

# Quantifying The Value of Delaware's Tidal Wetland Ecosystems

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# Ecosystem Services



The benefits people obtain from the natural processes occurring in ecosystems are called **ecosystem services**.



# Tidal Wetland Goods & Services



Water Quality Improvement



Carbon Storage



Extractive Resources



Coastal Protection



Ecologic



Aesthetic

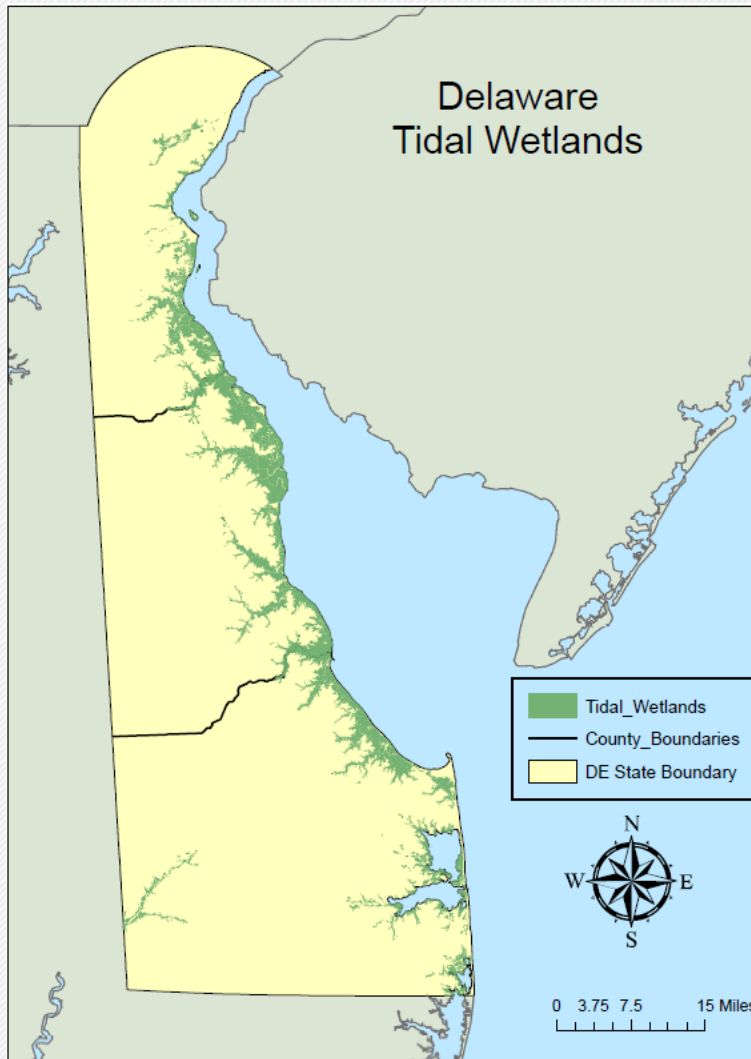


Recreation



Cognitive

# Current Status of DE Tidal Wetlands



- 25% of Delaware is wetland
- ~87,000 acres tidal (~320,000 total)

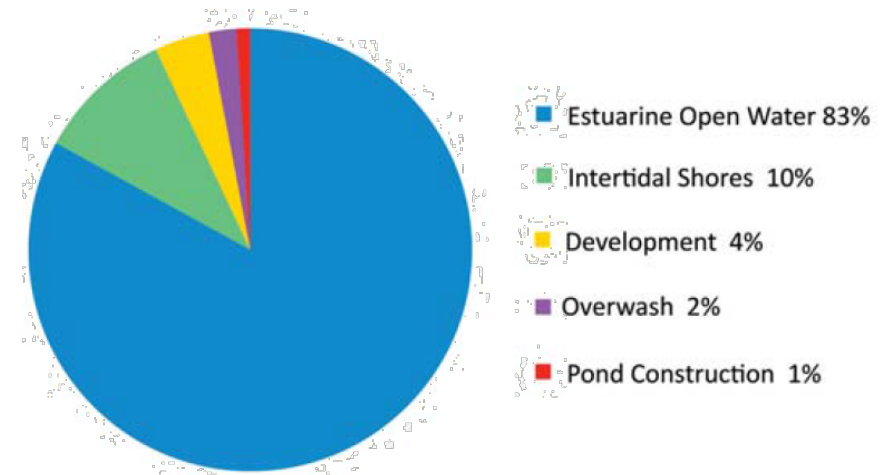


# Current Status of DE Tidal Wetlands



- Loss of 580 acres estuarine vegetated wetlands 1992-2007 (Tiner et al, 2011).
- 92% decrease brackish marsh, 14% increase estuarine open water under 69 cm SLR (NWF, 2008).
- 52% moderately stressed and 14 % severely stressed tidal wetlands in Murderkill watershed (Rogerson et al, 2013).

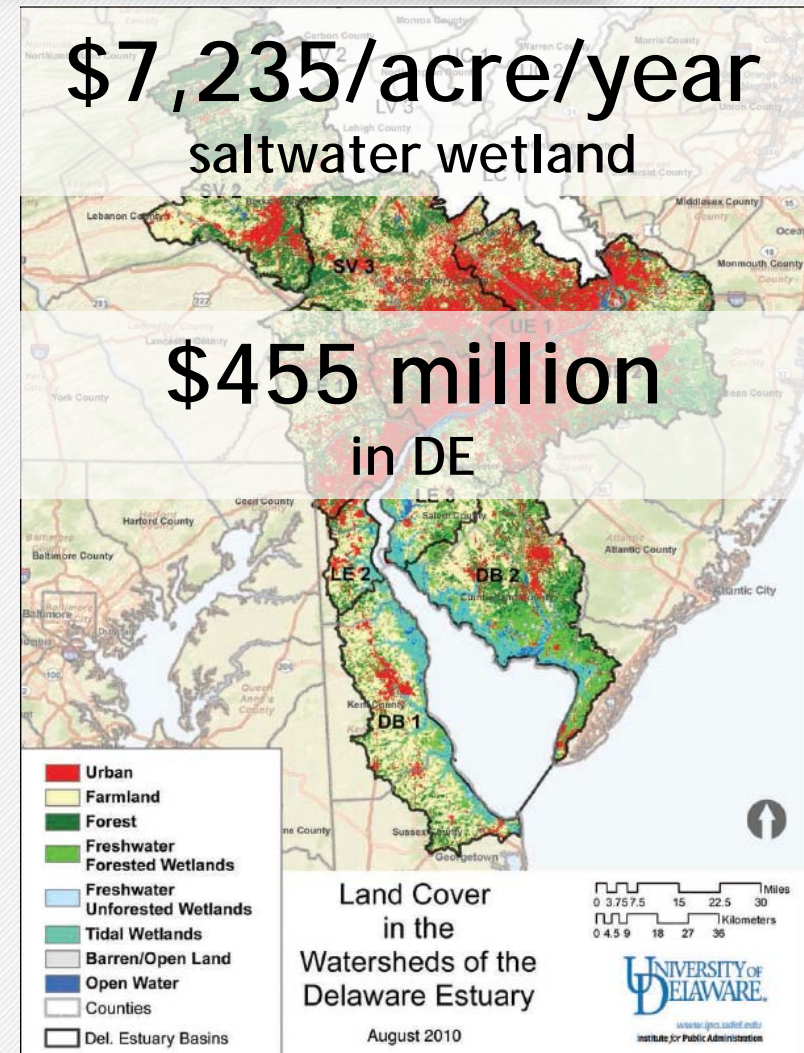
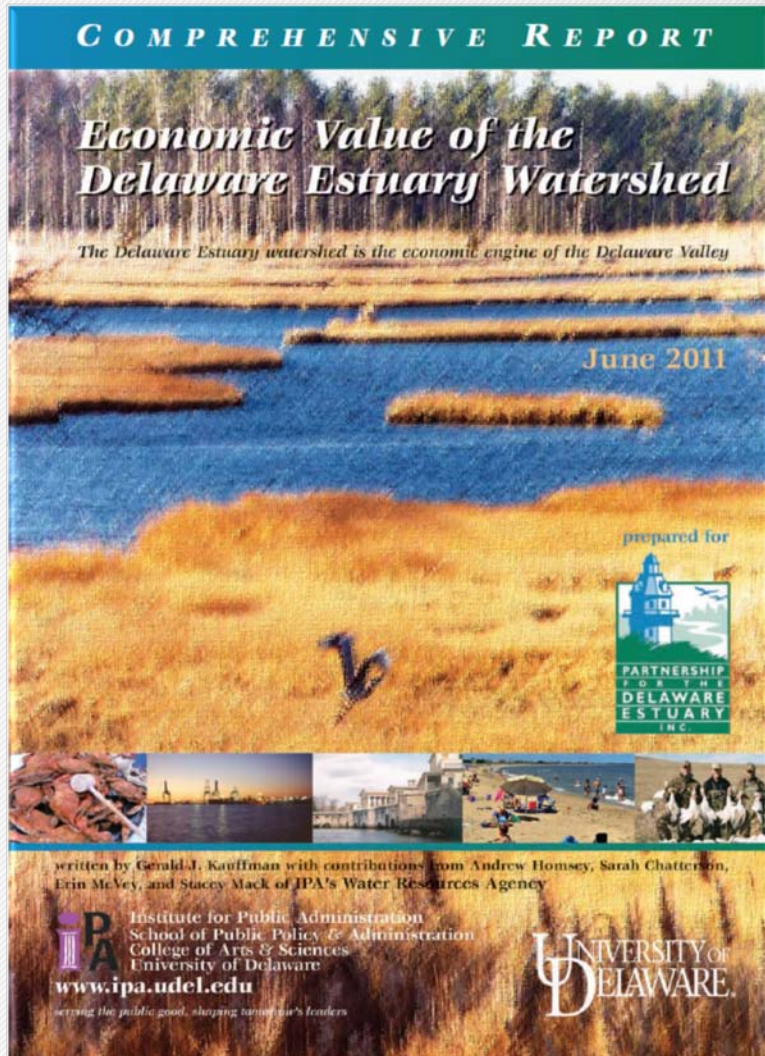
**Sources of Estuarine Wetland Losses**



**Figure 11. Proportion of gross estuarine vegetated wetland loss by source.**

Tiner et al, 2011

# Previous Studies





# Previous Studies



**\$19.9 million**  
Carbon Storage

Wetland Loss Locations 2007 - 2022

**\$9.67 million**  
Water Purification

**\$47,600-301,000**  
Coastal Storm Protection

Inland Bays/Atlantic Ocean

IEc

ECONOMIC VALUATION OF WETLAND  
ECOSYSTEM SERVICES IN DELAWARE

Final Report | June 2011

prepared for:

Delaware Department of Natural Resources and  
Environmental Control

Division of Water Resources

89 Kings Highway

Dover, DE 19901

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2067 Massachusetts Avenue

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# Research Goals



- Do DE residents want to protect tidal wetlands, and how much are they WTP?
- Which ecosystem services are priorities and what is the WTP for each?
- Use these values to leverage funding for wetlands protection and management
- Use priorities to help inform better management of existing wetlands












# Choice Valuation

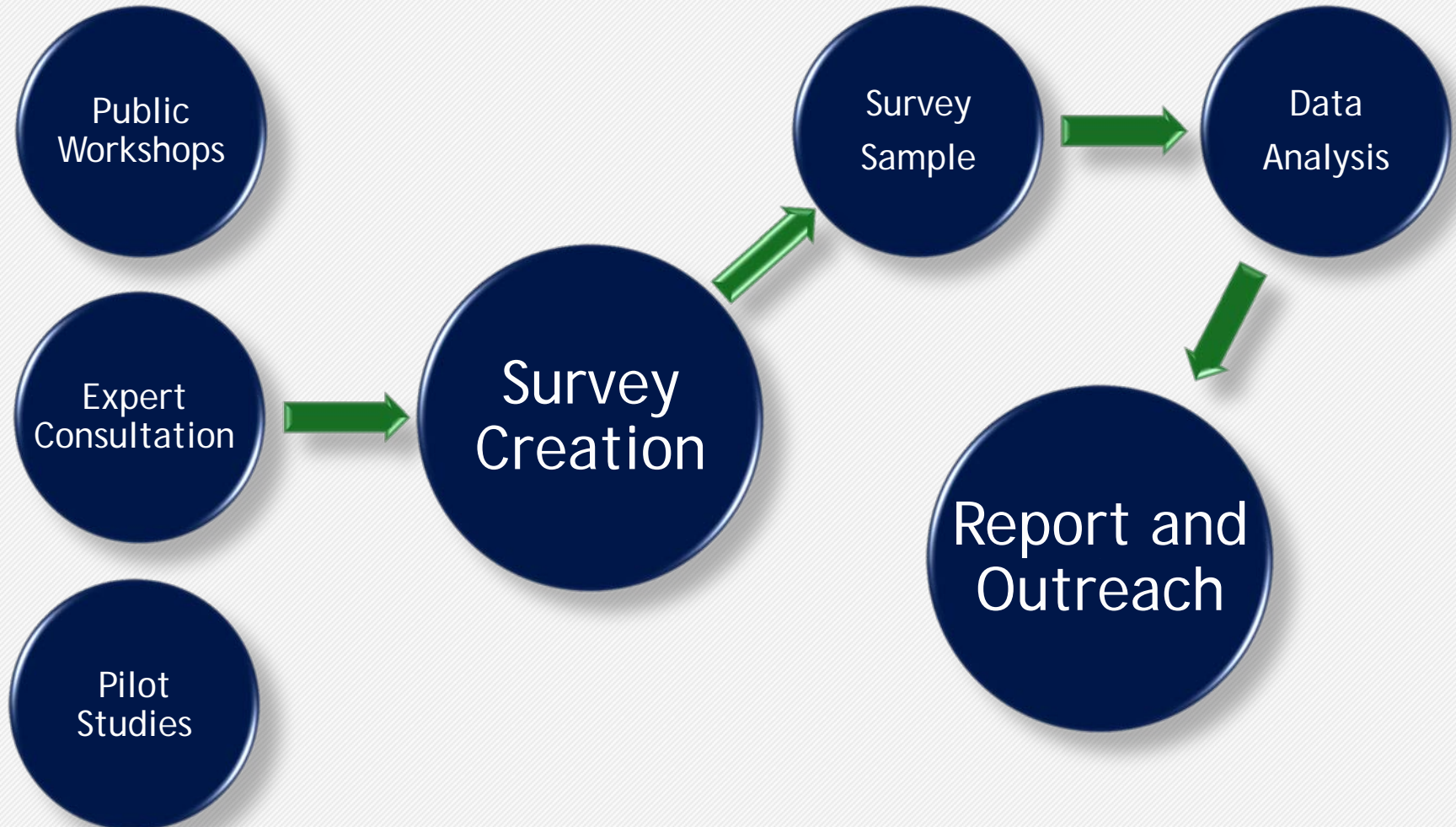


- Multiple ecosystem services
- Great for policy implications
- Allows for DE residents to voice how much they would actually pay

**Question 6.** Projects A and B are possible restoration projects for the Pawtuxet River, and the **Current Situation** is the status quo with no restoration. Given a choice between the three, how would you vote?

| Effect of Restoration  | Current Situation<br>(no restoration)                        | Restoration Project A                                   | Restoration Project B                                   |
|--|--|---|---|
| <br>Fish Habitat                        | 0%<br>0 of 4347 river acres accessible to fish               | 10%<br>450 of 4347 river acres accessible to fish       | 5%<br>225 of 4347 river acres accessible to fish        |
| <br>Migratory Fish                       | 0%<br>0 out of 1.2 million possible                          | 33%<br>395,000 out of 1.2 million possible              | 20%<br>245,000 out of 1.2 million possible              |
| <br>Catchable Fish Abundance            | 80%<br>116 fish/hour found out of 145 possible               | 80%<br>116 fish/hour found out of 145 possible          | 70%<br>102 fish/hour found out of 145 possible          |
| <br>Fish-Dependent Wildlife             | 55%<br>20 of 36 species native to RI are common              | 80%<br>28 of 36 species native to RI are common         | 65%<br>24 of 36 species native to RI are common         |
| <br>Aquatic Ecological Condition Score | 65%<br>Natural condition out of 100% maximum                 | 80%<br>Natural condition out of 100% maximum            | 70%<br>Natural condition out of 100% maximum            |
| <br>Public Access                     | Public <b>CANNOT</b> walk and fish in area                   | Public <b>CANNOT</b> walk and fish in area              | Public <b>CAN</b> walk and fish in area                 |
| <br>Cost to your Household per Year   | <b>\$0</b><br>Increase in Annual Taxes and Fees              | <b>\$5</b><br>Increase in Annual Taxes and Fees         | <b>\$5</b><br>Increase in Annual Taxes and Fees         |
| HOW WOULD YOU VOTE?<br>(CHOOSE ONE ONLY)   | <input type="checkbox"/><br>I vote for <b>NO RESTORATION</b> | <input type="checkbox"/><br>I vote for <b>PROJECT A</b> | <input type="checkbox"/><br>I vote for <b>PROJECT B</b> |

# Moving Forward



# Thank You!

- NOAA Office For Coastal Management
- Tridec Technologies
- Bob Scarborough, Bonnie Arvay, Carl Yetter  
Delaware Coastal Programs, DNREC
- George Parsons  
University of Delaware
- Rob Johnston  
Clark University, Worcester MA
- Pete Wiley  
NOAA
- Ian Yue  
NOAA Coastal Management Fellow, Connecticut





# Questions?

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