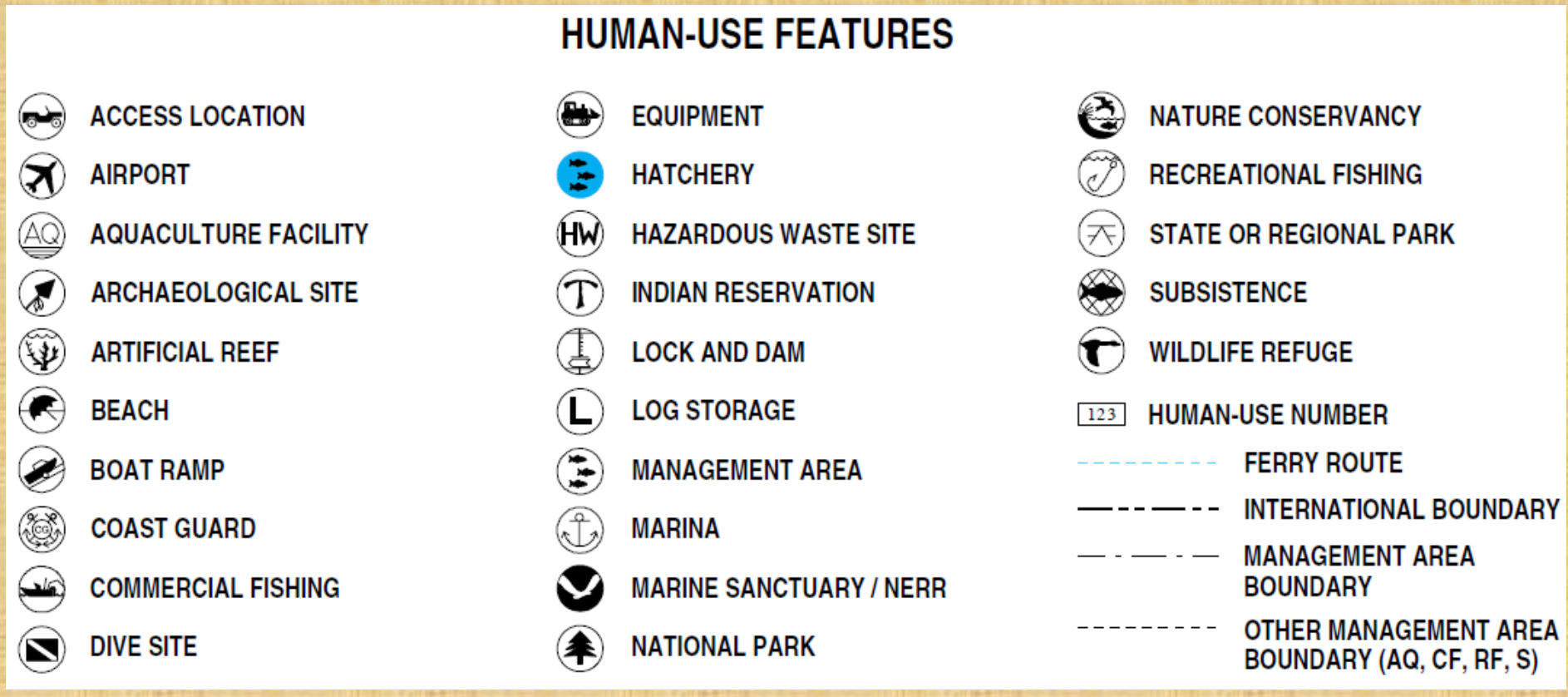
ESI Biology Mapping Qualifiers

BIRDS	FISH & INVERTEBRATES	MARINE MAMMALS
Concentration Area	Concentration Area	Concentration Area
Migration	Nursery Area	Calving
Nesting	Spawning Area	Denning
Rafting	Harvest Area	Haul Out
Vulnerable Occurrence	Vulnerable Occurrence	Migration
Wintering	Migration	Pupping
General Distribution	General Distribution	Thermal Refuge
		Vulnerable Occurrence
		General Distribution

- Why is this mapped? – Keep focus on the species and life stages vulnerable to oiling
- Additional information for users that aids in prioritization
- Used in production of the hard copy and PDF maps

Human Use Features: Focus on resources that may

1. Be adversely impacted by oiling (beaches, archaeological sites, fishing)
2. Be impacted by clean-up activities (beaches, archaeological sites, fishing)
3. Serve as a useful resource during clean-up (staged equipment, access points)
4. Require special permits or consideration when accessing (managed areas)
5. Represent a risk on their own (invasive species, EPA facilities)



Other Data Sources:

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- Digital Coast and other data portals
- Marine Cadastre
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- ShoreZone (Alaska and West Coast)
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- NWS Storm Surge Inundation Areas
- NMFS Essential Fish Habitat, HAPCs, Critical Habitat
- Coastal Assessment Framework, National Estuarine Inventory

Discussion Questions:

How to define a marine coastal water?
- Water on both sides of the coastline?
- How to define the coastline?
- Brackish waters, bays, inlets, coastal estuaries?
- What national GIS data are available?

How to define a coastal beach?
- How to define the coastline?
- Why portions are or are not considered beaches?
- What national GIS data are available?

How to define the Great Lakes?
- Connecting waters, marshes, estuaries, etc.
- What GIS data are available?

For More Information:

ESI Home Page
https://response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html

NCCOS Home Page
https://coastalscience.noaa.gov/

Contact:
David.Moe.Nelson@noaa.gov 240-533-0363
Jill.Petersen@noaa.gov 206-526-6944

Thanks!

Mahalo Nui Loa

Tusen Takk