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Tidal Waters Fish Habitat Assessment Analytical Framework

Fish Habitat Action Team Meeting

May 28, 2020

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Background and Drivers

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- 2014 Chesapeake Bay Agreement Fish Habitat Outcome
  - Specifically mentions new habitat assessments
- Previous and Concurrent Assessments
  - National and regional assessments limited in data inclusion and spatial scale
- 2018 STAC Workshop and Data Inventory
  - Underscored need for fish [habitat] assessments in both tidal and nontidal waters
- Assessment team formed - including NOAA, USGS, FHAT Coordinator, others
  - NOAA/NCCOS team working on tidal assessment and eel habitat project
  - USGS team working on nontidal assessment and eel habitat project
- CBT-funded Tetra Tech project to assess biological and habitat data availability nearly complete

Background and Drivers

Fish Habitat Outcome - 2020-2021 Logic and Action Plan

Element 2.3 calls for building an analytical framework in a candidate tributary

BIENNIAL STRATEGY REVIEW SYSTEM

Chesapeake Bay Program

Logic and Action Plan: Post-Quarterly Progress Meeting

Fish Habitat – 2020-2021

2.3	Build analytical (statistical) framework for candidate tidal tributary using physical and biological datasets.	Using small set of variables, develop an analytical, statistical framework for a candidate tributary (April).	NOAA/NCCOS	Tidal waters of candidate tributary (TBD)	April 2020

Selection of Choptank River as Candidate Tributary

We selected the Choptank River because of the extensive research and restoration work already being done

- Habitat Focus Area - designation under the NOAA Habitat Blueprint Program
- Extensive oyster restoration
- Watershed with continued land development and population growth

- Existing data collection
- An engaged community - Envision the Choptank

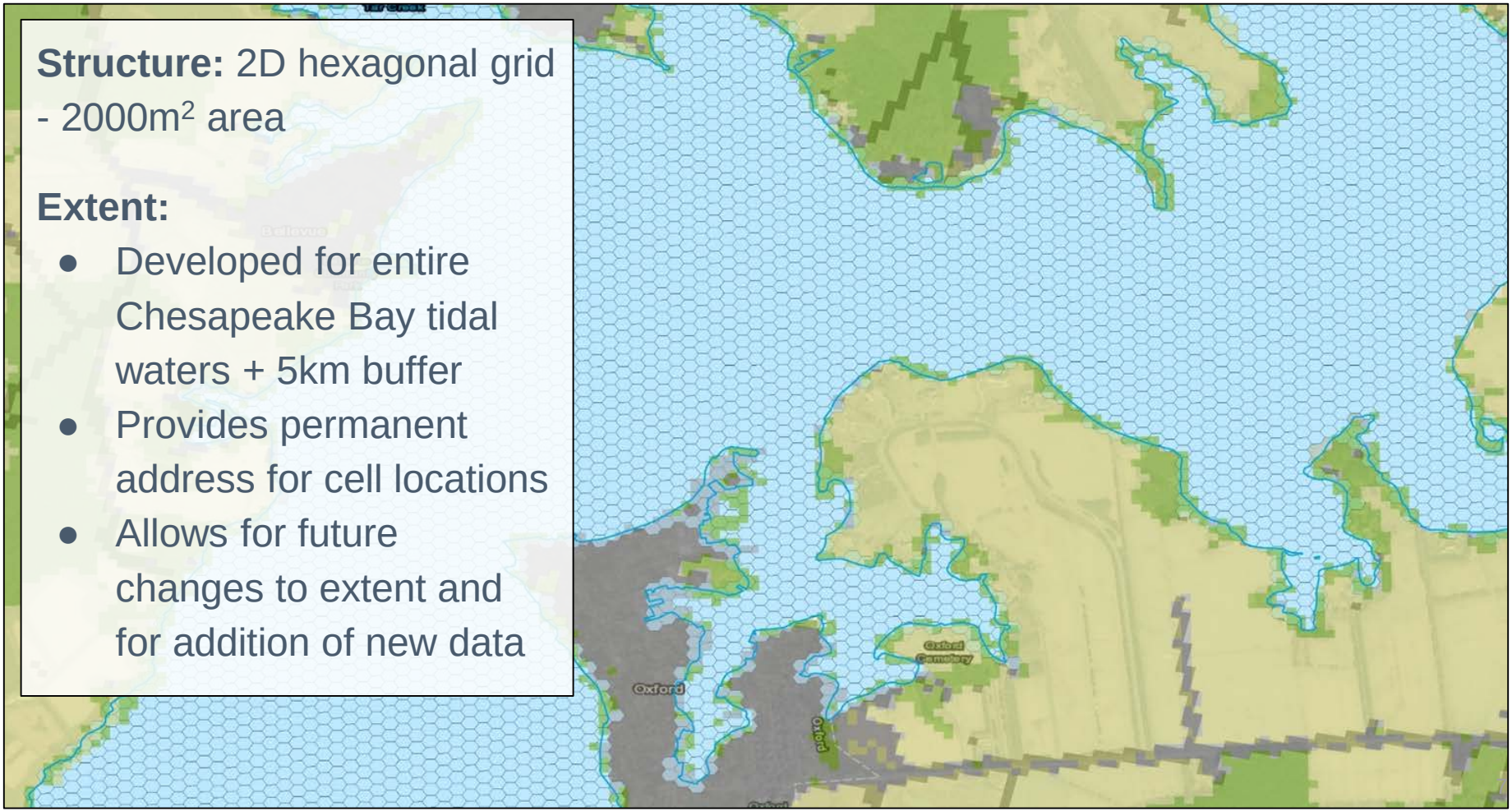
Framework Design

Framework Design

Structure: 2D hexagonal grid - 2000m^2 area

Extent:

- Developed for entire Chesapeake Bay tidal waters + 5km buffer
- Provides permanent address for cell locations
- Allows for future changes to extent and for addition of new data

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Habitat Layers
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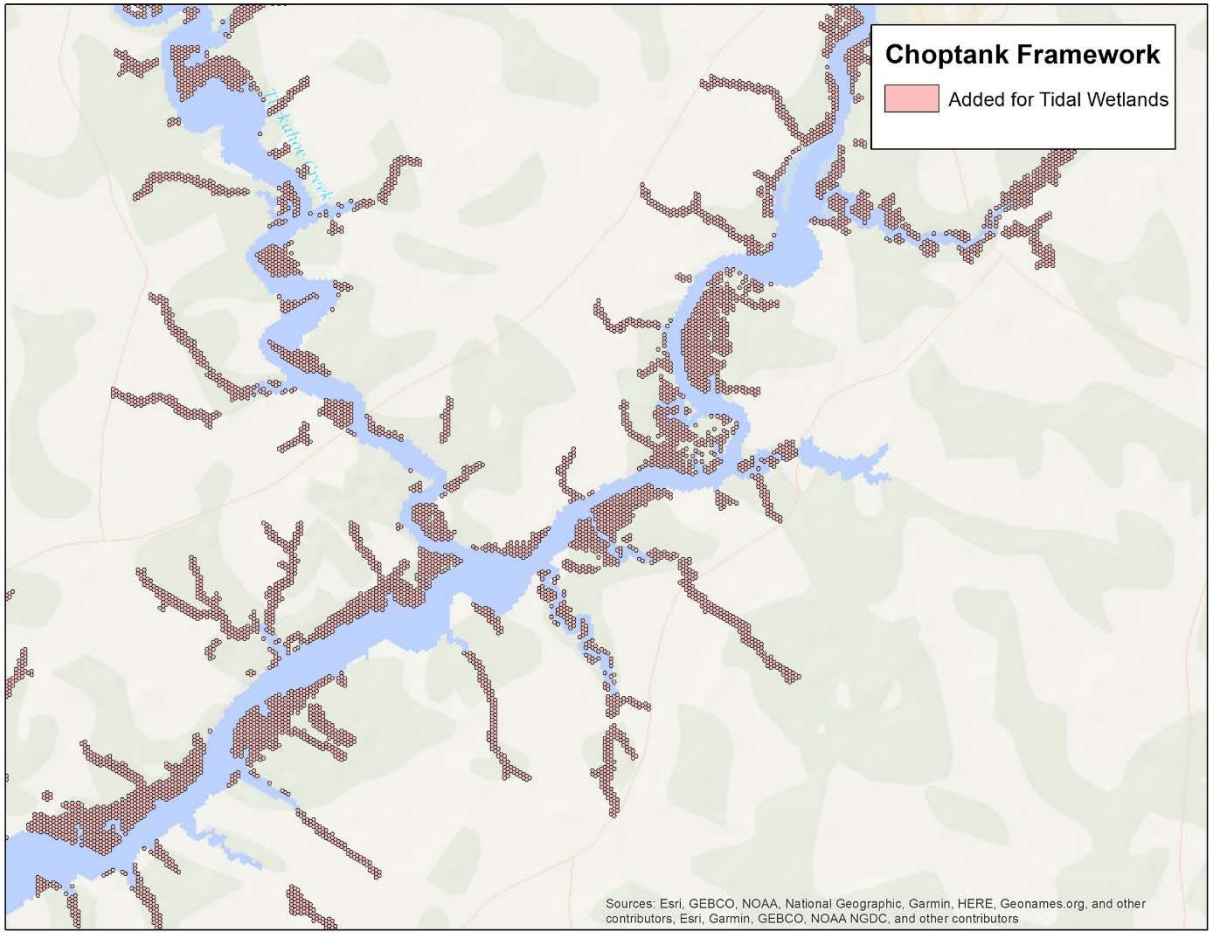
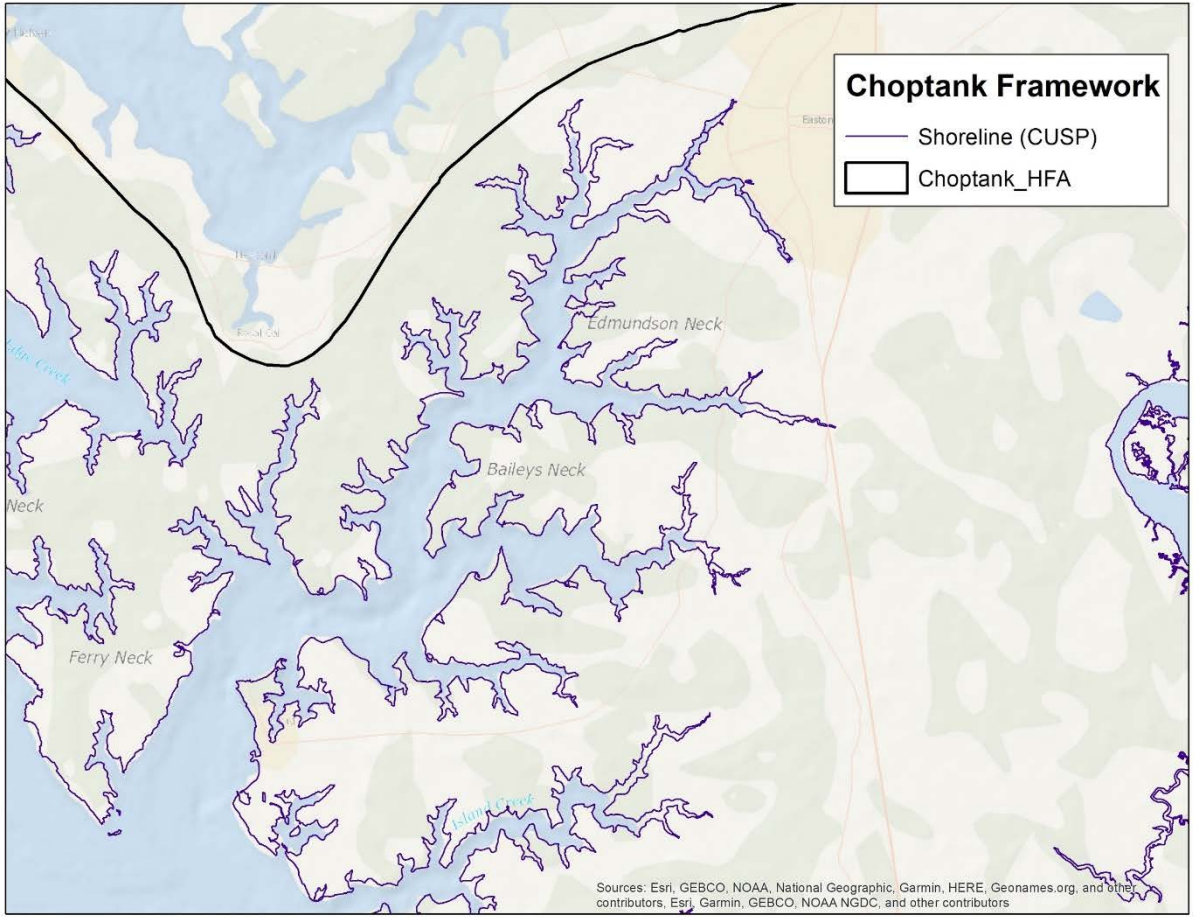
Framework Design for Choptank: Tidal Wetlands

- Important nursery habitat for a number of fish species;
- Included and based on Chesapeake Conservancy 1m^2 land cover data
- Extension of hexagons on land allows for inclusion of tidal wetlands



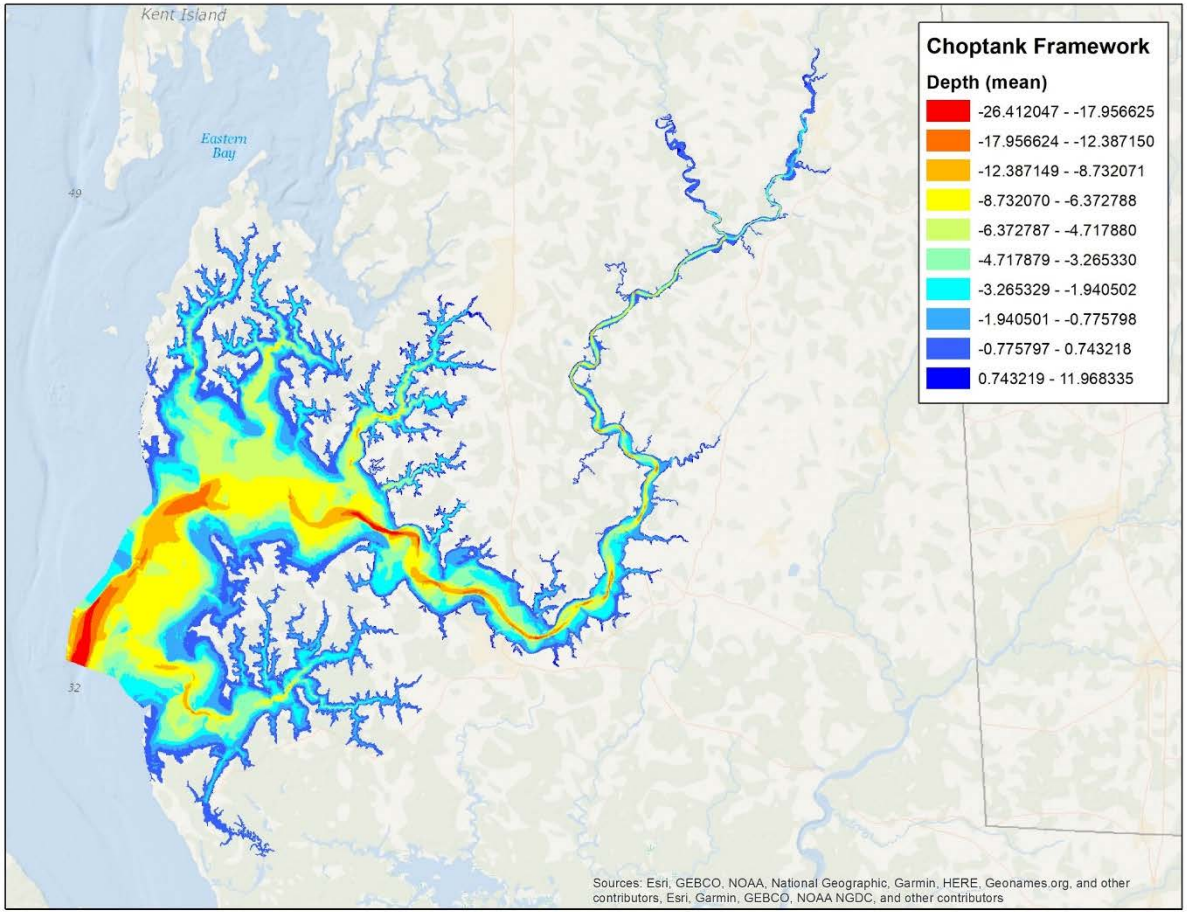
Habitat Layers: Shoreline

- Included a high resolution shoreline - NOAA Continually Updated Shoreline Product (CUSP)
- Allows observation of relatively small spatial scale differences in shoreline and near-shore habitat



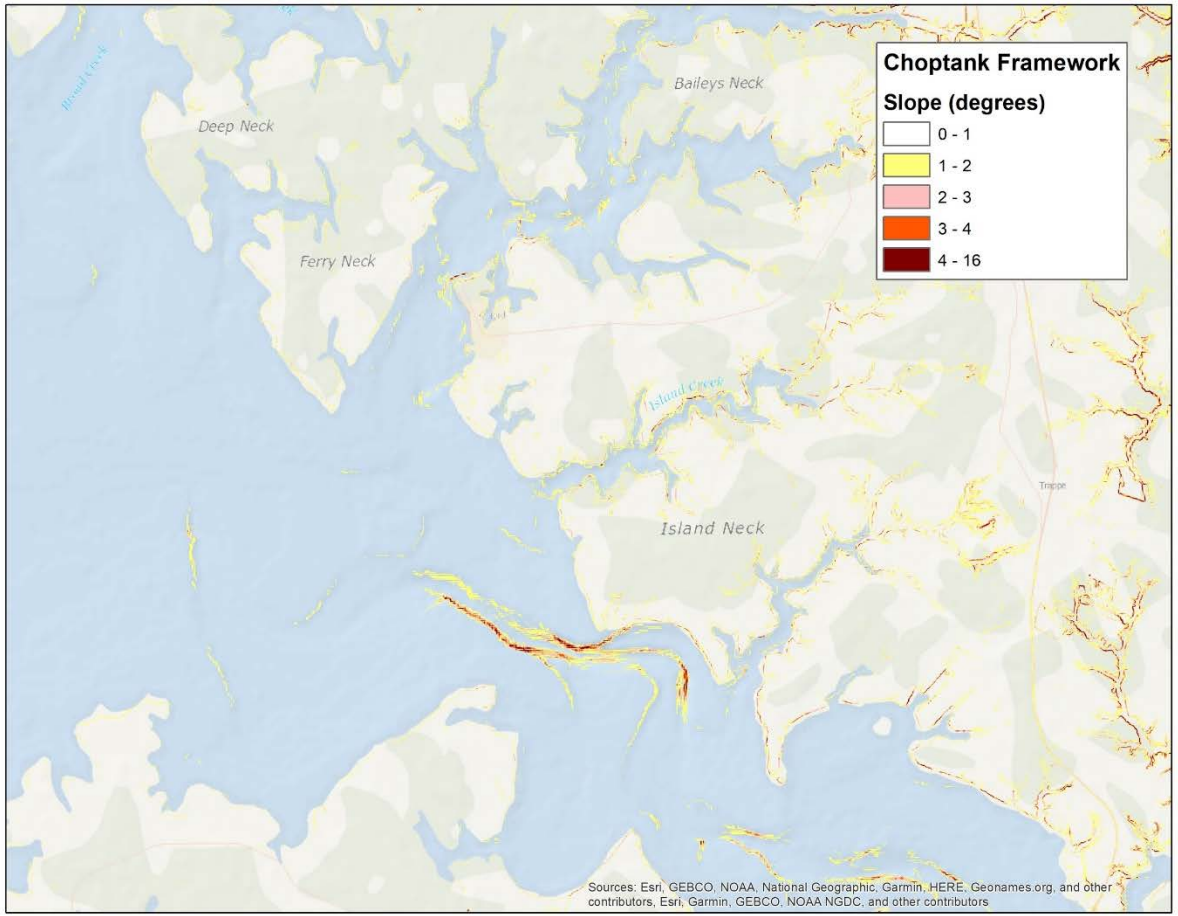
Habitat Layers: Bathymetry

- Included bathymetry from NOAA
- Using average depth within each hexagon for framework
- Extended to shoreline to capture important shallow-water habitat



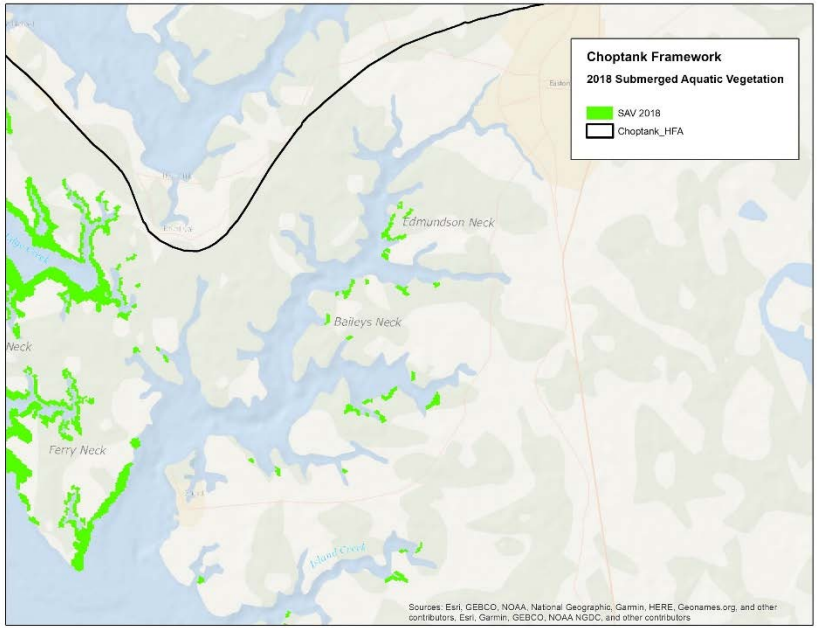
Habitat Layers: Slope and Rugosity

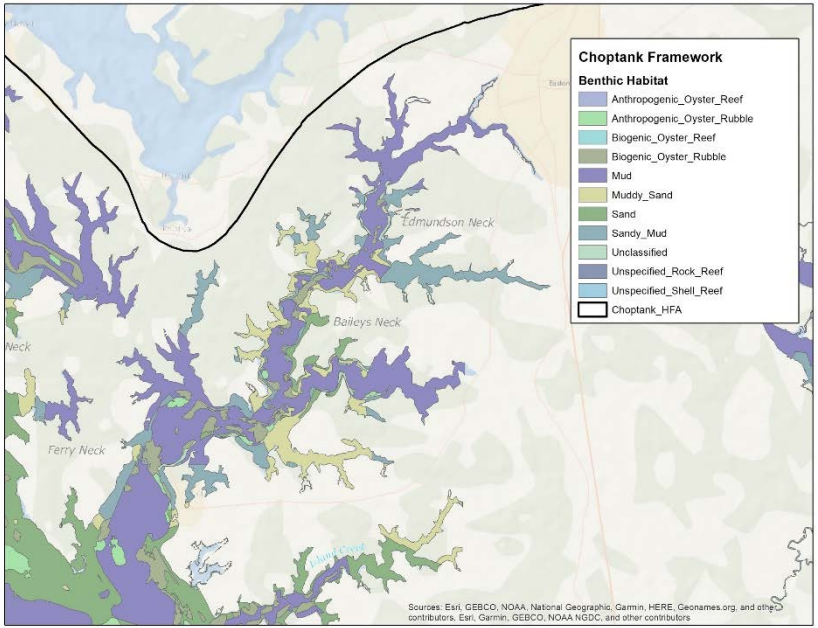
- Examples of variables that we are calculating in order to allow and improve assessment at fine scale
- Slope and rugosity (i.e. roughness) important habitat factors for some species
- Deriving variables from data in the framework is an advantage of this analytical statistical approach



Habitat Layers: SAV and Benthic Habitat

- Included as is important habitat for many fish
- SAV : considering a five year average area to control for interannual variability
- Benthic habitat: used the Chesapeake Bay Coastal Marine Ecological Classification Standard (CMECS) layer

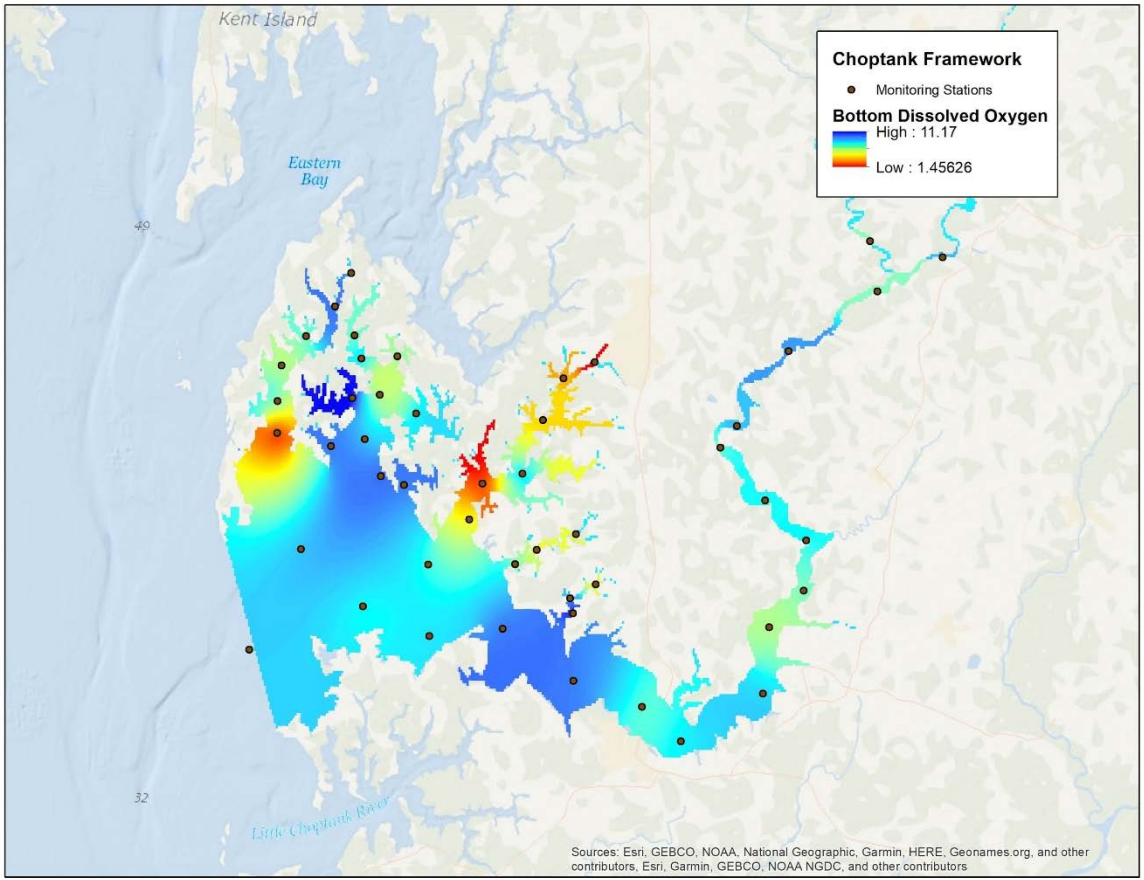




Habitat Layers: Water Quality

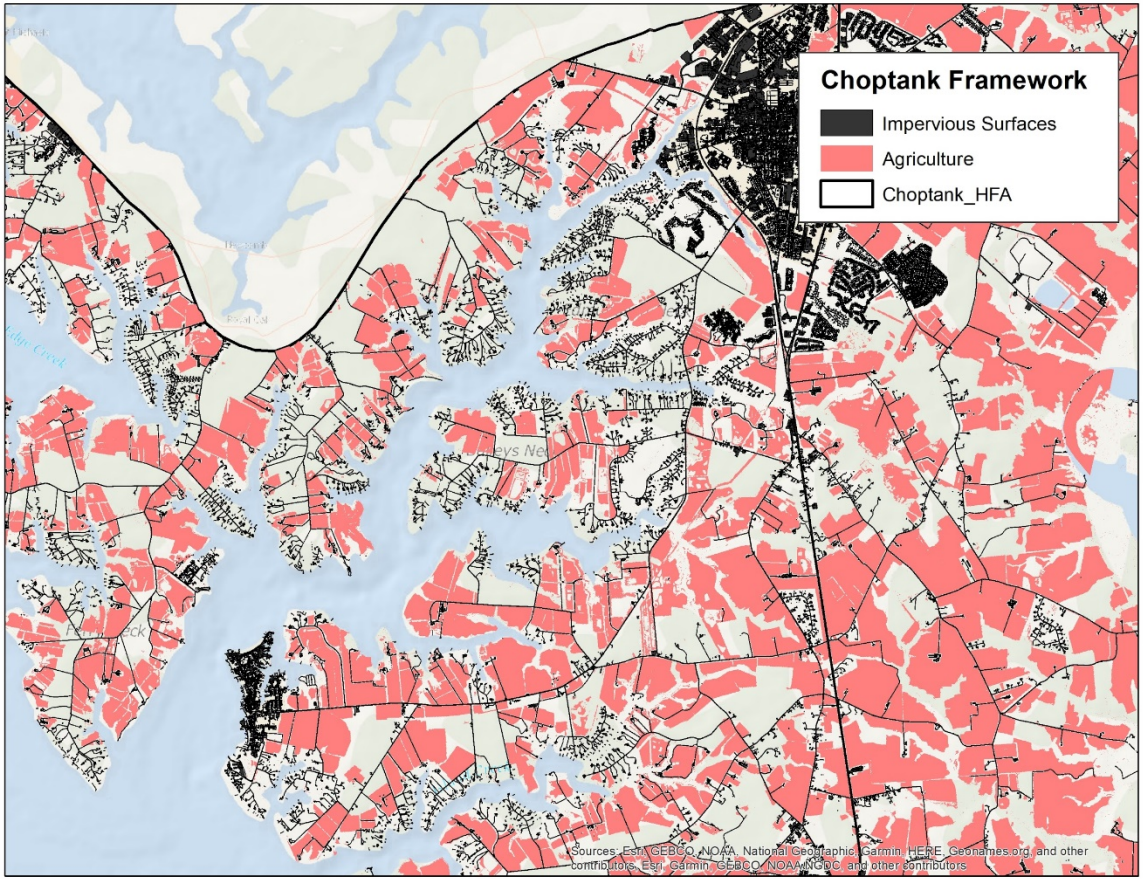
- Two sources:
  - ShoreRivers monitoring stations (n=52)
  - Total Suspended Matter grids (250m^2 grid cells; 10yr average values)

- Reviewed other data sources/ tools
  - Chesapeake Bay Program Water Quality Stations
  - Bay Interpolator
  - ChopROMS



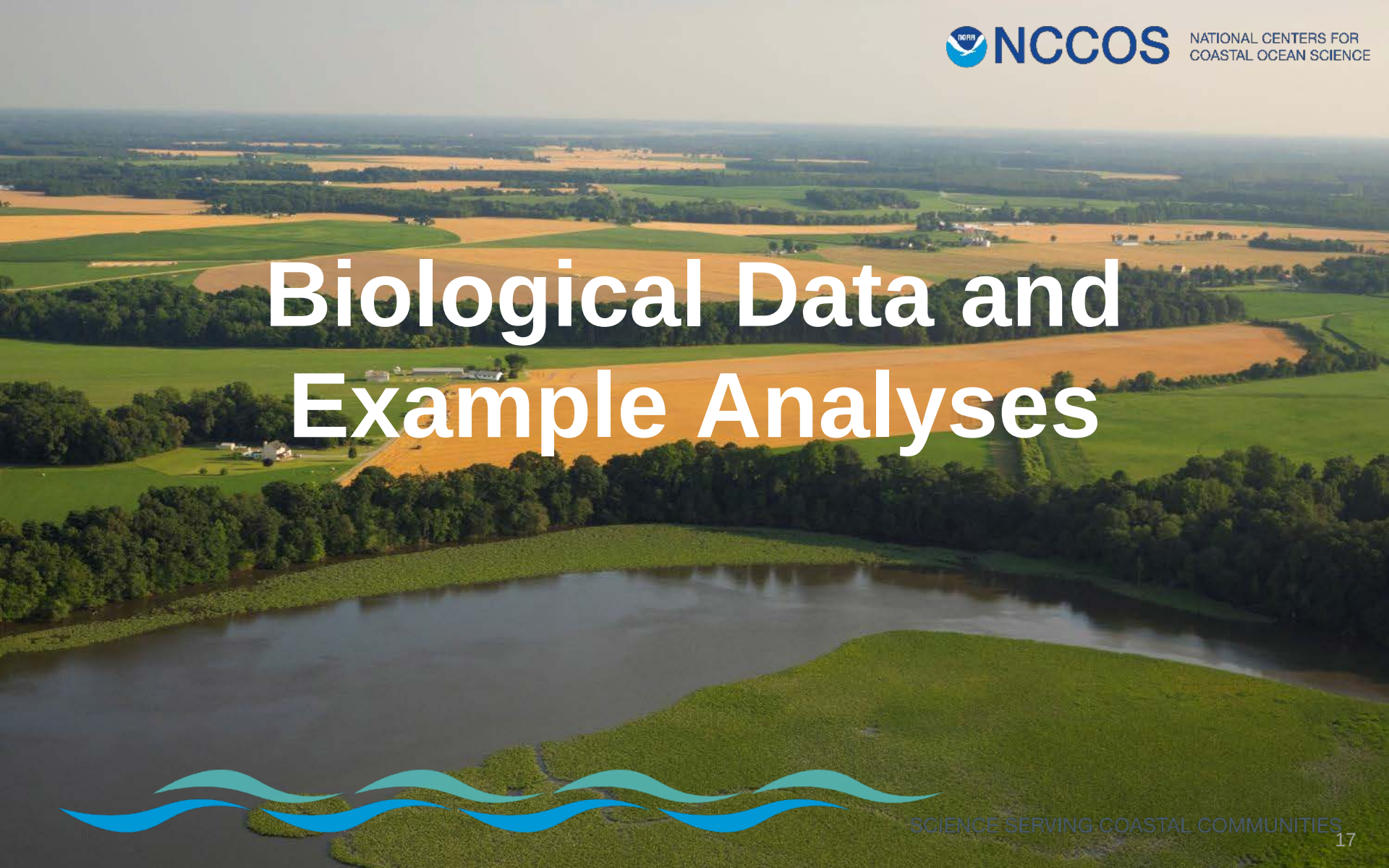
Habitat Layers: Land Use Data

- Chesapeake Conservancy 1m^2 land use layer
- Initially considering impervious surfaces and agriculture for each subwatershed
- Potential to leverage NHD Plus catchment data - including new Healthy Watersheds analysis
- Suggestions on best way to relate to hexagons?



Other Habitat Layers Collected for Framework

- **In-Water Variables**
  - Fish passage barriers
  - Benthic IBI
- **Land Characteristics**
  - Watershed Boundaries
- **Thoughts from group on others**?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Biological Data and
Example Analyses
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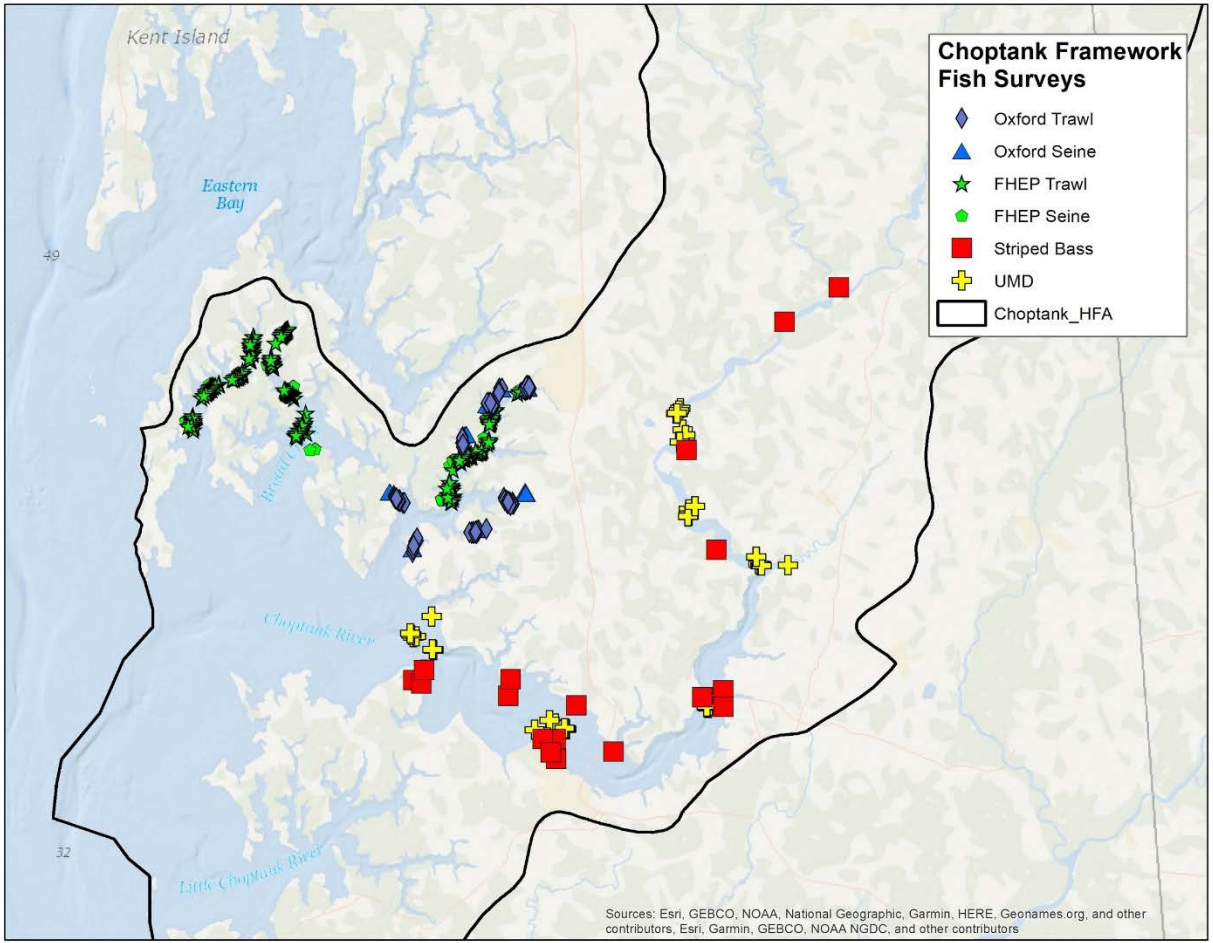
Biological Data

Fish and shellfish data:

- Cooperative Oxford Lab Trawl and Seine
- Juvenile Striped Bass Survey
- MD DNR Trawl and Seine
- UMD CBL Study
- Oyster Shell

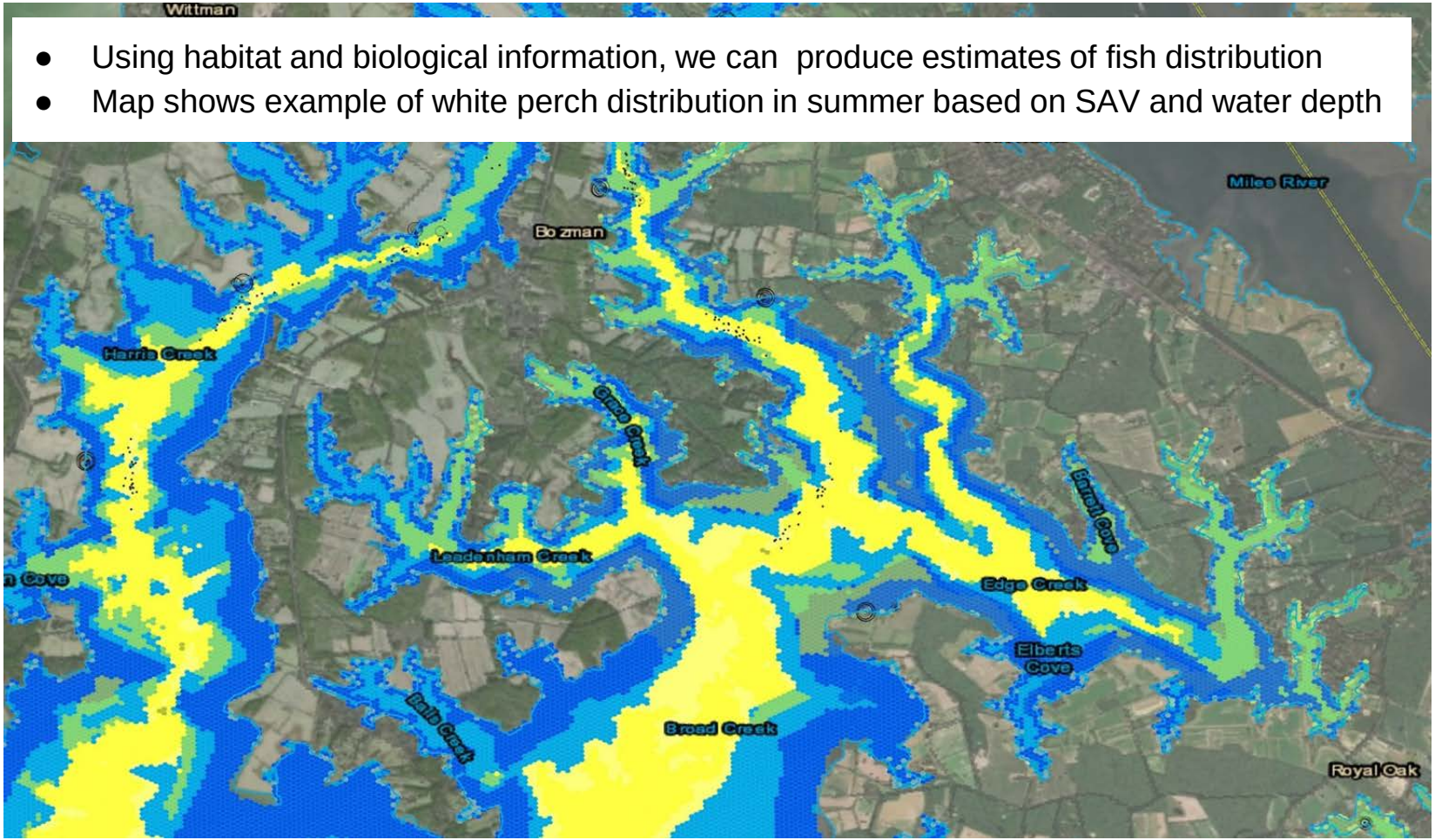
Other fish and shellfish data that could be included:

- Oyster Bars
- Choptank Fyke Net Survey
- MD DNR Blue Crab Surveys



Example Analysis – fish distribution

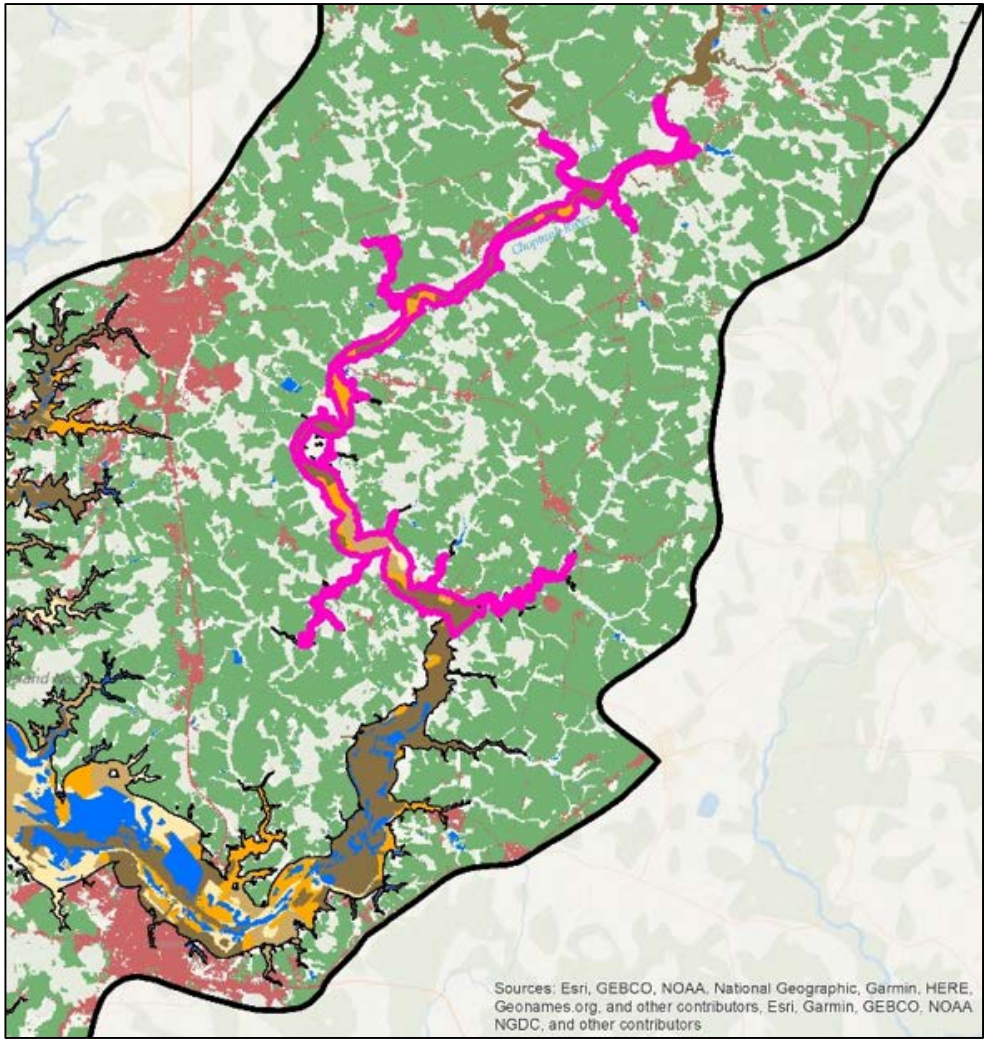
- Using habitat and biological information, we can produce estimates of fish distribution
- Map shows example of white perch distribution in summer based on SAV and water depth



EXAMPLE HABITAT CHARACTERIZATION:

Striped Bass Spawning Area (pink polygon)

- Shoreline: 0.6% man-made
- Average depth: 2.3m
- No oyster bars
- No SAV
- Mud: 58%
- Sandy-mud: 25.6%
- Muddy-sand: 13.2%
- Sand: 2.7%



Next Steps and Collaborations

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Next Steps - 2020-20201 Logic and Action Plan

Action #	Description	Performance Target(s)	Responsible Party (or Parties)	Geographic Location	Expected Timeline
2.3 Cont'd	Obtain feedback on the tidal framework from regional experts and incorporate feedback in final version of analytical (statistical) framework to Chesapeake Bay tidal areas.	Review the analytical and statistical framework with regional experts.	NOAA/NCCOS	Tidal waters of candidate tributary (TBD)	July 2020
		Testing of analytical framework for select tributary(s) informs development of recommendations for extending framework.	NOAA/NCCOS Fish GIT	Tidal waters of candidate tributary (TBD)	December 2020
2.4	Develop recommendations for extending the tidal analytical /statistical framework from candidate tributary to Chesapeake Bay tidal areas.	Recommendation report distributed to the Fisheries GIT, Fish Habitat Action Team, and other stakeholders.	NOAA/NCCOS	Tidal Waters of Bay	January 2021
2.7	Build on non-tidal and tidal analytical and assessment work to identify options for joint NOAA-USGS pilot with non-tidal and tidal habitats.	Options to identify means of achieving better understanding of habitat, stressor and species relationships from headwaters to estuary.	USGS and NOAA/NCCOS, NOAA/NCBO	Chesapeake Bay Watershed	October 2021

Project Team

Team Members	Affiliation/Contact
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David Bruce	NOAA/Office of Habitat/Chesapeake Bay Office

Discussion Questions

Discussion Questions

1. What are your initial thoughts about the analytical framework?

2. Are there "must have" habitat variables that are missing?

3. Do you have suggestions on how to best include water quality?

4. Do you have suggestions on conducting the July workshop with experts given Covid-19?

Resource Links

Choptank River Habitat Focus Area Storymap

Tred Avon Ecological Assessment Storymap

Choptank Digital Atlas

Envision the Choptank