

GOWANUS CANAL RESTORATION PROJECT

BY: RYAN RAIMONDI



**MARINE BIOLOGY RESEARCH
NEW YORK HARBOR SCHOOL
NEW YORK
2016**

Introduction:

The Gowanus Canal is infamously renowned for enormous concentration of pollutants that dwell within the greenish murky depths. But, what will the health of the canal be over the course of carefully monitoring over a span of a year. The data collected so far will depict conditions of the man-made river, and how other issues may be resolved in the greater future. This will benefit the human society around it by improving the canal for recreational use and using it for future housing alongside it. Thus, monthly testing shall be done in order to obtain a better understanding of the many factors that affect the canal.

Background:

The canal was initially home to numerous aquatic organisms before man came into place and deteriorated its surroundings. In the 1600s, foot-long oysters inhabited the canal along with the rest of the NY Harbor. There have even been accounts of young children swimming in this water body during the 1930's. "With one hand over his mouth, they would use the other arm to clear floatables off the water to allow his playmates an unobstructed swimming line to the clearer offshore water". "Other animals such as sharks, seals, and muskrats have been witnessed within the dirty water, (*Curbed NY, 2013, pg.2*). (Recently in the winter of 2013) had a starved dolphin that accidentally swam into the canal, and faced a toxic death as of being in the Gowanus too long". Thus, the event brought public attention of the government and biologists, and therefore became more motivational to the community in trying to aid the canal back to a clean stellar state.

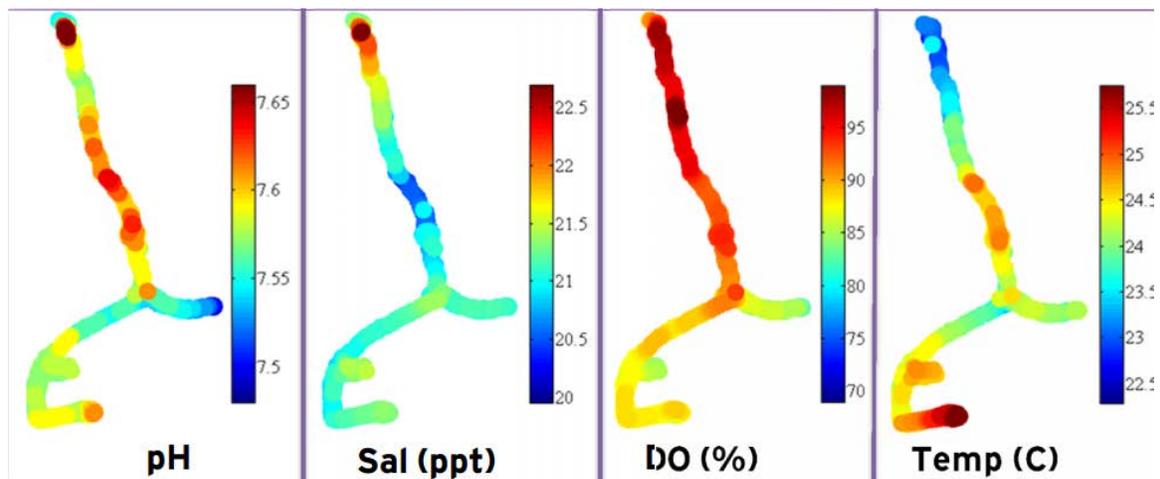
During colonial times, the Gowanus Canal was originally a tidal inlet of small creeks in the original saltwater marsh of South Brooklyn. Early settlers and natives named the area after the chief Gowanus of the Carnarsees, and in which Giovanni da Verrazano and Henry Hudson explored the area. This was also the site of the Battle of Brooklyn in which “American troops fought off the redcoats long enough to allow George Washington to retreat” (*Gowanus Canal Dredgers Club, Introduction, Pg.1*).

Over a long period of time, the location would become the ideal region for industry and businesses alike, and in 1849, the NY state called for the actual construction of the canal (*Curb, NY, Page.3*). During the next century and a half, factories would overrun alongside the canal, and the constant pumping and dumping would worsen this once beautiful place for wildlife. Thus, the government and city has made strenuous attempts to deplete the amount of toxins within the Gowanus, with a fund above 500 million dollars for this project.

In 2010, the EPA had announced a 506 million dollar fund in direction to restoring the canal, and removing the pollutants completely and entirely. The EPA has even designated the canal as one of the three major Superfund sites in the city. During the refurbishment, there have been reports of PCBs, polychlorinated biphenyls, and PAHs, polycyclic aromatic hydrocarbons, that lurk within the water body, and thus three segments of this project have been focused in ridding of both toxins from the water. (These chemicals are commonly found in oil substances and waste given off by humans, and hence are carelessly dumped or flowed into the canal on a daily basis). The extensive government plan will also diminish the

amount of run-off, sewage overflows, and discharges that are caused during storms and rain. Furthermore, once sites are placed on the Superfund list of the most contaminated waste sites, the EPA searches for parties responsible for the contamination and holds them accountable. (*EPA, Water Quality Report, 2010 Page.1*)

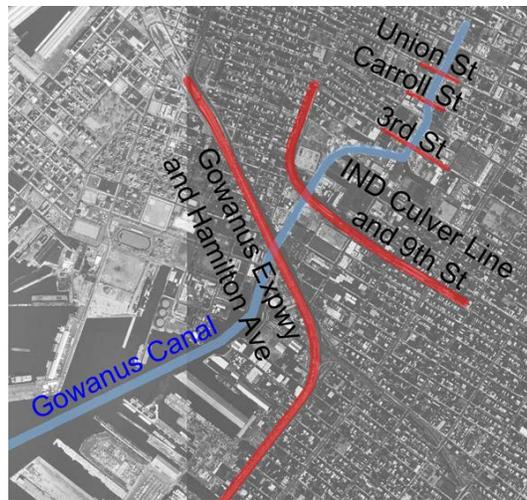
Despite the pollutants and clean up efforts of the canal, the estuary is ultimately getting the care and sanitation it needs. But dirty waters or no, given the Brooklyn real estate boom and Gowanus' choice location, it was only a matter of time before serious money moved in. The city has been significantly removing the pollution roaming within the waterway and this has made real estate and other neighboring businesses more prosperous than ever before. The improved canal has showed more interest among the public groups and thus more people are moving into the area. (*NY Post, 2011*)



Previous Data (Brooklyn Atlantis: September 5, 2014)

Hypothesis:

The chemical parameters will be at a very unhealthy state (in regards to basic parameters) and the water itself will have data below normal rates. Nonetheless, there may be little change that will occur throughout my tests due to the many poisons, oil, and sewage that make the water unbearable to support any form of existence. However, the primary question is how will progress over a simple two year cycle prior to the research project?



*Test sites alongside Canal used for project

*Photo courtesy of en.wikipedia.org

Research Questions:

1. Will the parameters be at unhealthy standards with pH above or below 6.5-6.7, or little dissolved oxygen?
2. Will the Gowanus Canal show any forms of improvement by means of what results will be given

Procedures:

1. Beta Bottle shall be used to gather water from the subsurface and shall be used to collect samples and to begin.
2. After water has been obtained completely, the Hanna Combo will be dipped into the water and shall be used to record temperature, pH, and salinity.
3. The three primary test strips (pH, Alk., etc.) will gather information for each individual parameter then will be documented on sight.
4. Dissolved Oxygen (DO) will determine amount of DO within the canal.
5. Lastly, turbidity will test the clarity and clearness within range of the water.

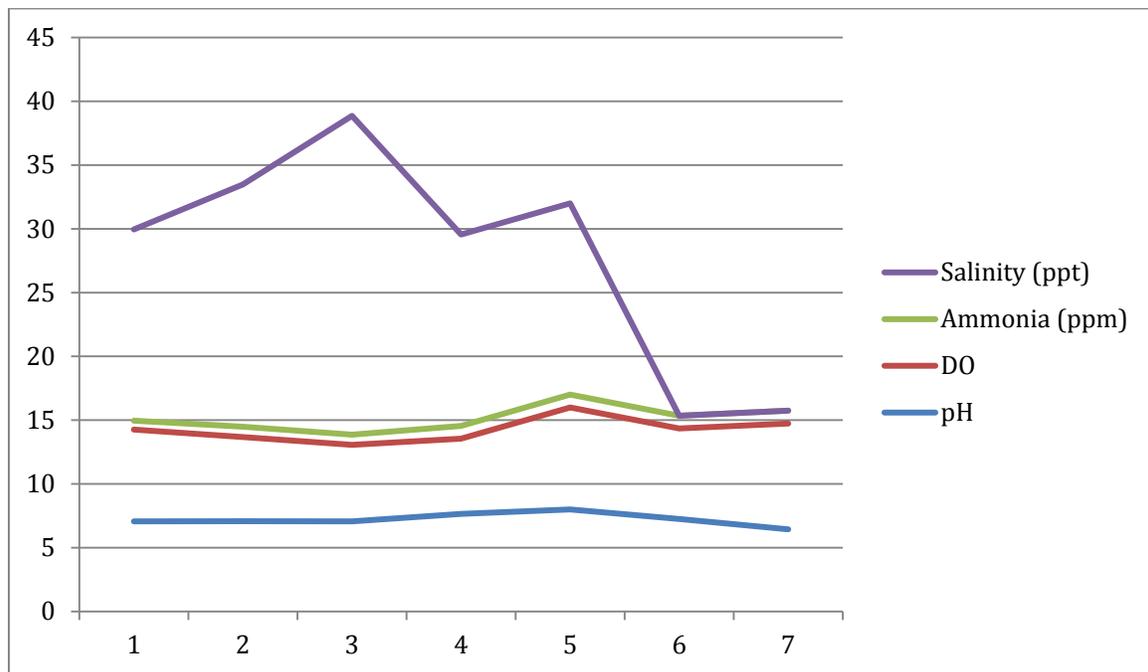
Risks & Ethics:

<ul style="list-style-type: none">• Safety is a major priority especially when handling toxic water in a hazardous field
<ul style="list-style-type: none">• Gloves shall be worn at all times to avoid any infection
<ul style="list-style-type: none">• A distance will be made from falling into the canal
<ul style="list-style-type: none">• A mentor or a person of guidance shall escort throughout series of experiments

Materials List

<u>Item:</u>	<u>Function:</u>
Turbidity Tube	To measure clarity
Beta Bottle	To obtain sample
Test Strips	For pH, Nitrite, Nitrate, Hardness, Ammonia, Phosphate, etc.
Winkler Kit	For dissolved oxygen

Results



Conclusion:

Based upon the data given, I feel that it will take quite some time for improvements to be seen in this water body. Despite the drawbacks that I had to overcome, I see a steady pattern that doesn't show any impressive changes for my hypothesis was

correct in a sense of how data was at unsanitary conditions, in comparison to my mentor's data and the EPA's. Therefore, further testing shall be accomplished to promote more precise data and to see if any dramatic changes shall occur prior to that.

Acknowledgements:

Mauricio Gonzalez: Head of the Marine Biology CTE Course

Eymund Diegel: A Participant in the Gowanus Canal Restoration

Bibliography:

"Welcome to The Gowanus Dredgers Canoe Club on the Gowanus Canal in Brooklyn NY." Welcome to The Gowanus Dredgers Canoe Club on the Gowanus Canal in Brooklyn NY. N.p., n.d. Web. 25 Nov. 2014.

"US EPA - Environmental Protection Agency." EPA Finalizes Cleanup Plan for Gowanus Canal Superfund Site in Brooklyn, New York on Environmental XPRT. N.p., n.d. Web. 25 Nov. 2014.

"With Its Namesake Canal Finally Getting Clean, Gowanus Grows." New York Post. N.p., n.d. Web. 25 Nov. 2014.

COMMUNITY SHIFT OF METHANE-OXIDIZING BACTERIA IN COVER SOIL OF WASTE LANDFILLS DUE TO METHANE EMISSION

Tomonori Ishigaki, Hiromi Sawamura, Kaoru Ikeda, Masato Yamada

WOULD USE OF CONTAMINATED WATER FOR IRRIGATION LEAD TO MORE ACCUMULATION OF NITRATE IN CROPS?

Guangwei Huang