Valuing Ecosystem Services in the Narragansett Bay Watershed

EPA Southeast New England Program for Coastal Watershed Resiliency





natural capital



COASTAL INSTITUTE









The Narragansett Bay Watershed

- Home to ~2 million people
- 60% MA, 40% RI
- Dramatic reductions in pollution by wastewater treatment facilities – now other challenges
 - NBEP State of the Narragansett Bay and its Watershed report

Project Elements & Roles



Valuation of economic sectors <u>nbweconomy.org</u>





Modeling of land use changes, sediment/ nutrient transport, wellbeing changes & value



SNEP Ecosystem Service Valuation Database

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Project organization, stakeholder outreach, materials, literature review Mass Audubon



NBW Economy Project





- Economic values of 13 sectors in NBW, most underpinned by natural resources
- Future threats for each industry, especially climate change



nbweconomy.org

NBW Economy Project







Total annual revenue: \$13.8 billion (2016 US dollars)

Total annual employment: 97,298







CRC COASTAL RESOURCES CENTER

Example: Tourism



Land Use and Water Quality Modeling

- Harvard Forest potential development scenarios – forest cover by 2060
 - "Connected Communities" 46%
 - "Growing Globally" 22%
- Used InVEST to model pollution retention benefits of land for water quality
 - If all natural areas are converted to development, significant changes in bacteria levels – no longer fishable/swimmable



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Land Use and Water Quality Modeling

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- Zone 1 & 2 different oceanographic conditions
- Willingness to Pay (WTP) for maintaining water quality improvements in the Bay:
 - \$44 and \$59/year/household \$30 and \$50 million total



Literature Review





Type of Ecosystem Providing Service



Literature Review





Ecosystem Service Measured



Five Ecosystem Services Fact Sheets

Forests | Grasslands and Farmland | Coastal |

Wetlands & Waterways | Urban

Carbon Capture & Sequestration

Flood Mitigation

Air and Water Quality

Recreation

Food and Other Goods (ex: forestry) Other Human Health (ex: heat mitigation)

Social and Cultural (ex: indigenous value)

Wildlife Value



massaudubon.org/lidfactsheets

Literature Review



Wetlands & Waterways

- Wetlands hold between 20 and 30% of global soil carbon despite occupying 5-8% of its land surface. Wetlands of the Eastern Mountains and Upper Midwest (includes New England) store the most carbon, accounting for nearly half of the wetland C in the US. (Nahlik and Fennessy 2016)
- Otter Creek floodplains and wetlands in Middlebury, VT: damage reductions of 54-78% across 10 flooding events. Annual value of flood mitigation services may be as high as \$450,000. (*Watson 2016*)



Wetlands & Waterways, cont.

• The Massachusetts Department of Ecological Restoration protects rivers, wetlands, and watersheds in MA. Their projects provide a 75% return on investment. Restoring the Muddy Creek Watershed in Chatham and Harwick, MA to remove 45.1% of nitrogen was about half the cost of equivalent sewering (\$3.6 million vs. \$7.5 million). (MA DER 2014)

Contact & Website



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