

# Examining Water Quality in New York City Wetlands

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## Abstract:

In order to assess water quality in wetlands across New York City, phosphate levels, pH, and salinity as well as dissolved oxygen, dissolved carbon dioxide, hardness, and nitrate levels, were tested using the LaMotte Limnology kit. The Ramble, located at Central Park, had the highest concentration of phosphate. Inwood Hill, a tidal wetland, had the highest concentration of salt, while Flushing Meadows, a freshwater wetland, had the lowest concentration of salt. The Ramble had the highest pH compared to all of the sites. Future studies should take more sites into account to create a more cohesive understanding of the water quality in New York City wetlands.

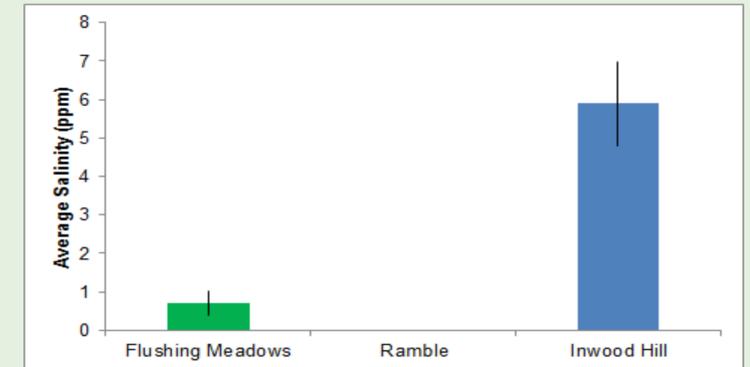
## Introduction:

- **Water quality is particularly important to wetlands**
  - Water quality encompasses various aspects of water such as phosphate levels, pH, and salinity as well as dissolved oxygen, dissolved carbon dioxide, hardness, and nitrate levels.
- **Urban wetland water quality differs from rural wetland water quality**
  - Not much research has been done on urban wetlands.
  - Human induced impacts can be observed through water testing.
  - Urban pollutants such as salt, acid rain, sewage, fertilizers, and other wastes disturb and decrease wetland water quality (Renn, 1968).
- **Water quality impacts wetland health and urban health**
  - Wetlands provide benefits by means of storm buffering, filtration, oxygen production, and carbon storage (Keddy, 2010).
  - Wetlands are essential to plant and animal life by providing habitats for a wide variety of organisms.
  - Studies have shown that decreased water quality decreases biodiversity (Findlay and Houlihan, 2003).
  - High nitrate and phosphate levels in the water contributed to eutrophication, causing algal blooms. This resulted in low dissolved carbon dioxide, as well as high pH and dissolved oxygen levels. High dissolved oxygen levels indicate purity (Renn, 1986).
- **Hypotheses**
  - Phosphate levels would be highest at the Ramble because it was in a highly populated area from which contaminants would increase the nutrient level.
  - The site with the greatest amount of aquatic plants would have the highest pH level because of the connection between high pH values and photosynthesis.
  - Inwood Hill would have the highest concentration of salt since it was a brackish wetland.

## Methods:

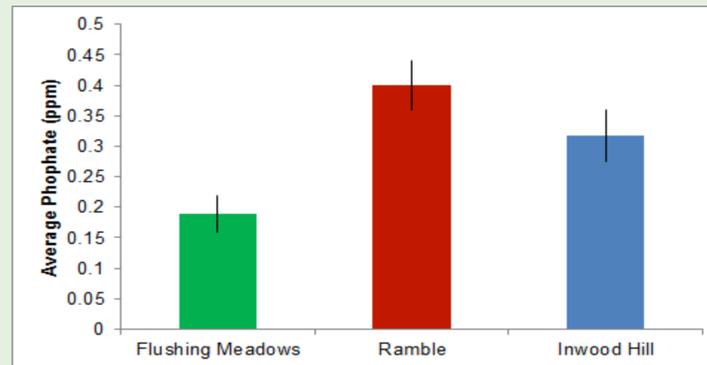
1. Water samples were collected at each randomly generated plot
2. A LaMotte Limnology kit was used to conduct the different water quality tests. It included the materials, guides, and procedures to acquire the necessary data.
  - Phosphate
  - pH
  - Salinity
  - Dissolved Oxygen
  - Dissolved Carbon Dioxide
  - Hardness
  - Nitrate

## Results (cont.) :

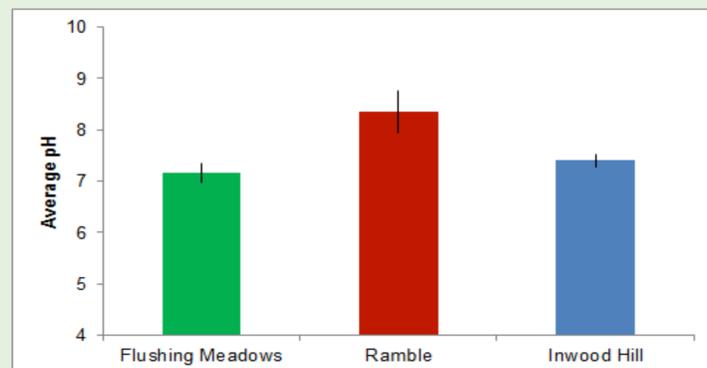


**Figure 3:** Inwood Hill was the only site with significant salinity present. ( $F=26.53, p<0.01$ )

## Results:



**Figure 1:** Average phosphate was highest at the Ramble and lowest at Flushing Meadows. ( $F=5.895, p=0.0107$ ).



**Figure 2:** The highest concentration of hydroxyl ions was found at the Ramble and the least was found at Flushing Meadows. ( $F=5.839, p=0.00721$ )

## Discussion:

- All hypotheses were supported from the data obtained.
- The Ramble was the most urban and maintained. Fertilizers, sewage, and runoff raised the nutrient level for plant growth, causing eutrophication and algal blooms.
- The algal blooms found at the Ramble contributed to its high pH level. Since plants need carbon dioxide in order to photosynthesize, there would be a lower dissolved carbon dioxide concentration, leading to a higher pH. There was no plant decay present, therefore no low pH levels.
- Inwood Hill was a tidal wetland, while the other sites were freshwater. The salinity at Flushing Meadows could be attributed to the nearby highway, as the wetland absorbed salt put on the roadways from the winter.

## Works Cited:

- Findlay, C. S., & Houlihan, J. (1997). Anthropogenic correlates of species richness in southeastern Ontario wetlands. *Conservation Biology*, 1000-1009.
- Keddy, P. A. (2010). *Wetlands: an overview. Wetland ecology: principles and conservation.* Cambridge University Press, 2-3.
- Renn, C. E. (1986). *A study of water quality.* LaMotte Company, 9-23.

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