

Harris Creek Case Study: Oyster Restoration and GIT Collaboration

Chesapeake Bay Program
Management Board

August 2, 2012

Peyton Robertson
Fisheries Goal Team Chair

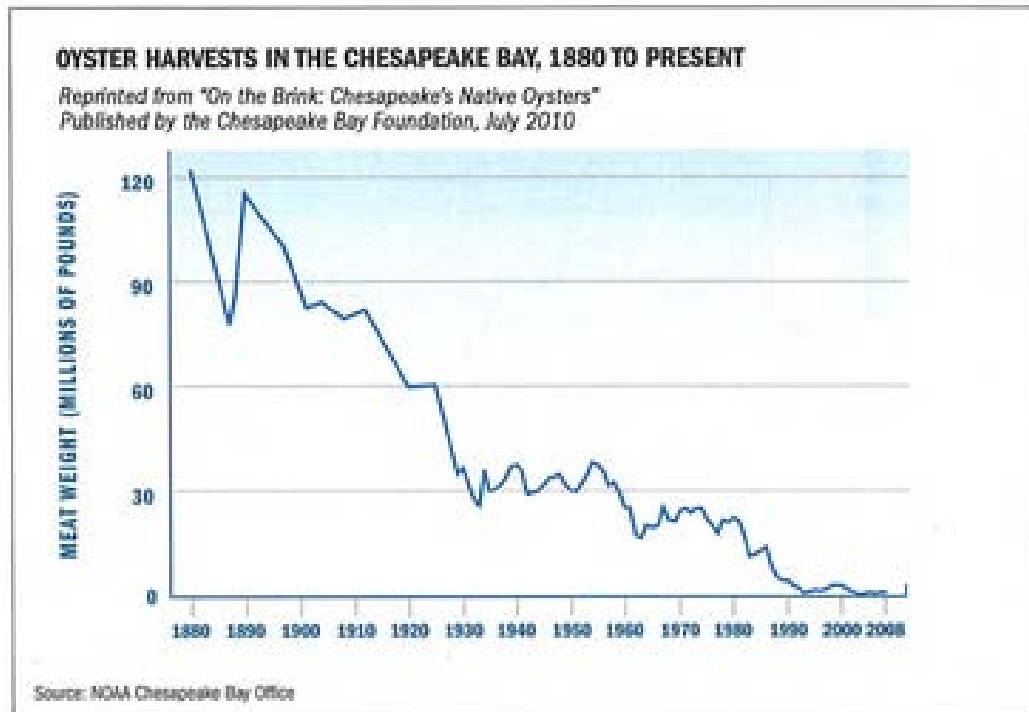
Outline

- Oyster Goal
- Factors Affecting Restoration Success
- Bay-Wide and Tributary-Specific Management Strategies
- Draft Harris Creek Tributary Plan/Blueprint
- GIT Collaboration



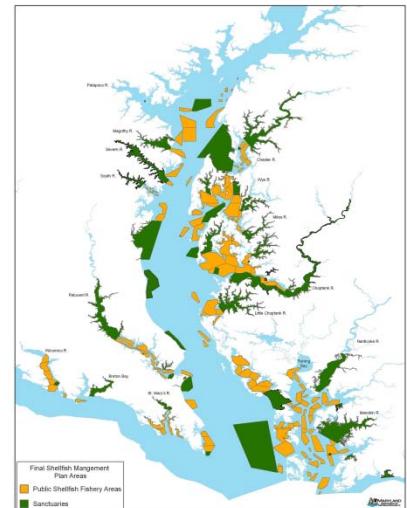
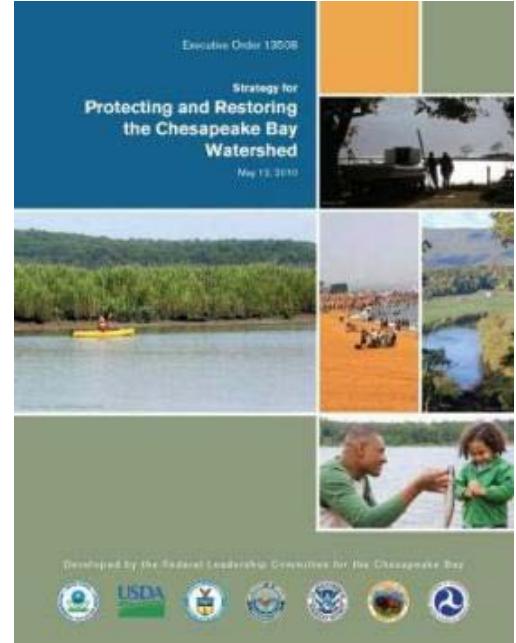
State of Oysters in the Bay

- Decimated Population
 - less than 1% of historical abundance (due to overfishing, habitat degradation, and disease)
- Keystone species
 - Water Quality
 - Habitat
- Economic and Heritage Value



Goal

- Restore native oyster habitat and populations in 20 tributaries by 2025 (EO 13508)
- Metrics for this goal
 1. 50-100% of restorable bottom in a tributary restored
 2. 50 oysters/m² covering at least 30% of the reef area
 3. At least two year classes present



Factors Affecting Restoration Success

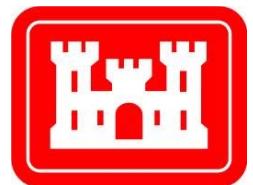
- Habitat limitation
- Disease
- Poaching
- Water Quality (DO, nutrients, salinity, sediment)
 - USACE Master Plan Parameters
- Land Use
- Regulatory Processes
 - Permitting



Bay-Wide Oyster Restoration Management Strategy



- Strengthened Federal Partnerships
- Coordinated Federal/State Planning
- Roadmap for Sustainable Fisheries GIT
 - Targeted Large-Scale Ecological Restoration
 - Enforcement
 - Aquaculture
- Inter-GIT collaboration!



Where We Are Now

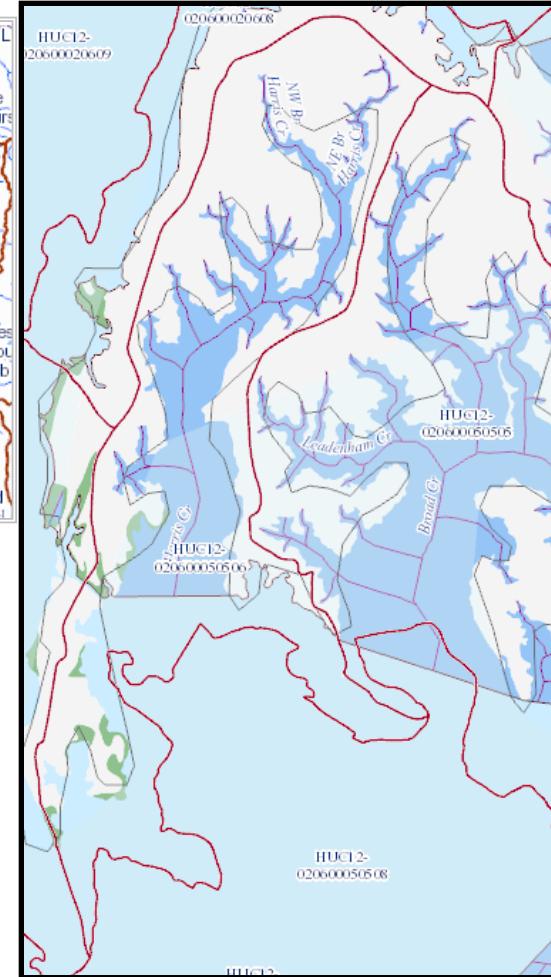
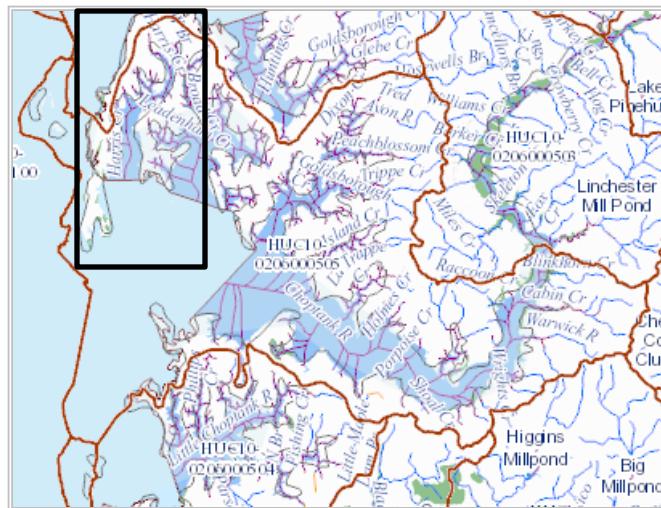
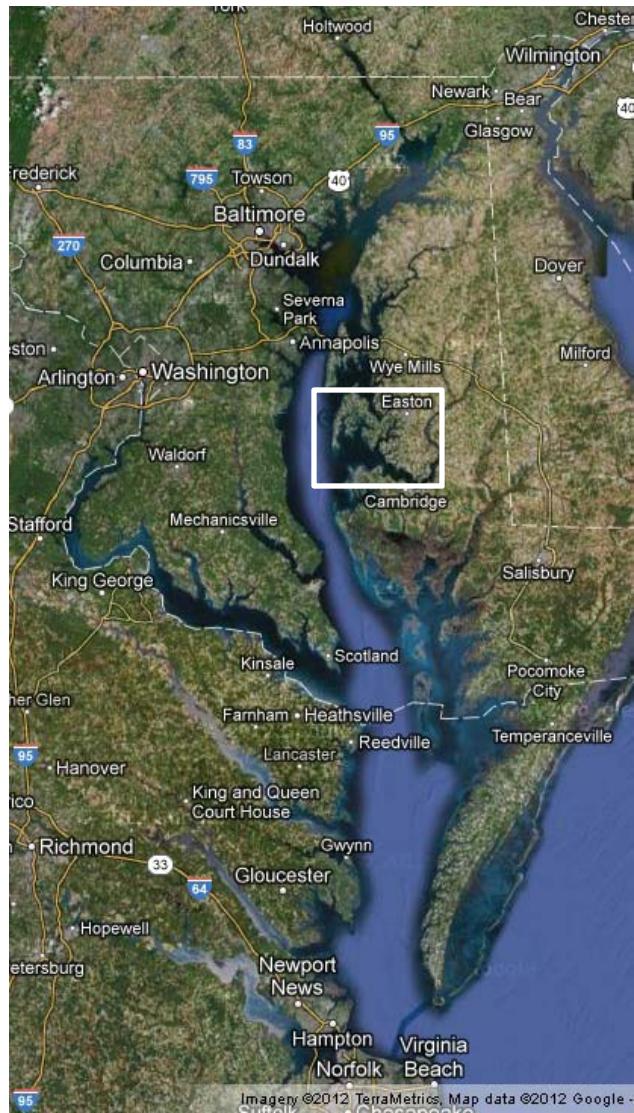
- Priority Tributary selection based on:
 - USACE Master Plan
 - MD Sanctuary Plan
 - Jurisdictional Priorities
- Areas most likely to succeed!
- 5 chosen to date



Harris Creek Management Strategy for Large-Scale Restoration

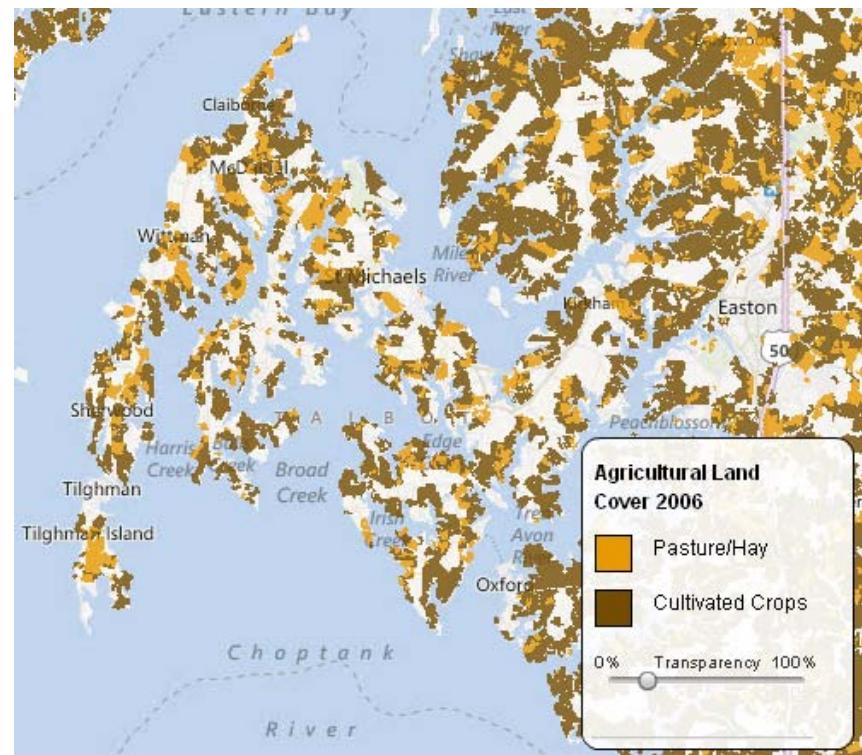
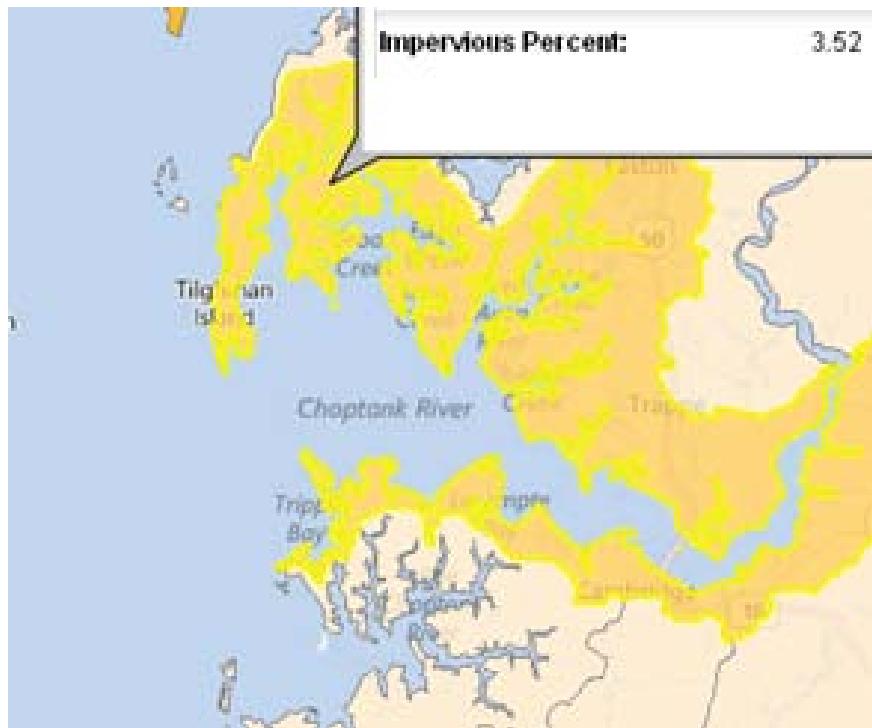
- Select Tributary
- Collect Environmental Data
- Draft Tributary Plan/Blueprint
 - Identify Sites and Types of Reef Treatment
 - Coordinate with Stakeholders
 - Finalize Tributary Plan
- Construct Reefs/Plant Spat-on-Shell
- Monitor and Evaluate per Oyster Metrics
- Adaptively Manage

Harris Creek



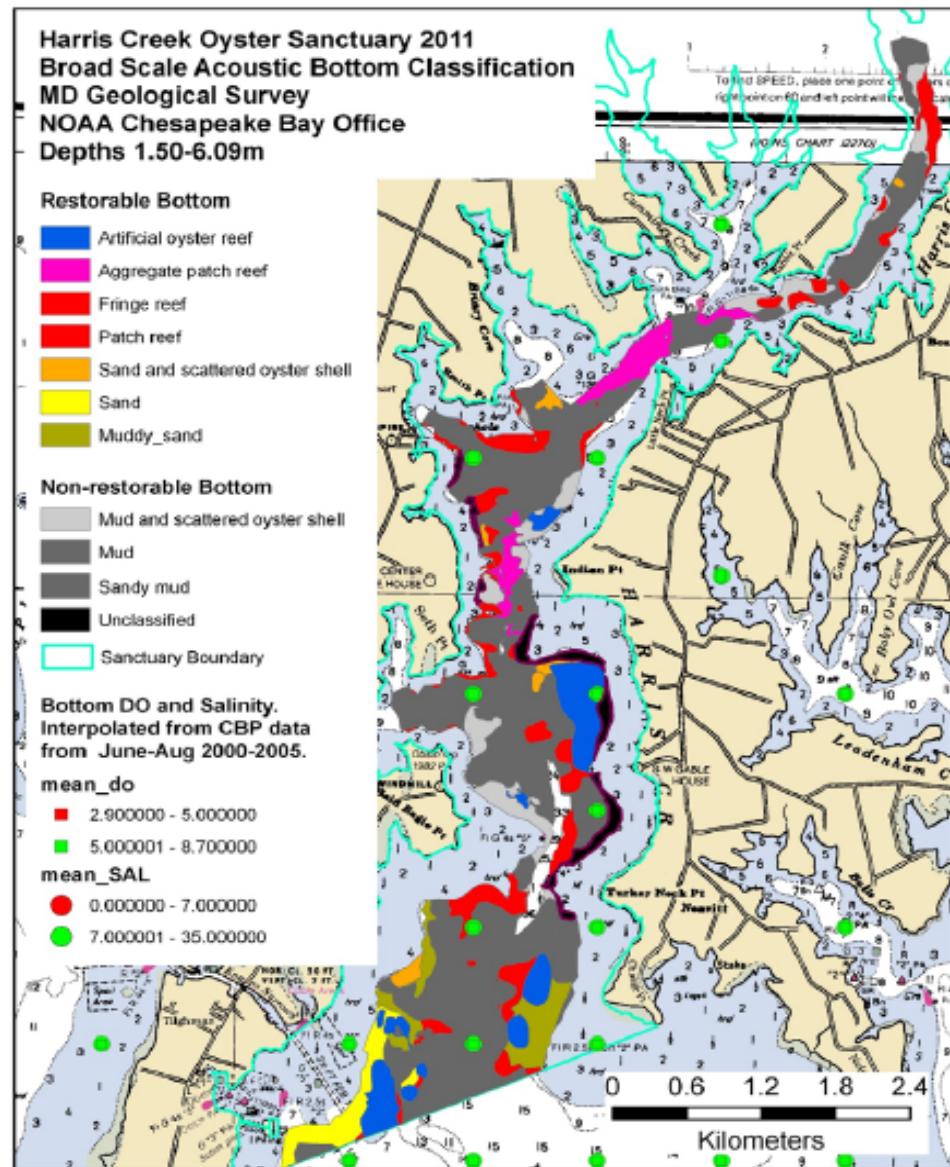
Harris Creek

- Impervious surface
 - Below 10% Threshold
- Land Use
 - Mostly Agricultural



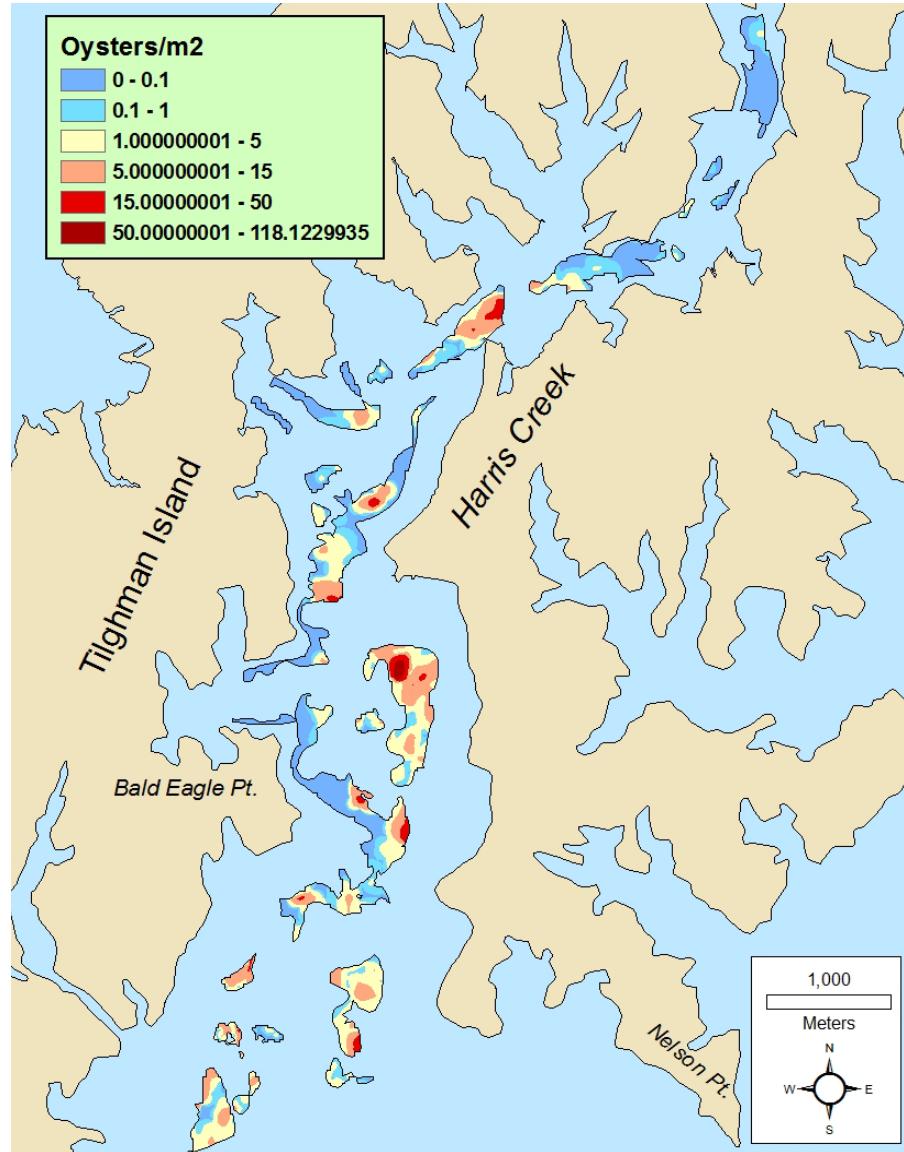
Draft Harris Creek Tributary Plan/Blueprint

- Restorable Bottom
 - 600 total acres
 - Need to restore 300-600 per the metrics
 - Target: 360 acres



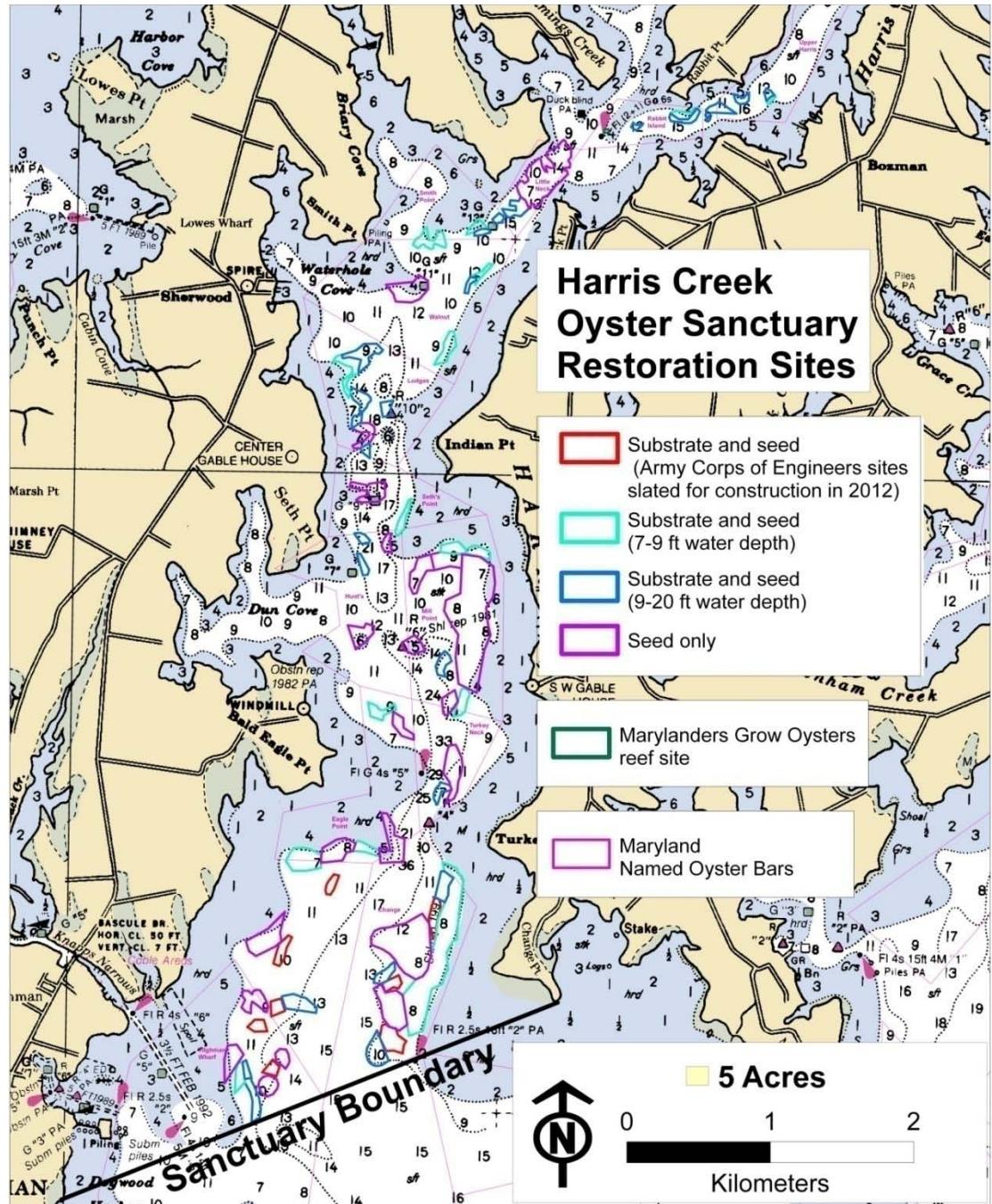
Draft Harris Creek Tributary Plan/Blueprint

- Oyster Population Assessment
 - We want to avoid covering or disturbing living oysters
 - Target: 50 oysters/m²



Draft Harris Creek Tributary Plan/Blueprint

- Target: 360 Acres restored
- Preliminary Cost: \$27 million
- 22 acres of substrate placed this summer
- 300 million spat-on-shell planted this summer



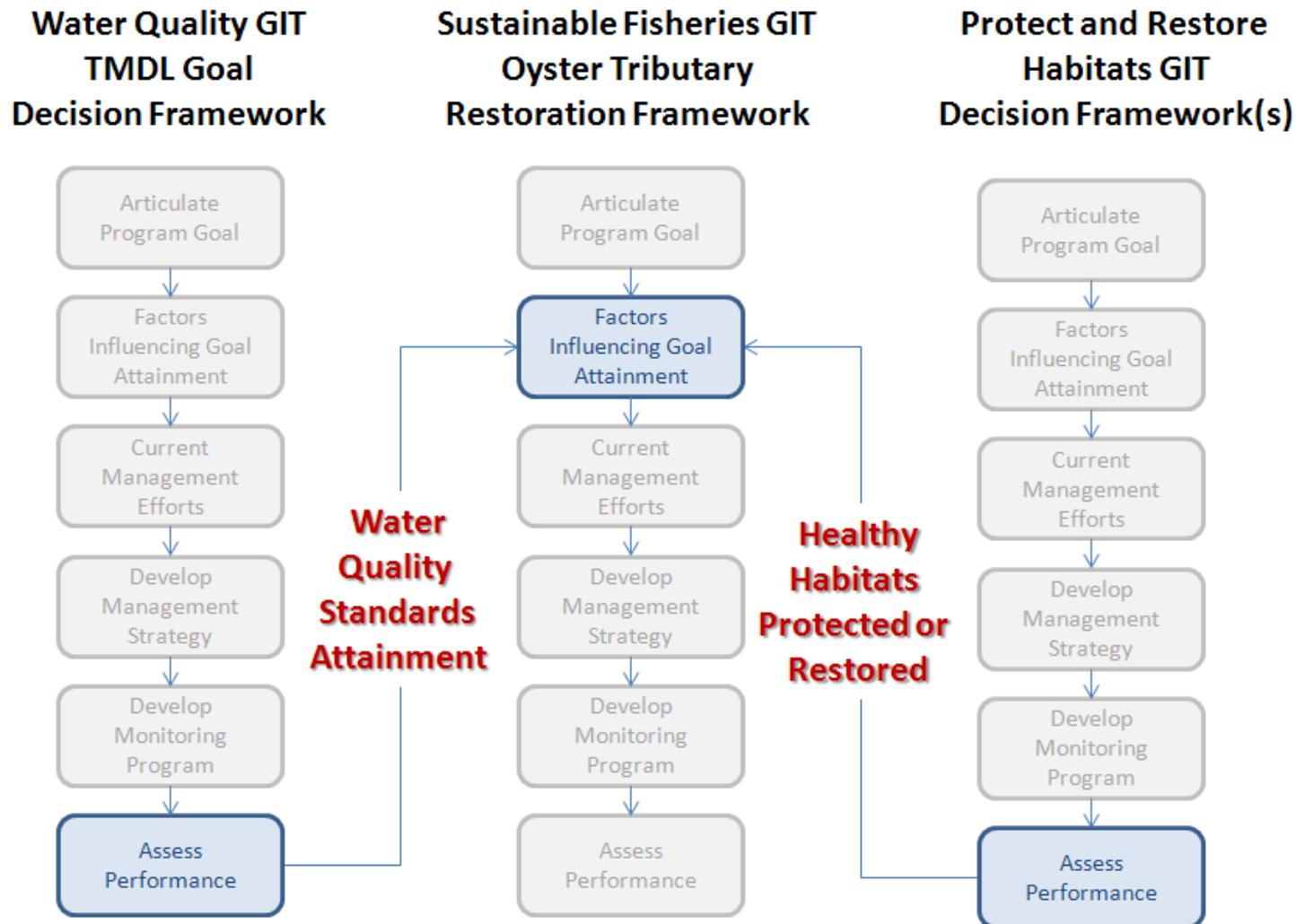
Managing Risk and Enhancing Restoration

- What can other GITs do to support this effort and protect our investment?
 - Maintain or improve water quality
 - Enhance wetlands and shoreline health
 - Protect watershed health
 - Education/Public Access



Chesapeake Bay Program
A Watershed Partnership

GIT Decision Framework Coordination



Water Quality (GIT 3)

Goals and Outcomes

- Supports the commitments of the CBP partnership to reduce nitrogen, phosphorus and sediment pollution in order to achieve water-quality standards in the tidal waters of the Chesapeake Bay and its tributaries for:
 - DO
 - SAV/Clarity
 - Chlorophyll-a
- Goal: have all practices in place by 2025 that are necessary to meet water quality standards
- Improved water quality will directly impact the success of the Harris Creek oyster restoration project by creating or maintaining conditions that support living resources.

Nitrogen Sources and Chesapeake Bay TMDL Allocations for MD's Eastern Shore

[Overview](#) [Agriculture](#) [TMDL Tracking](#) [BMP Review](#) [2009-2011 Milestones](#) [2012-2013 Milestones](#)

Chesapeake Bay TMDL Tracking and Accounting System

The Chesapeake Bay TMDL Tracking and Accounting System (BayTAS) was developed to inform EPA, the Bay Jurisdictions, and the public on progress in implementing the [Bay Total Maximum Daily Load \(Bay TMDL\)](#). BayTAS stores the TMDL allocations (based on the Watershed Model Phase 5.3.0 and tracks implementation progress (based on the Watershed Model Phase 5.3.2 and the jurisdictions' Phase II Watershed Implementation Plans). Explore the data by selecting the options below. [Learn more about BayTAS](#) and the [terminology of the TMDL](#) in the glossary found in Section 13 of the TMDL. Get answers to [frequently asked questions](#) about the Bay TMDL.

Click on a map feature or select from the options below to view TMDL information by Basin

Eastern Shore of Chesapeake Bay - MD

Show TMDL Allocations Show Progress towards Phase II WIP Planning Targets

Nitrogen Phosphorus Total Suspended Solids

Total Allocation for Nitrogen: 11,580,363 lbs/year

Total Allocation by Sector:

Download Data

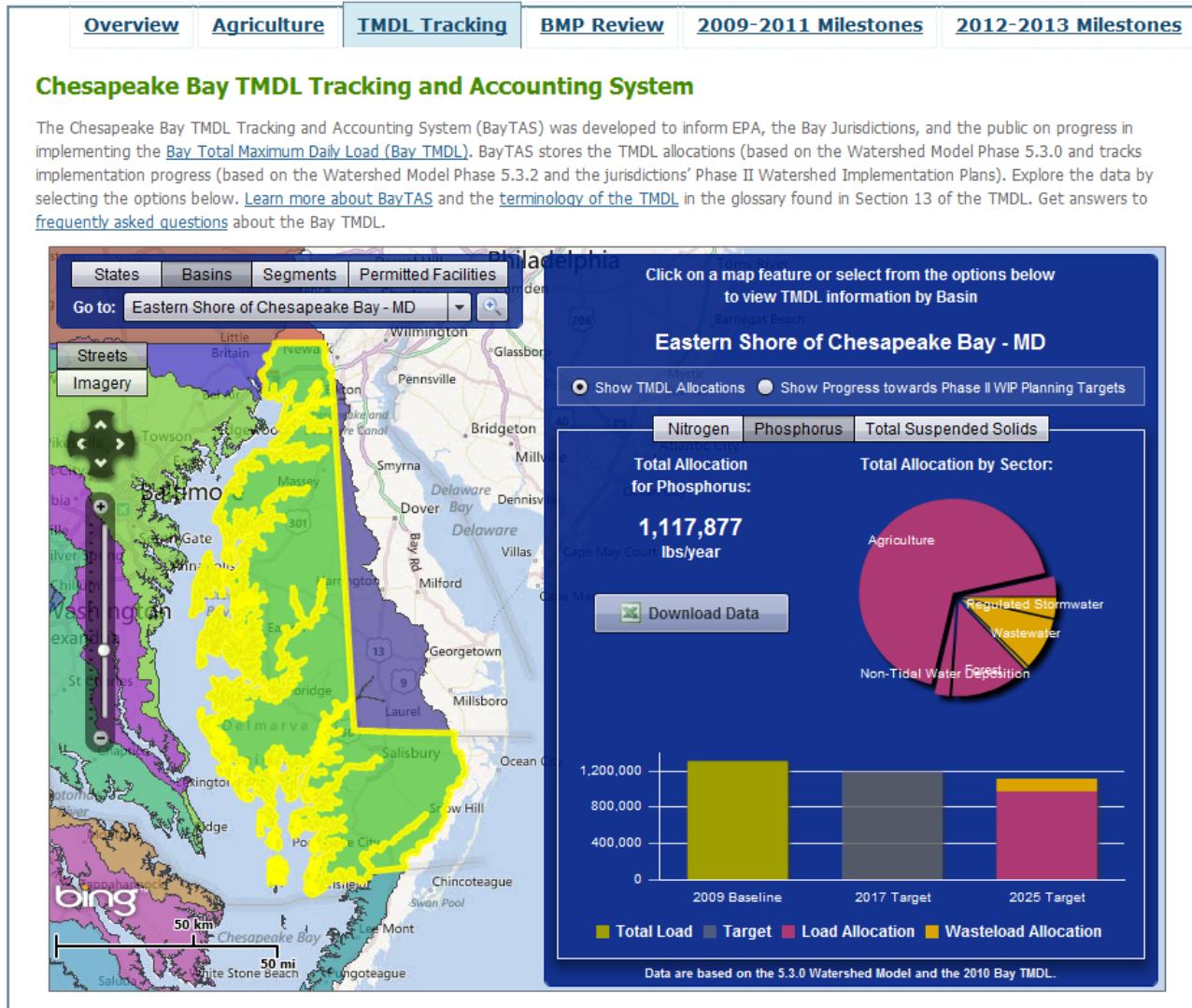
16,000,000
12,000,000
8,000,000
4,000,000
0

2009 Baseline 2017 Target 2025 Target

■ Total Load ■ Target ■ Load Allocation ■ Wasteload Allocation

Data are based on the 5.3.0 Watershed Model and the 2010 Bay TMDL.

Phosphorus Sources and Chesapeake Bay TMDL Allocations for MD's Eastern Shore



Sediment Sources and Chesapeake Bay TMDL Allocations for MD's Eastern Shore

[Overview](#) [Agriculture](#) [TMDL Tracking](#) [BMP Review](#) [2009-2011 Milestones](#) [2012-2013 Milestones](#)

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Eastern Shore of Chesapeake Bay - MD

Show TMDL Allocations Show Progress towards Phase II WIP Planning Targets

Nitrogen Phosphorus Total Suspended Solids

Total Allocation for Total Suspended Solids: 241,733,922 lbs/year

Download Data

Total Allocation by Sector:

Sector	Allocation (lbs/year)
Agriculture	241,733,922
Regulated Stormwater Wastewater	10,000
Forest	1,000

240,000,000
180,000,000
120,000,000
60,000,000
0

2009 Baseline 2017 Target 2025 Target

■ Total Load ■ Target ■ Load Allocation ■ Wasteload Allocation

Data are based on the 5.3.0 Watershed Model and the 2010 Bay TMDL.

Track Information on State's Milestone Practice and Loading Commitments

[Overview](#) [Agriculture](#) [TMDL Tracking](#) [BMP Review](#) [2009-2011 Milestones](#) [2012-2013 Milestones](#)

Milestone Commitments

Maryland's 2012-2013 milestone NPS BMP commitments and Wastewater strategy reduce nitrogen by 790,549 pounds and phosphorus by 161,611 pounds and decrease sediment by 904,079 pounds by the end of the milestone period, compared to the 2009 baseline.

Milestone Highlights

Maryland is making significant progress in its restoration efforts and is on track to meet the 2012-2013 milestones and commitments. Through BayStat, Maryland is tracking implementation and progress of its goals monthly. Visit [BayStat](#) to follow Maryland's progress.

Programmatic Highlights

Bay Restoration Fund Fee Increase: In 2012, double the Bay Restoration Fund Fee to generate the revenue needed to fully implement Maryland's

Nitrogen Phosphorus Sediment

State: Maryland

Year: 2013

Phosphorus Loads by Year for MD

Year	Load (lbs/year)
1985 Progress	5,200,000
2009 Progress	3,200,000
2013 Milestone Commitment	3,000,000

2017 Interim Target
2025 Planning Target

Select a Year to view pollution loads by Sector.

How to use this Tool

Pollutant loads are viewable by the entire Watershed or jurisdiction. Select by pollutant, year, or jurisdiction through the drop-down menus or by clicking on the bar or pie charts. Select a jurisdiction to view sector contributions to the load. The practices that achieve load reduction by sector can be viewed below.

Phosphorus Loads by Sector in 2013 for MD

Sector	Load (lbs/year)
Agriculture	3,139,631
Urban Runoff	~1,000,000
Wastewater + Combined Sewer Overflow	~500,000
Septic	~200,000
Forest + Non-Tidal Watershed Atmospheric Deposition	~100,000

Total Load: 3,139,631 lbs/year

Select a Sector to view Practice Implementations down below.

Practice Implementation Select a State, Sector and Practice to view progress.

Sector: Agriculture

Practice: Stream Access Control with Fencing (acres)

Definition: Stream access control with fencing involves excluding a strip of land with fencing along the stream corridor to provide protection from livestock. The fenced areas may be planted with trees or grass, or left to natural

Tracked: Cumulatively Units: acres

2009 Progress: 429

2011 Progress: 543

2013 Target: 713

Water Quality (GIT 3)

- ChesapeakeStat will be updated with Phase II WIP information in Fall 2012
- Maryland could use information to prioritize location and types of practices to most benefit oyster restoration in Harris Creek while still meeting TMDL and WIP goals

Habitat (GIT 2) Priorities

- Submerged Aquatic Vegetation (Restore and Monitor)
- Wetlands (Black Duck as biological outcome)
- Stream Health (Brook Trout as biological outcome)
- Fish Passage (River Herring, Shad, American Eel)

Harris Creek Evaluation completed through MD GreenPrint Data

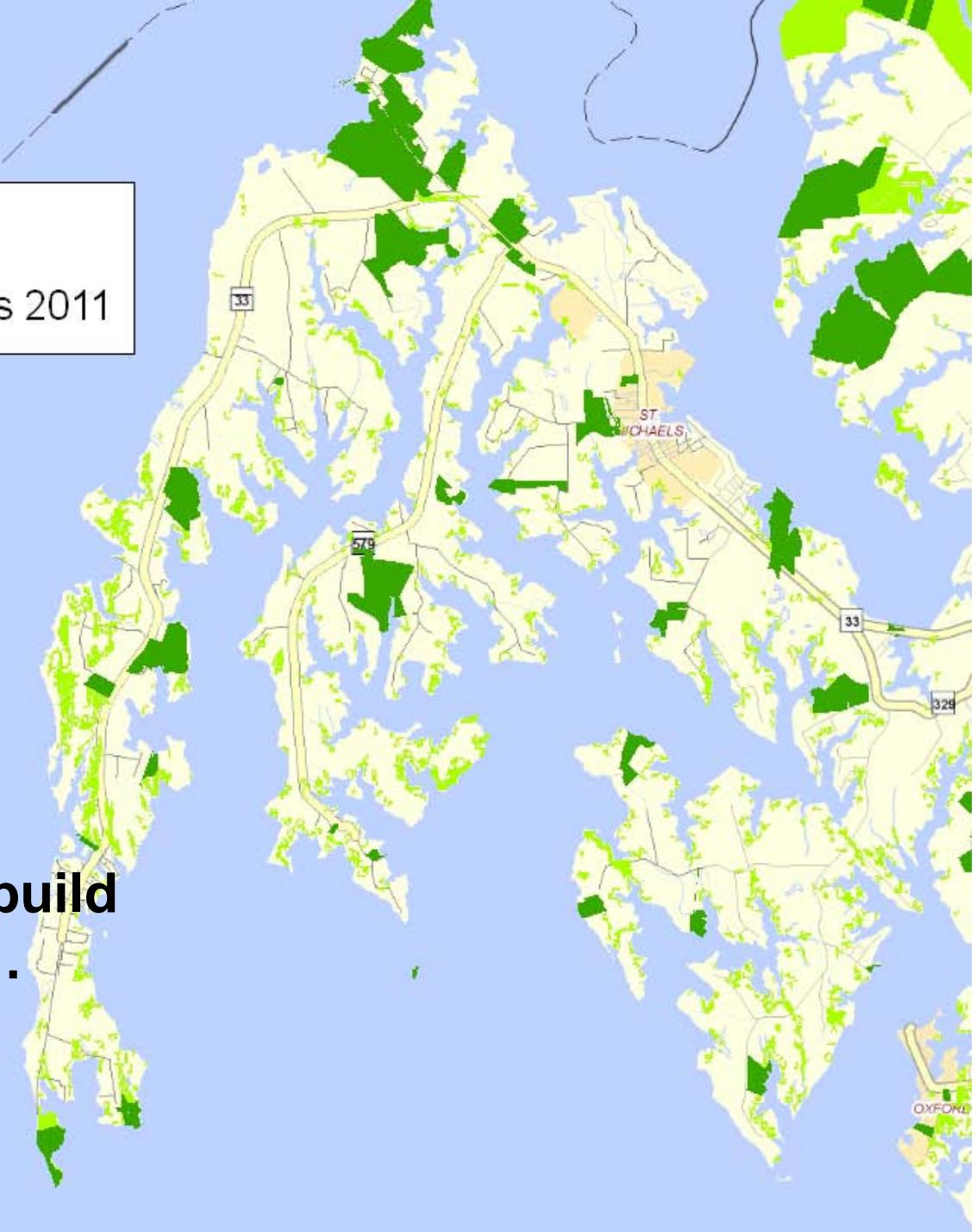
- Targeted Ecological Areas
- Wildlife and Rare Species Habitats (BioNET)
- Tidal Fisheries, Bays and Coastal Ecosystems (Blue Infrastructure)
- Climate Change Wetland Adaptation Areas (sea level rise and erosion vulnerability)
- Wetland Restoration Opportunities (EPA/SHA Watershed Resources Registry)

Moderately developed and predicted to remain relatively rural in character
(Plan MD and comp plan maps)

At 6% impervious, exceeds 5% threshold for protecting tidal finfish communities
but within the 5-10% impervious range for restoration targeting

No highly ranked productive fisheries in watershed, however likely a productive striped bass and blue crab nursery area

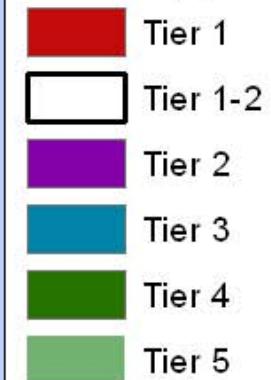
Watershed, and broader peninsula are important waterfowl habitat areas



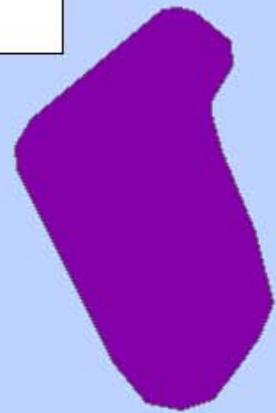
**A base from which to build
a network of habitats...**

BIONET version 1

BIONET_TIE



Wildlife and Rare Species Habitat

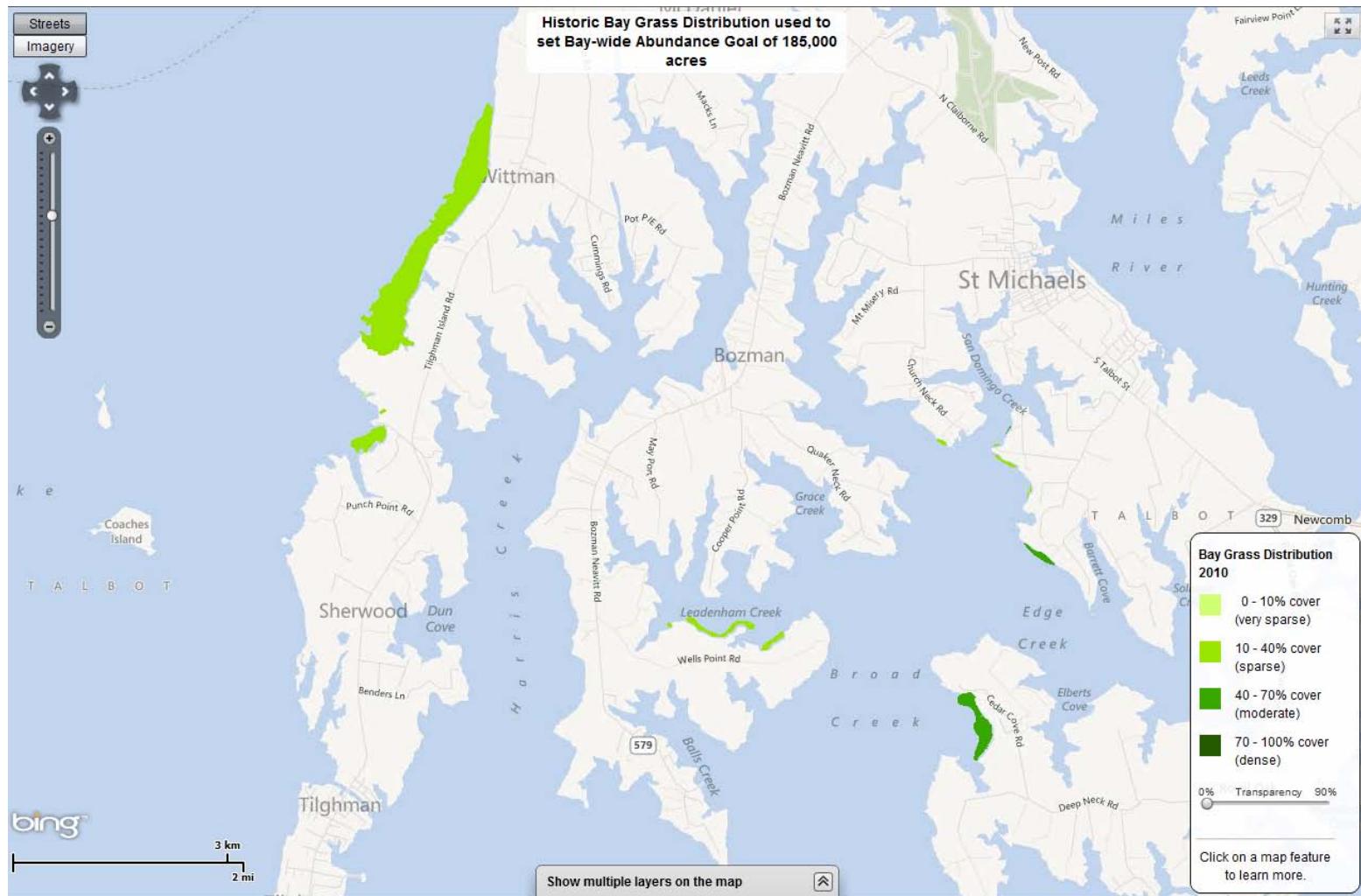


No Tier 1 areas (highest priority)

**Some Tier 2 (Poplar Island) and
Tier 3 (waterfowl sanctuaries)**

**Most BioNet areas are Tier 5
(primarily FIDS habitat)**



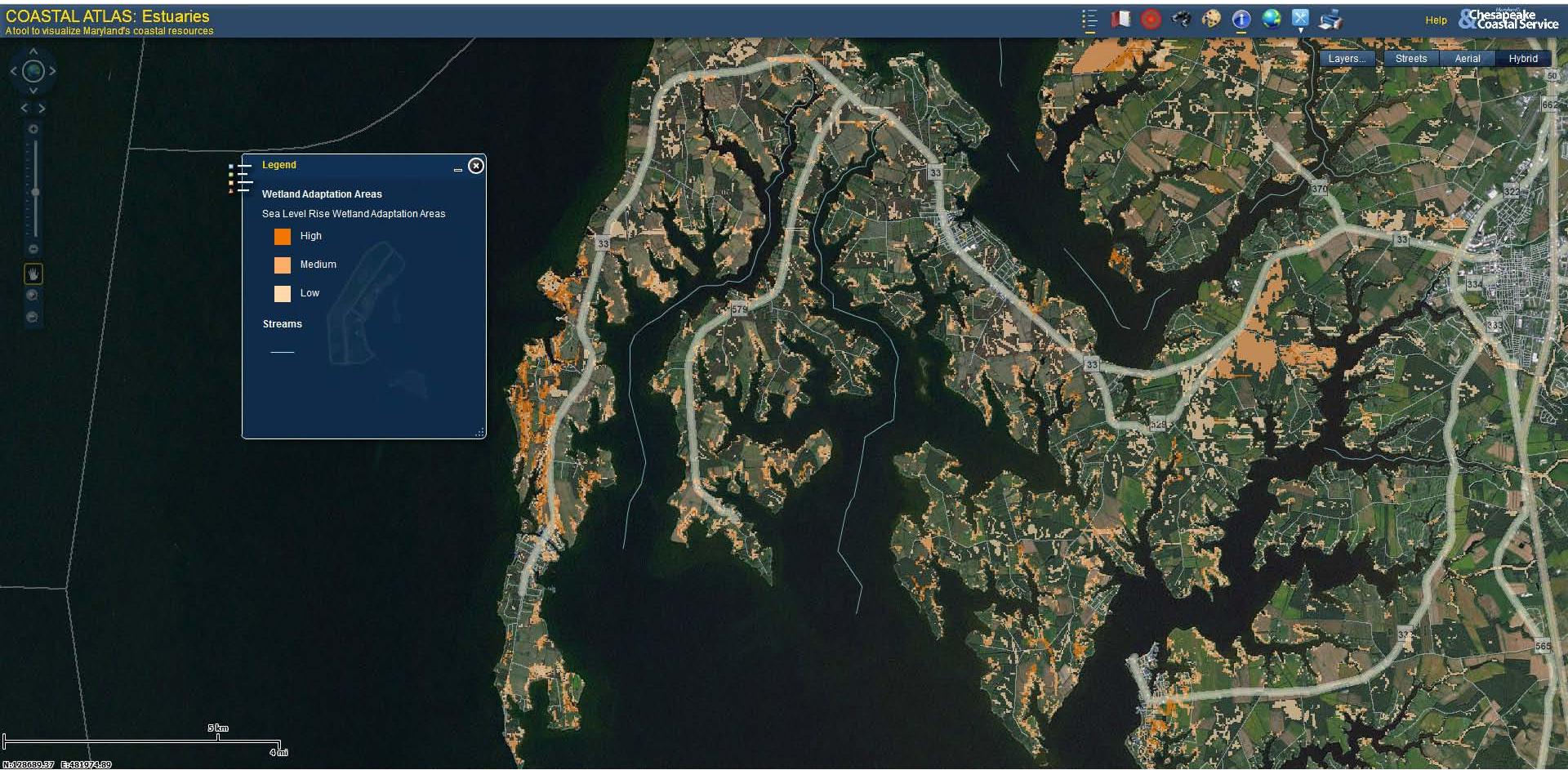


Shoreline Habitat



Blue Infrastructure Assessment shows no high priority shoreline segments in the Harris Creek watershed.

Climate Change Wetland Adaptation Areas

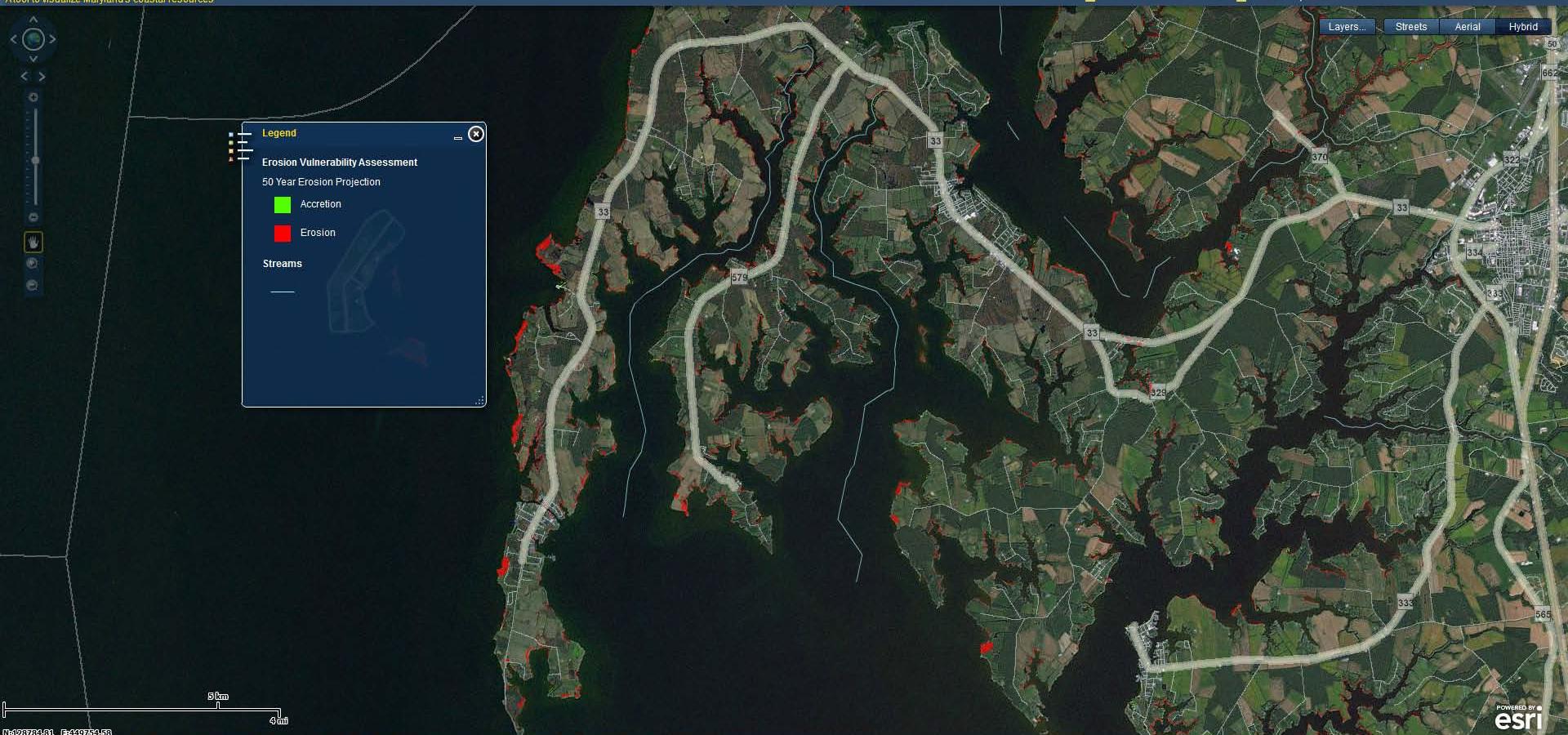


Areas ranked as High (darker orange) have higher priorities for conservation and management to allow for marsh migration

Erosion Vulnerability Assessment

COASTAL ATLAS: Estuaries
Tool to visualize Maryland's coastal resources

Help & Chesapeake Coastal Service



Red areas show where erosion is likely to occur in future



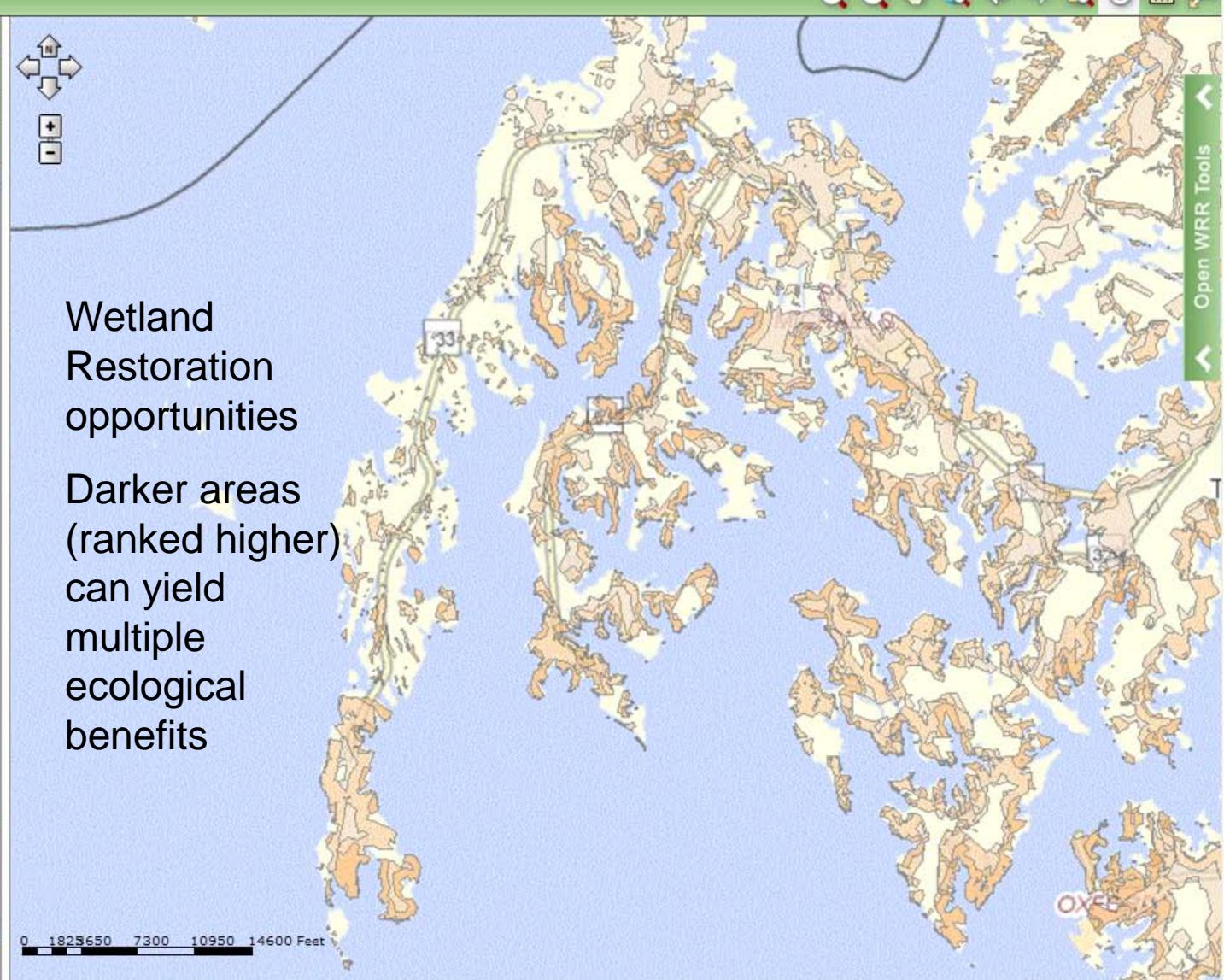
Location Details Results

Opportunities Results

Address Results

Map Contents

- Parcel Boundaries / Real Property
- Parcels
- Basemap
- Watershed Resources Improvement Opportunities
 - Upland Preservation
 - Upland Restoration
 - Wetland Preservation
 - Wetland Restoration
 - Not Suitable
 - 1
 - 2
 - 3
 - 4
 - 5
 - Riparian Preservation
 - Riparian Restoration
 - Stormwater Natural Infrastructures
 - Stormwater Compromised
- Watershed Characteristics
- Waters/Streams
- Water Quality Impairments
- Physiographic Region
- Geology
- Wetland
- Soils - Appears If Zoomed In
- Green Infrastructure



Healthy Watersheds (GIT 4) Potential Actions for Harris Creek

If modeling indicates that the Choptank Watershed is a significant driver of Harris Creek aquatic health, then:

- Assess and Track Health, Threats, and Protection Status of State-identified Tier II Watersheds in the Choptank basin
- Encourage Anti-Degradation Policy Implementation in State-identified Tier II Watersheds in the Choptank basin

High Quality (Tier II) Waters in Dorchester County

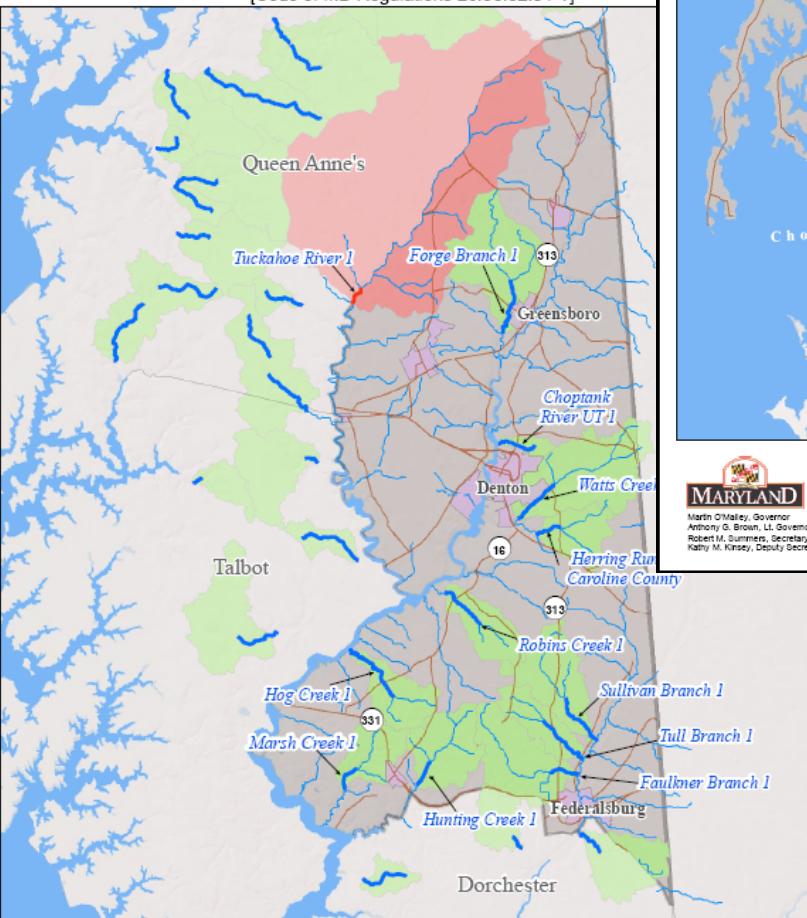
[Code of MD Regulations 26.08.02.04-1]



MD Tier II Watersheds

High Quality (Tier II) Waters in Caroline County

[Code of MD Regulations 26.08.02.04-1]

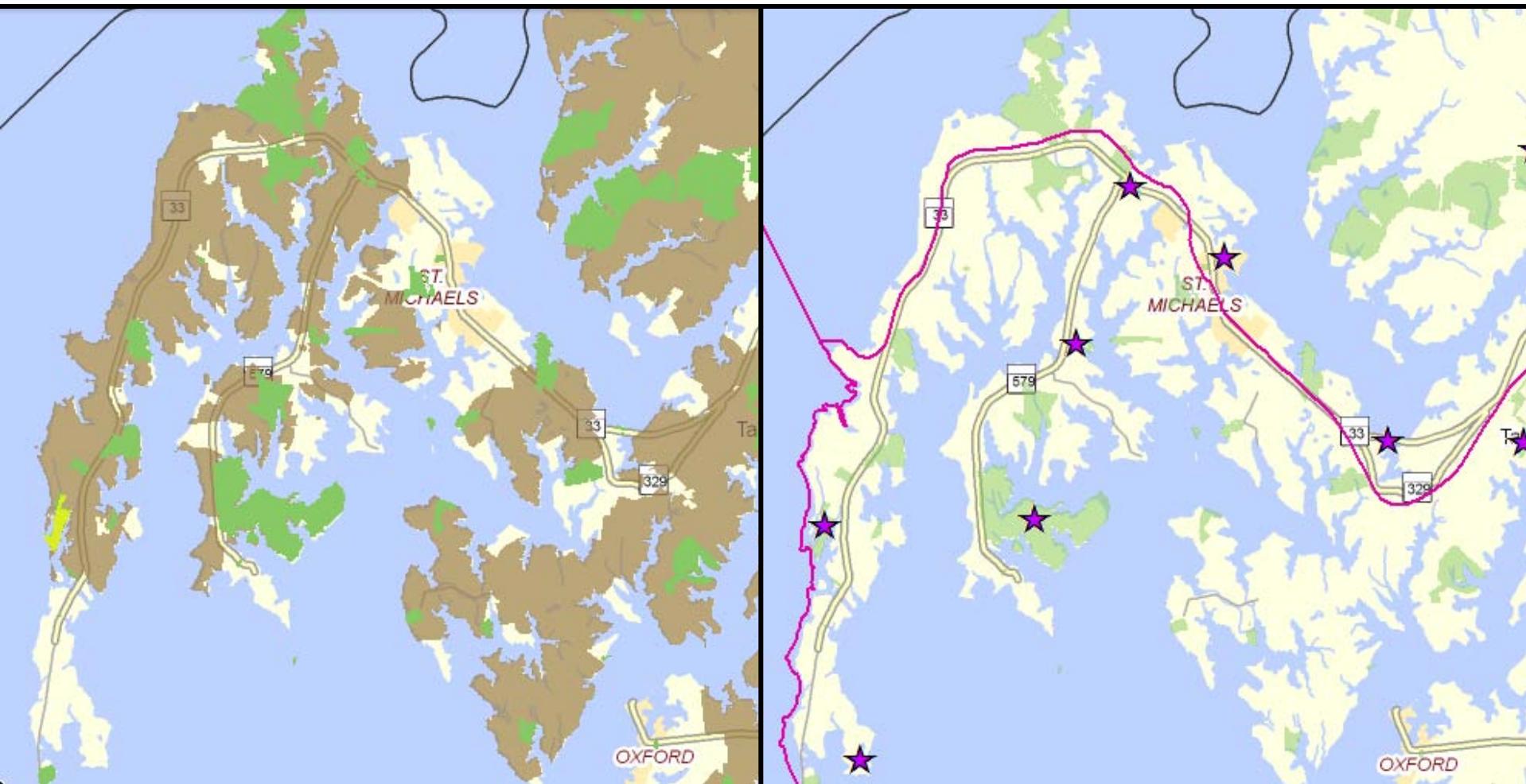


High Quality (Tier II) Waters in Talbot County

[Code of MD Regulations 26.08.02.04-1]



Citizen Stewardship (GIT 5) – Land Conservation



AGPRINT

- Permanently Preserved Agricultural Lands
- Other Protected Lands
- Targeted Agricultural Areas
- Military Lands

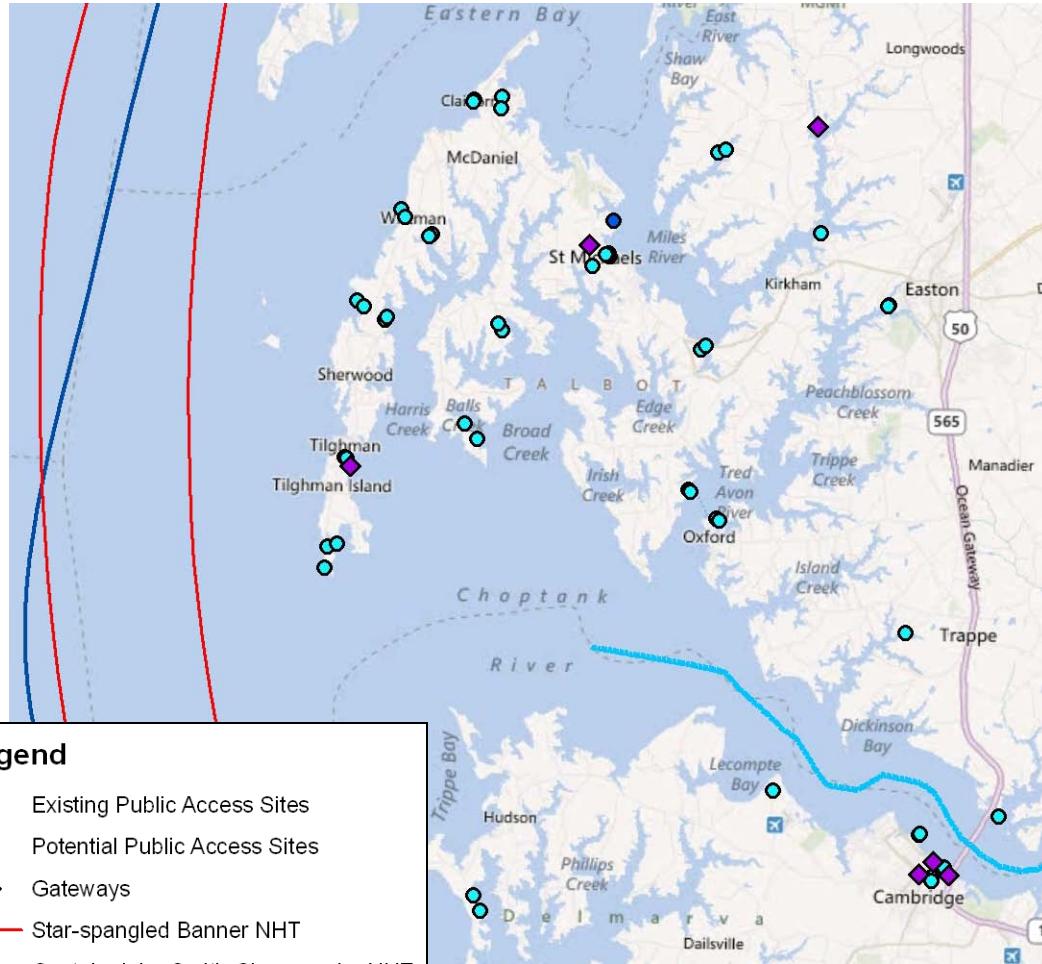
GREENPRINT

- Tributary Strategy Basins
- Acquisitions outside Targeted Ecological Areas
- All Protected Lands

Citizen Stewardship (GIT 5) – Land Conservation

- MD agencies have identified lands near Harris Creek that are priorities for protection due to their high ecological value
- These lands might be considered a higher priority for protection if this will further oyster restoration efforts.

Citizen Stewardship (GIT 5)– Public Access



- 6 public access sites currently exist on Harris Creek
 - 3 of these sites provide fishing access
 - 3 of these sites provide boating access
- No potential new sites were identified in the Public Access Plan

Citizen Stewardship (GIT 5) - Education

Oyster-related Meaningful Watershed Educational Experiences could be promoted in Talbot County



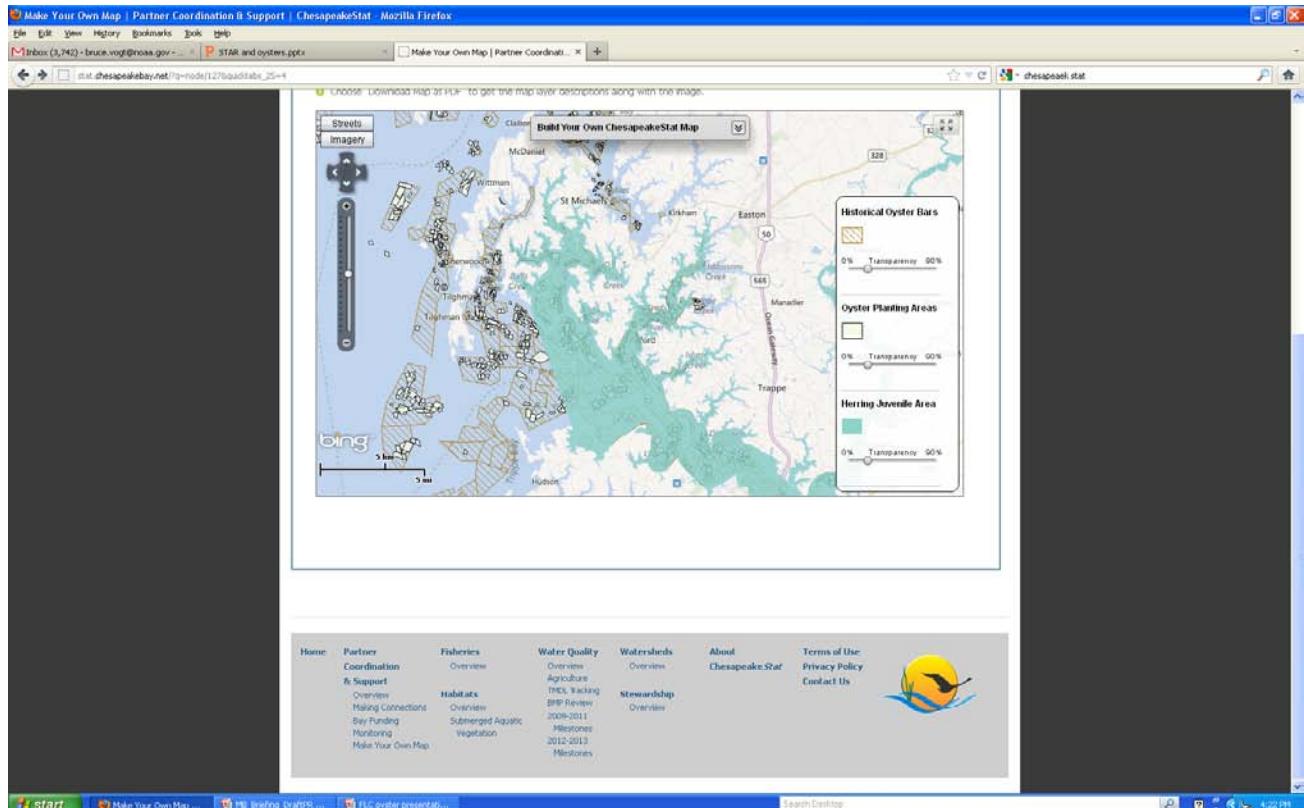
- Talbot County has 8 public schools
- Tilghman Elementary is located near Harris Creek
- 7 Field study providers
- NOAA's Environmental Science Training Center provides professional development for educators
- www.BayBackpack.com, our teacher resource website features oyster-related resources that could be utilized :
 - 22 teacher resources/lessons
 - 5 blog entries
 - 22 field study locations (watershed-wide)

Scientific, Technical Assessment and Reporting (STAR)

- Develop ecoservices assessment of restored oyster reef habitat (e.g., biofiltration, oyster larvae production, denitrification enhancement)
- Scale up to a Bay-wide oyster restoration assessment (e.g., would more oysters = more fish or more SAV?)
- Consider climate change implications on large scale oyster restoration (e.g., sea level rise, temperature, ocean acidity)

Chesapeake Stat

- Chesapeake Stat demo on data layers can be combined as a tool for selecting and assessing geographic focus areas



Questions to MB

- How can the Management Board actively support and foster cross-GIT collaboration and this ecosystem approach to protection and restoration?



*Photo Credit: Michael
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