A Historical, Political and Social Look into the Problem of Floatable Pollution in NYC's Bronx River

Zoe L. Bellapigna
Fordham University, zbellapigna@fordham.edu

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Abstract

Once clean enough to be considered as a potential potable water source for New York City, the Bronx River and the overall quality of the water has steadily declined since European arrival in North America. As the socioeconomic divide between Westchester County and the Bronx developed and grew, so did the flow of floatable pollutants in the Bronx River. Quantitative data on the current number and category of floatable pollutants removed from the river in 2017 through the Bronx River Alliances’ Project WASTE is explored to provide the most up to date data on the trash in the river. Research information extracted from the disciplines of History, Environmental Social Justice, and Environmental Politics are incorporated to argue for the importance of increasing community restoration efforts for the Bronx River. The natural history of the river is established to illuminate the enormity of the human environmental footprint that has been left. Restoration efforts for the Bronx River are compared with those of the Hudson River in order to contrast the differences in the response to water pollution made by each level of government regarding two similar urban streams. Finally, quantitative data as well as historical, economic and environmental justice research are used to promote policy changes that prioritize restoration of the Bronx River.

Keywords: Bronx River, floatable pollution, environmental history, environmental justice, environmental politics, water pollution
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Flowing down from the town of Valhalla in Westchester County New York the twenty-three mile long Bronx River was carved out by ancient glaciers and consequently altered by human activity. Today, the Bronx River runs through some of the wealthiest and poorest congressional districts in the state of New York. Named after one of the first Dutch settlers of the Northern New Amsterdam territory in North America, Jonas Bronck, the Bronx River was once a pristine body of water admired by those who experienced it. Reflecting on poems, writings, and paintings, it is evident that the European settlers of the Bronx River Valley had a true admiration for the river that fueled both them and their blossoming industries.

The Bronx River of 2017 no longer fuels the residents of New York City's Bronx Borough, for that job has been taken over by Dunkin' Donuts coffee served in styrofoam cups. Research for this paper will be focused around data collected through my summer internship with Project WASTE (water and street trash elimination), the Bronx based non-profit the Bronx River Alliance’s citizen scientist program focused on floatable pollution. Dressing up in a pair of waders and three layers of rubber gloves, my supervisor and I would take a small group of volunteers into the river to pick up, collect, and sort trash. This process was rewarding in many ways, but for volunteers the ability to clean your community in such an intimate manner is invaluable for the growth of an environmental consciousness.

This internship allowed me to engage with local residents of the community who were interested in taking action themselves and cleaning their river on a Saturday morning. More
importantly, most of our volunteers were groups of middle schoolers which, providing me with
the opportunity to share my passion for a sustainable future with youths. To educate children
about the importance of the environment and the negative impacts of pollution can be an
invaluable experience to have early in life, especially children living in highly urbanized
industrial areas, like Hunt’s Point in the Bronx. Environmental education is the key to
environmental awareness.

The first chapter of this thesis will provide quantitative data on floatable pollution in the
Bronx River from the final published Bronx River Alliance report on Project WASTE for both
2016 and 2017, as well as a brief history of Bronx pollution and resulting restoration efforts. This
data was collected through the work of a Bronx based non-profit organization, the Bronx River
Alliance, and will focus on the number and category of trash removed from the river at two
different established trash booms. Chapter two will delve into the history of both the Bronx and
the river and it’s history of environmental degradation. Industrialization and early European
settlement in the Bronx River Valley will be used as the historical starting point to focus on how
human interference and naivety has severely degraded the appearance and quality of the Bronx
River. Using the Hudson River and it’s past restoration efforts as a basis for comparison, chapter
three explores how the socioeconomic and spatial development of New York City negatively
influenced the future health and quality of the Bronx River. In Chapter 4 environment philosophy
is explored as it pertains developing ethical environmental policies. The final chapter of this
thesis will support the argument that community activism has has the most influential impact on
the Bronx River compared to most efforts, and will suggest a larger incorporation of funding for
community-based activist groups.
Chapter 1: Project WASTE

The Bronx River Alliance staff created a standard Rapid Trash Assessment sheet that was used in every Project WASTE event to record the quantity, brand, type, material, and source of the trash collected. Volunteers worked in pairs to remove and tally the trash in remove before it was placed into a bag to be disposed of. Project WASTE trash assessment events were held at least twice a month in the fall of 2016 and the spring/summer of 2017. Data collection did not occur during the winter because freezing conditions were dangerous for the boom and is thus removed during those conditions. Data was collected with the intended purpose of quantifying the frequency of certain common brands to help identify original sources of the trash in the river. This chapter will focus on both the statistical data conclusions that came from Project WASTE assessment sheets and evaluate it’s significance as the first data produced by a comprehensive study on floatable pollution in urban waterways.

Two trash booms were installed by the Bronx River Alliance in June of 2016 with the intended purpose of capturing floatable trash before it reaches the Long Island Sound. In addition to the removal of floatable garbage from these trash booms, the Bronx River Alliance initiated Project WASTE to count and categorize the floatable pollution to help find non-point sources and spur community activism. The importance of Project WASTE is insurmountable. Previously there was no other data available on the quantity of floatable trash pollution on the Bronx River. Funding for Project WASTE was granted by the NEIWPCC/EPA Trash Free Waters. Floatable pollution is not only a highly visible source of environmental degradation, but also dangerous to wildlife as the chemicals in household trash breaks down. The removal of trash from the boom is both relatively easy compared to other restoration steps and has a "large
aesthetic and recreational benefit,”¹ and has provided community activists with concrete data on the nature and origins of the trash the floats down the Bronx River. Suffice to say, the biggest polluter presence collected this summer was infallibly plastic and styrofoam carry-out food and drink containers.

The Bronx River provides the local ecosystem with important regulating, supporting, and cultural services that are threatened by the negative impacts of human activity. Pollution is cited as one of the direct divers of ecosystem change in the United Nations Millennium Ecosystem Assessment which states that pollution in freshwater ecosystems, including urban waterways, “has had devastating local and regional impacts on the biota of inland waters.”² Also included in this report is a formal acknowledgment that policy decisions to preserve ecosystem services sometimes face a lack published data on various threats posed by human activity.³ Each section of the Bronx River is included in NYDEC’s 2004 list of priority water bodies, and was rated as a category 1 watershed in 2000 by the Unified Watershed Assessment report,⁴ and has remained virtually unchanged to the present day.⁵ The Bronx River is currently labeled by the NYSDEC as impaired for aquatic life and recreation, as it was reported in similar studies conducted in 1998


³Ibid.,


and 2003. The NYSDEP has confirmed that stormwater runoff via combined overflow systems during periods of heavy rainfall directly correlate to an increased presence of floatable debris. Figure 1 shows the total quantity and locations of trash removed from the Bronx River during Project WASTE is 153,138 individual pieces of floatable pollution, the equivalent of 6,700 pounds of garbage in all.

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7 Ibid.,

Commonly accepted by many scholars and scientists, the existence of plastic and other wastes in oceans and other natural waterways is a growing problem affecting aquatic biodiversity and is a detriment to global human health. Urban waterbodies are more susceptible to floatable pollution, and other contamination sources at large, as a result of population density, economic disparity, and industrial activity. Figure 2 shows that styrofoam constitutes 73% of the trash collected during Project WASTE, while 19% was plastic. That leaves only 10% of the total trash collected that falls into the other categories. Of this 10% of the other category, cigarette butts made up 79% of the collected data. As published in the Wetlands and Water synthesis in the Millennium Ecosystem Assessment, “the private benefits of wetland conversion are often exaggerated by subsidies such as those that encourage the drainage of wetlands for agriculture or the large-scale replacement of coastal wetlands by intensive aquaculture or infrastructure, including for urban, industrial, and tourism development.”

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In essence, roughly two hundred years of human activity has decimated the natural health, morphology, and overall quality of the Bronx River and its surrounding residential areas. A dense population in urban areas creates environmental hazards, and the more people added to urban populations only causes more environmental harm.\footnote{Miller, G. Tyler. Living in the Environment: Principles, Connections and Solutions. South Melbourne Etc.: Thomson Learning, 2004. Print. Chapter 17} The last eight of this twenty three mile long river runs directly through the Bronx borough, declared “the nation’s poorest urban county with over 28% of its residents living below the federal poverty level.”\footnote{Miller, G. Tyler. Living in the Environment: Principles, Connections and Solutions. South Melbourne Etc.: Thomson Learning, 2004. Print. Chapter 17} The textbook *Living in the Environment* cites two reasons as to why “small dirty industries have a tendency to
locate in minority communities… One, cheap labor. And two, their relative lack of knowledge about environmental concerns.”¹³ In addition, the internalized racism of the United States combined with the intense economic climate of New York City makes it easy for big corporations to degrade, pollute and exploit the residential areas of impoverished minorities.

Floatable pollution is not only a highly visible source of river pollution for the Bronx River, but contributes to high levels of hazardous chemicals and increases the flow of microplastics in the New York Harbor. Floatable trash in the river is constantly being broken down into smaller pieces by the natural flow tides, sunlight, wind, and many other factors. NY/NJ Baykeeper published a report in 2015 stating that “165 million plastic pieces are floating in New York Harbor; the pieces that were large enough to identify were from dingle use, disposable food and beverage containers.”¹⁴ Project WASTE volunteers from local schools and community organizations aided in the categorization and collection of the data produced, a database of the type, material, and potential sources of floatable garbage in the last eight miles of the Bronx River. Accomplished through the installation of two trash booms catching trash floating down the river in June of 2016, the trash collected for the data was easily accessible and was prevented from reaching the Long Island Sound. Prior to Project WASTE there was no other data sources available to quantify the trash that had floated down the Bronx River.


Chapter 2: A Historical Look Into How Industry and Population Altered the Bronx River

The Bronx River that flows today is quite different compared to the Bronx River that was once a source of both food and water for so many centuries, fueling life for both Native Americans and early European Settlers. Historical poems, paintings and writings provide a powerful insight into the beauty and strength of the Bronx River, making it abundantly clear that those in contact with the river held a deep respect for it. Unfortunately, natural beauty could not protect the river in the eighteenth century when the industrial revolution began. This societal transition completely changed how the human world operated and created an era of humans irreversibly degrading the environment. In 1840 the first railroad was constructed in the Bronx along the river. The channel of the river was changed with construction of the Bronx River Parkway in 1925, and further exacerbated the degradation of the river. It would be extremely challenging for today's residents of the Bronx to imagine the clean, strong flowing river that Joan's Bronck saw when he first arrived.

Born in Sweden, Jonas Bronck was a ship merchant before moving to the Dutch North American territory of New Netherland in 1639 where he purchased a 500 acre plot of land that included a section of the Bronx River. Fifteen years prior to Bronck’s move the Dutch established their first colony in lower Manhattan, and Bronck was one of the first Dutch settlers to live in the Bronx River Valley. Jonas, along with his family, built a tobacco farm that rested on a five-hundred acre area of land that ended close to the river, but did not technically include the river in the property. The farm was prosperous but unfortunately, passing away only four years
after he arrived, Jonas’s time spent in the pristine river valley was short lived. Despite this, his presence in the Bronx has been immortalized through his name, Bronck’s River. (Folklore)

In the eighteenth century, the colloquial term “Bronx” was adapted to refer to the river that powered the beginning of industry in North America, but people still admired it’s natural beauty nevertheless. Joseph Rodman Drake, a relative of the Hunt family, notorious for owning a beautiful estate on large property in what is now known as Hunts Point. (Folklore) Drake’s occupation in life was as a physician, but he spent the last years of his life living on the Hunt’s family estate, where he quickly fell in love with the Bronx River. After being diagnosed with tuberculosis Drake took refuge in the beauty and quiet serenity of the Bronx River. In fact, he became so enamored with it that much of his poetry and writing was inspired by the river. One poem titled “Bronx” was dedicated entirely to the river. (Folklore) Even famous poet Edgar Allen Poe was attracted to the Bronx River Valley and moved into the Fordham area seeking a quiet place for him to spend time with his ailing wife. It is believed that many of his poems during that time period are inspired by the Bronx River. Before the effects of pollution from industry on the river took hold it was a beautiful place for those seeking refuge.

Though mill dams operated on the Bronx River for a period of 145 years, starting near the end of the seventeenth century with the Richardson Saw Mill Dam. These mills mostly produced biodegradable materials at a rate that the river was able to process, but still hindered the lives of fish in the river. (maarten) The nineteenth century marks the point of no return, so to say, as industrial mills were being constructed on the river at a fast rate. These mills used the convenience of the flowing water was a way to dispose of excess wastes, and so chemicals such as lead, cyanide, bleaching products etc., as well as human excrement was rapidly finding its
way into the river. The Lorillard snuff mill was the first mill of the river that contributed pollution into the river at a rate that was not sustainable. It was built in what is now the New York Botanical Gardens and the building still stands today. The nature of industry is to expand, and expand it did. Snuff, textiles, rubber, gun powder, and paint mills are just a few of the production mills that could be found on the river in the nineteenth century, dumping their production wastes into to river with no regulations to stop them, and no thought about the environmental consequences.

Mills on the river were not the only influences humans had and, in fact, a much more drastic change was made in 1885 with the completion of the first Kensico Dam. Infamous for demanding more, in 1915 a larger dam was completed in Kensico in order to create a larger water reservoir for residents of New York City. This action decreased the flow of the Bronx River by 25% by reverting the course of its headwaters and affected the natural ability of the water to clean and process waste.\footnote{de Kadt, Maarten. The Bronx River: An Environmental and Social History. The History Press, 2011.} Urban development in the Bronx increased in 1841 when the Harlem River Railroad was built and new train stations emerged throughout the borough.\footnote{Crimmens, T. (2016). \textit{Ecological Restoration and Management Plan} (Issue brief). Bronx, NY: Bronx River Alliance.} The population and development of the Bronx began to grow as transportation became more easily available. Additional railway lines were added to ares in the Bronx between the years of 1904 and 1920,\footnote{Ibid.,} thus beginning it’s transformation into an urban borough. The increase of transportation technology continued to effect the natural environment of the Bronx, and in 1925 the Bronx River Parkway was constructed. The parkway was built with the intention of reducing...
pollution to the Bronx River by incorporating a park on each side of the river. The transportation industry had an negative impact on the Bronx River as it’s natural course was altered and straightened in order to make room for the tracks. The natural bends in rivers creates an almost mixing effect that is useful in managing various pollutants. Later on in the early twentieth century, the course of the river was altered once again to accommodate the installation of sewer pipes.\(^\text{18}\) The last massive alteration of the river’s channel was executed by the hand of Robert Moses in the 1960’s in order to build the Sheridan Expressway in the South Bronx.

All of these man made changes to the river would eventually have a detrimental impact on the health of the water, but these were unforeseen repercussions that took years to come to fruition. Parts of the river were sectioned off and rendered inaccessible and abandoned as the channel was altered. Construction of the Bronx River Parkway had many negative effects on the Bronx River, including, but not limited to, the removal of important shrubbery on the river banks. Designed with a strip of greenway to separate the river from the road as an attempt to protect and beautify the river, the parkway actually created two different sources of pollution for the river. Flooding was more likely due to the lack of protective shrubbery and loss of wetlands along the banks of the river, and pollution from cars which was an entirely new source of pollution for the beaten down Bronx River.\(^\text{19}\)

Shrubbery along the sides of rivers are crucial to prevent flooding, but when the path of the river was changed to accommodate the increase in human population and industry, all of this


shrubbery was removed. The speed of the river and it’s natural bends that had allowed it to absorb and manage pollutants were depleted by the very humans who pollute it. Today, the Bronx River is a fairly sad sight to see, especially when canoeing around the industrial area that is Hunt’s Point, the mouth of the estuary and the end of the river. Efforts to clean up the River exist, and throughout history funding has been provided local, state and federal levels of government.

The first group organization completely dedicated to the restoration of the Bronx River was established in 1974. Dubbed the Bronx River Restoration Project, the organization was assembled by community activists dedicated to reclaiming their borough. The effort of this group resulted in the removal of debris from the banks of the Bronx. Partnership for Parks adopted the reclamation of the Bronx River into their mission statement in 1997, and a Bronx River Action Plan was drafted in 1999. This Action Plan included an initiative to build a Bronx River Greenway, a continuous route of green space that runs along the River which is open to community use. There is currently a Greenway Team on the Bronx River Alliance that is aimed at furthering the development of this project.

Despite this, industrial activity continues to occur on the river, within on of the most dense urban residential areas of the the Bronx, Hunt’s Point, which happens to also be the Bronx district with the highest rate of poverty. Trash enters the river from all angles, from barges shipping out cartons, auto parts, sheets of meta out of Hunt’s Point, to litter thrown out of cars as they drive back to Connecticut up the Bronx River Parkway. As it stands today, the river can’t

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22 Ibid.,
avoid trash. From the start of new European arrival in the Bronx River Valley human impact affected the Bronx River, but nothing changed its future more than the industrial revolution. Money and greed created industries that needed the river’s resources but did nothing for said river other than pollute and destroy it. In the beginning of industry, it was still a place a serene beauty, but as commodification grew, so did the mills and the waste and the dams. The ancient River that enamored so many for centuries became so unimportant in the blink of an eye. Those who lived near the Bronx River during its prime are among the luckiest New Yorkers to have ever existed, for the historical accounts of the beauty and joy this river brought to so many people are undeniable. The driving force behind the creation and continuation of restoration efforts for the Bronx River has always been community activism.
Chapter 3: Population and Pollution: Hudson vs Bronx Rivers

When exploring the urban streams of present day New York City, a clear parallel emerges between residential socioeconomic status and overall water quality and health. The New York City Federal Housing Authority unwittingly influenced the future health of the city’s urban streams by basing spatial arrangement on race and ethnicity. Today the Hudson River terminates alongside some of the wealthiest upper-class white neighborhoods in Manhattan, while the confluence of the Bronx River at the Long Island Sound is the location of one of the most impoverished residential districts in the city. The stratification of residential areas in New York City by race and socioeconomic standing defined the future valuation of the Bronx and Hudson Rivers. This disparity is evident when comparing past restoration projects of both rivers in response to the anthropogenic changes they endured.\(^{23}\) Throughout the 1970’s the popularity of the environmental movement in the urban population of New York City was increasing, the chemical contamination levels in the Hudson River was reaching an alarming rate, and the Bronx was burning.

The expansion of urban industrialization in New York City throughout the twentieth century resulted in an increase in population as well as escalating racial tensions, socioeconomic stratification, and residential segregation. This increase in population and racial tension were influenced by the Great Migration, the movement of African Americans from rural towns of the

south to industrial cities of the north throughout the first half of the twentieth century. Coupled with the continuous growth of economic activity, the growth of the urban population in New York City increased discrimination and violence over housing opportunities, employment, and access to resources. The solidification of racial status during this time is perhaps most evident in the segregation of residential areas, which is exacerbated by New York City zoning ordinances. The historical segregation and discrimination of residential areas in New York City demonstrates how cumulative effects of the past can influence outcomes for the future.

Harlem was once a wooded area and was considered the northern most suburb of Manhattan pioneered by the Dutch, French and the English. By the 1840’s the agricultural land in Harlem was of no use to farmers due to centuries of use and became and attractive place to build property. Much of the topography of Harlem prior to the twentieth century consisted of marshland. However, in 1870 New York City filled in roughly 1,350 acres of this marshland in Harlem and sold the property to the public, encouraging the construction of new residential buildings. New York City’s Federal Housing Authority (FHA) solidified neighborhood borderlines within the five boroughs in the 1930’s by making the population demographic of

25 Ibid.,
27 Osofsky, Gilbert, Harlem; The Making of a Ghetto, (73)
28 Ibid.,
29 Osofsky, Gilbert, Harlem; The Making of a Ghetto, (75)
each neighborhood tangible. This was done through a zoning process, known as redlining, which theoretically mapped out New York City neighborhoods and color-coated them based on their risk of “succumbing to social deterioration.”

The reality of redlining by the FHA was that every neighborhood was color-coated according to its ethnic and racial mix and the risk associated with loaning mortgages to respective residents. All streets that were predominately inhabited by non-white residents were colored red, including the entirety of the South Bronx. The United States saw a post-Vietnam War housing boom in the 1960’s which led the Federal Housing Authority to develop programs to help lower mortgage payments for new houses, creating new incentives for white upper-class residents to leave the burgeoning urban metropolis and move out to the suburbs of Westchester and Nassau County. The urban space of Harlem deteriorated as the population increased, landlords lost interest in building maintenance when they had no other option then to rent their properties to tenants of color, and by the 1960’s almost all white Harlem residents had fled to residential areas below 125th street. Many of the neighborhoods redlined by the FHA in the 1930’s have maintained a low socioeconomic status to the present day.

The General Electric Company, first established on the Hudson River in 1892, expanded its manufacturing operations downstream as American demand for electrical supplies grew. By 1947 the company had incorporated the use of polychlorinated biphenyls (PCBs) to act


32 Ibid.

as a coolant, unaware of the lasting impact this chemical would have on the future health of the Hudson. The New York State government formed the Hudson River Valley Commission (HRVC) in 1965 in order to review environmental propositions, and was the first legislative environmental commission in the state of New York. In addition to PCBs, sewer and material waste comprised the largest percentage of pollution until the Environmental Protection Agency (EPA) was formed and took action in the 1970’s. The EPA played a massive role in providing aid to the Hudson river by banning PCBs under the Toxic Substance Control Act in 1977, and establishing 70 water treatment plants on the river between the years of 1972 and 1985. The United States has spent roughly $368 million dollars protecting and restoring the Hudson River.

The role of governmental aid in urban river restoration efforts in the 1970’s is perhaps one of the largest discrepancies between the Hudson and Bronx Rivers. The Hudson River Valley Commission was established by the New York government and was the first organization focused on the environment of the Hudson River. The first organization to defend the Bronx River was created in 1974 by a small group of community activists, but their efforts were hardly noticed until 1997 when the Bronx River Working Group was formed by Partnerships for Parks and started with 60 local community organizations. The Hudson River has received $368 million in funds since 1994, allocated to restore and protect the river and its health, a massive amount when compared to the ~$70 million in funding received by the Bronx River since 1997.34

Formed in 2001, the Bronx River Alliance was the first permanent organization striving to return health to the Bronx and it’s urban waterway.

Chapter 4: Environmental Justice: Looking at the Bronx River Through an Ethical Lens

There is a strong tie between justice and equality, a tie which is not accurately represented in the health of urban streams in low income residential areas. Industrial activity is still rampant along the Bronx River, polluted at an alarming rate few residents are aware or concerned about. This lack of awareness and education is what allows upper-class wealthy stakeholders to earn money off of building in low income areas with an available workforce of cheap labor. When this activity is examined behind the veil of ignorance proposed by John Rawls, it would lead him to the conclusion that the treatment of the Bronx River is not ethical. It is undeniable that the decision regarding the location of industrial production operations closer to urban centers with a larger working force willing to be paid below livable means, and thus led to the current climate of environmental injustices in urban areas. The environmental consciousness of a society is an essential element that determines the overall philosophy and health of a community and it’s natural surroundings.

Human beings tend to think in a chronological order and often fail to acknowledge potential negative impacts to the health of future generations. Industry was developed by a generation of humans who had no idea their actions were detrimental to future health of ecosystems, and they didn’t even have a full grasp on the true importance of biodiversity. Decisions that hurt the environment in the beginning of the industrial revolution were made by people who were unaware of their actions, but the continuing presence of these industries in low-income urban areas are made deliberately by those who will not be effected. One’s social construction of reality is developed through experience and is directly tied to one’s
environmental consciousness as a citizen stakeholder. Miller’s environmental textbook lists three important ideas that form the foundation of environmental consciousness. First, natural capital matters because it supports the earth’s life and what we base our human lives around—economies. Secondly, it is important to know that our ecological footprints are immense and are expanding rapidly. Finally, ecological and climate-change tipping points are irreversible and should never be crossed, and once we cross such a point neither money nor technology can save us from the resulting consequences. The future generation of low-income residents in urban areas were constructed by the lack of an environmental consciousness of upperclass citizens with power to make influential decisions.

Philosophical ethicist John Rawls published *A Theory of Justice* which outlines his theory of what is right, and can be applied to issues of environmental injustices and open the minds of those who do not value environmental resources. He proposed that all moral and ethical decisions should be made behind a “veil of ignorance,” meaning the subject is unaware of their, race, gender, or economic standing. Most importantly, however, is that the subject is unaware of his/her place in time or species. According to Rawls, when decisions are made under a veil of ignorance it is assumed that questions of distribution would be answered in the most equal and ethical manner possible. When used to assess a problem of environmental injustice, a philosophical approach to evaluating environmental actions can help policy makers to take into account the ethical implications of their decisions.

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account the importance of human well-being and how it can be influenced by the natural
environment. Natural capital matters because it supports the earth’s life and our economies, yet
the true costs of the environmental degradation resulting from industrial activity is not
incorporated into the economic market price of a product. Markets very often fail in the
prevention of the degradation of natural resources because they do not assign a monetary value
to the use of natural resources. Impoverished communities like the Bronx are more dependent on
the ecosystem and its services when compared to more affluent communities like that of
Manhattan. Policy decisions effecting the Bronx River fail to account for the true value of
ecosystem services in maintaining human well-being, and has resulted in policy decisions that
turn a blind eye to the importance of natural capital.

Human well-being is directly tied to the health of the natural ecosystem is based upon the
socioeconomic standing of a community. Poor urban communities are more reliant on ecosystem
services to support their day to day lives and, as a consequence, are more exposed to the negative
effects of reduced accesses to natural resources. The health of an urban population is also
affected by the quality of water and air, and disproportionately harms communities located
around polluted urban streams. In addition, policy makers who decide on important
environmental actions are rarely personally motivated behind the issue as opposed to community
activism groups who are fueled by a passion to reclaim the natural beauty of their
neighborhoods. If all policy makers adapted a more compassionate approach and employ an

ecosystem services in deprived urban areas: Understanding people’s responses and consequences for well-

39 Ibid.,
environmental philosophy into the process of decision making then more impactful and sustainable policies will result.

Applying Rawls ethical theory of virtue can extremely useful in identifying potential environmental injustices in impoverished urban areas, and is accomplished through something as simple as his veil of ignorance. The veil can expose the biased nature that exists within industrial activity being located in low income residences. Moral arguments are made by humans reflecting on different courses of action, and eventually coming up with a rational and moral conclusion. The challenge with this is there is no universal definition of morality and in turn not everyone holds the same viewpoint about the natural environment, eventually leads to controversy. Varying valuations of the importance of ecological services has changed and evolved with emerging information, whether they are based in religion or science. While developing a viewpoint on the environment is a natural first step, the ability to apply an ethical code to the issue when discussing important natural issues about the environment can lead to a larger agreement among the myriad of environmental stakeholders that exist in America.

Chapter 5: Keeping the River Afloat; Exploring the Importance of Community Activism and Grass Roots Movements in Protecting the Bronx River

A great majority of urban New York Citizens lack instinctual ties with nature because of dense urban residential life compounded with a severe lack of access to natural ecosystems.
Love for nature grows from times spent as a child climbing trees in the woods, or spending all
day off from school on a sled speeding down snowy hills. Required environmental education and
awareness is an important step humanity must take towards a more sustainable future.
Opportunity hoarding is a term referring to the way in which specific portions of the population
benefit from resources while simultaneously excluding others from said resource. This
phenomenon is especially prevalent in places where two difference socioeconomic of people are
living in the same area but in different neighborhoods, and the Bronx borough in comparison to
the borough of Manhattan is a perfect example. Residential segregation based on socioeconomic
status and race defined the spatial arrangement of New York City’s population and influenced the
future degradation of the natural environment surrounding each borough.

The ecological problems found in Bronx River are results of intense industrialization
coupled with an unprecedented urban population density that severely lacked environmental
literacy or exposure. Human activity is the root of pollution in all of New York City’s urban
waterways, but the discriminatory nature of the socio-spatial development of New York City has
perpetuated the degradation and lack of awareness of the importance of urban aquatic
biodiversity. Historically, community activism and grassroots movements have been there to
support and protect the Bronx River when the government failed to do so. Habitat restoration,
water quality improvement, and trash removal have all been funded through investments.
Incorporating the local community as Citizen Scientists in the collection of data on the health of
the river has increased awareness of the rivers importance.\textsuperscript{40}

In terms of local environmental urban organizations that fight and protect their neighborhood habitats are currently on the rise.\textsuperscript{41} While these programs are started through the federal government, they remain to be non-profits with some governmental ties to aid in their positive impact on the community, as well as to further the success government organizations. Between 1990 and 2000, environmental nonprofits of this origin rose from 7\% to 16\%.\textsuperscript{42} In addition, there are currently roughly 20,000 urban environmental nonprofits in the United States, 11\% of which are focused on wetland and water resource conservation and management.\textsuperscript{43} In essence, local urban organizations have not only been on the rise in the United States, they have proven to provide necessary and useful aid to support local communities who cannot fight for their environment on their own.

The health of the Bronx River has been greatly improved through grassroots community activism in a manner that is incomparable to the aid that has been provided by state and federal governments. This is seen explicitly through the disparity in water quality improvement efforts of the Bronx and Hudson Rivers inc the 1970’s. Both of these streams are urban water ways in the same city, but it is clear that the middle and upperclass neighborhoods along the Hudson were given more attention than the lower class neighborhoods that line the Bronx Rivers. The Hudson was allocated more funding, and in turn necessary steps were taken to clean the waterway including inspiring the EPA to pass a ban on chemicals affecting the rivers health. \textsuperscript{44}

\textsuperscript{41} Ibid.,
\textsuperscript{43} Ibid.,
\textsuperscript{44} Luebke, M. M. (2018). Final Report: Project WASTE.
While the state of New York as well as the federal government has provided funding to clean the Bronx River, true progress has mostly been made by nonprofit community organizations. The Bronx River Alliance is a product of NYC’s Partnership for Parks which assembled 60 different Bronx-based community activist groups into a unified organization in 1997 and named the organization the Bronx River Working Group. In 2001 the Bronx River Working Group created the Bronx River Alliance as a permanent organization dedicated to restoring the river. The Alliance is governed by a board of elected community representatives and works closely with NYC Parks Department. They, in turn, have an elected board of directors who act as a voice for the Bronx community to create and suggest policy recommendations. Funding for Project WASTE was provided by the EPA through the New England Interstate Water Pollution Control Commission (NEIWPCC). The Bronx River Alliance’s final report for Project WASTE included an acknowledgement of the tremendous help this funding was in developing and improving the methodology and application of the program. It is stated that “because of this funding, we [BxRA] have been able to expand our initial pilot study to create Project WASTE, including development of robust Citizen Science programming around floatable trash… one of our primary water quality impairments.”

These groups not only educate Bronx residents about their environment, but also fight for change against active industrial zoning and planning injustices that have decimated the health of

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45 Ibid.,
the river in a way that the government never has. The floatable pollution in the Bronx River is a red flag alerting the larger issue at hand, and the importance of the river and the health of it’s local residents is being undermined by the intrinsic racism and economic stratification prevalent within the population. By increasing recreational and educational opportunities and programs in green spaces throughout the Bronx, more residents will increase their environmental consciousness and awareness of their position as a environmental stakeholders. It is clear that the historical funding of Bronx River restoration have been less than adequate, especially in comparison to the restoration efforts of the Hudson. Continued and increased funding for community-based programs such as the Bronx River Alliance is essential for the restoration of important environmental resources. The trash that flows down the Bronx River every second will only cease when the community of the Bronx is empowered to learn and fight for continued awareness of the contributions of natural biodiversity to their health.

Appendix

Figure 1.1: Spatial distribution of categories of trash collected in October 2017

Figure 1.2: Correlation between water levels and floatable debris
Figure 1.3: Project WASTE locations for installed and monitored trash booms
Figure 1.4: Bronx River Alliance’s Rapid Trash Assessment Sheet
<table>
<thead>
<tr>
<th>Ball/Toys</th>
<th>Total</th>
<th>Metal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennis Ball</td>
<td></td>
<td>Aluminum Can</td>
<td></td>
</tr>
<tr>
<td>Soccer/Basketball</td>
<td></td>
<td>Aluminum Foil</td>
<td></td>
</tr>
<tr>
<td>Golf Ball</td>
<td></td>
<td>Glass (if broken, do not touch)</td>
<td></td>
</tr>
<tr>
<td>Base/Soft Ball</td>
<td></td>
<td>Glass Bottle or Piece</td>
<td></td>
</tr>
<tr>
<td>Plastic Ball</td>
<td></td>
<td>Large (50% &gt; regular)</td>
<td></td>
</tr>
<tr>
<td>Nerf Dart</td>
<td></td>
<td>Regular (snapple drink bottle)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Small (50%&lt; regular)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other glass container</td>
<td></td>
</tr>
<tr>
<td>Toxic</td>
<td></td>
<td>Rubber</td>
<td></td>
</tr>
<tr>
<td>Oil container</td>
<td></td>
<td>Rubber gloves</td>
<td></td>
</tr>
<tr>
<td>Paint Container (Spray or not)</td>
<td></td>
<td>Rubber boot/flip flop</td>
<td></td>
</tr>
<tr>
<td>Aerosol Can (not paint)</td>
<td></td>
<td>Ear Plug</td>
<td></td>
</tr>
<tr>
<td>Lighters</td>
<td></td>
<td>Balloon</td>
<td></td>
</tr>
<tr>
<td>Small Battery</td>
<td></td>
<td>Other Synthetic Rubber</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>Other Foam Rubber</td>
<td></td>
</tr>
<tr>
<td>Hazard (Do not touch, only record)</td>
<td></td>
<td>Metal (cont'd)</td>
<td></td>
</tr>
<tr>
<td>Syringes</td>
<td></td>
<td>Metal Bottle Cap, Beer Cap</td>
<td></td>
</tr>
<tr>
<td>Other Medical Waste/Container</td>
<td></td>
<td>Wire</td>
<td></td>
</tr>
<tr>
<td>Personal care materials</td>
<td></td>
<td>Hanger</td>
<td></td>
</tr>
<tr>
<td>Condom</td>
<td></td>
<td>Auto Part</td>
<td></td>
</tr>
<tr>
<td>Tampon Applicator</td>
<td></td>
<td>Bicycle/Scooter</td>
<td></td>
</tr>
<tr>
<td>Human waste</td>
<td></td>
<td>Other Soft Metal Object (bend)</td>
<td></td>
</tr>
<tr>
<td>Dead Animal</td>
<td></td>
<td>Other Hard Metal Object</td>
<td></td>
</tr>
<tr>
<td>Pet Waste</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodegradable</td>
<td></td>
<td>Miscellaneous (cont'd)</td>
<td></td>
</tr>
<tr>
<td>Paper cup, Starbucks</td>
<td></td>
<td>Pen</td>
<td></td>
</tr>
<tr>
<td>Paper cup, brand</td>
<td></td>
<td>Shoes (not rubber)</td>
<td></td>
</tr>
<tr>
<td>Paper cup, no brand</td>
<td></td>
<td>Light Bulb</td>
<td></td>
</tr>
<tr>
<td>Paper sheet</td>
<td></td>
<td>Furniture (mixed material)</td>
<td></td>
</tr>
<tr>
<td>Paper piece</td>
<td></td>
<td>Mattress</td>
<td></td>
</tr>
<tr>
<td>Cardboard</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lumber</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Waste/Offering</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fabric and Cloth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthetic Fabric</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Fabric</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can't tell</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For the Recorder: please write everything down clearly and neatly, always place a trash piece into the right section.*
References


