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The Gowanus Canal: Delving into the Murky and Mysterious waters Of Brooklyn’s Toxic Canal

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The Gowanus Canal: Delving into the Murky and Mysterious waters

Of Brooklyn’s Toxic Canal

By: Victoria Von Ancken
Abstract

Like many environmental issues we face today, the Gowanus Canal began as a hopeful tale. It was envisioned as a promising cargo transportation waterway in Brooklyn, New York. However, due to reckless planning with little thought for the future, the canal slowly began to have a negative effect on its surrounding landscape and community, as well as abandoning its initial purpose, and ultimately sitting stagnant in the neighborhood. Today, the canal is a large environmental problem we face and is in great need of cleanup. The canal is a prime example of a lack of planning and consequential detrimental effects on the surrounding neighborhood and wildlife. The Gowanus issues particularly echo today’s headlines, in light of the shortsighted actions in Flint, Michigan causing long-term harm.

This thesis starts by looking at the current status of the Gowanus canal and its intended purpose. Current events relating to the canal and its detrimental effects are cited. After this, the thesis begins to address the history of the Gowanus canal as a whole and why it was created in the first place. The public opinion towards the canal when it was just built compared to the feelings towards it now are looked at as well as its humble beginning. Then, natural science, more specifically biology and ecology, is used to describe the science behind why the canal has become so detrimental. This discipline is also used to explain the toxicity of the water as well as the wildlife that may attempt to live inside its murky waters. Next, a combination of social as well as natural science is utilized to describe New York City's waste water treatment process and how this relates to the canal and more specifically its overflowing. Political science is then utilized to brainstorm
future solutions for the canal and what people of the community can do to help repurpose the area, assist in clean up and advocate for change. Finally, economics is used to discuss the negative and positive economic effects the canal has had on society as well as the significant amount of money that would be needed in an attempt to clean the canal itself. A conclusion is then written to summarize what has been discussed throughout the essay itself.

When discussing the Gowanus canal, sources from online books as well as articles are used. Information from the book “Gowanus: Brooklyn’s Curious Canal”, by Joesph Alexiou is a primary source. Scientific data online is used to give specific information on the toxicity of the canal as well as wildlife living in it. Historical and current events involving the canal are added throughout the thesis to enhance and support my claims on the mysterious canal.
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Chapter 1: Introduction

The Gowanus Canal is something of an enigma in the ever-growing borough of Brooklyn, New York. Spanning about 2 miles and surrounding the neighborhoods of Park Slope and Carroll Gardens, the canal has gained recognition as one of the most polluted bodies of water in the United States.¹ Today, the canal is very rarely actually used for its intended purpose of the transportation of goods and now simply sits as a perpetuating pollutant and environmental hazard to the community. Various reports have come out on the canal, including lurid headlines such as “Three eyed fish found in the Gowanus Canal” or “The Tale of Sludgie the Whale in Gowanus”. These headlines evoke confusion and alarmed interest into the brackish and polluted waters of the canal. This current morbid curiosity now needs to be turned into outrage demanding change and inspiring action for a renewal of a new and cleaner body of water. The fact that the canal is roped off with chain-linked fences, shows just how dangerous it is and how much neglect it receives in today’s society.²

The Gowanus Canal was not always a canal. Originally a creek full of marshland and wildlife, its water used to thrive with massive delicious oysters and a variety of fish. The Dutch who settled the land back in the 1500s used the ecosystem services provided by the creek for themselves and for farming. Farming was practiced near the water and as the years went by the


creek began to be used for transportation and even later began to be constructed into a canal to ease this transportation of goods.

The construction of the canal is when problems begin to arise. Just like many other environmental problems, the construction of the canal was done with little to no planning for the future. Environmental degradation was not taken into consideration nor was any type of pollution or harmful toxins. This is why today the Gowanus is full of polluted substances from the remnants of industrial era factories seeping their chemicals into its waters. Not only is it polluted from these factories but also is highly polluted from Combined Sewage Outflows. These “CSOs” release solid waste into the Gowanus canal causing the pollution to grow. Without any current or system to flush these toxins out they stay stagnant in the water accumulating deeper and deeper over the years.

Studies have shown that the contamination of the canal is even worse than expected. The canal has little to no current so pollution has sunk deep down into its sediment making it increasingly difficult to clean up. The pollution in the canal is not just simply trash and plastic bags, it is direct chemical toxins that can seriously harm a person or animal’s health. The canal’s toxic makeup runs from the coal of the initial pollution in the canal, to a number of bacteria such as e-coli, to known carcinogens such as PAHs and PCBs. The main study that was done to determine what was in Gowanus’s water was conducted by the EPA after it declared the Gowanus Canal a Superfund site in 2010.
Although it took about 100 years, the Gowanus is finally taking action to properly clean up the canal after it was declared a Superfund Site. This increases its likelihood of the canal getting cleaned up exponentially as there can now be a cohesive plan to take charge on by local participants. Many local community stakeholders helped to open the dialogue about the Gowanus and continue to help shape its healthier future. Although the economics of the canal are still a pressing issue, giving considered thought now to the ecosystem services and natural ways to avoid pollution can help with future clean up costs and plans.

In Chapter 2, I will discuss the history of the area of Gowanus and how the canal came to be. The next chapter will be on the science of what is inside the canal and the chemicals that have accumulated over the years according to the EPA. Chapter 4 will then look at politics such as what action has been taken to cleanup the canal and who are the stakeholders at hand. Next, chapter 5 will briefly discuss the economics of the Gowanus Canal, what ecosystem services it provides, and the economic viewpoints of the community regarding development along the waterway. Lastly, I will conclude by summarizing what has been talked about and reviewing current and future plans for the Gowanus Canal.

**Chapter 2 HISTORY: The Humble Beginnings of Gowanus**

Etymology can often be a good way to begin looking at the history of a specific place or thing. The origin of the word “Gowanus” can give great insight to the foundation and beginnings of this area of Brooklyn, New York. Gowanus is so old that the etymology of the word is difficult to trace. For instance, Martha Flint, in “Early Long Island: A Colonial Study” says, “No Long
Island name is more puzzling and elusive than Gowanus”. However, one common theme that reveals itself when looking at Gowanus are the origins and ties with Native Americans. For instance, one theory is that the name comes from an Iroquois chief of the time named ‘Gouwane’. In his compelling book “Gowanus, Brooklyn’s Curious Canal”, Joseph Alexiou notes, “The spelling of this elusive name has at least 15 permutations throughout history- a partial list includes Cujane, Cowanoes, Gauwanes, Gouanes, and Gouwanes- depending on the era and native tongue of whomever was writing”. This seems to be the most promising, accurate and well known theory for the etymology of the Gowanus name.

The native American chief Gouwane, who, Gowanus might be named after, sold his land consisting of what was later called Gowanus creek to new Dutch settlers, William Adrianse Bennet and Jaques Bentin, in 1636. This settlement by the Dutch is considered the first step in the settlement of Brooklyn and subsequently Manhattan. The area of Gowanus was perfect for the colonists of the time as it was almost as if the land was perfectly built for agriculture and farming. Fishing and farming was greatly popular since wildlife flourished at the time while oysters were

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4 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print. Pg. 27
5 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print. Pg. 29
6 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print 28
plentiful in the Gowanus creek.\(^8\) Gowanus has such a “unique placement in the vicinity of an “arm of the sea”, and estuary that travels inland, originally creating a wetland that functions as a transitional space between land and water”.\(^9\) During this time the current site of the Gowanus Canal was occupied by Gowanus Creek and full of marshlands so the creek was often dammed and used to power tide mills. Tide mills were an invention of the Dutch which catalyzed and greatly helped the commerce of the time.

\[\text{Figure 1: Gowanus Tide Mill Workshop of Gowanus as as seen through a Birdseye view of where the battle of Long island took place}^{10}\]

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\(^9\) Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 360

\(^{10}\) Collins, Lisa. *Gowanus Tide Mill Workshop*
With regards to transportation of the time, farmers living in the Gowanus area had an advantage when transporting from Brooklyn to Manhattan. Being the marshland and creek that it was, farmers could hire someone or row themselves from the creek across Gowanus bay. In 1642, a ferry was approved between Manhattan and Brooklyn so that farmers no longer had to row between islands themselves. As time went on, some began to realize the incredible potential of Gowanus’s waters. More specifically, Adam Brouwer, a proprietor of Brouwer’s mill of Gowanus, was possibly the first to suggest widening and dredging part of the creek to help in the transportation of goods. Adam proposed his idea to the governor and council in 1664. At the council there were no objections and so the creek began to be dredged that same year. Many other farmers during this time began to transform the marshy area of Gowanus into land that could grow produce near their homes and would use the creek to transport their goods. During this time period, the canal was also often a local sourced for oysters. The oysters were plenty and very common throughout the area. A Dutch missionary, Jasper Danckerts, journaled his time in Gowanus describing the oysters as, “the best in the country. They are large and full, some of them not less than a foot long, and they grow sometimes ten, twelve and sixteen together, and are then like piece of rock”. These oysters, often described as the “size of dinner plates” could have been

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11 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 30
12 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print 34
14 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 40
Brooklyn’s first export.\textsuperscript{15} Before New York became industrialized, this is what the Gowanus was used for; simply to power tidal mills, local transportation and catching oysters. It was not until the 1840s, when, like many other things, the area of Gowanus changed forever.

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An important aspect of Gowanus’s history to note is its contribution to the Revolutionary War. It is not commonly known that the area of Gowanus is where the first official battle of the Revolutionary war took place during the Battle of Brooklyn in August of 1776. Although the Americans lost the Battle of Brooklyn, the Gowanus creek still was somewhat of an unsung hero during their struggles against the British. The Americans had a rough battle with the English amounting to about 1,200 American casualties and 1,500 wounded. This is opposed to the 60 casualties and 300 wounded of the British. The battle was very hard on the Americans. However, after this battle finished, the Gowanus creek was used as a quick and stealthy escape. George Washington knew that after the previous battle, the Americans could not hold another day of battle in this state. On the night of August 29th, “Washington moved nearly nine thousand troops across the East River to Manhattan”. According to reports, the soldiers also got lucky as there was a fog lingering over the waters as they escaped. So, the Gowanus creek became an essential defense mechanism during the revolutionary war and without it Washington and his troops could have easily been completely defeated and obliterated by the British, possibly altering the course of the entire revolution to come. At this time industry and pollution had not yet entered the canal.

When the 1840s came around, Brooklyn was rapidly growing along with industry and factories. A man of this time, Daniel Richards, had a lot to do with the creation of the Gowanus Canal. Richards and his wife originally lived in Fonda’s Bush with their children. However, his

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17 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 85
18 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 92
wife tragically died in the 1830s. Due to an outbreak of cholera in 1832, Richards and his children moved from Fonda’s Bush to Brooklyn in hope to escape the “miasmas” (deadly fumes) people believed to be carrying the disease. Richards subsequently became a prominent entrepreneur in Brooklyn and in 1848, was elected alderman to the common council of Brooklyn.\textsuperscript{19} During this time, transportation cost to and from New York City became much less costly as New York became the center for trade because of the Erie Canal. In response to this, canal building became rather popular (94). The Gowanus creek during this time period was not getting the usual amount of use it had received in the past. Modern boats of the time could no longer fit in the canal as the water was too shallow. Whenever it would rain, the canal would flood and make the surrounding land useless. Richards was one of the main people to begin to think of a solution to these problems. The big solution and change he thought of was to create a canal. Richards appointed an engineer, Major David Bates Douglass. Douglass surveyed the creek and came up with a number of ideas, including some that even addressed concerns about pollution. He ended up proposing a plan costing $366,740, which is about $100 million dollars today.\textsuperscript{20} Unfortunately, his plan may have been more thorough and more caring with regards to pollution, but it was determined to be too expensive. Richards called upon another engineer, Willard Day, who proposed a much less expensive plan costing only $78,600. This was the plan that was approved and used to construct the Gowanus Canal known today. Richards believed that the tidal movement was enough to clean

\textsuperscript{19} Alexiou, Joseph. \textit{Gowanus: Brooklyn's Curious Canal}. Print pg. 106
\textsuperscript{20} Alexiou, Joseph. \textit{Gowanus: Brooklyn's Curious Canal}. Print pg. 112
the pollution of the canal, although many disagreed.21 The construction of this canal was presented in a very positive light to the community. Newspapers such as the “Eagle” described the proposal as “valuable for purposes of commerce and the mechanic arts” (114). After presenting the plans to the public, construction of the canal began, funded by nearby landowners, most prominently Edwin Litchfield. He is sometimes called the ‘father of the Gowanus Canal’ because of the significant amounts of money he funded for its construction. Construction of the canal was officially finished in 1869.

Once the canal was finished, industry in the area greatly increased. Things such as coal plants, oil refineries, chemical plants, cement makers, sulfur and soap makers were popular businesses along the canal.22 As a result, the canal became one of the nation’s busiest industrial waterways. Unfortunately, these businesses that appeared because of the canal created large amounts of toxic waste that was often emptied straight into the canal. These are some of the many culprits for the pollution we still see today. “The Gowanus Canal served as an open sewer when it was initially constructed in the late 1860s. As a result of the poor environmental practices typical of the era, large quantities of wastes from many of these operations were discharged directly into the canal”.23 Alas, the pollution of the canal begins. People began to describe the canal as “lavender

21 Alexiou, Joseph. Gowanus: Brooklyn's Curious Canal. Print pg. 114
lake” because of the purple hue and odd smell the water and subsequent sewage gave off. In the 1890s, the area along Smith street was actually known as ‘gashouse’ because of the numerous gas plants along the waterway.

In 1911, after years of pollution, the first stab at action to clean the canal is taken in the form of the flushing tunnel pumping station. It was a 6,280 ft. tunnel meant to flush out the water. “A large ship propeller was designated to pass water through the pump’s tunnels and toward the Gowanus Bay”. However, the pump was not very effective nor long lived. As the years went on, the need for the canal plummeted. The canal and essentially the dredging of it, seemed unnecessary due to the increased alternative option of using automobiles for transporting goods.

In 1961 the pumping station broke down and after this, although the canal was hardly used, the pollution from previous industries and factories continued to remain in the sediment as raw sewage would empty into the canal regularly. Thus, the canal continued to be virtually neglected until the 1980s, when South Brooklyn began to be seen as an attractive neighborhood for the middle class. By 1999, due to continued popularity of the area as a residential neighborhood, the Flushing pump was reinstated. After this reinstatement, people actually began to notice wildlife around the channel. “Because the oxygen levels increased, locals also noticed the return of geese, egrets,

horseshoe crabs, blue crabs, fiddler crabs, baby flounder, shrimp, mussels, killifish, and jellyfish”. However, the canal still had huge amounts of contamination and pollution. Toxic contaminants that had been lying in the canal’s floor for years began to seep to the surface. These toxins became so bad that the Environmental Protection Agency declared the Gowanus Canal a superfund site in 2010. The details and reasoning behind the decision to declare Gowanus a superfund site will be explained in greater detail in the next chapter.

Figure 3: Flushing Tunnel in 1911 just nearing completion

Chapter 3 SCIENCE: What is underneath the surface of Gowanus’s Waters?

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“Go with me to the foot of Bond Street, where one of the largest sewers in the city discharges its contents. Here are the feces and urine of not far from forty thousand people. Look at the map of the city to see where this mass of filth is discharged...it is into a large, open sewer, called the Gowanus Canal. In it there is no current; the tide rises and falls, it is true, but so slowly that everything which is poured into it sinks to the bottom...”

-Dr. Raymond, superintendent of the Board of Health in 1876

Dr. Raymond was thus quoted in an 1876 Brooklyn medical journal. This is not too long after the canal was constructed and pollution is already incredibly noticeable.

The Gowanus was originally made up of marshland and fresh water that drained into the Atlantic Ocean. The mix between fresh and salt made the brackish water a nice home for oysters that were plentiful at the time. Now, and since the canal was built, the waterway no longer lets out into the ocean as it was paved over and blocked. Currently, water simply flows in from the Upper New York bay and then continues to simply sit in the canal as it has nowhere else to go. Without movement in the stagnant canal, there is very little oxygen in the water, causing there to be very little life. The stillness of the water also makes the pollution even more dangerous. This is because when there is little to no movement, microclimates occur throughout the canal. This means that

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because of the little interaction throughout the canal, one area can have drastically different levels and types of pollution than another area.

With regards to testing, it is unfortunate that due to the extensive costs involved, there have not been many tests on the canal. The documentation mostly used going forward in this chapter, with regards to experimentation, testing and chemicals in the canal, primarily comes from the EPA's superfund documentation.

The Gowanus tale is especially saddening from an ecological perspective. Once a lavish saltmarsh and creek with vast amounts of clean and delicious oysters, the Gowanus is now a stagnant body of water filled with toxins and chemicals, making it almost impossible for life to thrive in it. Originally, the water in Gowanus was fed by marshland springs and then drained into the Atlantic Ocean. Now aside from when the flushing pump is on, there is virtually no current or flow in the canal, and although there have been improvements, the canal is essentially a large open sewer. The 1.8-mile length of the waterway is fringed with Combined Sewer Overflows (CSOs). These CSOs are where raw sewage is dumped into the canal during storms.

One can see from Gowanus’s long and reckless history, that toxins are bound to be prevalent and deep in its waters. Chemicals and solid waste are deep down in the sediment from years prior as well as floating near the water’s surface. In response to this, finally, in 2010, the EPA declared the Gowanus Canal a superfund site. A superfund site is a designation given under “A United States

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federal law designed to clean up sites contaminated with hazardous substances and pollutants.\textsuperscript{31}

The reasoning behind this superfund status is validated by a number of studies and tests that were conducted to reveal the truth of what lies beneath the Gowanus waters.

Before delving into the studies that have been conducted on the canal, a brief look at what is ecologically underneath the water’s surface with regards to sedimentation is helpful. The area surrounding the canal is comprised of a variety of different consistencies. Much of the surrounding area is ‘fill’.\textsuperscript{32} Originally marshland, the physical construction of the canal back in the 1800s significantly altered the environment and now the area consists of “silts, sands and gravels...ash, metal, glass, concrete, wood and other debris”.\textsuperscript{33} After the ‘fill’ layer is the area of alluvial and marsh. This is below the fill and consists mostly of silt and clay. This is similar to the native sediment and is made up of a lot of marshland-like materials. After the alluvial and marsh is an area of glacial deposits.\textsuperscript{34} This is mostly the sand and gravel that were left as glacial ice melted during the last ice age. Under this is bedrock consisting primarily of metamorphic rock. Throughout these different layers there are elements of pollution; toxins and chemicals that have been sitting in the layers of sediment for years. Through remedial investigation or RI, the EPA


was able to discover what exactly these chemicals are, where they are coming from and how harmful they are to society and biological/ecological life.

In addition to the specific pollution in the canal, there is a background level of pollution. This backbone consists of debris, rubble, trash, tires and so on.\textsuperscript{35} This type of contamination exists all throughout the canal. The more concerning type of chemical pollution is seen in canal sediments. The remedial investigation found that PCBs and 7 metals including: barium, cadmium, copper, lead, mercury, nickel and silver were all found in the sediment. All of these pollutants were found at an unsafe level for humans, posed ecological risks and found to be much higher than in the Upper New York Bay.\textsuperscript{36} PCBs and metals were found more frequently and at higher rates in the surface sediments. In the native sediment, there were large amounts of coal and tar found as well as VOCs. Both the surface(upper) and native(lower) areas were found to have a variety of unsafe chemicals. However, the deeper and older sediments were found to have an even higher contamination of chemicals than the upper more recent sedimentation.

The different overflows, outfalls, and release that come into the canal every day continue to contribute significantly to the pollution in the canal. For instance, the CSOs contribute greatly to this pollution, especially during stormy and rainy weather. The EPA’s Superfund documentation notes that during wet weather events, CSOs that have VOCs, PAHs, PCBs, pesticides and metals

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discharge into the canal at a very high rate. These CSOs are the largest contributor to the release of solid wastes. The solids are released from the CSOs and flushed through to the canal. These solids contain a high amount of total organic carbon and contaminate the sediment in the canal. The total organic carbon in the surface sediment of the canal as a result of the solid waste is 6 percent. By way of comparison, the Upper New York Bay level is only 3 percent. The solid waste is also a cause of the presence of fecal matter found in much of the surface sediment. Because of the CSOs, fecal matter is something found consistently in the canal’s surface sediment. The sediment of the canal, more specifically the surface sediment is greatly affected by CSOs and the solids that they release into the canal’s waters. The vast amount of these contaminated sediments accumulate at such a high rate because of the incredibly low flow rate of the canal. There is such limited tidal exchange with Gowanus Bay that the sediments easily accumulate and sit in the canal rather than being pushed out. In fact, the average current velocity of the Gowanus Canal is less than .5 feet per second.

Not just the sediment but the surface water of the canal was also found to have high levels of contaminants. VOCs and metals were found as well as benzene and PAHs. PAHs or polycyclic aromatic hydrocarbons are often found in plastics and char. Today they are banned in plastics.

All of these contaminant levels were found to be much higher than the ones found at the Upper New York Bay. This disturbing trend of unsafe levels inside the canal at both the sediment and surface layers, and all higher than those of normal bodies of water, makes it stand out like a sore thumb. It is shocking to learn that even the groundwater surrounding the canal was found to have higher level of contaminants than normal. The EPA found that “With regard to metals, all of the shallow and intermediate monitoring wells contained at least one metal (arsenic, barium, lead, nickel or sodium) above its screening value”. On top of this, 97.8% of the groundwater samples contained at least one PAH. Fortunately, although the Gowanus may reek of odor, the ambient air around the canal is technically safe and typical of those found in urban environments. It is really the water itself that is truly harmful.

With the contaminants inside the canal at a level way above the healthy maximum the health and ecological risks should be quantified. However, due to the present state of the canal, it is rare that people actually are in contact with its waters. To analyze the risks, the EPA conducted a risk assessment supposing a human would be in contact with the canal as a normal body of water. For instance, if an adult or child were to use the canal for recreational purposes such as swimming, it was determined that it would pose a great risk to the people at hand as it can result in carcinogenic risks above the EPA’s target risk range. Why are the carcinogenic risks so high? Most of the reasoning is attributed to the surface water and and sediment contamination levels of PAHs caused

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by the CSOs. Generally, PAHs are renowned carcinogens that are found at extremely unhealthy levels in the canal. In Dan Nosowitz’s article “What Would Happen if you Drank water from the Gowanus Canal”, he speaks of the high doses of coal tar saying, “if you’re unlucky enough to get a little dose of coal tar in your glass, you could suffer ‘pitch poisoning’, in which you suffer vascular collapse, capillary damage, and possibly renal damage”.

Although not common given the canal’s circumstances, it is additionally dangerous if a human were to consume marine life such as crab or fish from the canal. The EPA’s superfund document notes that the concentrations of PCBs or polychlorinated biphenyls in the fish and crab of the canal is two times higher than the average PCB concentration in the Upper New York Bay. This level was taken at the surface of the canal, and if one was to go even deeper to the depths of the water, the level of PCBs is even higher. The “normal” level of PCB in the Upper New York Bay is under 2mg/kg (EPA). The levels of PCB deep down in the Gowanus canal in the soft sediment was found to be 66mg/kg (2012 National Grid Survey). This is clearly not safe and poses great risk to humans. Consumption or exposure to PCBs has been proven to cause a number of issues including: increased risk for cancer, decreased conception rates, learning deficits in children, and a weakened immune system.41

The EPA has not studied the small microbial content in the canal. The EPA’s reasoning for this is that the oxygen levels are so low that it would be highly unlikely for microbes to even

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survive. However, outside sources such as Nasreen Haque, a microbiologist, have done tests with surprising results indicating a number of microbial pathogens including odd white clouds of biofilm. These biofilms are supposedly very rare clumps of white colored mush that sit just below the surface. Although not addressed by the EPA there is clearly a high amount of coliforms (e-coli) given the disturbing levels of fecal matter in Gowanus. “The levels of fecal matter, usually measured in parts per million, can be measured in parts per hundred in the Gowanus”. Most know that e-coli itself, without the other numerous toxins in the canal, can be vastly harmful to humans.

Humans aside, how is the Gowanus affecting wildlife and the “ecosystem” (if there is one), surrounding the canal? The EPA did an ‘Ecological Risk Assessment’ looking at: Benthic (sediment dwelling) macro invertebrates, water column dwelling aquatic life, and avian wildlife (aquatic herbivores, omnivores and piscivores). Benthic communities seem to have a potential risk because of the chemicals in the sediment, more specifically in the central area of the canal where pollution and contamination is the highest. PAHs are highly prevalent in these areas as well as PCBs which can greatly hurt these benthic organisms. Herbivores such as the black duck are at risk from consuming PAHs in sediments. Avian omnivores are also at risk from exposure to mercury and selenium. Mercury is found in both fish and crab in the canal at levels high above those in the Upper New York Bay.

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Aside from the technical EPA findings, it can be more informative to look at real life examples of wildlife in the Gowanus Canal. Of course in the 1600s when the Gowanus canal was only a glint in Daniel Richard’s eye and the Gowanus creek was clean and healthy, oysters thrived and were plentiful. However, now it is much more difficult to find wildlife living let alone thriving in the canal’s waters. A more well known tale is one of ‘Sludgie’ the whale who was found drifting in the canal in April of 2007. The whale became very popular among the media as Gowanus goers watched with a curious eye. In his book, Alexiou describes Sludgie’s appearance as “an enthralling reminder of the natural world in a seemingly endless stretch of concrete”. However, a storm came in shortly after Sludgie’s appearance causing massive amounts of sewage to float into the canal. The whale could not survive in the presence of such toxins and even banged her head multiple times on bulkheads. On April 17th a witness is said to have seen “Sludgie thrashing in the water...she then beached herself onto some rocks and...died just before five o’clock, only a single day into her celebrity”. Sludgie is just one example of many types of animals drifting into the canal only to find a habitat simply uninhabitable and deadly. It’s incredibly sad to think that the state of the the Gowanus Canal is quite literally killing wildlife.

Chapter 4 POLITICS: The Forces and Voices behind the Journey of Cleaning the Canal
Both Small and Large

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43 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 3
44 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 4
45 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 5
Unfortunately, Gowanus still lacks a very cohesive driving force or political mechanism with regards to the cleanup of the canal. The stakeholders seem to be divided into Federal government via the EPA and the local Gowanus community stakeholders. Ever since the Gowanus began to evoke a sense of uncleanliness and bad odors, community members of the area began to take note that change needed to be made to the canal. Although many in the community concur with the idea of the need for change, actually taking action and doing something about the problem is easier said than done. Politics, unfortunately, is needed to create change even when something like the Gowanus canal is in great need of help. Ideas in the past have been made but many have not been approved or even mentioned to the political leaders that matter. For instance, in 1873, many Gowanus residents were becoming fed up with the look and especially stench of the canal. Some people were even driven out of the neighborhood because of the smell. During a meeting with the health committee of the board of Aldermen at City Hall in 1876, a resident of Gowanus said, “Tenants who took up house on first of May were giving them up and moving away”.\(^{46}\) However, this man’s worries were not adequately addressed by the local leaders. The common council gave only $100 to try and abate the problem. This was not even close to being enough money to do anything at all or create change. In addition, community members of this time proposed a “plan to pump the offensive water from the pond and fill it with dirt”, but the plan was never even voted upon. Unfortunately, most of the proposed ideas to clean the canal over the years are rejected because of a common problem: money. In 1880, a Brooklynite named H.S Maxim

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\(^{46}\) Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 222
proposed an idea to dig another canal with a system of locks that would help flush out the pollution of the canal. As most other ideas proposed to help out the waterway, it was rejected because it was deemed too costly and thought of as unnecessary. Many valid complaints about the canal and subsequent ideas for cleanup were made in the 1880s. It is sad to think that real reliable plans for change in the Gowanus canal did not happen until September of 2010 when the canal was declared a superfund site. This is a span of 130 years. One can think about all of the pollution that could have been remediated and avoided, had planning and political action only been taken earlier. The designation of the canal as a superfund would never have happened without local community stakeholders and people that truly care about the canal. Even now, though, there is conflict of political stakeholders and ideas, which is slowing down the process of cleanup.

Currently, there are a number of political stakeholders in the Gowanus community. Numerous groups have formed over the years in an attempt to push for faster and better cleanup of the canal. One group in particular calls themselves FROGG or “Friends and Residents of Greater Gowanus”. This group is one of the largest and most effective of the local Gowanus community groups. Their mission is to “Work towards an eco-safe and healthy Gowanus Canal corridor and watershed including restoration of the natural environment; save and protect its industrial heritage and support its innovative and creative future; and maintain an organization that affords communication opportunities to the community at large”. FROGG was actually a large

47 Alexiou, Joseph. *Gowanus: Brooklyn's Curious Canal*. Print pg. 226
48 http://froggbrooklyn.org
proponent turning advocating for the Gowanus Canal to be a Superfund site. In 2006, FROGG held a community forum to carefully discuss “the roll of each branch of government in achieving a clean healthy environment for the Gowanus region”. Some groups at this discussion included: the US Army Corp harbor division, people from the City’s department of Environmental Preservation, representatives from the NY State department of environmental conservation and representatives from the federal EPA. After this, in December of 2008, the commissioner of the department of environmental conservation, Peter Grannis, asked the EPA if they could consider analyzing the canal as a Superfund site. Throughout the next year the EPA evaluated the canal and found that that it did qualify as a superfund site. However, Mayor Bloomberg at the time opposed the idea of pegging the canal as a superfund site. He thought he could clean the canal through a plan he had proposed through public funding. However, his plan had never really moved forward in the 8 years since its initial proposal. Finally, in March of 2010, the EPA disregarded Mayor Bloomberg’s concerns and officially declared the Gowanus Canal a superfund site. Not only was FROGG a big help in declaring Gowanus a superfund, they also helped in preserving an old brick industrial building right along the Gowanus from becoming a 7 story luxury apartment complex. Most community members of Gowanus were against this idea. FROGG and other community groups gave a number of testimonies against the use of the space for luxury apartments to the BSA(Board of Standards and Appeals) for a total of two years. Their work paid off and in February 2004, the application to turn the historical Gowanus building into condominiums was denied. This

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49 http://froggbrooklyn.org
fight is completely in line with FROGG’s goals for Gowanus as from the very beginning they have believed that “any properties that slipped through their watch could open the real estate floodgates, creating precedent that would transform their neighborhood into something they didn’t recognize”. FROGG has stuck to their guns and worked hard to maintain the neighborhood character and create a healthier Gowanus.

Another important political stakeholder for Gowanus is a community group called Bridging Gowanus. Like FROGG, Bridging Gowanus was formed to create a healthier and cleaner Gowanus. They are also proponents for proper, safe infrastructure and land use regulations surrounding the canal. Bridging Gowanus is slightly different from FROGG as it has created a more concrete community planning framework for the future of the canal. This framework was created through numerous meetings and conversations with Gowanus residents and community leaders. On their website it describes their process as,

“The community planning framework presented on this website is the result of many hours of public meetings with several hundred people – long-time and newer homeowners, tenants, and NYC residents, small business owners, environmental activists, artists, affordable housing advocates, and more. Together we grappled with challenging questions, discussed different viewpoints, articulated broadly-shared goals, and found substantial agreement on the core values that should shape future actions in Gowanus.”

The outline created by Bridging Gowanus is comprehensive and carefully goes through all the necessary problems and needs regarding the Gowanus Canal and the industry and infrastructure around it. In the outline they briefly go through the industrial contamination of the canal and also

50 Alexiou, Joseph. Gowanus: Brooklyn's Curious Canal. Print pg. 345

51 http://bridginggowanus.com
touch on the waste and storm water management issues. They consider the burden of the space around Gowanus and what it can be used for. Bridging Gowanus is an important community stakeholder as they are extensively organized and ready to make change.

Although local stakeholders like Bridging Gowanus and FROGG are forces committed to helping to clean and better the Gowanus, now that it has been declared a superfund site, the EPA is the leading driving power of change (hopefully). In its Superfund Site document, there is an outline for the future plans of cleaning up the canal. Generally the proposed plan is to remove contaminated sediment in the canal, reduce sewage overflows and other land-based sources of contamination.\(^{52}\) When getting more specific, the EPA divides the canal into three parts. This is necessary because the canal has almost no current. Which has resulted in different areas of the canal being more polluted than others.

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The first part of the canal is from the very tip of the canal to third street. This segment will require dredging of about 307,000 cubic yards of contaminated sediment. However, in this area there is also a large amount of deep liquid coal tar that comes to the surface of the canal. To clean this, the EPA plans to “stabilize” it by mixing it with materials similar to cement. This will hopefully stop the liquid coal in its tracks. The plan is to then cover this stabilized area with a material that can absorb and remove PAH contaminants that come from deep below the canal. To ensure cleanliness there will lastly be a security or “armor” layer. This layer will consist of gravel and other heavy stones so as to prevent erosion from boats. Then, to make the canal a hopefully livable habitat again, sand will be placed as the last layer at the canal bottom.\(^5^4\) The second segment

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of the canal is from 3rd street to just about the Hamilton Avenue Bridge and will be worked on the same way as the first segment. The third segment runs from the Hamilton Avenue Bridge to the mouth of the canal. This part is slightly less contaminated than the first two, but is still in need of great help. With less than the first two, this segment requires 280,000 cubic yards of contaminated sediment. Like the first two, this segment will have “armor” layers and also layers of sand to be extra protective. The EPA also notes that it is imperative to clean the 1st and 5th street turning basins as they are deeply contaminated. This type of plan is carefully protective of not just human but also ecological health. In the Superfund Document it states, “Placing such an active cap over the contaminated native sediment remaining in the canal would prevent exposure to human and ecological receptors, thereby reducing and controlling toxicity to benthic organisms and eliminating the risks to herbivorous birds”.

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The EPA is careful to lay out everything in the superfund plan. The plan includes consideration of the issue of managing the contamination of the canal once the technical cleaning and dredging has been finished. The idea for the removal of dredged sediment is to take it away

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from the canal where the organic contaminants in the sediment can be taken out and then reused in an environmentally sound way. For example, ideally it could be used for something like a landfill cover or incorporating it into construction materials like concrete.\textsuperscript{57}

There is still the issue of the Combined Sewage Outflows. The EPA plans to significantly reduce the amount of contaminated sewage solids from CSOs by adding retention tanks to greatly lessen the amount of solid discharge.\textsuperscript{58} If this is not done, the CSOs will continue to pollute the canal with these discharges even after sediment cleaning. Along with the combined sewage outfalls, the contaminated land sites from previous industrial sites surrounding the canal are addressed. According to the EPA, these issues of contamination are being (or will be) addressed by the New York State Department of Environmental Conservation. According to the EPA, the total cost of the entirety of the Gowanus Canal cleanup is estimated to be $506 million.

Outside sources of political urban environmental cleanup may prove helpful to the Gowanus Canal as well. For instance, former mayor Bloomberg’s plaNYC may proved assistance. This plan is a comprehensive plan for a greener and healthier New York City. A part of this plan an element called “Vision 2020” which is an effort for NYC to reclaim its waterfronts.\textsuperscript{59} The

‘vision’ has been relatively successful so far, opening up and reclaiming a number of waterfronts in New York City. The Gowanus Canal is actually an important aspect of this plan. Inside the “Vision 2020” is a goal to create a clean Gowanus watershed with parks and a vast amount of wildlife and nature along the waterway. If cleaned and flushed out carefully, properly, and permanently, the Gowanus canal can become an essential and beautiful aspect of New York City’s waters as displayed in Bloomberg’s plan. The fact that the Gowanus Canal is included in proposals like plaNYC is encouraging as it gives hope that political leaders are recognizing the Gowanus as in need of great and imminent change.

It is important to note that one of the most important factors in driving political change is increasing awareness of the issue at hand. A number of people and communities throughout the Gowanus and Brooklyn area have done a great deal to raise awareness about the extent of contamination in the Gowanus canal. One example in particular was a man named Chris Swain who swam the length of Gowanus in its entirety simply to prove a point.

Chris is 47 years old and an environmentalist. It took him 40 minutes to swim the Gowanus on April 22, 2015 (Earth Day). When he got out of the water he had to be rinsed off with bleach and rinsed his mouth with hydrogen peroxide. In the New York times article on Chris’s swim through Gowanus he says of the water,

“The water was 50 degrees and it tasted like blood, poop, ground-up grass, detergent, and gasoline,” he says. “This is a no-joke, big, difficult cleanup. So what I’m here to say is even though

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it is discouraging, even though it is difficult, let's find the courage to do it anyway. "After that, he got his bleach bath."

Although slightly crazy considering the intense amount of contamination in the canal, events such as this swim done by Chris Swain is a huge help in bringing awareness to the canal to further political aid and change. Masses of journalists came to watch Chris swim and subsequently ask him questions and take pictures. Awareness is the first step in gathering enough voices to push the politics towards this pressing issue.

Unfortunately, in the USA today politics is almost the most important aspect of trying to get an environmental issue solved. The Gowanus has had a long journey to get to the point of a Superfund Site. If only local leaders had addressed to growing concerns about the canal over the years, it could have been stopped before getting to the level of designating Gowanus as a superfund site. This was, however, a huge step as it allowed the EPA to conduct comprehensive tests on the canal and then create a conclusive plan for cleanup in the next years to come. Community members and stakeholders aided vastly in the journey to the superfund and are helping now as well to raise awareness and create the push the EPA needs to get its plan off on the right foot.

CHAPTER 5 ECONOMICS: What is Gowanus truly Worth?

Economically, the cost of cleaning up the Gowanus canal is currently estimated at $506 million. Apart and in addition to the technical estimate of cleanup, any economic analysis of the canal must also look at the use of the land surrounding the canal.
The use of environmental economics can prove helpful when looking at the cost and benefits of cleaning up the Gowanus Canal. For instance, when community members first started to push for cleanup of the water, the response from the political stakeholders was often that it was too costly. However, this is only taking into consideration the monetary cost of remediation and construction. The intangible costs of other things occurring without clean up were not taken into account such as public health costs, cost of the loss of recreational space and the possible cost of a lower mental state from living in and around a contaminated waterway. If economists looked at these negative externalities in the past, maybe clean up would have happened much sooner. Even the “Pareto” inefficiency may come into play. The Pareto inefficiency is when economically, some people are made better off where others are made worse off. If political stakeholders say no to clean up of the canal, are they saying that the lives of the people of Gowanus are not worth enough money to clean it? Thus in the absence of cleanup, prices of housing around Gowanus will stay low because of the stench and muck of the canal. Therefore, people around the canal will constantly be low income people who get the brunt of the toxins from the canal. In the Economist Special Edition of 2013-2014 it says of the Gowanus,

“Like other post-industrial areas in the city, New York’s Gowanus neighborhood is getting stylish. But those who venture there after a heavy rainstorm might rethink their plans to buy that loft. When the city’s ageing sewerage system is overwhelmed, untreated storm water and sewage
flood into local waterways, including the Gowanus Canal. The resulting whiff is sure to keep property prices at a level starving Brooklyn artists can afford”.61

Even in the 1980s striving artists came to Gowanus to utilize the cheap open industrial space right along the canal.62 So, because these artists cannot afford to work or live in Manhattan they are forced to use the industrial sites along the canal to live in, which are cheap because of their proximity to toxicity. This economic problem has left the past 100 years of Gowanus with virtually no change in the cleanliness of the canal. This is why the declaration of the Superfund site in 2010 was so important because it can truly push for change. However, even after the Superfund declaration of Gowanus, some people still felt it was a bad idea economically. The announcement of the Superfund “surprised and enraged city officials, who warn that the ‘stigma’ of being included in the program could halt economic improvement indefinitely”.63 Many thought that the Superfund name would put investors at risk and feared the EPA would force the parties responsible for pollution to pay for it, which actually became true. The EPA states that where possible, the federal government identifies businesses and other entities responsible for the pollution and orders them to help pay for the cleanup.

Not only is there the cost of the health of the people of Gowanus but also the cost of the lack of recreational space and greenery. Because of the state of the Gowanus waters, it leaves

61 The Economist. Special Edition: Revaluing ecosystems. Pg. 20
62 Alexiou, Joseph. Gowanus: Brooklyn's Curious Canal. Print pg. 330

63 Alexiou, Joseph. Gowanus: Brooklyn's Curious Canal. Print pg. 351
something of an economic void near and around the canal. The economic benefits of having a clean new park in the Gowanus area would be incredibly drastic. Only a short subway ride away from the children dominated Park Slope, a local Gowanus park would be deeply beneficial to the community and could incorporate other things such as markets and stores. In a New York Times question and answer, Jack S. Nyman, the director of the Steven L. Newman Institute at Baruch College, responds to readers about the clean up of the Gowanus Canal. He says, “Its restoration is central to the neighborhood’s economic health and further revitalization. Indeed, it is Gowanus defining feature, and this sense of place must not be lost. The community is clamoring for its remediation.”

Jack also notes that a new urban design including ecologically sound landscapes, and large open spaces and parks could help in linking the new neighborhood to its old roots and also the city as a whole. Although filling in the canal would be less expensive, it would not provide the community with this historic and nostalgic connection to Brooklyn’s waters. In addition to this, the canal is still connected to the New York-New Jersey harbor estuary which supports wildlife. “Situated next to major city highways and along two subway lines, Gowanus is unusually well connected to the rest of the city.” Once the canal is clean it can aid in the economic growth of the community. “As one of the only canal-based communities in the city, Gowanus brings rare

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assets to the table. A clean waterway would support new parks, bicycle pathways and waterfront housing”. If the Superfund plan to clean up the canal is successful and effective, the surrounding area can benefit economically. The historical connection would still be there from the canal and the benefits from the lack of toxic chemicals as well. This way, cleaning the canal would be better than simply filling it with concrete as a new future would still maintain ties with its historic context.

Even the wildlife of the canal can prove to be economically helpful to the community. Upon looking at cleanup economically, it is important to look at the ecosystem services provided or that can be provided by the canal itself. This is geared towards something more similar to ecological economics. For example, harnessing ecosystem services as a way to clean pollution is currently being used in the Bronx River. Andrew Cuomo “announced that his office will provide $1.8 million of a $7 million settlement with a number of towns in Westchester that had been illegally dumping raw sewage into the Bronx River”. This money will be supposedly allocated to seven different places including New York Botanical Garden and the Bronx River Alliance. The idea is to use the money for natural clean up systems that attempt to mimic natural ecosystems. The plan is to trap pollution before it even reaches the Bronx River. This idea of utilizing the

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natural resources to mitigate the pollution anthropologically done, is something that Gowanus should take into consideration. Utilizing ecosystem services for our water supply is something that New York has been doing for years. New York does not need to pay for large scale management practices of our watershed in the Catskills because we are able to keep and preserve the ecosystems and land to naturally keep the water clean.\(^6\) Actually, it would be more expensive to build the large facilities needed to treat the water, about $8 billion. Instead of doing this, New York naturally keeps the water clean by only paying $200 million per year for upkeep. So harnessing the ecosystem services of the land and water are much more economically sound. Because Gowanus is such an extreme case, serious consideration should be given to using these ecosystem services for cleaning after the major clean up has been done. It would make the most sense to use natural systems instead of paying for and creating large facilities to attempt to upkeep the hopefully cleaner canal in the future. In an Observer article on the usage of ecosystem services in New York notes, “We are beginning to learn that the natural environment is more than something nice to look at or camp in, that it actually does work of economic value that can improve our quality of life”. This quote is extremely important as the natural land and water in Gowanus is so essential not just aesthetically but also economically. The story of the Gowanus Canal is one that we as citizens can and should learn from.

Just like the surrounding area of Park Slope, the Gowanus area has been growing and becoming more gentrified within the past 10 years. This idea of gentrification has the potential of affecting development and economic opportunities. As a result, there is currently a clash between the people of Gowanus who want new development construction in the area and people who want to maintain the somewhat industrial feel that is already present surrounding the canal. The designation of the Gowanus canal as a Superfund Site has affected the economics of development of the surrounding area. “Superfund opponents worried that the designation would lower property values or otherwise harm long-time residents”.  

The clash between the people who believe the Superfund will aid in development and those who think it will economically hurt the area is interesting. Those who see the Superfund designation and cleanup as economically positive believe that Gowanus can create new housing for people with a wide range of incomes (Nyman, 1). This can then stimulate the city’s economy and can be used in other similar urban areas suffering economically.

**Conclusion**

The Gowanus Canal is a prime example of an anthropogenic environmental issue caused by poor planning and lack of compassion for the Earth. The history of how the canal came to be is an interesting story beginning with the simple purpose of transportation. The Gowanus was originally home to the Native American Iroquois tribe, led by their chief ‘Gouwane’. These natives

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utilized the land and water of Gowanus with respect and love, never thinking about the land as a means for money or wealth. It is ironic that a body of water so polluted today is named after a group of people that treated this area with such admiration. After years of change and industry, the canal slowly became polluted with no regards to the future. This lack of consideration for future generations is a theme among many environmental issues we face today. Currently, the canal faces a myriad of pollutants. Without movement, the water of the canal has become stagnant over the years, creating a breeding ground for bacteria and other types of pollution. Until the flushing tunnel was installed, stopped, and then reinstalled, and then the more recent declaration of the Superfund site, the Gowanus canal had just been left with all of this pollution and no help to clean it up. Due to this lack of initiative or help for a number of years, the cleanup now is much more difficult. That Native American sense of respect and admiration for their environment should now be re-contextualized and used by the people today to aid in the cleanup and revitalization of Gowanus.

It should also be re-emphasized that the pollution of the canal is not something to be taken lightly. The toxicity and amount of the chemicals swarming around the waters is scarily real. The water does not contain enough oxygen for life and yet there is still odd bacteria floating around its waters. Toxins like PCBs, fecal metal, Ecoli and hundreds of others are floating around the waters of the canal, not going anywhere. Due to the stagnant nature of the canal, these myriad of pollutants just sit there waiting to for the cleanup that may never come. Of course, the Superfund declaration is a promising start to get rid of these chemicals, however, with local and
more governmental stakeholders clashing with each other, the wait for clean up may be longer than expected. In the meantime, some local stakeholders have taken charge and are doing as much as they can to help in their own small way. For instance, Brooklyn recently has created a small park near the Gowanus Canal named Sponge Park. This purpose for the creation of this park was to lessen the pollution flowing into the canal itself. The park, just opened in the early Spring of 2016, is 2,100 square feet and is planned to stop storm water in its tracks before heading into the canal.\(^70\) This way, the pollutants in the storm water will be absorbed into park through plants like asters, Rosa Rugosa and sedge grass before it can contaminate the Gowanus. Unlike the $500 million project of the 12 year planned Superfund clean up, Sponge Park is estimated to cost $1.5 million. The park has taken a lot of planning, but the construction is the easiest part. Ms. Drake, the architect of the park says, “It was eight years in the planning and will be eight weeks in construction,” she said of Sponge Park. “It’s like assembling Legos”.\(^71\) Even thought the Superfund clean up of the canal will be greatly helpful, continuing efforts such as Sponge Park will be immensely important in preventing future pollution of the canal, which essentially is what the canal needed 100 years ago.

It will ultimately be actions of the locals via efforts such as Sponge Park, that will help in the successful future of the canal. Of course, the Superfund site and the EPA cleanup is necessary.

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However, getting smaller organizations and community stakeholders is a great way to get people in the area interested and involved in the Gowanus Canal, which, I think, is the most important for future and ongoing success. Lack of planning, disregard for the environment and failure to recognize failing systems when pushing developments results in long term disasters such as the Gowanus. New Yorkers should learn from these mistakes. An informed and interested community is a helpful community. This is not just true for the tragic Gowanus canal, but many other environmental and social issues our world faces today.


Collins, Lisa. Gowanus Tide Mill Workshop


The Economist. Special Edition: Revaluing ecosystems. Pg. 20


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