Chesapeake Bay Program and Chesapeake Conservancy:

General Geospatial Support Under Objective Four

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Chesapeake Conservancy
EXPLORE. CONSERVE. INNOVATE.

CONSERVATION INNOVATION CENTER
CHESAPEAKE CONSERVANCY

What We're Discussing Today

- Overview of the objectives
- Deep dive into Objective 4
  - Surveying
  - GIS cataloging
- Talkback on goals, needs
- Moving forward

CBP Objectives

Objective 1: Land Cover and Land Use

- Partnering with University of Vermont

Objective 2: Hydrology & Ditches

- Partnering with UMBC

Objective 3: BMP Mapping & Tracking

- Partnering with Chesapeake Commons and Drexel University

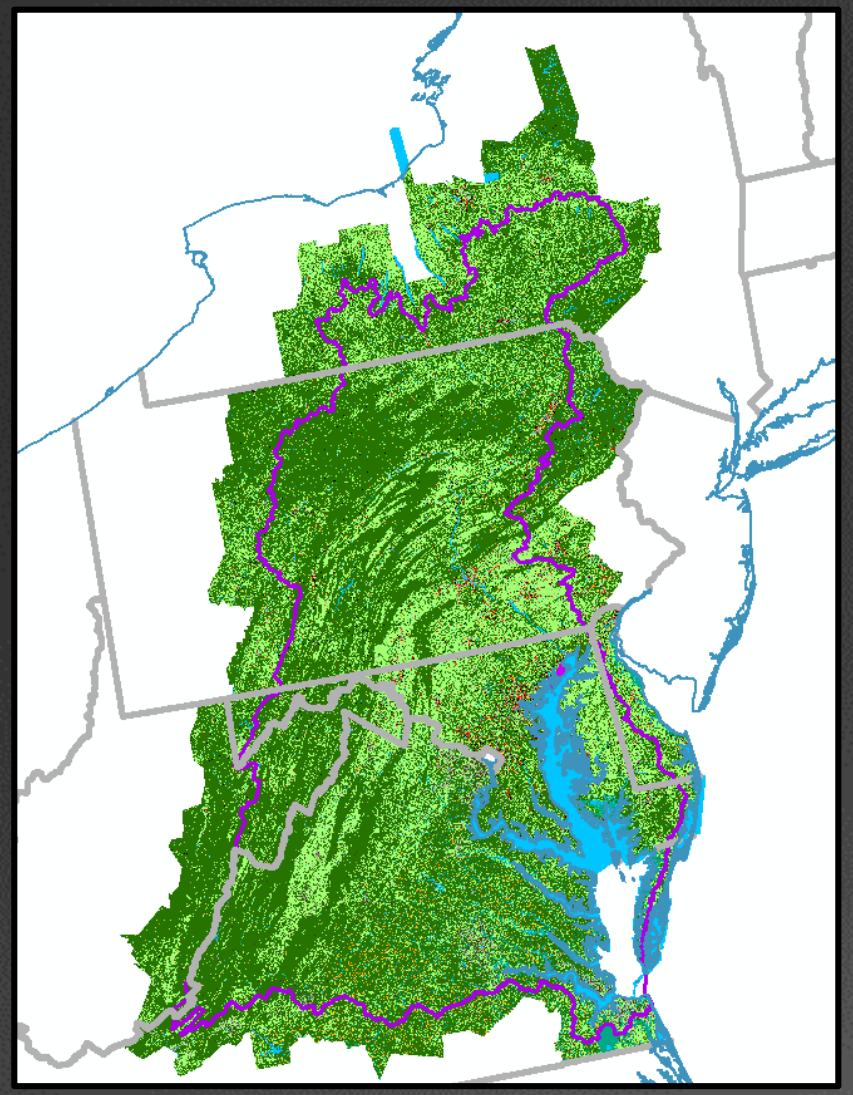
Objective 4: General Geospatial Support

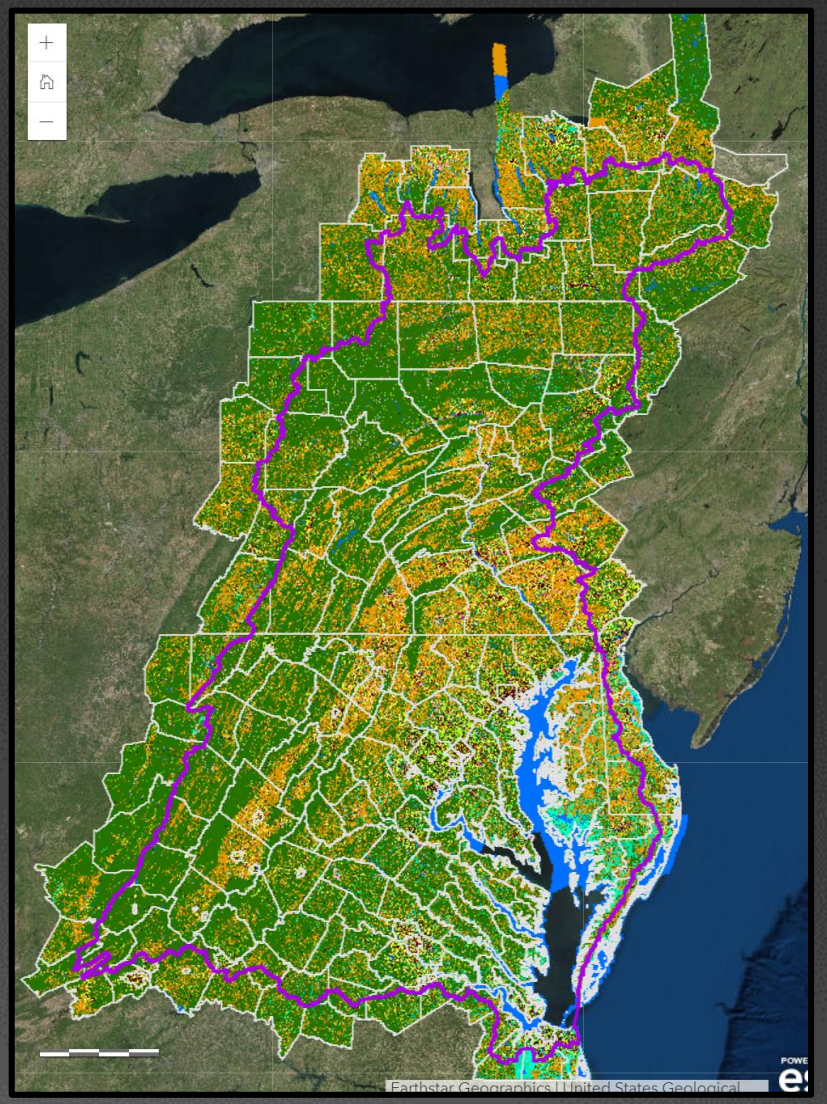
Objective 1: Land Cover and Land Use

Partnering with University of Vermont Spatial Analysis Laboratory

Main Goal: Create high-resolution land cover and land use maps for the entire Chesapeake Bay watershed for **2017/18**, and for **2021/22.**

2013/2014 Land Cover and Land Use





Water	Structures
Wetlands	Impervious
Forest	Roads
Shrubland	Tree Canopy over Structures
Herbaceous Vegetation	Tree Canopy over Impervious Surfaces
Barren	Tree Canopy over Impervious Roads

- Impervious, Road
- Impervious, Non-Road
- Tree Canopy over Impervious
- Water
- Tidal Wetlands
- Floodplain Wetlands
- Other Wetlands
- Forest
- Tree Canopy over Turf
- Mixed Open
- Fractional Turf (small)
- Fractional Turf (med)
- Fractional Turf (large)
- Fractional Impervious
- Turf Grass
- Cropland
- Pasture

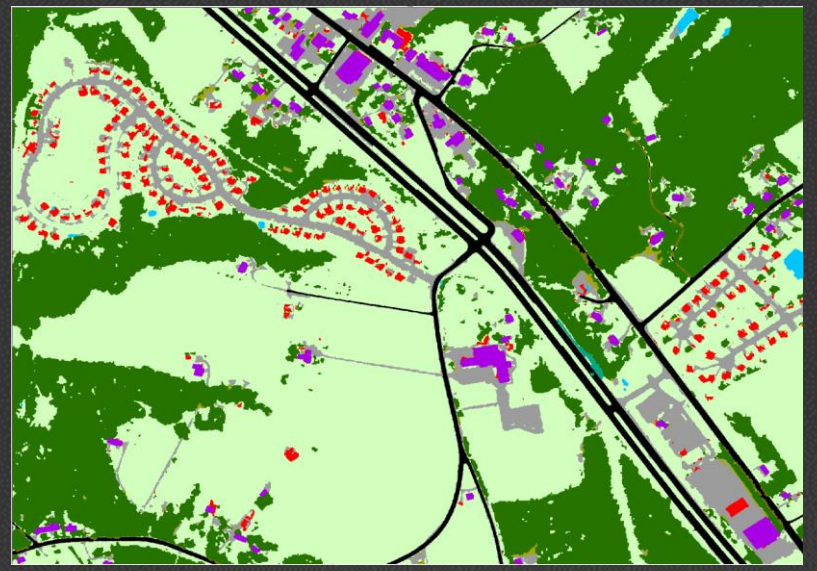
High-resolution Data

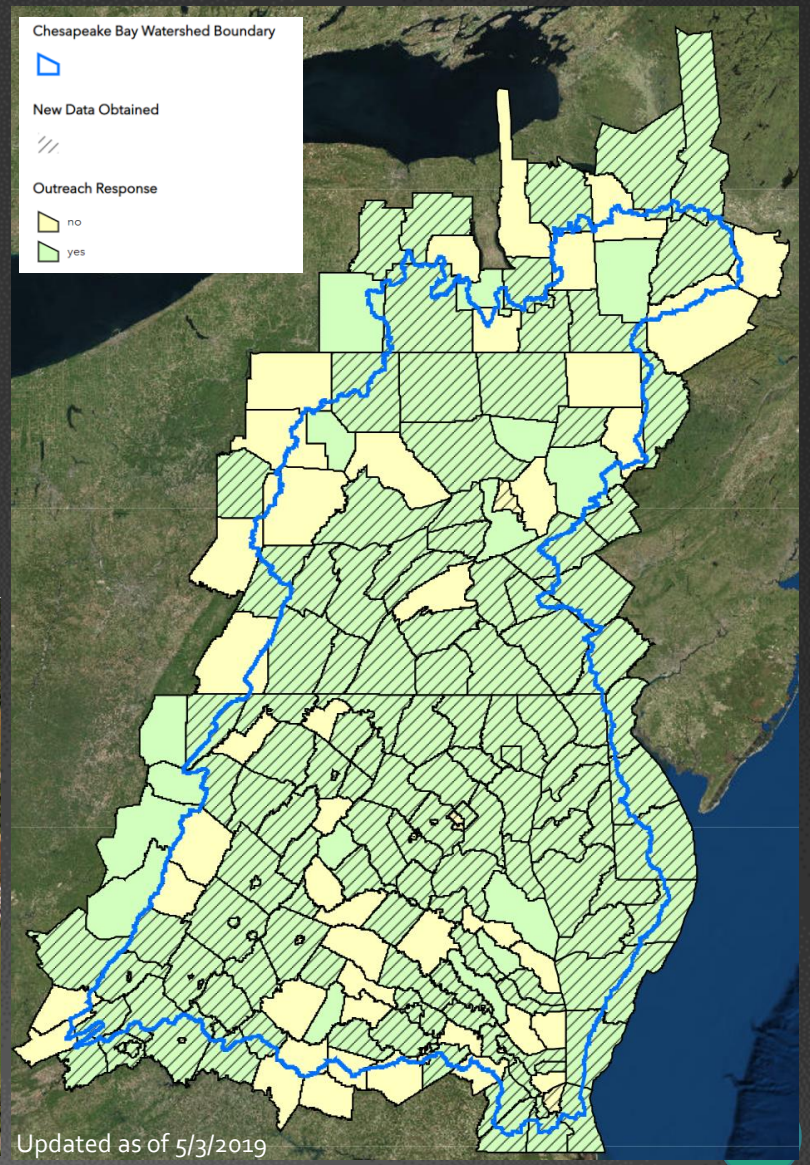
Planning at the Parcel Scale

Planimetric Data

Integrate county planning data:

- Parcel Data
- Local Land Use Data
- Building Footprints
- Street Centerlines
- Zoning Data
- MS4
- Sewer Service Data
- *storm water infrastructure (inlets, outputs, etc.),*
- *culverts and other structures that convey water, and*
- *locations of existing BMPs (infiltration ponds, curb cuts, etc.)*

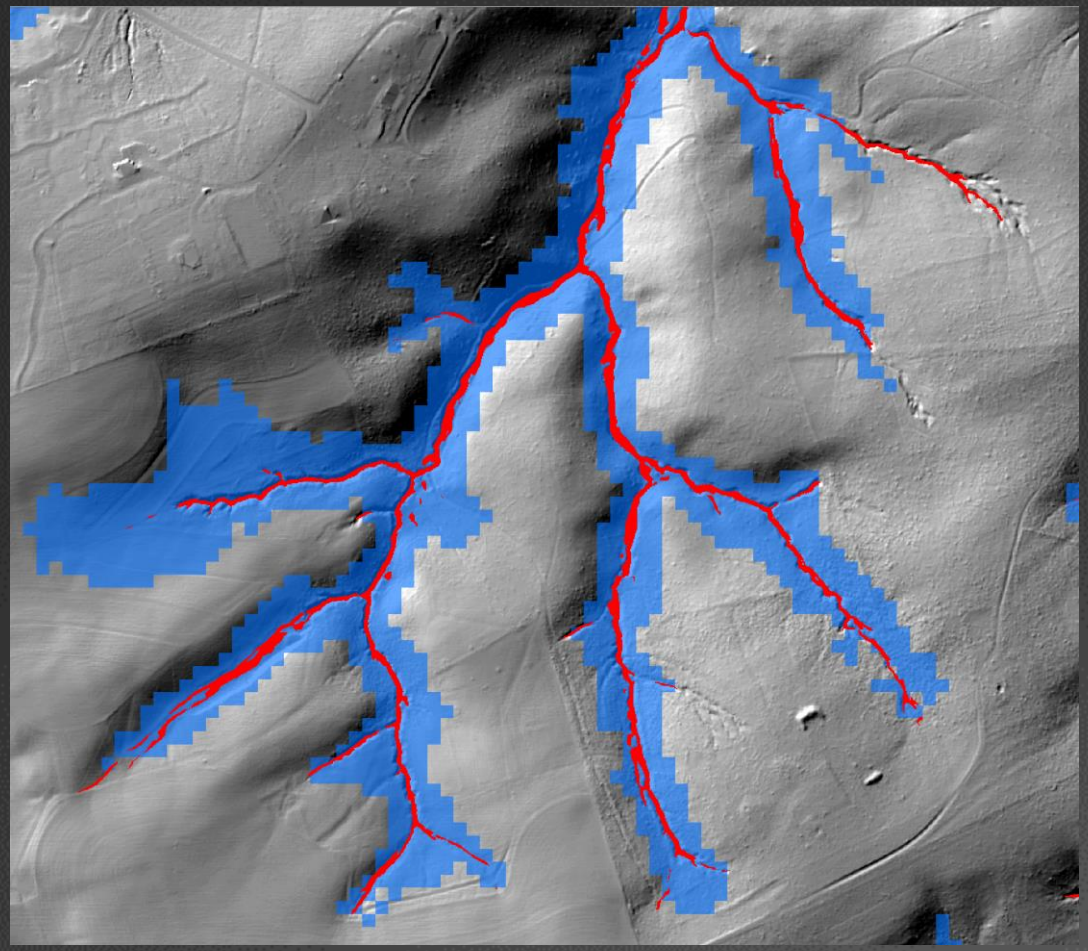


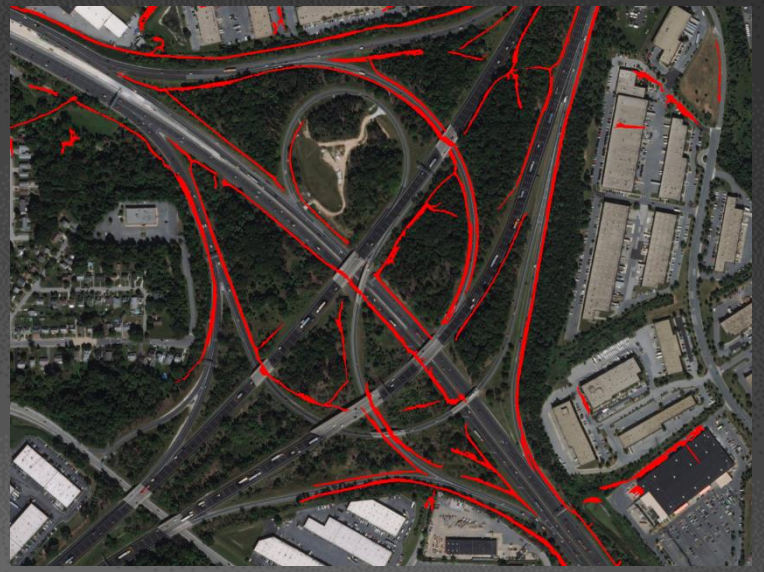


Updated as of 5/3/2019

Objective 2: Hydrology and Ditch Mapping

Main Goal: Use high-resolution LiDAR elevation models to classify terrain and extract stream valleys to then delineate channels.





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Objective 3: BMP Mapping and Tracking

Main Goal: Develop 6-year dynamic blueprint for conservation strategies. Help identify opportunities and practices to help move towards Watershed Implementation (WIP) goals, while tracking implementation.

Water and Sediment Control Basins

Contour Buffer Strips

Grassed Waterways

Louis Keddell- lkeddell@chesapeakeconservancy.org

Objective 4: General Geospatial Support

Partnering with Chesapeake Bay Program

Main Goal: To provide geospatial planning and support to CBP to allow partners to integrate geospatial data into management efforts

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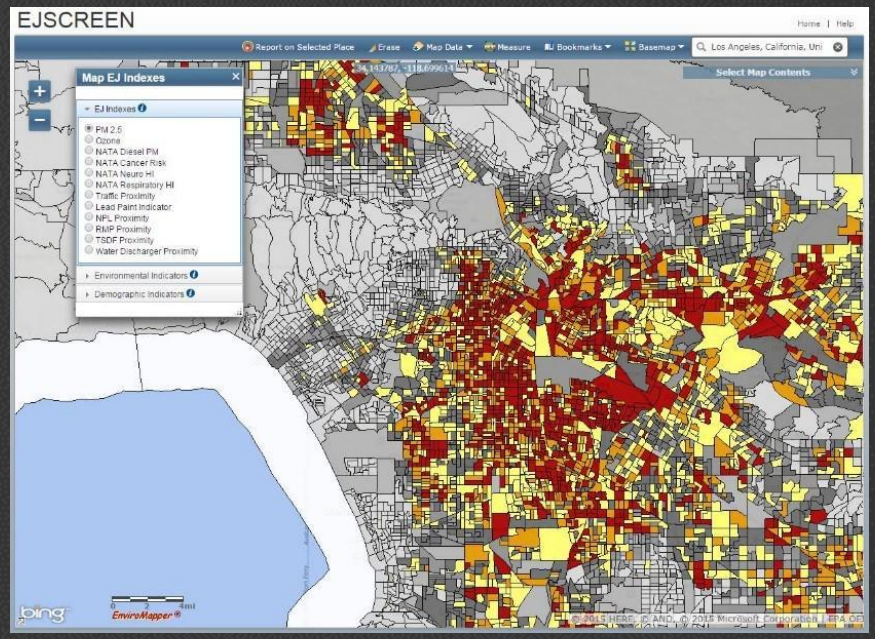
Taking an account of the current structures for GIS data creation and use at a Bay-wide scale…

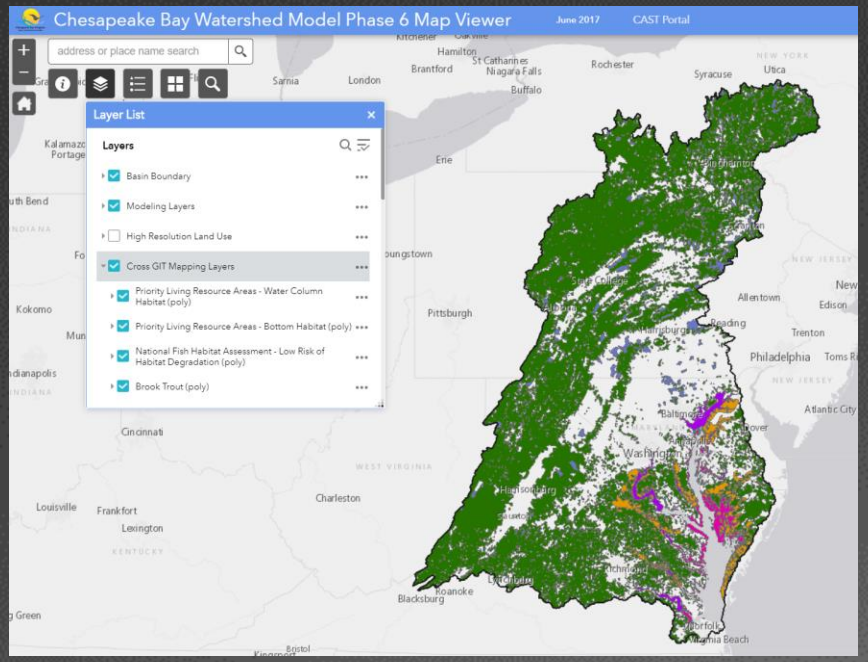
Existing Examples

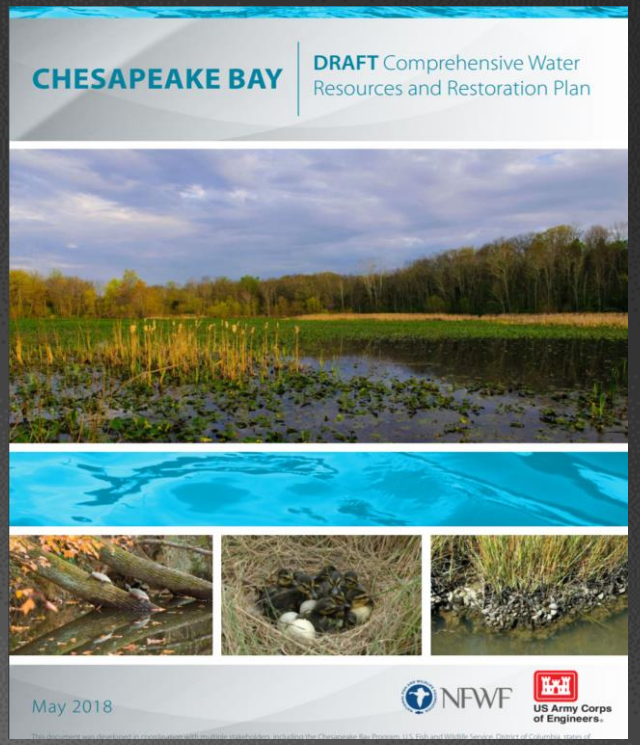
A Chesapeake Conservation Atlas

Version 1.1
March 2018

Chesapeake Conservation Partnership







Layer Name	Layer Description	Resolution	Source	Extent	Vintage
Priority Living Resources Areas-Water Column (poly)	Target species were acquired from the list in Habitat Requirements for Chesapeake Bay Living Resources, Second Edition (1991) to contribute to a map of priority living resource areas. Bottom dwelling species which had habitat requirements that could be directly affected by excess nutrients or sediments were identified and included in this spatial depiction. Species selected for bottom dwelling habitat included: blue crab, oyster, soft shell clam, hard shell clam, spot, speckled sea trout, postlarval blue crab, catfish, summer flounder, Atlantic sturgeon, and croaker. This map was combined with the bottom dwelling habitat map, and overlapped areas were included in the development of a priority living resources map.	Polygon	CBP	Bay	2016

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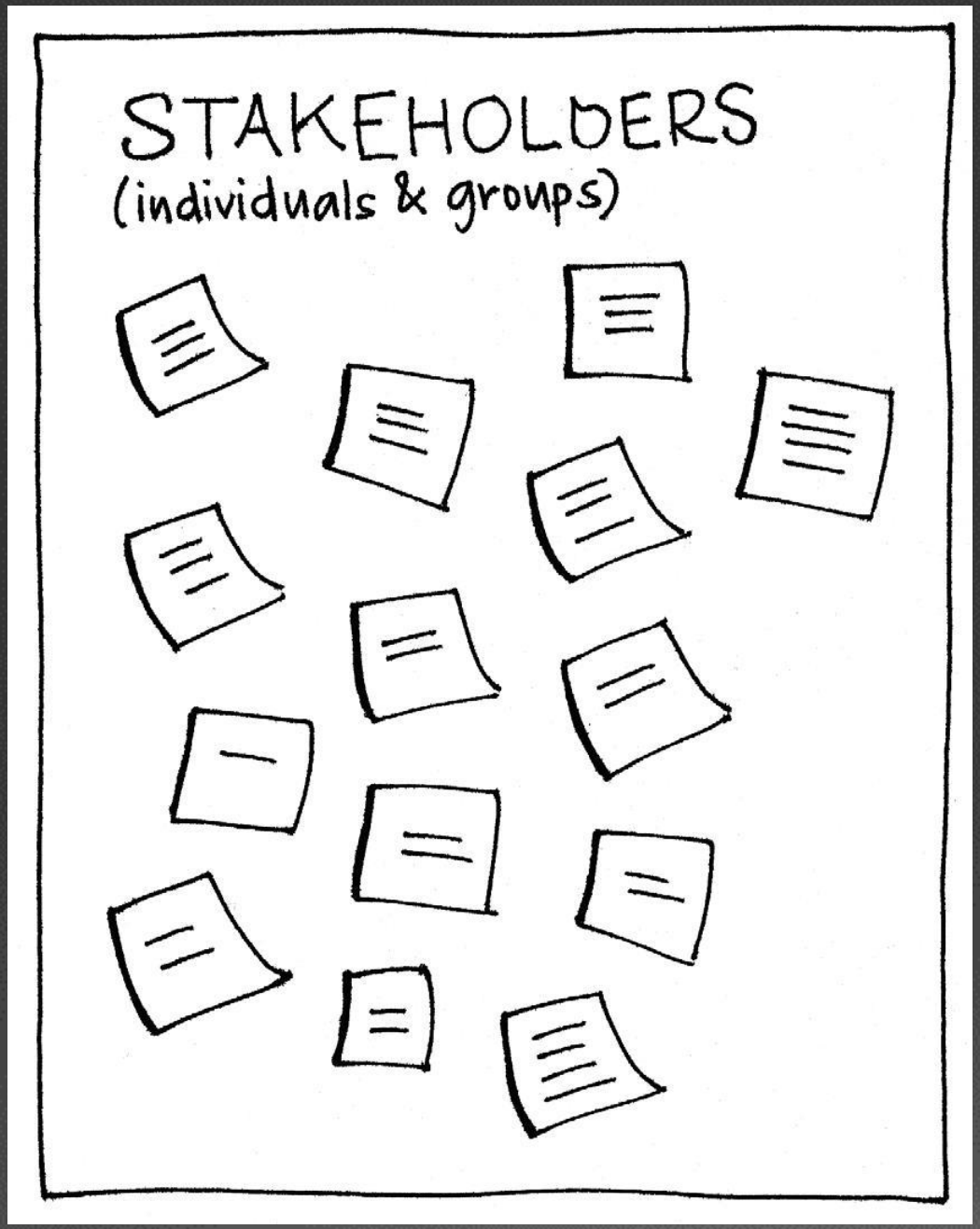
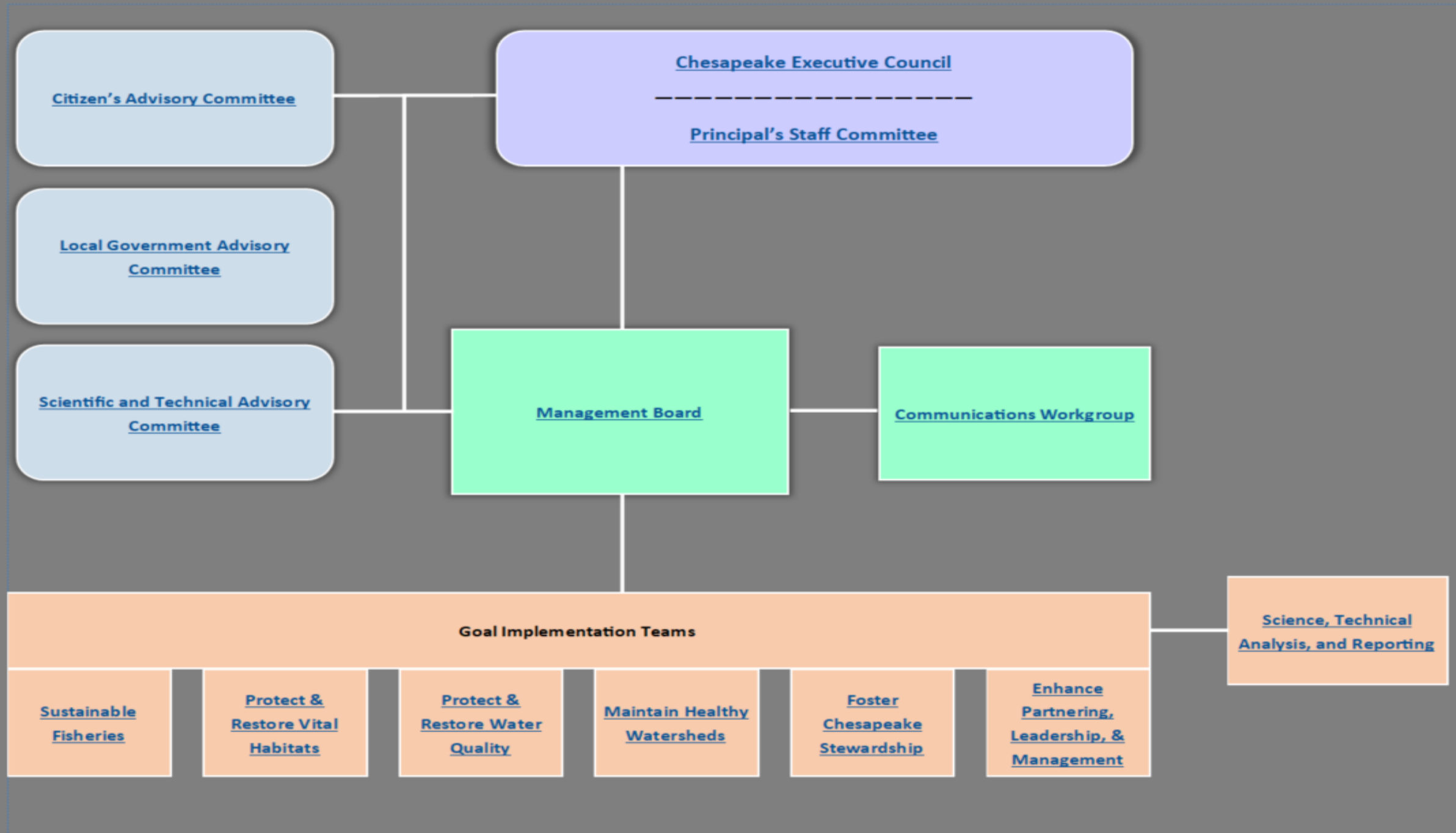
Priority Living Resources Areas-Bottom Habitat (poly)	Target species were acquired from the list in Habitat Requirements for Chesapeake Bay Living Resources, Second Edition (1991) to contribute to a map of priority living resource areas. Bottom dwelling species which had habitat requirements that could be directly affected by excess nutrients or sediments were identified and included in this spatial depiction. Species selected for bottom dwelling habitat included: blue crab, oyster, soft shell clam, hard shell clam, spot, speckled sea trout, postlarval blue crab, catfish, summer flounder, Atlantic sturgeon, and croaker. This map was combined with the bottom dwelling habitat map, and overlapped areas were included in the development of a priority living resources map.	Polygon		Bay
National Fish Habitat Assessment - Low Risk of Habitat Degradation (poly)	The National Fish Habitat Partnership compiled freshwater datasets available at the national scale to develop habitat vulnerability scores across the United States. Datasets included anthropogenic disturbances and accounted for natural variation at different spatial scales. Chesapeake Bay watershed scores depict the current risk of habitat degradation and do not represent regional or local data sets for specific watersheds or geographies. The most limiting disturbances for Chesapeake Bay habitats were found to be agriculture, urbanization, mining and nutrients. The areas shown on this map indicate a very low, low, or moderate risk of habitat degradation within the watershed.	Polygon	National Fish Habitat Partnership	Bay
Brook Trout (poly)	This dataset represents areas with subwatershed priority scores that are intended to assist in identifying areas that are best suited for brook trout protection, enhancement, and restoration projects. The higher the subwatershed score, the higher the priority for conservation action. Priority scores for the EBTJV subwatersheds, which have a range of 0-2, were developed using a model-based approach that relates a measure of priority with a set of variables associated with the subwatersheds. This prioritization method also adds a measure of priority from neighboring subwatersheds to take into account the potential to increase habitat connectivity and resilience. This is important to our GIT because the Brook Trout is a representative species of healthy habitats. Brook Trout symbolize healthy waters because they rely on clean, cold stream habitat and are sensitive to rising stream temperatures.	Polygon		Bay
Potential Oyster Habitat (poly)	This layer is derived from NOAA's Coastal and Marine Ecological Classification Standard. This data describes the bottom substrate conditions that can support oyster populations if potential salinity or depth (dissolved oxygen) constraints are met. Benthic data were aggregated from multiple sources to create a bayside record of seabed material in the Chesapeake Bay. Habitat polygons are classified with an adaptation of the Coastal and Marine Ecological Classification Standard (CMECS) Substrate Component (SC). Source data were collected during the interval 1842-2014. Because of potential temporal changes in bottom conditions and deficiencies in survey methodology, benthic habitat characterizations may be in error in some areas. These are, however, the best data currently available. This is a dynamic dataset. As new surveys occur the resulting CMECS habitat characterizations will spatially replace existing habitat depictions	Polygon		Bay
Black Duck Focus Area (poly)	This dataset depicts the potential capability of the landscape throughout the Northeastern United States to provide habitat for American Black Duck, during the non-breeding season, based on environmental conditions existing in approximately 2010. Landscape capability integrates factors influencing climate suitability, habitat capability, and other biogeographic factors affecting the species' prevalence in the area.	Polygon	CBP	Bay
Regional Conservation Opportunity Areas- Cores and Connectors (poly)	The RCOA vision is to identify and map a connected network of resilient and ecologically intact habitats that will support biodiversity under changing conditions to prioritize restoration and inform land protection. RCOAs will supplement State Wildlife Action Plans in identifying core habitats and restoration/connectivity opportunities. Similar to the IEI, the RCOAs follow a complete wildlife approach. It shows areas where conservation and restoration will have the largest impact on threatened species and habitats.	Polygon		Bay
Index of Ecological Integrity - High or Intact (poly)	The index of ecological integrity (IEI) is a measure of relative intactness (i.e., freedom from adverse human modifications and disturbance) and resiliency to environmental change (i.e., capacity to recover from or adapt to changing environmental conditions driven by human land use and climate change) on a 0-1 scale. It is a composite index derived from up to 21 different landscape metrics, each measuring a different aspect of intactness (e.g., road traffic intensity, percent impervious) and/or resiliency (e.g., ecological similarity, connectedness) and applied to each 30 m cell. The IEI acts as an all-encompassing measure of habitat quality, and provides inclusion of both habitat types addressed by the Watershed Agreement (with Management Strategies and Outcomes) and those omitted.	Polygon		Bay
Open Water Designated Use-Segments in Attainment (poly)	The Bay and its tidal tributaries can be divided into 92 segments. Each of these segments contains up to five "designated uses," including deep channel; deep water; open water; shallow water; and migratory fish, spawning and nursery. Each of these designated uses—also known as aquatic habitats—has its own set of criteria for dissolved oxygen, water clarity/underwater grasses and chlorophyll a designed to protect those uses. This map shows the segments that have been designated as attaining all designated use criteria. Attainment of Water Quality Standards is the ultimate goal of the Chesapeake Bay TMDL.	Polygon		Bay
State Identified Health Watersheds (poly)	The data presented in this map is based on state derived definitions and classifications of their own healthy waters and watersheds. Healthy watersheds begin with healthy streams, and bring resilience to the region in the form of clean water, critical habitat and social and economic benefits. Healthy watersheds are also a bargain: protecting them is much less expensive than restoring degraded waters.	Polygon		Bay
GIT Priorities		Polygon		Bay
CCP Composite	This data set includes any areas identified as conservation priorities by the Chesapeake Conservation Partnership. These include the CCP data themes of Farms, Forests, Habitat, and Heritage. The Human Health Theme will be added when the data is complete.	Raster		Bay
Protected Lands	From Chesapeake Bay Program- Combines Protected Areas Database with authoritative state environmental agencies data.	Raster		Bay
Priority Oyster Restoration Tributaries	The Oyster Restoration Management Strategy goal is to restore native oyster habitat and populations in 10 tributaries by 2025. Six tributaries have been selected for oyster restoration at this time, Harris Creek, the Little Choptank, and Tred Avon rivers in Maryland and the Lafayette, Lynnhaven and Pinkatank rivers in Virginia. This map depicts the location of current oyster restoration efforts.	Raster		Bay
National Fish Habitat Assessment - High Risk of Habitat Degradation (poly)	The National Fish Habitat Partnership compiled freshwater datasets available at the national scale to develop habitat vulnerability scores across the United States. Datasets included anthropogenic disturbances and accounted for natural variation at different spatial scales. Chesapeake Bay watershed scores depict the current risk of habitat degradation and do not represent regional or local data sets for specific watersheds or geographies. The most limiting disturbances for Chesapeake Bay habitats were found to be agriculture, urbanization, mining and nutrients. The areas shown on this map indicate a high risk or very high risk of habitat degradation within the watershed.	Raster		Bay
Index of Ecological Integrity - Low or Non-intact	The index of ecological integrity (IEI) is a measure of relative intactness (i.e., freedom from adverse human modifications and disturbance) and resiliency to environmental change (i.e., capacity to recover from or adapt to changing environmental conditions driven by human land use and climate change) on a 0-1 scale. It is a composite index derived from up to 21 different landscape metrics, each measuring a different aspect of intactness (e.g., road traffic intensity, percent impervious) and/or resiliency (e.g., ecological similarity, connectedness) and applied to each 30 m cell. The IEI acts as an all-encompassing measure of habitat quality, and provides inclusion of both habitat types addressed by the Watershed Agreement (with Management Strategies and Outcomes) and those omitted.	Raster		Bay
Toxic Contaminant Impairment	NHDplus V1 catchments (inland) and state monitoring segments (tidal) that contain a full or partial overlay with state designated impairments pertaining to all Toxic Contaminant Impairments: Ammonia, Cyanide, Oil and grease, Metals other than mercury, Mercury, Pcbs, Pesticides, pH/Acidity/Caustic Conditions, Salinity/Total dissolved solids/Chlorides/Sulfates, Toxic organics, Total Toxics.	Raster		Bay
Open Water Designated Use-Segments Not in Attainment	The Bay and its tidal tributaries can be divided into 92 segments. Each of these segments contains up to five "designated uses," including deep channel; deep water; open water; shallow water; and migratory fish, spawning and nursery. Each of these designated uses—also known as aquatic habitats—has its own set of criteria for dissolved oxygen, water clarity/underwater grasses and chlorophyll a designed to protect those uses. This map shows the segments that have and have not attained the 1 or any designated use criteria. Attainment of Water Quality Standards is the ultimate goal of the Chesapeake Bay TMDL.	Raster		Bay
SPARROW Delivered Phosphorous - Top 25% Catchments	This dataset contains mean-annual total Phosphorus (TP) fluxes predicted by the SPARROW model, CBTP_v4, for individual stream and shoreline reaches in the Chesapeake watershed as defined by NHDPlus, a 1:100,000 scale representation of stream hydrography built upon the National Hydrography Dataset (NHD) (Horizon Systems, 2010; Simley and Carswell, 2010).	Raster		Bay

Layer Name	Layer Description	Resolution	Source	Extent			
Individuals under age 5	The number or percent of people in a block group under the age of 5.	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide		Environmental Indicators	Demographic Indicators
Individuals under age 64	The number or percent of people in a block group over the age of 64.	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide			
Lead Paint	Percent of housing units built pre-1960, as indicator of potential lead paint exposure	Census block group level	Calculated based on Census/ACS data, retrieved 2017 https://www.census.gov/programs-surveys/acs/data/summaryfile.html	Nationwide			
Less than high school education	The number or percent of people age 25 or older in a block group whose education is short of a high school diploma	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide			
Lingustic isolation	The number or percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and over speak a nonEnglish language and also speak English less than "very well" (have difficulty with English) is linguistically isolated.	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide			
Low-Income	The number or percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide			
Minority	The number or percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, since multiracial individuals are tabulated in another category – a non-Hispanic individual who is half white and half American Indian would be counted as a minority by this definition.	Census block group level	American Community Survey five-year summary file from U.S. Census Bureau	Nationwide			
NATA Air Toxics Cancer Risk	Lifetime cancer risk from inhalation of air toxics	Census block group level	EPA NATA, retrieved 2016 https://www.epa.gov/national-air-toxics-assessment/2011-nataassessment-results	Nationwide			
NATA Diesel PM (DPM)	Diesel particulate matter level in air, µg/m3	Census block group level	EPA NATA, retrieved 2016 https://www.epa.gov/national-air-toxics-assessment/2011-nataassessment-results	Nationwide			
NATA Respiratory Hazard	Air toxics respiratory hazard index (ratio of exposure concentration to health-based reference	Census block group	EPA NATA, retrieved 2016 https://www.epa.gov/national-air-				

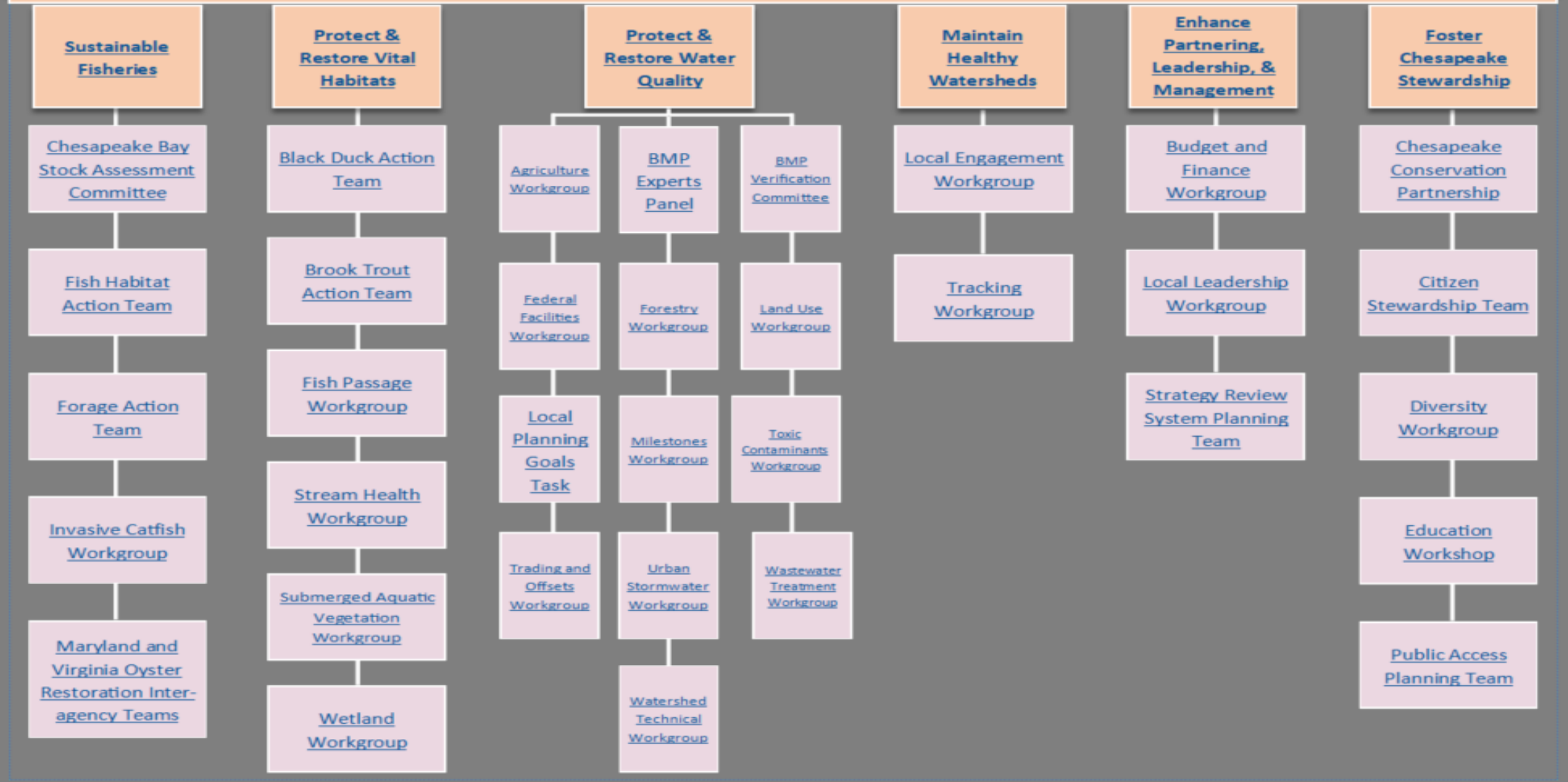

STAKEHOLDERS
(individuals & groups)

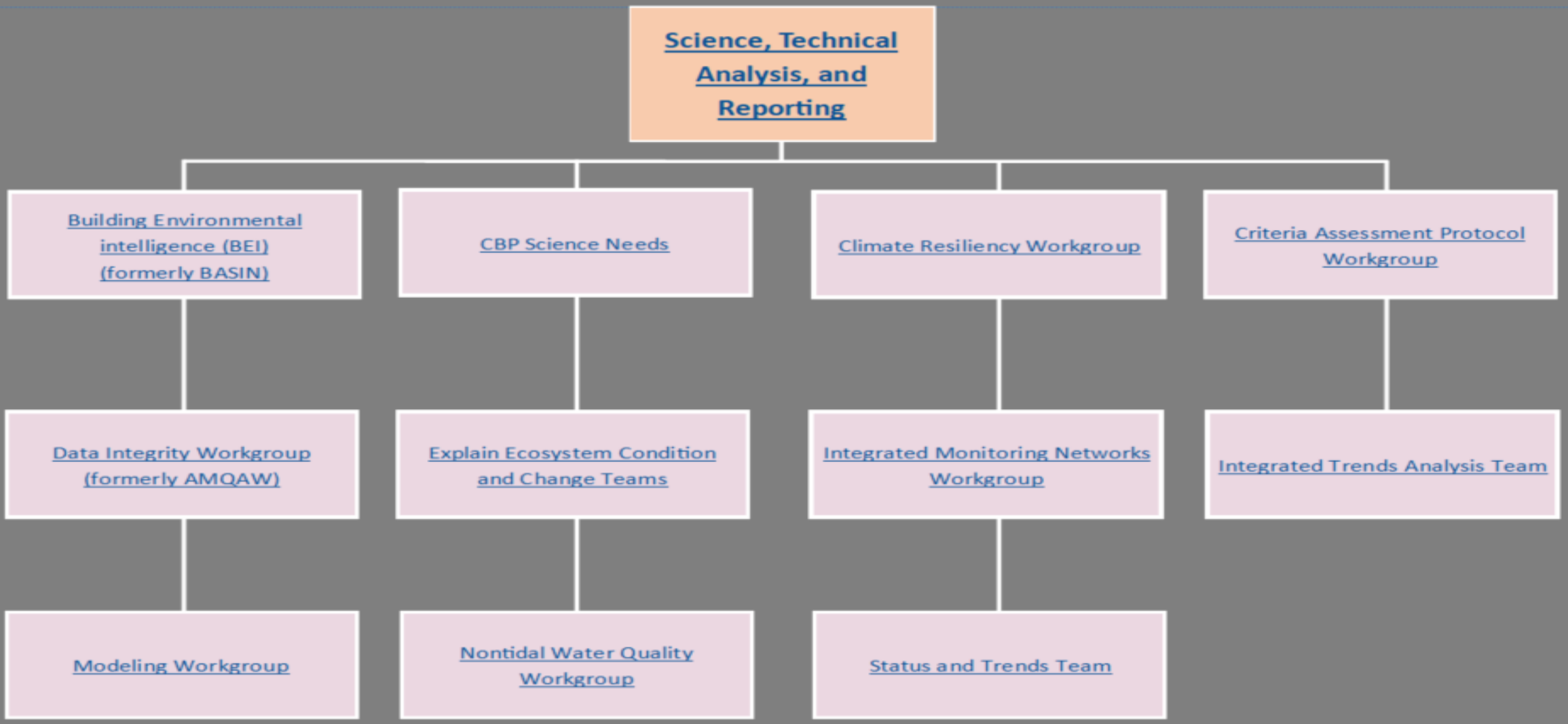

Citizen's Advisory Committee
Chesapeake Executive Council
Principal's Staff Committee
Local Government Advisory Committee
Scientific and Technical Advisory Committee
Management Board
Communications Workgroup
Goal Implementation Teams
Science, Technical Analysis, and Reporting
Sustainable Fisheries
Protect & Restore Vital Habitats
Protect & Restore Water Quality
Maintain Healthy Watersheds
Foster Chesapeake Stewardship
Enhance Partnering, Leadership, & Management

Goal Implementation Teams

- Sustainable Fisheries
- Habitat
- Water Quality
- Maintain Healthy Watersheds
- Fostering Chesapeake Stewardship
- Enhance Partnering, Leadership, and Management

Goal Implementation Teams




Science, Technical Analysis, and Reporting
Building Environmental intelligence (BEI) (formerly BASIN)
CBP Science Needs
Climate Resiliency Workgroup
Criteria Assessment Protocol Workgroup
Data Integrity Workgroup (formerly AMQAW)
Explain Ecosystem Condition and Change Teams
Integrated Monitoring Networks Workgroup
Integrated Trends Analysis Team
Modeling Workgroup
Nontidal Water Quality Workgroup
Status and Trends Team


Individual GIT
workgroup
outreach

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Survey Categories

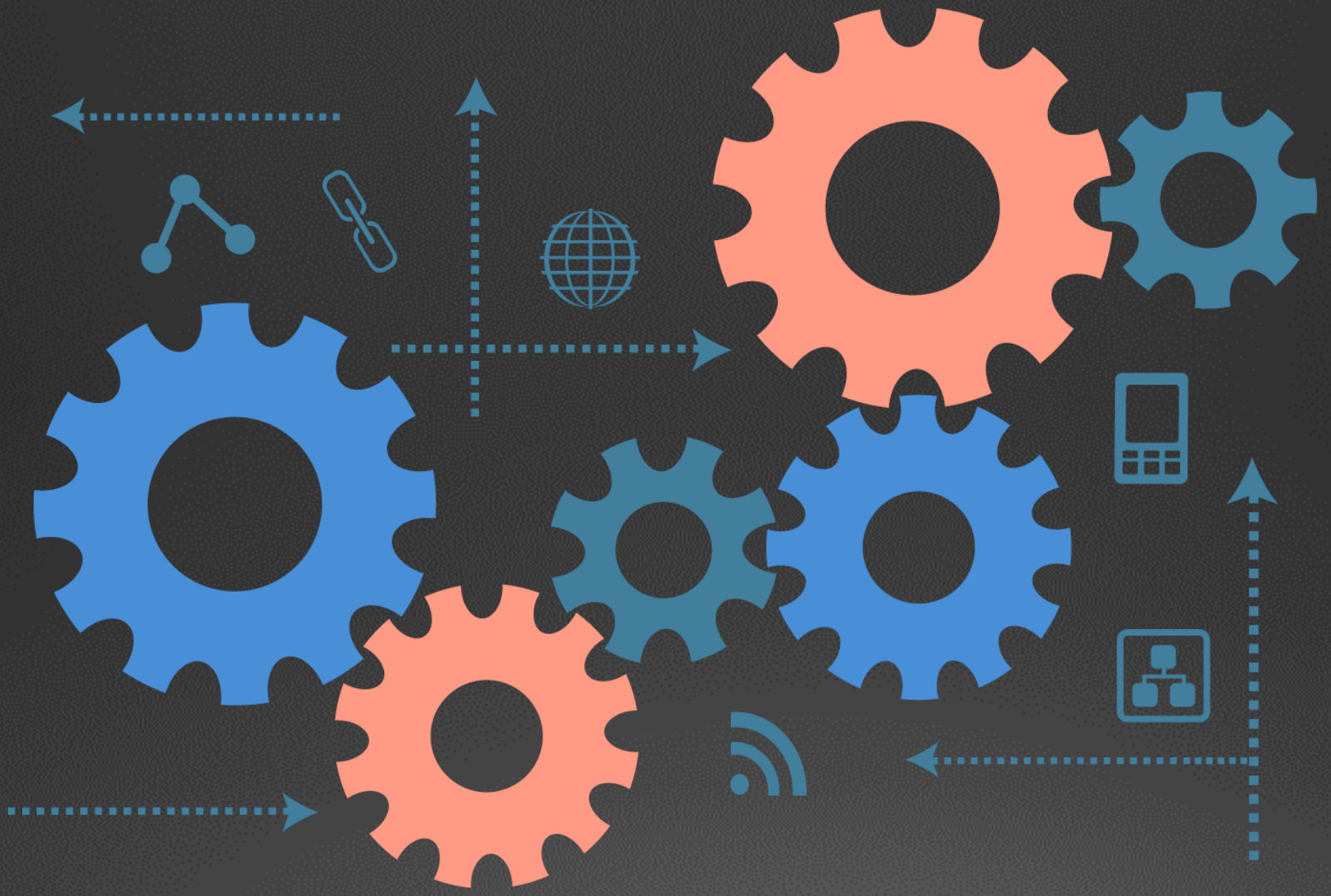
- **What are your current geospatial tools, abilities, and barriers?**
  - General demographic information
  - Work Group specific information
  - GIS Familiarity

- **What are some current needs you have that COULD be solved geospatially?**
  - Goals and outcomes
  - Day-to-day needs

23

Taking an account of the current structures for GIS data creation and use at a Bay-wide scale…

…And using that to inform structures and use moving forward for the data created in Obj. 1-3



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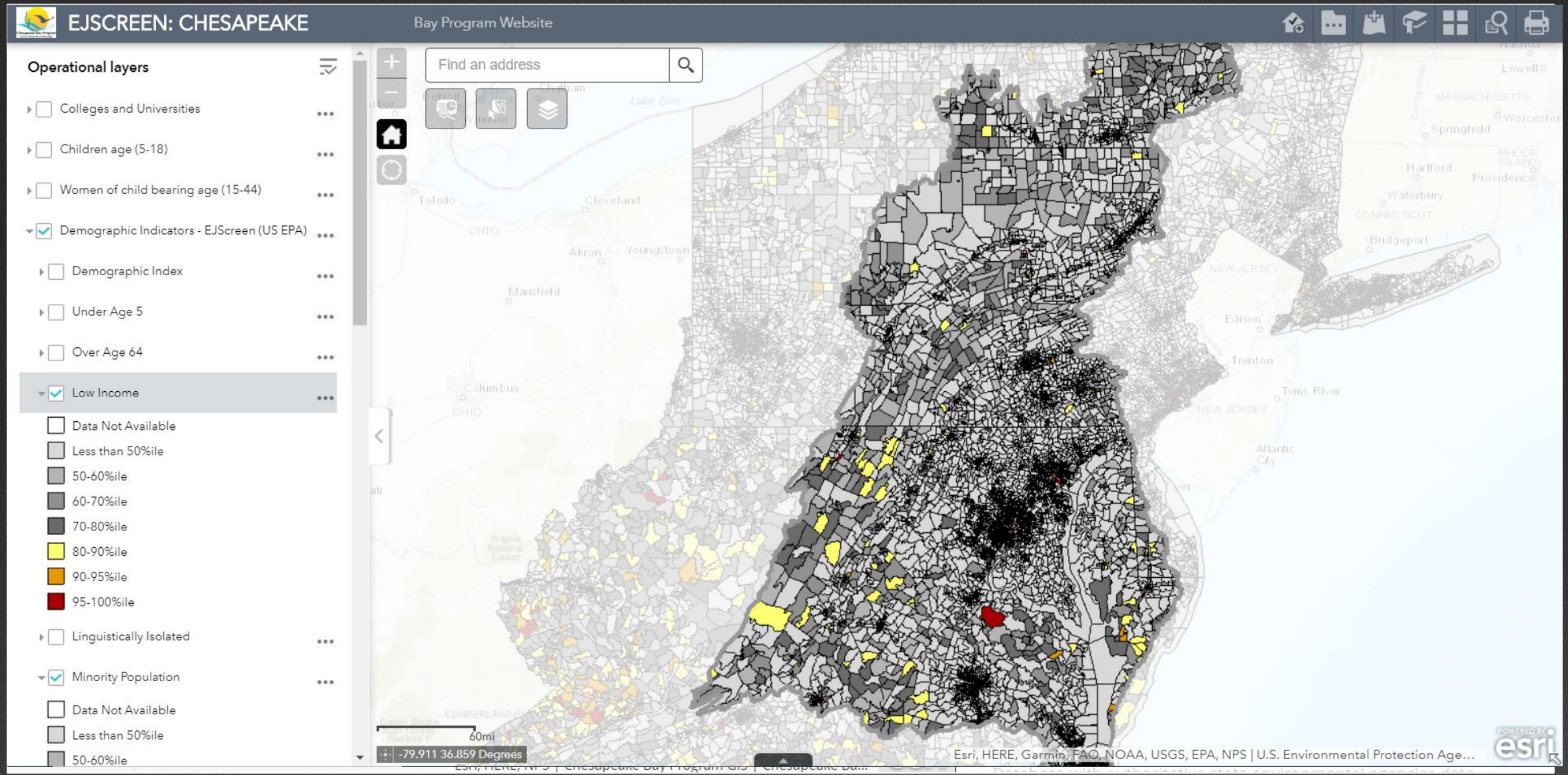
Existing GIS work




What's next?

conservationinnovationcenter.org

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