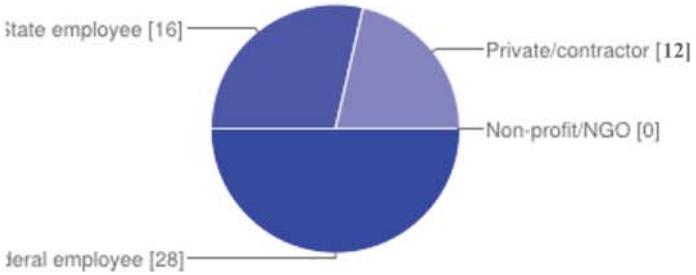
ESI User Survey

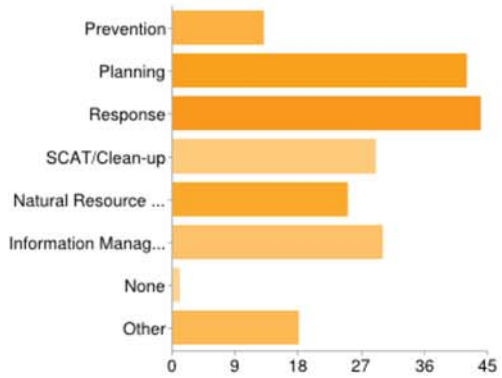
58 users responded - Who were they??

Affiliation:



Federal employee	**28**	49%
State employee	**16**	28%
Private/contractor	**12**	21%
Non-profit/NGO	**0**	0%

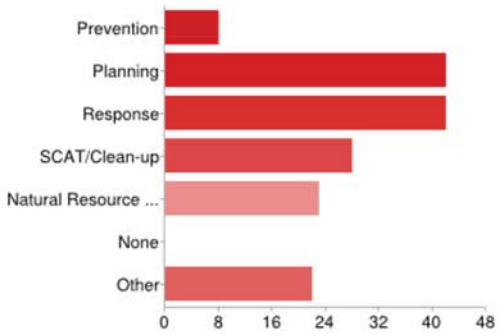
Role in spill response:



Prevention	**13**	23%
Planning	**42**	75%
Response	**44**	79%
SCAT/Clean-up	**29**	52%
Natural Resource Damage Assessment (NRDA)	**25**	45%
Information Management/Mapping	**30**	54%
None	**1**	2%
Other	**18**	32%

People may select more than one checkbox, so percentages may add up to more than 100%.

Activities where ESI maps or data are used:



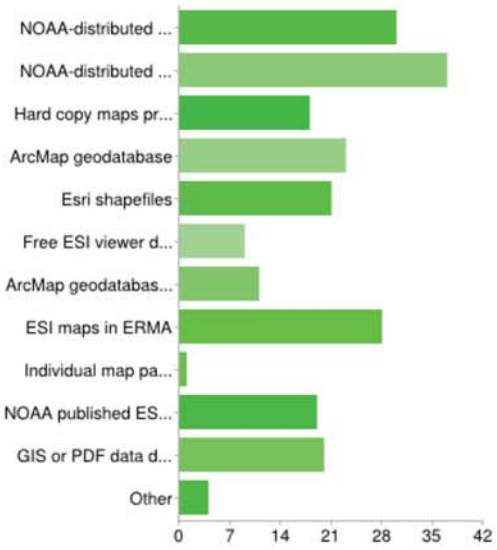
Prevention	**8**	14%
Planning	**42**	75%
Response	**42**	75%
SCAT/Clean-up	**28**	50%
Natural Resource Damage Assessment (NRDA)	**23**	41%
None	**0**	0%
Other	**22**	39%

People may select more than one checkbox, so percentages may add up to more than 100%.

ESI User Survey

Who responded?

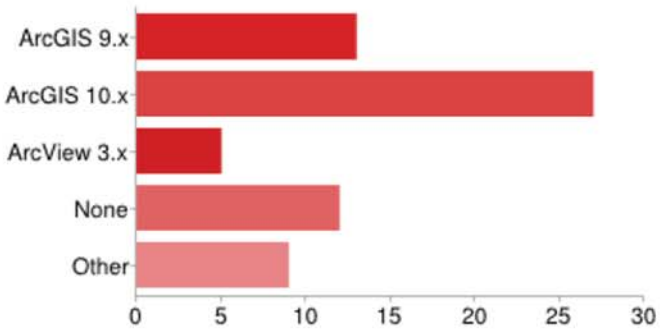
ESI products used:



NOAA-distributed hard copy atlas	**30**	56%
NOAA-distributed PDF files	**37**	69%
Hard copy maps printed from the PDF files	**18**	33%
ArcMap geodatabase	**23**	43%
Esri shapefiles	**21**	39%
Free ESI viewer distributed by NOAA	**9**	17%
ArcMap geodatabase tools	**11**	20%
ESI maps in ERMA	**28**	52%
Individual map pages ordered from NOAA OR&R	**1**	2%
NOAA published ESI CD/DVDs	**19**	35%
GIS or PDF data downloaded from NOAA/OR&R website	**20**	37%
Other	**4**	7%

People may select more than one checkbox, so percentages may add up to more than 100%.

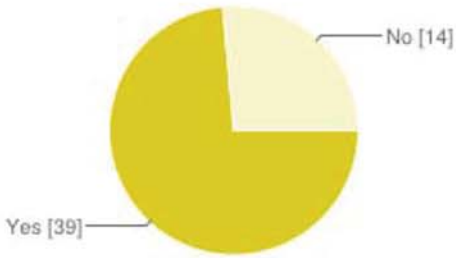
GIS software used:



ArcGIS 9.x	**13**	28%
ArcGIS 10.x	**27**	59%
ArcView 3.x	**5**	11%
None	**12**	26%
Other	**9**	20%

People may select more than one checkbox, so percentages may add up to more than 100%.

Familiar with web mapping services:

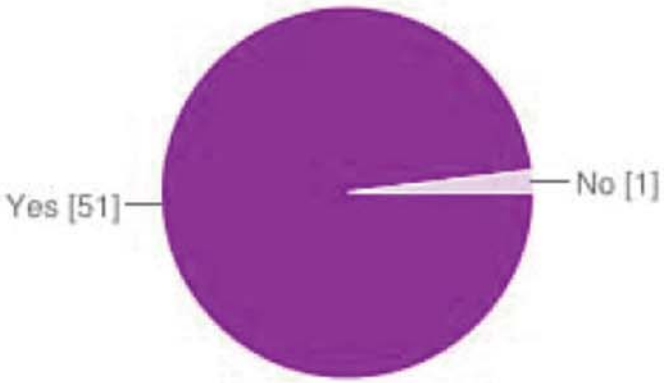


Yes	**39**	68%
No	**14**	25%

ESI User Survey

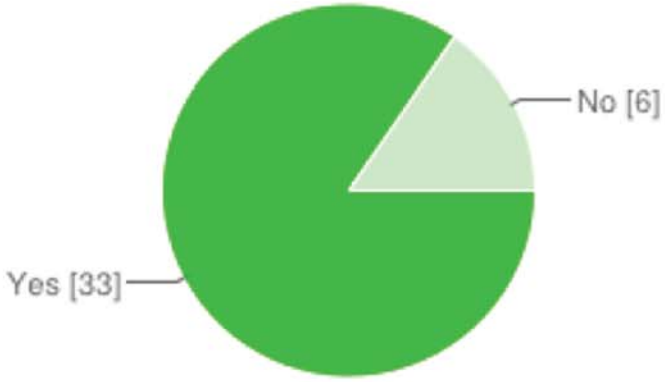
Who responded?

Familiar with ERMA:



Yes	**51**	89%
No	**1**	2%

Use ESIs in regional/area response plans:

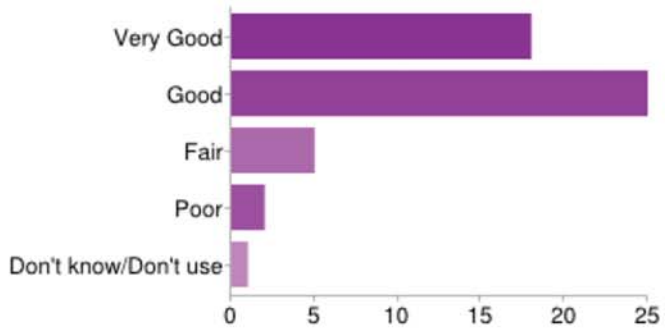


Yes	**33**	58%
No	**6**	11%

ESI User Survey

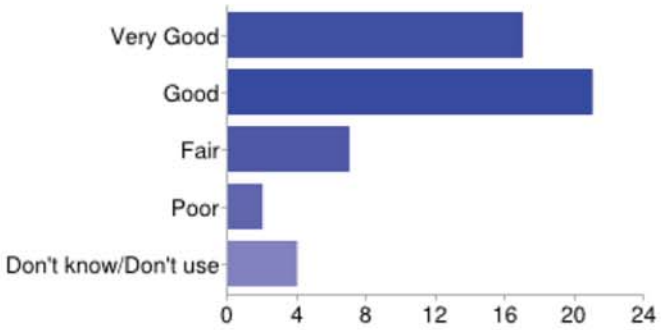
ESI data - how users ranked...

Collection & integration of biology and human-use resources:



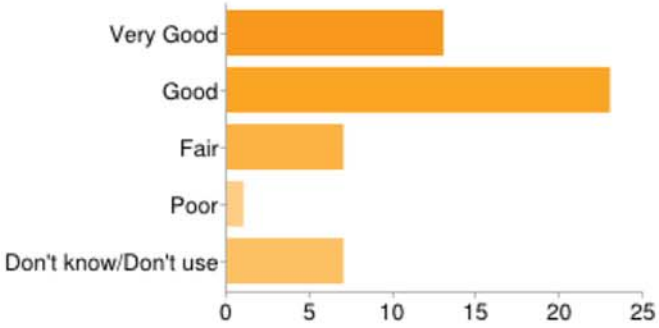
Very Good	18	32%
Good	25	44%
Fair	5	9%
Poor	2	4%
Don't know/Don't use	1	2%

Map presentation of biology and human-use data:



Very Good	17	30%
Good	21	37%
Fair	7	12%
Poor	2	4%
Don't know/Don't use	4	7%

Digital data content for biological resources:

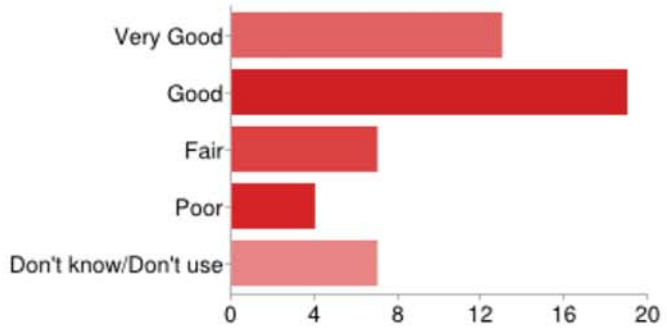


Good	23	40%
Fair	7	12%
Poor	1	2%
Don't know/Don't use	7	12%

ESI User Survey

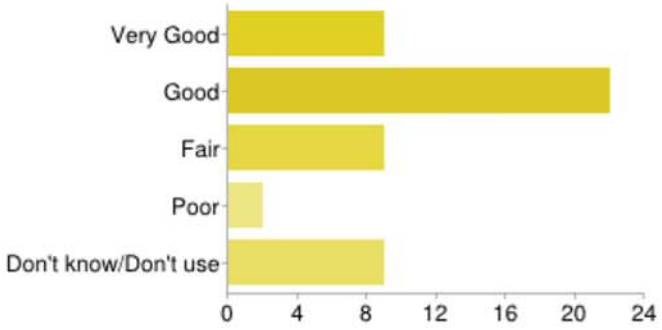
ESI data - how users ranked...

Digital data organization for the biological resources:



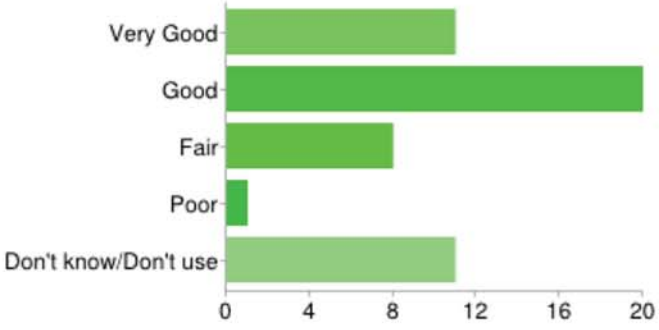
Very Good	13	23%
Good	19	33%
Fair	7	12%
Poor	4	7%
Don't know/Don't use	7	12%

Digital data content for human-use resources:



Very Good	9	16%
Good	22	39%
Fair	9	16%
Poor	2	4%
Don't know/Don't use	9	16%

Digital data organization for the human-use resources:

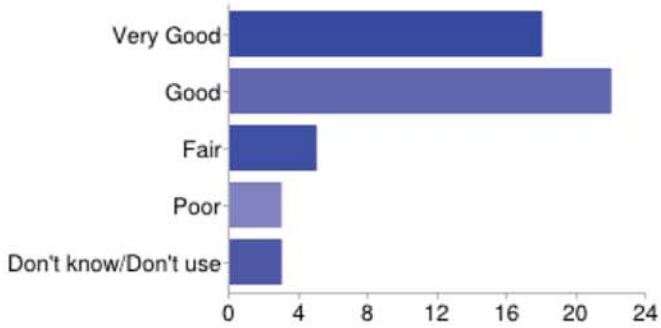


Very Good	11	19%
Good	20	35%
Fair	8	14%
Poor	1	2%
Don't know/Don't use	11	19%

ESI User Survey

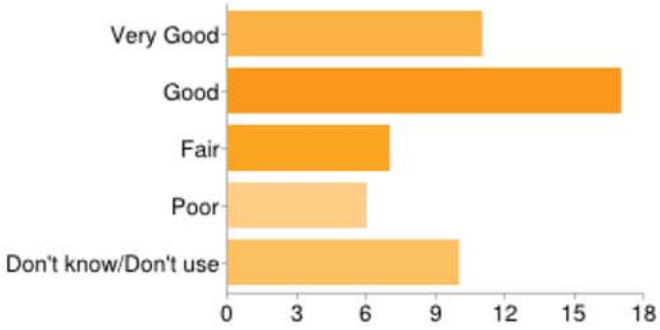
ESI data - how users ranked...

ESI shoreline classification scheme:



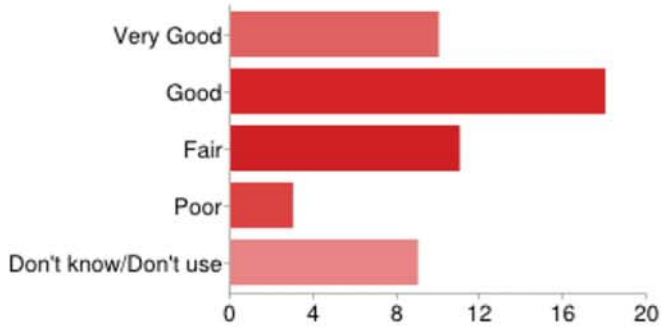
Very Good	18	32%
Good	22	39%
Fair	5	9%
Poor	3	5%
Don't know/Don't use	3	5%

Integration of ESI shoreline types with assessment and clean-up strategies:



Very Good	11	19%
Good	17	30%
Fair	7	12%
Poor	6	11%
Don't know/Don't use	10	18%

Geographic reference information from USGS quads and supplemental annotation:

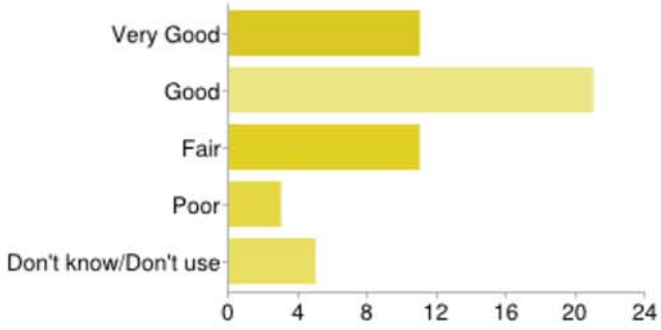


Very Good	10	18%
Good	18	32%
Fair	11	19%
Poor	3	5%
Don't know/Don't use	9	16%

ESI User Survey

ESI data - how users ranked...

Digital data distribution formats and methods:



Very Good	**11**	19%
Good	**21**	37%
Fair	**11**	19%
Poor	**3**	5%
Don't know/Don't use	**5**	9%

ESI User Survey

comments on data content and satisfaction...

Need to expand ESI from just oil to all hazard approach like we did with the North Carolina ESI for the Wilmington area.

For the bio, the digital data format is not intuitive and makes it cumbersome to query the data - you have to get through many different layers to examine all the resources in a particular location, and some resources are in separate spatial data layers (nests, birds). I think the bio data could be arranged so that it is easier to understand by the user. Breeding stages need to be labeled in the digital data and it would be helpful to have years attached to the biological data so you know how current it is. Also, I have found errors in the digital data distributed on the website (some of the databases do not appear to have spatial data files (SC) or the bio data is incorrect (TX)).

Hard copy maps - It's hard to see the shoreline on the hard copy maps. I dislike having to flip from the front to the back of the map to see what is in a particular location. Overall they work well when you need data at the scale that they are mapped, but when you try to scale up to include larger sections of shoreline it becomes time consuming to examine each of the RAR numbers individually.

The PDF maps are the other important ESI product. So having the ESI Index be a WMS linked to the PDF is golden. One of the more popular ESI features in ERMA. People love those maps!

Human Use (Soc-Econ, particularly Managed Areas) need to be more thorough in terms of contacts actually used in spill response and planning. ESI Shoreline needs to better match aerial photography and other imagery distributed via map services. The USGS Quad, while useful, particularly for place names, may not these days of Bing maps/Google maps, etc, be the best geographic reference/base map. A blend of aerial photography/nautical charts with transparency can in many cases offer a much better option with the added benefit of seeing human-use features (development/roads/canals/ditches, etc) more clearly.

I still think that ESI needs to be served out as a map service or a compilation of service-based architectures/tools.

ESI User Survey

comments on data content and satisfaction...

1) Digital data table content doesn't allows seem to be complete or most recent information; don't know how much value local people put in the contacts/addresses, etc. when they see it out of date.

2) Shoreline classification is a great, quick, big picture of vulnerability. Very useful to experts and the lay person.

3) PDF maps also great quick, big picture to the experts and lay person.

4) USGS Quads - I don't encounter many people at drills or responses who use USGS quads for their base maps. They always want NOAA charts, or more recently, aerial/satellite pictures thanks to Google Earth. Try to tell them to keep the maps simple with charts. I understand the concept of referencing the PDFs/Indices to quads, so that might be fine for cartographic design, but beyond that the basic responder doesn't know about them. They want to see soundings and isobaths and vessel traffic areas. Biologists like to see depth and how it relates to resource habitats (ex. fisheries, marine mammals). When I make a base map with charts, I use a transparency so the main data is highlighted, but with a nice transparent chart background for additional reference.

5) Digital Data Distribution - People are definitely expecting WMSs and easy access to data so they always have the most current version. But also having a geodatabase so they can do analysis on their own is good too. It would be most useful to offer a WMS that utilized the relational tables to give the user what they need to know in one click. The ERMA ESI Tool is nice for a report, but I always encounter users (myself included) who just want to click on a poly and get the info there, not in a report. Plus the user should be able to pull the ESI WMS data into their own program (ArcGIS or web map) and get the relational table info there as well.

Would be an advantage to select or toggle selected time periods (months) to condense pertinent time-sensitive data for a particular spill incident, and then subdivide it into categories of interest.

ESI User Survey

comments on data content and satisfaction...

PDF maps are outdated. Numerous sources exist to consume digital data and produce paper maps for free.

Need it fed to Google Earth & Google Maps. I never use ESRI anymore and never could use ERMA. Post the ESI's as web feeds to .kmz.

Shoreline classification for the Lakes and rivers can be more habitat oriented as opposed to geologically oriented

Data refresh time is too long and makes some users question the usability of the data.

The data is level is good, however it is often a decade old and not inclusive of recent biological or shoreline information. The linking of table for data is not intuitive and without the tools it's hard to pull all information out electronically to have all information at your finger tips.

The problem with the ESI maps is that they include "everything" without really characterizing specific species sensitivity, habitat utilization and a finer scale of detail of distribution. For response purposes I need to know what habitat types are at the most risk, not that all habitat is at risk. If a decision needs to be made on the use of dispersants I need better detail on where a dispersed plume may or may not make landfall. The ESI maps do show "what" is there generically but not in the detail to give me a more accurate real time seasonal distribution and use. ERMA is where the effort needs to be invested.

I seldom use the digital ESI data except for in ERMA and even then I've not fully explored it. Even so, in my ERMA dabbling, I've become a BIG fan of the ESI Query Tool concept and want to work more with it!

Recommend that maps show cultural/historical resources where applicable.

ESI User Survey

comments on data content and satisfaction...

Oblique, low altitude aerial images of shoreline are extremely valuable if available. In order to save money, they might be gotten in retrospect by using AUV's and added to the ESI digital data output, i.e. as part of the DVD.

When the shoreline type is hidden or overlapped with sensitive hatched areas, you really don't know what the shoreline type is for sure. This may be less of an issue as layers, but as a composite map it is a problem.

The hard copy/PDF maps get very overwhelming with so much information. The best option seems to have a program to highlight specific information that is relevant to a spill. It is difficult to see the shoreline types when the biological information is added into the same map.

The database format was designed many years ago when it was more state of the art. Today the database structure seems to limit the usefulness of the information that the database contains.

Multiple ESI shoreline types are difficult to symbolize and difficult to read on the map atlas.

I am looking forward to familiarizing myself with ERMA. I think that is going to be the most useful format for me to reference the ESI data.

Biological information is overwhelming and cluttered with relatively unimportant information. In most cases, there are only a few T&E species that would be of greatest concern to spill responders--other information on general use of sites by shorebirds, etc., can be gathered real-time in the field.

Recommend that maps show cultural/historical resources where applicable.

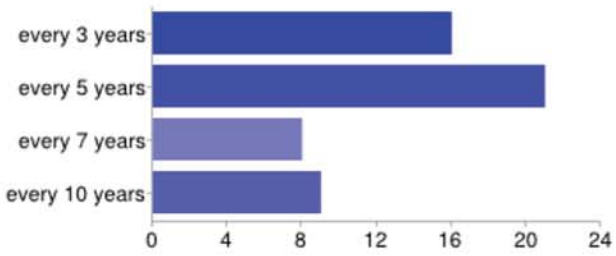
Need to expand ESI from just oil to all hazard approach like we did with the North Carolina ESI for the Wilmington area.

ESI is an excellent system, however, it is still tied to outdated items such as USGS quad index, paper maps and RAR model.

ESI User Survey

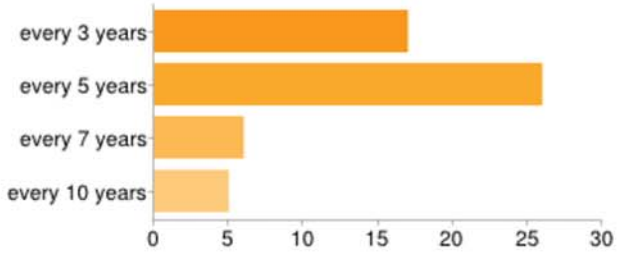
Optimal ESI update schedule for...

Shoreline data:



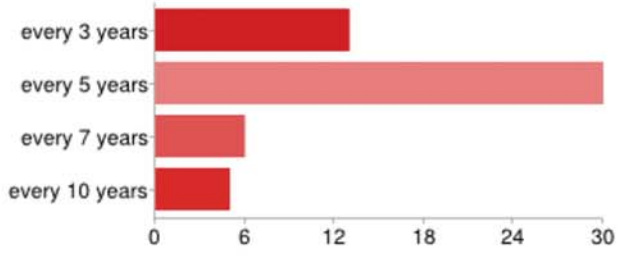
every 3 years	**16**	28%
every 5 years	**21**	37%
every 7 years	**8**	14%
every 10 years	**9**	16%

Biological data:



every 3 years	**17**	30%
every 5 years	**26**	46%
every 7 years	**6**	11%
every 10 years	**5**	9%

Socio-economic data:

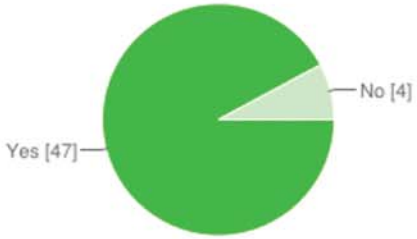


every 3 years	**13**	23%
every 5 years	**30**	53%
every 7 years	**6**	11%
every 10 years	**5**	9%

ESI User Survey

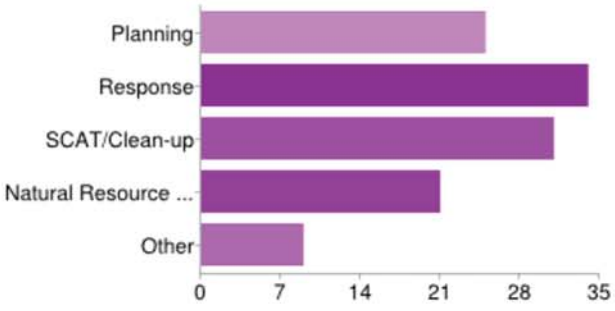
With regard to the shoreline ...

Explicitly characterizing shoreline slope and exposure would be useful:



Yes	**47**	82%
No	**4**	7%

Shoreline slope and exposure would be useful for:



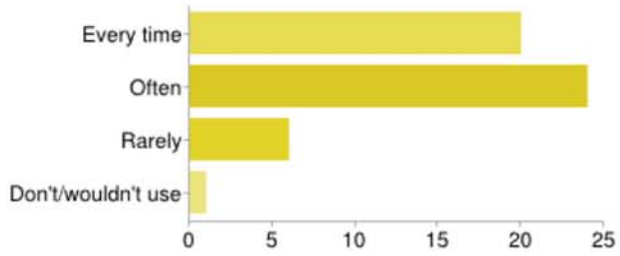
Planning	**25**	52%
Response	**34**	71%
SCAT/Clean-up	**31**	65%
Natural Resource Damage Assessment (NRDA)	**21**	44%
Other	**9**	19%

People may select more than one checkbox, so percentages may add up to more than 100%.

ESI User Survey

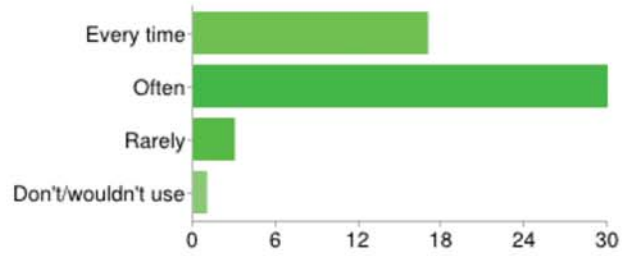
Biology data - frequency of attribute usage for...

Monthly seasonality:



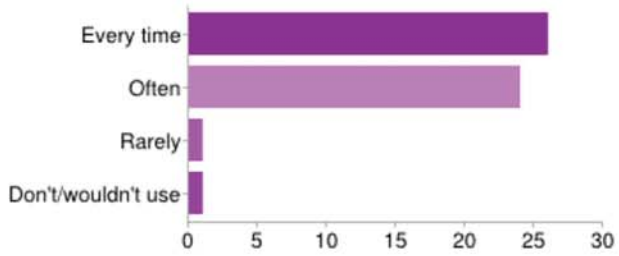
Every time	**20**	35%
Often	**24**	42%
Rarely	**6**	11%
Don't/wouldn't use	**1**	2%

Montly summary of sensistive life stages:



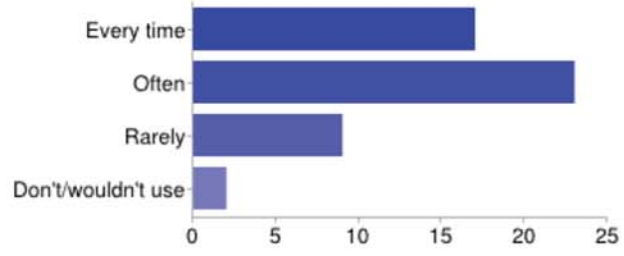
Every time	**17**	30%
Often	**30**	53%
Rarely	**3**	5%
Don't/wouldn't use	**1**	2%

Protection status (e.g. threatened, endangered, state species of concern:



Every time	**17**	30%
Often	**30**	53%
Rarely	**3**	5%
Don't/wouldn't use	**1**	2%

Concentration:

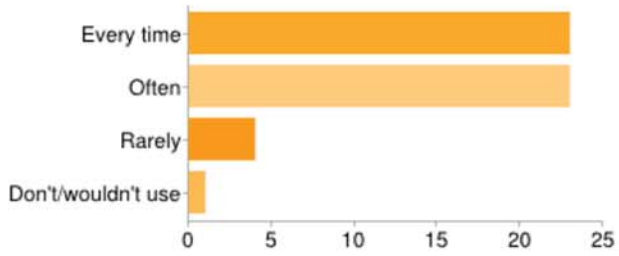


Every time	**17**	30%
Often	**23**	40%
Rarely	**9**	16%
Don't/wouldn't use	**2**	4%

ESI User Survey

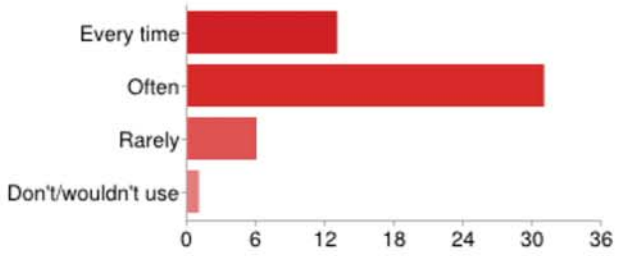
Biology data - frequency of attribute usage for...

Hot spot polygons and points (e.g. high concentrations, breeding areas...):



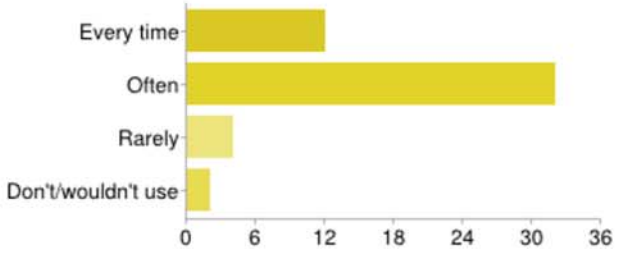
Every time	23	40%
Often	23	40%
Rarely	4	7%
Don't/wouldn't use	1	2%

Expected range of presence based on habitat, etc:



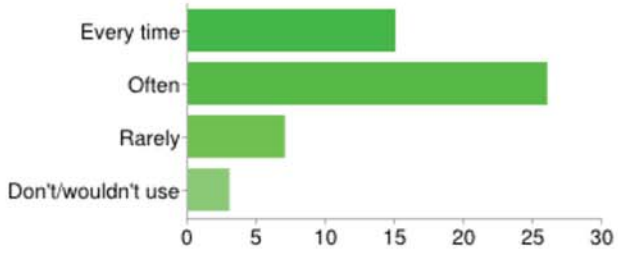
Every time	13	23%
Often	31	54%
Rarely	6	11%
Don't/wouldn't use	1	2%

"Present throughout" (e.g. occurs on this map, in this bay, etc):



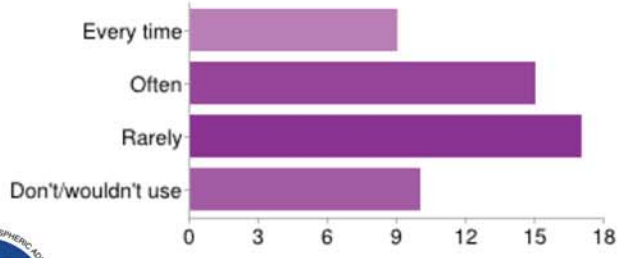
Every time	12	21%
Often	32	56%
Rarely	4	7%
Don't/wouldn't use	2	4%

Concentration specific to life stage (e.g. hatching/high concentration):



Every time	15	26%
Often	26	46%
Rarely	7	12%
Don't/wouldn't use	3	5%

National Heritage Program (NHP) status:

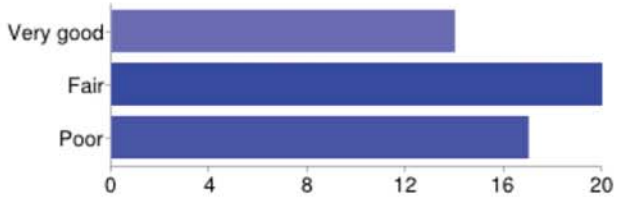


Every time	9	16%
Often	15	26%
Rarely	17	30%
Don't/wouldn't use	10	18%

ESI User Survey

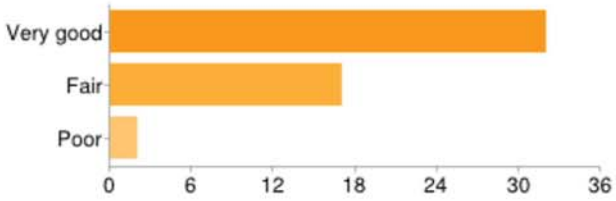
Regarding traditional map 113, rankings for...

Readability of ESI shoreline types:



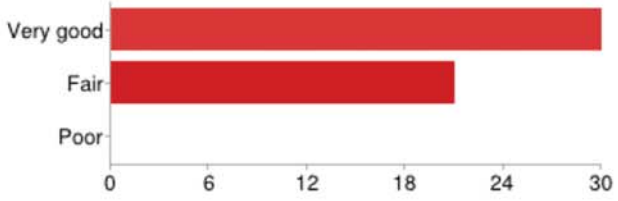
Very good	**14**	25%
Fair	**20**	35%
Poor	**17**	30%

Orientation provided by the basemap and annotation:



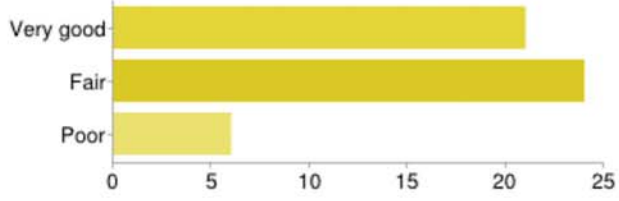
Very good	**32**	56%
Fair	**17**	30%
Poor	**2**	4%

Detail of biological presence:



Very good	**30**	53%
Fair	**21**	37%
Poor	**0**	0%

Map asthetics:

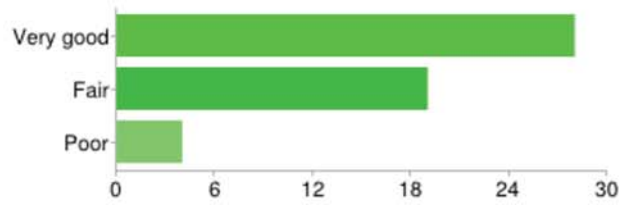


Very good	**21**	37%
Fair	**24**	42%
Poor	**6**	11%

ESI User Survey

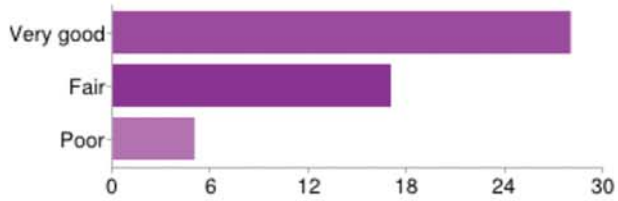
Regarding traditional map 113, rankings for...

Scale:



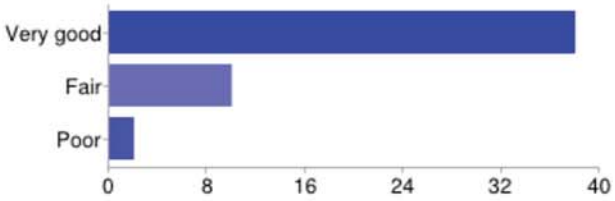
Very good	**28**	49%
Fair	**19**	33%
Poor	**4**	7%

Area of coverage:



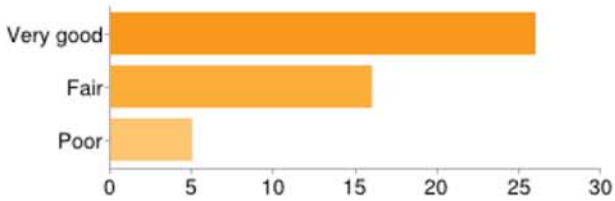
Very good	**28**	49%
Fair	**17**	30%
Poor	**5**	9%

Back of map - species information content:



Very good	**38**	67%
Fair	**10**	18%
Poor	**2**	4%

Usability of RAR# to link biology polygons to back of map species details:

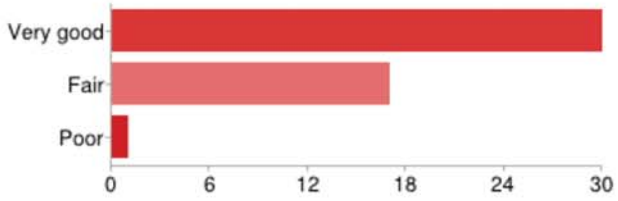


Very good	**26**	46%
Fair	**16**	28%
Poor	**5**	9%

ESI User Survey

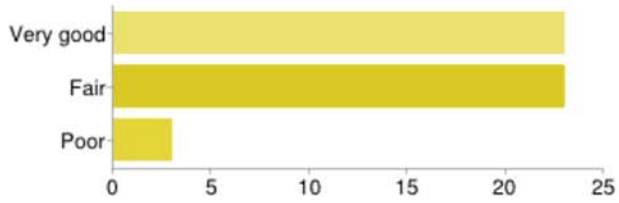
Regarding traditional map 113, rankings for...

Presentation of species information:



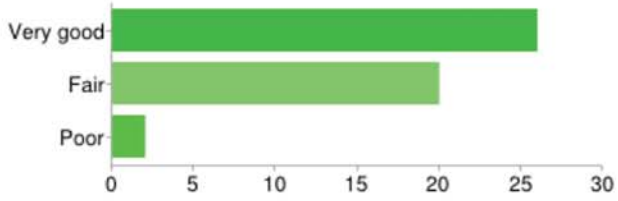
Very good	**30**	53%
Fair	**17**	30%
Poor	**1**	2%

Human use resource information content:



Very good	**23**	40%
Fair	**23**	40%
Poor	**3**	5%

Presentation of human use resource information:

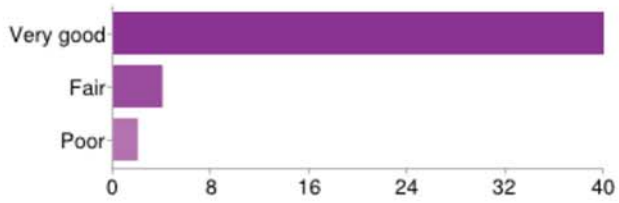


Very good	**26**	46%
Fair	**20**	35%
Poor	**2**	4%

ESI User Survey

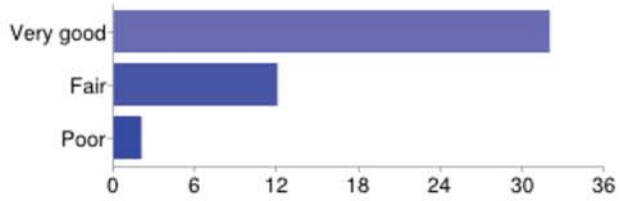
Regarding simple map 113, rankings for...

Readability of shoreline types:



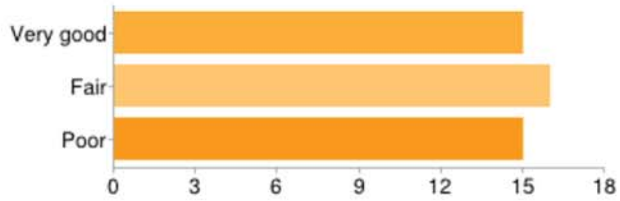
Very good	**40**	70%
Fair	**4**	7%
Poor	**2**	4%

Orientation provided by the basemap annotation:



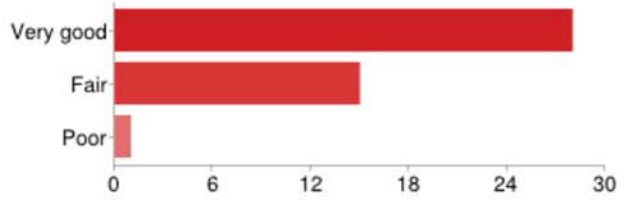
Very good	**32**	56%
Fair	**12**	21%
Poor	**2**	4%

Detail of biological presence:



Very good	**15**	26%
Fair	**16**	28%
Poor	**15**	26%

Asthetics:

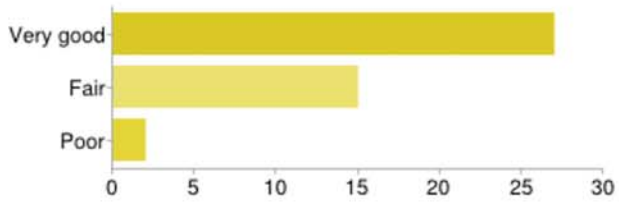


Very good	**28**	49%
Fair	**15**	26%
Poor	**1**	2%

ESI User Survey

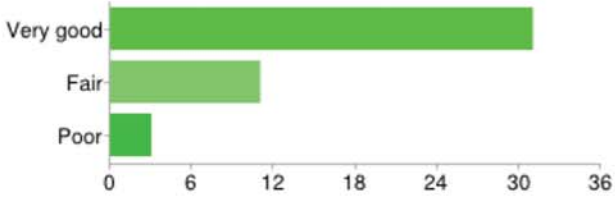
Regarding simple map 113, rankings for...

Scale:



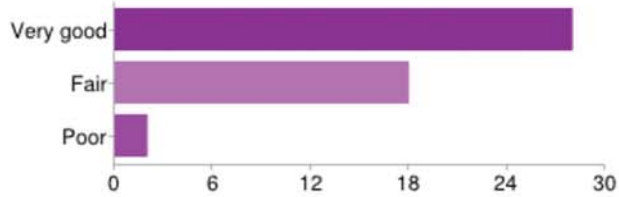
Very good	27	47%
Fair	15	26%
Poor	2	4%

Area of coverage:



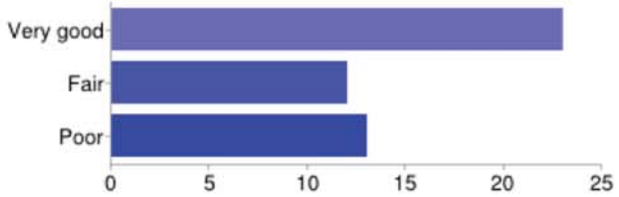
Very good	31	54%
Fair	11	19%
Poor	3	5%

Species information content:



Very good	28	49%
Fair	18	32%
Poor	2	4%

Presentation of the species information:

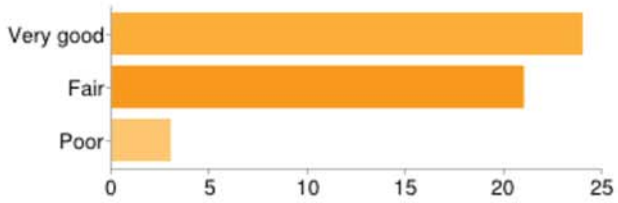


Very good	23	40%
Fair	12	21%
Poor	13	23%

ESI User Survey

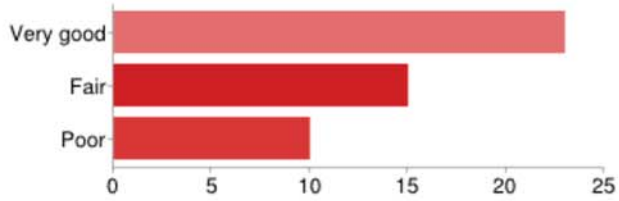
Regarding simple map 113, rankings for...

Human use resource information content:



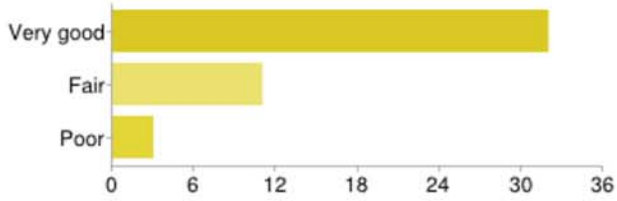
Very good	**24**	42%
Fair	**21**	37%
Poor	**3**	5%

Presentation of human use resource information:



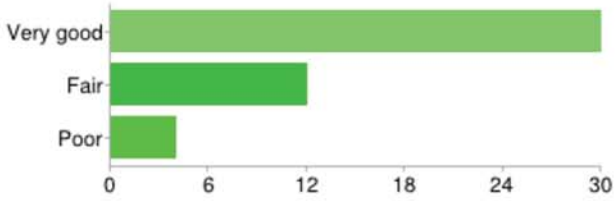
Very good	**23**	40%
Fair	**15**	26%
Poor	**10**	18%

Utility of ESI shoreline lengths:



Very good	**32**	56%
Fair	**11**	19%
Poor	**3**	5%

Utility of ESI shoreline percentages:

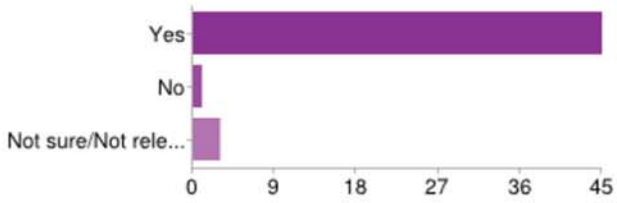


Very good	**30**	53%
Fair	**12**	21%
Poor	**4**	7%

ESI User Survey

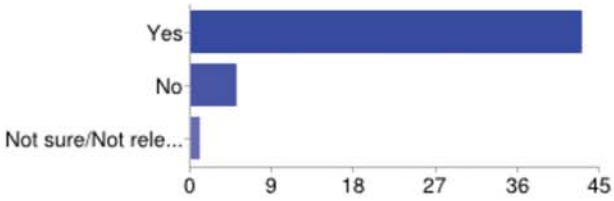
Regarding simple map - New River area, users...

Like ability to see a "logical" geographic region as a whole:



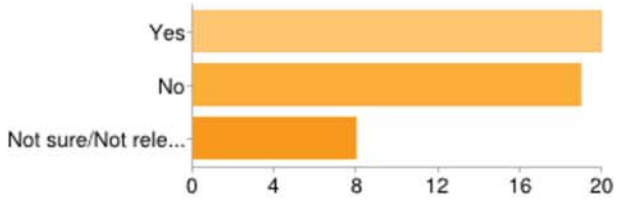
Yes	**45**	79%
No	**1**	2%
Not sure/Not relevant	**3**	5%

Think a map like this with supporting larger scale insets would be useful:



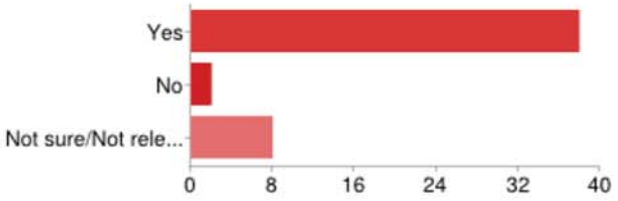
Yes	**43**	75%
No	**5**	9%
Not sure/Not relevant	**1**	2%

Feel this map could be an adequate replacement to the traditional ESI map:



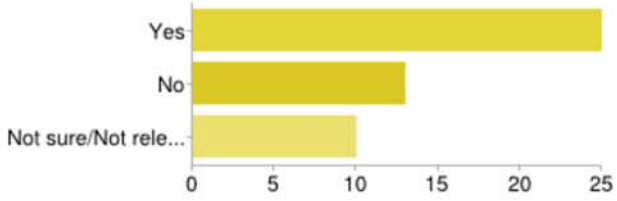
Yes	**20**	35%
No	**19**	33%
Not sure/Not relevant	**8**	14%

Would use an ArcMap tool to produce a map of this type for their area:



Yes	**38**	67%
No	**2**	4%
Not sure/Not relevant	**8**	14%

At 1:24K or larger, species information is adequate with "presence on map":



Yes	**25**	44%
No	**13**	23%
Not sure/Not relevant	**10**	18%

ESI User Survey

comments on sample maps...

The backside data in its current table format at first blush is easier to evaluate 'quickly' than the text format proposed in the two other examples. A lot of time spent 'reading' the extensive text format. While the information is basically the same, the visual analysis is quicker in the current table format.

I do not like the quad based layout - they do not present "logical" areas and most any area of interest will span multiple maps

It is hard making such map comparisons on my tiny computer screen

I like the new maps better than the traditional because now you can see the shoreline types and it is not overwhelmed by the biological information. It is good to note what species are in the area but since these are movable objects there precise location does not need to be noted. The back of the map is also good because it is more condensed and color-coded.

The shoreline is so busy with red that I cannot see the shoreline. When a shoreline is all one type, obscuring it as is done in the sample map serves to reduce the utility of the map while adding lots of redundant information that does not greatly improve my understanding of the area.

We prefer tabular data on the back of the map

On both maps, the colors of the different shoreline types is very hard to see and it looks like the colors may not match up with what is in the legend. I think the maps would be much more usable in a format like ERMA so you can adjust the scale.

The simple map 113 back of map details is more aesthetic but the columns with x in the traditional map are preferrable if they were made more aesthetic

ESI User Survey

comments on sample maps...

Have you thought of creating GeoPDFs?
This type of pdfs will allow you to turn on & off layers so that you can have a cluttered map like the "Simple" map and make it less cluttered. Check out the new USGS quads at:
http://store.usgs.gov/b2c_usgs/usgs/maplocator/%28xcm=r3standardpitrex_prd&layout=6_1_61_48&uiarea=2&ctype=areaDetails&carea=%24ROOT%29/.do

All 3 maps have a strength, I there were a way to combine the mapping and gridded fashion of species presence etc in the traditional map with the explanations provided simple map new river area, I think that would be ideal.

Regarding seeing a species occur somewhere on the map, it depends on the scale of the map. For example, if you have a habitat type on the map where a species occurs in only a portion of that habitat on the map, it may result in incorrect assumptions on species distribution.

I like seeing the species icons/points on the map. Just saying "Species Present in Area" doesn't tell me where. There's a big difference between where a whale might be and where a heron rookery might be. And I lose where a marina or popular beach is located. The traditional maps are great for a quick overall picture of what's in the area. That is lost on these 2 new map styles.

I also like the traditional table "back of the map" layout. The species are their own line item and it's easy to scroll down the list. Having them all mushed together in one table cell is very difficult to read and loses its important information.

I like the other layouts and I see some excellent potential for these as automated map products from ArcGIS. I don't think that one single product can fully support all circumstances, hence the need for multiple types and scales and I like the idea that I think this is presenting. If the cartographic presentation and reporting can be automated for "on-demand" production, then we're talking something very powerful (and useful!)

ESI User Survey

comments on sample maps...

Sample map 113 –
The shoreline is clear. I like the bluff/point and water body names, they are very helpful. Needs a locator map (not even lat/long lines). Also, I would like to see some bathymetry or navigational locators to the water (ICW, Ocean channels, etc)? Human use features (marinas/ramps/other points) need to be shown on the map. I think a little more terrestrial location detail would also help (Camp LeJeune should be indicated, add the roads). Benthic features (SAV,oyster) should be shown on the map. The gold shoreline (tidal flats) looks almost the same color as the land background.

Bio data: Reducing the information to the back of the map is fine for organisms that are widespread, but there are significant differences (i.e. salinity) between areas on this map and how organisms use them (i.e. bird nesting colonies occur at specific locations; fish use specific areas for spawning). If the task at hand is to determine areas within the map extent that are more sensitive with respect to biological resources, removing the bio polygons makes this difficult. Removing concentration and seasonality information might lead to decisions being made about things that are not really priorities or not present (i.e. manatees in NC are rare, whales are important but not present year round). The subelements could use some revision if they are going to be emphasized. For example, diadromous actually encompasses catadromous and anadromous species, which have completely opposite life histories.
The utility of the shoreline lengths/meters would depend on the scale of the area being considered. Percentages are a little misleading, as the shorelines are not evenly distributed over space.

New River Area map – Add roads and city locations/footprints. Same feedback as above regarding the bio, but the larger geographic area makes the shortcomings more pronounced as there is more environmental variability on the map. Complex shorelines are hard to see at this scale. Colors can be hard to differentiate (but that is the color scheme, not the map).

ESI User Survey

comments on sample maps...

I much prefer the simple map. The important features standout. The data sheet makes an RAR much easier to produce

Would be good to show the "footprints" of the "traditional ESI map extents on this "grouped map". This would give the user a connection back to the traditional presentation of the data and allow paper maps to be referenced to compiled maps.

The New River Map is too broad of scale for anything except for potentially shoreline classification so this map is not helpful for resources or socio- economic issues. The simple map is an improvement however it is still hard to determine species location if only in PDF format, however if in electronic this seems to be the most intuitive and easy to maintain, although you do lose some of the resource socio details, but for most of the detailed work you would refer back to electronic format anyway.

In the absence of a Regional ERMA I would like the ability to go from a broad to localized geographic scale. If the data is being inputted electronically then dialing in a target area to get better resolution would seem to be the obvious next step. Much like Google Earth you keep scrolling "into" the map to see finer detail.

I like the relative simplicity of Simple Map 113, but I would still want to key in on specific locations for key sensitive species, particularly to help Operations reduce responder impacts/conflicts (bird strike potential for aircraft, disturbing nesting seabirds by vehicles or foot traffic, etc.). That said, for planning purposes I might prefer having a "Species Present List" for different major areas of the map rather than just one for the entire map. The same for response purposes, but might also prefer hotspots for key species that might be particularly sensitive to responder disturbance (i.e. limited mobility or high site fidelity and easily flushed) since that efficiently focus the appropriate eco-constraints for different strategies.

ESI User Survey

comments on sample maps...

Simple maps are vast improvements!! However, simple maps don't provide show which species are T&E species.

Traditional Map 113, back of the map details - Don't understand "Usability of RAR# link to the map polygons and points." Viewing the PDF in my browser, I'm not finding any links to/from the back of the map.

Good job simplifying the maps. Having simple and important layers available in ERMA will be very useful. Not all layers should be included in ERMA (or if they are, relatively unimportant ones should go in their own folder so people don't mistakenly think that they are as important as others).

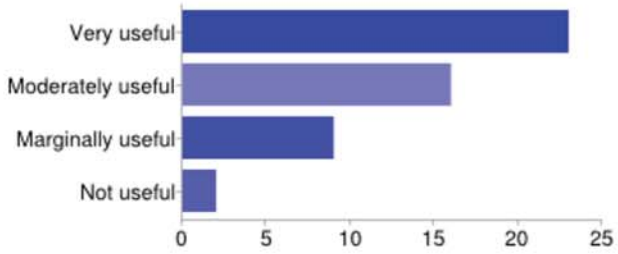
I would like to see how these maps would translate to mobile devices such as tablets (7" screens and smaller)

I like how the sample maps pull out the more sensitive species for emphasis (T/E, breeding during the specified months). For ERA purposes, these are the species we want to focus on; the others are more clutter.

ESI User Survey

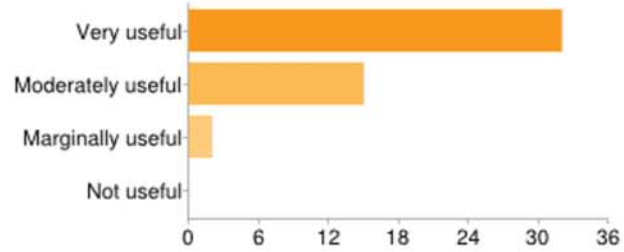
Utility of training covering...

Basics of an ESI map:



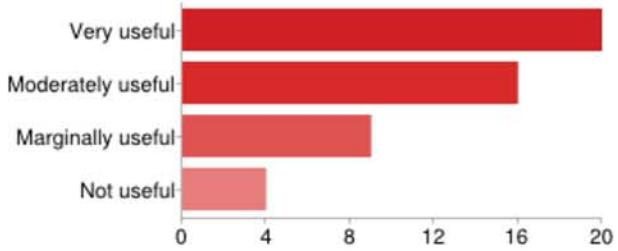
Very useful	**23**	40%
Moderately useful	**16**	28%
Marginally useful	**9**	16%
Not useful	**2**	4%

ESI geodatabase and supporting tools:



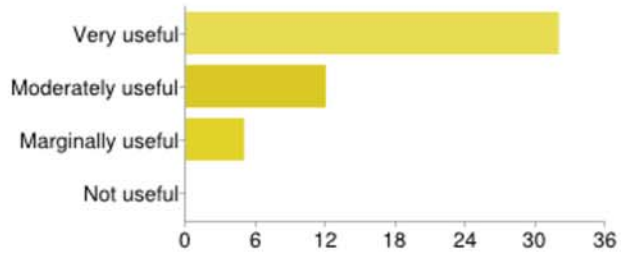
Very useful	**32**	56%
Moderately useful	**15**	26%
Marginally useful	**2**	4%
Not useful	**0**	0%

Free ESI viewer software:



Very useful	**20**	35%
Moderately useful	**16**	28%
Marginally useful	**9**	16%
Not useful	**4**	7%

ESIs in ERMA and other map services:

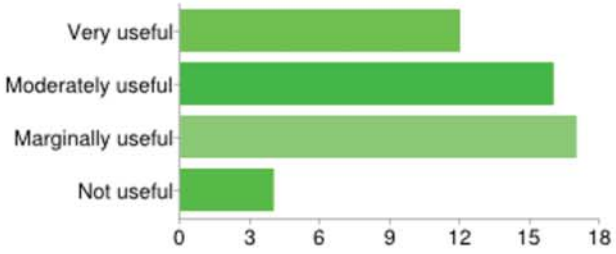


Very useful	**32**	56%
Moderately useful	**12**	21%
Marginally useful	**5**	9%
Not useful	**0**	0%

ESI User Survey

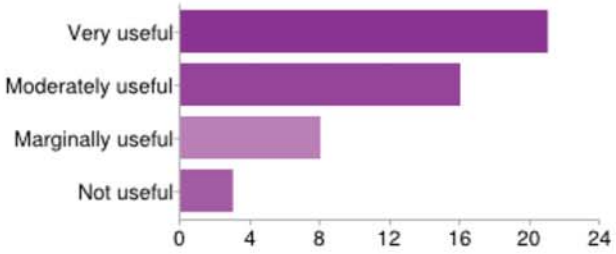
Utility of training presented as...

Hard copy or PDF tutorial:



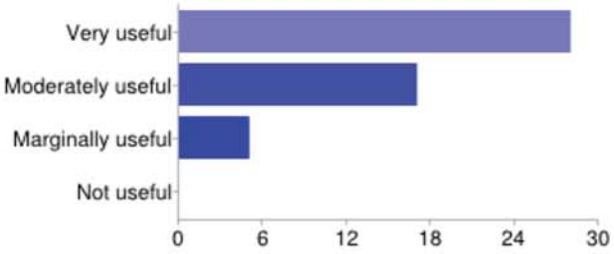
Very useful	**12**	21%
Moderately useful	**16**	28%
Marginally useful	**17**	30%
Not useful	**4**	7%

One day live, hands on training:



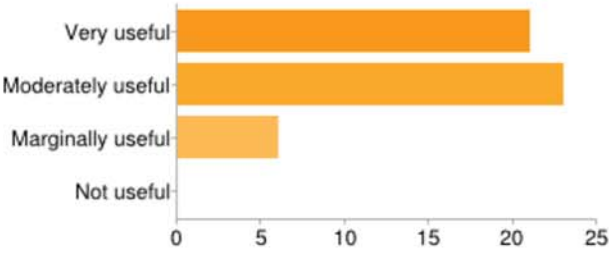
Very useful	**21**	37%
Moderately useful	**16**	28%
Marginally useful	**8**	14%
Not useful	**3**	5%

WebEx



Very useful	**28**	49%
Moderately useful	**17**	30%
Marginally useful	**5**	9%
Not useful	**0**	0%

On-line training:



Very useful	**21**	37%
Moderately useful	**23**	40%
Marginally useful	**6**	11%
Not useful	**0**	0%

ESI User Survey

comments on training content and format...

Assuming Google is the other web service, then this would very highly extremely and wonderfully useful. If it just ERMA, then almost completely useless.

Create tutorial videos to share off ORR website

Hands on training is ideal, but offering a WebEx or online option would reach more users.

Online training video(s) that users can watch at their own convenience. A documentary type YouTube video explaining how they are used "in the real world". With "real-world" on-scene examples of what the maps represent. IE: shoreline types, wildlife resources, socio-economic resources.

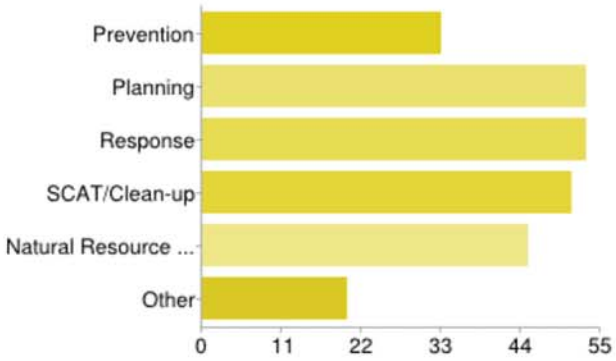
GeoPDF format should be used for obvious reasons. In RRT3 several of the Sectors are utilizing GRP using geoPDF format and are easy for non-GIS individuals to dissect needed information as opposed to data for response needs. They can be easily updated and sent into the field by any laptop/tablet with an Adobe Reader, which is universally used and accepted. Maps/Geo information can be carried into field on HD or DVDs.

Another avenue would be utilization on Google Earth, but without internet connection in field it might not be useful.

ESI User Survey

miscellaneous...

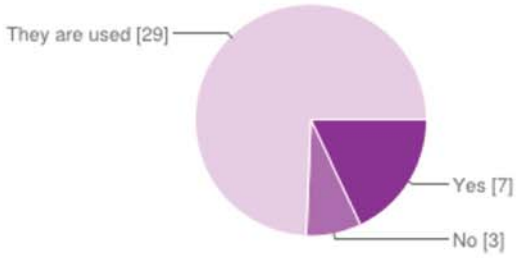
In what activities do you think ESI maps or data could be useful:



Prevention	**33**	59%
Planning	**53**	95%
Response	**53**	95%
SCAT/Clean-up	**51**	91%
Natural Resource Damage Assessment (NRDA)	**45**	80%
Other	**20**	36%

People may select more than one checkbox, so percentages may add up to more than 100%.

Should ESIs be used in area/geographic response plans?:

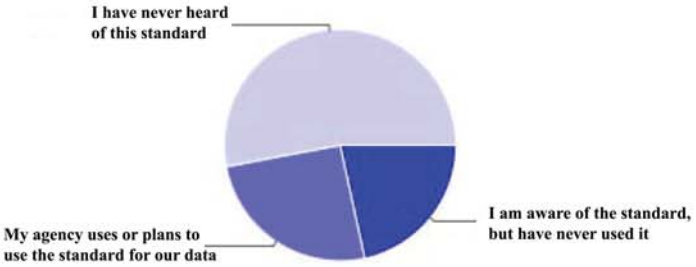


Yes	**7**	12%
No	**3**	5%
They are used	**29**	51%

Would you like to have ESI data available through mapping services?:

Yes	**47**	82%
No	**2**	4%

Regarding the Coastal & Marine Ecological Classification Standard (CMEC):



I am aware of the standard, but have never used it	**11**	19
My agency uses or plans to use the standard for our data	**13**	23
I have never heard of this standard	**27**	47

ESI User Survey

ESI usage in contingency and response planning...

Often referenced

Very inconsistent across the country

The PDF is often used to "add" response planning layers. These additions are often only available as a PDF and not as a GIS layer.

Strictly provide an approximation of what may be at risk in a spill. Not likely to have much benefit in NRDA.

Specific maps are incorporated by reference in the Area and Geographic Response Plans but not shown. This may change as CA starts using ERMA more and more to display Area Plan data (e.g. overlaying booming strategies with ESI layers).

Pre-spill planning and compliance documents of facilities

Sensitivity to determine where the GRP's are done.

Preparation for Sensitive Area Sheets.

We create the DACPs for the Coast Guard and these are integral. Additionally, we use these for agency commenting, zoning and permitting.

Digital ACP planning, response, priorities, drills, countermeasure use evaluations, SCAT

All the ESI data and maps are included on every Digital Area Contingency Plan we produce in the Southeast US and Caribbean. They are a very important part of the planning and response framework.

Not used by industry/shore side facilities due to PDF limitations. They are used, but not across the board due to map data clutter, i.e. layers upon layers. AC Port partners don't have GIS staff to fully use at 100% level.

ESI User Survey

ESI usage in contingency and response planning...

In Philadelphia Sector the current ESI maps are 20 out of date and the data supplied for these maps was from late '80s and very early 1990s ('91-92). Much has been 'learned' about the natural resources form the AO that doesn't appear in the ESIs. Regular scheduled updates are a necessity in order to make the maps worthwhile.

To identify sensitive areas and species of concern among other information.

Used to determine RAR during a spill response

Occasional in response but if they could be improved upon they might be used more.

We use them as a reference to select sensitive sites along the coast.

Included in the Area Contingency Plans, used for training purposes (PREP, tabletop exercises), and Geographic Response Plans.

sensitivity to determine where the GRP's are done.

They provide core information in the GRPs and ACPs for Dist 7 and Dist 8.

ESI User Survey

comments - what works, what doesn't, wish list....

Google, Google, Google!!!

I think anything you can do to make ESIs more dynamic (digital, etc). Coming up w/ a way to integrate new data before an update actually comes on line is a request I get all the time.

It's all about having current information and adequate detail to be effective in response, cleanup and damage assessment. ANY WAY that can be improved should be the objective.

Ease of access and extraction of information during an incident is limited in the current PDF format. Data layers are fixed and superimposed making separation impossible. Having a 'book' geoPFD format allows one to drill down into important layers and select desired topics. Likewise geoPDF books can be carried into the field on DVDs, and not require an internet or wireless connection. Would be useful in SCAT and incorporated into ERMA for a unified COP. DVDs could be updated easily for field distribution. GeoPDFs are already being used successfully by a number of Sectors' GRPs. A simpler format would help industry to use ESI maps in their FRPs. Also easier for the general public to access ESI information.

My input for shoreline update frequency does not really apply to areas with more dynamic shorelines like Louisiana, which may benefit from more frequent updates.

RAR#s are straightforward tool and a logical & visually efficient concept but understanding what prompts their creation is not always intuitive to the user. That said, I would've preferred to pick "Good" rather than "Fair" for Traditional Map 113, but that rating option was not offered.

1. *Cost of developing maps*
2. *Costs for updates of maps do not go down, even though stored in a GIS*
3. *Developing of kml/kmz*

ESI User Survey

comments - what works, what doesn't, wish list....

easier updating ability would be helpful

1) If ESIs moved to more of a WMS format, perhaps it would be more realistic to update them more frequently (naive idea ;). I know that some states discount the ESIs because they are outdated. Joe User is expecting data to be on-line more and more (think Google). To be out of date technologically is to be extinct. And the public expects knowledge and maps of trust resources to be current by using better technology.

2) Can States have more ownership in updating their ESIs? A database of contacts or T&E species to update 1/year?

3) Encountered many many state and federal agencies at DWH who had never heard of ESIs. They were excited to see the wealth of info available, but didn't know their history. May need more outreach at RRT meetings and/or other agencies.

ESI's need to match at state and atlas boundaries. This consistently presents problems when working with ESI data across multiple state boundaries. This holds true for both shoreline classification and biological resources.

Map services and digital data with tools for interacting with the data are what I think the future holds for ESI. Static maps ARE useful for sure, especially for "non-GIS" users, but for higher level users and managers whose job it is to inform decision makers at critical times, the digital data is where more support is needed. Dynamic atlas production has become a common and expected capability in GIS and ArcGIS 10.x supports this well with data driven pages. With some effort and money devoted to the development of ESI-specific data driven tools, there could be greatly expended uses of these data and map products.

Digital formats for ESI data and maps in Open GIS and OGC standard formats is critical and should be easily accessible for anyone to find and use.

ESI User Survey

comments - what works, what doesn't, wish list....

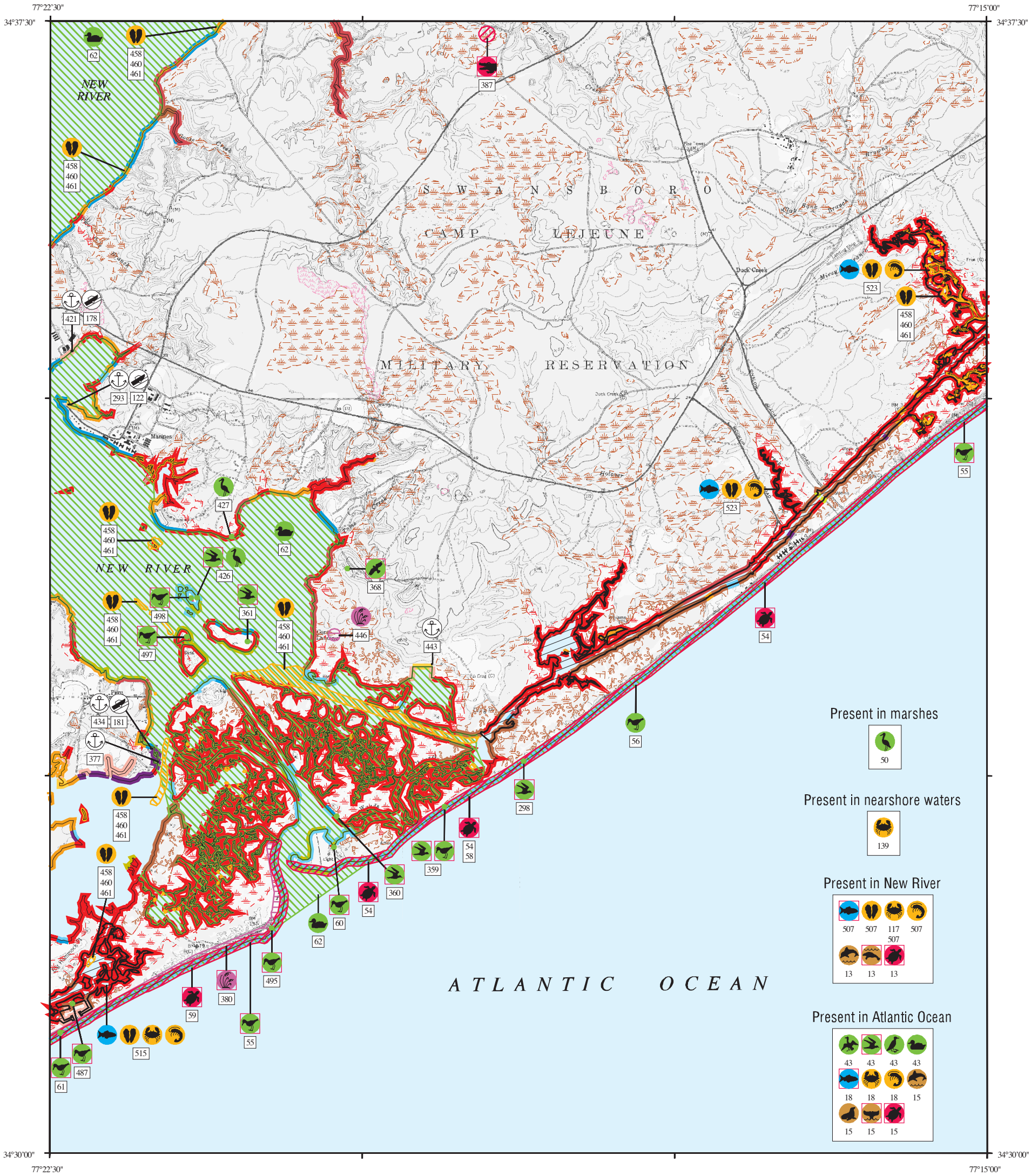
New version is improved than traditional version because the shoreline types are viewable.

The maps were first made using color pencils on USGS quad maps to indicate what habitat existed along the shoreline.
The shoreline type information is most useful for emergency response uses, and it could be useful in ERMA if it can be loaded as an interactive layer where the specific shoreline types can be "turned off & on" for viewing & planning purposes.

Provide data in KML(Z), GeoPDF

ESI is a wonderful model and is used well for oil and hazmat purposes. But given the expense and time to maintain, I would like to see it evolve so it can support other management and scientific needs.

ENVIRONMENTAL SENSITIVITY INDEX MAP



SHORELINE HABITATS (ESI)

- 1B EXPOSED, SOLID, MAN–MADE STRUCTURES
- 2A EXPOSED WAVE–CUT PLATFORMS IN MUD OR CLAY
- 3A FINE– TO MEDIUM–GRAINED SAND BEACHES
  3B SCARPS AND STEEP SLOPES IN SAND
- 4 COARSE–GRAINED SAND BEACHES
- 5 MIXED SAND AND GRAVEL BEACHES
- 6B RIPRAP
- 7 EXPOSED TIDAL FLATS
- 8B SHELTERED, SOLID MAN–MADE STRUCTURES
- 8C SHELTERED RIPRAP
- 9A SHELTERED TIDAL FLATS
  9B VEGETATED LOW BANKS
- 10A SALT–AND BRACKISH–WATER MARSHES
- 10B FRESHWATER MARSHES
- 10C SWAMPS
- 10D SCRUB–SHRUB WETLANDS

N W E S

SCALE 1:50000

1 .5 0 1 KILOMETER

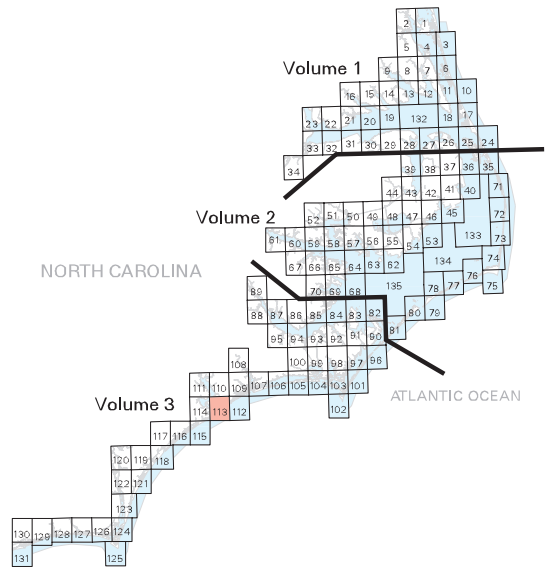
1 .5 0 1 MILE

1 .5 0 1 NAUTICAL MILE

Not For Navigation

Published: April 2011

Published at Seattle, Washington
National Oceanic and Atmospheric Administration
National Ocean Service
Office of Response and Restoration
Emergency Response Division



NEW RIVER INLET, N.C. (1988) **ESI-113**

North Carolina: ESIMAP 113

BIOLOGICAL RESOURCES:

BIRD:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Migrating	Molting
43	Black scoter				X	X	X	X						X	X	X	-	-	-
	Black skimmer	C					X	X	X	X	X	X	X	X	X		MAR-AUG	-	-
	Brown pelican				X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Bufflehead				X	X	X	X							X	X	-	-	-
	Cormorants				X	X	X	X	X				X	X	X	X	-	-	-
	Gulls				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Loons				X	X	X	X	X					X	X	X	-	-	-
	Mergansers				X	X	X	X	X	X				X	X	X	-	-	-
	Northern gannet				X	X	X	X	X	X			X	X	X	X	-	-	-
	Scaup				X	X	X	X						X	X	X	-	-	-
	Terns						X	X	X	X	X	X					-	-	-
50	Bitterns						X	X	X	X	X	X	X	X	X		-	-	-
	Rails				X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	-	-
	Wading birds				X	X	X	X	X	X	X	X	X	X	X	X	MAR-SEP	-	-
55	Piping plover	T	T		X	X	X				X	X	X	X	X	X	-	-	-
	Red knot							X	X	X			X	X	X		-	-	-
	Sanderling				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
	Shorebirds				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
56	Red knot						X	X	X				X	X	X		-	-	-
	Sanderling				X	X	X	X	X			X	X	X	X	X	-	-	-
	Semipalmated sandpiper			10S				X	X	X	X	X	X	X			-	-	-
	Shorebirds				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
60	Piping plover	T	T	1 BIRD			X	X	X	X	X	X					MAR-AUG	-	-
61	Wilson's plover	C		10 BIRDS			X	X	X	X	X	X	X				MAR-AUG	-	-
62	American coot			100S	X	X	X	X	X				X	X	X	X	-	-	-
	Bufflehead			100S	X	X	X	X							X	X	-	-	-
	Mergansers			100S	X	X	X	X	X	X				X	X	X	-	-	-
	Ring-necked duck			1000S	X	X	X	X						X	X	X	-	-	-
	Ruddy duck			10S	X	X	X	X						X	X	X	-	-	-
	Scaup			10000S	X	X	X	X						X	X	X	-	-	-
298	Least tern	C		4 NESTS			X	X	X	X	X	X	X				MAR-AUG	-	-
359	American oystercatcher	C		2 BIRDS			X	X	X	X	X	X					MAR-AUG	-	-
	Least tern	C		20 NESTS			X	X	X	X	X	X	X				MAR-AUG	-	-
	Piping plover	T	T	2 BIRDS			X	X	X	X	X	X					MAR-AUG	-	-
	Wilson's plover	C		6 BIRDS			X	X	X	X	X	X	X				MAR-AUG	-	-
360	Least tern	C		6 NESTS			X	X	X	X	X	X	X				MAR-AUG	-	-
361	Least tern	C		22 NESTS			X	X	X	X	X	X	X				MAR-AUG	-	-
368	Bald eagle	T			X	X	X	X	X	X	X	X	X	X	X	X	DEC-MAR	-	-
426	Green heron			1 NEST				X	X	X	X	X	X				APR-AUG	-	-
	Least tern	C		13 NESTS			X	X	X	X	X	X	X				MAR-AUG	-	-
427	Green heron			13 NESTS				X	X	X	X	X	X				APR-AUG	-	-
487	Killdeer			2 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Willet			2 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Wilson's plover	C		14 BIRDS			X	X	X	X	X	X	X				MAR-AUG	-	-
495	American oystercatcher	C		2 BIRDS			X	X	X	X	X	X					MAR-AUG	-	-
	Willet			6 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Wilson's plover	C		4 BIRDS			X	X	X	X	X	X	X				MAR-AUG	-	-
497	American oystercatcher	C		4 BIRDS			X	X	X	X	X	X					MAR-AUG	-	-
	Killdeer			2 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Willet			10 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-
	Wilson's plover	C		4 BIRDS			X	X	X	X	X	X	X				MAR-AUG	-	-
498	American oystercatcher	C		2 BIRDS			X	X	X	X	X	X					MAR-AUG	-	-
	Willet			6 BIRDS	X	X	X	X	X	X	X	X	X	X	X	X	MAR-AUG	-	-

FISH:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
18	Atlantic bonito						X	X	X	X							-	-	-	-	-
	Atlantic croaker								X	X	X	X	X	X	X	X	SEP-NOV	SEP-NOV	SEP-DEC	-	MAY-NOV
	Atlantic spadefish				X	X	X	X	X	X	X	X	X	X	X	X	MAY-SEP	MAY-SEP	MAY-SEP	-	JAN-DEC
	Atlantic sturgeon	C			X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JUN-MAR
	Black drum				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Black sea bass				X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	-	-	-	JAN-DEC
	Bluefin tuna				X	X	X							X	X	X	-	-	-	-	-
	Bluefish						X	X	X	X	X	X					MAR-AUG	MAR-AUG	MAR-AUG	MAR-AUG	MAR-AUG
	Butterfish				X	X	X							X	X	X	-	-	-	-	OCT-MAR
	Cobia						X	X	X	X	X	X	X				-	-	-	-	-
	Dolphin				X	X	X	X	X	X	X	X	X	X	X	X	JAN-JUN	-	-	-	JAN-DEC
	Florida pompano						X	X	X	X	X	X	X	X			-	-	APR-NOV	APR-NOV	APR-NOV
	Forage fish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Gray triggerfish									X	X	X	X				-	-	-	-	-
	Greater amberjack						X	X	X	X	X	X	X				-	-	-	-	-
	Gulf flounder				X	X	X						X	X	X	X	NOV-MAR	NOV-MAR	-	-	SEP-MAR
	Gulf kingfish						X	X	X	X	X	X	X	X	X		APR-OCT	APR-OCT	APR-NOV	APR-NOV	APR-OCT
	Harvestfish							X	X	X	X	X	X	X	X		-	-	-	MAY-NOV	MAY-NOV
	Hickory shad				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JUN-FEB
	Jacks						X	X	X	X	X	X	X	X			-	-	-	-	-
	King mackerel							X	X	X	X	X	X	X	X		-	-	-	MAY-NOV	MAY-NOV
	Little tunny						X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Pigfish						X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Red drum				X	X	X	X	X			X	X	X	X	X	-	-	-	-	SEP-MAY
	Sailfish								X	X	X	X	X	X			-	-	-	-	-
	Scup							X	X	X	X	X	X	X	X		-	-	-	-	-
	Searobins						X	X	X	X	X	X	X	X			-	-	-	-	-
	Sharks				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Sheepshead						X	X	X	X	X	X	X	X	X		-	-	-	-	-
	Silver seatrout				X	X	X	X	X	X	X	X	X	X	X	X	JUN-JUL	JUN-JUL	JUN-AUG	JUN-OCT	JAN-DEC
	Skates/rays				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Snapper/grouper						X	X	X	X	X	X	X				-	-	-	-	-
	Southern flounder				X	X	X						X	X	X	X	NOV-MAR	NOV-MAR	-	-	SEP-MAR
	Southern kingfish						X	X	X	X	X	X	X	X			APR-OCT	APR-OCT	APR-NOV	APR-NOV	APR-OCT
	Spanish mackerel						X	X	X	X	X	X	X	X			MAY-SEP	MAY-SEP	MAY-NOV	MAY-NOV	APR-NOV
	Spot				X	X	X							X	X	X	OCT-MAR	OCT-MAR	-	-	OCT-MAR
	Spottail pinfish						X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Spotted seatrout				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Striped bass				X	X	X			X	X	X	X	X	X	X	-	-	-	-	JUL-MAR
	Summer flounder				X	X	X						X	X	X	X	NOV-MAR	NOV-MAR	-	-	SEP-MAR
	Tarpon							X	X	X	X	X	X				-	-	-	-	-
	Tautog				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Tomtate						X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Weakfish				X	X	X								X	X	-	-	-	NOV-MAR	NOV-MAR
	White grunt						X	X	X	X	X	X	X	X			-	-	-	-	-
	Windowpane				X	X	X	X	X	X	X	X	X	X	X	X	FEB-NOV	FEB-NOV	FEB-NOV	JAN-DEC	JAN-DEC
507	American eel				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	AUG-DEC
	American shad					X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	MAR-JUN	APR-DEC	FEB-MAY
	Atlantic croaker				X	X	X	X	X	X	X	X	X	X	X	X	-	-	SEP-MAY	JAN-DEC	MAR-NOV
	Atlantic cutlassfish				X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-AUG	-	JAN-DEC
	Atlantic menhaden				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-APR	JAN-DEC	MAR-NOV
	Atlantic spadefish				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAY-AUG	MAY-AUG	-	JAN-DEC

Species assemblages and abundances depicted on these maps and tables are based on multiple years of data and expert opinion and were intended to be used for this product, specifically. Please contact local experts and data providers for the most current information, as species composition and concentrations vary spatially and temporally.

North Carolina: ESIMAP 113 (cont.)

BIOLOGICAL RESOURCES: (cont.)

FISH: (cont.)

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
507	Atlantic sturgeon	C					X	X	X	X	X	X	X				-	-	-	MAR-SEP	-
	Banded drum				X	X	X	X	X	X	X	X	X	X	X	X	MAY-OCT	MAY-OCT	MAY-OCT	-	JAN-DEC
	Black drum				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-MAY	JAN-DEC	MAR-NOV
	Black sea bass				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	MAY-JUN	MAY-JUN	JUN-SEP	JAN-DEC
	Bluefish						X	X	X	X	X	X	X	X	X	X	-	-	-	MAR-DEC	-
	Bowfin				X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	-	-	-	JAN-DEC
	Butterfish				X	X	X	X	X	X	X	X	X	X	X	X	JUN-SEP	JUN-SEP	JUN-SEP	-	JAN-DEC
	Catfish				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Cobia							X	X	X	X	X					-	-	JUL-AUG	MAY-SEP	MAY-SEP
	Crappie				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	JAN-DEC	JAN-DEC
	Florida pompano				X	X	X	X	X	X	X	X	X	X	X	X	MAY-SEP	MAY-SEP	MAY-SEP	-	JAN-DEC
	Forage fish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Gizzard shad				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	MAY-JUN	MAY-JUN	-	JAN-DEC
	Gulf flounder					X	X	X	X	X	X	X	X	X	X	X	-	-	FEB-MAR	MAR-DEC	APR-NOV
	Harvestfish				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	-	-	-	-
	Hickory shad				X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY	MAR-MAY	MAR-MAY	JUN-NOV	NOV-MAY
	Jacks				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Ladyfish				X	X	X	X	X	X	X	X		X	X	X	-	-	OCT-MAY	MAR-AUG	-
	Largemouth bass				X	X	X	X	X	X	X	X	X	X	X	X	MAR-APR	-	-	-	JAN-DEC
	Longnose gar				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Northern puffer				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAY-AUG	MAY-AUG	-	JAN-DEC
	Pigfish				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	-	JAN-DEC
	Pinfish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-MAY	JAN-DEC	JAN-DEC
	Red drum				X	X	X	X	X	X	X	X	X	X	X	X	JUL-SEP	JUL-SEP	JUL-OCT	JAN-DEC	MAR-NOV
	Searobins				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAY-AUG	MAY-AUG	-	JAN-DEC
	Sharks				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Sheepshead				X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUL	MAY-JUL	JAN-DEC	JAN-DEC
	Silver perch				X	X	X	X	X	X	X	X	X	X	X	X	MAY-SEP	MAY-SEP	MAY-SEP	-	JAN-DEC
	Skates/rays				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Snapper/grouper					X	X	X	X	X	X	X	X				-	-	MAR-OCT	MAR-OCT	-
	Southern flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAR	JAN-DEC	JAN-DEC
	Southern kingfish					X	X	X	X	X	X	X	X	X	X	X	-	-	APR-SEP	MAR-DEC	MAR-DEC
	Spanish mackerel					X	X	X	X	X	X	X	X	X			-	-	MAY-SEP	MAY-NOV	MAR-NOV
	Spot				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAY	JAN-DEC	MAR-NOV
	Spotted seatrout				X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-OCT	JAN-DEC	JAN-DEC
	Striped bass				X	X	X	X	X	X	X	X	X	X	X	X	APR-JUN	APR-JUN	APR-JUN	JAN-DEC	JAN-DEC
	Striped mullet				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-APR	JAN-DEC	MAR-NOV
	Summer flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	JAN-APR	JAN-DEC	APR-DEC
	Sunfishes				X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	APR-JUL	APR-JUL	JAN-DEC	JAN-DEC
	Tautog				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	MAY-JUN	MAY-JUN	-	JAN-DEC
	Weakfish				X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	MAR-DEC
	White mullet							X	X	X	X	X	X	X	X	X	-	-	-	MAY-DEC	-
	White perch				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	JAN-DEC	JAN-DEC
515	American eel				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	AUG-DEC
	Atlantic croaker				X	X	X	X	X	X	X	X	X	X	X	X	-	-	SEP-MAY	JAN-DEC	MAR-NOV
	Atlantic menhaden				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-APR	JAN-DEC	MAR-NOV
	Black drum				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-MAY	JAN-DEC	MAR-NOV
	Black sea bass				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUN	MAY-JUN	MAY-JUN	JUN-SEP	JAN-DEC
	Bluefish					X	X	X	X	X	X	X	X	X	X	X	-	-	-	MAR-DEC	-
	Catfish				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	APR-JUL	JAN-DEC	JAN-DEC
	Forage fish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Gulf flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	JAN-DEC
	Houndfish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Jacks				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Ladyfish				X	X	X	X	X	X	X	X		X	X	X	-	-	OCT-MAY	MAR-AUG	-
	Pigfish				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	-	JAN-DEC
	Pinfish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-MAY	JAN-DEC	JAN-DEC
	Red drum				X	X	X	X	X	X	X	X	X	X	X	X	JUL-SEP	JUL-SEP	JUL-OCT	JAN-DEC	MAR-NOV
	Searobins				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAY-AUG	MAY-AUG	-	JAN-DEC
	Sheepshead				X	X	X	X	X	X	X	X	X	X	X	X	MAY-JUL	MAY-JUL	MAY-JUL	JAN-DEC	JAN-DEC
	Silver perch				X	X	X	X	X	X	X	X	X	X	X	X	MAY-SEP	MAY-SEP	MAY-SEP	-	JAN-DEC
	Snapper/grouper					X	X	X	X	X	X	X	X				-	-	MAR-OCT	MAR-OCT	-
	Southern flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAR	JAN-DEC	JAN-DEC
	Spot				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAY	JAN-DEC	MAR-NOV
	Spotted seatrout				X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	APR-SEP	APR-OCT	JAN-DEC	JAN-DEC
	Striped mullet				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-APR	JAN-DEC	MAR-NOV
	Summer flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	JAN-APR	JAN-DEC	APR-DEC
	Weakfish				X	X	X	X	X	X	X	X	X	X	X	X	APR-AUG	APR-AUG	APR-SEP	JAN-DEC	MAR-DEC
	White mullet							X	X	X	X	X	X	X	X	X	-	-	-	MAY-DEC	-
523	Atlantic croaker				X	X	X	X	X	X	X	X	X	X	X	X	-	-	SEP-MAY	JAN-DEC	MAR-NOV
	Black drum				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAR-MAY	JAN-DEC	MAR-NOV
	Forage fish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	JAN-DEC
	Gulf flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-APR	JAN-DEC	MAY-DEC
	Pigfish				X	X	X	X	X	X	X	X	X	X	X	X	MAR-JUN	MAR-JUN	MAR-JUN	-	JAN-DEC
	Pinfish				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-MAY	JAN-DEC	MAR-DEC
	Searobins				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	MAY-AUG	MAY-AUG	-	JAN-DEC
	Silver perch				X	X	X	X	X	X	X	X	X	X	X	X	MAY-SEP	MAY-SEP	MAY-SEP	-	JAN-DEC
	Southern flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAR	JAN-DEC	MAR-DEC
	Spot				X	X	X	X	X	X	X	X	X	X	X	X	-	-	DEC-MAY	JAN-DEC	MAR-NOV
	Striped mullet				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-APR	JAN-DEC	MAR-NOV
	Summer flounder				X	X	X	X	X	X	X	X	X	X	X	X	-	-	JAN-APR	JAN-DEC	MAR-DEC

HABITAT:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D
380	Seabeach amaranth	T	T		X	X	X	X	X	X	X	X	X	X	X	X
446	Spreading sandwort				X	X	X	X	X	X	X	X	X	X	X	X

INVERTEBRATE:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
18	Blue crab				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Brown shrimp				X	X	X	X	X	X	X	X	X	X	X	X	OCT-NOV	OCT-NOV	OCT-NOV	DEC-JUN	JAN-DEC
	Horseshoe crab				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	JAN-DEC	JAN-DEC
	Pink shrimp				X	X	X	X	X	X	X	X	X	X	X	X	APR-JUL	APR-JUL	APR-JUL	-	JAN-DEC
	White shrimp				X	X	X	X	X	X	X	X	X	X	X	X	MAR-NOV	MAR-NOV	MAR-NOV	-	JAN-DEC
117	Blue crab				X	X	X	X	X	X	X	X	X	X	X	X	MAR-OCT	MAR-OCT	APR-NOV	JAN-DEC	JAN-DEC
139	Blue crab			HIGH	X	X	X	X	X	X	X	X	X	X	X	X	MAR-OCT	MAR-OCT	APR-NOV	JAN-DEC	JAN-DEC
458	Bay scallop				X	X	X	X	X	X	X	X	X	X	X	X	AUG-DEC	AUG-DEC	AUG-DEC	JAN-DEC	JAN-DEC
460	Eastern oyster				X	X	X	X	X	X	X	X	X	X	X	X	MAY-NOV	MAY-NOV	MAY-NOV	JAN-DEC	JAN-DEC
461	Hard clam				X	X	X	X	X	X	X	X	X	X	X	X	APR-NOV	APR-NOV	APR-NOV	JAN-DEC	JAN-DEC
507	Atlantic rangia				X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	JAN-DEC	JAN-DEC
	Brown shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-JUN	APR-NOV	-
	Florida stone crab				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-	JAN-DEC	JAN-DEC
	Grass shrimp				X	X	X	X	X	X	X	X	X	X	X	X	APR-OCT	APR-OCT	APR-NOV	JAN-DEC	JAN-DEC
	Pink shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAY-NOV	JAN-DEC	-
	Portunus sp.				X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	-	-	JAN-DEC	JAN-DEC
	White shrimp							X	X	X	X	X	X	X	X	X	-	-	MAY-SEP	JUL-DEC	-

Species assemblages and abundances depicted on these maps and tables are based on multiple years of data and expert opinion and were intended to be used for this product, specifically. Please contact local experts and data providers for the most current information, as species composition and concentrations vary spatially and temporally.

North Carolina: ESIMAP 113 (cont.)

BIOLOGICAL RESOURCES: (cont.)

INVERTEBRATE: (cont.)

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Spawning	Eggs	Larvae	Juveniles	Adults
515	Atlantic rangia				X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	JAN-DEC	JAN-DEC
	Brown shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-JUN	APR-NOV	-
	Florida stone crab				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-	JAN-DEC	JAN-DEC
	Grass shrimp				X	X	X	X	X	X	X	X	X	X	X	X	APR-OCT	APR-NOV	APR-NOV	JAN-DEC	JAN-DEC
	Pink shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAY-NOV	JAN-DEC	-
	Portunus sp.				X	X	X	X	X	X	X	X	X	X	X	X	APR-SEP	-	-	JAN-DEC	JAN-DEC
	White shrimp								X	X	X	X	X	X	X		-	-	MAY-SEP	JUN-NOV	-
523	Atlantic rangia				X	X	X	X	X	X	X	X	X	X	X	X	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	MAR-MAY AUG-OCT	JAN-DEC	JAN-DEC
	Brown shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	NOV-JUN	APR-NOV	-
	Florida stone crab				X	X	X	X	X	X	X	X	X	X	X	X	MAY-AUG	-	-	JAN-DEC	JAN-DEC
	Grass shrimp				X	X	X	X	X	X	X	X	X	X	X	X	APR-OCT	APR-NOV	APR-NOV	JAN-DEC	JAN-DEC
	Pink shrimp				X	X	X	X	X	X	X	X	X	X	X	X	-	-	MAY-NOV	JAN-DEC	-
	White shrimp								X	X	X	X	X	X	X		-	-	MAY-SEP	JUN-NOV	-

MARINE MAMMAL:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Mating	Calving	Pupping	Molting
13	Bottlenose dolphin				X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-
	West Indian manatee	E	E							X	X	X	X	X			-	-	-	-
15	Bottlenose dolphin				X	X	X	X	X	X	X	X	X	X	X	X	-	MAY-JUN SEP-OCT	-	-
	Gray seal			LOW	X	X	X	X								X	-	-	-	-
	Harbor seal			COMMON	X	X	X	X								X	-	-	-	-
	Harp seal			LOW	X	X	X	X								X	-	-	-	-
	Hooded seal			LOW	X	X	X	X								X	-	-	-	-
	Humpback whale	E	E		X	X	X	X								X	-	-	-	-
	North Atlantic right whale	E	E		X	X	X	X	X						X	X	-	-	-	-

REPTILE:

RAR#	Species	S	F	Conc.	J	F	M	A	M	J	J	A	S	O	N	D	Nesting	Hatching	Internesting	Juveniles	Adults
13	Green sea turtle	T	T					X	X	X	X	X	X	X	X	X	-	-	-	APR-DEC	-
	Kemp's ridley sea turtle	E	E					X	X	X	X	X	X	X	X	X	-	-	-	APR-DEC	-
	Loggerhead sea turtle	T	T					X	X	X	X	X	X	X	X	X	-	-	-	APR-DEC	-
15	Green sea turtle	T	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Kemp's ridley sea turtle	E	E		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Leatherback sea turtle	E	E		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
	Loggerhead sea turtle	T	T		X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-
54	Loggerhead sea turtle	T	T	6-48 NESTS					X	X	X	X	X	X	X	X	MAY-SEP	JUN-DEC	-	JUN-DEC	MAY-SEP
58	Green sea turtle	T	T	3 NESTS					X	X	X	X	X	X	X	X	-	-	-	APR-DEC	-
59	Loggerhead sea turtle	T	T	53-89 NESTS					X	X	X	X	X	X	X	X	MAY-SEP	JUN-DEC	-	JUN-DEC	MAY-SEP
387	American alligator	T			X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	-

HUMAN USE RESOURCES:

BOAT RAMP:

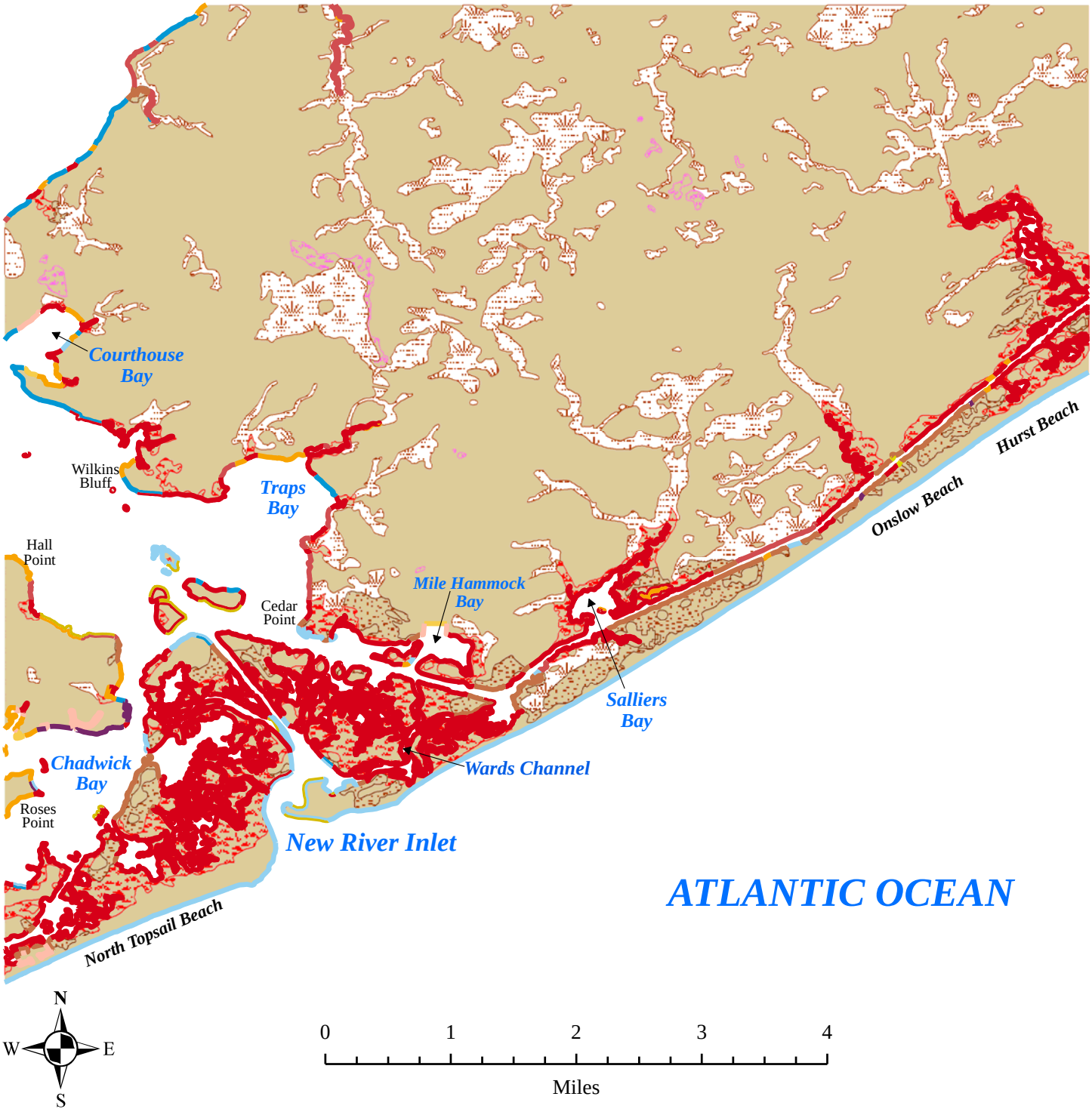
HUN#	Name	Contact	Phone
122	COURTHOUSE BAY MARINA	CAMERON BROOKS	910/450-7386
178	SECOND MARINE DIVISION BOAT BASIN		
181	SWAN POINT MARINA		

MARINA:

HUN#	Name	Contact	Phone
293	COURTHOUSE BAY MARINA	CAMERON BROOKS	910/450-7386
377	NEW RIVER MARINA		
421	SECOND MARINE DIVISION BOAT BASIN		
434	SWAN POINT MARINA		
443	TLZ BLUEBIRD		

Species assemblages and abundances depicted on these maps and tables are based on multiple years of data and expert opinion and were intended to be used for this product, specifically. Please contact local experts and data providers for the most current information, as species composition and concentrations vary spatially and temporally.

North Carolina Map 113
Environmental Sensitivity Index Map



Legend (More details on back of map)

Species Present in Area

Shoreline Types on Map

10A Salt- and brackish-water marshes	8C Sheltered riprap
10C Swamps	7 Exposed tidal flats
10D Scrub-shrub wetlands	6B Riprap
9A Sheltered tidal flats	4 Coarse-grained sand beaches
9B Vegetated low banks	3B Scarps and steep slopes in sand
8B Sheltered, solid man-made structures	1B Exposed, solid man-made structures

Content from North Carolina ESI - 2011

North Carolina Map 113

Biological Resources (Species Of Particular Concern Present At Any Time)

Birds	
Diving	Brown pelican *(Nesting Mar-Aug)*
Gull/Tern	Black skimmer *(State species of concern; Nesting Mar-Aug)*; Least tern *(State species of concern; Nesting Mar-Aug)*
Raptor	Bald eagle *(State threatened; Nesting Dec-Mar)*
Shorebird	American oystercatcher *(State species of concern; Nesting Mar-Aug)*; Killdeer *(Nesting Mar-Aug)*; Piping plover *(State threatened; Federally threatened; Nesting Mar-Aug)*; Willet *(Nesting Mar-Aug)*; Wilson's plover *(State species of concern; Nesting Mar-Aug)*
Wading	Green heron *(Nesting Apr-Aug)*; Rails *(Nesting Apr-Aug)*; Wading birds *(Nesting Mar-Sep)*
Fish	
Diadromous	American eel *(Larvae Dec-Apr; Juvenile Jan-Dec; Adults Aug-Dec)*; American shad *(Spawning Mar-May; Eggs Mar-May; Larvae Mar-Jun; Juvenile Apr-Dec; Adults Feb-May)*; Atlantic sturgeon *(State species of concern; Juvenile Jan-Dec; Adults Jun-Mar)*; Gizzard shad *(Spawning May-Jun; Eggs May-Jun; Larvae May-Jun; Adults Jan-Dec)*; Hickory shad *(Spawning Mar-May; Eggs Mar-May; Larvae Mar-May; Juvenile Jan-Dec; Adults Jan-Dec)*; Striped bass *(Spawning Apr-Jun; Eggs Apr-Jun; Larvae Apr-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*
Estuarine Nursery	Atlantic croaker *(Spawning Sep-Nov; Eggs Sep-Nov; Larvae Sep-May; Juvenile Jan-Dec; Adults Mar-Nov)*; Atlantic cutlassfish *(Spawning Apr-Aug; Eggs Apr-Aug; Larvae Apr-Aug; Adults Jan-Dec)*; Atlantic menhaden *(Larvae Nov-Apr; Juvenile Jan-Dec; Adults Mar-Nov)*; Black sea bass *(Spawning Mar-Jun; Eggs May-Jun; Larvae May-Jun; Juvenile Jun-Sep; Adults Jan-Dec)*; Bluefish *(Spawning Mar-Aug; Eggs Mar-Aug; Larvae Mar-Aug; Juvenile Mar-Dec; Adults Mar-Aug)*; Gulf flounder *(Spawning Nov-Mar; Eggs Nov-Mar; Larvae Dec-Apr; Juvenile Jan-Dec; Adults Jan-Dec)*; Gulf kingfish *(Spawning Apr-Oct; Eggs Apr-Oct; Larvae Apr-Nov; Juvenile Apr-Nov; Adults Apr-Oct)*; Ladyfish *(Larvae Oct-May; Juvenile Mar-Aug)*; Northern puffer *(Spawning May-Aug; Eggs May-Aug; Larvae May-Aug; Adults Jan-Dec)*; Pinfish *(Larvae Nov-May; Juvenile Jan-Dec; Adults Jan-Dec)*; Sheepshead *(Spawning May-Sep; Eggs May-Sep; Larvae May-Oct; Juvenile Jan-Dec; Adults Jan-Dec)*; Silver seatrout *(Spawning Jun-Jul; Eggs Jun-Jul; Larvae Jun-Aug; Juvenile Jun-Oct; Adults Jan-Dec)*; Southern flounder *(Spawning Nov-Mar; Larvae Dec-Mar; Eggs Nov-Mar; Juvenile Jan-Dec; Adults Jan-Dec)*; Southern kingfish *(Spawning Apr-Oct; Eggs Apr-Oct; Larvae Apr-Nov; Juvenile Mar-Dec; Adults Mar-Dec)*; Spot *(Spawning Oct-Mar; Larvae Dec-May; Eggs Oct-Mar; Juvenile Jan-Dec; Adults Jan-Dec)*; Striped mullet *(Larvae Nov-Apr; Juvenile Jan-Dec; Adults Mar-Nov)*; Summer flounder *(Spawning Nov-Mar; Larvae Jan-Apr; Eggs Nov-Mar; Juvenile Jan-Dec; Adults Jan-Dec)*; Weakfish *(Spawning Apr-Aug; Eggs Apr-Aug; Larvae Apr-Sep; Juvenile Jan-Dec; Adults Jan-Dec)*; White mullet *(Juvenile May-Dec)*; White perch *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Mar-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*; Windowpane *(Spawning Feb-Nov; Eggs Feb-Nov; Larvae Feb-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*
Estuarine Resident	Catfish *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Apr-Jul; Juvenile Jan-Dec; Adults Jan-Dec)*; Silver perch *(Spawning May-Sep; Eggs May-Sep; Larvae May-Sep; Adults Jan-Dec)*
Freshwater	Bowfin *(Spawning Apr-Jun; Adults Jan-Dec)*; Crappie *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Mar-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*; Largemouth bass *(Spawning Mar-Apr; Adults Jan-Dec)*; Longnose gar *(Adults Jan-Dec)*; Sunfishes *(Spawning Apr-Jul; Eggs Apr-Jul; Larvae Apr-Jul; Juvenile Jan-Dec; Adults Jan-Dec)*
Marine Benthic	Atlantic spadefish *(Spawning May-Sep; Eggs May-Sep; Larvae May-Sep; Adults Jan-Dec)*; Banded drum *(Spawning May-Oct; Eggs May-Oct; Larvae May-Oct; Adults Jan-Dec)*; Florida pompano *(Spawning May-Sep; Eggs May-Sep; Larvae Apr-Nov; Juvenile Apr-Nov; Adults Jan-Dec)*
Marine Pelagic	Butterfish *(Spawning Jun-Sep; Eggs Jun-Sep; Larvae Jun-Sep; Adults Jan-Dec)*; Dolphin *(Spawning Jan-Jun; Adults Jan-Dec)*; Harvestfish *(Spawning May-Jun; Juvenile May-Nov; Adults May-Nov)*; King mackerel *(Juvenile May-Nov; Adults May-Nov)*; Spanish mackerel *(Spawning May-Sep; Eggs May-Sep; Larvae May-Nov; Juvenile May-Nov; Adults Mar-Nov)*
Habitats and Rare Plants	
Wetland	Seabeach amaranth *(State threatened; Federally threatened)*
Shellfish	
Bivalve	Atlantic rangia *(Spawning Aug-May*; Eggs Aug-May*; Larvae Aug-May*; Juvenile Jan-Dec; Adults Jan-Dec)*; Bay scallop *(Spawning Aug-Dec; Eggs Aug-Dec; Larvae Aug-Dec; Juvenile Jan-Dec; Adults Jan-Dec)*; Eastern oyster *(Spawning May-Nov; Eggs May-Nov; Larvae May-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Hard clam *(Spawning Apr-Nov; Eggs Apr-Nov; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*
Crab	Blue crab *(Spawning Mar-Oct; Eggs Mar-Oct; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Horseshoe crab *(Juvenile Jan-Dec; Adults Jan-Dec)*; Portunus sp. *(Spawning Apr-Sep; Juvenile Jan-Dec; Adults Jan-Dec)*

North Carolina Map 113 (continued)

Shellfish (continued)	
Shrimp	Brown shrimp *(Spawning Oct-Nov; Eggs Oct-Nov; Larvae Oct-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*; Florida stone crab *(Spawning May-Aug; Juvenile Jan-Dec; Adults Jan-Dec)*; Grass shrimp *(Spawning Apr-Oct; Eggs Apr-Nov; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Pink shrimp *(Spawning Apr-Jul; Eggs Apr-Jul; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; White shrimp *(Spawning Mar-Nov; Eggs Mar-Nov; Larvae Mar-Nov; Juvenile Jun-Dec; Adults Jan-Dec)*
Marine Mammals	
Manatee	West Indian manatee *(State endangered; Federally endangered)*
Whale	Humpback whale *(State endangered; Federally endangered)*; North Atlantic right whale *(State endangered; Federally endangered)*
Reptiles and Amphibians	
Alligator	American alligator *(State threatened)*
Turtle	Green sea turtle *(State threatened; Federally threatened; Juvenile Apr-Dec)*; Kemp's ridley sea turtle *(State endangered; Federally endangered; Juvenile Apr-Dec)*; Leatherback sea turtle *(State endangered; Federally endangered)*; Loggerhead sea turtle *(State threatened; Federally threatened; Nesting May-Sep; Hatching Jun-Dec; Juvenile Apr-Dec; Adults May-Sep)*

(*) = This life stage occurs during the months listed, but not continuously.

Additional Species (No Life Stage Noted, but Present At Any Time)
Cormorants; Gulls; Terns; Northern gannet; Red knot; Sanderling; Semipalmated sandpiper; Shorebirds; Bitterns; American coot; Black scoter; Bufflehead; Mergansers; Ring-necked duck; Ruddy duck; Scaup; Black drum; Jacks; Pigfish; Scup; Sheepshead; Spotted seatrout; Tarpon; Forage fish; Gray triggerfish; Little tunny; Searobins; Tautog; Atlantic bonito; Bluefin tuna; Cobia; Greater amberjack; Houndfish; Sharks; White grunt; Spreading sandwort; Submerged aquatic vegetation; Bottlenose dolphin; Gray seal; Harbor seal; Harp seal; Hooded seal

Socioeconomic Resources

Icon	Type	Name	Contact	Phone
	Boat Ramp	Courthouse Bay Marina	CAMERON BROOKS	910/450-7386
	Boat Ramp	Second Marine Division Boat Basin		
	Boat Ramp	Swan Point Marina		
	Marina	Courthouse Bay Marina	CAMERON BROOKS	910/450-7386
	Marina	New River Marina		
	Marina	Second Marine Division Boat Basin		
	Marina	Swan Point Marina		
	Marina	Tlz Bluebird		

ESI Polygon Habitats

Pattern	ESI Rank	Habitat	Area (meters^2)
	10A	Salt- and brackish-water marshes	6,406,423
	10B	Freshwater marshes	363,501
	10C	Swamps	11,426,755
	10D	Scrub-shrub wetlands	2,389,795

North Carolina Map 113 (continued)

Shoreline Types (Length of ESI Shoreline on Map = 250,548 meters; Length of Shoreline on Map = 250,079 meters)

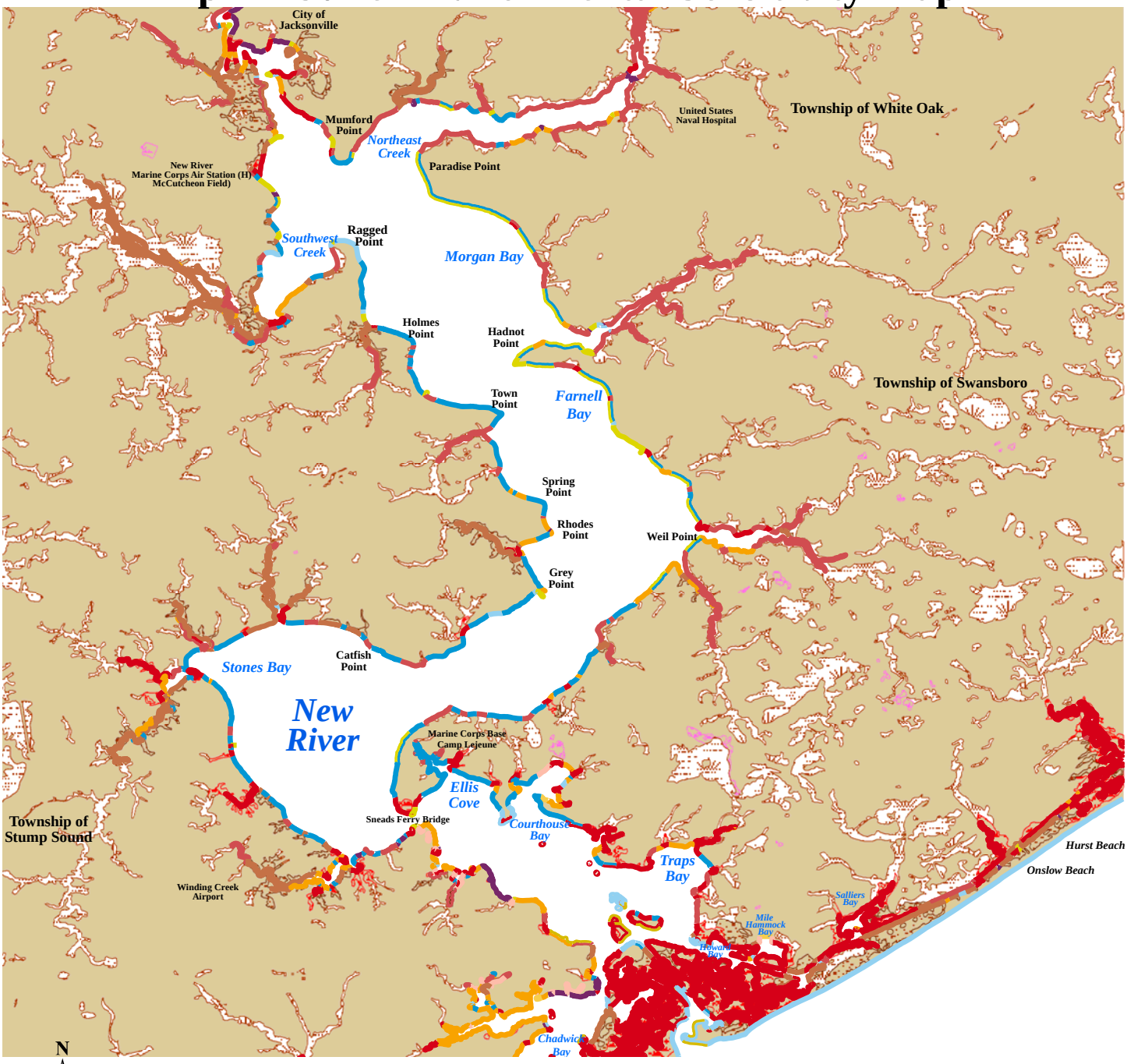
Color	ESI Rank	Shoreline Habitat	Length (meters)	% of ESI Shoreline
	10A	Salt- and brackish-water marshes	192,951	77
	10C	Swamps	8,233	3
	10D	Scrub-shrub wetlands	11,278	4
	9A	Sheltered tidal flats	974	<1
	9B	Vegetated low banks	6,831	2
	8B	Sheltered, solid man-made structures	3,281	1
	8C	Sheltered riprap	678	<1
	7	Exposed tidal flats	4,565	1
	6B	Riprap	111	<1
	4	Coarse-grained sand beaches	21,785	8
	3B	Scarps and steep slopes in sand	5,631	2
	1B	Exposed, solid man-made structures	1,744	<1

Note: A shoreline segment may include multiple shoreline habitats. If any segments include multiple habitats, the combined length of all habitats will exceed the length of the mapped ESI shoreline, and the percent of ESI shoreline values will sum to greater than 100%.

Content from North Carolina ESI - 2011

New River, North Carolina

April - June Environmental Sensitivity Map



Legend (More details on back of map)

Species Present in Area

Shoreline Types on Map

10A Salt- and brackish-water marshes	8C Sheltered riprap
10C Swamps	7 Exposed tidal flats
10D Scrub-shrub wetlands	6B Riprap
9A Sheltered tidal flats	4 Coarse-grained sand beaches
9B Vegetated low banks	3A Fine- to medium-grained sand beaches
8B Sheltered, solid man-made structures	3B Scarps and steep slopes in sand

Additional shoreline types are present - see back of map for complete listing.

Content from North Carolina ESI - 2011

New River, North Carolina

Biological Resources (Species Of Particular Concern Present April-june)

Birds	
Diving	Brown pelican *(Nesting Mar-Aug)*
Gull/Tern	Black skimmer *(State species of concern; Nesting Mar-Aug)*; Least tern *(State species of concern; Nesting Mar-Aug)*
Raptor	Bald eagle *(State threatened)*
Shorebird	American oystercatcher *(State species of concern; Nesting Mar-Aug)*; Killdeer *(Nesting Mar-Aug)*; Piping plover *(State threatened; Federally threatened; Nesting Mar-Aug)*; Willet *(Nesting Mar-Aug)*; Wilson's plover *(State species of concern; Nesting Mar-Aug)*
Wading	Green heron *(Nesting Apr-Aug)*; Rails *(Nesting Apr-Aug)*; Wading birds *(Nesting Mar-Sep)*
Fish	
Diadromous	American eel *(Larvae Dec-Apr; Juvenile Jan-Dec)*; American shad *(Spawning Mar-May; Eggs Mar-May; Larvae Mar-Jun; Juvenile Apr-Dec; Adults Feb-May)*; Atlantic sturgeon *(State species of concern; Juvenile Jan-Dec; Adults Jun-Mar)*; Gizzard shad *(Spawning May-Jun; Eggs May-Jun; Larvae May-Jun; Adults Jan-Dec)*; Hickory shad *(Spawning Mar-May; Eggs Mar-May; Larvae Mar-May; Juvenile Jan-Dec; Adults Nov-May)*; Striped bass *(Spawning Apr-Jun; Eggs Apr-Jun; Larvae Apr-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*
Estuarine Nursery	Atlantic croaker *(Larvae Sep-May; Juvenile Jan-Dec; Adults Mar-Nov)*; Atlantic cutlassfish *(Spawning Apr-Aug; Eggs Apr-Aug; Larvae Apr-Aug; Adults Jan-Dec)*; Atlantic menhaden *(Larvae Nov-Apr; Juvenile Jan-Dec; Adults Mar-Nov)*; Black sea bass *(Spawning Mar-Jun; Eggs May-Jun; Larvae May-Jun; Juvenile Jun-Sep; Adults Jan-Dec)*; Bluefish *(Spawning Mar-Aug; Eggs Mar-Aug; Larvae Mar-Aug; Juvenile Mar-Dec; Adults Mar-Aug)*; Gulf flounder *(Larvae Dec-Apr; Juvenile Jan-Dec; Adults Jan-Dec)*; Gulf kingfish *(Spawning Apr-Oct; Eggs Apr-Oct; Larvae Apr-Nov; Juvenile Apr-Nov; Adults Apr-Oct)*; Ladyfish *(Larvae Oct-May; Juvenile Mar-Aug)*; Northern puffer *(Spawning May-Aug; Eggs May-Aug; Larvae May-Aug; Adults Jan-Dec)*; Pinfish *(Larvae Nov-May; Juvenile Jan-Dec; Adults Jan-Dec)*; Sheepshead *(Spawning May-Jul; Eggs May-Jul; Larvae May-Jul; Juvenile Jan-Dec; Adults Jan-Dec)*; Silver seatrout *(Spawning Jun-Jul; Eggs Jun-Jul; Larvae Jun-Aug; Juvenile Jun-Oct; Adults Jan-Dec)*; Southern flounder *(Juvenile Jan-Dec; Adults Jan-Dec)*; Southern kingfish *(Spawning Apr-Oct; Eggs Apr-Oct; Larvae Apr-Nov; Juvenile Mar-Dec; Adults Mar-Dec)*; Spot *(Larvae Dec-May; Juvenile Jan-Dec; Adults Mar-Nov)*; Striped mullet *(Larvae Nov-Apr; Juvenile Jan-Dec; Adults Mar-Nov)*; Summer flounder *(Larvae Jan-Apr; Juvenile Jan-Dec; Adults Mar-Dec)*; Weakfish *(Spawning Apr-Aug; Eggs Apr-Aug; Larvae Apr-Sep; Juvenile Jan-Dec; Adults Mar-Dec)*; White mullet *(Juvenile May-Dec)*; White perch *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Mar-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*; Windowpane *(Spawning Feb-Nov; Eggs Feb-Nov; Larvae Feb-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*
Estuarine Resident	Catfish *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Apr-Jul; Juvenile Jan-Dec; Adults Jan-Dec)*; Silver perch *(Spawning May-Sep; Eggs May-Sep; Larvae May-Sep; Adults Jan-Dec)*
Freshwater	Bowfin *(Spawning Apr-Jun; Adults Jan-Dec)*; Crappie *(Spawning Mar-Jun; Eggs Mar-Jun; Larvae Mar-Jun; Juvenile Jan-Dec; Adults Jan-Dec)*; Largemouth bass *(Spawning Mar-Apr; Adults Jan-Dec)*; Longnose gar *(Adults Jan-Dec)*; Sunfishes *(Spawning Apr-Jul; Eggs Apr-Jul; Larvae Apr-Jul; Juvenile Jan-Dec; Adults Jan-Dec)*
Marine Benthic	Atlantic spadefish *(Spawning May-Sep; Eggs May-Sep; Larvae May-Sep; Adults Jan-Dec)*; Banded drum *(Spawning May-Oct; Eggs May-Oct; Larvae May-Oct; Adults Jan-Dec)*; Florida pompano *(Spawning May-Sep; Eggs May-Sep; Larvae May-Sep; Juvenile Apr-Nov; Adults Jan-Dec)*
Marine Pelagic	Butterfish *(Spawning Jun-Sep; Eggs Jun-Sep; Larvae Jun-Sep; Adults Jan-Dec)*; Dolphin *(Spawning Jan-Jun; Adults Jan-Dec)*; Harvestfish *(Spawning May-Jun; Juvenile May-Nov; Adults May-Nov)*; King mackerel *(Juvenile May-Nov; Adults May-Nov)*; Spanish mackerel *(Spawning May-Sep; Eggs May-Sep; Larvae May-Nov; Juvenile May-Nov; Adults Mar-Nov)*
Habitats and Rare Plants	
Wetland	Seabeach amaranth *(State threatened; Federally threatened)*
Shellfish	
Bivalve	Atlantic rangia *(Spawning Aug-May*; Eggs Aug-May*; Larvae Aug-May*; Juvenile Jan-Dec; Adults Jan-Dec)*; Bay scallop *(Juvenile Jan-Dec; Adults Jan-Dec)*; Eastern oyster *(Spawning May-Nov; Eggs May-Nov; Larvae May-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Hard clam *(Spawning Apr-Nov; Eggs Apr-Nov; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*
Crab	Blue crab *(Spawning Mar-Oct; Eggs Mar-Oct; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Horseshoe crab *(Juvenile Jan-Dec; Adults Jan-Dec)*; Portunus sp. *(Spawning Apr-Sep; Juvenile Jan-Dec; Adults Jan-Dec)*

New River, North Carolina (continued)

Shellfish (continued)	
Shrimp	Brown shrimp *(Larvae Nov-Jun; Juvenile Jan-Dec)*; Florida stone crab *(Spawning May-Aug; Juvenile Jan-Dec; Adults Jan-Dec)*; Grass shrimp *(Spawning Apr-Oct; Eggs Apr-Nov; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; Pink shrimp *(Spawning Apr-Jul; Eggs Apr-Jul; Larvae Apr-Nov; Juvenile Jan-Dec; Adults Jan-Dec)*; White shrimp *(Spawning Mar-Nov; Eggs Mar-Nov; Larvae Mar-Nov; Juvenile Jun-Nov; Adults Jan-Dec)*
Marine Mammals	
Manatee	West Indian manatee *(State endangered; Federally endangered)*
Whale	Humpback whale *(State endangered; Federally endangered)*; North Atlantic right whale *(State endangered; Federally endangered)*
Reptiles and Amphibians	
Alligator	American alligator *(State threatened)*
Turtle	Green sea turtle *(State threatened; Federally threatened; Juvenile Apr-Dec)*; Kemp's ridley sea turtle *(State endangered; Federally endangered; Juvenile Apr-Dec)*; Leatherback sea turtle *(State endangered; Federally endangered)*; Loggerhead sea turtle *(State threatened; Federally threatened; Nesting May-Sep; Hatching Jun-Dec; Juvenile Apr-Dec; Adults May-Sep)*

(*) = This life stage occurs during the months listed, but not continuously.

Additional Species (No Life Stage Noted, but Present April-june)
Cormorants; Gulls; Terns; Northern gannet; Red knot; Sanderling; Semipalmated sandpiper; Shorebirds; Bitterns; American coot; Black scoter; Bufflehead; Mergansers; Ring-necked duck; Ruddy duck; Scaup; Black drum; Jacks; Pigfish; Scup; Sheepshead; Spotted seatrout; Tarpon; Forage fish; Little tunny; Searobins; Tautog; Atlantic bonito; Cobia; Greater amberjack; Houndfish; Sharks; White grunt; Fourangle flatsedge; Spreading sandwort; Submerged aquatic vegetation; Bottlenose dolphin; Gray seal; Harbor seal; Harp seal; Hooded seal

Socioeconomic Resources

Icon	Type	Name	Contact	Phone
	Airport	New River Mcas		
	Airport	Whitewood Forest		
	Boat Ramp	Courthouse Bay Marina	CAMERON BROOKS	910/450-7386
	Boat Ramp	Gottschalk Marina	CAMERON BROOKS	910/451-8307
	Boat Ramp	Mcas Marina	CAMERON BROOKS	910/449-6578
	Boat Ramp	Old Ferry Marina Basin	BRUCE CARLSON	910/327-2258
	Boat Ramp	Paradise Landing		
	Boat Ramp	Second Marine Division Boat Basin		
	Boat Ramp	Still Water Marina	JOHN MCCHESNEY	910/989-2628
	Boat Ramp	Swan Point Marina		
	Historical Site	Historical Site		
	Marina	Courthouse Bay Marina	CAMERON BROOKS	910/450-7386
	Marina	Everetts Seafood	GIG EVERETT	910/327-2216
	Marina	Gottschalk Marina	CAMERON BROOKS	910/451-8307
	Marina	Grants Seafood	JUNIOR GRANT	
	Marina	Mcas Marina	CAMERON BROOKS	910/449-6578
	Marina	Millis Seafood		910/327-4571
	Marina	New River Landing	DENNIS CHISM	
	Marina	New River Marina		
	Marina	Old Ferry Marina Basin	BRUCE CARLSON	910/327-2258

New River, North Carolina (continued)

Socioeconomic Resources (continued)

Icon	Type	Name	Contact	Phone
	Marina	Paradise Landing		
	Marina	Second Marine Division Boat Basin		
	Marina	Sneads Ferry Seafood	BILLY MILLIS	910/327-7741
	Marina	Still Water Marina	JOHN MCCHESNEY	910/989-2628
	Marina	Swan Point Marina		
	Marina	Tlz Bluebird		

ESI Polygon Habitats

Pattern	ESI Rank	Habitat	Area (meters^2)
	10A	Salt- and brackish-water marshes	11,041,741
	10B	Freshwater marshes	577,315
	10C	Swamps	53,587,520
	10D	Scrub-shrub wetlands	6,965,999

Shoreline Types (Length of ESI Shoreline on Map = 542,706 meters; Length of Shoreline on Map = 476,443 meters)

Color	ESI Rank	Shoreline Habitat	Length (meters)	% of ESI Shoreline
	10A	Salt- and brackish-water marshes	251,298	46
	10C	Swamps	81,735	15
	10D	Scrub-shrub wetlands	87,508	16
	9A	Sheltered tidal flats	974	<1
	9B	Vegetated low banks	33,482	6
	8B	Sheltered, solid man-made structures	6,556	1
	8C	Sheltered riprap	678	<1
	7	Exposed tidal flats	5,167	<1
	6B	Riprap	16,936	3
	4	Coarse-grained sand beaches	30,185	5
	3A	Fine- to medium-grained sand beaches	730	<1
	3B	Scarps and steep slopes in sand	45,920	8
	1B	Exposed, solid man-made structures	7,568	1

Note: A shoreline segment may include multiple shoreline habitats. If any segments include multiple habitats, the combined length of all habitats will exceed the length of the mapped ESI shoreline, and the percent of ESI shoreline values will sum to greater than 100%.

Content from North Carolina ESI - 2011