Water quality issues influence human and environmental health. The more we monitor our water, the better we will be able to recognize and prevent problems.
HOW IS IONA ISLAND CHANGING?

- **Precipitation** is decreasing
- **Air Temperature** is not changing
- **Water Temperature** is increasing
- **Chloride** is increasing at Doodletown Brook, but not changing at Iona Island
- **Sulfate** is decreasing at Doodletown Brook, but not changing at Iona Island

**Trends in Weather & Water Quality**

*Iona Island Component Site (Piermont added for comparison)*

<table>
<thead>
<tr>
<th>Location ID</th>
<th>Location Name</th>
<th>Air Temp</th>
<th>Rainfall</th>
<th>Water Temp</th>
<th>Salinity</th>
<th>Dissolved Oxygen</th>
<th>Chloride</th>
<th>Sulfate</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS</td>
<td>Field Station</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DB</td>
<td>Doodletown Brook</td>
<td>↑</td>
<td>↓</td>
<td>↑</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>II</td>
<td>Iona Island</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>PM</td>
<td>Piemont Marsh</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>SP</td>
<td>Sparkill Creek</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td>↑</td>
<td>•</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location ID</th>
<th>Location Name</th>
<th>Ortho-phosphate</th>
<th>Ammonium</th>
<th>Nitrate</th>
<th>Chlorophyll-a</th>
<th>Pheophytin-a</th>
</tr>
</thead>
<tbody>
<tr>
<td>DB</td>
<td>Doodletown Brook</td>
<td>↓</td>
<td>X</td>
<td>•</td>
<td>↑</td>
<td>•</td>
</tr>
<tr>
<td>II</td>
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<td>↑</td>
<td>X</td>
<td>•</td>
<td>↑</td>
<td>•</td>
</tr>
</tbody>
</table>

All other data collected from 1991-2019

Weather Can Have A Major Impact On Water Quality

Weather data helps scientists and managers understand water circulation patterns, plant growth, shellfish and fish distribution, storm frequency and intensity, and much more…

In 2019, precipitation during the fall season was high (~17 in.) compared to the historic fall trend, but for the year, precipitation was less than the long-term historical average.
Water Quality is a MAJOR Driver of Ecosystem Change
What happens on the land affects the quality of the water and the health of the plants and animals that live in the estuary.

Do HRNERR data show climate change impacts?

The impacts of climate change, particularly sea level rise, are projected to be more extreme in the Mid-Atlantic region of the United States than in other areas of the world. HRNERR data do not show an increasing trend in air temperature, but do show an increase in water temperature. In 2017, HRNERR installed a tide station at Turkey Point (near the Tivoli Bays). Data from this station will be used to monitor changes in water level over time. Long-term data sets are extremely useful tools for monitoring future impacts of climate change to local ecosystems.

Iona Island Component Site

Water Temperature has been increasing. While warm summer temperatures have not exceeded the 95th percentile, cold winter temperatures have been above the 5th percentile as ice has not formed across the entire river in recent years.

Chlorophyll-a measures algal growth. Harmful algal blooms (HABs) can be discrete in space and time. Levels increased in the summer at Norrie Point, but a bloom was not apparent to the north (Tivoli Bays) or south (Iona Island).

Estuarine organisms, including, mammals, birds, fish, and crustaceans, have different tolerances and responses to the impacts of climate change. Shifts in temperature and water level could alter estuarine habitats. The types and locations of aquatic plants could change. These changes could impact how organisms use habitats for protection, food sources, and breeding grounds.

Water Quality is a MAJOR Driver of Ecosystem Change
What happens on the land affects the quality of the water and the health of the plants and animals that live in the estuary.
### Why Estuaries Matter

<table>
<thead>
<tr>
<th>Economic Impacts</th>
<th>Community Benefits</th>
<th>Healthy Ecosystems</th>
<th>Habitat Diversity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal shoreline counties provided 53 million jobs and contributed $7.4 trillion (nearly 44%) of the nation’s gross domestic product in 2012.</td>
<td>Estuaries protect coastal communities by reducing flooding and storm surge impacts, enhancing water quality, and providing commercial and recreational benefits.</td>
<td>Up to two-thirds of the nation’s commercial fish and shellfish spend some part of their life cycle in an estuary or depend on this resource for food.</td>
<td>Habitat types include shallow open waters, freshwater/salt marshes, swamps, sandy beaches, mud/sand flats, rocky shores, oyster reefs, mangrove forests, river deltas, tidal pools and seagrasses.</td>
</tr>
</tbody>
</table>

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### Tracking The Health of Our Estuaries 24/7

The **NERRS** is a partnership program between NOAA and the coastal states to manage designated reserves. More than 1.3 million acres of estuarine land and water are protected. Each reserve is managed on a daily basis by a lead state agency or university with input from local partners. The health of every reserve is continuously monitored by the **System Wide Monitoring Program (SWMP)**. SWMP is a **robust, long-term, and versatile** monitoring program that uses the NERRS network to intensively study estuarine reference sites for evaluating ecosystem function and change. Reserve-generated data and information are available to local citizens and decision makers. For more information, go to: [https://coast.noaa.gov/nerrs/](https://coast.noaa.gov/nerrs/)

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### More Information...

#### For Citizen Science
Access data at the System Wide Monitoring Program (SWMP) Graphing Application website: [https://coast.noaa.gov/swmp/](https://coast.noaa.gov/swmp/)

#### For Scientists

#### Have Questions?
- Contact Sarah Fernald
  - sarah.fernald@dec.ny.gov
  - (845) 889-4745

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**Hudson River NERR** - providing the science needed for today and tomorrow