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 STOCKPORT FLATS CHANGING?

- Precipitation is decreasing
- Air Temperature is not changing
- Water Temperature is increasing
- Chloride is increasing
- Sulfate is decreasing

Trends in Weather & Water Quality

Stockport Flats Component Site (Tivoli included for comparison)

<table>
<thead>
<tr>
<th>Location ID</th>
<th>Location Name</th>
<th>Air Temp</th>
<th>Rainfall</th>
</tr>
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<tbody>
<tr>
<td>FS</td>
<td>Field Station</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Location ID</th>
<th>Location Name</th>
<th>Water Temp</th>
<th>Salinity</th>
<th>Dissolved Oxygen</th>
<th>Chloride</th>
<th>Sulfate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST</td>
<td>Stockport Creek</td>
<td>↑</td>
<td>↑</td>
<td>•</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>SF</td>
<td>Stockport Flats</td>
<td>↑</td>
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<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>SC</td>
<td>Stony Creek</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>TN</td>
<td>Tivoli North</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>
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</thead>
<tbody>
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<td>Stockport Creek</td>
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<td>X</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>SF</td>
<td>Stockport Flats</td>
<td>↑</td>
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<td>•</td>
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<td>•</td>
</tr>
</tbody>
</table>

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.
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.

Stockport Flats Component Site

Chloride has been accumulating in at the mouth of tributaries. Potential causes include road salt, septic wastes, and water softeners. Life in the tributaries could be adversely affected.

Stockport Flats (SF)

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 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.

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

## Economic Impacts
Coastal shoreline counties provided 53 million jobs and contributed $7.4 trillion (nearly 44%) of the nation’s gross domestic product in 2012.

## Community Benefits
Estuaries protect coastal communities by reducing flooding and storm surge impacts, enhancing water quality, and providing commercial and recreational benefits.

## Healthy Ecosystems
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.

## Habitat Diversity
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.

### 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/)

### 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](mailto:sarah.fernald@dec.ny.gov)
- (845) 889-4745

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