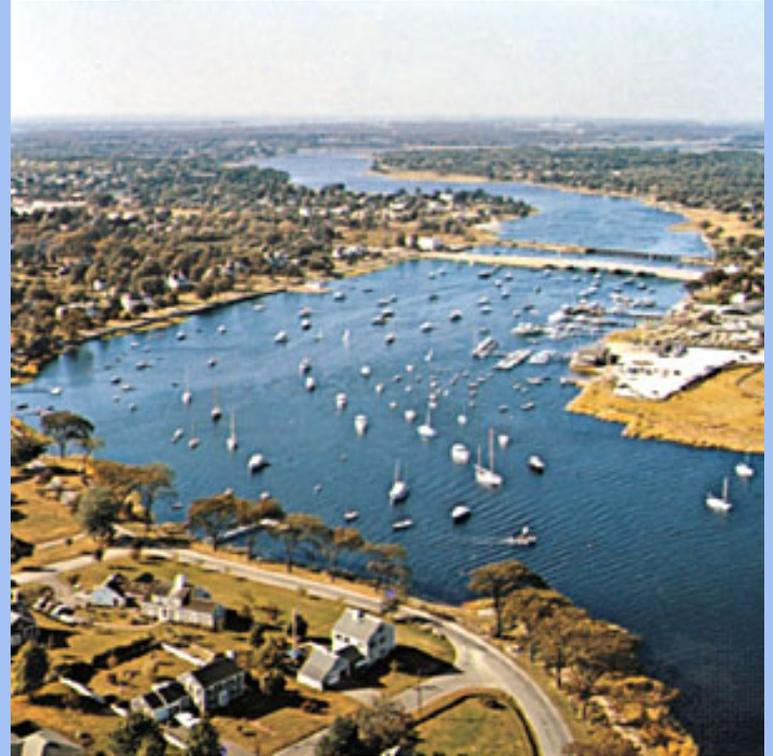


# **Narragansett Environmental Action Team (N.E.A.T.)**

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Timothy Lyons

# Overview:

- Mission Statement
- History and Characteristics
- Population
- Land Use
- Water Use
- Environmental Problems
- Existing Organizations
- Problems and Solutions



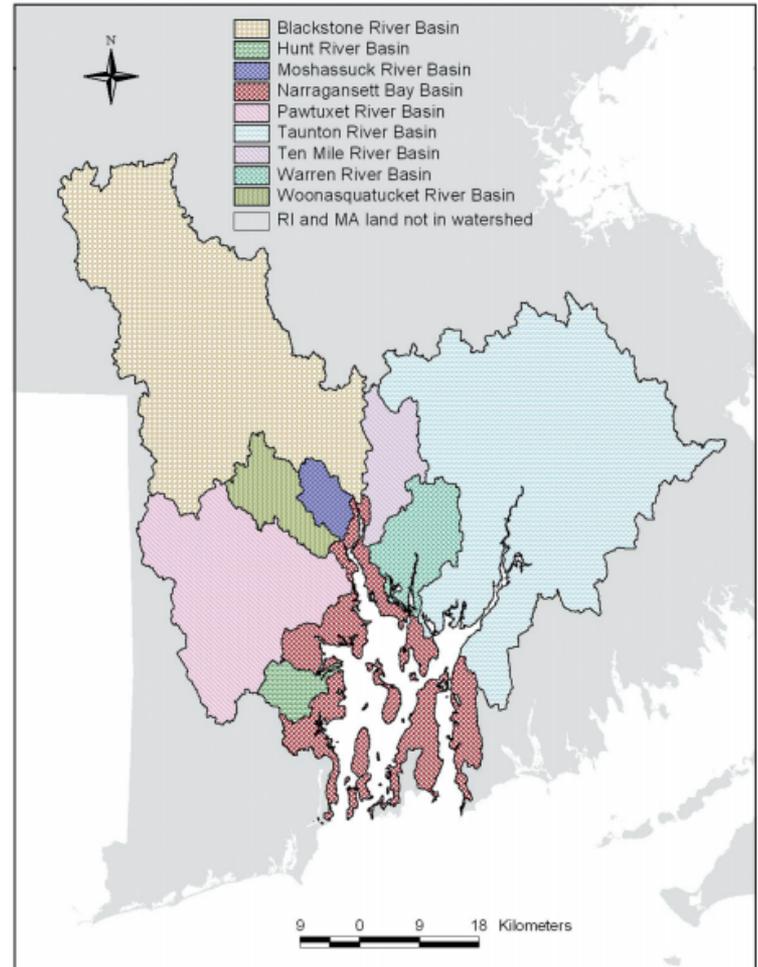
# Mission Statement:

The Narragansett Bay is important economically, aesthetically, recreationally, and environmentally to Rhode Island and Massachusetts. With that in mind, it is important that the health of the Narragansett Bay watershed be maintained. The Narragansett Environmental Action Team (N.E.A.T.) plans to reduce pollutants such as phosphorus, and bacteria by 50% by the year 2025.



# History

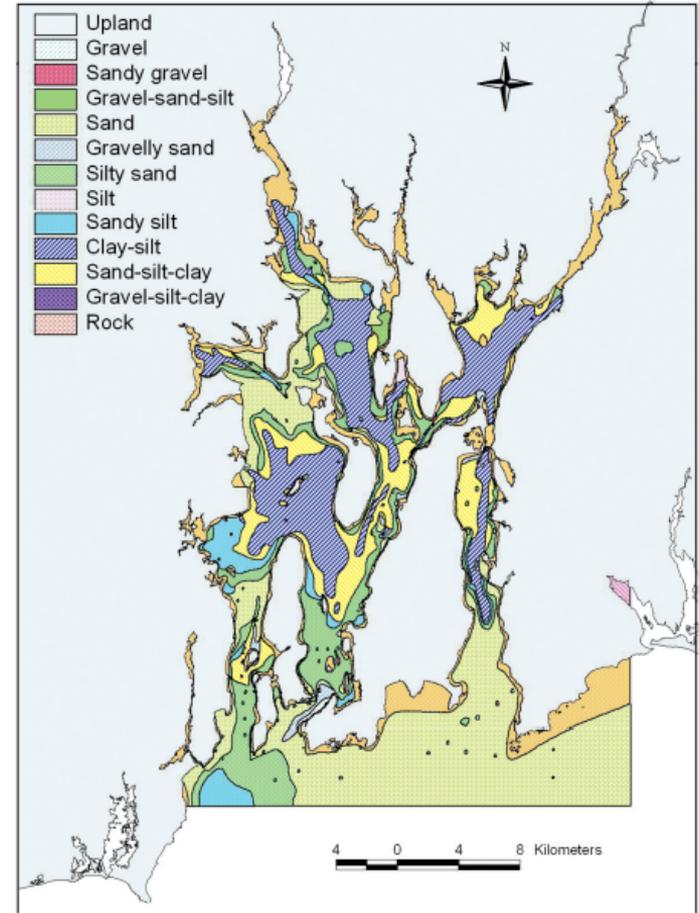
- Covers 147 square miles in Rhode Island and parts of Massachusetts
- Over 40 islands
- New England's largest estuary
- "ria" → a drowned river valley that remains open to the sea
- Shape comes from glacier movement about 18,000 years ago
  - New sediments to expose older bedrock
  - Carved out channels that flow into the Bay
- First settlement by Europeans in 16th century



**Figure:** Narragansett Bay Watershed & Subwatershed Basins

# Characteristics

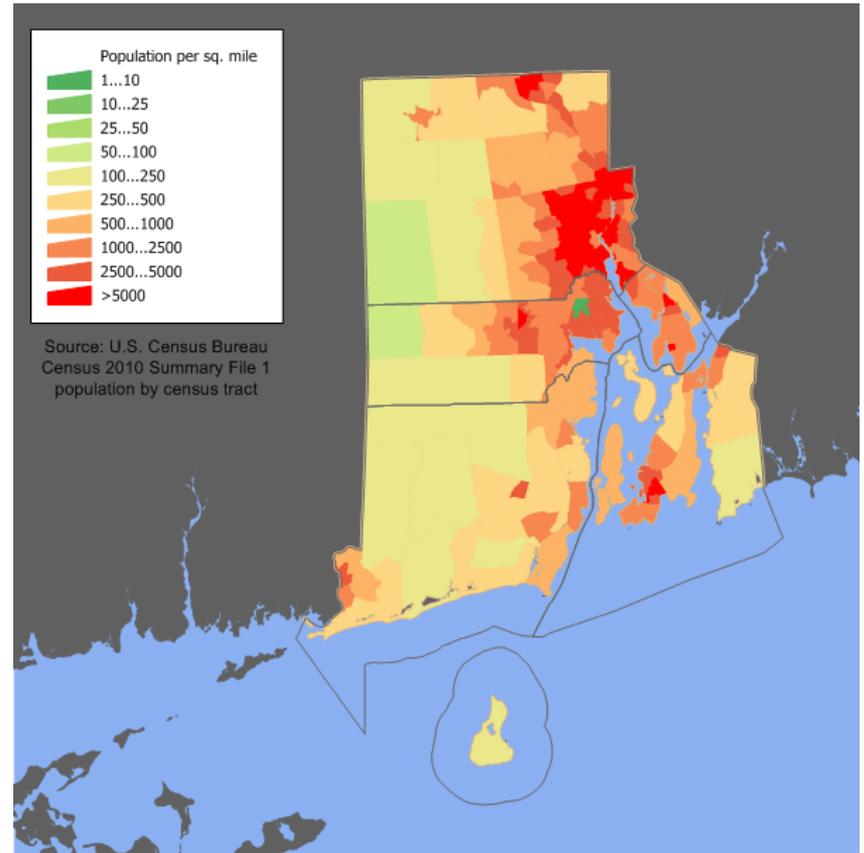
- Watershed area: 4,674 square kilometers
- 7 sub-drainage basins:
  - Warren, Woonasquatucket, Ten Mile, Taunton, Moshassuck, Pawtuxet, Hunt River and Blackstone
- Average depth = ~9.0 meters
- Water temperature range
  - 0.5 - 24 degrees Celsius
- Semidiurnal tides - 2 tides per day
  - 1.1 meters at head
  - 1.4 meters at mouth
- 11 different types of sediments recorded throughout Bay



**Figure:** Sediments of Narragansett Bay

# Population

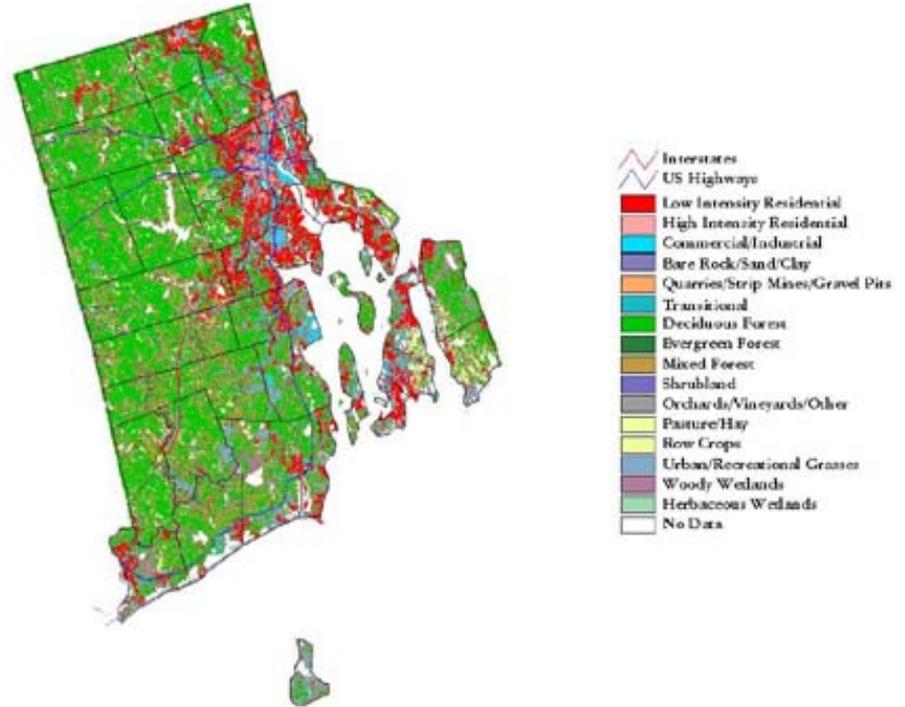
- 2 million people
- Congregated around the bay→ heavily towards the upper part of the bay
- Most populated around the city of Providence



**Figure:** Population Density in Rhode Island (2010)

# Land Use

- Forested but in the regions closest to the Bay, the land becomes residential and commercial
- Land surrounding was mostly undeveloped
  - Small communities surrounded by rural areas
- Now densely populated
- Chemicals and fertilizers are more abundant in these parts
  - Runoff eventually leads to anoxia in the bay



**Figure:** Land Use in Rhode Island

# Water Use

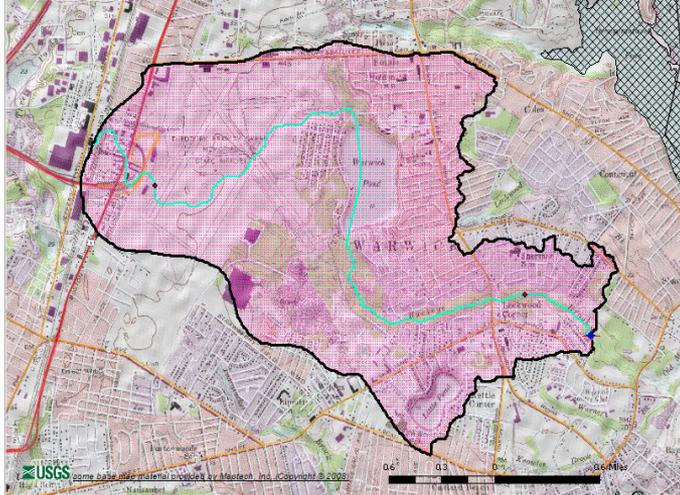
- Wastewater and Stormwater Pollution and Control
  - Municipal and Regional Wastewater Facilities
  - Septic Systems
- Recreation and commercial industry
- Sailing races from Newport like the America's Cup
  - Volvo Ocean Race
- Shellfish industry
  - Clams, oysters and mussels are indigenous to the Bay
  - Filter feeders help filter many gallons of water everyday which helps improve the watershed and the Bay



# Environmental Problems:

## Buckeye Brook:

- Tributary creek of the Narragansett Bay
- Surrounded by residential and commercial areas
- Contamination from Fecal Coliform and Enterococci
  - Affects safe swimming and shellfishing



**Figure:** Buckeye Brook Watershed Area

<b>Narragansett Basin</b>	
<b><u>Barrington River</u></b>	Fecal Coliform
<b><u>Belleville Ponds</u></b> Belleville Ponds Belleville Upper Pond Inlet	Phosphorus
<b><u>Buckeye Brook Watershed</u></b> Buckeye Brook Lockwood Brook Parsonage (Knowles) Brook Warner Brook Old Mill Creek estuary Tributaries to Warwick Pond	Fecal Coliform and Enterococci
<b><u>Eutrophic Ponds</u></b> Brickyard Pond Gorton Pond Warwick Pond	Phosphorus
<b><u>Greenwich Bay</u></b> Apponaug Cove Brush Neck Cove Buttonwoods Cove Greenwich Cove Warwick Cove Baker Creek Dark Entry Brook Gorton Pond Trib Greenwood Creek Hardig Brook and Tribs Maskerchugg River Mill Brook Saddle Brook Southern Creek (Carpenter Brook) Tuscatucket Brook	Fecal Coliform
<b><u>Hunt River</u></b>	Fecal Coliform
<b><u>Fry Brook</u></b>	Fecal Coliform
<b><u>Scrabbletown Brook</u></b>	Fecal Coliform
<b><u>Kickemuit River</u></b> Upper Kickemuit River Kickemuit Reservoir	Fecal Coliform Phosphorus
<b><u>Mount Hope Bay and the Kickemuit River Estuary</u></b>	Fecal Coliform
<b><u>Palmer River</u></b>	Fecal Coliform
<b><u>Runnins River</u></b>	Fecal Coliform
<b><u>Stafford Pond</u></b>	Phosphorus

**Table:** Pollutants within Narragansett Basin

# Impervious Land

- Water applied to the ground is unable to be filtered naturally through the soil before reaching the Narragansett Bay
- Impervious land acts as a funnel to the Bay
  - Rinsing any pollutant directly into the Bay or nearby streams.

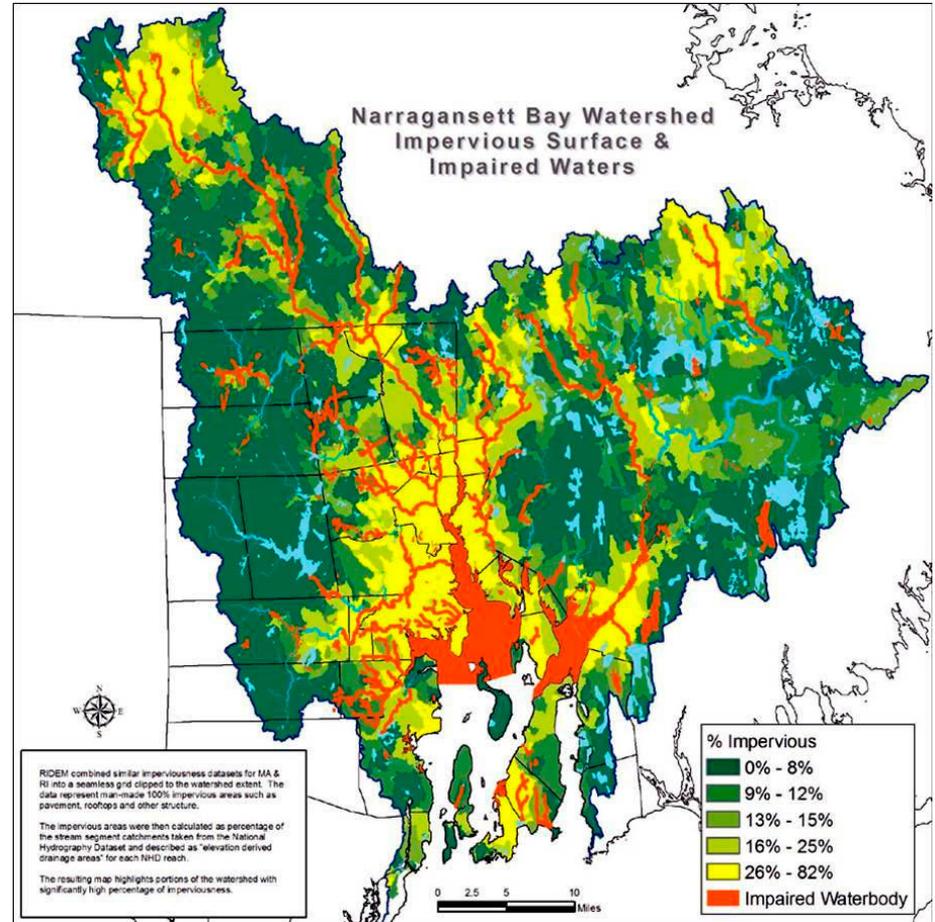


Figure: Impervious Land Areas around Narragansett Bay

# Existing Programs & Organizations

## Organizations:

- Narragansett Bay Estuary Program (NBEP)
- Save The Bay
- Narragansett Bay Commission
- Narragansett Bay National Estuarine Research Reserve (NBNERR)
- New England Interstate Water Pollution Control Commission (NEIWPC)
- EPA's National Estuary Program
- Rhode Island Department of Environmental Management (RIDEM)
- Massachusetts Water Pollution Control Association (MWPCA)

# Problems

<b>Problem</b>	<b>Result</b>	<b>Cause</b>
P.1 Eutrophication	Dense algal blooms	excessive nutrients (nitrogen and phosphorous) from stormwater runoff, waste water treatment plants, cesspools and septic plants, industry, and impervious land
P.2 Rising Water Temp/ Sea Level Rise	Coastline retreats and beach erosion	climate change is causing ocean temperatures to rise
P.3 Hypoxia	Low dissolved oxygen occurring especially during the summer months	excess nitrogen entering the upper Bay
P.4 Pollutants	Pharmaceuticals, mercury, lead, zinc, copper, and other heavy metals in the water	stormwater runoff, waste water treatment plants, cesspools and septic plants, industry, and impervious land
P.5 Invasive Species	Disturbance of native flora and fauna, native species outcompeted for space and sources of food	arrive via ballast water from shipping containers, sometimes introduced as a result of expanding ranges due to changes in water temperature and salinity

<b>Problem</b>	<b>Goal</b>	<b>Solutions</b>
P.1 Eutrophication	G.1 Reduce the amount of excess nutrients entering the Bay to reduce eutrophication	S.1 Narragansett Bay Commission to help reduce the pollution from industry by updating water treatment plants and removing unnecessary pavement, and installing rain gardens
P.2 Rising Water Temp/ Sea Level Rise	G.2 Prevent the beach from further erosion	S.2 Begin to move industry inland, reduce carbon emissions to help with climate change
P.3 Hypoxia	G.3 Reduce the amount of nitrogen entering the Bay	S.3 Legislation to reduce the amount of nitrogen entering the water via major RI and MA waterways
P.4 Pollutants	G.4 Reduce the amount of pollutants the enter the Bay via stormwater runoff, waste water treatment plants, and industry	S.4 Narragansett Bay Commission to help with industry pollution by updating water treatment plants, and removing unnecessary pavement, and installing rain gardens
P.5 Invasive Species	G.5 Prevent new invasive species from entering the Bay and eradicate already existing invasive species	S.5 Federal laws to control the introduction and outbreak, Rapid Assessment Surveys to collect data and analyze the situation