



The Massapequa Macroinvertebrate Mission

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Abstract

Pollution from roadways can runoff into nearby waterways. We investigated the impact of the Southern State Parkway, (Massapequa, NY) on the local Massapequa Creek by collecting macroinvertebrate and testing water chemistry. We then compared these values collected at the sampling site to the distance from the Southern State Parkway. All of the values (pH, turbidity, dissolved oxygen, phosphates, nitrates and macroinvertebrate), regardless of the distance from the Southern State parkway, were similar. Overall we saw little variation in water quality in varying distances of 0.21 to 1.11 miles away from the Southern State Highway.

Introduction

Urban sprawl is a major environmental issue. Sprawl promote factors that can lead to environmental issues like high car usage and a high area of impermeable surfaces. These factors can cause contaminated runoff which is harmful due to the fact that sediments from roadways near can be carried into nearby waterways, as well as fertilizers, that contain nitrogen and phosphate, and cause harm to the bodies of waters nearby. (Zartman, Ramsey, & Huang, 2001)

Roads increase turbidity, due to sediments from the road being deposited in streams, which decreases vegetation because the particles block out sunlight necessary for photosynthesis. Chemical pollutants can also be introduced to aquatic ecosystems through storm runoff. Chemicals associated with vehicle emissions also increase near roads.(Coffin, 2007)

Through measuring nitrates, dissolved oxygen and turbidity levels effect that roads are having on aquatic ecosystems can be studied. Nitrate levels will be tested because it is a macronutrient for photosynthetic organisms, and in excess can cause algae blooms lowering the dissolved oxygen levels in waterways. Dissolved oxygen is vital for fish to survive, because it is necessary for cellular respiration. Most aquatic plants and animals thrive in a neutral pH. Overly acidic or basic pHs can be indicators of nitrogen oxides, carbon dioxide, and wastewater that contains soap in runoff. The types of macroinvertebrates also can show the quality of the water, one measurement is called Ephemeroptera, Plecoptera, and Trichoptera index. EPT is used to identify a body of water's health through collecting macroinvertebrates. Many macroinvertebrates are sensitive to dissolved oxygen levels. Some organisms need very high dissolved oxygen levels to survive, like stonefly nymphs, and other organisms have adapted to live in

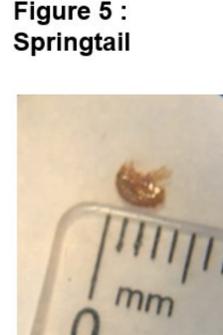
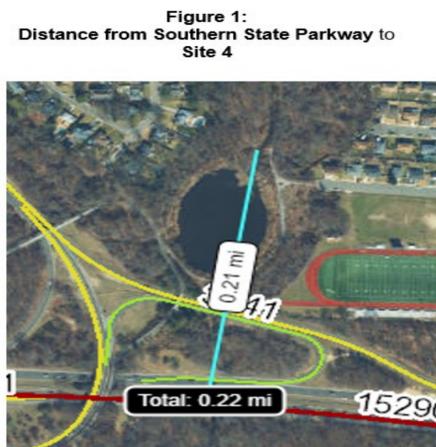
Materials and Methods

We tested dissolved oxygen, pH, nitrates, turbidity, and phosphorous from multiple locations of the Massapequa creek by using the instructions in the Lamotte Earth Force Low Cost Water Monitoring kits instructions. We also collected macroinvertebrates at these locations, with d-nets and leaf packs.

We calculated the distance of the site from the Southern State Highway. Then we compared the distance of the roadway to the water to the parameters collected: dissolved oxygen, nitrates, phosphorus, pH, EPT index score, and turbidity.

The four sites sampled are located at: SITE 1: 40 41 49 N,73 27 9 W, SITE 2: 40.693533, -73.453064, SITE 3: 40.702042, -73.460922, SITE 4: 40.4232,-73.263.

Then we isolated the DNA using standard silica protocol, amplified the DNA through PCR and analyzed the DNA through gel electrophoresis.



Results

We observed little variation the quality of the water within one mile of the Southern State Parkway. We also did not see many visible results in the gels and the banding we did see was minimal and there was not enough DNA to sequence effectively.

Table 1: Water Quality of the Massapequa Streams Adjacent to the Southern State Parkway

Site	Distance (mi)	pH	Temperature (C)	DO (ppm)	DO (% sat)	turbidity (fnu)	nitrate (ppm)
1	0.34	6	14	6	52	0	5
2	0.75	6	15	5	50	0	5
3	1.11	6	15	6	58	0	5
4	0.21	6	9	2	18	0	2

Discussion

Our results did not support our hypothesis and did not show a difference in water quality within one mile of the Southern State Parkway. The lack of variation in pH, dissolved oxygen, phosphate, and turbidity could be due to how close the sites were to the Southern State Highway. The smaller roads, which were not taken into consideration, could have also impacted the results. The Massapequa creek is surrounded by smaller suburban roads for its entire length which could contribute to pollution. In addition, the macroinvertebrates collected cannot attest in any way to the stream health of the Massapequa preserve.

We also believe the lack of results when barcoding to be due to a error while storing the samples. We did not suspend the samples in ethanol before we froze them and we think that this may have destroyed the DNA.

References

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