

N.E.A.T.

Narragansett Environmental Action Team



Report by:

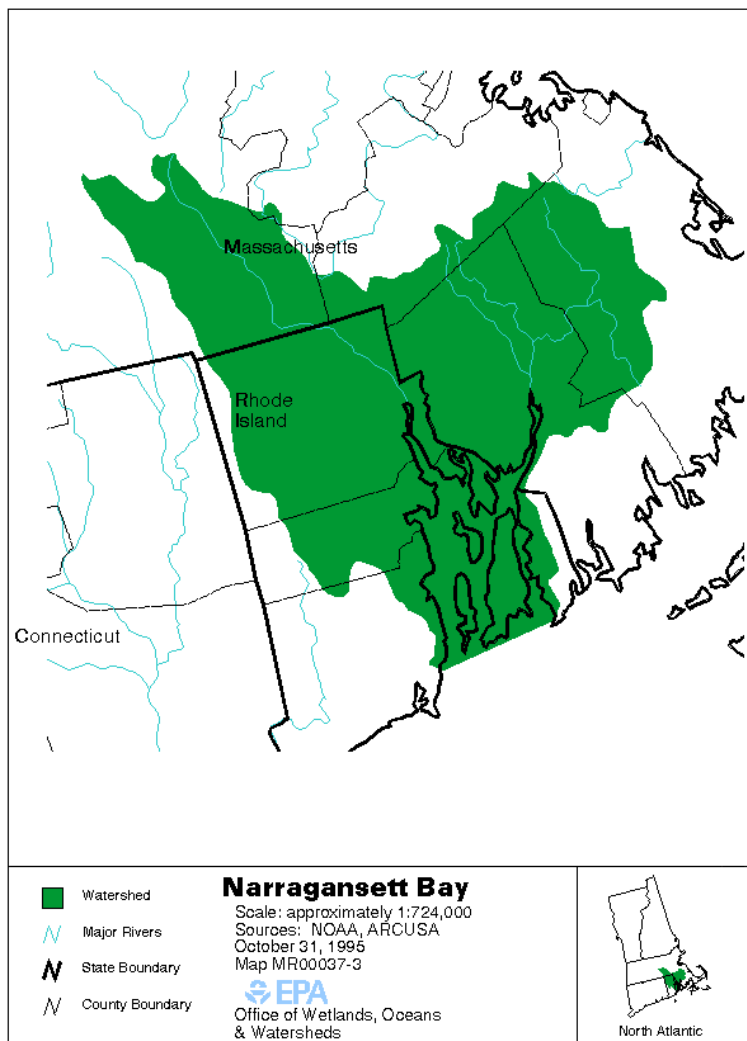
Elizabeth Omenitsch, Andrea Miller, Maeve Crimmins, Jessica Anton
Timothy Lyons

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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.

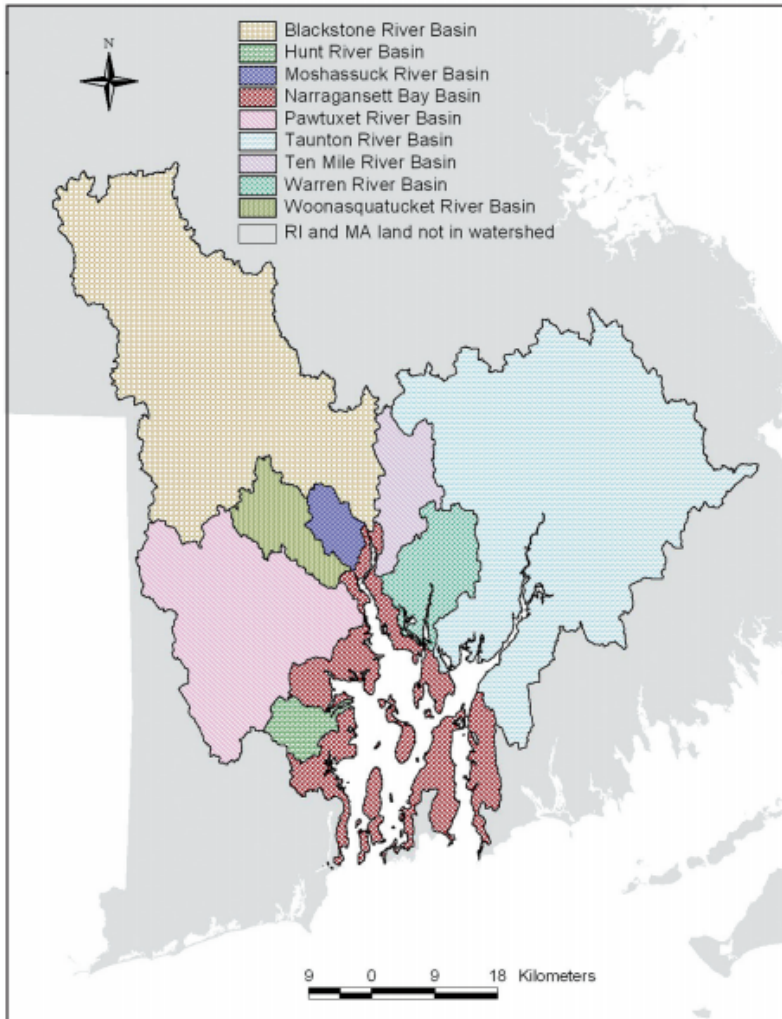


(Figure 1) Narragansett Bay Watershed area

About the Bay:

History & Characteristics:

Narragansett Bay is an estuary that covers 147 square miles in Rhode Island and parts



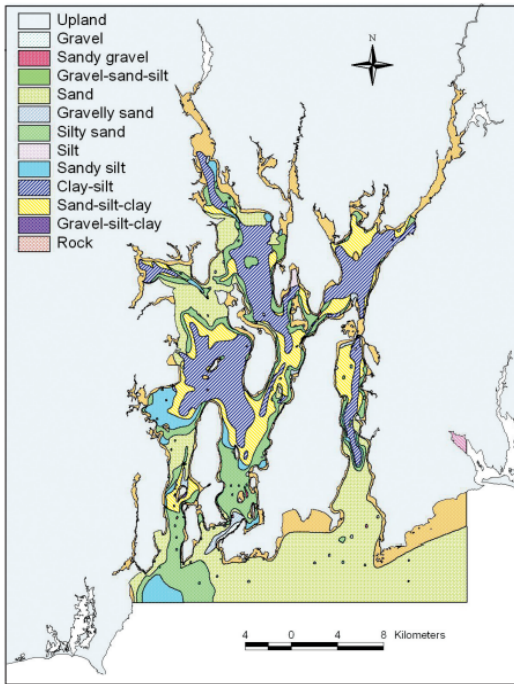
(Figure 2) **Narragansett Bay Watershed and Subwatershed Basins**

of Massachusetts. The area of the watershed is 4,674 square kilometers. It is New England's largest estuary and acts as a natural harbor, obtaining a small archipelago of over 40 islands. The Bay is known as a ria, which is a drowned river valley that remains open to the sea; it opens to the sea on the Rhode Island Sound. The first settlement by Europeans occurred in the sixteenth century while there were two groups of natives occupying the land surrounding the Bay, the Narragansetts on the West and the

Wampanoag on the East.

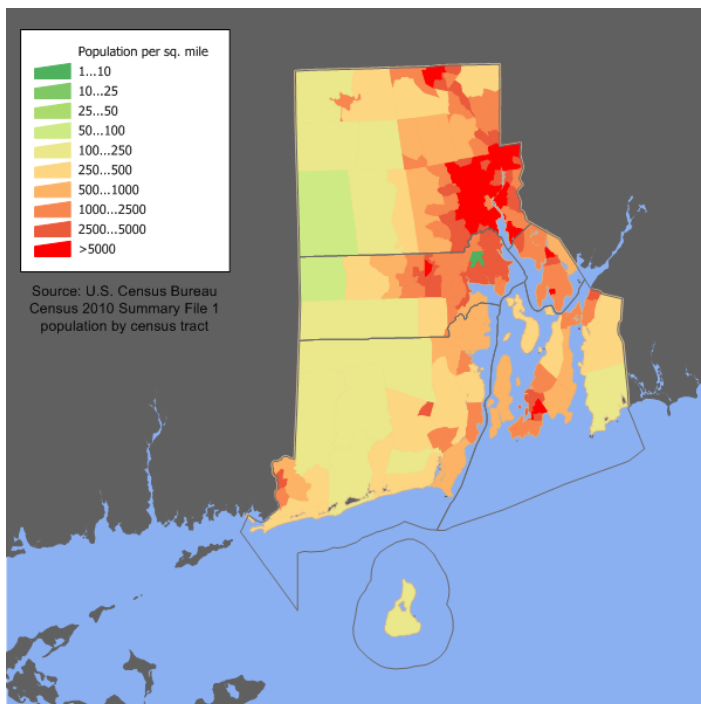
The current shape of the Narragansett Bay is the result of the most recent glacier movement approximately 18,000 years ago. The ice retreated around 14,000 years ago,

causing new sediments to expose older bedrock, which carved out channels that flow into the Bay. The ice also left continental shelf exposed, creating some of the islands, such as Block Island. Narragansett Bay has seven sub-drainage basins: Warren,



(Figure 3) Sediments of Narragansett Bay

Woonasquatucket, Ten Mile, Taunton, Moshassuck, Pawtuxet, Hunt River and Blackstone. The average depth of the bay is approximately 9.0 meters throughout. Tides in the Bay are semidiurnal, meaning there are two tides per day, with the average being approximately 1.1 meters near the mouth of the Bay and approximately 1.4 meters near the head. The water temperature ranges from 0.5 degrees to 24 degrees Celsius. There are eleven different types of sediments found throughout the Bay, including gravel, sand, clay, and rock.



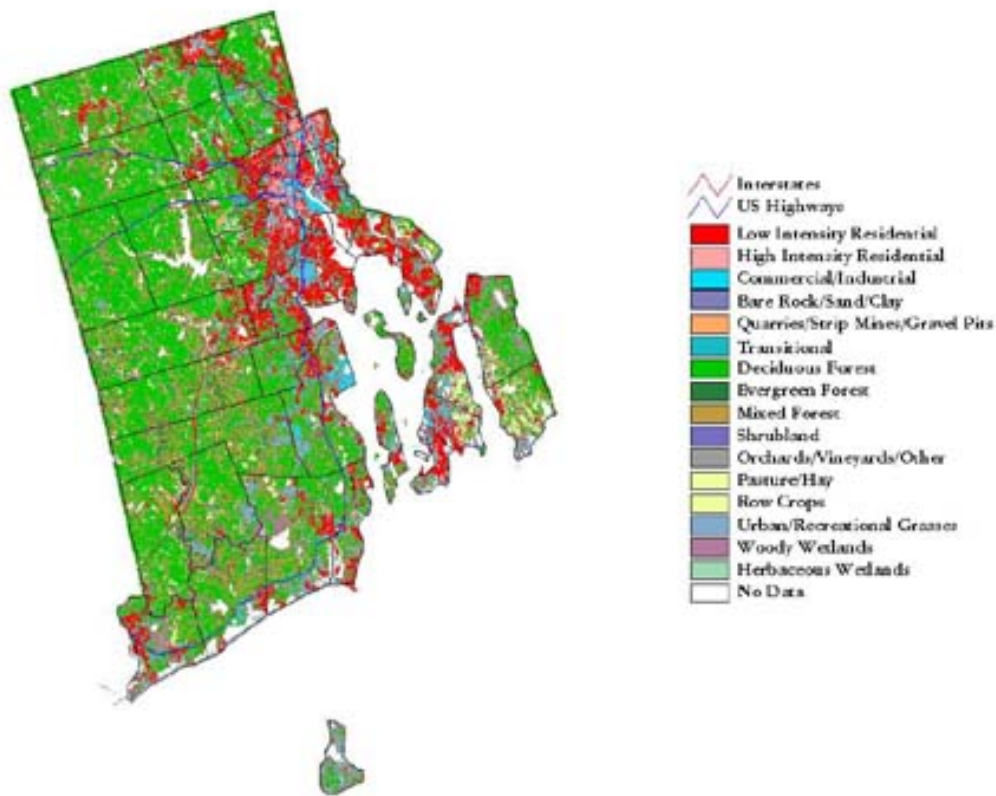
Population:

The Narragansett Bay region is home to nearly two million people. Most of Rhode Island’s population is congregated around the bay, more heavily towards the upper part of the Bay, coincidentally the most endangered region of the Bay.

(Figure 4) Population density of Rhode Island (2010)

Land Use:

Most of Rhode Island's land is forested but in the regions closest to the Bay the land becomes residential and commercial. Most of the residential land in the area is densely populated, increasing the risk of pollution to the Bay. Chemicals and fertilizers are more abundant in these parts, causing runoff that eventually leads to anoxia in the Bay. In the past the land surrounding the Bay was mostly undeveloped, with small communities surrounded by rural areas.



(Figure 5) Land Use in Rhode Island

Water Use:

The waters of Rhode Island's Narragansett Bay are used heavily for both recreation and commercial industry. The Narragansett Bay is known for its illustrious sailing races from Newport, such as the America's Cup, which was held there until 1983. This popular competition gave the port a reputation as a sailing mecca. Newport now hosts the Volvo Ocean Race, which brings thousands of tourists to the area. It is home the shellfish industry, which is one of the Bay's most iconic species. Clams, oysters and mussels are indigenous to the Bay and recently with the restoration of the local waters, scallops are beginning to make a comeback. These filter feeders help filter many gallons of water everyday, which helps improve the water quality of the watershed and the Bay. On the contrary, as the animals filter pollutants out of the water such as the toxic metals and sewage, they aren't able to be consumed. Organizations such as Save the Bay work with local and federal agencies to help restore rivers in the watershed. Removing dams is one project Save the Bay is working on, and it will help restore the river's natural flow and ecological habitats.

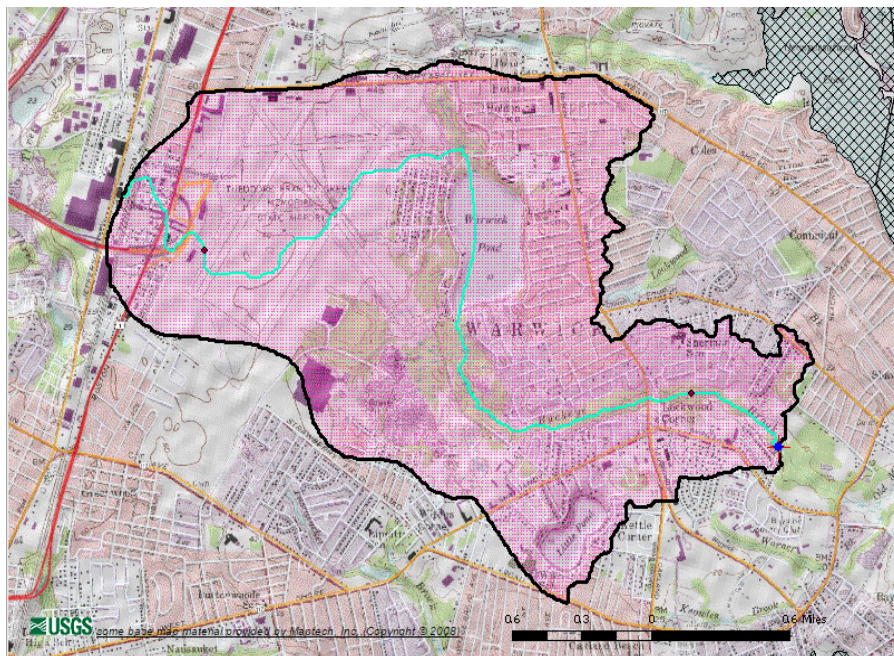
Another very large part of the water use is the treatment of wastewater and disposal along with stormwater pollution control. Municipal and regional wastewater plants treat the water for metals, bacteria and nutrients like phosphorus. There are nineteen publicly owned treatment plants in Rhode Island and sixteen in Massachusetts which all contribute treated water into the watershed. The treated water is then disposed into rivers and the bay through pipes. The four largest plants are Fields Points in Providence, Bucklin Point in East Providence (which are both located in the largest

city of Rhode Island), the Upper Blackstone Water Pollution Abatement District in Worcester, and Brockton Advanced Water Reclamation Facility in Brockton Massachusetts. Cesspools have also become a large problem with 25,000 homes in Rhode Island disposing of waste through pipes directly into the ground, which has a direct impact on the watershed.

The pollution in the Narragansett Bay watershed impacts its water and marine life along with the livelihood of people and quality of life. By helping to restore some of the local rivers and other coastal habitats, it will provide a segway into creating a healthier and more sustainable watershed.

Environmental Concerns and Problems:

Polluted section of Narragansett Bay Watershed: Buckeye Brook



(Figure 6) **Buckeye Brook Watershed Area**

Buckeye Brook is a tributary creek of the Narragansett Bay watershed and is suffering from contamination from Fecal Coliform and Enterococci. The land making up the watershed is mostly residential and commercial. There is a small section of forest immediately surrounding the brook but data provided by StreamStats noted that the area is mostly urban land use.

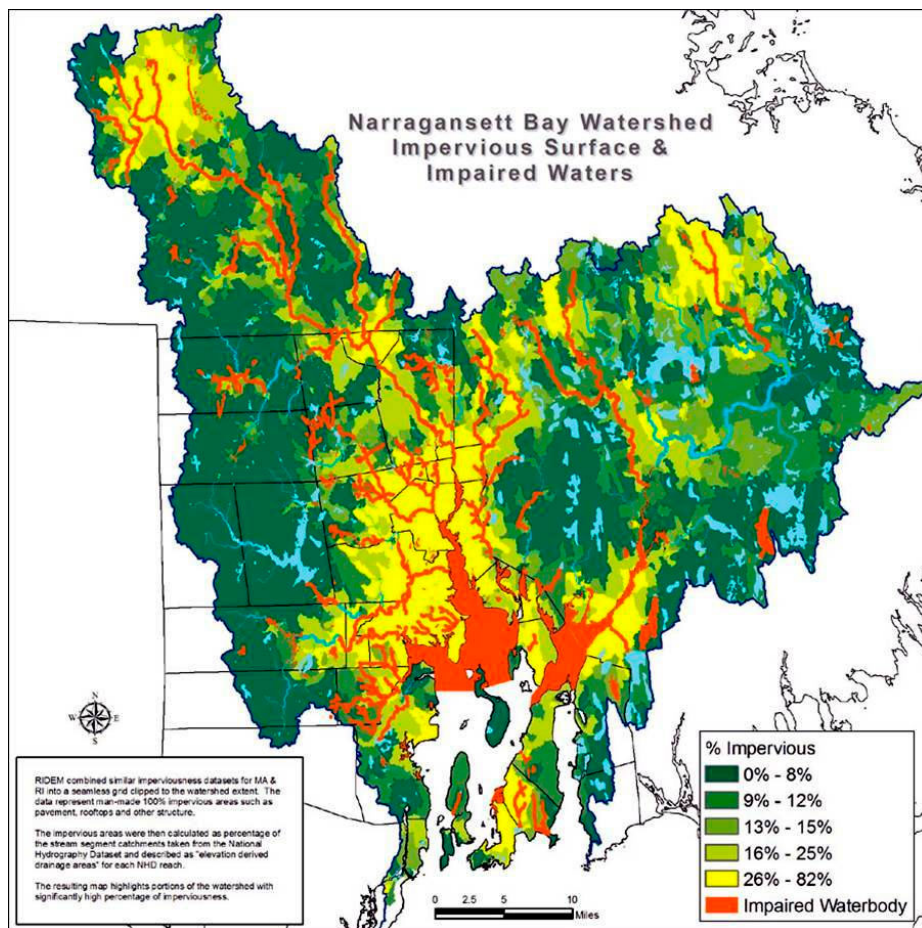
This is not uncommon of the Narragansett Bay watershed. Table 1 below shows the pollutants of many other tributaries to the Narragansett Bay. The pollutants include Fecal Coliform, Enterococci, and Phosphorus. The main concerning pollutants are Fecal Coliform Enterococci because they are a factor in water quality, affecting the ability to have safe swimming and shellfishing.

(Table 1) **Pollutants within Narragansett Basin**

Narragansett Basin	
Barrington River	Fecal Coliform
Belleville Ponds Belleville Ponds Belleville Upper Pond Inlet	Phosphorus
Buckeye Brook Watershed Buckeye Brook Lockwood Brook Parsonage (Knowles) Brook Warner Brook Old Mill Creek estuary Tributaries to Warwick Pond	Fecal Coliform and Enterococci
Eutrophic Ponds Brickyard Pond Gorton Pond Warwick Pond	Phosphorus
Greenwich Bay 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
Hunt River	Fecal Coliform
Fry Brook	Fecal Coliform
Scrabbletown Brook	Fecal Coliform
Kickemuit River Upper Kickemuit River Kickemuit Reservoir	Fecal Coliform Phosphorus
Mount Hope Bay and the Kickemuit River Estuary	Fecal Coliform
Palmer River	Fecal Coliform
Runnins River	Fecal Coliform
Stafford Pond	Phosphorus

Problem: Impervious Land

The land area around the bay poses a problem with pollutants because the urbanization has caused the areas around the bay to be impervious. This is a concern because surface water is unable to be filtered naturally through the soil before reaching the Narragansett Bay. The impervious land acts as a funnel to the bay, rinsing any pollutant directly into the bay or nearby streams.



(Figure 7) Impervious land areas around Narragansett Bay

Existing Organizations

Narragansett Bay Estuary Program (NBEP) → program priorities include bay planning and policy on a watershed basis, monitoring of ecosystems, technical and funding assistance for communities and watershed councils, inventory of habitat, restoration and protection, informing the public and policy makers

Save The Bay → works to protect, restore, and preserve the ecological health of the Narragansett Bay region through an ecosystem based approach to environmental action. They defend the public's right to use and enjoy the Bay and try to foster an ethic of environmental stewardship among the people who live in the region.

Narragansett Bay Commission → works to protect and enhance the water quality in the Narragansett Bay and its watershed by providing safe and reliable wastewater collection and treatment services at a reasonable cost.

Narragansett Bay National Estuarine Research Reserve (NBNERR) → works to preserve, protect, and restore ecosystems within the Narragansett Bay watershed through long term research, education, and training.

Rhode Island Department of Environmental Management (RIDEM) → have a Bay Assessment and Response Team (BART) who respond to environmental incidents on the Narragansett Bay. They receive reports, assess impacts, pursue appropriate remedies, and provide information and advice.

New England Interstate Water Pollution Control Commission (NEIWPCC) → non-profit interstate agency that uses a variety of strategies to meet the water related needs of the New England states.

Massachusetts Water Pollution Control Association (MWPCA) → work to make education and training available, and to promote the exchange of information among its members so they have more knowledge and can effectively provide excellent water quality throughout the state of Massachusetts.

Environmental Protection Agency’s National Estuary Program → work to maintain water quality in estuaries through the protection of public water supplies, protection of indigenous species, and required control of point and non-point sources of pollution. They use science to inform decision making, emphasize collaboratize problem solving, and stress the importance of involving the public.

Problems & Solutions

Problem	Result	Cause
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	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

Problem	Goal	Solution
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, update water treatment plants
P.2 Rising Water Temp	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
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, update water treatment plants, remove unnecessary impervious land, and installing rain gardens
P.5 Invasive Species	G.5 Prevent new invasive species from entering the	S.5 Federal laws to control the introduction and

	Bay and eradicate already existing invasive species	outbreak, Rapid Assessment Surveys to collect data and analyze the situation
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