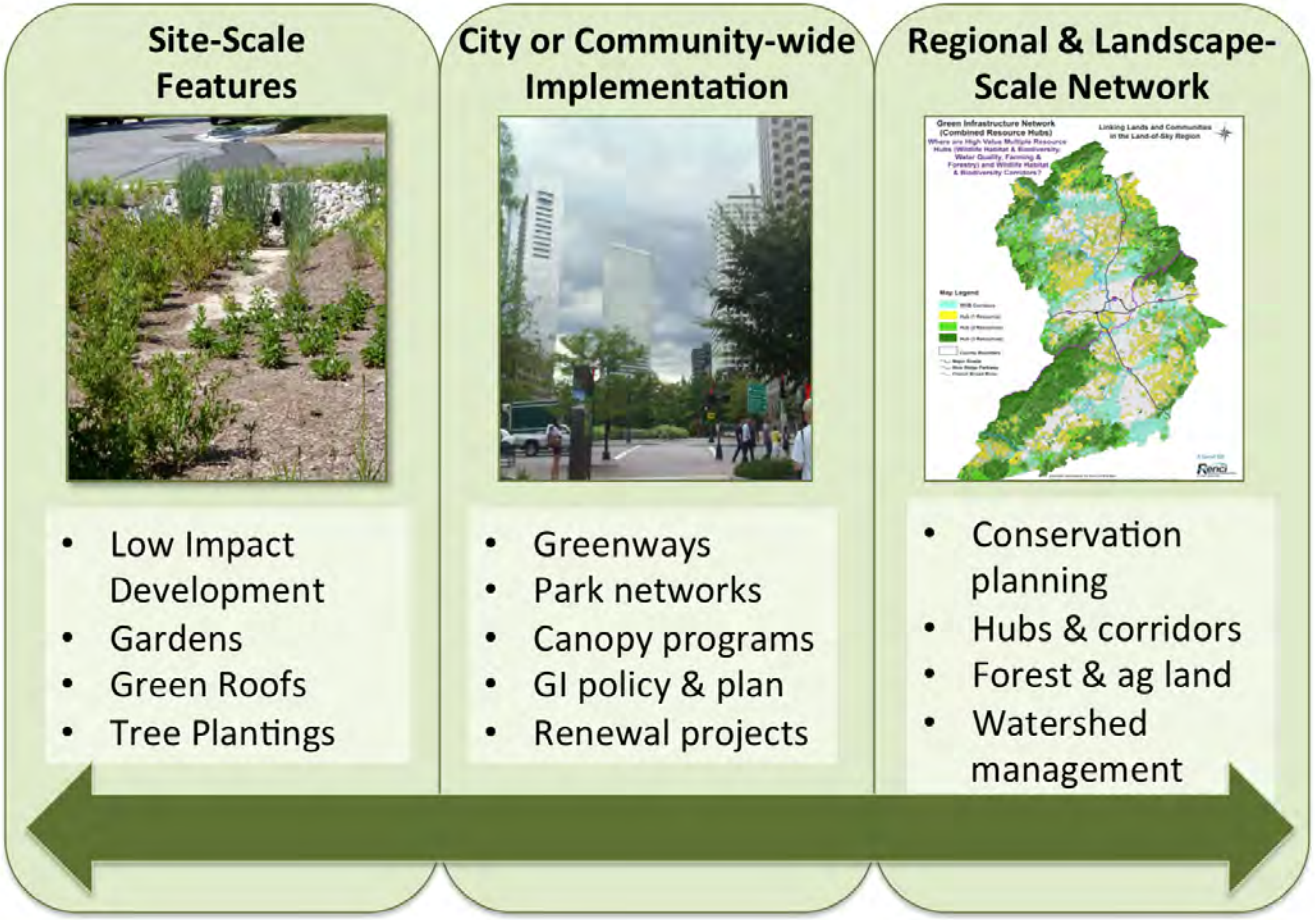
Vibrant Economies: Session 1

Explore how green infrastructure can save municipalities and local communities monies and provide economic benefits community wide



From Greening the Grey: Green Infrastructure for an Urbanizing World
http://www.greeningthegrey.org/gi-features/scale/

Analyzing the Benefits of Green Infrastructure

Local Government Guidance

Presented at:
MD State of the Coast Conference, Cambridge, MD
May 18, 2018

Naomi Young
nyoung@edclancaster.com

ENVIRONMENTAL FINANCE CENTER

LANCASTER COUNTY, PA
Economic Development Company

CENTER FOR REGIONAL ANALYSIS

Local Government and Green Infrastructure

What we thought going in…

- GI is synonymous with stormwater management.
- GI benefits in CSS are the same as GI benefits in MS4.
- Lessons from Phase 1 communities translate easily to Phase 2 communities.
- Investment decision are about green or grey.
- Benefits are benefits, and communities need assistance in monetizing benefits to make decisions.

What we learned...

- Green infrastructure means many things and depends on scale and context.
- GI benefits depend on the setting – or existing context.
- Local governments (Phase 2 communities) have different experience, regulatory drivers and capacity that impact transferability of Phase 1 lessons.
- Investment decisions are seldom about grey or green but rather cost and ease of implementation.
- Direct benefits and co-benefits have a different role in the planning and decision process.

Framing Benefits at the Local Government

- GI decision is not “either-or” but what is the best approach to managing stormwater or meeting regulatory requirements
- Key concerns:
  - Purpose of the stormwater investment
  - Site location characteristics
  - Capacity to maintain the practice
  - Budget/financial constraints
- Holistically analyzing benefits has to answer these question.

Framing Benefits at the Local Government

- Set out four-step process:
  - Define the goal(s) for assessing benefits
  - Distinguish between direct benefits and co-benefits
  - Inventory and assess the most meaningful benefits
  - Tailor the characterization of benefits to the purpose

Define the Goal

- In a Phase 2 MS4 context, the goal is regulatory compliance.
- But for some local governments GI emerges as a strategy to meet other goals:
  - Climate resiliency
  - Sustainability initiatives
  - Community partnerships.

Direct Benefits vs Co-Benefits

- Direct benefits:
  - Respond to service driver
  - Often specified in design and performance specs

- Co-benefits:
  - Impacts that go beyond performance specifications
  - External to the stormwater network or asset owner
  - Generally impact people and place in and around the GI site

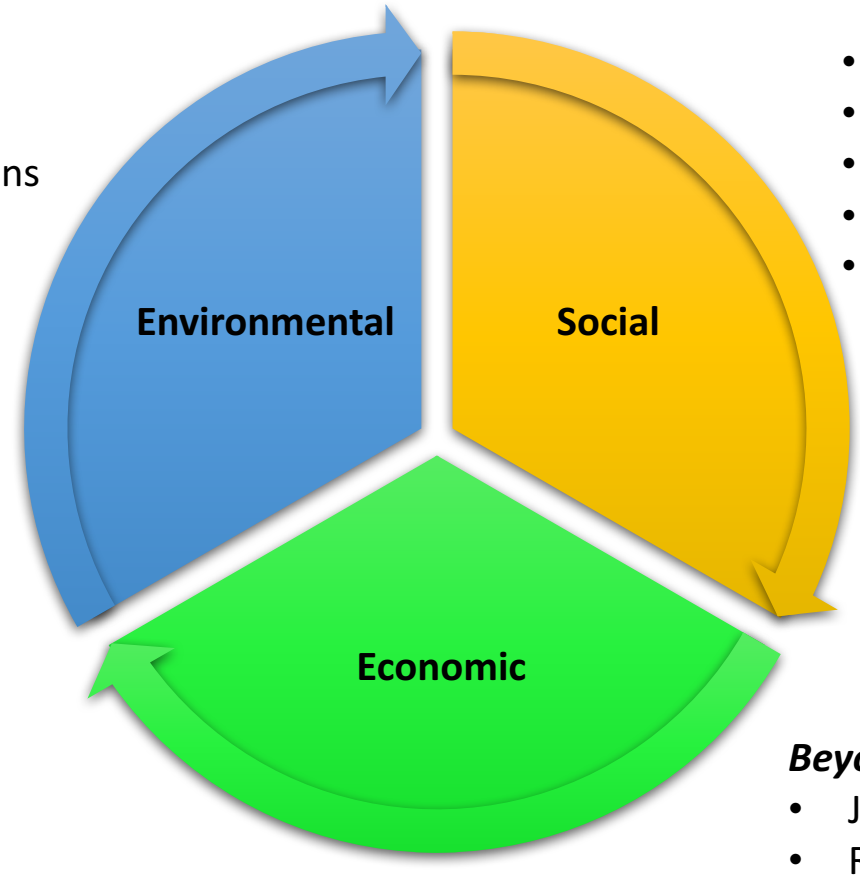
Inventory & Focus on the Most Meaningful

- Not all benefits are the same in terms of scale, significance, and distribution.
- Triple bottom line is helpful for identifying full range of benefits.
- Screen these based on what is relevant to the community.
- Characterize what rises to the top:
  - describe **coverage** of the impact in terms of populations and geographic coverage (ie, the number of individuals); and/or
  - determine **degrees of separation**, that is how many factors or causal links exist before the co-benefit is realized

Triple Bottom Line and Co-Benefits

Beyond water quality….

- Improved air quality
- Reduced GHG emissions
- Habitat restoration



- Recreational opportunities
- Reductions in crime
- Increased beautification
- Improved health & wellbeing
- Enhanced social cohesion

Beyond cost savings…

- Job creation
- Redevelopment
- Increased property values

Tailor the Information to the Need

- Monetization is not always useful or desirable.
- Benefits can also be described in terms of:
  - Beneficiaries – who and how many
  - Quantity – how much change (physical sense)
  - Timing
  - Location
- Benefits should be expressed in the manner that best addresses the stated goal.

Conclusions

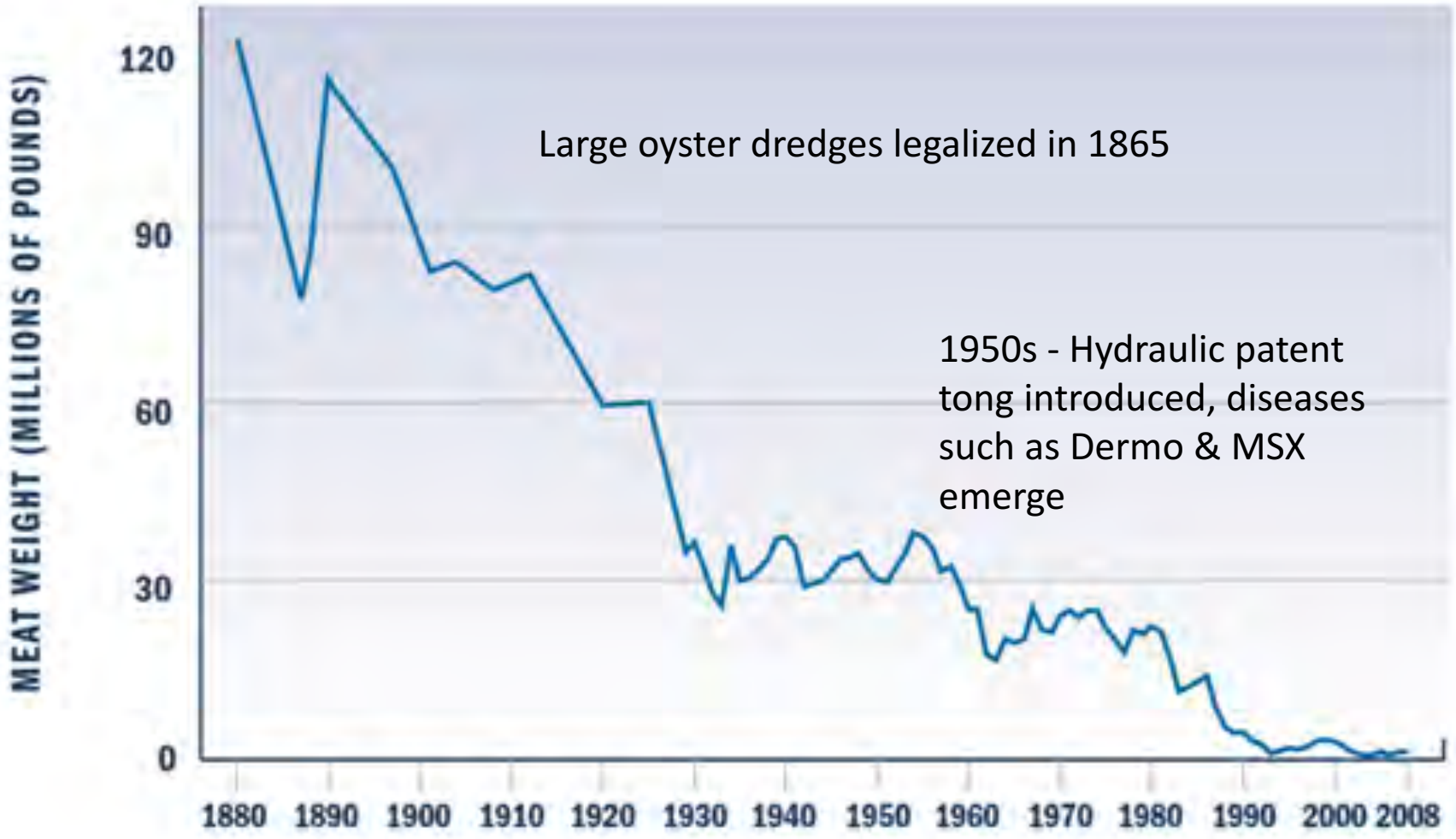
- Holistically analyzing benefits can be costly and challenging – and not always impactful.
- Level and scope of effort should match the need. Understanding benefits can assist in:
  - Cost-effectiveness of meeting compliance
  - Community engagement
  - Addressing underserved communities
  - Motivation collaboration
  - Pursuing funding.
- But don't assume these needs require benefits to be monetized. They can also be described in terms of:
  - Beneficiaries – who and how many
  - Quantity – how much change (physical sense)
  - Timing
  - Location

Socio-Economic Impacts from Oyster Reef Restoration, Choptank River Complex, MD

Scott Knoche, MSU
Tom Ihde, MSU
Giselle Samonte, NOAA
Doug Lipton, NOAA

Jorge Holzer, UMD
Howard Townsend, NOAA
Scott Steinback, NOAA
Kristy Lewis, St. Mary's

Oyster Harvests in the Chesapeake Bay – 1880 to Present



Source: NOAA Chesapeake Bay Office

Oysters and Ecosystem Services

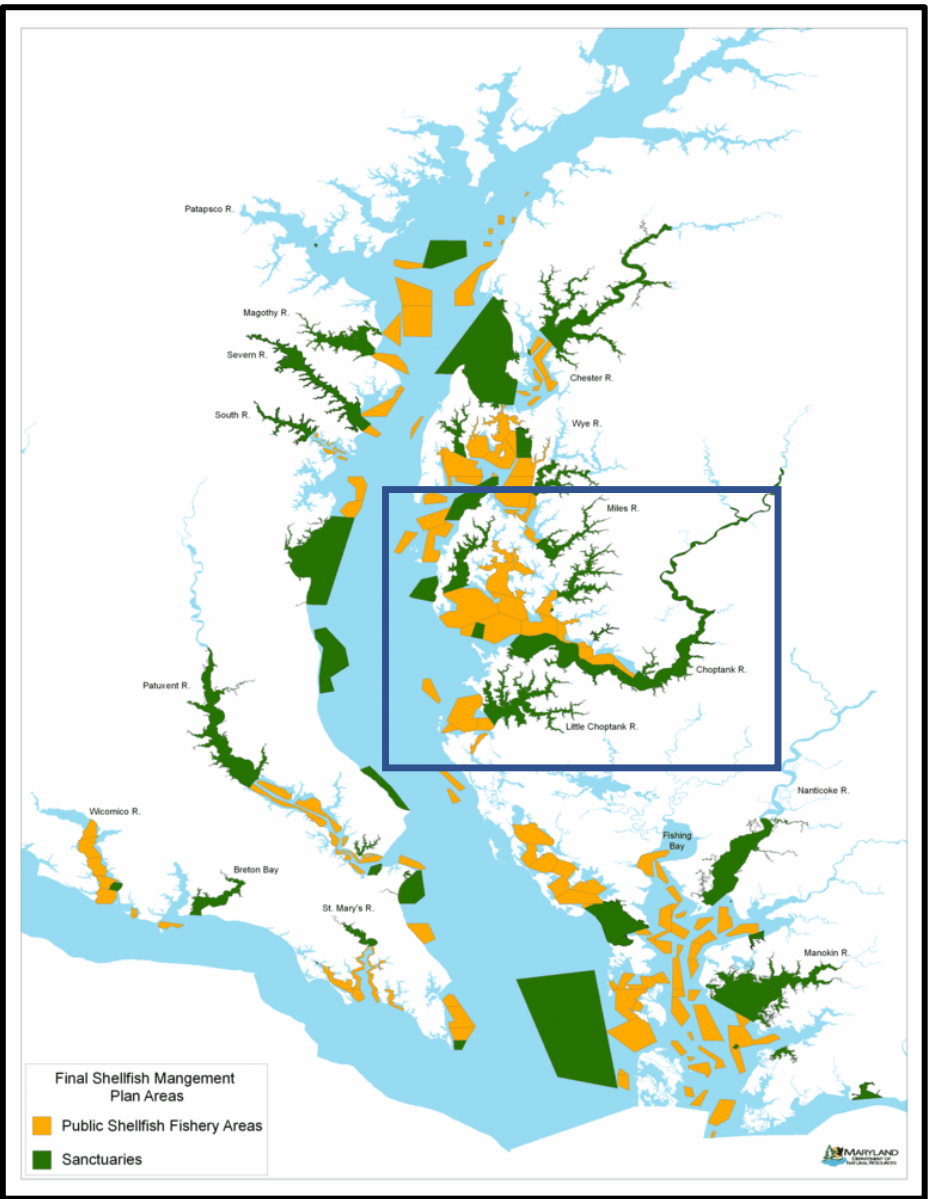
Oysters provide a variety of ecosystem services, including

- Water filtration
  - Decrease in suspended solids
  - Increase in denitrification, SAV
- Carbon sequestration
- Shoreline stabilization
- Habitat for other species

Oysters as ecosystem engineers

- Provide habitat both for themselves & other organisms

Maryland Oyster Sanctuaries



Maryland Oyster Restoration and Aquaculture Development Plan (Dec, 2009)

- Prior to 2009, 1,500 acres of bottom habitat in sanctuaries
- In 2009, 3 new sanctuaries now protecting total of 2,600 acres (9% of habitat)
- In 2010, State of Maryland set aside 24% of remaining oyster habitat, for a total of 6,900 acres protected

Maryland Oyster Restoration

First three tributaries in MD

Chesapeake Bay Watershed Agreement:
Restore 10 tributaries by 2025

Harris Creek
Goal: 377 restored acres
Estimated Cost: $31.7 million
Status: Completed; ~ 2 billion oysters planted

Tred Avon River
Goal: 191 restored acres
Estimated Cost: $14.3 million
Status: Ongoing (20% complete)

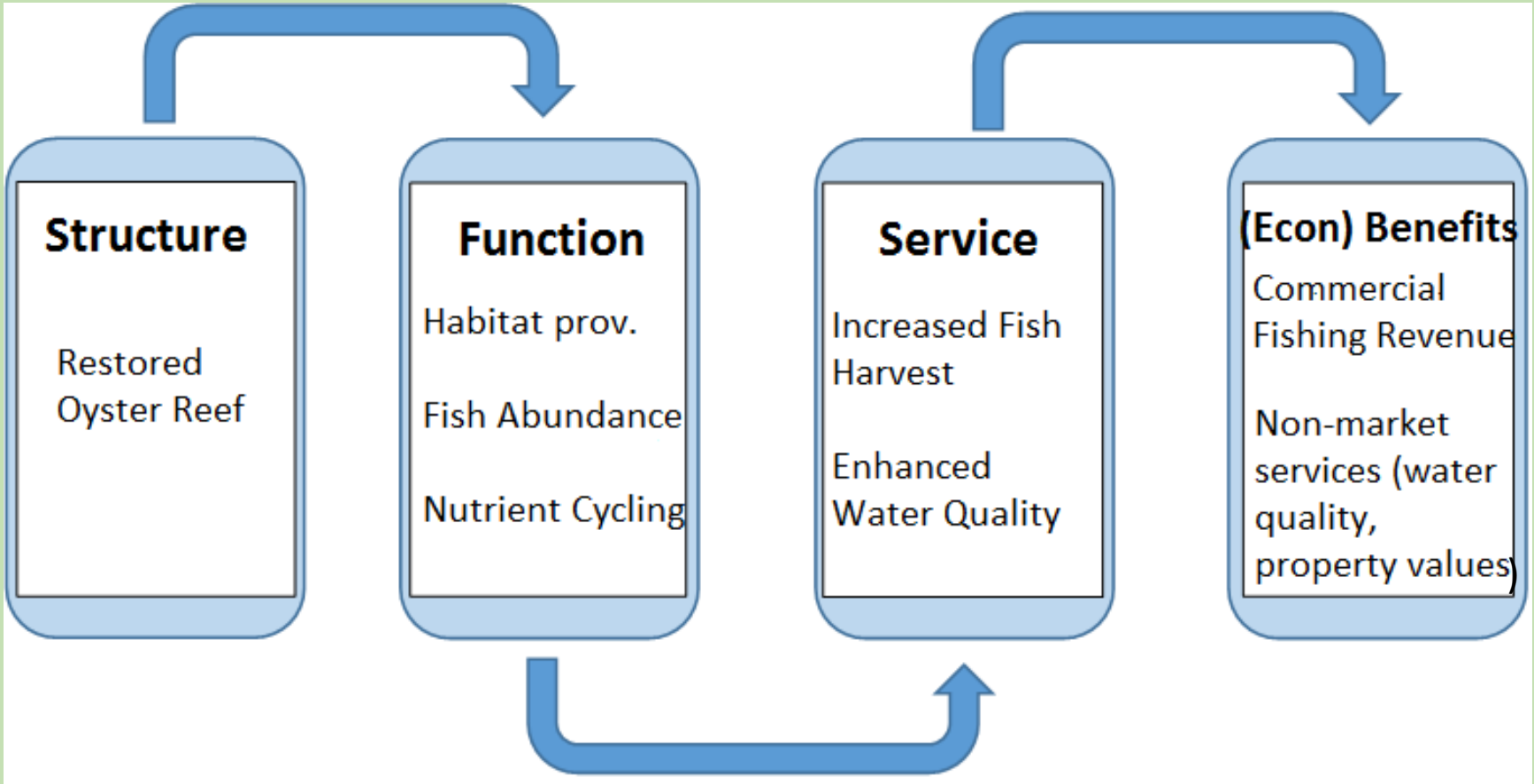
Little Choptank River
Goal: 342 restored acres
Estimated Cost: $22 million
Status: Ongoing (82% complete)

Estimated Cost - $70 million

Project Objectives

- Estimate change in fisheries harvest generated through oyster reef restoration in the Choptank Complex
  - Focus on species of commercial value
    - Blue Crab – 2015 dockside value of $8.7 million
    - Finfish – 2015 dockside value of $807,000
- Estimate socio-economic impacts of different oyster reef restoration scenarios
  - Calculate change in dockside values generated from biomass
  - Estimate changes in key socio-economic metrics (e.g., sales, jobs)

From Restoration to Benefits



Linking Ecology and Economics

Ecopath with Ecosim

No fish is an island

Output:
Fisheries Landings/ Revenue

IMPLAN

Economic (Industry) Multipliers – Cost Functions

Output:
Employment, Sales, Income

Socio-economic Impact: Jobs & $$$

Restoration Scenarios

Ecopath with Ecosim

No fish is an island

No Reef

Landings Outputs

IMPLAN

Econ Outputs

Jobs & $$$

Young Restored Reef

Landings Outputs

IMPLAN

Econ Outputs

Jobs & $$$

Mature Restored Reef

Landings Outputs

IMPLAN

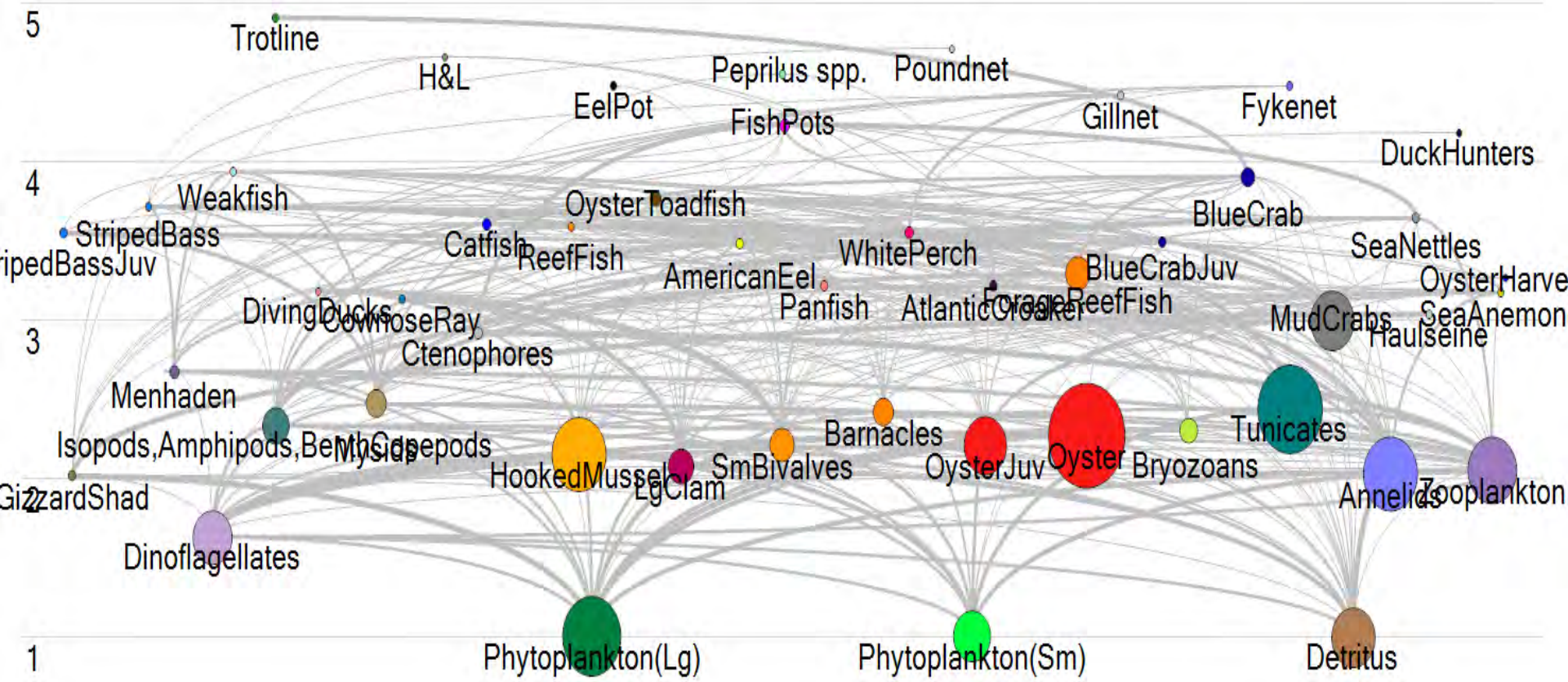
Econ Outputs

Jobs & $$$

Ecopath with Ecosim

No fish is an island

Food web of restored oyster reef in the Choptank & Little Choptank Rivers



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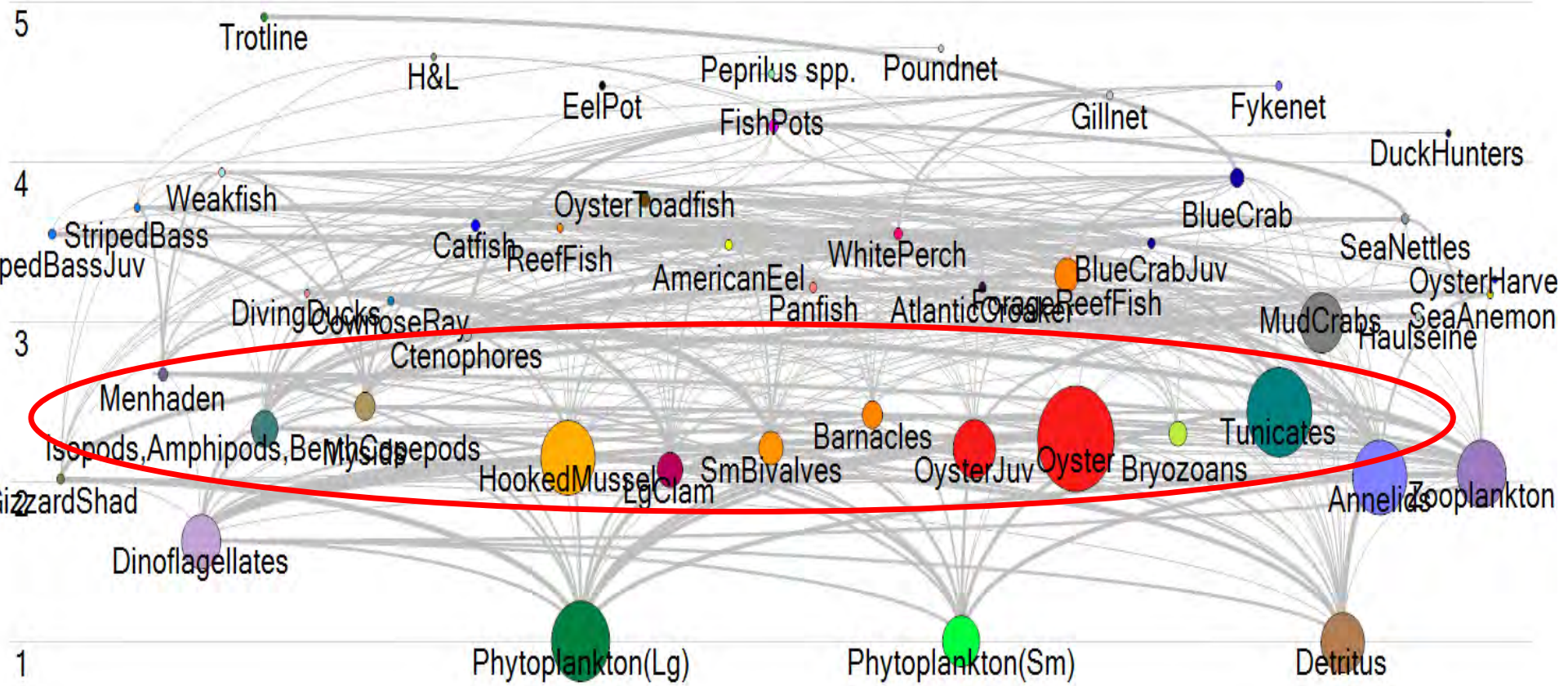


IMPLAN: Input-Output Modeling

IMPLAN: Economic impact assessment software system using economic data and relationship between industry sectors

- **Employment** – Full & part-time workers
- **Output** – Measure of sales
- **Value-Added** – Diff. betw. output & cost of inputs
- **Labor Income** – Employee & proprietor

Each of the above Socio-economic metrics can be measured in...

Direct Effects – Initial change in industry

Indirect Effects – Changes in inter-industry transactions as supplying industries respond to increasing demands from directly affected industries

Induced Effects– Changes in local spending that result from income changes in directly and indirectly affected industries

Total Impacts = Direct Effects + Indirect Effects + Induced Effects

Summary

- Project near completion (estimated August 2018)
- When completed, project will provide return-on-investment information with respect to costly and controversial restoration
- Change in socio-economic metrics such as employment and income is increasingly important environmental project evaluation criteria for managers & policymakers


Thank you!

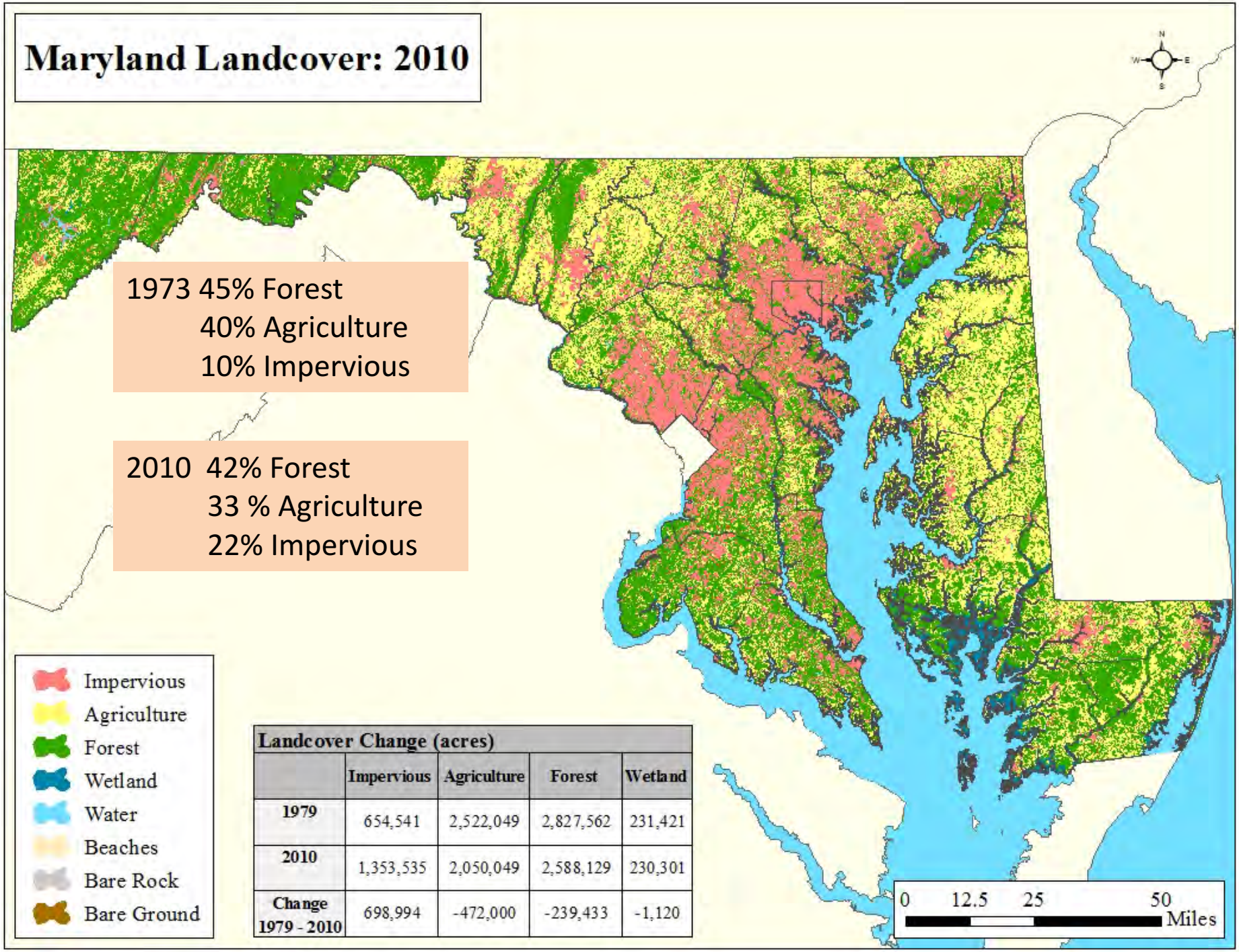
Getting Green from Green: Ecosystem Service Benefits of Green Infrastructure

State of the Coasts 2018
Cambridge, Maryland

Elliott Campbell, Rachel Marks, Christine Conn

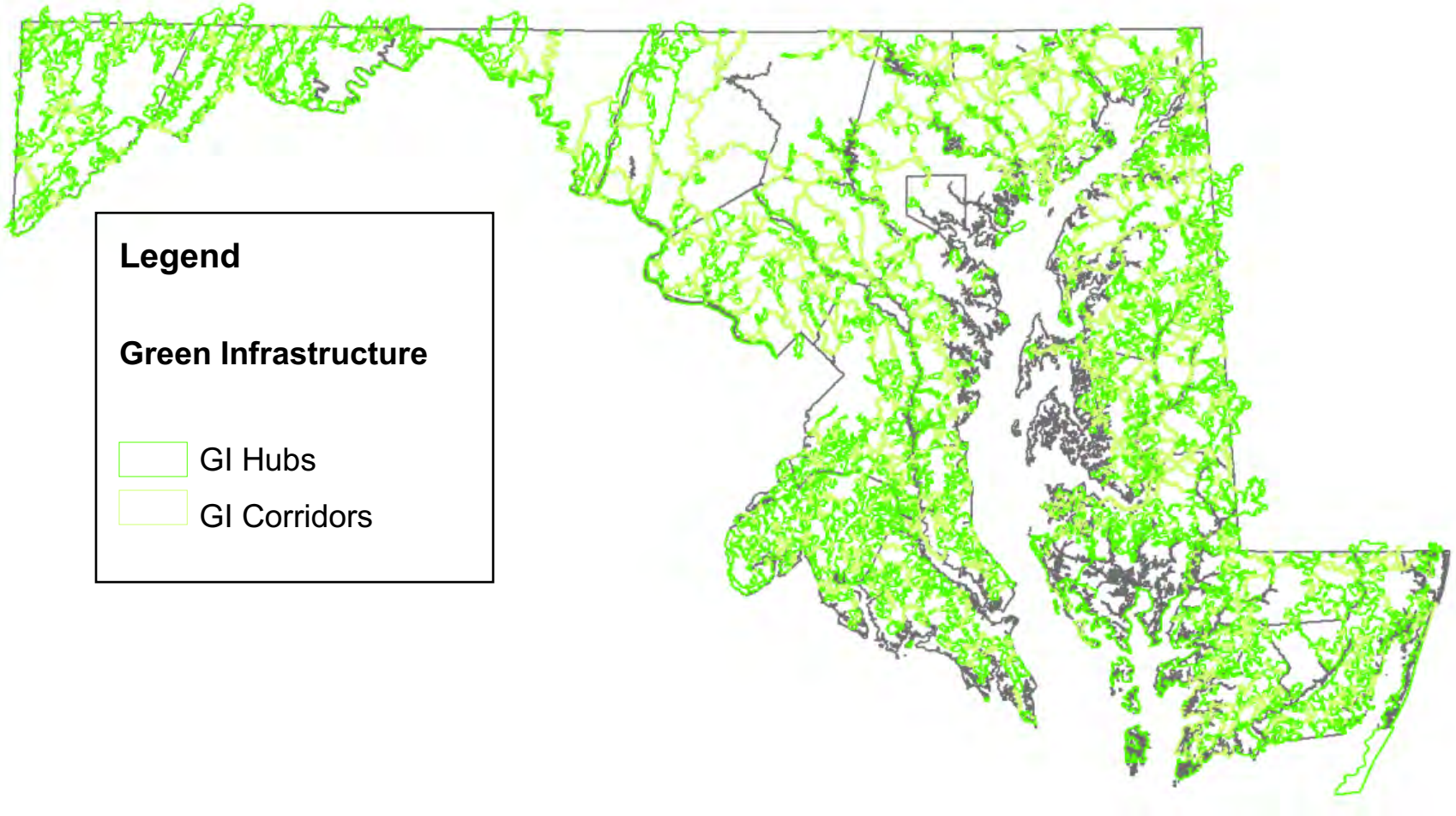
Chesapeake & Coastal Service
Maryland Department of Natural Resources

Maryland Landcover: 2010



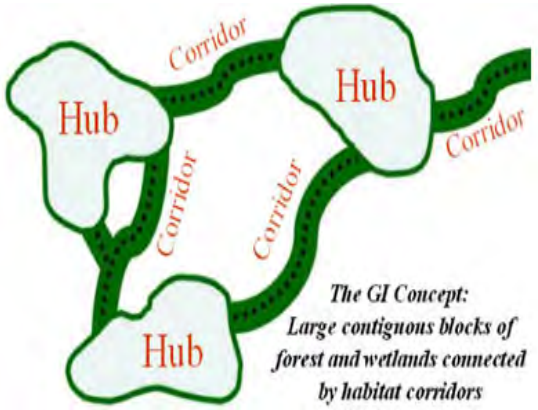
Landcover Change (acres)				
	Impervious	Agriculture	Forest	Wetland
1979	654,541	2,522,049	2,827,562	231,421
2010	1,353,535	2,050,049	2,588,129	230,301
Change 1979 - 2010	698,994	-472,000	-239,433	-1,120

MD Green Infrastructure Map



Maryland's Green Infrastructure

- System of connected hubs and corridors of forests and wetlands
- Particularly important for habitat requirements for certain species
- GIA map comprised more than 1.7 million acres in hubs and roughly 250,000 acres of corridors, totaling about 39% of the State's land area



Ecosystem Services

Broadly- "*Benefits gained by people from the environment*"

Practical definition for inclusion in decision making-

"*Benefits gained by people from the environment that are not already being paid for in a market and are contributing to a marginal increase in human well-being*"

MD DNR has developed a tool to quantify Ecosystem Services from natural lands

Valuation Methodology: Eco-Price

- Ecosystem services are paid for in many different ways
- People view responsibility for providing ecosystem services to be a collective obligation
- We look at the many different ways society invests in protecting or replacing the environment
  - In a regulatory market
  - Cost of restoration
  - Through mitigation fees
  - Cost to regulate

Assesses the Social Value for decision making

≠ Market Value

Mapping Ecosystem Services

- Ecosystem Services vary spatially across the landscape
- ES vary in the biophysical supply of the service (e.g. amount of carbon that is sequestered, water being recharged to aquifers)
- ES vary in the way and amount that people benefit (e.g. number of people and value of infrastructure vulnerable to flooding)
- We consider both sources of variation when mapping ES in Maryland

Ecosystem Services Mapped

Air pollution mitigation- USFS i-Tree landscape

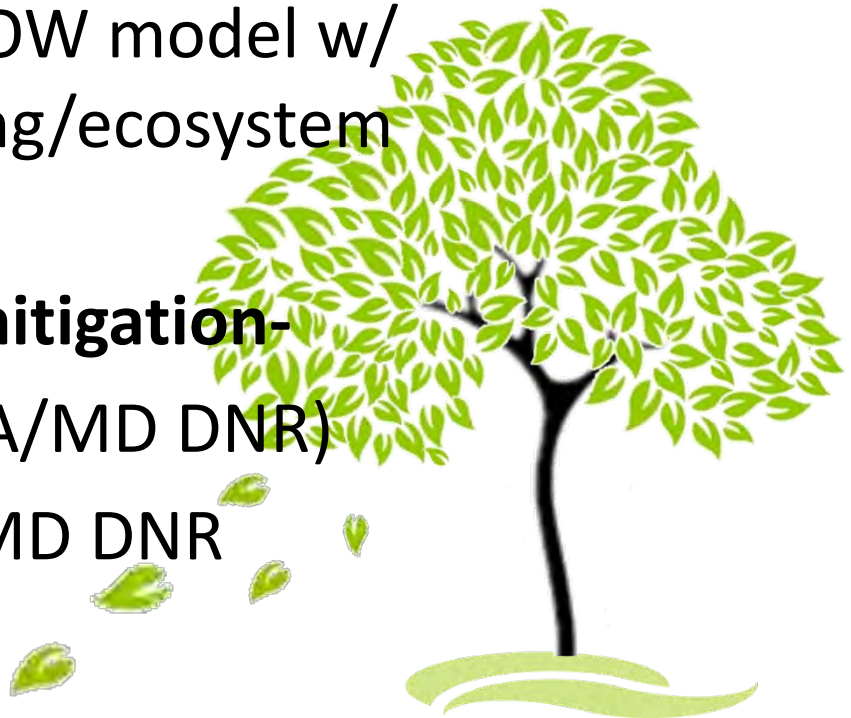
Carbon sequestration- USFS i-Tree and MD DNR

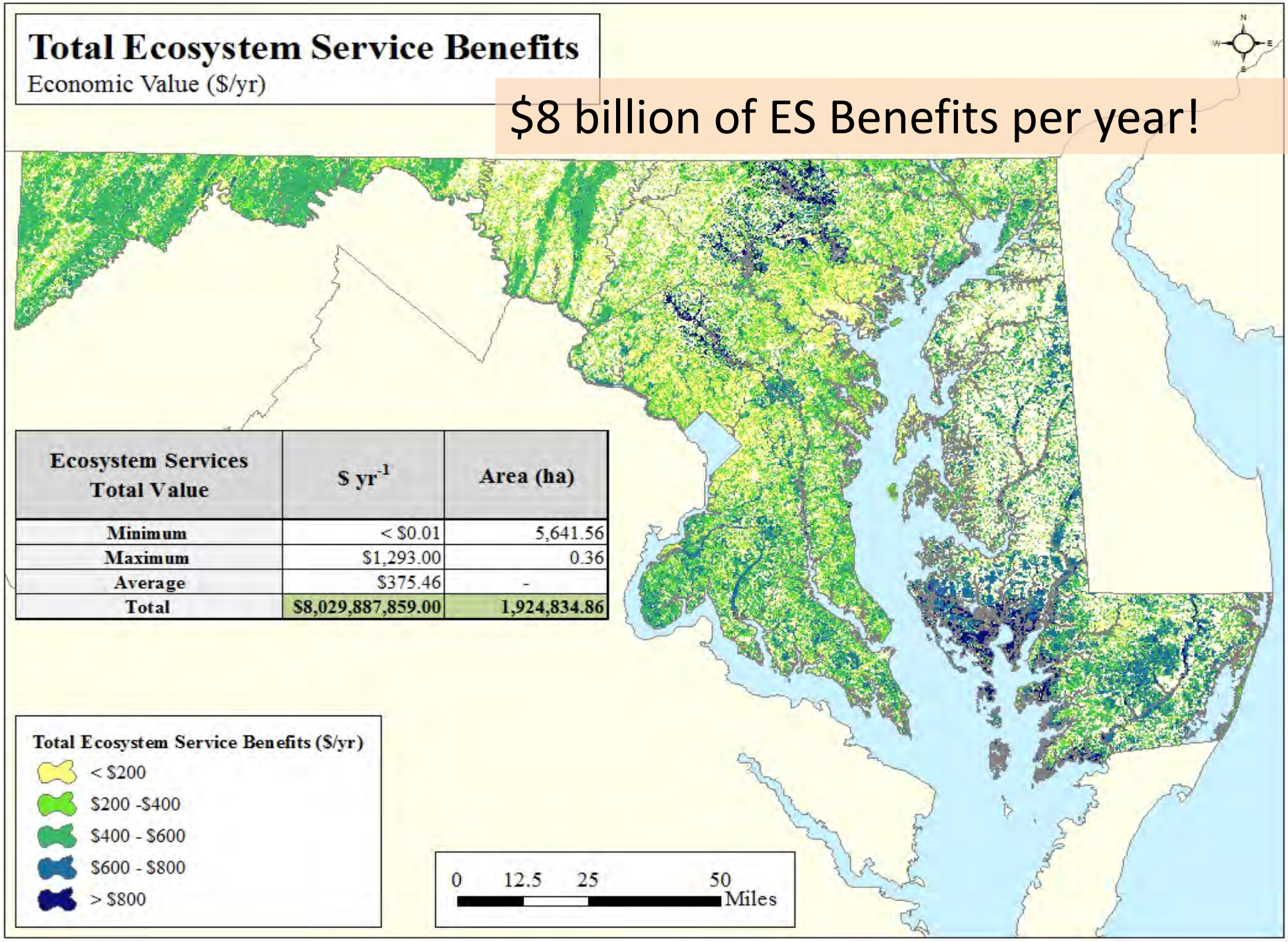
Groundwater recharge- USGS National Hydrography Dataset (1 km)

Nitrogen Removal- USGS SPARROW model w/ literature removal rates by loading/ecosystem type

Flood Prevention/Stormwater mitigation- Index of Mitigation Potential (EPA/MD DNR)

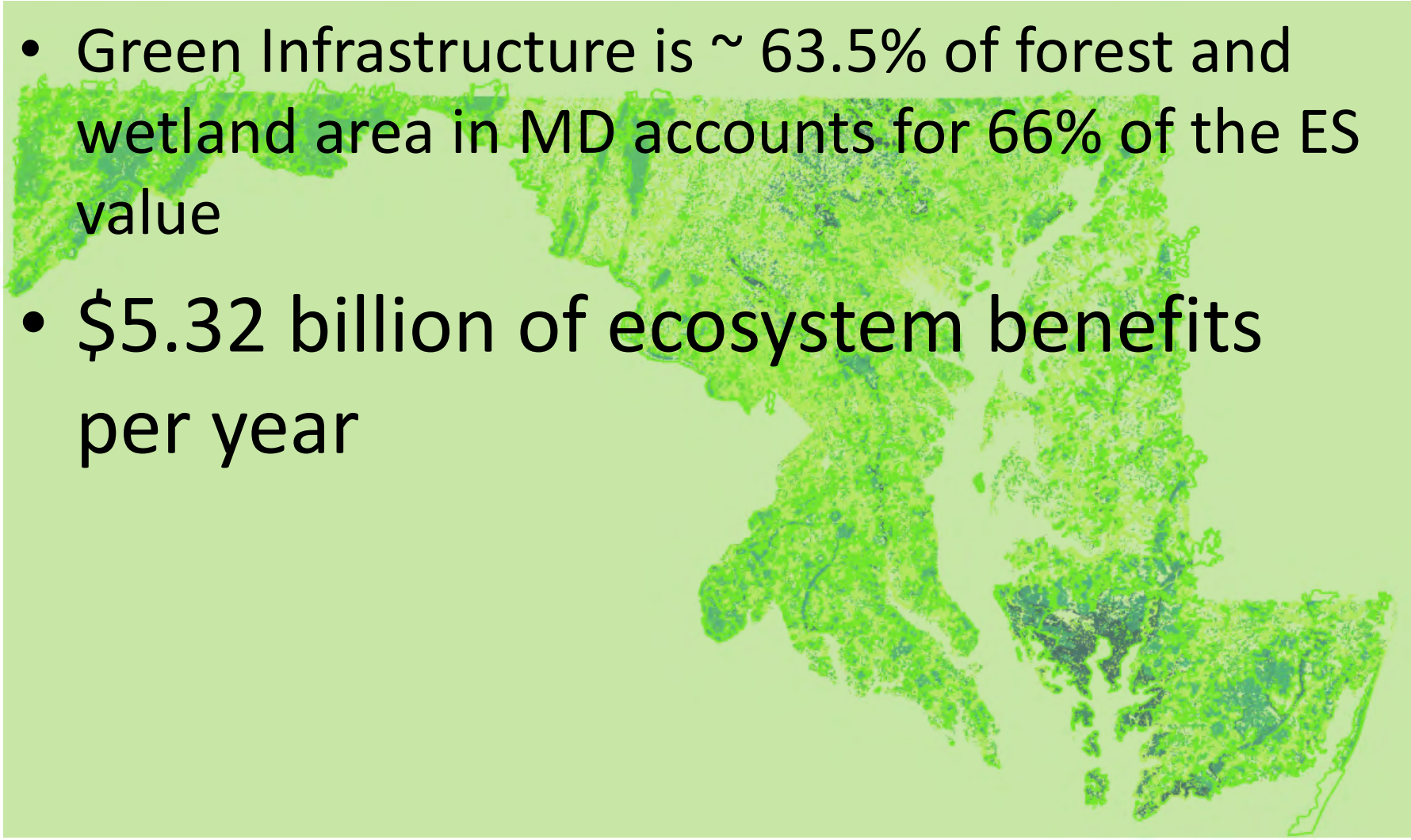
Wildlife- Habitat Quality Index, MD DNR




Total Ecosystem Service Benefits
Economic Value ($/yr)
$8 billion of ES Benefits per year!
Ecosystem Services Total Value | $ yr-1 | Area (ha)
Minimum | < $0.01 | 5,641.56
Maximum | $1,293.00 | 0.36
Average | $375.46 | -
Total | $8,029,887,859.00 | 1,924,834.86
Total Ecosystem Service Benefits ($/yr)
< $200
$200 -$400
$400 - $600
$600 - $800
> $800
0 12.5 25 50 Miles

Ecosystem Benefits from Green Infrastructure

- Green Infrastructure is ~ 63.5% of forest and wetland area in MD accounts for 66% of the ES value
- $5.32 billion of ecosystem benefits per year



ES Applications by the MD DNR

- Consider ES Value When Selecting Projects and Investments, Evaluating ROI, suggesting compensation
  - Conservation- Program Open Space Investments –Totaled >$100 million for FY2018. Parcel Evaluator Tool with ES information will be used for prioritizations of future acquisitions.
  - Restoration- Creating a tool to help target and evaluate the ES benefits of th tion
  - Working with the Maryland Park Service to evaluate impacts on park lands
  - Collaborating with Counties, Conservation Fund to consider ES in County level GI mapping

Our Tool is Live!

http://geodata.md.gov/greenprint

Future Work

- Map Services from the Chesapeake Bay
  - Oyster beds
  - Submerged Aquatic Vegetation (SAV)
- Restoration Targeting Tool
- Incorporate new data
  - Wetland mapping
  - Better floodplain mapping
  - Higher resolution land cover
  - New models
  - New eco-prices
- Collaborate with instate, interstate, and federal partners- PA, Ches. Bay Program, EPA Reg. 3, Counties

Thank You!

- Websites:
- http://geodata.md.gov/greenprint/
- http://dnr.maryland.gov/ccs/Pages/Ecosystem-Services.aspx

- Contact:
- Elliott.campbell@maryland.gov
- Rachel.Marks@maryland.gov
- Christine.Conn@maryland.gov

Tourism and Arts: Maryland's Quality of Life Industry

The Maryland Office of Tourism's mission is to grow revenue to the state through increased customer spending. Or, more simply:

MORE CUSTOMERS. MORE REVENUE. MORE JOBS.

The Maryland Office of Tourism measures its programs against four strategic objectives:

MARKET EXPANSION

MAXIMIZING OPPORTUNITIES

LEVERAGING PARTNERSHIPS

TRANSACTIONABLE OPPORTUNITIES

Customer Volume and Spending 2016

- Maryland welcomed 42.1 million customers/visitors, up 4 percent from 40.5 million in 2015
- Visitors to Maryland spent nearly $17.3 billion, an increase of 2.7 percent from 2015
- Visitor spending generated $2.3 billion in state and local taxes
- Each household would need to pay an additional $1,080 in taxes to replace the tax revenue generated

Tourism is Vital to Marylanders

- Tourism supported more than 146,000 employees in 2016, increasing 1.7 percent from 2015, outpacing job growth in other industries
- These employees earned $6 billion in wages, an overall increase of 5 percent from 2015
- Tourism is the 10th largest private sector employer in Maryland.

Maryland Visitor Statistics

Continued growth in the leisure, overnight and day travel segments

	MARYLAND			U.S.		
	2014	2015	2016	2014	2015	2016
TOTAL	38.23	40.47	42.10	2,512.78	2,637.08	2,706.93
BUSINESS	7.15	7.56	7.49	517.99	537.26	542.77
LEISURE	31.09	32.92 ↑	34.61 ↑	1,994.79	2,099.82	2,164.17
DAY	19.38	20.98 ↑	21.98 ↑	1,340.63	1,408.73	1,452.07
OVERNIGHT	18.85	19.49 ↑	20.12 ↑	1,172.15	1,228.36	1,254.87

Demographic Characteristics of Visitors

- Males make up 49 percent and women make up 51 percent of the overnight visitors.
- Fifty-five percent of all overnight travelers are under the age of 50 and 45 percent are age 50 or more.
- Most overnight trips taken to Maryland are by those without children in the home (31 percent have children present).
- Nearly 29 percent of day trippers and overnight visitors have a household income under $50,000, while 55 percent have a household income of $75,000 or more, with 22 percent having a household income of $150,000 or more.

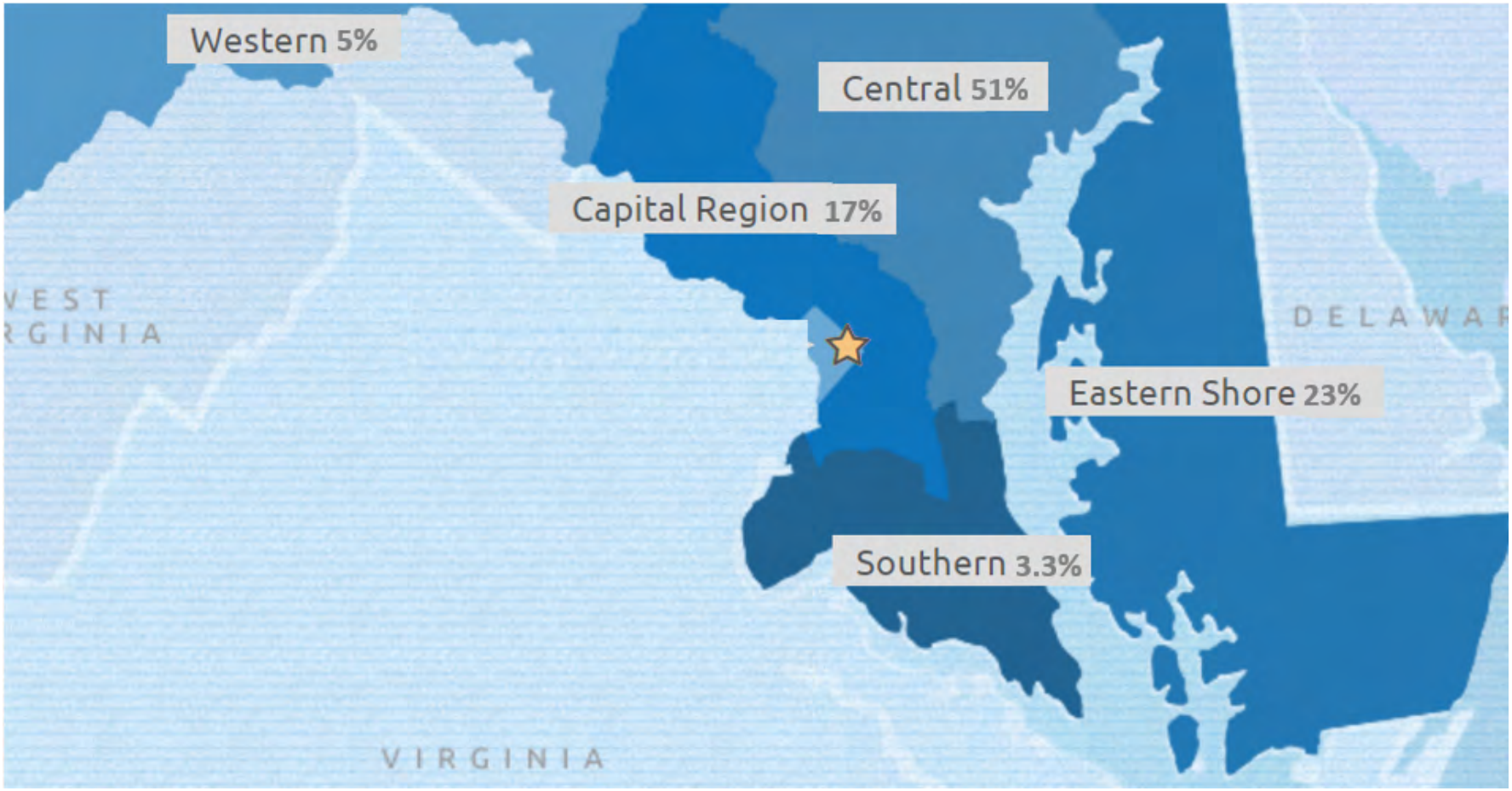
Where do they come from?

- Most day trippers and overnight visitors come from Washington, D.C.
- The states of NY, NJ, PA and CT combined make up 34 percent of overnight visitors and 20 percent of day trips.
- Philadelphia makes up 10 percent of overnights.
- Baltimore makes up 30 percent of day trips and 10 percent of overnights.
- Five percent of day visitors are from the Harrisburg-Lancaster-Lebanon-York, PA area.

What are they doing?

- A large percentage of day trip and overnight visitors are visiting friends and family (27 percent).
- They arrive by car (76 percent) and are staying in paid accommodations (63 percent).
- Activities that overnight visitors engage in most frequently include:
    1. Culinary Experiences (14 percent),
    2. Shopping (11 percent),
    3. Beach/Waterfront (9 percent),
    4. Touring/Sightseeing (5 percent),
    5. Historic Sites (5 percent)

Where are they going?



New Initiatives

- Maryland Crab & Oyster Trail
- The Great Chesapeake Loop


MARYLAND
Office of Tourism
Thank You

Maryland Agricultural and Resource-Based Industry Development Corporation

State of the Coast Conference
May 21, 2018

Steve McHenry
Executive Director
www.marbidco.org

“Mar_BID_Co”

- “Is an Ag/Rural Business Development & Financial Intermediary Organization Serving All of Maryland”
- With a focus on:
  - Farming
  - Forestry
  - Seafood
  - Aquaculture

MARBIDCO's programming (12+) falls into three broad categories

- **Core Rural (and urban ag) Business Development** – several secured lending and small grant investment programs that are funded from the *Agricultural Stewardship Act of 2006*.
- **Rural Land Preservation Facilitation** – programs that are funded from dedicated special funds, or that are offered with other agencies (conduit finance).
- **Higher Risk or Specialty Lending** – ***special revolving loan programs*** that are funded by partnering organizations for targeted business and environmental purposes (e.g., farm energy efficiency and shellfish aquaculture).

MARBIDCO Partners

- Commercial Banks and Farm Credit System
- State Agencies (MDA, DNR, Commerce, UME, MEA, RMC, TEDCO, etc.)
- USDA (including FSA, NRCS and Rural Development) and other Federal Agencies
- Regional rural planning/development councils
- Local economic development offices
- Farm groups and rural industry associations
- MD Ag Land Preservation Foundation (MALPF)
- Private nonprofit foundations

Since 2007, MARBIDCO has:

- Has funded nearly 500 agricultural and rural business projects in every county of Maryland totaling about $50 million.
- Partnered with 18 banks and 4 local government revolving loan funds on projects, and leveraging over $135 million in commercial bank financing.
- Helped 250 young or beginning farmers, and funded 160 farm diversification (value added processing) projects.
- Partnering with DNR and UM Extension, funded 66 shellfish aquaculture projects totally $3.7 million.
- A total of 76 seafood and aquaculture projects funded over $4.2 million.

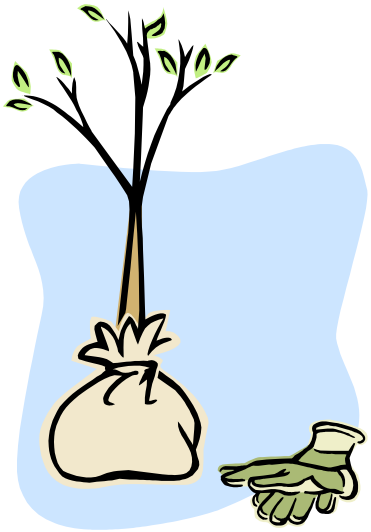
MARBIDCO Loan Programs

- MARBIDCO offers 8 Lending Programs today.
- 5 of the loan programs are offered using MARBIDCO resources -- these loans require collateral security.
- 3 other loan programs are for special purposes and involve a higher level of credit risk (unsecured lending).
- The "workhorse program" is the Maryland Resource-Based Industry Financing Fund Loan (MRBIFF)

NOTE: All loans reviewed and approved by a loan review committee

Maryland Resource-Based Industry Financing Loan Fund

- **Offers low-interest (3.25% APR initially) loans for the purchase of land and capital equipment.**
- **Maximum Loan Amount – $250,000 ($450,000 for land purchase & $650,000 for a major project).**
- **Financial commitment:**
  - Provide supplemental loan proceeds within a range of 20% to 40% of the total commercial financing needed.
- **MARBIDCO will accept a junior lien position in most situations.**



Benefits to using a MARBIDCO "MRBIFF" loan

- Complements the financial services offered by commercial lenders by helping to make rural business "gap" financing both available and affordable.

- Flexible loan terms to match and enhance commercial lender offerings.

Other Loan Programs

- Rural Business Equipment & Working Capital Loan Fund
- Maryland Vineyard, Hops & Tree Fruit Planting Loan Fund
- Forestry Equipment and Working Capital Loan Fund
- Agricultural Cooperatives Equity Investment Fund
- Rural Business Energy Efficiency Improvement Loan
- **Maryland Shellfish Aquaculture Financing Fund**
- **Maryland Remote Setting Aquaculture Financing Fund**

MARBIDCO Grant Incentive Programs

- **Local Government Ag/RBI Project Cost Share Program**
  - Funds projects jointly with county economic development offices and farmers
  - Matching grant amounts of up to $5,000 to $10,000

- **Maryland Value Added Producer Grants**
  - USDA VAPG Matching Grants (currently closed) – 15% match
  - MVAPG Capital Assets/Equipment (currently closed) – $10K

    Seafood processing projects have been funded too

- **Urban Ag Commercial Lending Incentive Grants**

(projects located in municipalities or inside the two beltways)

  - Funded with support from MidAtlantic Farm Credit
  - Helps city farmers to get bank loans
  - Grant amounts from $1,000 to $7,500

NEW BEGINNING THIS YEAR

The Next Generation Farmland Acquisition Program

- Established to help young and beginning farmers who have trouble entering the agricultural profession due to high farmland costs and lack of access to adequate financial capital.
- Helps B.F. to purchase the land AND preserve the land all at the same time.

Next Generation Farmland Acquisition Program

- A second State appropriation of $2.5 million is available in FY 2019.
- Approved applicants will enter into a “easement purchase option contract” for the property to be purchased (and hopefully preserved).
- MARBIDCO will pay up to 51% of the Fair Market Value of the agricultural land (only).
- Beginning farmer will have a period of 4 or 7 years (depending on default easement holder) to sell the permanent conservation easement to a rural land conservation program.

Relevant MARBIDCO capabilities that may be of help coastal communities

- MARBIDCO will continue to fund on-bottom & water column shellfish aquaculture projects with subsidized financing, and make loans to qualified commercial seafood businesses.
- MARBIDCO may be able to partner with county and town governments (and/or commercial lenders) to help leverage financial resources to fund viable food and fiber production and processing projects.
- As a financial intermediary, MARBIDCO may be able to help facilitate the purchase of land (or waterfront) conservation easements using other public or private funding. (NOTE: MARBIDCO does not hold permanent easements.)

For More Information…

MARBIDCO
growing rural ventures™

Please Visit:

www.marbidco.org

Multi-year passive acoustic monitoring of marine mammals in the Mid-Atlantic

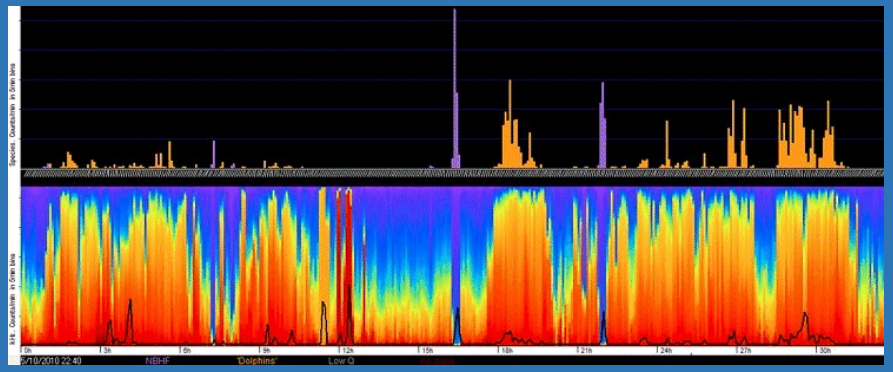
Helen Bailey and Aaron Rice

The Cornell Lab of Ornithology

University of Maryland
Center for Environmental Science
Chesapeake Biological Laboratory

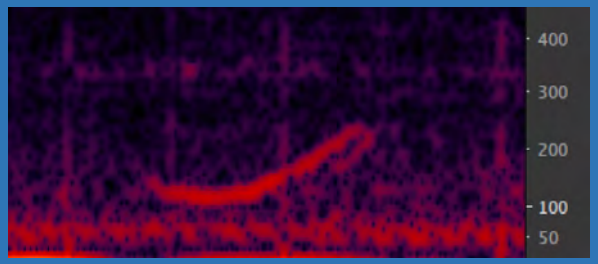
Passive Acoustic Monitoring

- Excellent for detecting vocally active species at high temporal resolution in all weather conditions
- Provides pervasive record
- Ability to detect other environmental and anthropogenic sounds
- Non-invasive

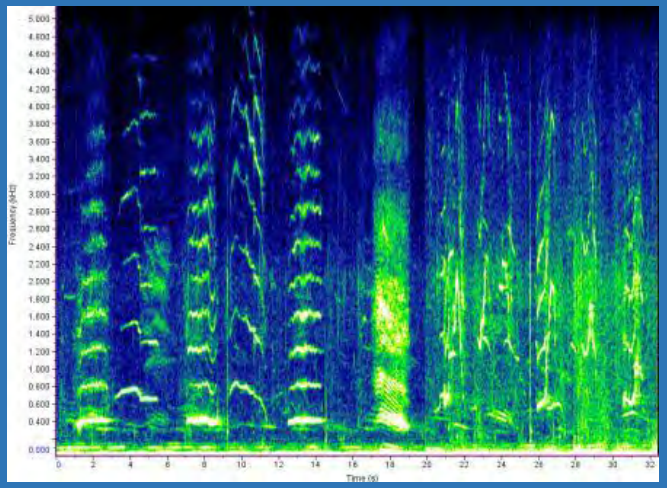


Marine Mammals

North Atlantic Right Whale



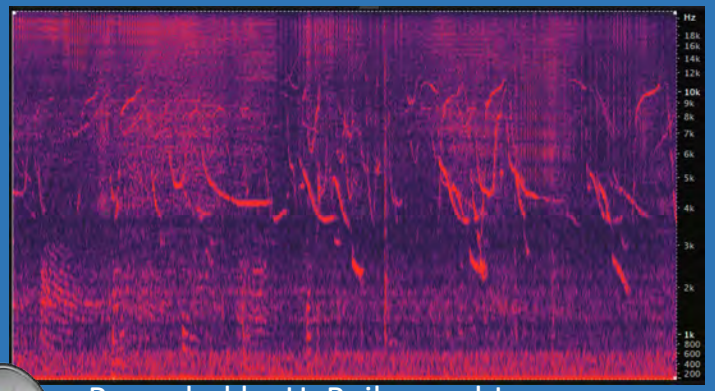
Recorded by A. Rice and his team in the MD WEA.



Humpback Whale

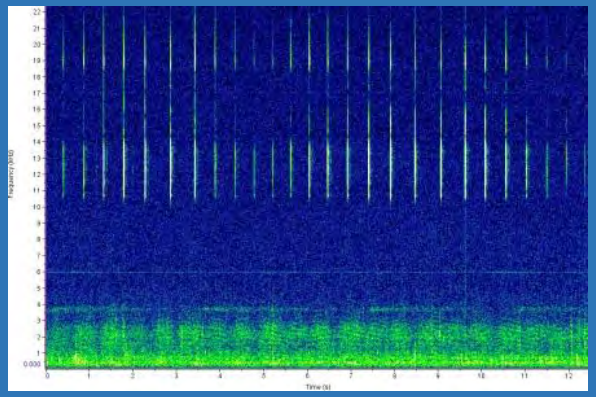
Humpback whale sound and spectrogram courtesy of NOAA NEFSC.

Marine Mammals



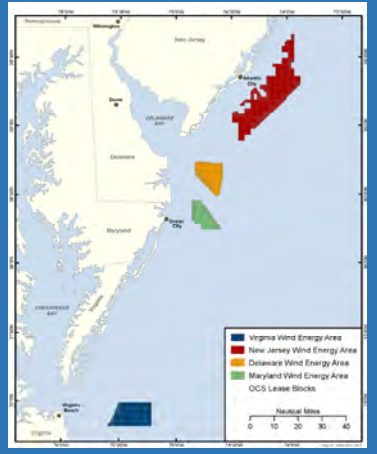
Recorded by H. Bailey and J. Wingfield in the MD WEA.

Sound 1/20 normal speed



Porpoise sound and spectrograms courtesy of NOAA NEFSC.

Goals

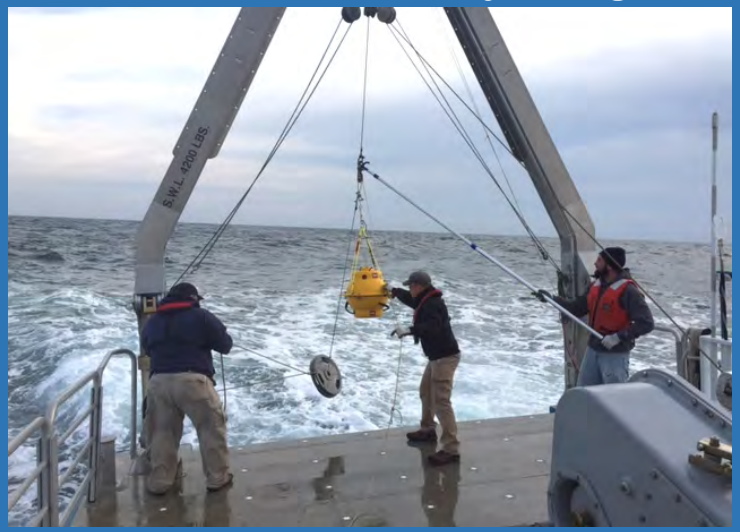


- Collect acoustic data to:
  - characterize patterns of temporal and spatial occurrence of vocalizing marine mammal species (including right whales, fin whales, humpback whales, minke whale, dolphins and porpoises)
  - characterize the existing ambient noise environment in and around the Maryland Wind Energy Area (MD WEA)

Data Collection

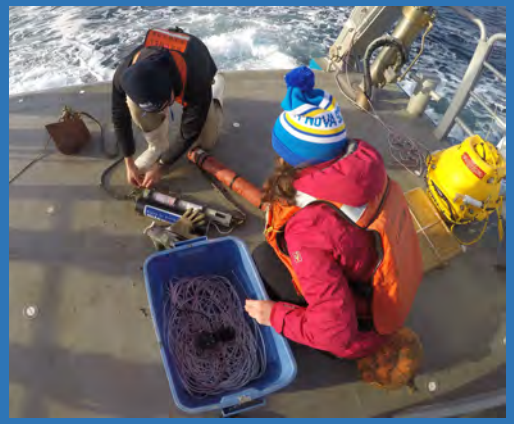
Two types of devices:

1) The Marine Autonomous Recording Unit (MARU) designed by Cornell University collects a continuous archival record of the sound environment (sampling at 2kHz).
   - Calibrated to measure absolute ambient noise levels
   - Detects calls by large whales

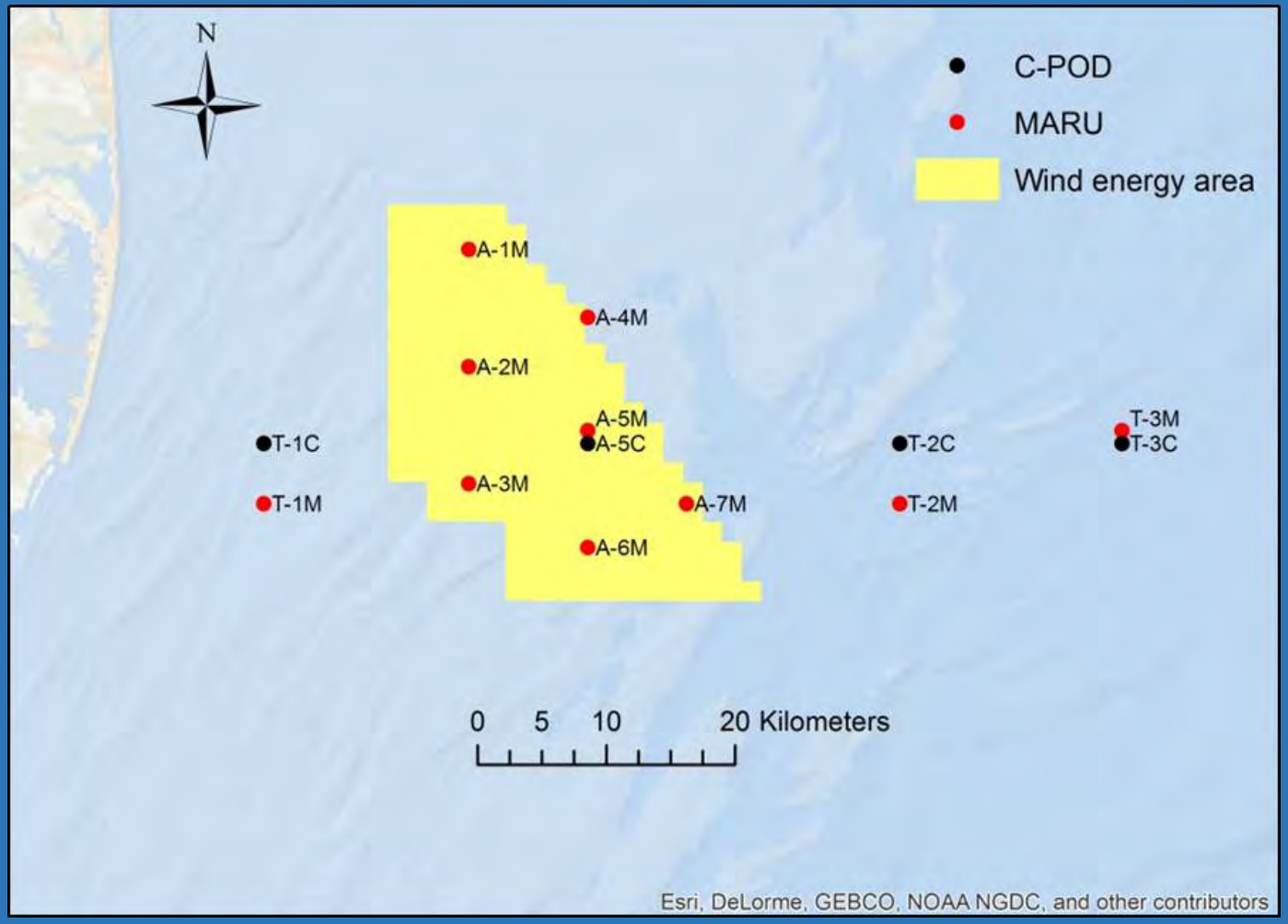


Data collection

2) The C-POD is a tonal click detector that continuously monitors the 20-160kHz frequency range.
   - Detects echolocation clicks by small cetaceans (dolphins and porpoises).
   - Supplemented at some locations by a SM3M acoustic recorder sampling at 48 kHz.

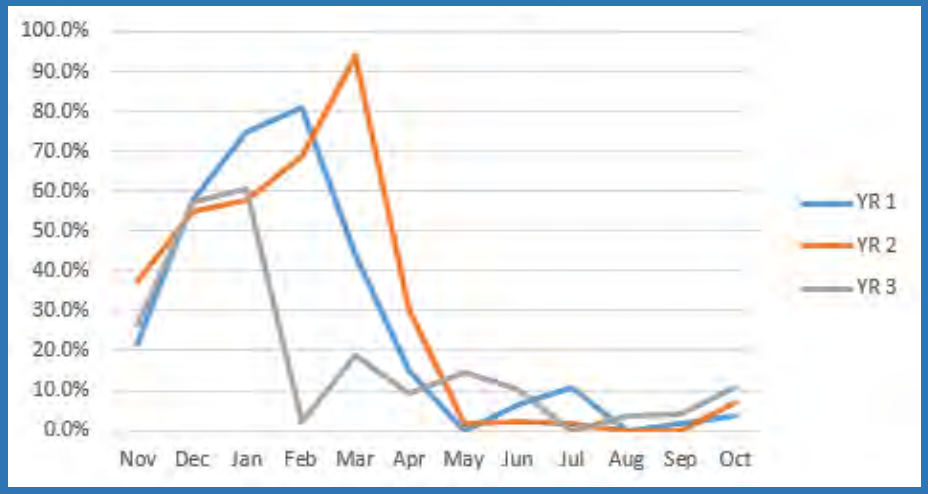


Acoustic Array

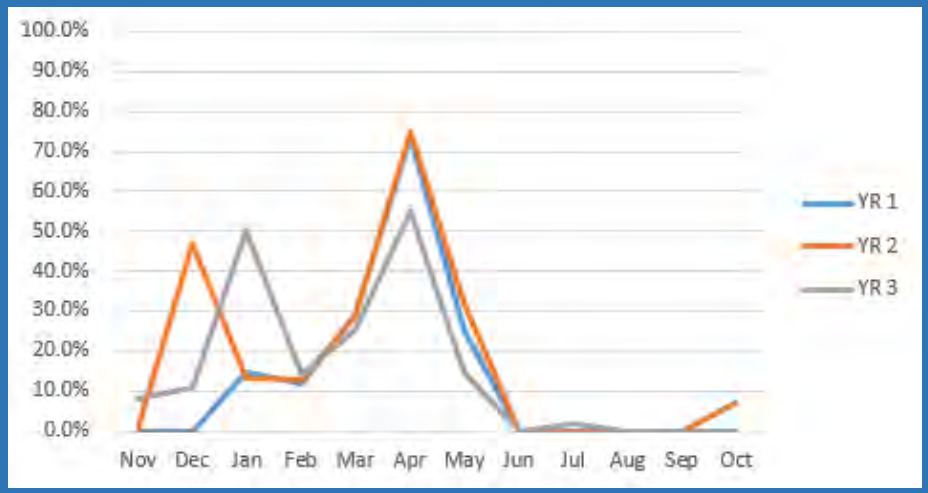


Large Whale Occurrence

Right whales



Humpback whales

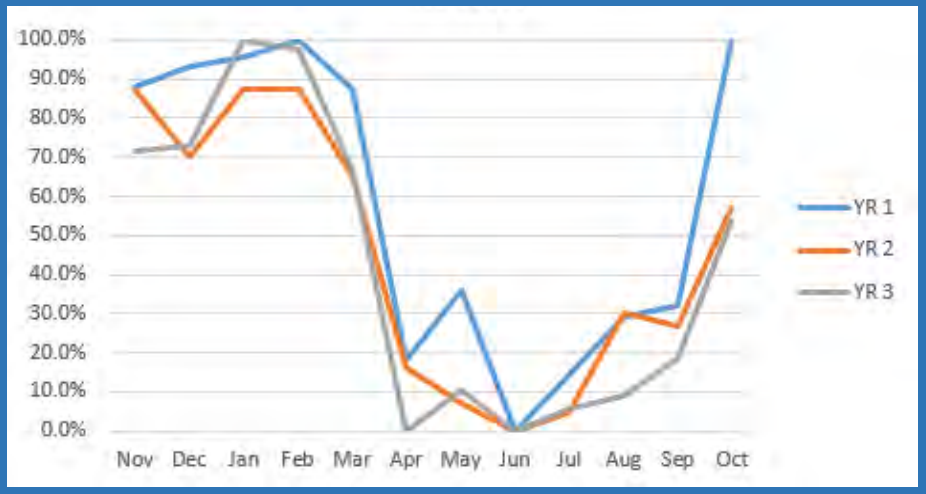


Monthly percent presence in the MD wind energy area
Nov 2014 - Oct 2017

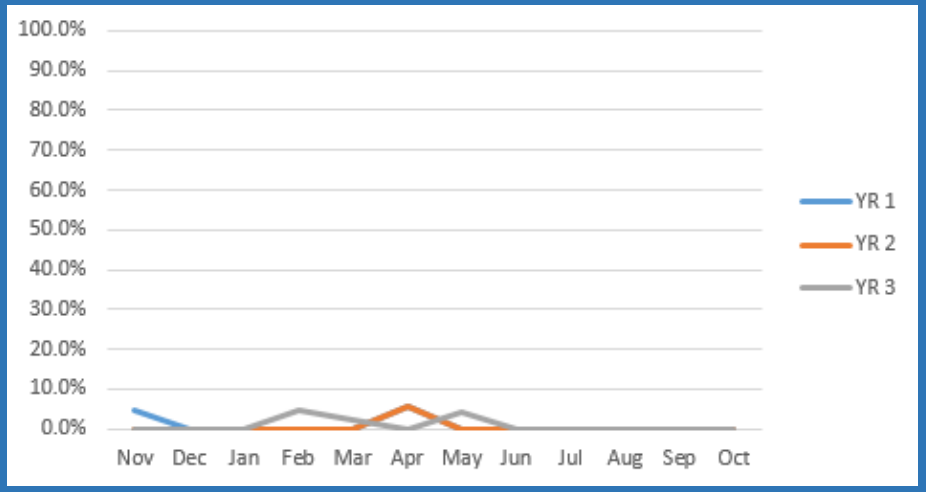
(Hodge, Estabrook and Rice, Bioacoustics Research Program Cornell University)

Large Whale Occurrence

Fin whales



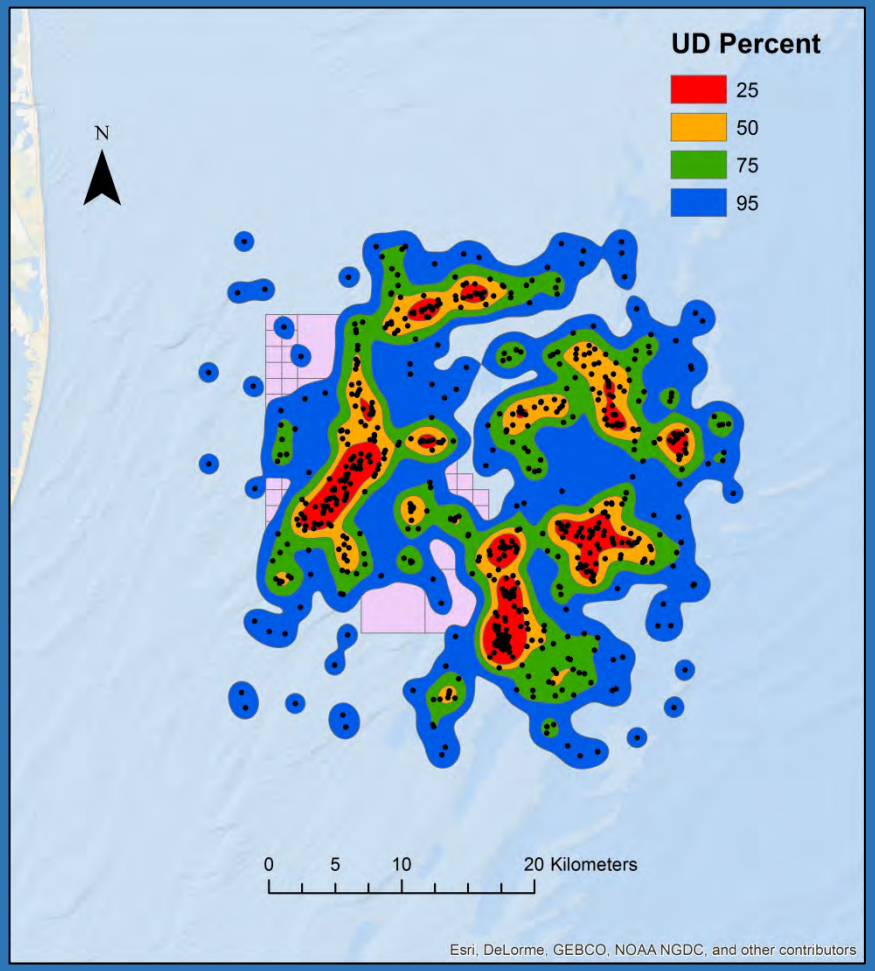
Minke whales



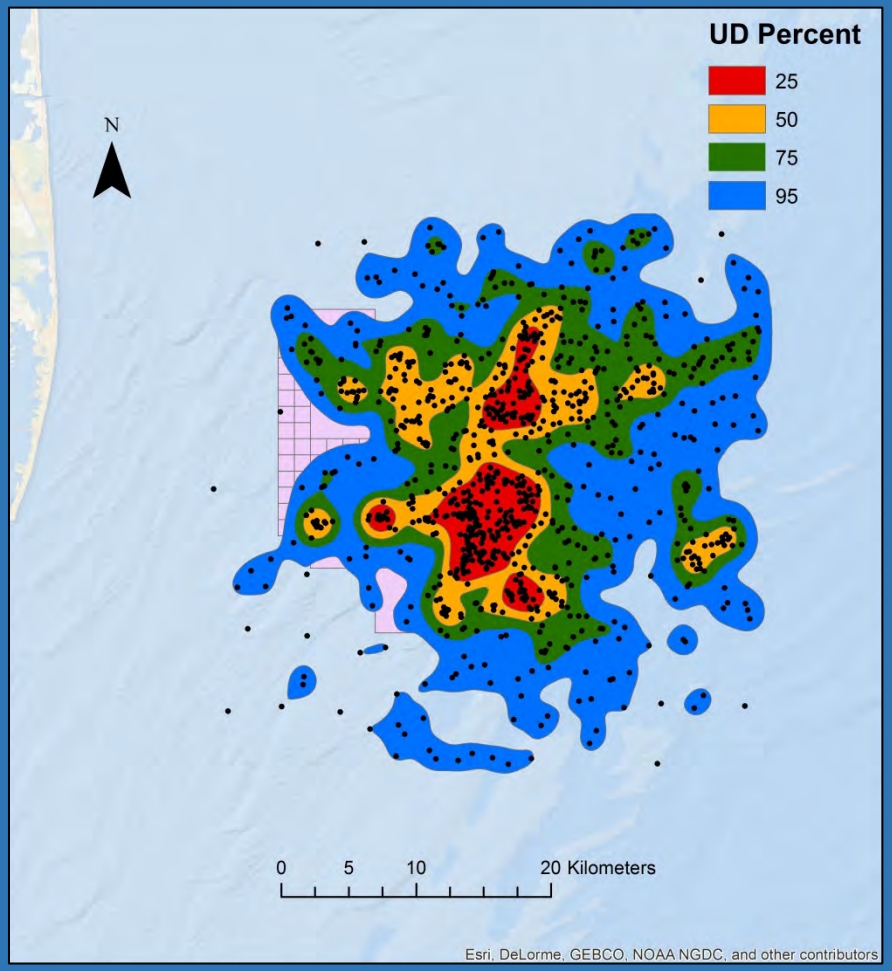
Monthly percent presence in the MD wind energy area
Nov 2014 - Oct 2017

(Hodge, Estabrook and Rice, Bioacoustics Research Program Cornell University)

Right Whale Locations

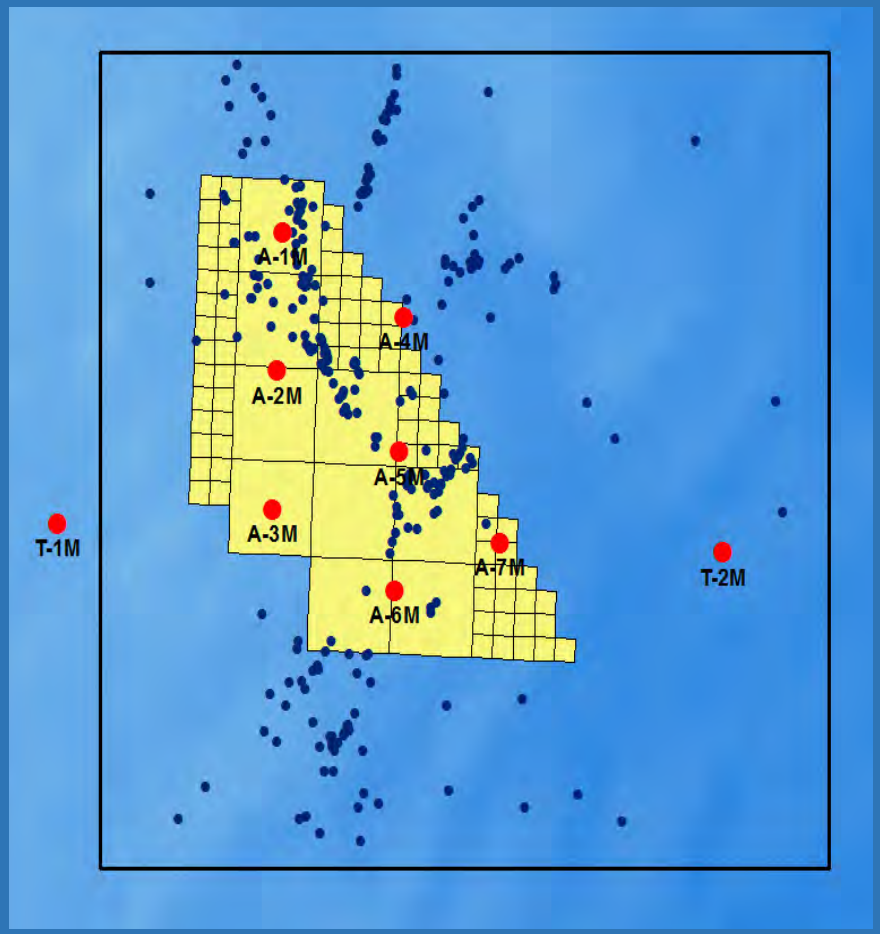


November to January

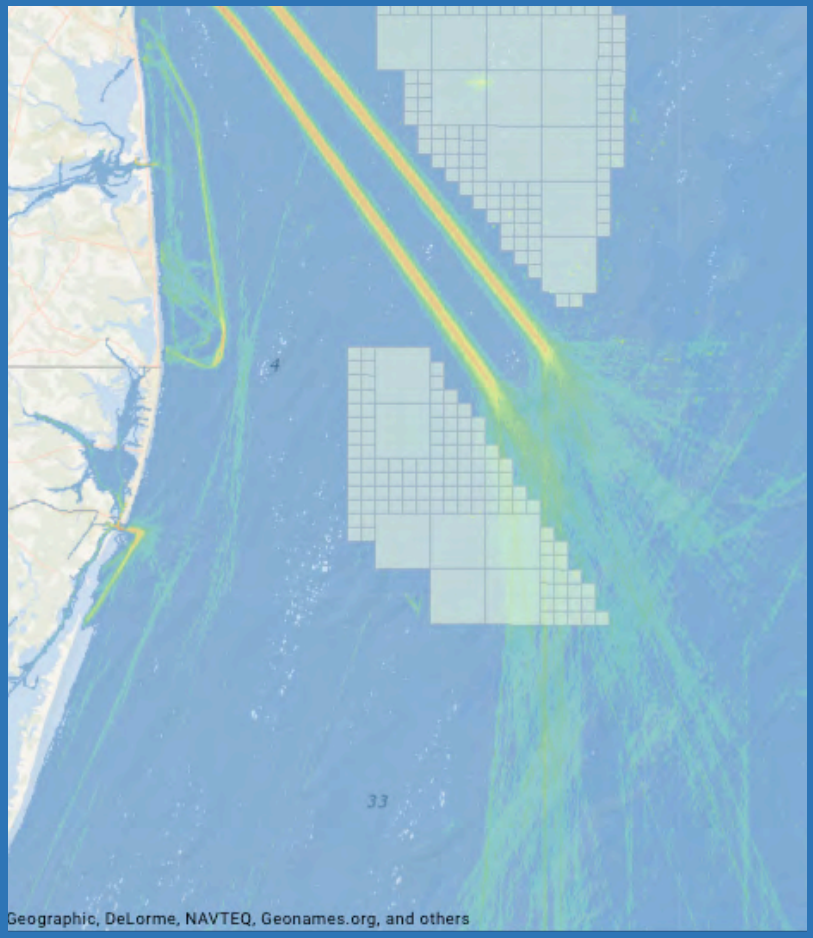


February to May

Right Whale Migration Route

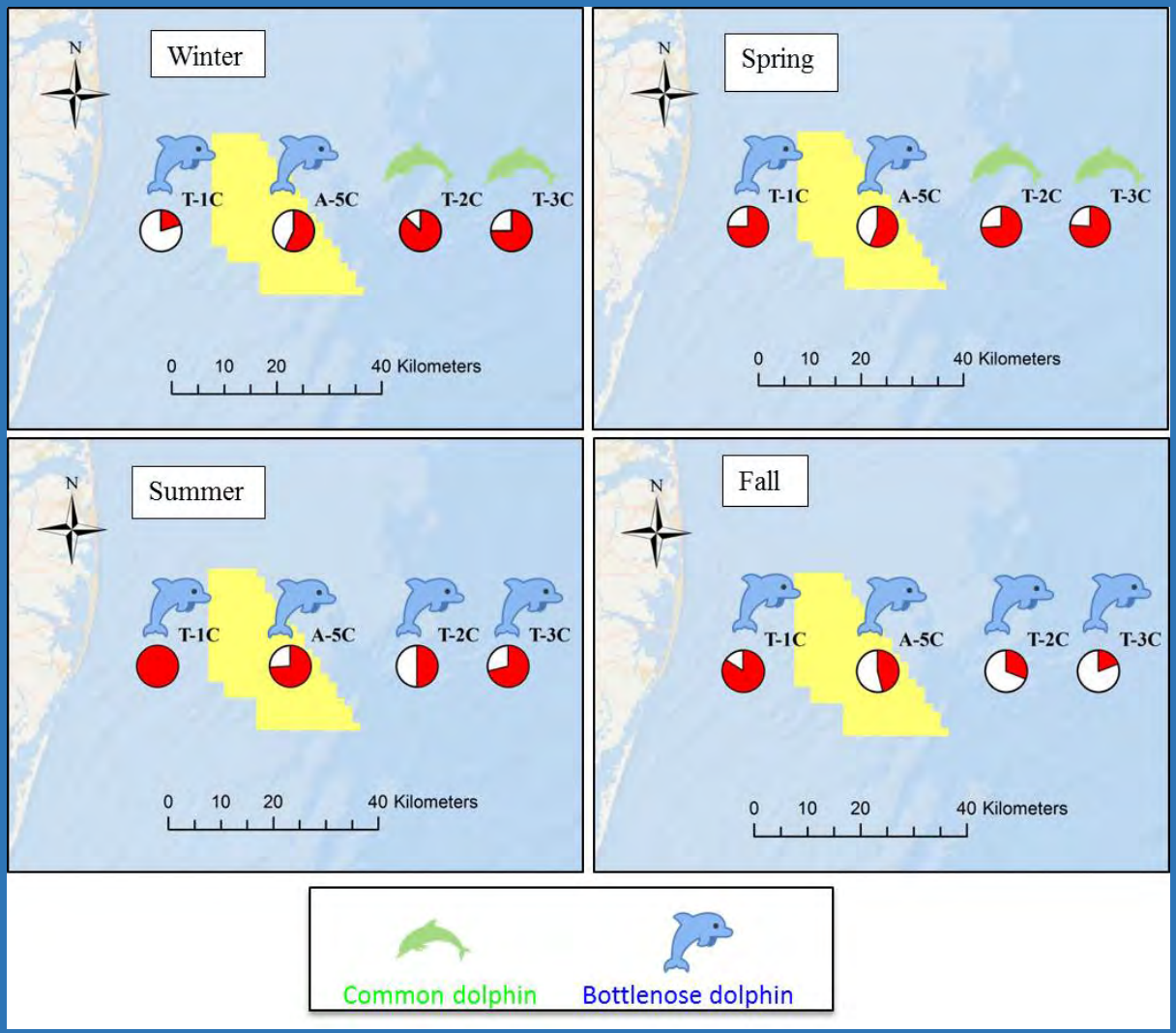


Right whale locations during Jul 2016 – Jan 2017.



Density of ship traffic. High-use right whale areas coincide with high ship traffic.

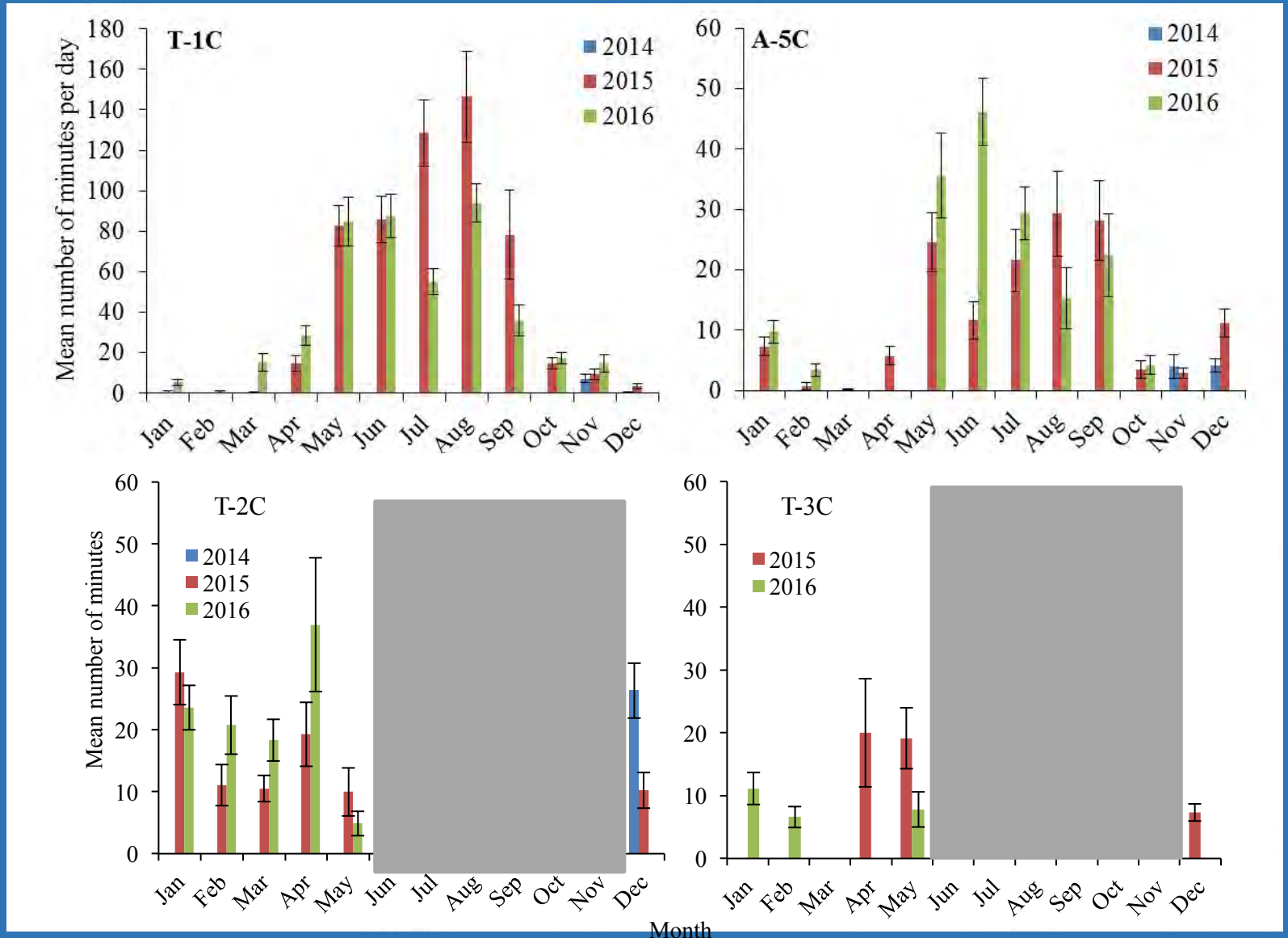
Dolphin Species



By Wingfield, Lyubchich and Bailey, CBL UMCES

Acoustic detections classified based on season and location of sightings using a random forest classifier

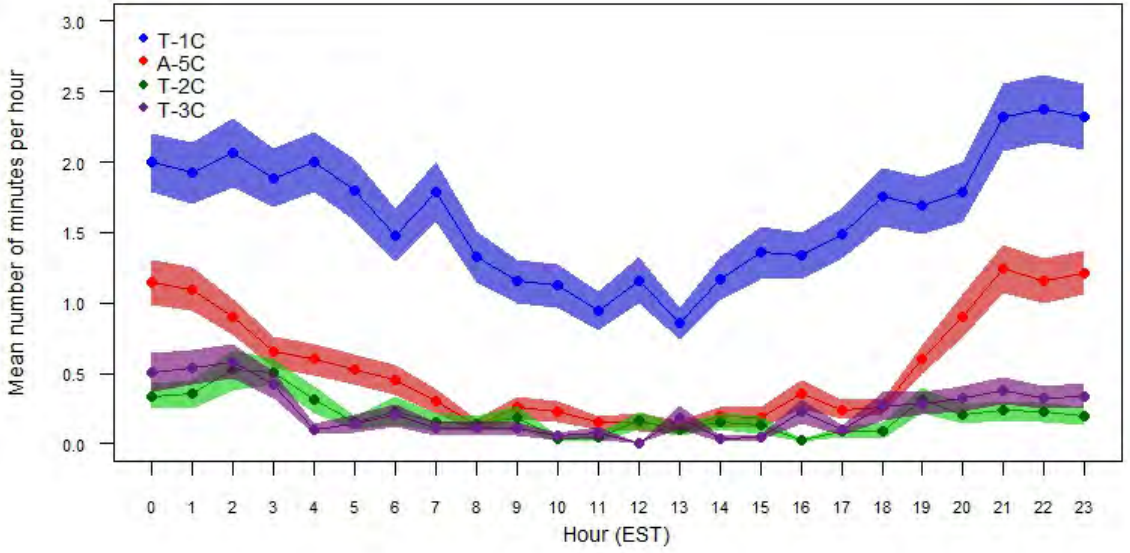
Dolphin Occurrence

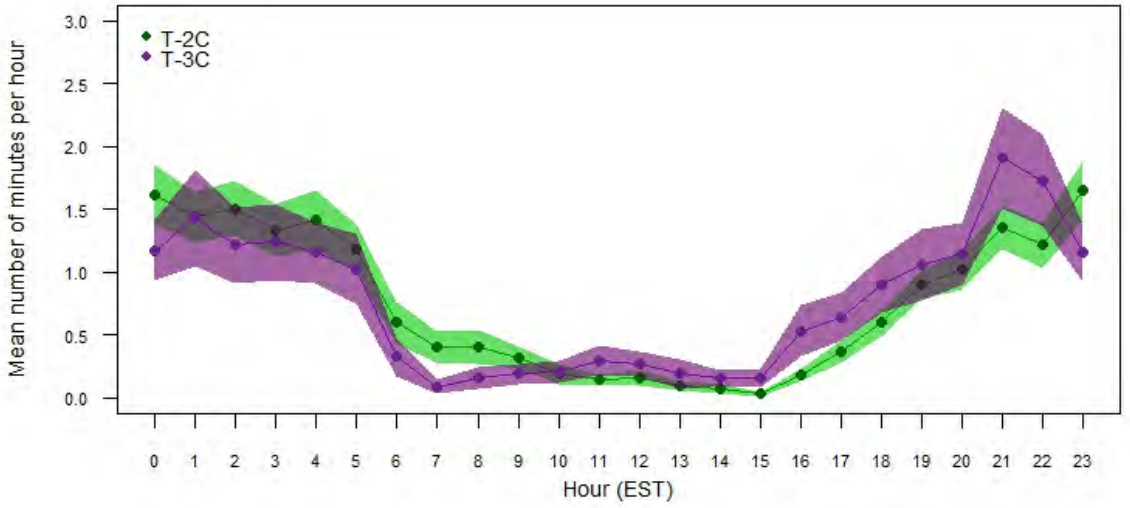


Bottlenose dolphin

Common dolphin

Dolphin Diurnal Pattern



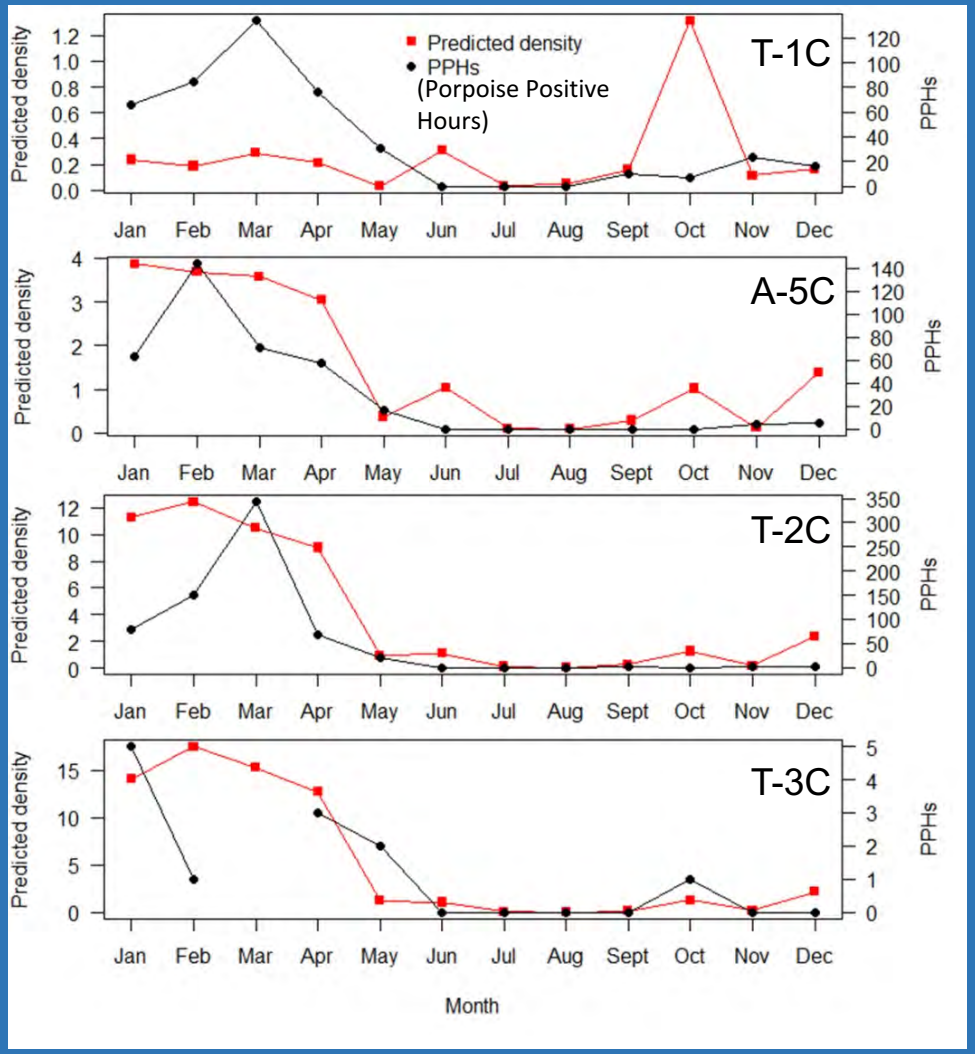


Bottlenose dolphins

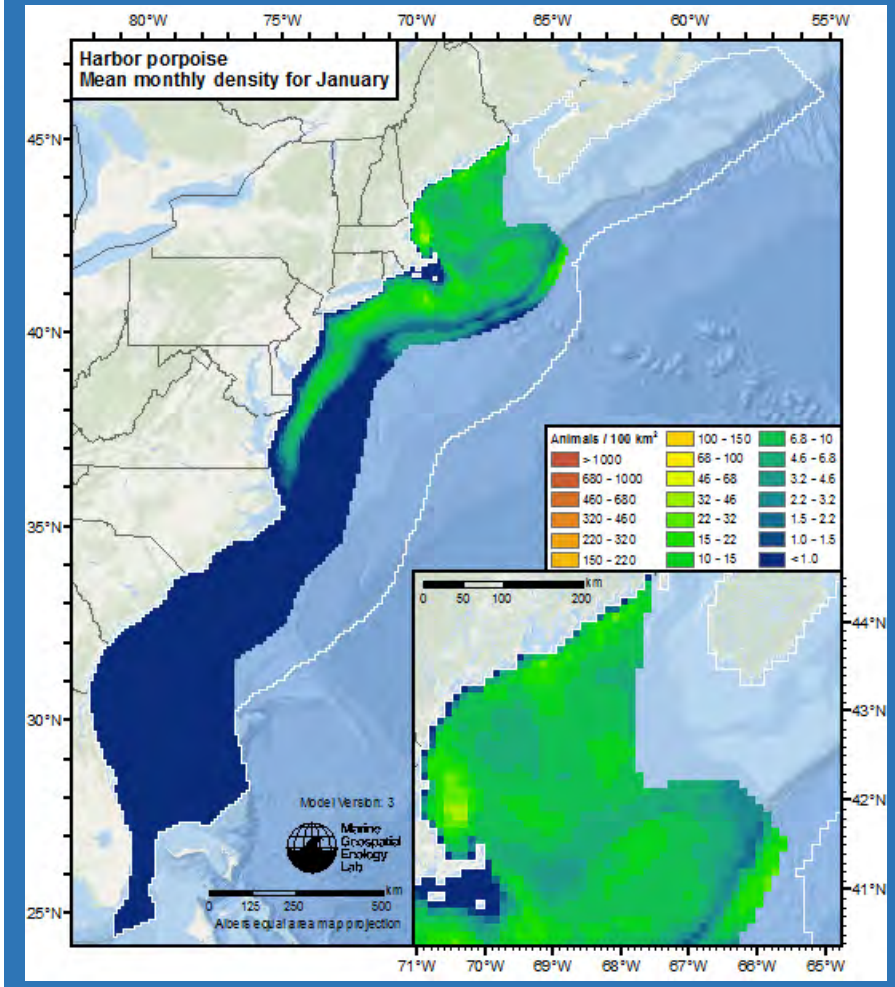
Common dolphins

By Wingfield and Bailey, CBL UMCES

Harbour Porpoises

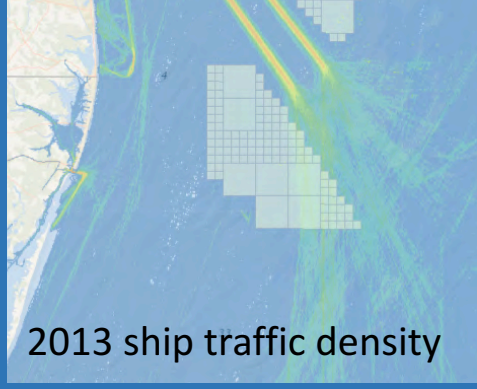


From Wingfield et al. 2017

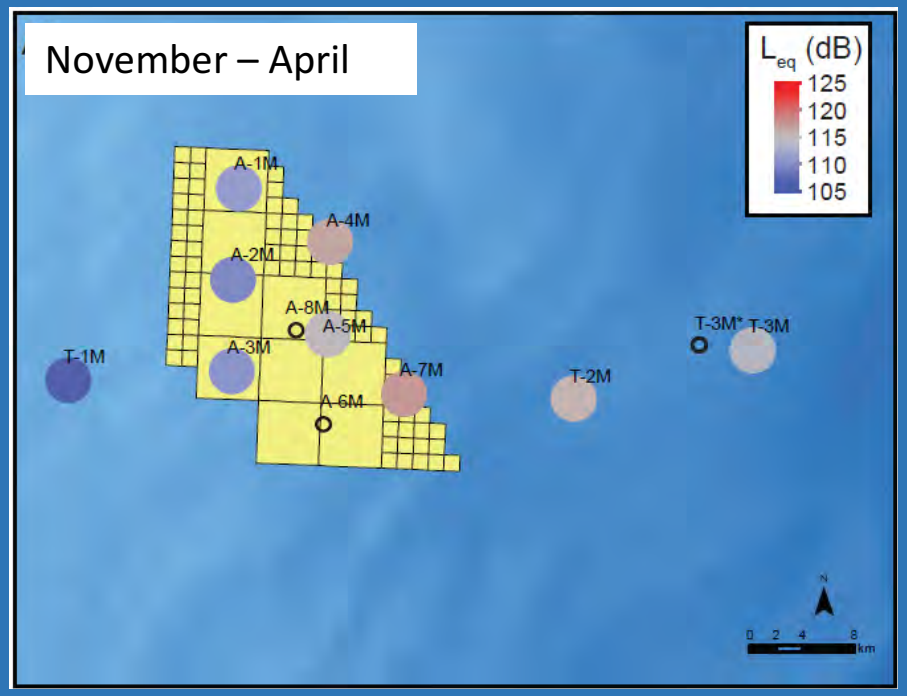


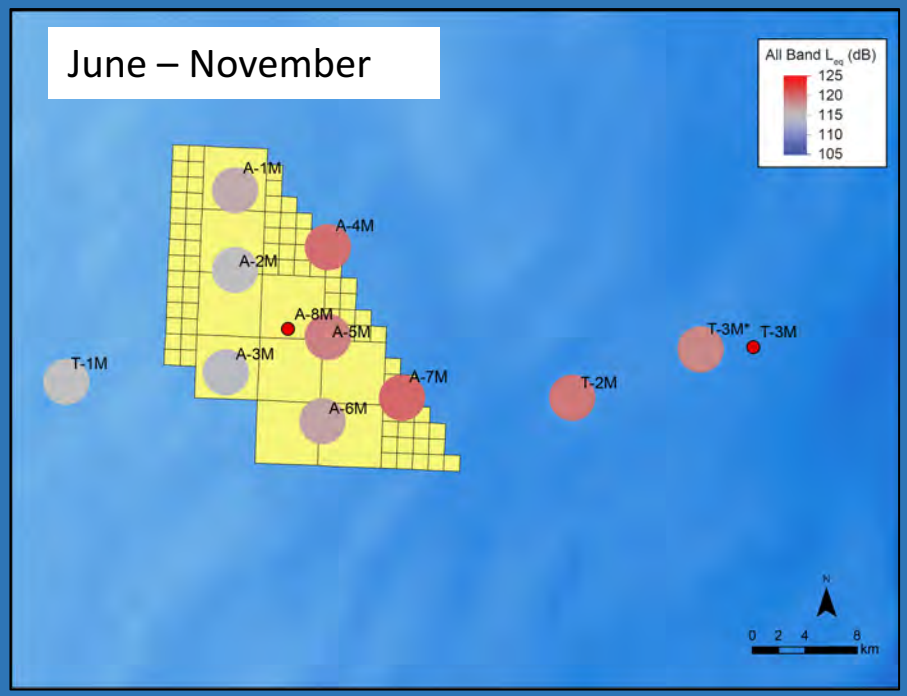
From Roberts et al. 2016

Ambient Noise Levels



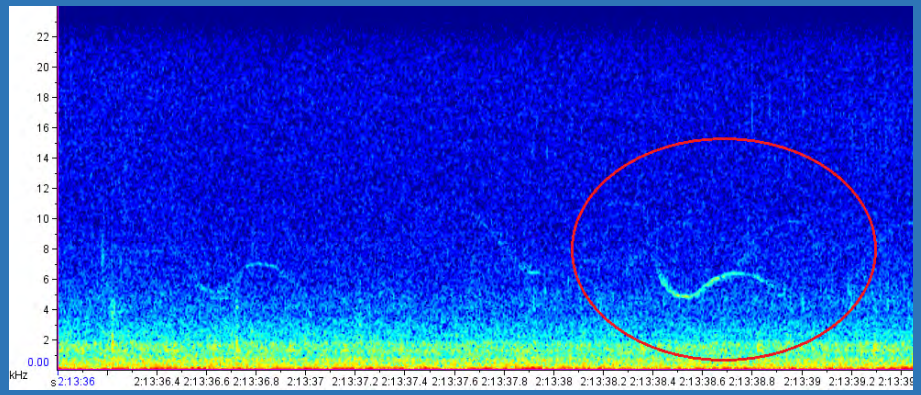
2013 ship traffic density





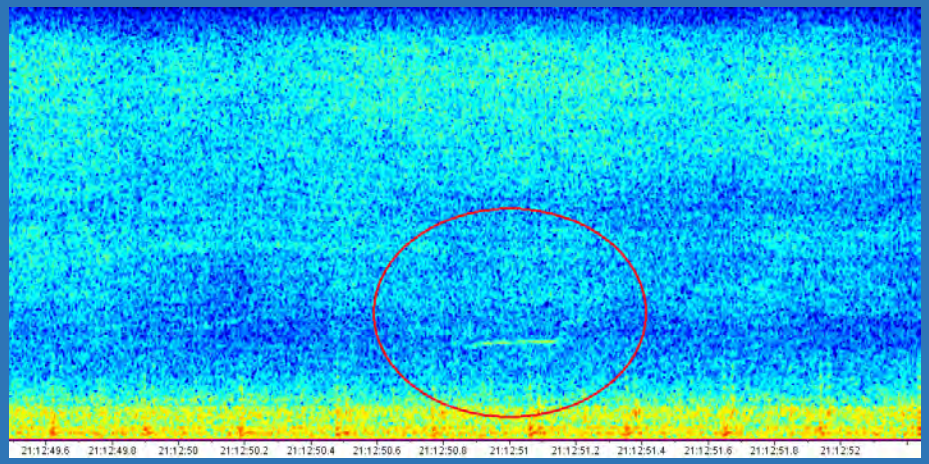
(Hodge and Rice, Cornell University)

Dolphin Whistles and Ambient Noise



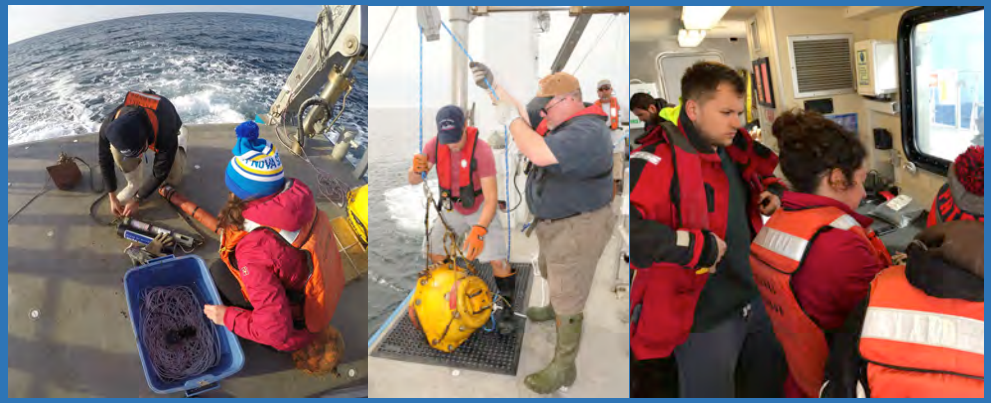
Lower background noise levels and mainly low frequency sound

Higher frequency background noise levels can cause masking of calls



By Fouda and Bailey, CBL UMCES

Summary



- Seasonal pattern in whale occurrence, with fin and North Atlantic right whales most frequently detected.
- Dolphins detected year-round whereas porpoises most frequently detected in winter and spring.
- Detections tend to be more frequent during the evening to early morning

Acknowledgements

- Thank you to Kristin Hodge, Jessica Wingfield, Aran Garrod, Amber Fandel, Aimee Hoover, and everyone who assisted with the field data collection and analysis.
- The Maryland Department of Natural Resources secured the funding for this project from the Maryland Energy Administration's Offshore Wind Development Fund and the U.S. Department of Interior's Bureau of Ocean Energy Management, Environmental Studies Program.

Colin Dunn

Thank you!

For more information please contact:

Helen Bailey (hbailey@umces.edu)
Aaron Rice (arice@cornell.edu)

MARACOOS
Ocean Information for a Changing World

The Mid-Atlantic Regional Association Coastal Ocean Observing System

IOOS
Integrated Ocean Observing System

Powering Understanding and Prediction of the Maryland Ocean and Coasts

To Protect Lives, Health & Property
To Promote a Strong Economy & Job Creation

IOOS
Integrated Ocean Observing System

IOOS ASSOCIATION

AMBASSADOR™ WRN WEATHER-READY NATION

REGIONAL INFORMATION COORDINATION ENTITY
CERTIFIED
INTEGRATED OCEAN OBSERVING SYSTEM
2016

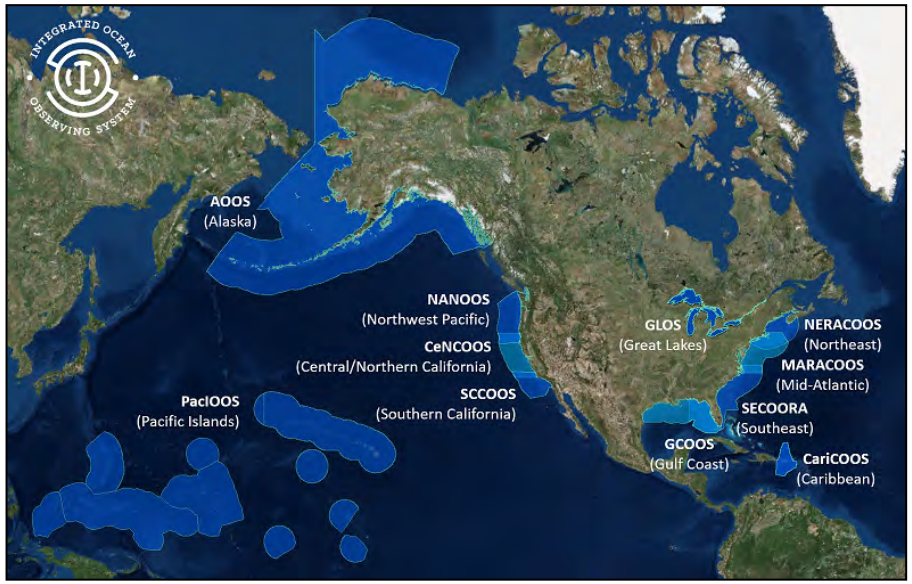
Dr. Gerhard Kuska
Executive Director, MARACOOS
Maryland State of the Coast Conference, May 23, 2018

Governance Picture

The Global Ocean Observing System

Global component

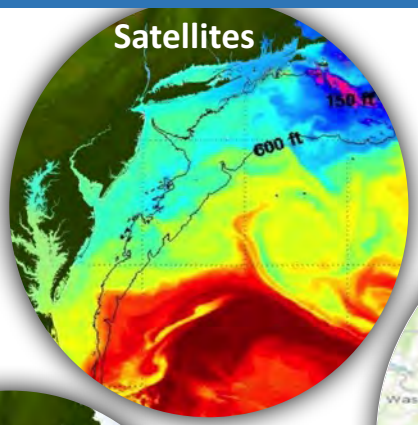
IOOS = National 17-interagency component

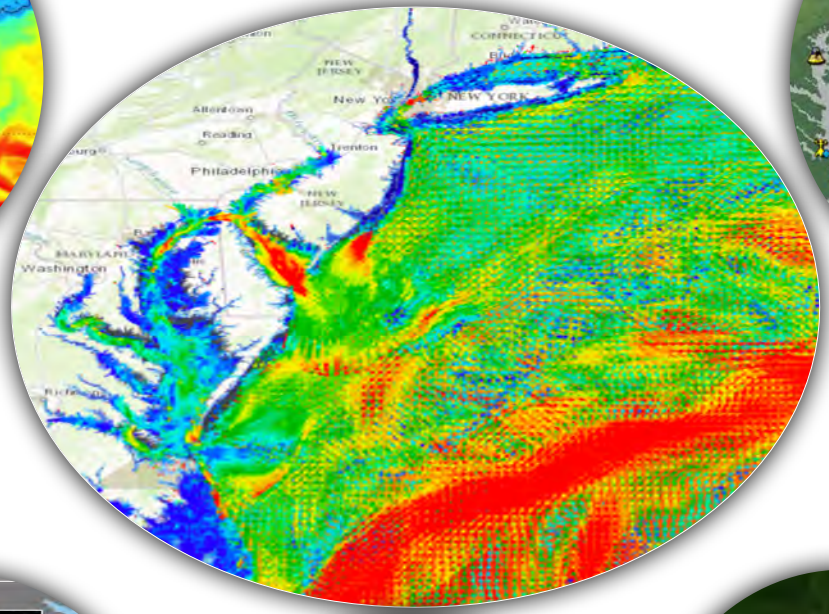


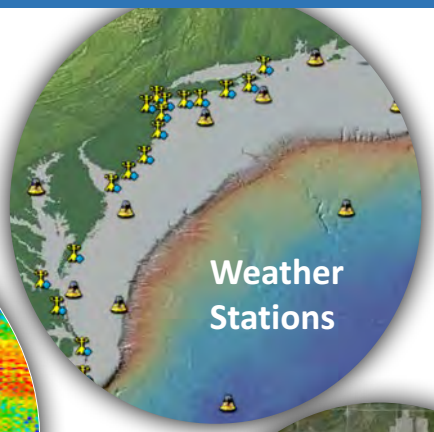
11 Regions

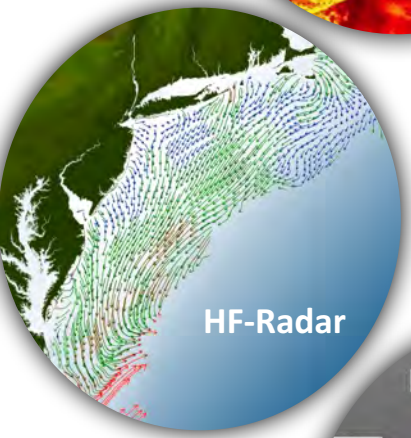
10 States +DC in the Mid-Atlantic region

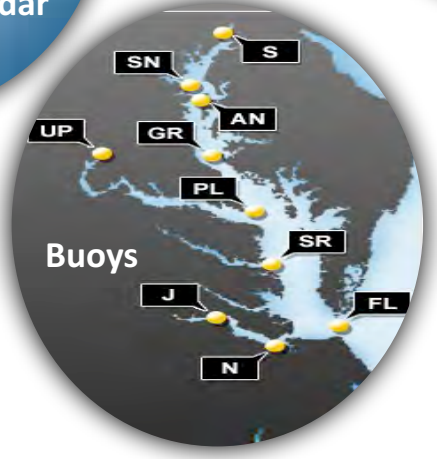
Variety of Technologies

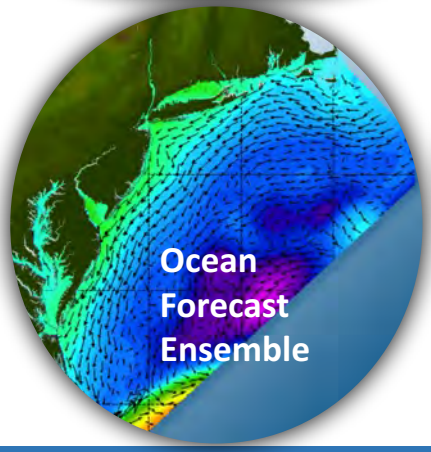






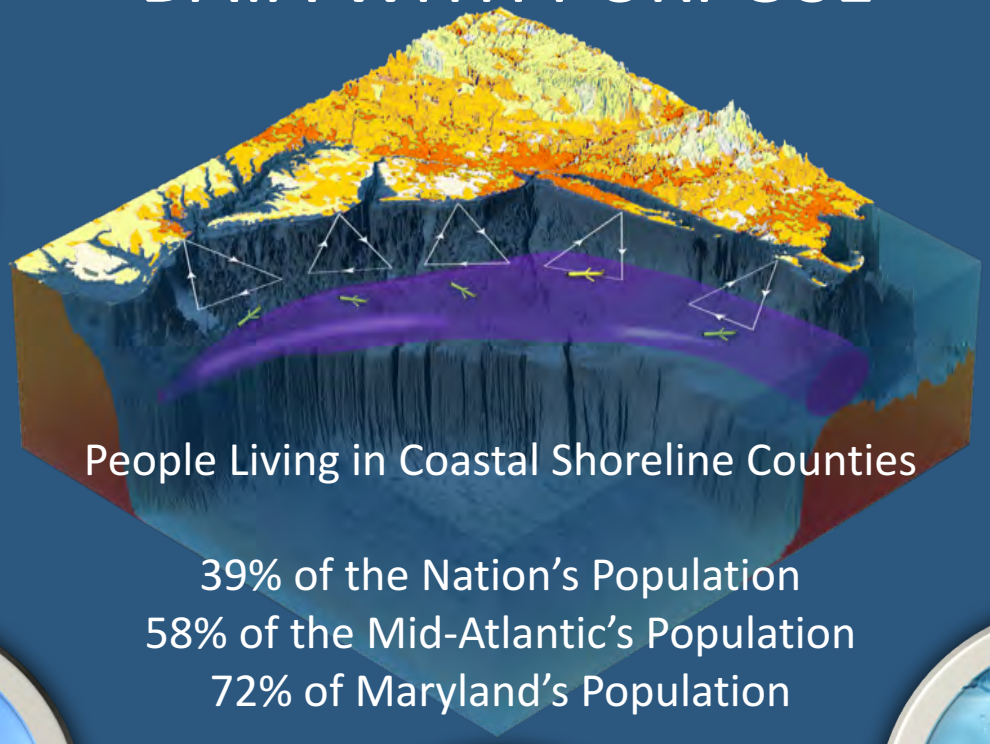






DATA WITH PURPOSE

Maritime Safety



People Living in Coastal Shoreline Counties

39% of the Nation's Population
58% of the Mid-Atlantic's Population
72% of Maryland's Population

Fisheries

Offshore Wind

Coastal Hazards

Water Quality

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IOOS
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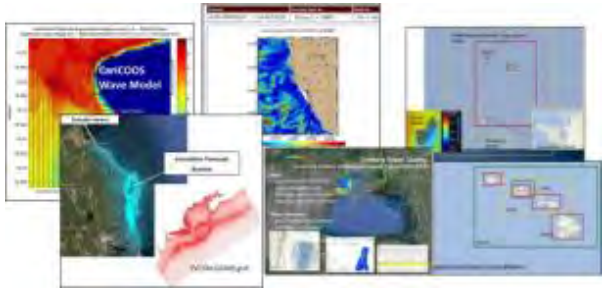
Meeting User/Stakeholder Needs

Stakeholder outreach

Information products



Observations

Data Management

WMO

Global Telecommunication System (GTS)

NATIONAL WEATHER SERVICE

REGIONAL INFORMATION COORDINATION ENTITY CERTIFIED 2016

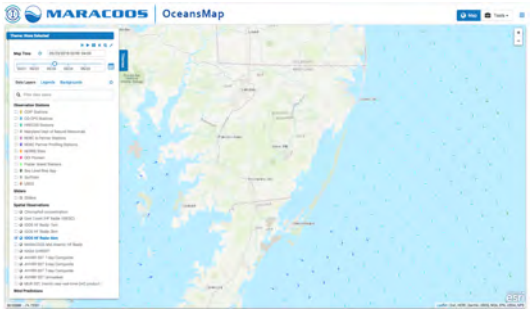
Data/Product Development Approach

Need / Requirement

Users

Comprehensive Regional Obs. and Predictions

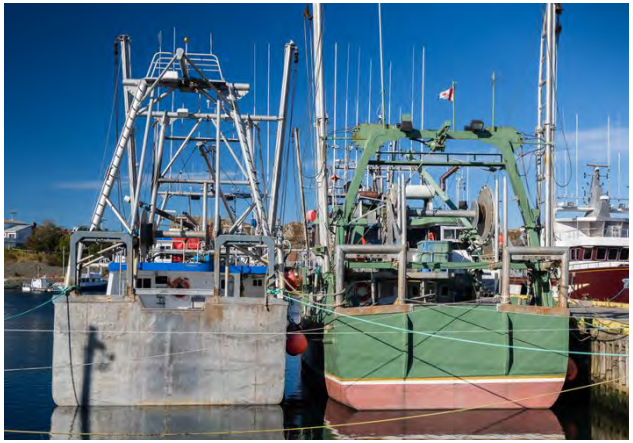
MARACOOS & Partners

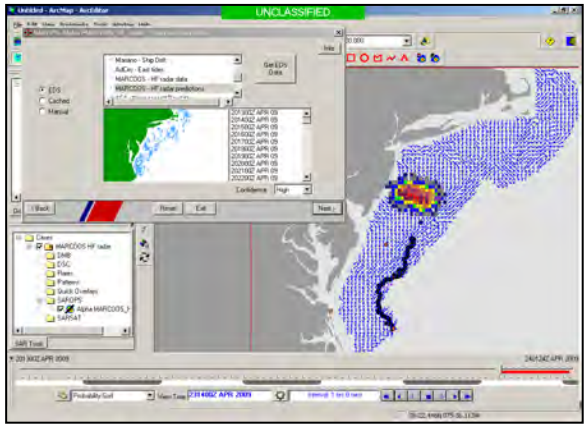


Products / Decision Tools

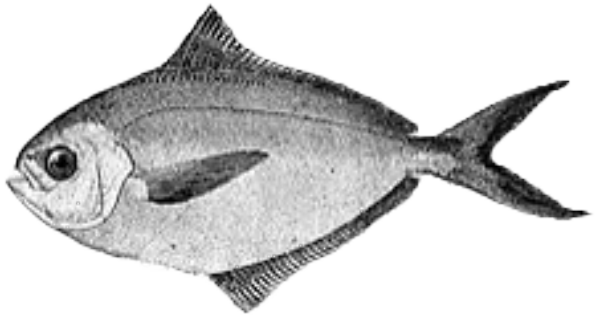
Gov't
Private Sector
Academia
MARACOOS

Maritime Commerce and Safety



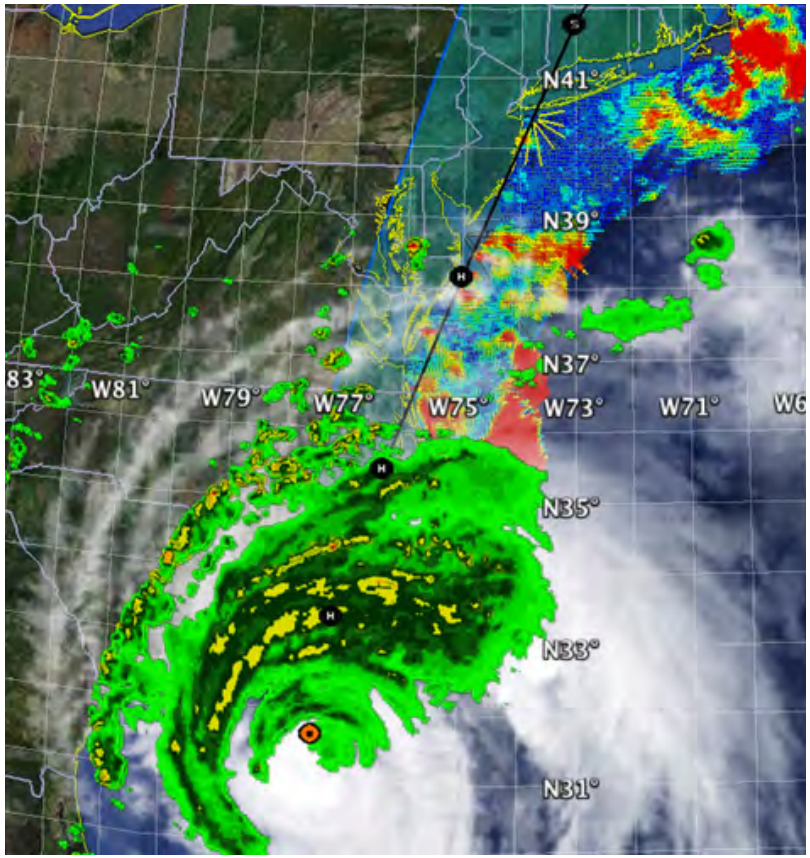


Fisheries and Fishing



Water Quality

Coastal Hazards



Offshore Wind

IOOS Refreshed Core Variables

PHYSICS

- Bathymetry
- Bottom character
- Currents
- Heat flux
- Ice distribution
- Salinity
- Sea level
- Surface waves
- Stream flow
- Temperature
- Wind speed and direction

BIOGEOCHEMISTRY

- Acidity
- Colored dissolved organic matter
- Contaminants
- Dissolved nutrients
- Dissolved Oxygen
- Ocean color
- Optical properties
- Pathogens
- Partial pressure of CO2
- Total suspended matter

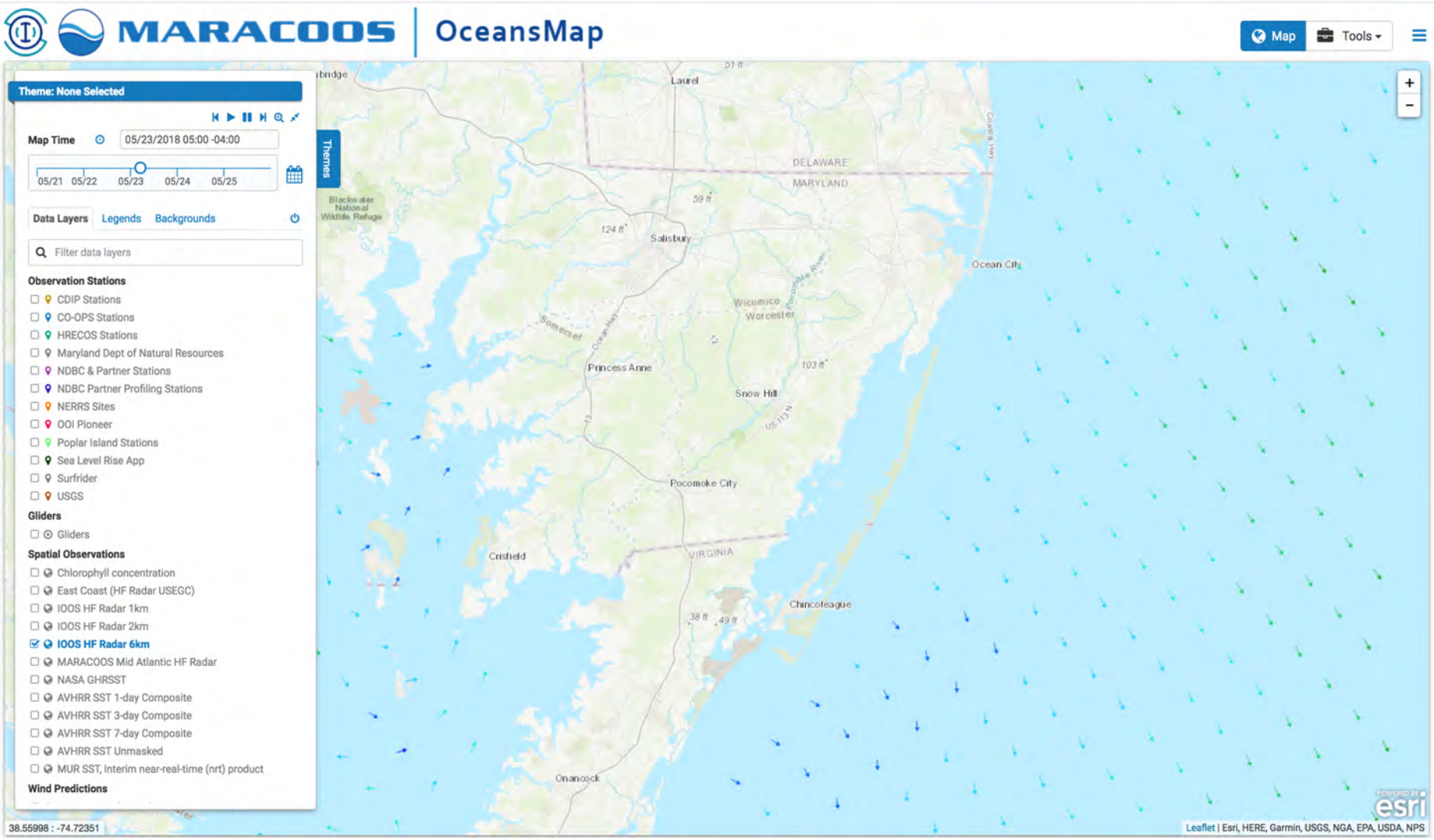
https://cdn.ioos.noaa.gov/media/2018/02/US-IOOS-Enterprise-Strategic-Plan_v101_secure.pdf

BIOLOGY & ECOSYSTEMS

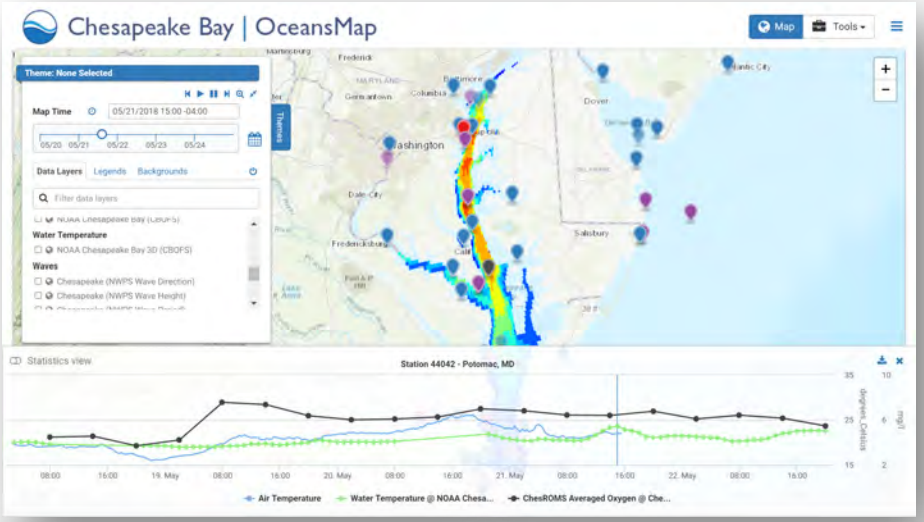
- Biological vital rates
- Coral species and abundance
- Fish species/abundance
- Invertebrate species and abundance
- Marine mammal species/abundance
- Microbial species/abundance/activity
- Nekton diet
- Phytoplankton species/abundance
- Sea birds species/abundance
- Sea turtles species/abundance
- Submerged aquatic vegetation species/abundance
- Sound
- Zooplankton species/abundance

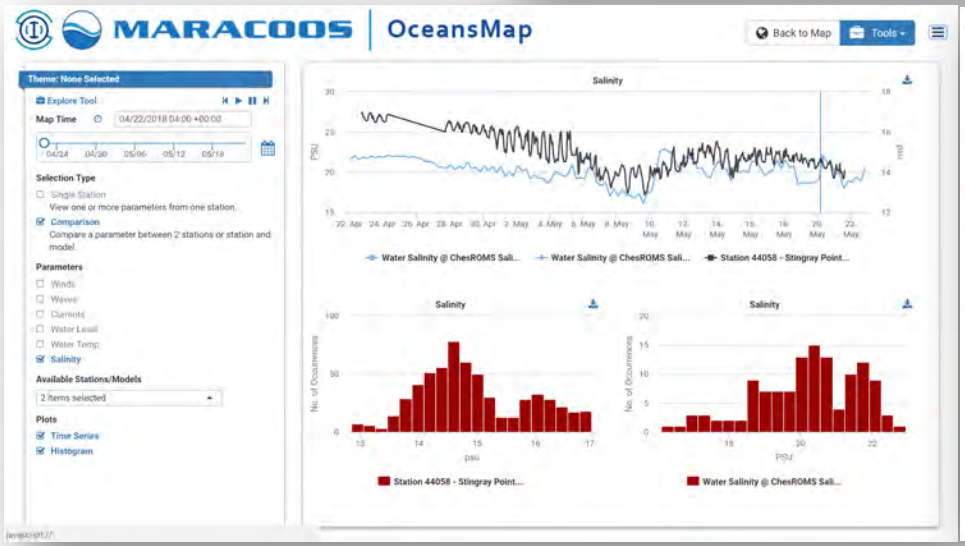
MARACOOS OceansMap

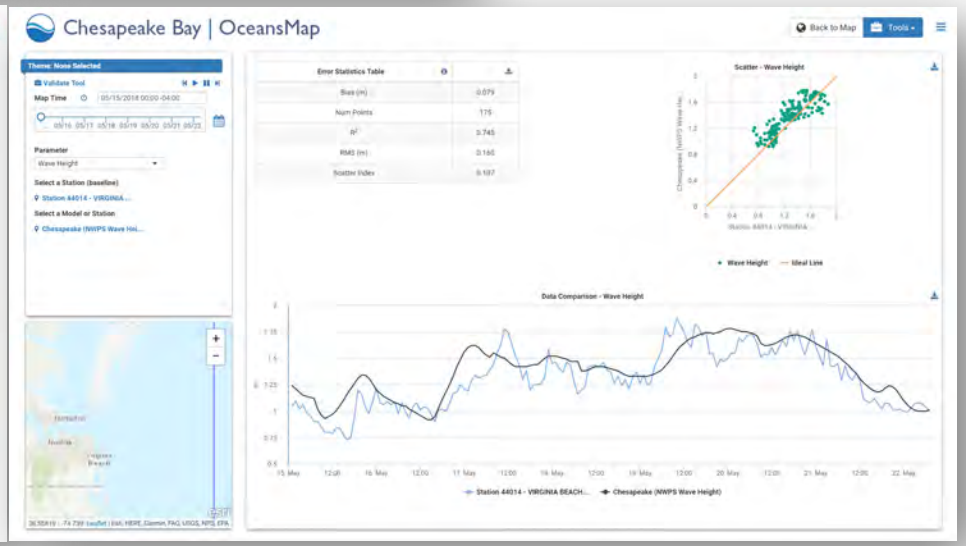
→ oceansmap.maracoos.org



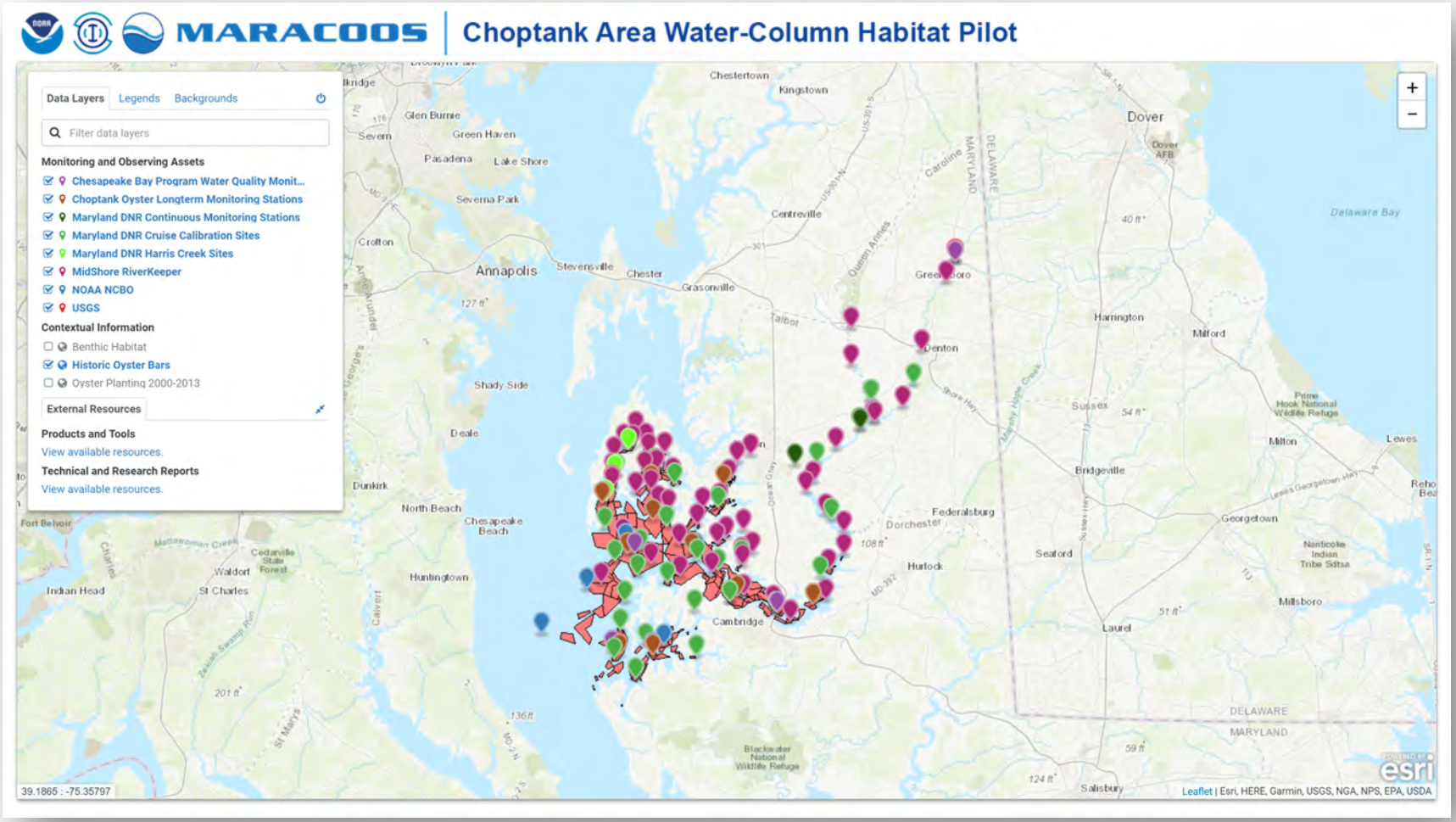
MARACOOS Chesapeake Bay Portal







MARACOOS Harris Creek / Choptank



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IOOS
Integrated Ocean Observing System

Thank You!

www.maracoos.org **kuska@maracoos.org**
302-831-7553

Atlantic States Marine Fisheries Commission

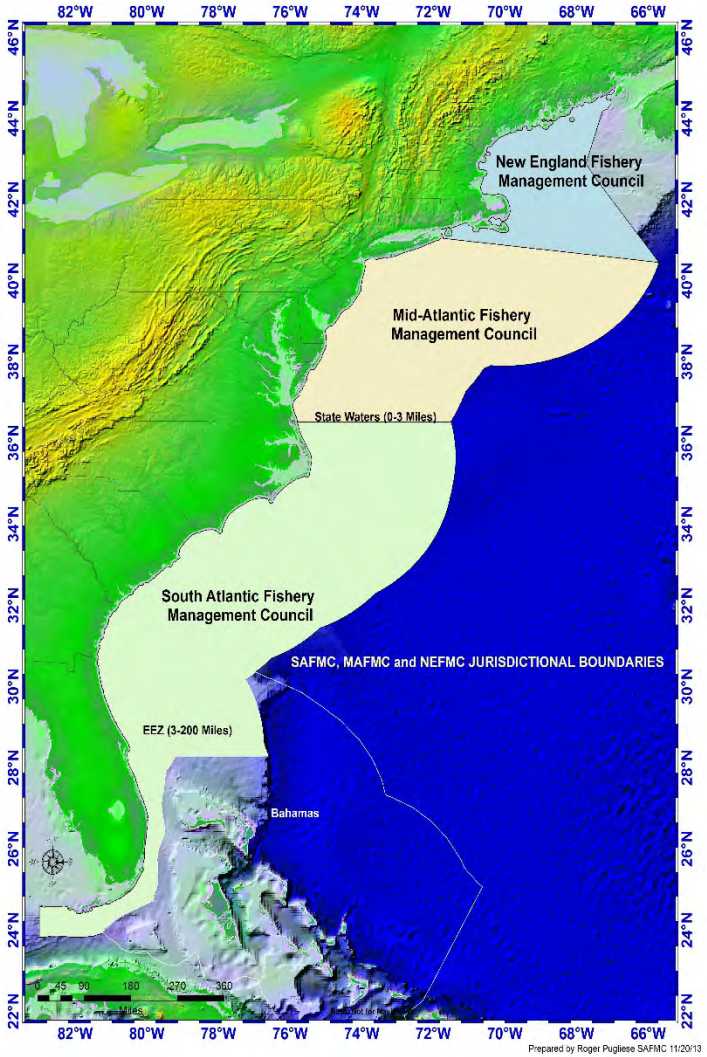
by

Bob Beal

“Beyond the Bay”

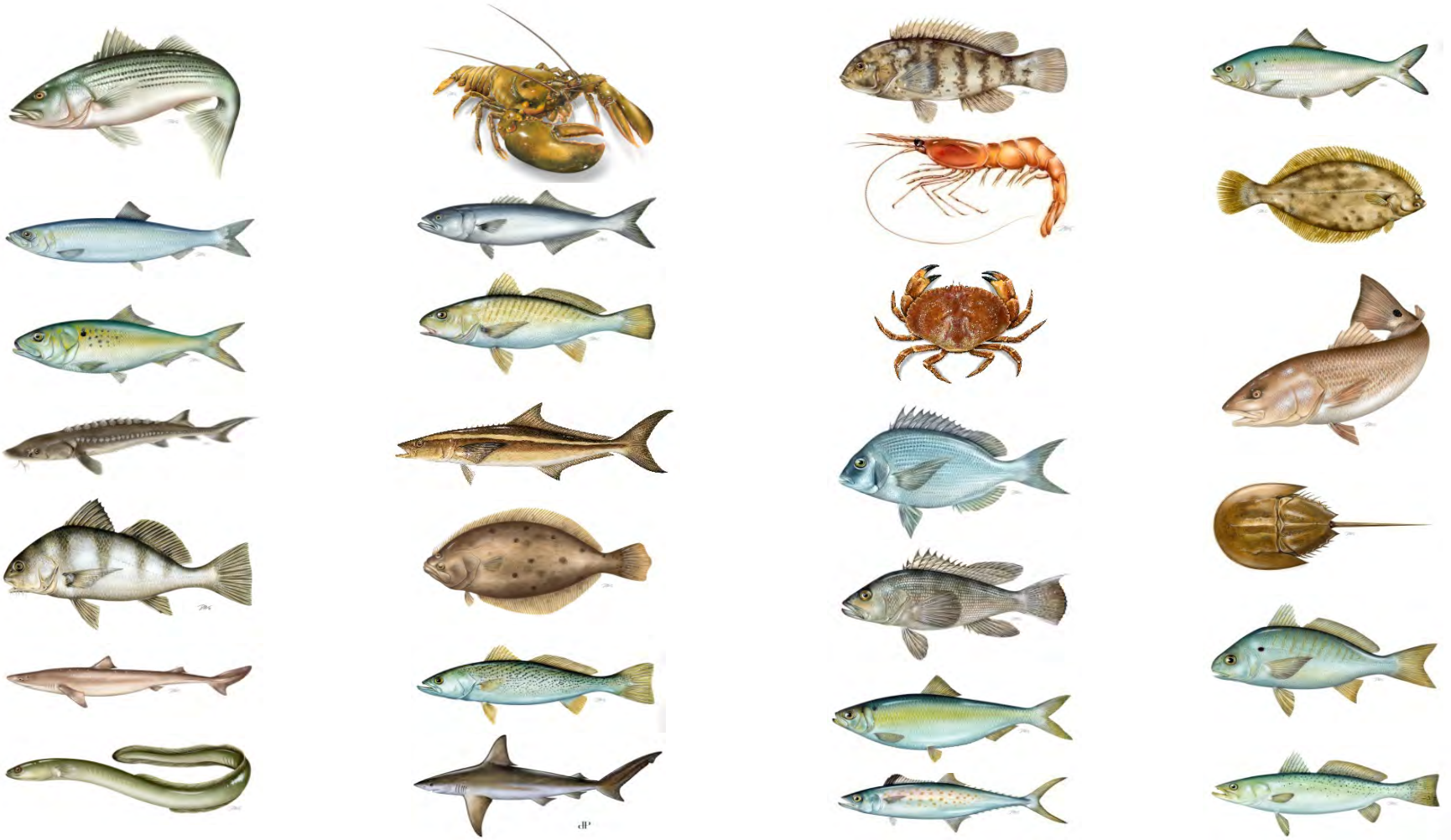
ASMFC Overview

- Formed in 1942 – ASMFC Compact
- 15 Atlantic coast states, ME – FL
- 0 – 3 miles from shore
- Transboundary resources
- Responsible stewardship

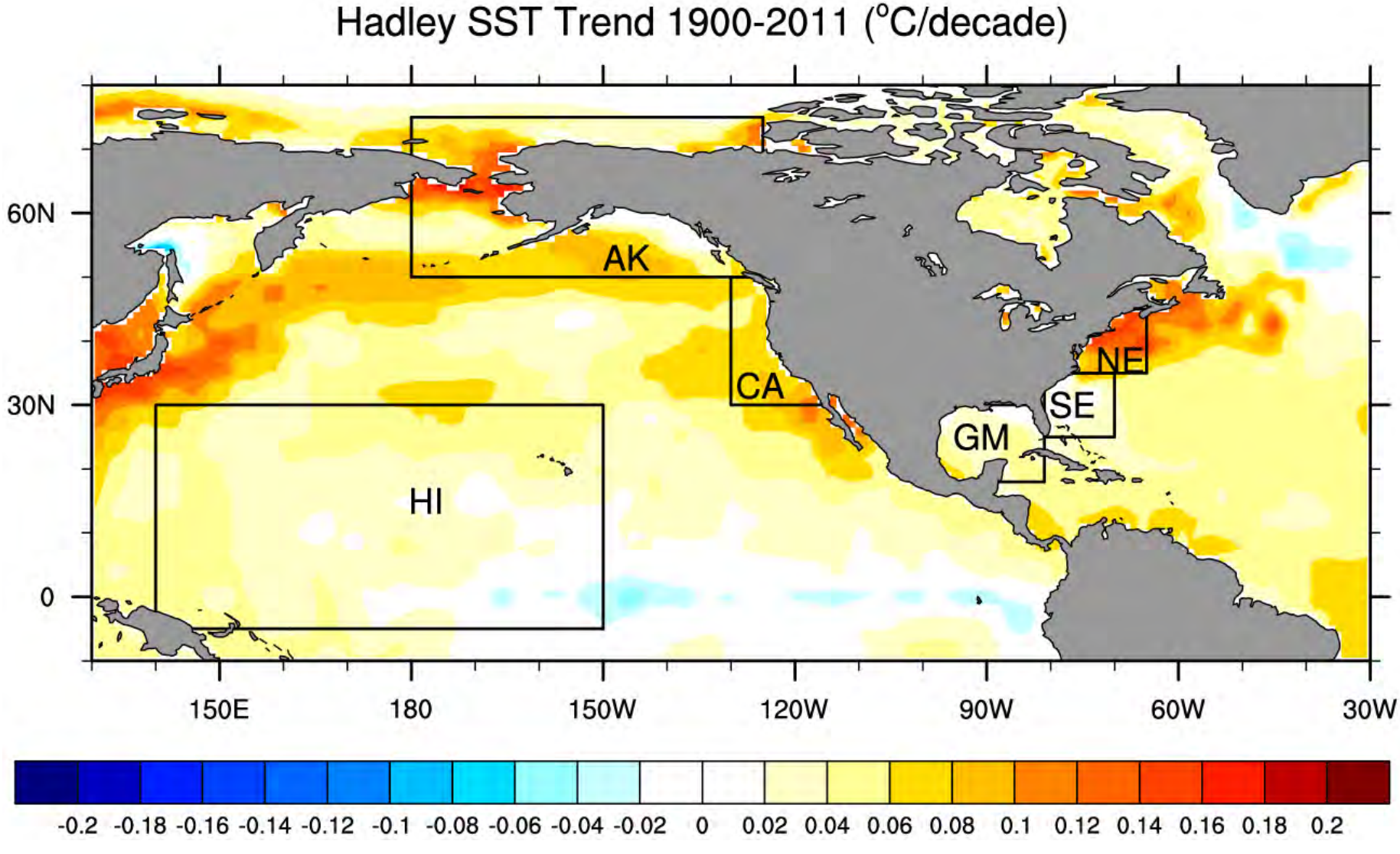


Fisheries Management

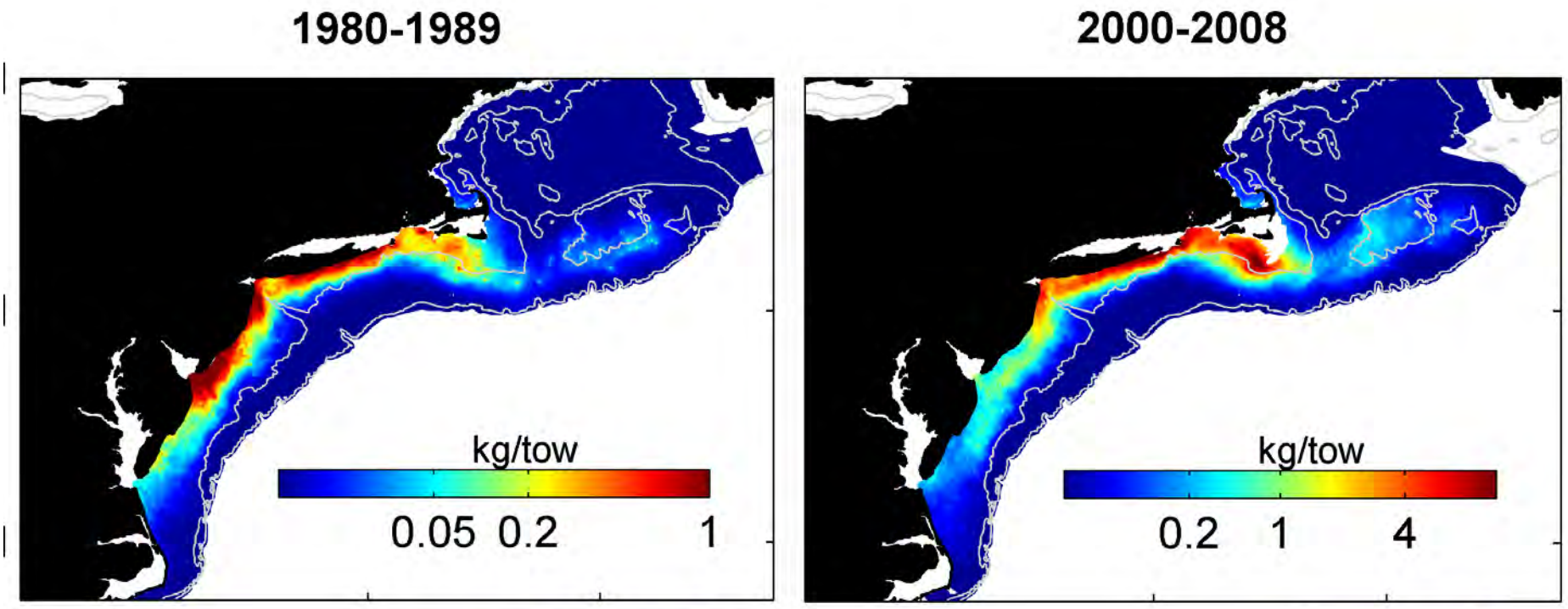
27 Species/Species Groups Under Management



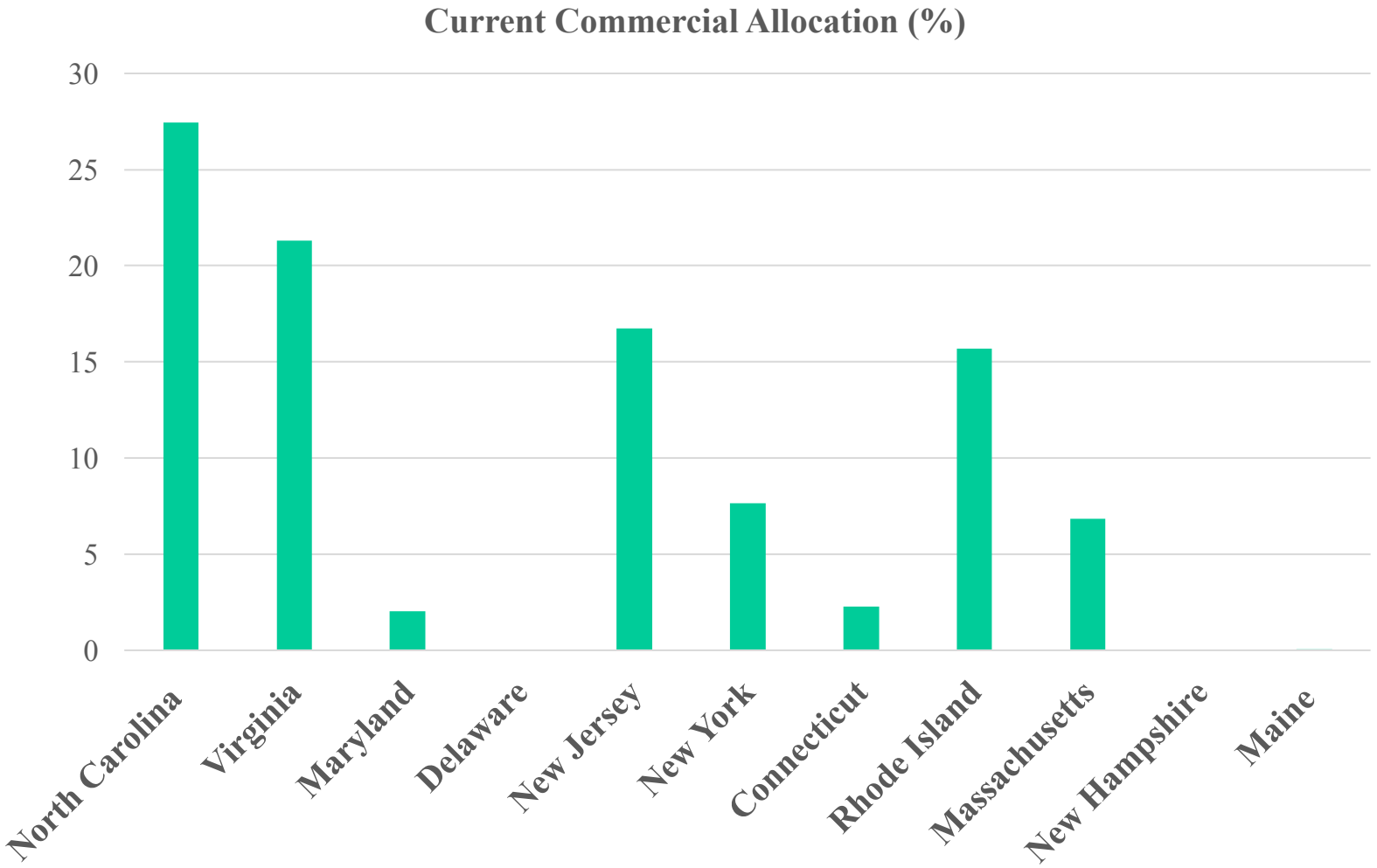
Water Temperature Change



Summer Flounder Distribution

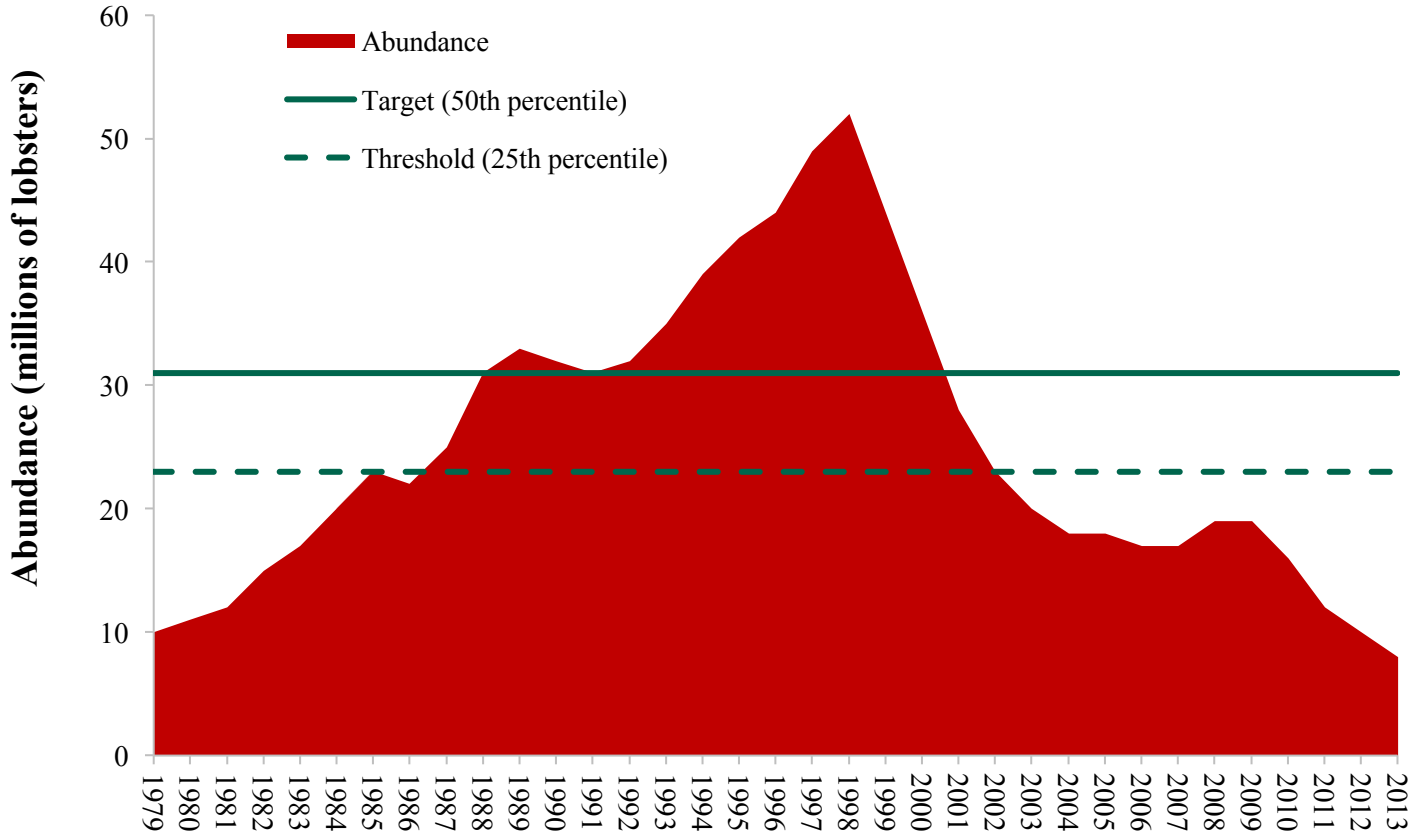


Summer Flounder



SNE American Lobster

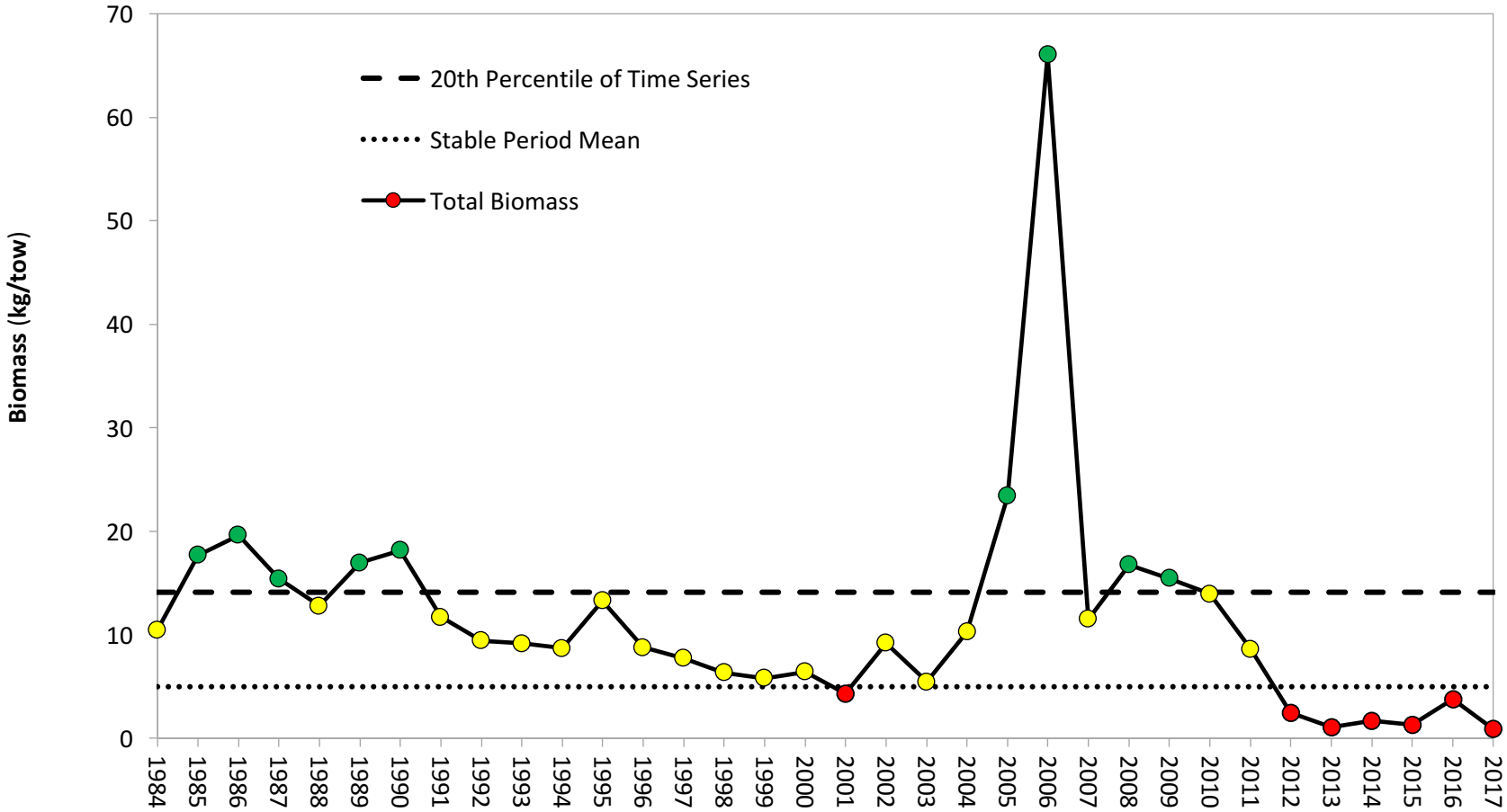
American Lobster Abundance for the Southern New England Stock Unit
Source: ASMFC American Lobster Benchmark Stock Assessment Report, 2015



Northern Shrimp

Total Biomass of Northern Shrimp from the Gulf of Maine Summer Shrimp Survey

Source: Stock Status Report for Gulf of Maine Northern Shrimp, 2017



Any Good News?

- Cobia
- Red Drum
- “Southern” Shrimp
- Atlantic Croaker

What's Next?

- ASMFC Climate Change Strategy
- Assess Vulnerability
- Consider Changes in Productivity
- Consider Reallocation

45-Inch Red Drum Caught on Cape Cod

Thank You

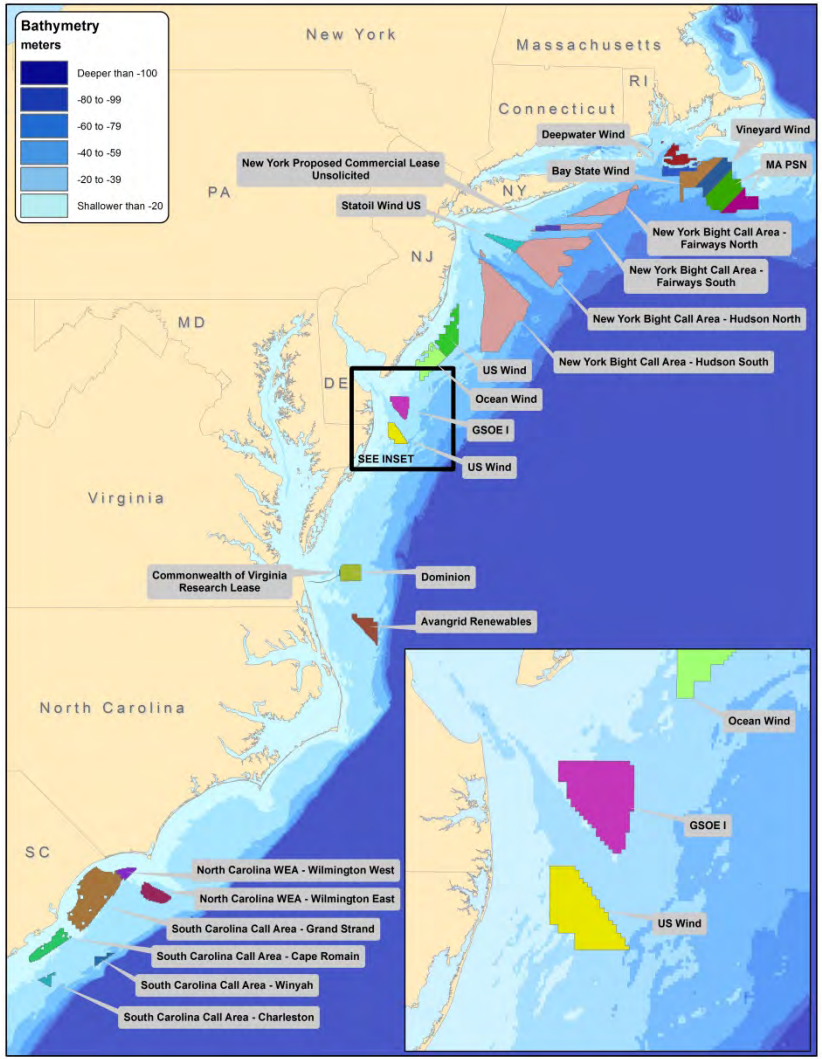
Visit our website at www.asmfc.org

BOEM
Renewable Energy Leasing and Environmental Studies

BOEM Office of Renewable Energy Programs

BOEM
Bureau of Ocean Energy Management

Atlantic OCS Renewable Energy Leases



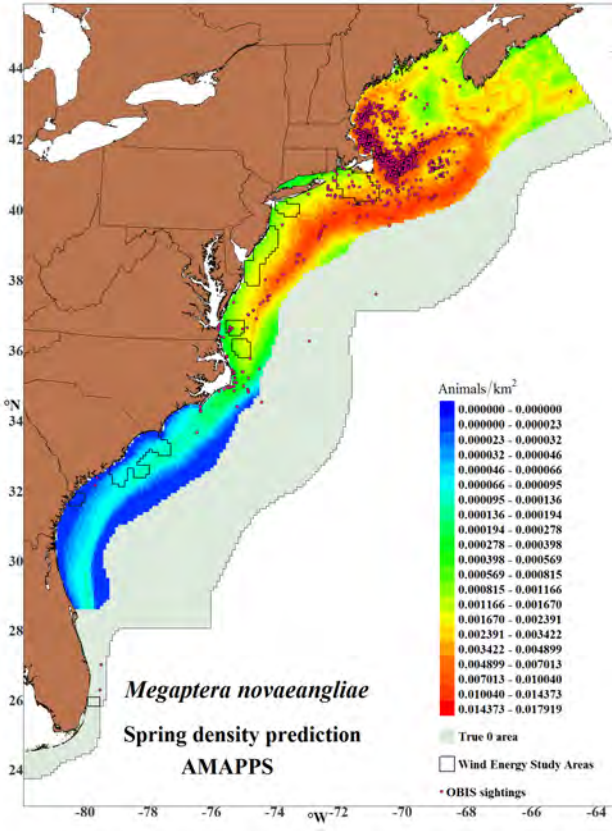
- Seven competitive lease sales, 13 leases issued.
- DE – Garden State Offshore Energy/Deepwater Wind 2012/2016 – 120 MW
- MD – US Wind 2014 – 248 MW

BOEM Studies | Overview

BOEM's Environmental Studies Program is informed largely by public comments and statutory consultations (e.g., NHPA, ESA, MSA/EFH) which fall into the following categories:

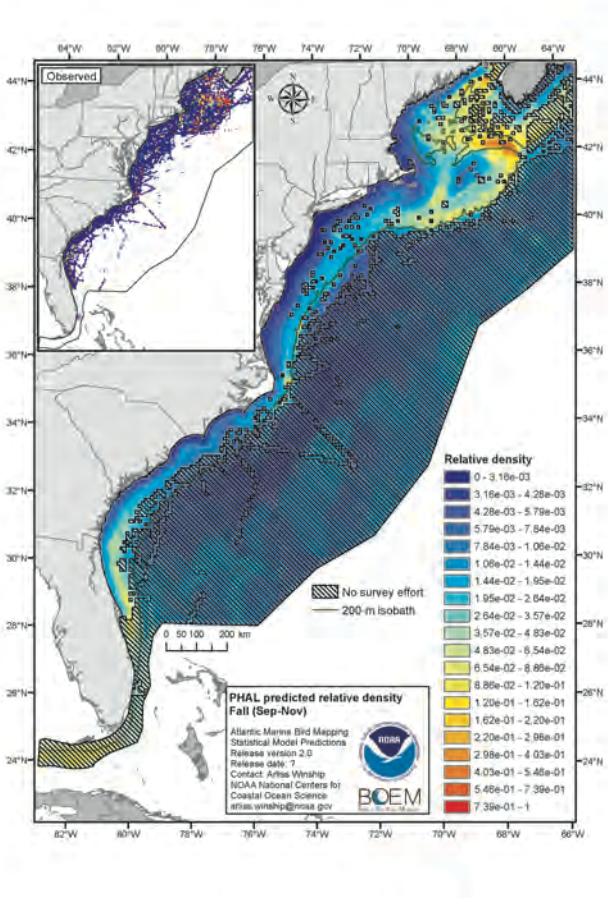
- Marine Mammals and other Protected Species
- Birds and Bats
- Social Science
- Fish and Fisheries
- Physical Environment
- Environmental Monitoring
- Cultural and Archaeological Resources

BOEM Studies | Marine Mammals and Protected Species



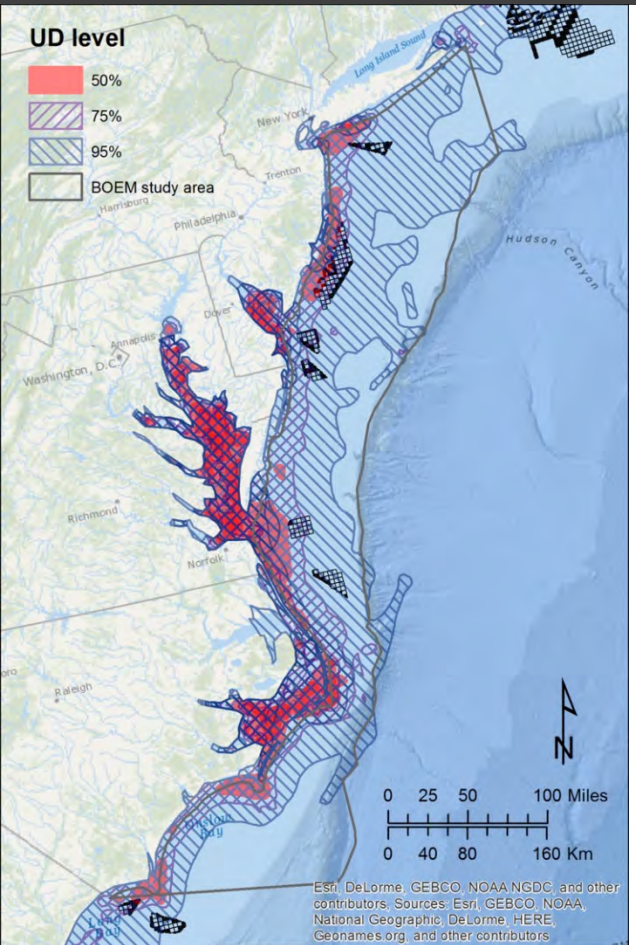
- Atlantic Marine Assessment Program for Protected Species (AMAPPS, 2010-Present)
- Mid-Atlantic Baseline Studies (DOE funded, 2012-2015) DE-VA
- Maryland Baseline Studies (MD funded, 2013-2015) – State waters

BOEM Studies | Avian Studies



- Integrative Statistical Modeling & Predictive Mapping of Seabird Distribution & Abundance on the Atlantic OCS
- Phase II report and maps available in June
- Maps available through the Mid-Atlantic Ocean Data Portal

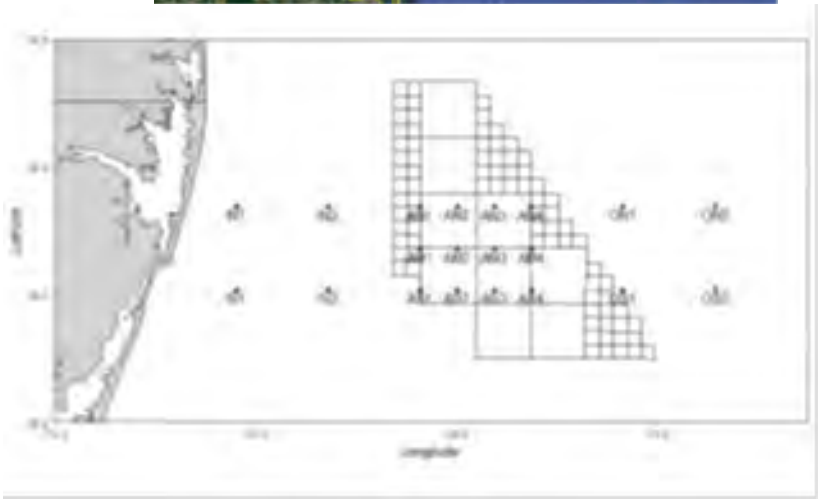
BOEM Studies | Avian Studies



- Satellite tags on sea ducks – Northern Gannett, Surf Scoter, Red-throated Loon
- Tracked migration from southern wintering grounds to northern nesting areas
- Most birds found in bays and near coast, some use offshore area

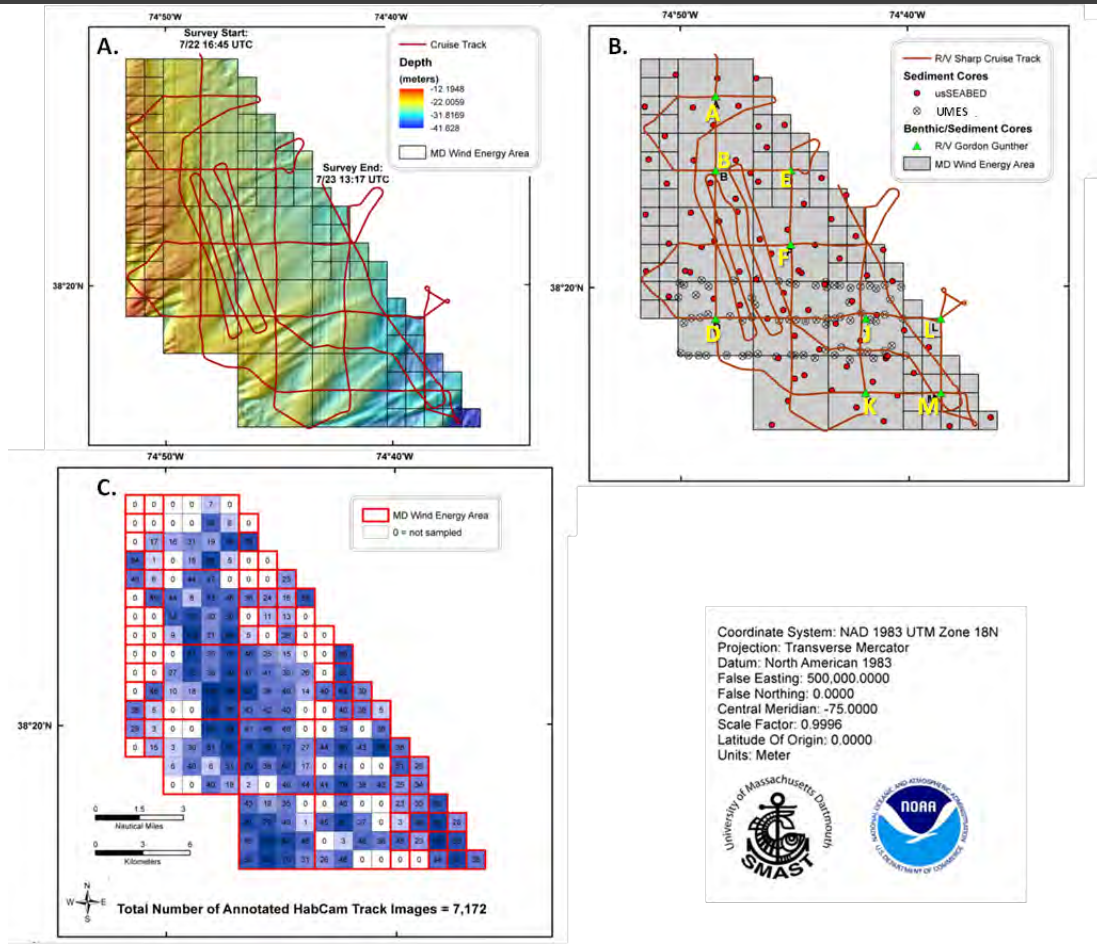
BOEM Studies | Fish and Fisheries

- Telemetry studies for fish
- Tagging of Atlantic Sturgeon, Black Sea Bass and other fish
- Receive signals from other tagged fish
- Understand fish usage in WEAs, particularly endangered Atlantic Sturgeon



BOEM Studies | Fish and Fisheries

- Benthic Habitat Mapping using HabCam
- Track lines covered most of Wind Energy Area
- Also analyzed fish species, hydrodynamic environment

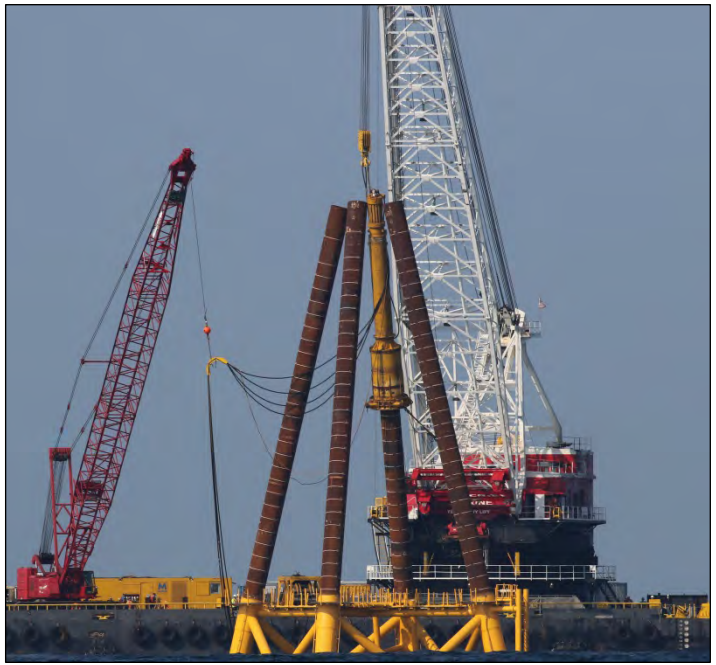


BOEM Studies | Archaeology

- Identified anomalies from geophysical surveys
- Used diver's to verify eight locations
- Four shipwrecks identified, four anomalies were not represent an archaeological find

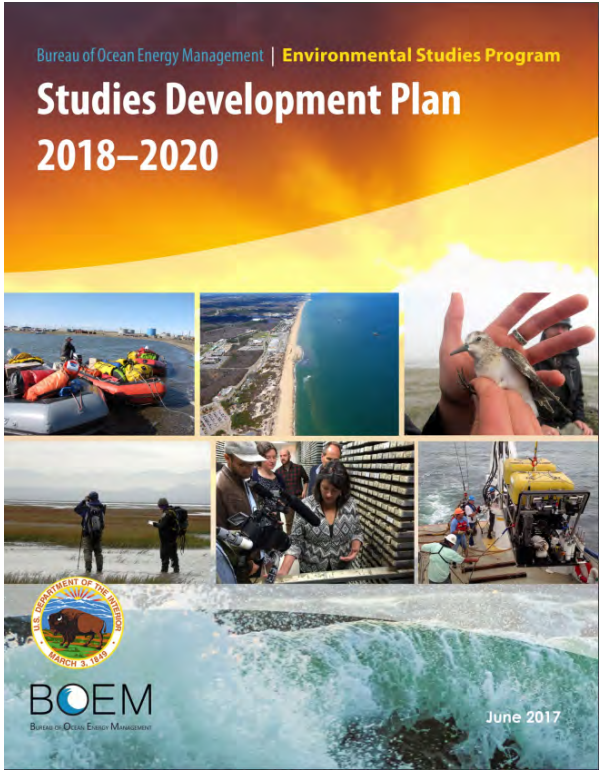
BOEM Studies | RODEO

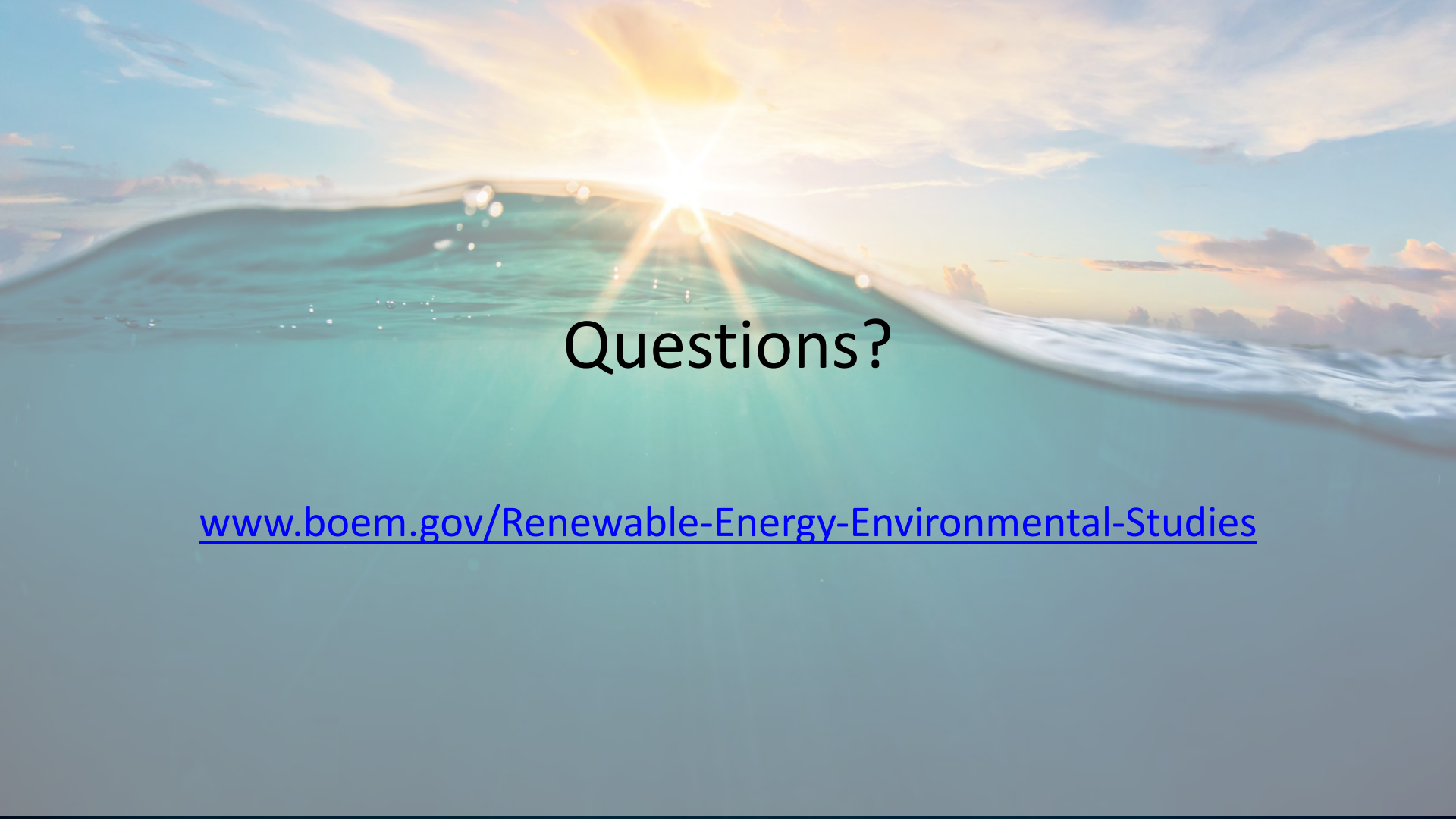
- Real-time Opportunity for Development Environmental Observations
  - Pile driving acoustic monitoring (particle motion)
  - Sediment suspension from cable laying- complete!
  - Benthic monitoring of foundations
  - Maryland Met Tower acoustic study this summer



Studies Participation

- Stay informed on study updates by subscribing to BOEM Notes to Stakeholders
- BOEM solicits study ideas from public every fall/winter (just concluded for FY19).
- 2018-2022 Study Development Plan posted on www.boem.gov
- Check out the revamped studies webpage!




Questions?
www.boem.gov/Renewable-Energy-Environmental-Studies


Working Waterfronts
are Disappearing
Aquaholic
CHELLE YEAH
Triple Threat
ROCK HALL, MD
©Lauren Amberman
Lauren's Photography

Oyster Shell Piles Cambridge Creek

Cambridge Creek

JM Clayton Cambridge

Rock Hall Harbor

Rock Hall Harbor

Tilghman Packing Company

Tilghman on Chesapeake Marina

Urban Drift of Young People

Loss of Community Centers
Local Schools

Community Working Together to Repopulate the School

Tilghman United

While Creating an Environmental Magnet School

Loss of Churches

Eco – Tourism Sport Fishing

Eco- Tourism Kayaking

Knapps Narrows Bridge

Gat Back to Nature

Authentic Experiences
Skipjack Sailing

Authentic Experience
Trotlining for crabs

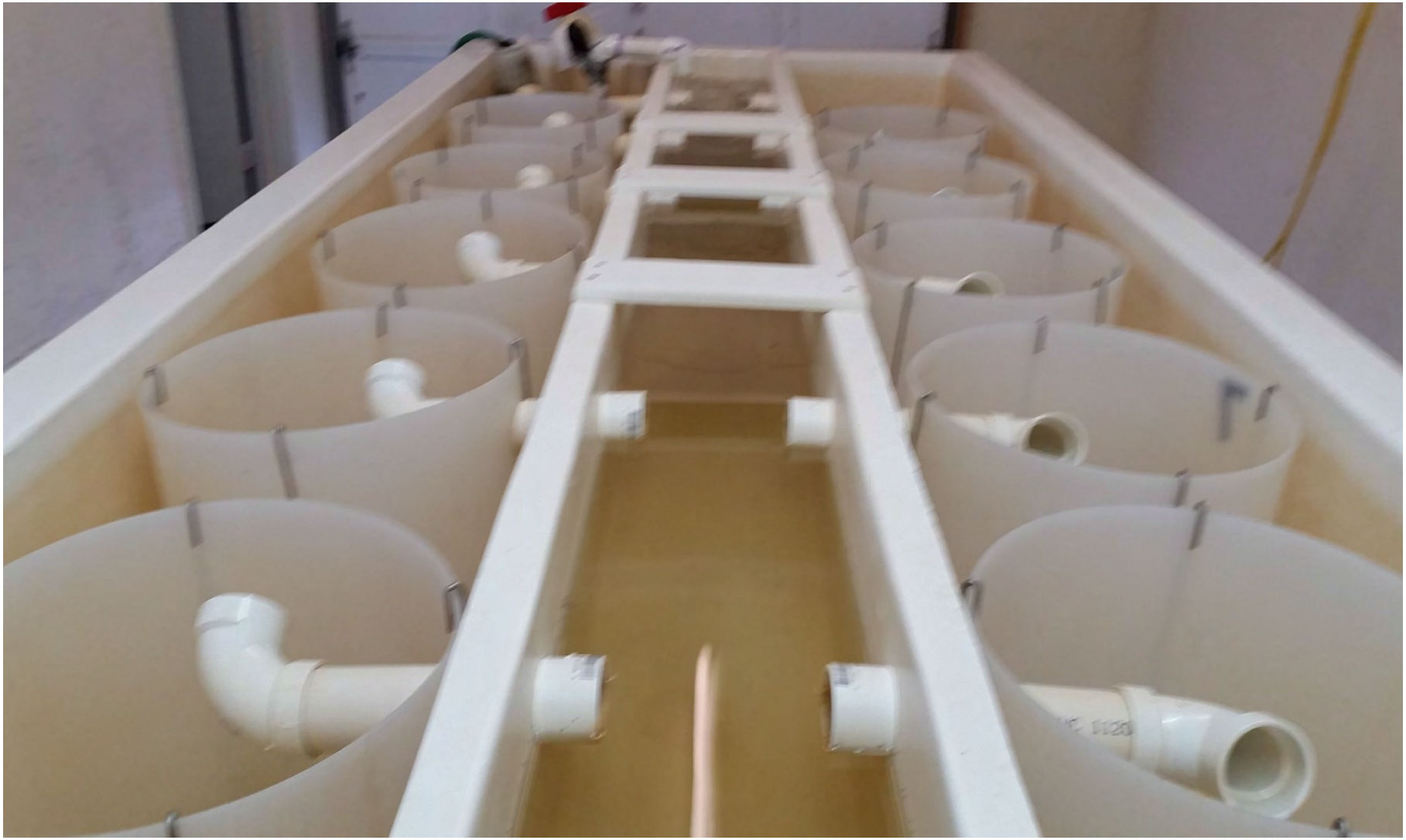
Authentic Experiences
Oyster Shucking 101

Phillips Wharf Environmental Center

Shucking Oysters

Shellfish Aquaculture Incubator

Nursery Tank Upweller/Downweller



Microcultch for setting Cultchless oysters

Cultchless Seed Oysters

Tumbling and Sorting Oysters

Fisherman’s Daughter Brand Oysters

Maintaining a Centuries Old Way of Life, While Building a Sustainable Future for Working Waterfront Communities

Vibrant Economies:
Showcasing Local Solutions and Strategies

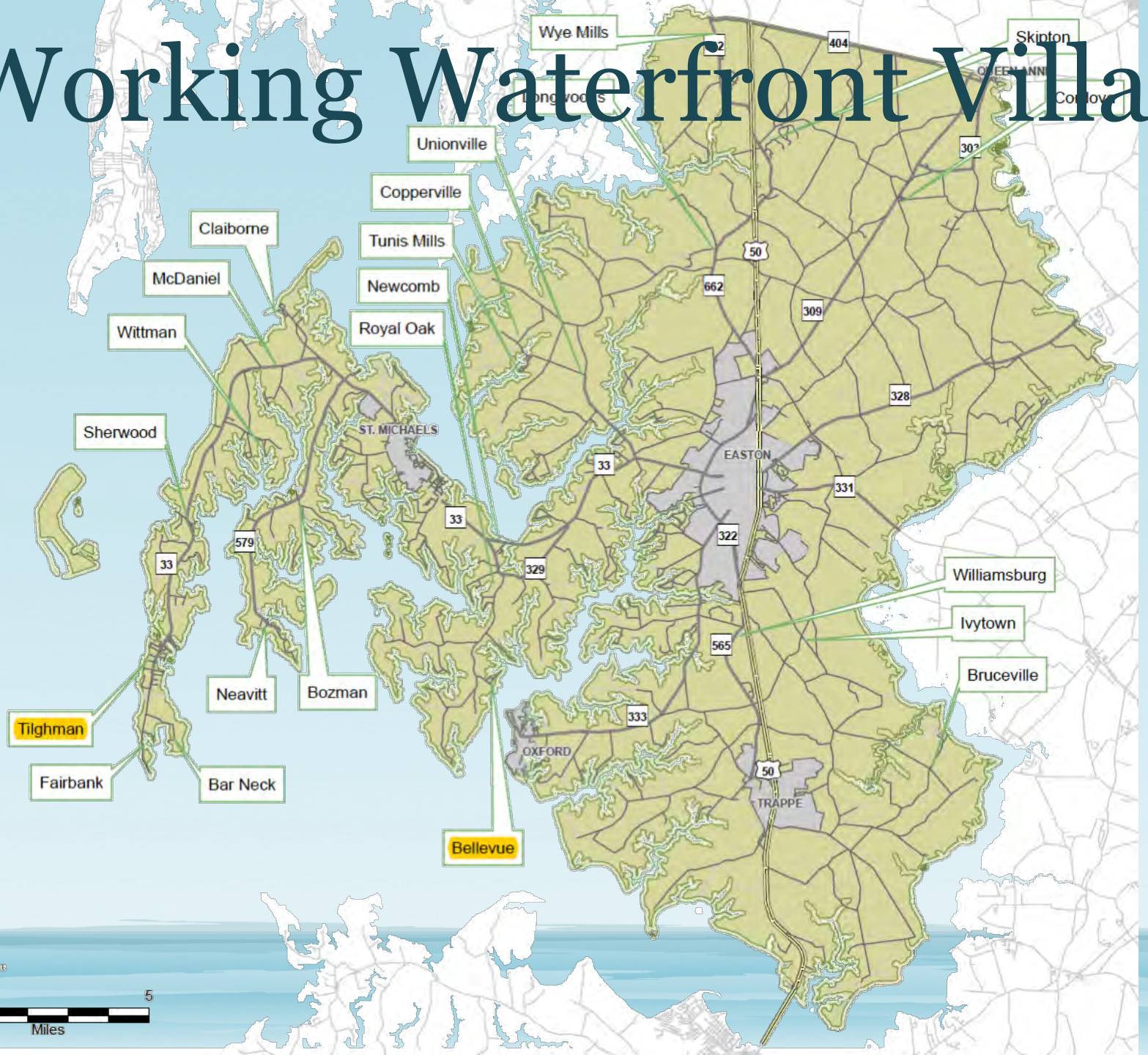
TALBOT COUNTY, MARYLAND

Maryland State of the Coast Conference
May 23, 2018

Introduction

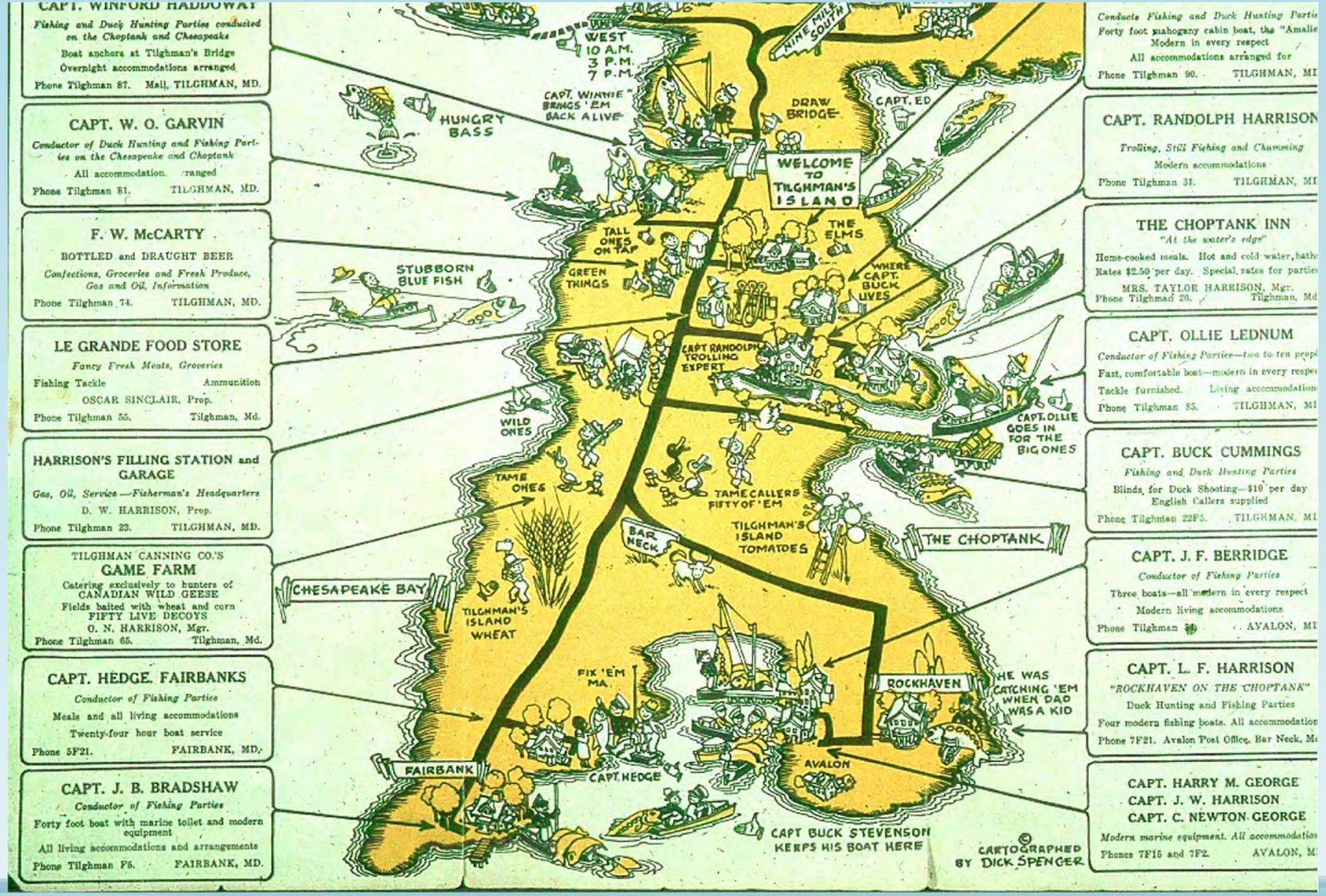
- Village Working Waterfronts Background
  - Historic Overview
  - Demographics
  - Challenges
- Master Planning
  - Process
  - Results
- Master Plan Legacy

Two Working Waterfront Villages



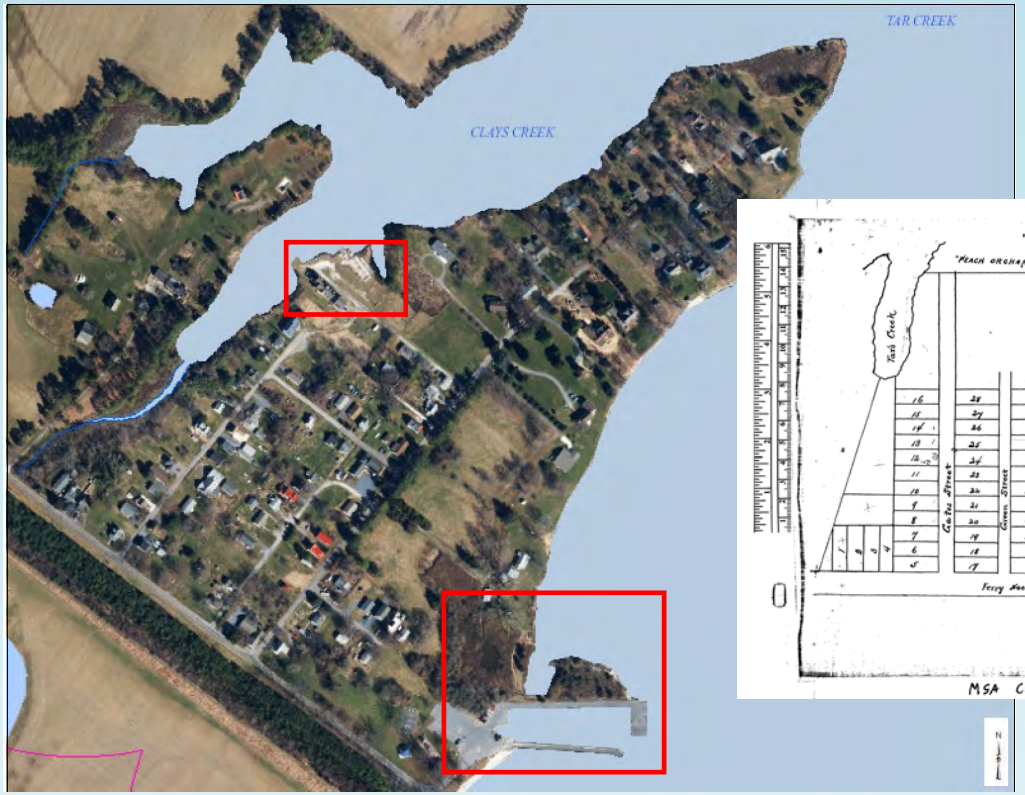
Tilghman Overview

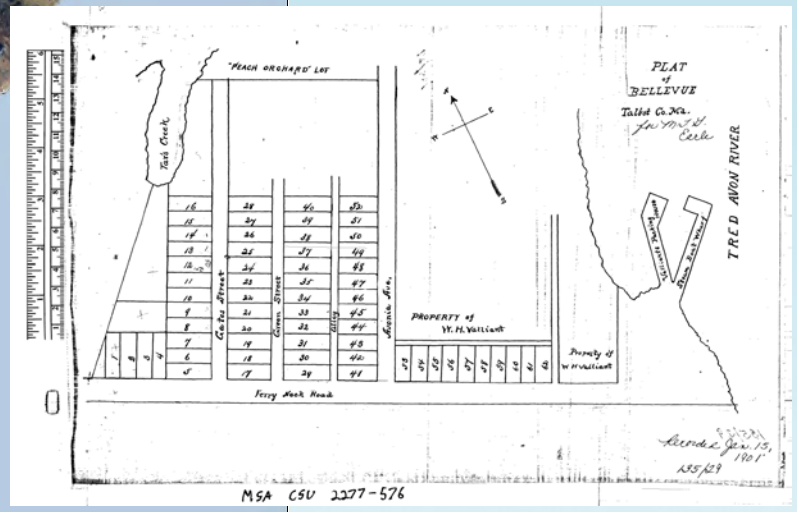
Tilghman Packing Company

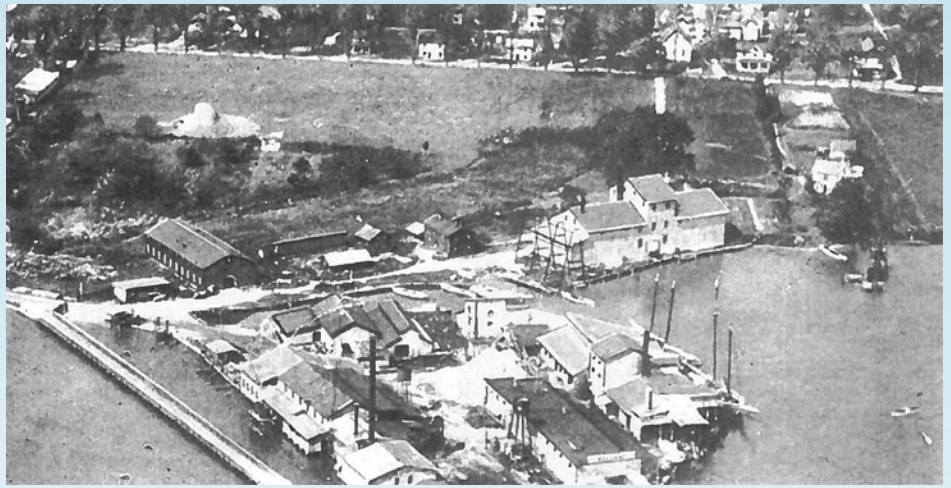


Bellevue Overview

Bellevue Working Waterfronts







Tilghman Today

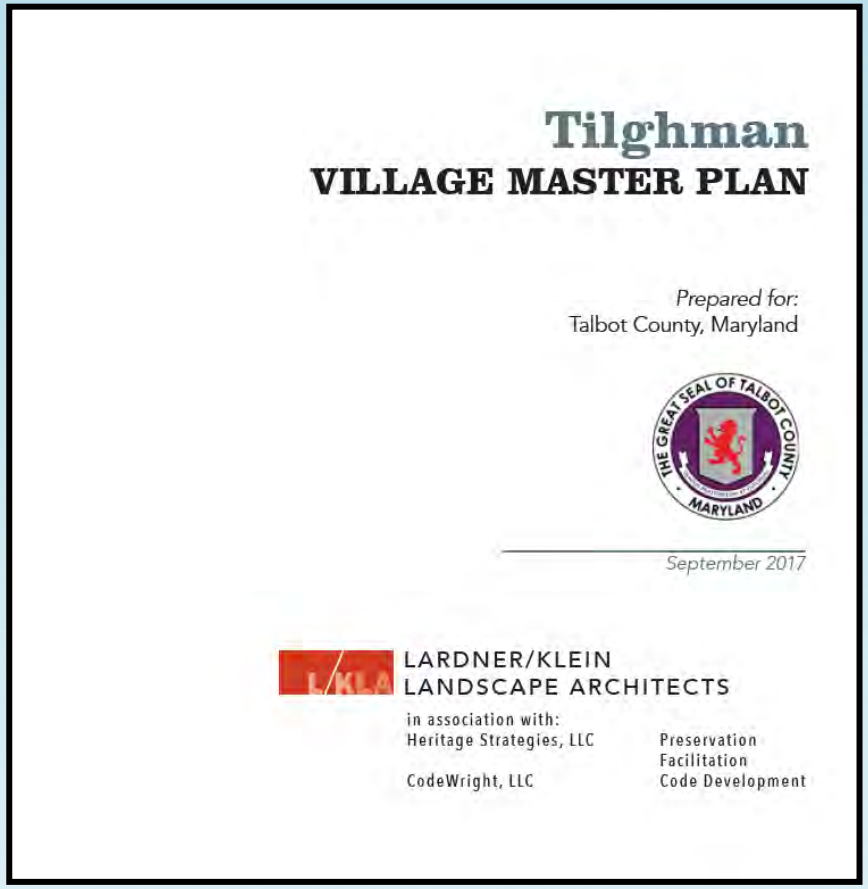
- Approximately 950 residents
- 32% of workforce is self-employed
- Per capita income of $26,370
- Poverty rate of 12%
- Loss of businesses over time
- 44% of housing units vacant
- 75% vacant units used for occasional use

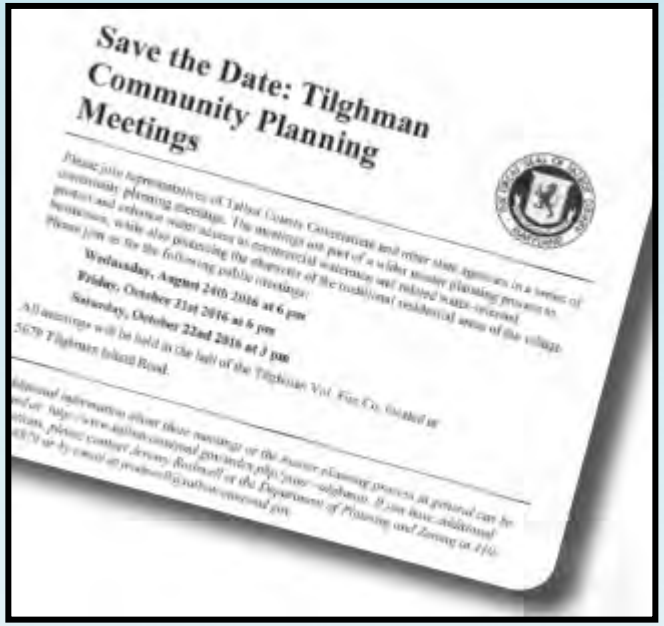
Bellevue Today

- Residential community
- Approximately 90 residents
- Noted for its public landing
- 62% of residents are African-American
- $50,083 median income

Village Master Planning

- Funded by MD DNR Working Waterfronts Program
- Implementation of comp plan
- Reflects Council priorities
- Working Waterfront Commission identified Tilghman
- Typical plan process was used



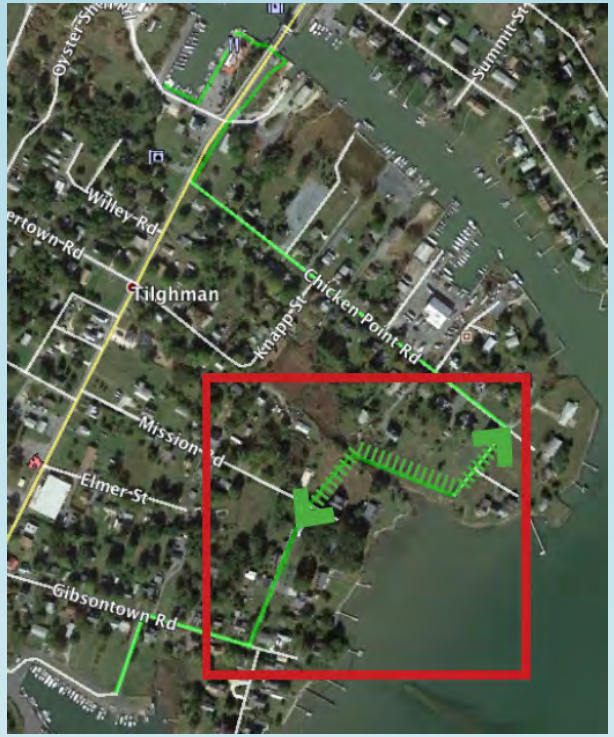


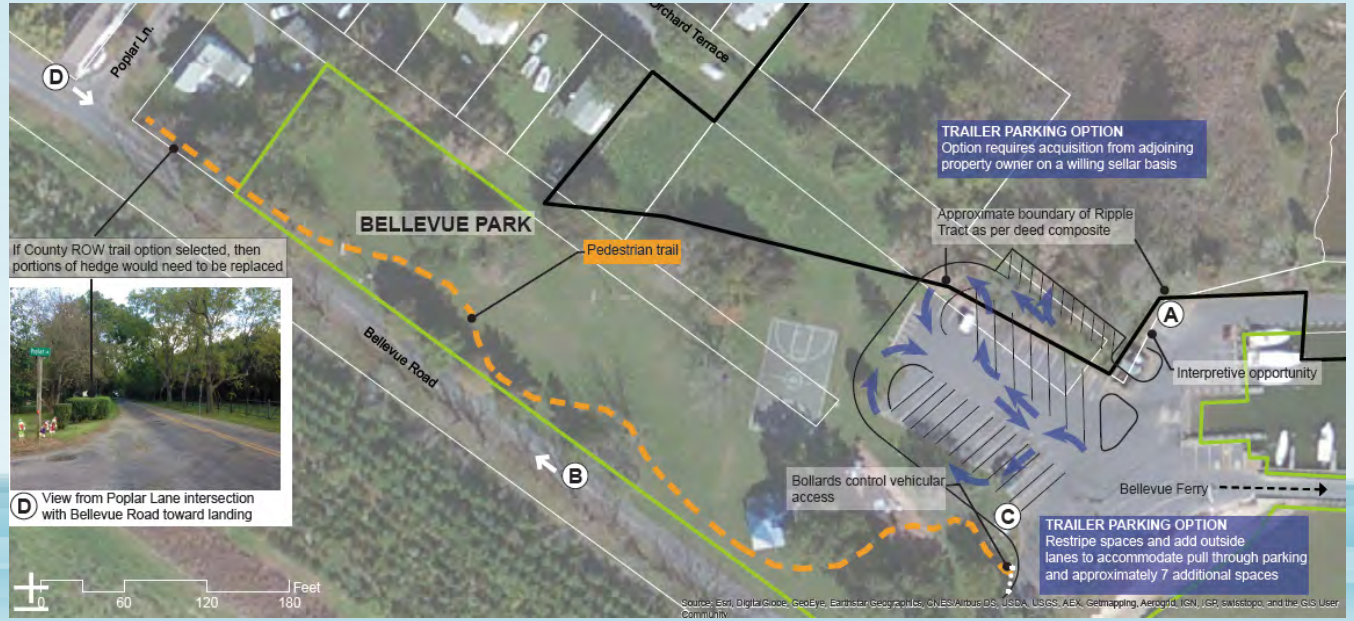
Issues

- Maritime economy
- Dredging Knapps Narrows
- Sidewalks / Street design
- Regulations
- Community character / design
- Noise
- Transitions to residential
- Affordable housing

Opportunities

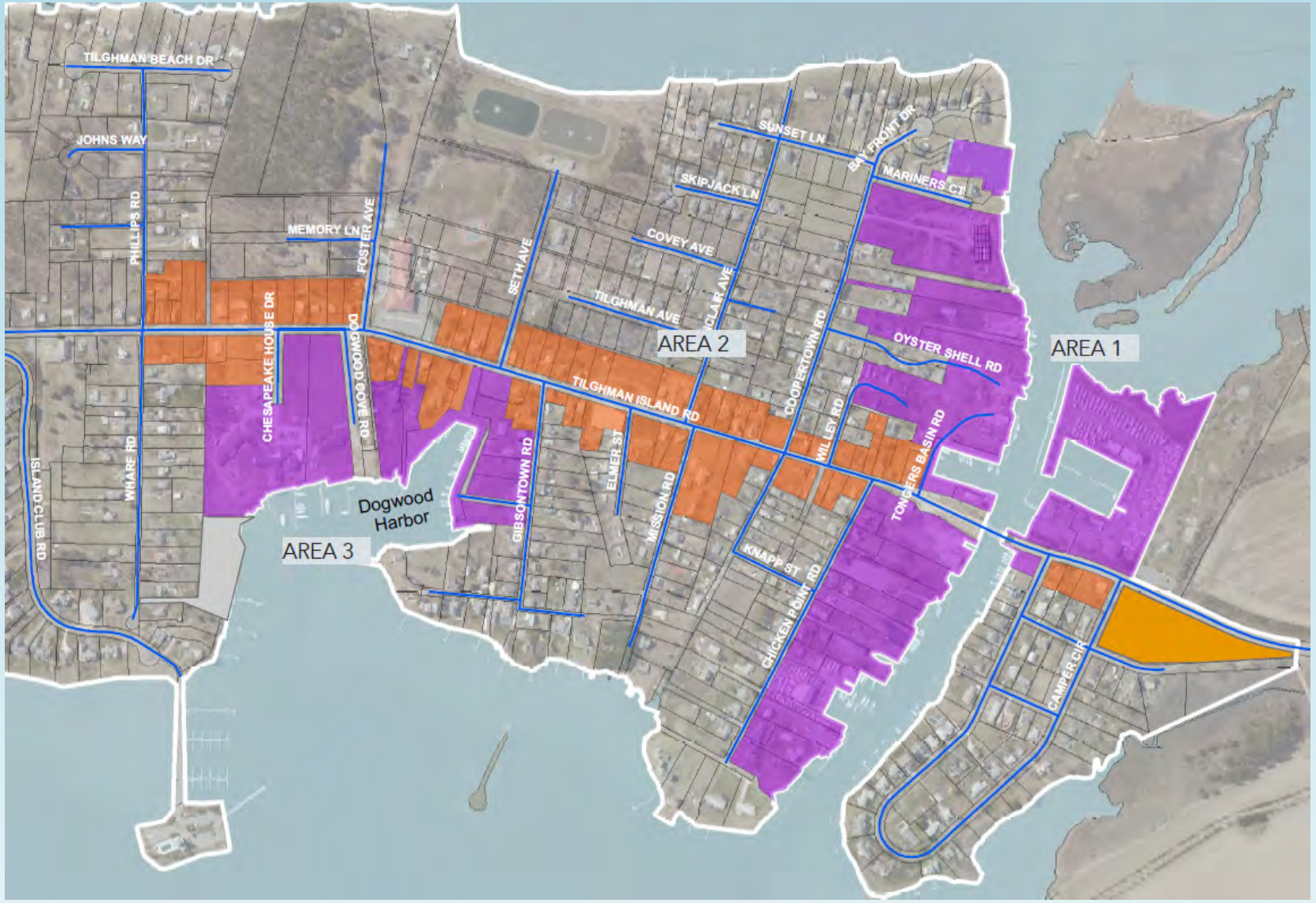
- Public landing improvements
- Traffic calming
- Community Character/design
- Sidewalks / Street design
- Diversifying economy through nature and heritage-based tourism
- Infill development and building rehab incentives





Regulations

- WWOD
- LDA to IDA



Elements of WWOD

Issue	Bellevue	Tilghman
Land use, density, scale, setbacks, site layout, mix of use, and general design compatible with existing character	■	■
Expand maritime-related uses		■
Encourage heritage and nature-based tourism		■
Facilitate home-based and cottage industries		■
Transitions to residential neighborhoods		■
Site Plan review		■
Standards for Maritime Support uses		■
Master Plans for review of small scale and major subdivision, and major site plans	■	■
Minimize lot consolidation / teardowns	■	■
Minimize tear down of existing homes	■	
Construction or reconstruction of new homes that are consistent with existing and desired historic character	■	■
Encourage rehabilitation and adaptive re-use of existing structures		■

Use Categories

Use Category		Description	Examples
Working waterfronts		Adjacent to public trust waters + WDU	Knapps Narrows, Dogwood Harbor
Water-dependent	**Maritime** **Commercial**	Requires direct access to the water to physically function	Charter boat companies, commercial fishing and other maritime operations, marinas, water-based transportation facilities, aquaculture operations and water-based education and research organizations (*e.g. Tilghman Island Marina, Knapp's Narrows Marina , Dogwood Harbor, Tongers Basin, and Phillips Wharf Environmental Center*)
Water-related	**Maritime** **Support**	Provides goods and services for water-dependent businesses. Not critical to have direct access to water.	Seafood markets, seafood production facilities, boat sales, boat repair and dry storage.
Water-enhanced		Not need direct water access to function Not provide essential goods and services to WDU Location on/near the waterfront enhances economic value	Hotels, motels, inns, bed and breakfasts, restaurants, shops and event venues

Master Plan Legacy

Tilghman action committee lays out plan

By DENAE SPIERING dspiering@chespub.com Sep 1, 2017 0

On Wednesday, Aug. 30, members of the newly formed Tilghman Island committee held a town hall-style meeting at the Tilghman Island Volunteer Fire Department. A digital image of a proposed kiosk and ATM location for the island is pictured.

PHOTO BY DENAE SPIERING

Knapps Narrows Dredging Underway

State of the Coast Conference 2018

Working Waterfront Implementation Plan

IMPLEMENTING THE VISION

CAMBRIDGE WORKING WATERFRONTS IMPLEMENTATION PLAN

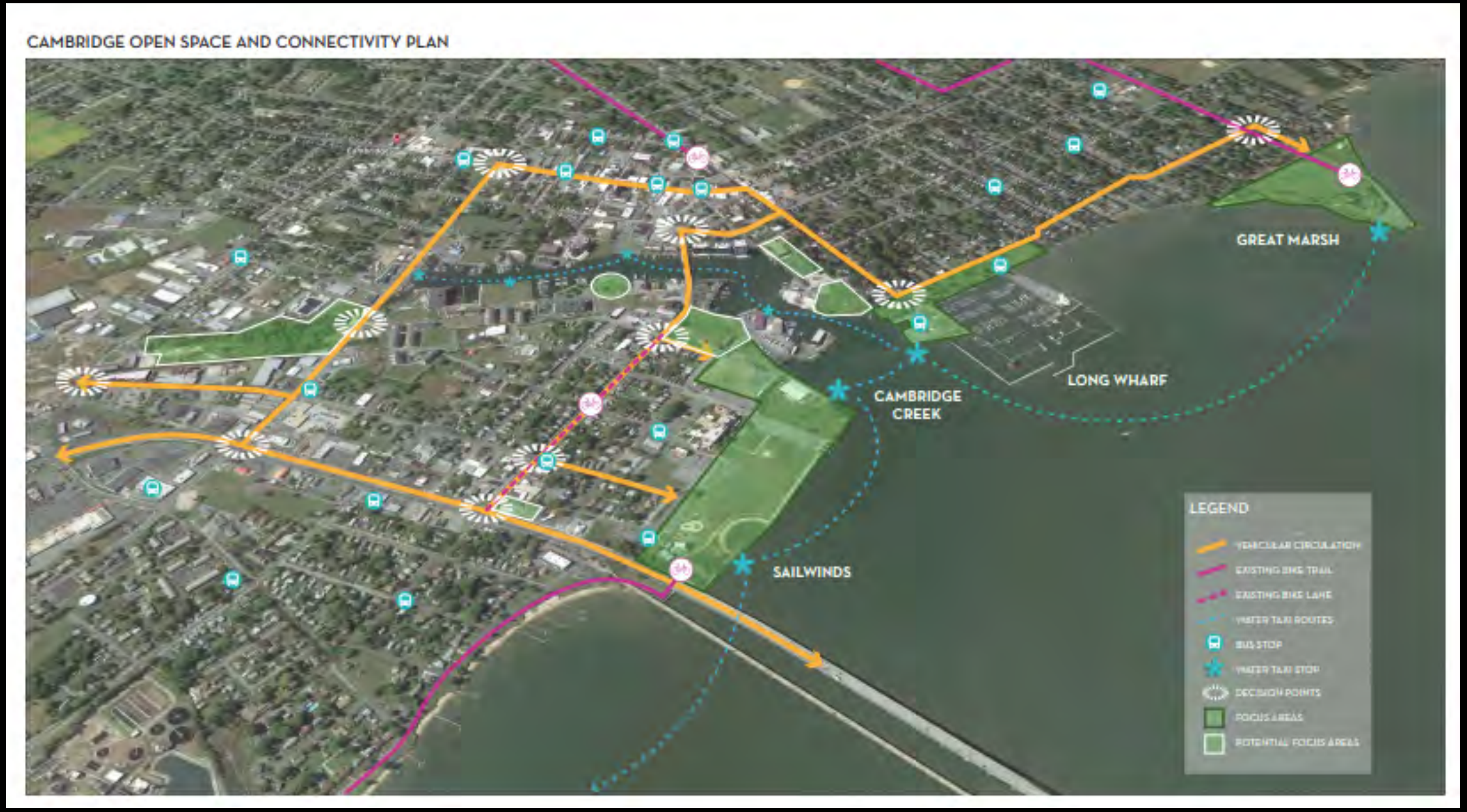
OCTOBER 27, 2017

CAMPION HRUBY
LANDSCAPE ARCHITECTS
www.campionhruby.com
410.280.8850

*This report was prepared by **Campion Hruby** using Federal funds under award number NA16NOS4190170 from NOAA, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of NOAA or the U.S. Department of Commerce.*

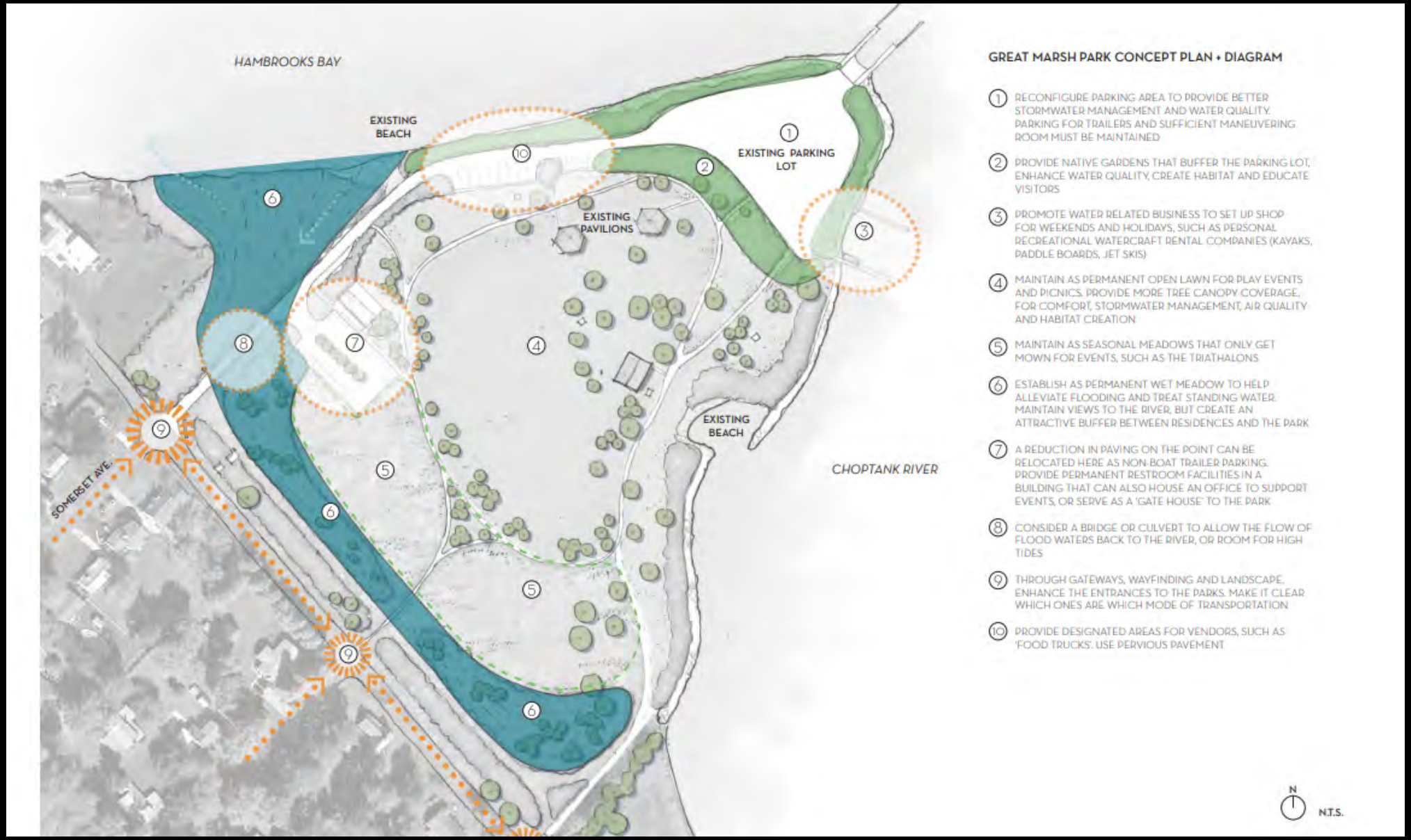
Open Space and Connectivity Plan

Open Space and Connectivity Plan



Great Marsh Existing Conditions

Great Marsh Concept Plan



Marina Existing Conditions

Marina Concept Plan

LONG WHARF PARK PLAN - DIAGRAM

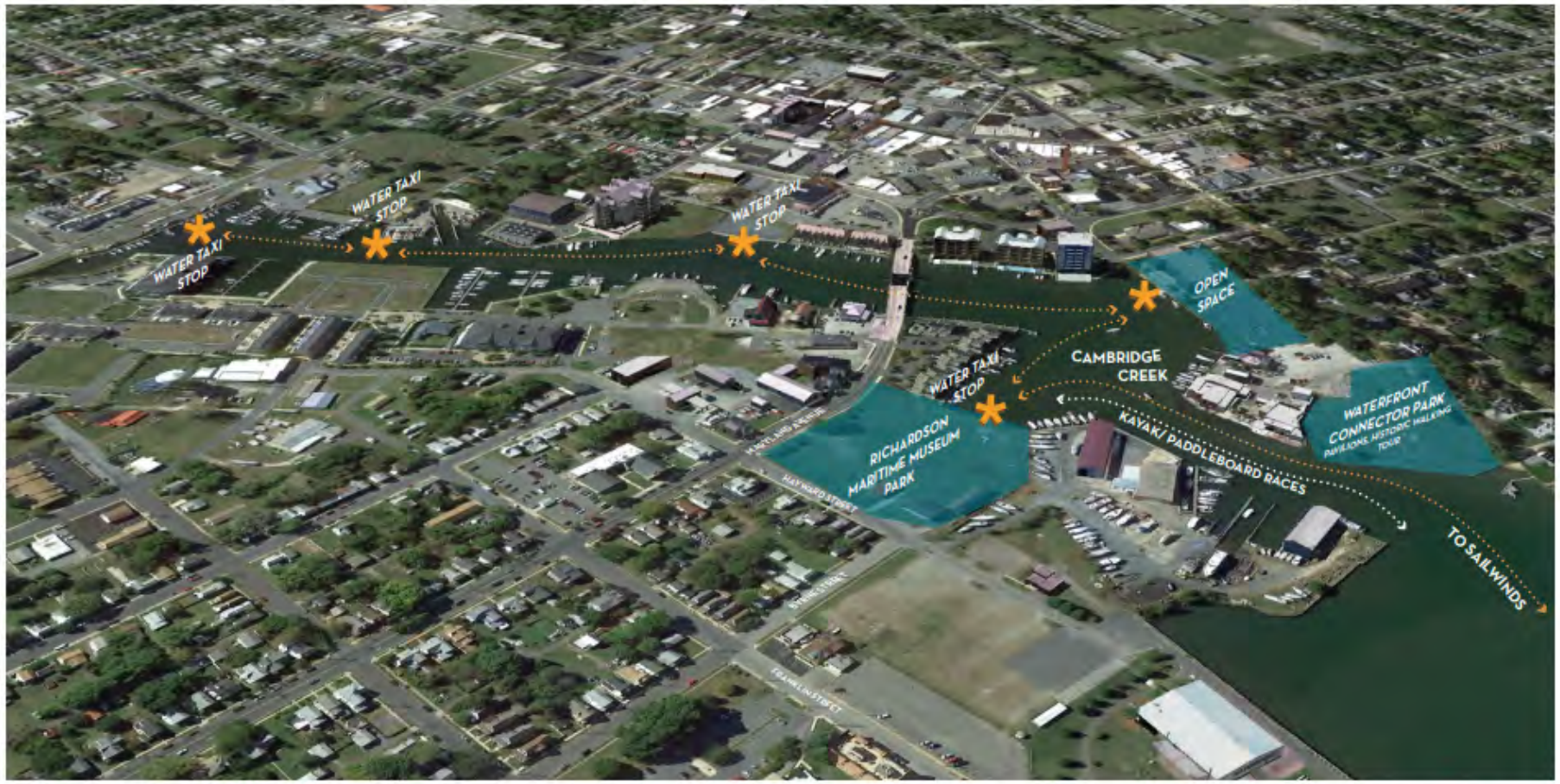
1. CONVERT BULKHEAD TO LIVING SHORELINE
2. PROVIDE WATER ACCESS FOR RECREATIONAL WATERCRAFT RENTED FROM THE PUMP HOUSE, OR FLOR RESIDENT'S USE
3. PROVIDE VEGETATED BUFFERS AND RAIN GARDENS TO IMPROVE WATER QUALITY FROM PARKING LOTS
4. ADD PARKING FOR PUMP HOUSE PATRONS, PER LONG WHARF MASTERPLAN
5. REMODEL THE PUMP HOUSE AND ENCOURAGE USES TO ATTRACT TOURISTS AND SUPPORT FOR SLIP HOLDERS. THESE CAN INCLUDE RECREATIONAL WATERCRAFT RENTALS, FOOD AND BEVERAGES, FISHING SUPPLIES. PROVIDE RESTROOM FACILITIES AND SEATING AREAS.
6. TRANSFORM THE WALK ALONG THE BULKHEAD TO A PROMENADE FOR BOATERS, VISITORS AND RESIDENTS. PROVIDE LIGHTING AND VARIOUS SEATING OPTIONS, SUCH AS BENCHES, CAFE TABLES AND ADIRONDACK CHAIRS. CONNECT THE PROMENADE TO THE OLD 'DUCK WALK' PARCEL
7. PROVIDE A PAVILION AND/OR BANDSTAND AS AN ATTRACTION AND FOCIAL POINT FOR THE PARK
8. RESPECT AND ENHANCE THE LANDSCAPING AROUND THE MEMORIAL PLAZA
9. PROVIDE PICNIC TABLES AND CHARCOAL GRILLS IN VARIOUS AREAS OF THE PARK.
10. ENHANCE PARKING AND WATER QUALITY AS SUGGESTED IN THE LONG WHARF PARK MASTERPLAN
11. PROVIDE SHADE STRUCTURE, SUCH AS A PAVILION OR SEASONAL TENT, TO SUPPORT A REGULAR PUBLIC 'FISH MARKET' AND OTHER EVENTS.
12. SUPPORT THE HISTORICAL TOURS AND ENCOURAGE HERITAGE EVENTS AND ACTIVITIES . THESE CAN INCLUDE DOCKED ANTIQUE VESSELS AND WATERMAN HOSTED HERITAGE BOAT TOURS
13. PROVIDE THE TOOLS THAT THE WATERMEN NEED TO EFFICIENTLY UNLOAD THEIR CATCH, SUCH AS CRANES, CARTS AND LOADING SPOTS FOR TRUCKS

N

N.T.S.

Water Taxi

Cambridge Creek Potential Water Taxi Stops

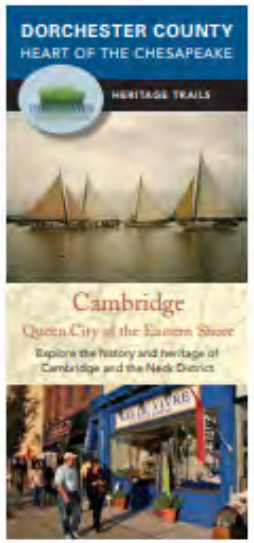


EXISTING CONDITIONS AND OPPORTUNITIES
SCALE: N.T.S.

Existing Literature of Cambridge

Downtown Cambridge Walking Tour

Choose Cambridge Art & Entertainment Brochure



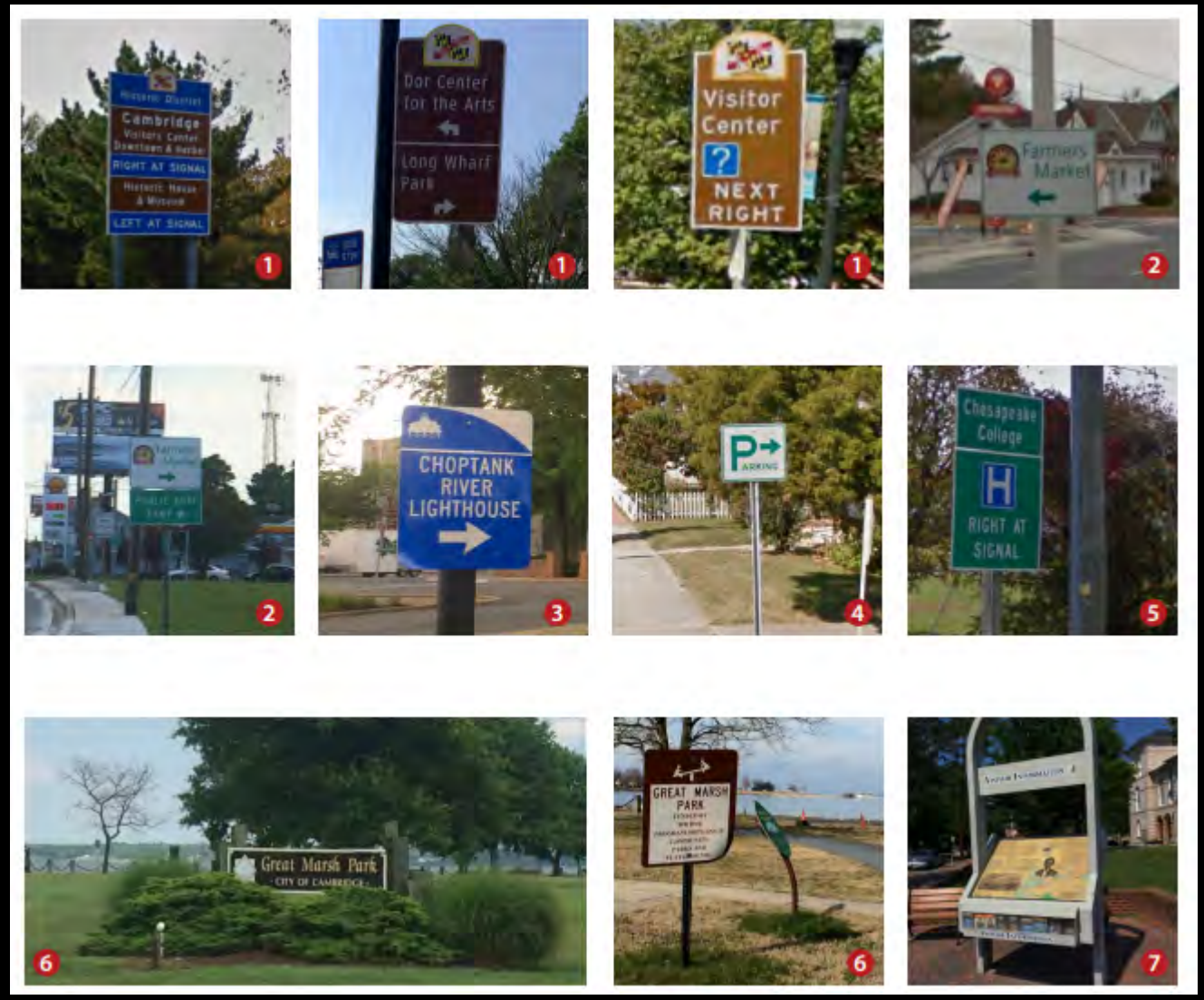
Dorchester County: Cambridge Tourism Brochure

City of Cambridge Maryland Seal

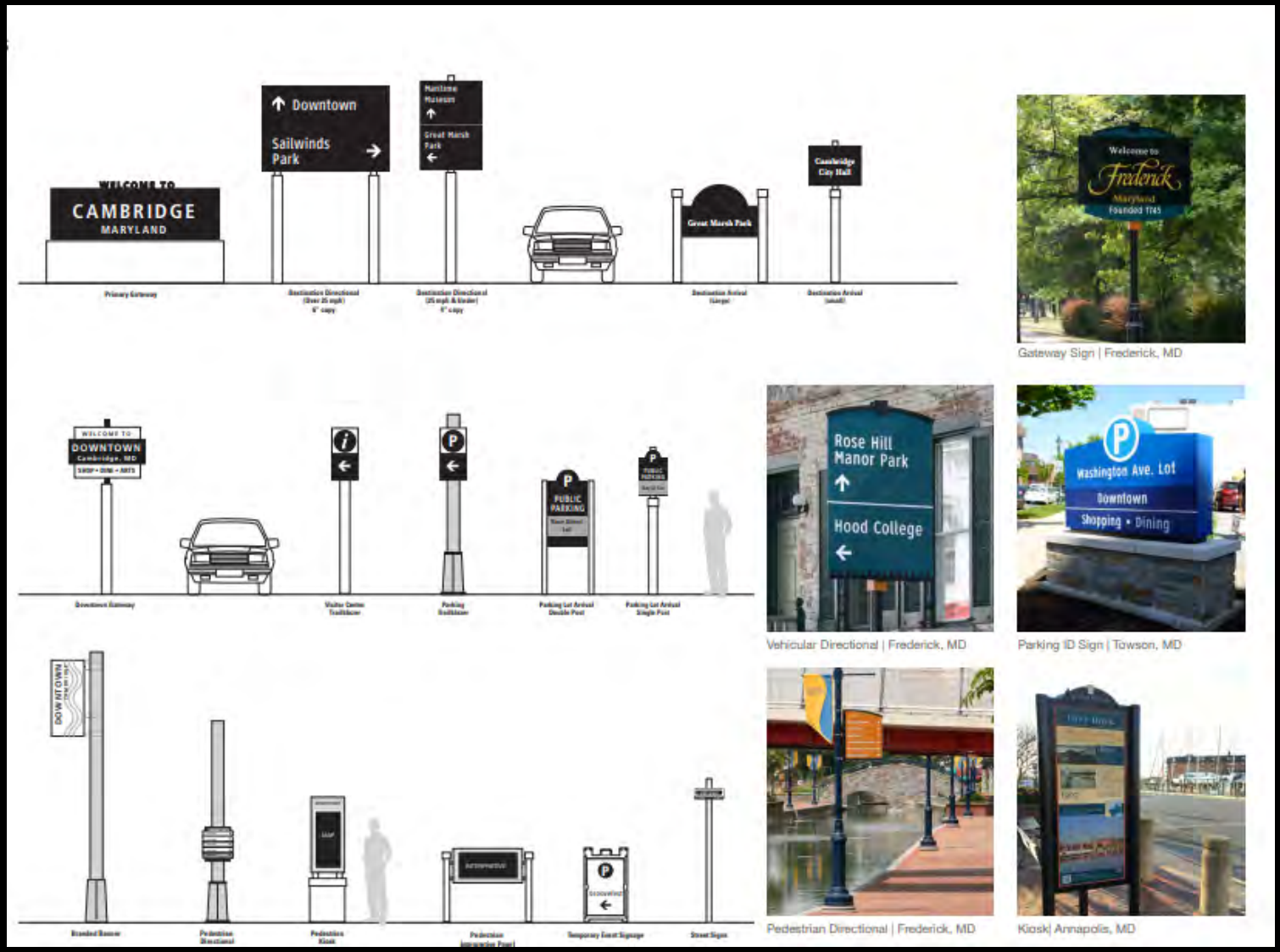
Cambridge Maryland Art and Entertainment

Cambridge Main Street Logo

Existing Signs in Cambridge



Potential Signs for Cambridge



Gateway Sign | Frederick, MD

Vehicular Directional | Frederick, MD

Parking ID Sign | Towson, MD

Pedestrian Directional | Frederick, MD

Kiosk| Annapolis, MD

Potential Signs for Cambridge

Street Sign in Desteranb, CA

Street Sign in New York, NY

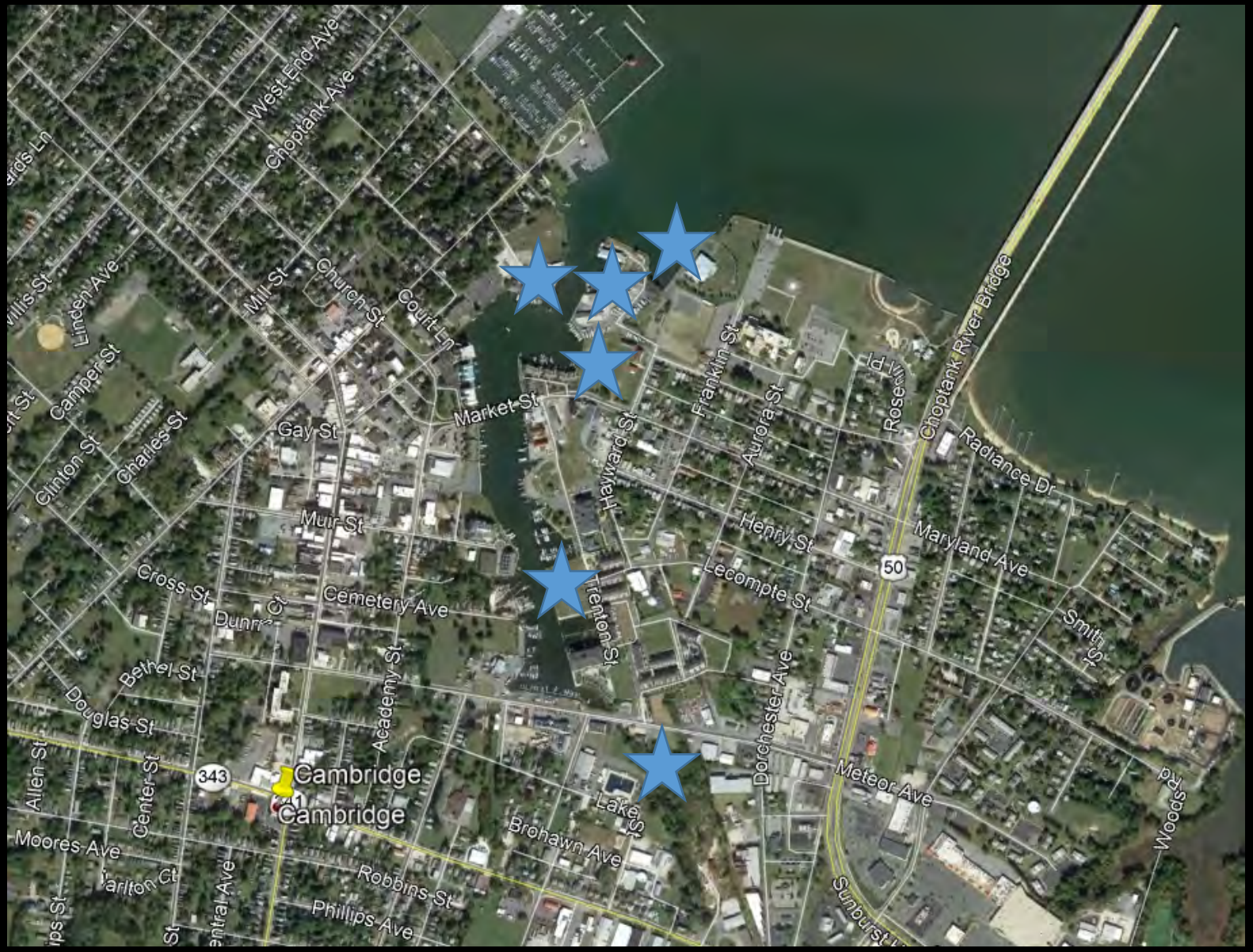
Water Related Developments

American Legion

Before

Afte

Cambridge Creek



The Wharf
John Brown
Cambridge Ship Yard
Clayton's
Richardson Museum
Pedestrian Path
Cambridge Creek
Cannery Park
Factory F

Wharf After Improvements

Events

The Historic Liberty Ship JOHN W. BROWN will visit Cambridge Maryland, August 5 to 11, 2018

****

Come Welcome her to Cambridge! Sailwinds Park - August 4 at 5pm

John Brown, Liberty Ship

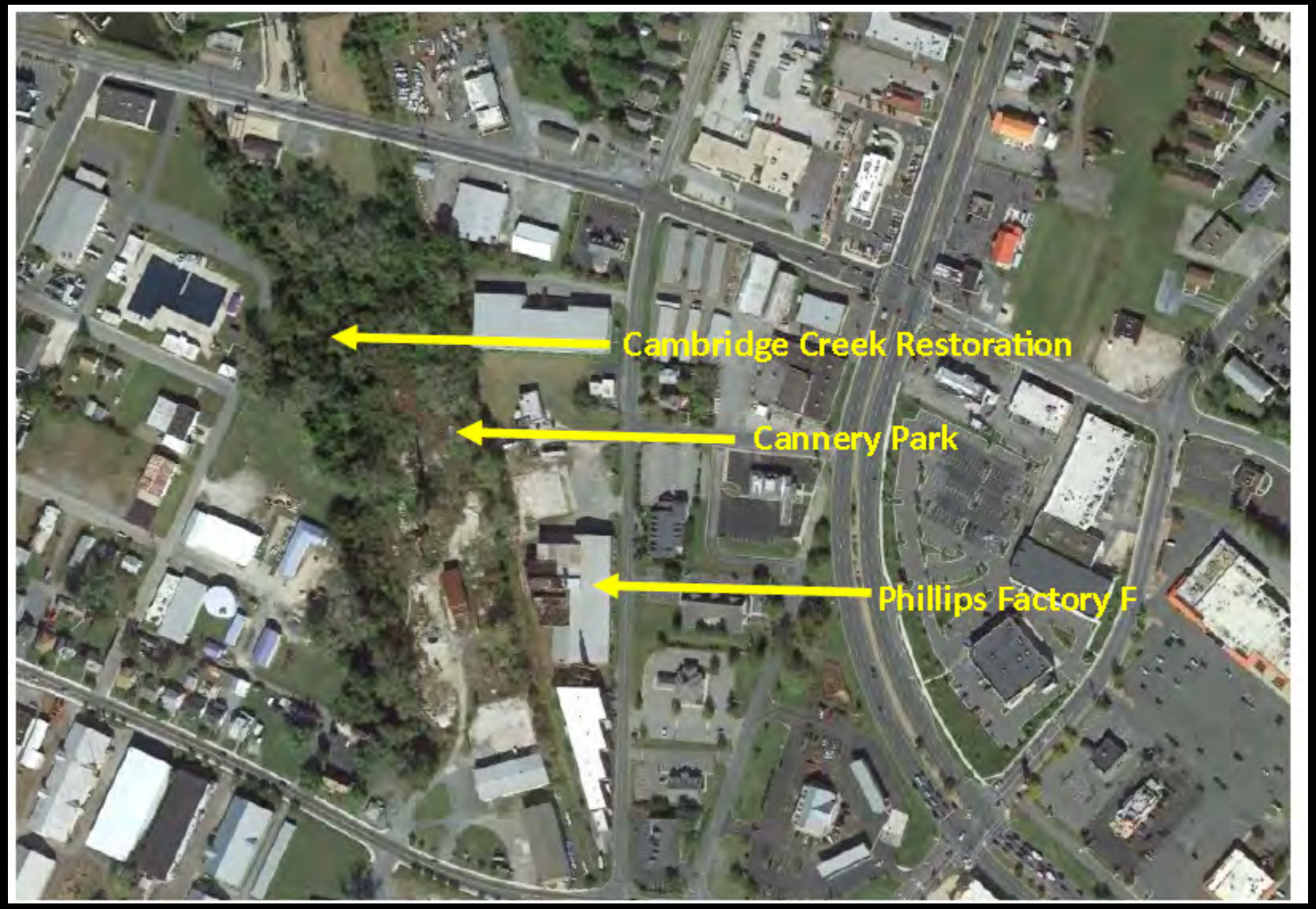
Cambridge Ship Yard, Inc.

JM Clayton's Mural

Richardson Museum

Creating Access from Market Street to Cedar Street

Proposed Pedestrian Path


Cambridge Creek Restoration
Cannery Park
Phillips Factory F

Cambridge Creek Stream Restoration

Cannery Park

Legend:

1. Packing House
2. Bicycle Trail
3. Event Lawn
4. Event Plaza
5. Smotestack Entry
6. Pavilion
7. Vegetable Garden
8. Skate Area
9. Playground
10. Nature Play
11. Boardwalk
12. Bridge
13. Nature Path
14. Dog Park
15. Volleyball Court
16. Fitness Stations
17. Connection to Virginia Avenue
18. Connection to Bohann Avenue

Phillips Factory F

VIEW FROM PARKING LOT

City of Cambridge

Questions?