



EDGAR DYER INSTITUTE FOR
LEADERSHIP AND PUBLIC POLICY
COASTAL CAROLINA UNIVERSITY

Public Trust Resources, Sustainability and Sacrifice Zone: A
Case of Georgetown, South Carolina

Kelly Shelton

Supervisory Committee

Richard Aidoo
Jacqueline Kurlowski

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ABSTRACT

The City of Georgetown, South Carolina currently has a minority population of 59% with the average median income of \$26,364. 10.3% of population earns less than \$10,000 a year. A concentration of minorities are living in zones of high particulate matter (pm), that is, pm 2.5 and pm 10, which does not meet Environmental Protection Agency's (EPA) regulations as required by law. A formal enforcement of noncompliance was filed by the EPA against International Paper Company on July 22, 2014 for pollution. However, as documented on the EPA Toxic Release Inventory, there were two other significant violations that the state did not address in 2013 and 2014: total particulate matter violations. Studies have shown a link between high levels of particulate matter and high levels of disease. To further these concerns, several other industrial sites are also releasing effluents into the waterway adjacent to Georgetown, Winyah Bay, which is a part of the Long Bay embayment. The Winyah Bay is an estuary, watershed, and a public trust resource. Georgetown is socially vulnerable to geographic and environmental hazards such as sea level rise and flooding due to climate change. These hazards are compounded with other perilous socioeconomic and environmental factors. Other fundamental causes of human vulnerability include a lack of access to resources, information and knowledge, and limited access to political power and representation. This paper analyzes the public trust doctrine, industrial polluters degrading public natural resources, and environmental injustices in a minority community, and provides sustainable alternatives.

INTRODUCTION

This research paper focuses on the public trust doctrine along with citizens' rights with regards to local natural resources. The research considers environmental equity as a policy standard and justification of the public trust doctrine, specifically pollution and the environmental degradation the citizens of Georgetown have lived with for decades. The correlation between high levels of poverty, especially among minorities, and issues of environmental injustice is considered. In Georgetown County, South Carolina, citizens do not have clear ownership over their natural resources, and have endure the consequences of industrial pollution with associated health risks. Within this case-study, there is opportunity for recommendations toward solutions to these issues based on the concept of resource allocation and sustainability. These solutions reflect a global perspective as environmental challenges like climate change have been on the global policy making and governance forefront.

To contribute to this global policy goal and to accomplish the much needed carbon reductions, climate change needs to be addressed at the state and local level. With this fact in mind, Georgetown, which is socially vulnerable to geographic and environmental hazards such as sea level rise and flooding from climate change, must be studied. These hazards are compounded by other perilous socioeconomic and environmental factors such as a higher poverty level than national average (\$26,364 median income) (US Census, 2015) with 10.3 % of population earning less than \$10,000 a year. A concentration of minorities in high level air particulate matter zones inconsistent with EPA standards. Furthermore, the fundamental causes of human vulnerability include a lack of access to resources, information and knowledge, and limited access to political power and representation (Cutter, Mitchell, Scott, 2000). The impact of habitat loss and pollution of air and water systems, particularly the high levels of particulate matter in the atmosphere in Georgetown, along with the dead zones in the Intracoastal Waterway are prominent in this research. Specifically, how are these environmental issues contributing to generational poverty and other socioeconomic challenges in Georgetown? What role does public policy play in the marginalization of coastal communities like Georgetown?

In this paper, I first address the public trust doctrine as a guide for environmental justice and equity. This doctrine provides a foundation for the concept that citizens have the right to a healthy environment and preservation of public trust resources. This foundation is the premise for citizens' rights in regards to equity in allocation and preservation of resources. The second relevant concept I address is Georgetown's option for sustainable development. This mindful approach to development is important due to the global climate crisis, growing challenges of protecting environmental resources on the coast, and the environmental issues in the Georgetown community. The second part of this paper is my problem definition where I highlight the challenges that drive this research. Here, I highlight the public trust laws in the state of South Carolina and the importance of those laws with regards ethical deliberations over distributive justice. This section is followed by the methodology and findings. Finally, I draw recommendations for future research in the executive summary.

PROBLEM DEFINITION

The problem in Georgetown County can be defined in both socioeconomic and environmental terms. The residents of Georgetown live, on average, below the poverty line but are surrounded by bountiful natural resources. Why are the citizens who live in the vicinity of such plentiful resources living in deficient environmental conditions and are subjected to known carcinogenic pollutants in their air and water ecosystems? The question lies in ownership of their public trust resources and the subsequent use of those resources. The public owns all submerged lands, navigable waters, and beaches by state public trust laws and by United Nations statute, the atmosphere¹. However, the ownership of these resources is seemingly held by industrial polluters since they have used the aforementioned resources and polluted them to the point of degradation.

The public trust doctrine is an ancient Roman law doctrine that stipulates states right must hold certain natural resources, most notably submerged lands under tidal and navigable waters, in trust for the use and benefit of the public and future generations.² The modern public trust theory as identified by Professor Sax, (who revisited this doctrine in 1970), connects some American cultural traditions and ideas about access to public lands and resources to the commitments to preserve the public function of property.³ As noted in the introduction, the natural resources in Georgetown are not presently protected for citizens or for future generations. The particulate matter in the atmosphere is toxic to humans and the waterways surrounding the city have dead zones.

The problem being investigated in this research is as follows: The South Carolina Supreme Court has recognized the public trust law in several cases and has been empowered to protect the public trust resources, therefore, why is this law not being used in Georgetown to protect the navigable waters, submerged tidal land, and the atmosphere? According to Joseph Sax (1970), the public trust doctrine could be an alternative and complementary means of forcing state agency officials to protect natural resources even when strong environmental protection legislation did not require such action or provide standing to those who wish to protect natural resources.⁴ The coastal plain ecosystem has been defined as one of the most bio diverse ecosystems on the continent. The plethora of wildlife, flora and fauna, wetlands, and fisheries alone are tremendous reason for protecting the natural resources in this geographic area. The economic value of these resources alone, besides the social justice and equity issues being addressed in this paper, are providing a strong case for conservation and preservation of public trust resources. Given the high level of poverty in Georgetown and prevalent environmental injustices, including offshore drilling, research and thought need to be put into this community to preserve the common good. By reallocate natural resources to benefit the people, eliminating health issues, and adhering to principles of sustainable development would be future solutions to these issues.

¹ Anthony, R. (2014).

² Klass. State Environmental Rights. (2015).

³ Klass, State Environmental Rights (2015)

⁴ Klass. State Environmental Rights. (2015).

METHODOLOGY

The methodology for this research includes qualitative and some quantifiable research. Reviewed state governmental documents and files provided data needed to evaluate current ecological damage, socioeconomic factors, and pollution statistics. The qualitative research was largely unstructured interviews with local citizens, the mayor of Georgetown, Department of Health and Environmental Control (DHEC), and Department of Natural Resources (DNR). Interviews provided insight on current and past environmental issues along with social issues.

The quantitative research included data on particulate matter statistics, poverty statistics, related health impacts from particulate matter, Environmental Protection Agency (EPA) standards and records in Georgetown County, and natural resource evaluation. These quantitative sources help justify the thesis of environmental injustice and Georgetown's need to implement public trust doctrine and sustainable development goals. The natural resource evaluation of the area provided data on the means for implementing sustainability for low income minority communities. The natural resource data provides insight on the risk factors which contribute to global climate change, toxicity correlations with local health, along with an overall economic analysis of resources and contributions of resources.

The focal point of my research is the qualitative investigation of stakeholders in Georgetown. The claimants are affected and unaffected citizens of generational poverty and environmental injustice. The primary source of this research includes interviews with the following stakeholders: the city mayor, a city council member, a DHEC representative and the Georgetown Museum curator. Other informants include local citizens, including minority and non-minority stakeholders, and a Coastal Carolina University (CCU) Marine Science researcher.

The secondary sources for the research include many academic sources, scholarly articles, state public trust law documents, DHEC pollution data, and data from the EPA. This methodology is directed at establishing a solution to the aforementioned social and environmental problems. The broad objective of this research is to help highlight historical, social, and environmental obstacles. To reveal more opportunities, education, reverse environmental injustice by way of resource allocation. Lastly, the creation of environmental equity and further utilization of public trust resources for the community.

FINDINGS

The Public Trust Doctrine and Citizen's Rights: The public trust doctrine is an ancient Roman law doctrine providing states must hold certain natural resources, most notably submerged lands under tidal and navigable waters, in trust for the use and benefit of the public and future generations.⁵ The modern definition of the public trust doctrine states that it is a common law doctrine that holds some natural resources in trust to be protected by the sovereign, the governing body, for future generations.⁶ The US Supreme Court determined all states own submerged lands in trust for the public.⁷ In contemporary society, public trust rights refer to common law public trust doctrine that was introduced by Joseph Sax in 1970 in an influential law review.⁸ In this review, he argued that the public trust doctrine could be a vehicle to compel state and local governments to protect water and other natural resources from development and other threats.⁹ The doctrine was used in the state of Minnesota, where Sax originated, to create the Minnesota Environmental Rights Act (MERA) in 1971.¹⁰ MERA referred to natural resources as all mineral, botanical, animal, air, water, land, timber, soil, quietude, recreational, and historical resources as well as state-owned scenic and aesthetic resources: publicly and privately owned, protection from pollution, impairment, or destruction.¹¹ This use of the doctrine in Minnesota legislation can be referenced by states in the United States for increasing environmental and conservation protection.

The public trust doctrine may be used by state agencies and nongovernmental organizations to protect the public's natural resources from industrial pollution or any unwarranted pollution that may adversely affect such properties. Further, the public trust doctrine or law protects citizen's rights over common resources that could potentially become privatized, polluted, or developed. No state may alienate public rights over public lands.¹² These resources are public goods, which should be valued and protected for the public and future generations. For example, public trust resources provide the basis for public access to America's beaches and state prevention of beach privatization.¹³ Public trust resources provide many benefits which are essential not only to human and animal survival but to economic stability. Nature provides the indispensable economic foundation as the source of raw materials- food, fiber, water, energy, and minerals-and is the sink for waste generated by production and consumption.¹⁴ Further, because the climate change crisis has a direct impact on these public trust assets, the climate change crisis needs to and should be addressed from the public trust context.¹⁵ This foundation is the premise for citizen's rights to equity in allocation and security of resources. When citizens lose the right to

⁵ Klass, (2015)

⁶ Lords, Courtney (2008)

⁷ Journal of Land Use and Environmental Law, (2008)

⁸ Klass, (2015)

⁹ Klass, (2015)

¹⁰ Klass, (2015)

¹¹ KClass, (2015)

¹² Journal of Land Use and Environmental Law, (2008)

¹³ Environmental Law, (2008)

¹⁴ Shelly, Boyce, (2003)

¹⁵ Lords, Courtney, (2008)

decide how to use common resources, a sense of community and pride has also been eliminated along with a source of economy. Additionally, interests lie in the value systems of state and national governments and whether the value of life (nature) is quantified by such value systems.

This research paper reflects on public trust resources in a city that has a high poverty rate, high levels of disease, and low-income minority communities with impacted waterways and atmosphere from local industrial sites. Application of sustainable development and theories of reallocation of resources to impacted communities will be conceptualized. Therefore, climate change needs to be addressed on a local level as well as state level to accomplish the needed carbon reductions. With this acknowledged political factor in policymaking, Georgetown is socially vulnerable to geographic and environmental hazards such as sea level rise and flooding from climate change. These hazards are compounded by other perilous socioeconomic factors and environmental factors such as a higher poverty level than national average, a concentration of minorities living in zones of high levels of air particulate matter not meeting EPA standards, and 10.3 % of population earning less than \$10,000 a year. The fundamental causes of human vulnerability include limited of access to resources, limited information, and limited access to political representation¹⁶.

The impact of habitat loss and polluted air and water systems have contributed to public health problems in Georgetown, South Carolina. The high levels of particulate matter in the atmosphere and documented eutrophication and hypoxia (dead zones or low diffused oxygen) in Winyah Bay and Intracoastal Waterway are main reasons for this research. Impacts on the coastal ecosystems of these anthropogenic induced pollutants will be discussed and evaluated. Why should citizens care about these issues in Georgetown? Citizens should care about citizens who are already marginalized by generational poverty and other socioeconomic problems who have endured many inequities for decades. Parts of the community have suffered years of high poverty and high levels of unemployment accompanied by detrimental social impacts of environmental degradation. Therefore, in this paper I use the public trust doctrine as a guideline for environmental justice and environmental equity. This doctrine provides a useful foundation for the concept that citizens have the right to a healthy environment and preservation of public trust resources in the interest of the public. This foundation is the premise for citizens' rights in regards to equity in allocation of resources and security of those resources.

Georgetown's Health Impacts from Pollutants: The levels of heart disease, respiratory disease, and diabetes in Georgetown are some of the highest rates per capita in the state of South Carolina. Acute exposure to elevated levels of air pollution have been associated with increased cardiopulmonary mortality, increased hospitalization, for respiratory disease, exacerbation of asthma, increased evidence of incidence and duration of respiratory symptoms, decline in lung function, and restricted activity¹⁷. The particulate matter occurring in Georgetown's atmosphere has been recorded as some of the highest levels in country and have consistently not met EPA air quality standards. According to DHEC respondent one, the EPA, who sets the standard for health, up to a certain degree, particulate matter is not harmful. DHEC respondent one also asserts that exposure to certain amounts of particulate matter is not detrimental to human health. However, according to researchers Pope, Dockery, and Schwartz from the International Forum

¹⁶ Cutter, Micheal, Scott, (2000)

¹⁷ Pope, Dockery, Schwartz(2008)

for Respiratory Research, health effects from particulate matter have been seen at levels below the National Air Quality Standards.¹⁸ Further, particulate matter (pm10) has been associated with daily deaths and hospital admissions in numerous studies over the past decade.¹⁹ Air pollution could be a contributing factor in county health conditions. Exposure to air pollution has been associated with cardiovascular-related mortality and morbidity²⁰. There has also been evidence that persons with diabetes are particularly susceptible to acute effects of air pollution²¹. Scientific mouse models used for pm testing, exposure to fine particulate matter (particles with an aerodynamic diameter, less than or equal to 2.5 pm; PM 2.5), increased blood glucose and induced adipose inflammation and insulin resistance²² (Sun et al. 2009). These studies show a potential link between air pollution and diabetes.²³ Therefore, this paper discusses the correlation between air and water pollution with health impacts in Georgetown. This research paper acknowledges and analyzes the high levels of disease which correlates with the Georgetown residents.

Georgetown's Natural Resource Evaluation: The citizens of South Carolina continue to face a growing challenge in balancing the protection of economic and environmental resources along the shorelines.²⁴ In South Carolina, natural resources are essential for economic development and contribute nearly thirty billion dollars and 250,000 jobs to the state's economy.²⁵ Georgetown is no exception to this growing challenge with increased flooding and pollution impacts from industry. Access to abundant recreational opportunities and natural assets play an important role in economic growth and quality of life issues at the local, regional, and state levels. Protection and enhancement of natural resources can, and should be, a part of the overall economic development strategy.²⁶ Any changes to the coastal environment could cause substantial economic consequences affecting property uses, land values, tourism, and natural resources management. Changes could also impact traditional uses such as hunting, fishing, timber management, and agriculture.²⁷ Further, humankind benefits from a multitude of resources and processes supplied by natural resources such as: clean drinking water, decomposition, and assimilation of wastes.²⁸ The public trust resources of Georgetown include its navigable waters, Winyah Bay (part of the Long Bay embayment), the surrounding estuaries, beaches, and rivers. It is important to acknowledge the risks that are causing the areas vulnerabilities besides geography. The onslaught of climate change has added to Georgetown's other physical vulnerabilities. The Southeastern United States may be particularly vulnerable to climate change because of the risks associated with its low-lying coastline and periodic winter storms and tropical systems.²⁹ The rich biodiversity of the Southeastern US could be exposed to more risks

¹⁸ Pope, Dockery, Schwartz(2008)

¹⁹ Brook et al. 2010; Chen et al. (2008)

²⁰ Brook et al. 2010; Chen et al., (2008)

²¹ Goldberg et al. 2006; O'Neill et al., (2005)

²² Sun et al.,2009

²³ Chen, Burnett, Kwong, Villeneuve, Goldberg, (2013) Environmental Health Perspectives.

²⁴ SCdhec.gov

²⁵ www.dnr.sc.gov/pubs/CCINatResReport.pdf

²⁶ www.dnr.sc.gov/pubs/CCINatResReport.pdf

²⁷ www.dnr.sc.gov/pubs/CCINatResReport.pdf

²⁸ www.dnr.sc.gov/pubs/CCINatResReport.pdf

²⁹ www.dnr.sc.gov/pubs/CCINatResreport.pdf

being related to drought, plant and animal pathogens, and invasive species due to climate change.³⁰ Without current immunity from these impacts, Georgetown has environmental and social vulnerabilities which can adversely affect the population. However, the public trust doctrine is a useful vehicle for natural resource preservation, flood prevention, and water quality control. Not recognizing these public property rights would severely limit the ability of states to prevent public harm by preempting floods, water contamination, and the depletion of natural resources.³¹ According to South Carolina Supreme Court, under the state's public trust doctrine, "everyone has the inalienable right to breathe clean air, to drink safe water, to fish and sail; to recreate upon the high seas, territorial seas, and navigable waters, as well as to land and seashore and riverbanks. Moreover, the state cannot permit activity that substantially impairs public access" (McQueen verses S.C. Coastal, 580 S.E.2d 116,119).³²

Within the City of Georgetown and Georgetown County, land use is much more diverse (with associated anthropogenic impacts), including large industries such as International Paper Company, 3V Chemical, a cargo port facility, Arcelor Mittal Steel mill (presently closed), several marinas, and municipalities including single and multi-family residences.³³ The ship channel in Winyah Bay and Sampit River provides a corridor for the movement of large commercial ships between the ocean and the city of Georgetown.³⁴ The Intracoastal Waterway provides protected areas for commercial barges and recreational boats into Winyah bay from the north and south.³⁵ Local citizens use the extensive rivers and tidal marsh systems within Georgetown County for hunting, fishing, and general recreational enjoyment.³⁶ In Winyah Bay and North Inlet, recreational fishers enjoy catching a variety of fishes, including red drum, speckled sea trout, flounder, spots, along with oysters, clams, shrimps, and blue crabs.³⁷ This plethora of marine resources are sought after by residents and visitors alike contributing to the SC economy around \$411 million as the recreational fishing industry (in 2009).³⁸ The commercial fishing industry in SC contributed over \$14 million dollars to the economy in 2010 with white shrimp being the most important in terms of value followed by blue crabs and then oysters (National Ocean and Economics Program, 2012).³⁹

The tremendous economic value of Winyah Bay and adjoining waterways as natural assets such as a watershed and estuary need to be understood in order to evaluate the importance of conservation efforts. Winyah Bay has been researched by Coastal Carolina's Marine Science Institute since 2004. Their discoveries are as follows: International Paper (IP) continues to face challenges dealing with their environmental impact through the discharge of effluents into local water sources.⁴⁰ Winyah Bay, which surrounds the paper mill, is the third largest estuary in

³⁰ www.dnr.sc.gov/pubs/CCINatResreport.pdf

³¹ Journal of Land Use and Environmental Law

³² USC The Public Trust Doctrine in SC, 1998, Kenneth R. Moss SC Environmental Law Journal

³³ NERR Site Profile North Inlet Winyah Bay

³⁴ NERR Site Profile North Inlet Winyah Bay

³⁵ NERR Site Profile North Inlet Winyah Bay

³⁶ NERR Site Profile North Inlet Winyah Bay

³⁷ NERR Site Profile North Inlet Winyah Bay

³⁸ NERR Site Profile North Inlet Winyah Bay

³⁹ NERR Site Profile North Inlet Winyah Bay

⁴⁰ CCU Research Paper

terms of watershed area on the eastern seaboard and is a part of the Long Bay embayment.⁴¹ After fines and acquisitions of contamination, IP has worked to become a more environmentally friendly company.⁴² However, considering that IP has been producing pulp and paper since 1935, it is questionable the actual amount of pollution that has been emitted and the actual percentage of environmental impacts on public resources. In 2009, IP paper mill in Georgetown faced lawsuits from 135 local community members claiming alleged pollutants from IP were having negative impacts to their health and properties.⁴³ The cases, Anderson vs. IP and Winleyns vs. IP, were later dismissed by the SC Federal Court for failure to provide adequate data and specificity to the health and property damage that was connected to IP.⁴⁴

According to research by the CCU Marine and Wetland Studies, since June of 2004, Hypoxia, or low levels of oxygen, i.e. dead zones have been located in the Long Bay embayment.⁴⁵ Hypoxia is commonly found in coastal areas and in enclosed or semi-enclosed basins due to both anthropogenic and natural factors.⁴⁶ The effects of hypoxia can adversely influence the local economy and ecosystem by limiting or changing the environment's biodiversity.⁴⁷ Frequent cases of low dissolved hypoxia have been documented in Long Bay embayment since June of 2004.⁴⁸ Winyah Bay is apparently an efficient trap for suspended particulate materials under both low and high discharge conditions.⁴⁹ Particulate export to the ocean at depth occurs under very high discharge conditions.⁵⁰ This tendency to retain particulates makes the bay more susceptible to pollutants, eutrophication, and salt intrusion.⁵¹ This geographic vulnerability, with the added daily pollutants from industry and other anthropogenic sources, creates a susceptible environment for degradation. It appears that eutrophication occurs in Winyah Bay around the industrialized sites such as the Steel Mill Channel. According to the NOAA Eutrophication Assessment, Winyah Bay is at risk of becoming eutrophic in the future which could severely affect species diversity and the coastal plain watershed ecosystem.⁵² According to DHEC respondent one, the state could be more stringent in amounts of particulate matter currently being permitted.

Studies of Eutrophication and Hypoxia in the Winyah Bay: There have been many studies done on the problems of pollution affecting coastal waterways and public trust resources. Since 2004, Winyah Bay has been researched by Coastal Carolina University Marine and Wetland Studies. All studies have found contaminants in the public trust resource of the Winyah Bay. Considering there are four industrial polluters with pollution permits, it is not surprising that the waterways and marine life have been affected. According to South Carolina Estuarine and Coastal

⁴¹ CCU Marine and Wetland Studies

⁴² CCU Research Paper, (2014)

⁴³ CCU Research Paper, (2014)

⁴⁴ CCU Research Paper,(2014)

⁴⁵ CCU Marine and Wetland Studies

⁴⁶ CCU Marine and Wetland Studies

⁴⁷ CCU Marine and Wetland Studies

⁴⁸ CCU Marine and Wetland Studies

⁴⁹ Goni et al. (2009)

⁵⁰ Goni et al. (2009)

⁵¹ Goni et al. (2009)

⁵² CCU Neff, Allen et al., (1999)

Assessment Program (SCECAP), fish that were examined for contaminants had detectable (PAH and PCB) but did not exceed federal limits.⁵³ However, in 2001, a spot fish contained PAH and PCB levels which exceeded the 90th percentile of values for all 60 SCECAP stations in 2000 to 2002.⁵⁴ It needs to be noted that commercial fishing, recreational fishing, and traditional cultures include fishing in their food sources occur in Winyah Bay and North Inlet estuary. The SCECAP has rated the midsection of the North Inlet estuary “good,” (the highest rating) based on: fecal coliform, toxicity, contaminant concentrations, benthic index of biotic integrity, and water quality.⁵⁵ However, the middle and upper sections of Winyah Bay did not fare as well with designations in the “fair” and “poor” categories and this has remained the same through 2006.⁵⁶

Eutrophication is described as decreased dissolved oxygen which, in turn, causes a decrease in the pH levels in affected coastal waters.⁵⁷ Cheyenne Neff and her colleague, two CCU marine science seniors, conducted a tri-area survey of the Winyah Bay in 2015. They tested according to NOAA standards and their findings were relevant to this research for accurate analysis of pollutant and anthropogenic impacts. In Neff’s study, it can be seen that the dissolved oxygen is in the middle range of the eutrophication parameters and there was a slight increase in pH that could indicate that eutrophication is occurring. The turbidity was high at all the water sample locations which would indicate that there is eutrophication.⁵⁸ A standard part of eutrophication is the decreased dissolved oxygen at depth. Another effect of hypoxia is decreased pH and dissolved oxygen typically means more carbon dioxide in the water which also lowers the pH.⁵⁹ Therefore, based on all the results it can be concluded that eutrophication is occurring in the Winyah Bay in the locations closest to the anthropogenic sources such as the Steel Mill channel.⁶⁰ The eutrophication is not severe, but it is occurring and could potentially worsen in the future and affect future generations’ quality of life.⁶¹ The quality of life is not only cultural, but also economic, which sustains the general welfare of human life. There is also ecological justice—the idea that within human and nonhuman relationships, the nonhumans possess a right to continue to exist within habitats required to sustain their existence.⁶² The issue is the fact that eutrophication almost guarantees acidification in the oceans having many harmful effects on marine life.⁶³ These effects are detrimental on marine life, the very life that sustains coastal communities.

The effects of hypoxia and eutrophication on coastal communities has not only a direct link to the intensive detrimental ecosystem health of the estuary, but also can be correlated to a detriment of economic and social goods. Eutrophic conditions in the waterway can contribute to impaired uses of the waterway and has been noted by NOAA. These impaired uses include:

⁵³ Van Dolah, et al. 2002

⁵⁴ Van Dolah, et al. 2002

⁵⁵ Van Dolah et al. (2008)

⁵⁶ Van Dolah et al. (2008)

⁵⁷ Wallace, (2014)

⁵⁸ Neff, (2015)

⁵⁹ Neff, (2015) Wallace et al. (2014)

⁶⁰ Neff, (2015)

⁶¹ Neff, (2015)

⁶² Baxter (2005)

⁶³ Wallace et al. (2014)

recreational and commercial fishing, fish consumption, shellfish, swimming, boating, aesthetics, tourism, habitat loss, and loss of assimilative capacity.⁶⁴ Although this information is not supported by a comprehensive data set, it does provide a rough picture of the extent of problems stemming from eutrophic conditions.⁶⁵ The experts also identified the point and nonpoint sources which they judged as most important to target for managing nutrients in the estuary which included: wastewater treatment, combined sewer overflow, industrial discharge, urban runoff, forestry practices, atmospheric inputs, and aquaculture.⁶⁶ These expert evaluations of the effects of eutrophication on an estuary have significance in understanding what types and level of actions need to be taken to address the harms being inflicted on Georgetown's public trust resources.⁶⁷

Georgetown, a Sacrifice Zone: It has been documented by the EPA, and other NGO agencies that marginalized communities endure the effects of pollution and environmental degradation on a larger scale than other higher income communities. These marginalized communities tend to be low sociodemographic or minority communities with a social and biophysical vulnerability. It has been documented that Georgetown is one of these marginalized minority communities by data and many researchers. The susceptibilities Georgetown endures are many and currently have not been fully addressed. The degree to which populations are vulnerable to hazards is not solely dependent on their proximity to the potential source, which in this case points directly to the industrial polluters.⁶⁸ Social factors such as wealth and housing characteristics can contribute to greater vulnerability.⁶⁹ The factors of environmental injustice comprises of the "disproportionate environmental risks, unequal access to public environmental goods, but also an inability to participate in decisions concerning environmental issues."⁷⁰ These communities have been adversely affected by pollution, environmental hazards, and poor health as a result of pollution or environmental degradation.⁷¹ DHEC respondent one specifies the law allows industries to pollute with permits given in accordance to EPA standards. Permits are the minimum of what has to be done, states DHEC respondent one, there could be more but then it would be a cost benefit issue. According to the EPA toxic release inventory website, there were significant violations that the state did not address in 2013 and 2014.⁷² Further, a noncompliance in 2015 was addressed by the state of SC with a formal enforcement of \$97,000 fine to IP.⁷³ There are known human carcinogens being released on a daily basis such as, acetaldehyde, formaldehyde, carbon dioxide, and sulfuric acid (harmful to aquatic organisms and humans according to the Center for Disease Control and Prevention). The research on racial residential segregation has, in some cases, circumvented the connection to environmental pollution. However, these well observed locational patterns of residential minorities often correlate with

⁶⁴ NOAA Eutrophication Report

⁶⁵ NOAA Eutrophication Report

⁶⁶ NOAA Eutrophication Report

⁶⁷ NOAA Eutrophication Report

⁶⁸ Cutter, Mitchell, Scott (2015)

⁶⁹ Cutter, Mitchell, Scott (2015)

⁷⁰ Shrader-Frechette, (2002)

⁷¹ Shrader-Frechette, (2002)

⁷² EPA Toxic Release Inventory

⁷³ EPA Toxic Release Inventory

observed adverse environmental impacts.⁷⁴ This observation has been recognized in Georgetown and gives reason to identify the area as a socially vulnerable zone which should be addressed in public policy. The term social vulnerability is used to define the susceptibility of social groups to potential losses from hazard events or society's resistance to hazards.⁷⁵ The nature of a hazardous event is understood. The nature of social vulnerability highlights the historical, social, and political processes that give "rise" to unsafe conditions in the first place.⁷⁶ The research highlights the social vulnerability of Georgetown by examining the slow onset, or chronic types of hazards, that exist such as industrial pollution, global environmental change, and generational poverty.⁷⁷ These facts contribute to the overall analysis that Georgetown is identifiable as a sacrifice zone and socially vulnerable due to: daily disposal of contaminants by IP, historical poverty, and the remaining contaminants by the steel mill on the land, water, and atmosphere.

It is within Georgetown that sustainable policies need to be enacted not only to protect the citizens but the natural resources as well. All citizens deserve environmental equity which is the theory that every man deserves his fair share of natural resources and proportionate share of pollution. Further, these resources supply public goods that contribute to overall well-being such as clean air, food supplies, and clean water sources. In sustainable policies, all of these resources will be protected for present and future citizens. Sustainable policies give credence to a system which attempts to overcome poverty and reasons for poverty. For instance, in South Carolina (SC), commercial fishing provides a viable income for many coastal citizens and fresh seafood for restaurants and wholesale purchasing. If the ocean and estuaries were protected from pollution such as: fossil fuel extraction, industrial pollution, and rainwater runoff from roadways, the commercial fishing would still be a viable economic income. If the opposite occurs, continuous toxic overload into habitats and ecosystems, the contaminated habitats would not contribute to the local economy. The consequences of not having the public trust resources protected by law would create severe economic loss for the community. With that being acknowledged, it is imperative that there needs to be more effective analysis of Georgetown, SC, its demographics, its policies on pollution, sustainable development, and natural resource protection. There also needs to be a call to action with city, county, state, and federal regulatory boards to address the needs of this communities sustainable policies.

Demographics of Poverty and Social Vulnerability: The city of Georgetown has a higher population of African Americans, 56.7% (US Census 2014), than non-minority population of 37.8% (US Census 2014). Within this population, the percentage in poverty and below poverty level is significant. Further, there are currently and past historical issues with generational poverty that can be directly linked to slavery. According to Mayor Jack Scoville, "Georgetown's poverty goes back to slavery, and until fifty years ago, the state was not helping the working class, African American or white. It was the unstated policy to keep the wages down so the people would stay in the cotton mills and working on the farms". Furthermore, Mayor Scoville's commented on how the average worker could spend forty years in a mill and never receive a raise or retirement. This information is relevant to this study because there has been an injustice done socially to minority and low income communities; further this injustice is compounded

⁷⁴ Ibipo Johnson-Anumonwo

⁷⁵ Cutter, Micheal, Scott

⁷⁶ Cutter, Micheal, Scott

⁷⁷ Cutter, Michael, Scott

with environmental injustice. Even more significant is the environmental injustice on low income minority citizens who are already impacted by historical generational poverty. The concepts of vulnerability and multiple hazards (hazard of place), which, in this case, is generational poverty and pollution encompass both biophysical and social vulnerability and are applied to geographic domains ranging from local to global.⁷⁸ Findings reveal racial inequalities in environmental pollution that are consistent with a systematic and widespread pattern of defacto racial residential segregation in the contemporary United States.⁷⁹ Georgetown may well represent one of those communities affected by environmental racism. Mayor Jack Scoville stated, “We also had intentional neglect of the education system in South Carolina, until Governor Fritz Hollings in the 60’s implemented a good education for everyone as a part of the solution for poverty”. In Georgetown, SC, there are many factors which contribute to the overall “hazard of place”. The interplay of social, political, and economic factors- interacting separately and in combination with one another. The physical environment creates a mosaic of risks and hazards which affect people and places they inhabit (riskscapes or hazardscapes).⁸⁰ The risks and hazards that are identified in Georgetown are as follows: generational poverty, concentration of minorities subjected to environmental toxins, geographic vulnerabilities, climate change impacts, polluted ecosystems, lack of infrastructure in sustainable policies, lack of representation of low income residents, lack of social mobility, and high levels of disease. Therefore, recognition of these risks and hazards need to be implemented in governance and policy in order to sustain and create resiliency for current citizens and future generations. To evaluate and find solutions Georgetown’s demographics of historical poverty and environmental degradation issues. Further, acknowledgement of hazard potential interacts with the underlying social fabric of place to create social vulnerability.⁸¹ Policymakers can look at examples of biophysical and social vulnerability to understand hazards and societal responses to them by examining studies of land degradation, drought, and severe environmental degradation in selected world regions.⁸²

Sustainable Solutions: According to researchers from University of Massachusetts, Amherst, sustainable advances in human well-being and reductions in poverty are undermined by environmental degradation. Environmental quality is undermined by large disparities of wealth and power.⁸³ Poverty reduction requires some combination of economic growth and economic redistribution. Poverty reduction can be advanced simultaneously and must go together.⁸⁴ There are strategies for expanding the quantity and quality of natural assets held by low-income communities to evaluate the potential to reduce poverty and protect the environment.⁸⁵ Greater access to natural resources and greater control over environmental sinks can be achieved in two broad ways: by increases in total stock of society’s natural assets and by redistribution of the existing stock so as to increase the share of the poor.⁸⁶ This principle of redistribution relates back to the initial definition of public trust resource. The public trust resources (PTR), owned by

⁷⁸ Cutter, Michael, Scott, (2000)

⁷⁹ Ibipo Johnson-Anumonwno, (2009)

⁸⁰ Cutter, Michael, Scott, (2000)

⁸¹ Cutter, Michael, Scott, (2000)

⁸² Cutter, Michael, Scott, (2000)

⁸³ Shelly, Barry G., Boyce, James K. (2003)

⁸⁴ Shelly et al. (2003)

⁸⁵ Shelly et al. (2003)

⁸⁶ Shelly et al. (2003)

the state, federal, and city governments, should be held in guardianship for the benefit of the public. If an industrial entity is polluting these resources then the industrial entity needs to reimburse the public for its impacts on the public resource, present impacts and intergenerational impacts. The struggle of low-income communities today to curb pollution from industrial facilities near their homes represent the effort not only to increase the amount of clean air and clean water but also to redistribute rights from the polluters to the people who breathe the air and drink the water.⁸⁷ Not only is it the intention of sustainability to eliminate poverty but to redistribute environment rights from polluter to the underprovided. The expectations of this policy to reinstate citizen's ownership and the utilization of their natural resources for ecosystem services will give opportunity for conservation of natural assets. There are two avenues for increasing the total stock of natural assets or what economist's term- "investment in natural capital".⁸⁸ The first is **Ecological Restoration**; steps repair environmental damages inflicted by economic activities in the past.⁸⁹ Examples of ecological restoration include reforestation, soil and water conservation, and the cleanup of polluted waterways and contaminated lands.⁹⁰ Such investments simply seek to reverse past depreciation of natural capital. The potential scope is limited by the extent of past environmental degradation.⁹¹ The second avenue for increasing the investment in natural capital is **Coevolution**. Coevolution is where human interactions with the environment add to nature's wealth.⁹² The term asset implies not only the existence of wealth but also a set of rules and institutions that govern access to the wealth and the distribution of benefits derived from it.⁹³

When a natural resource such as a salt marsh or estuary is harmed by an oil spill or discharge of other hazardous substances, the task of assessing the damage and implementing a plan to restore the resource falls to natural resource trustees, or "public trustees", who serve as guardians of the nation's natural resources.⁹⁴ The deliberation lies in whether the trustees are fully equipped to handle the current restoration needs and climate change implications such as sea level rise. Mayor Jack Scoville gives reason to investigate new policies, "we are losing waterfront property uses, global warming is happening"⁹⁵. This acknowledgement of the changing environment, the constant influx of effluents and particulates, and the disease rates in Georgetown has indicated that a sustainable solution is needed. According to a DHEC employee (interviewee one), who prefers to remain anonymous, "[The current trustees of public trust resources are as follows: the Department of Natural Resources (DNR), local non-governmental conservation groups (riverkeepers), and DHEC, who specifically is a regulatory board.⁹⁶ However, according to interviewee one, "the standards could be higher, we can only regulate within the confines of the law and if the standards are not adequate, there is nothing we can do about it". The standards that are regulated by DHEC, refer to the actual amount of pollutants allowed to be released into

⁸⁷ Shelly et al. (2003)

⁸⁸ Shelly et al. (2003)

⁸⁹ Shelly et al. (2003)

⁹⁰ Shelly et al. (2003)

⁹¹ Shelly et al. (2003)

⁹² Shelly et al. (2003)

⁹³ Shelly et al. (2003)

⁹⁴ Tulane Law Journal, Kanner, (2015)

⁹⁵ Mayor Jack Scoville Georgetown SC (2016)

⁹⁶ DNR Interviewee One, (2016)

natural resources federally mandated by the EPA.⁹⁷ Federally designated natural resource trustees include NOAA, Department of the Interior, US Department of Agriculture, US Department of Energy, US Department of Defense, and federally recognized tribes.⁹⁸

Ethics: Philosophy gives a means to create moral standing in society, governing bodies, and relationships to other people and nature. When facing a crisis such as environmental injustice and degradation, ethics can be used as a tool for change in the perception and value systems. According to Wenz, an environmental ethicist, environmental racism is evident in practices that expose minorities on a larger scale than non-minorities to disproportionate shares of environmental hazards.⁹⁹ Wenz describes the current practice of economic and political practices that disproportionately expose poor people to toxic substances as unethical even though it is currently the norm.¹⁰⁰ In Georgetown, both high income and low income residents are subjected to environmental pollution. However, the percentage of low income residents affected is greater than the percentage of high income residents. Wenz clarifies that we should erect legal remedies to the disproportionate share of exposure.¹⁰¹ Wenz defends his moral argument by stating the moral principle of commensurate burdens. This moral principle states that people who derive benefits should shoulder commensurate burdens.¹⁰² That is why it's intuitive and everyone should agree the private industry that reaps the monetary benefits should also shoulder the burden of compensation for pollution. It is counterintuitive to expect the public to pay for damages of public trust resources when they are not profiting off the use of such resources. Wenz speaks on this unjust issue, "using tax money (public money, i.e. superfund monies) to protect the public from dangerous private property is justified as encouraging private industry and commerce, which are supposed to increase public wealth".¹⁰³ The principle of commensuration between benefits and burdens is not the only moral principle governing distributive justice but a commonsense principle that could be economically and ethically sound.¹⁰⁴ The moral point here is that applying the principle of commensuration between benefits and burdens, burdens of ill health associated with toxic hazards should be related to benefits derived from processes and products that create those hazards.¹⁰⁵ Social and environmental justice requires that people's proximity to toxic wastes be related positively to their wealth but, in reality, is exactly the opposite. The tendency in society, poor people are more proximate to toxic wastes legally permitted and emitted.¹⁰⁶

⁹⁷ DNR Interviewee One, (2016)

⁹⁸ Tulane Law journal, Kanner, (2015)

⁹⁹ Wenz, Peter S. (1995)

¹⁰⁰ Wenz Peter, S. (1995)

¹⁰¹ Wenz, Peter, S.(1995)

¹⁰² Wenz, Peter, S. (1995)

¹⁰³ Wenz, Peter, S. (1995)

¹⁰⁴ Wenz, Peter, S (1995)

¹⁰⁵ Wenz, Peter, S. (1995)

¹⁰⁶ Wenz, Peter, S. (1995)

EXECUTIVE SUMMARY & RECOMMENDATIONS

This paper defends the thesis that citizens of Georgetown should have legal remedies to protect public trust resources and welfare from pollution. These fundamental public trust rights are purely a constituent of democracy and justify the concept of environmental justice and equity. If the public trust doctrine is going to operate as a trust- for the protection of natural resources for future generations- then the sovereign has an explicit duty to protect trust assets from damage and depletion during the climate change crisis.¹⁰⁷ The documented impact of pollution of air and water systems contribute to habitat loss in the Winyah Bay estuary, health impacts, and can contribute to economic losses. Environmental injustice is linked to climate change, health risks, loss of public goods, economic adversity, and quality of life issues. A resolution of sustainability and resiliency as a resolution to resolve current and future impacts is recommended. Public trust rights refer to the common law public trust doctrine reintroduced in contemporary studies by Joseph Sax in 1970.¹⁰⁸ This doctrine protects natural resources from pollution, privatization, and exclusion by law for current and future generations. This doctrine, along with new regulations on permitting pollution, reallocation of resources by “pay to pollute” policies and sustainable practices are imperative in promoting a healthy quality of life in this community. The sovereign trustees must act to defend the trust against injury, and where the trust is damaged, the trustee must restore the trust assets.¹⁰⁹

- Sustainability itself is a theory that incorporates three pillars: society, economics, and environment. Sustainability balances these societal pillars and creates an economy that supports the people presently and in the future. Sustainability can be used in policy to protect natural resources and public trust resources.
- Sustainability gives the rights over natural resources back to the people from the private sector or public sector. Thus, the possibility of incentivizing the public to preserve, protect, and invest (physically or financially) in the regional environments. Sustainability in regional, national, and international policy is a solution for natural resource depletion, preservation of public trust resources, environmental injustice, environmental inequities, and elimination of poverty.
- Resiliency is the knowledge that an ecological system is simply not going to keep delivering goods and services.¹¹⁰ Resource-management efforts must shift from reshaping nature for the purpose of satisfying human demands, to moderating demands so that they fit within biophysical limits.¹¹¹
- Resiliency management should be implemented in statewide policy, which creates economic planning, that maintains regional ecosystems in the face of

¹⁰⁷ Lords, Courtney, (2008)

¹⁰⁸ Sax, Joseph. (1970)

¹⁰⁹ Lords, Courtney, (2008)

¹¹⁰ Rees, William E. Post Carbon Reader, (2010)

¹¹¹ Rees, William E. Post Carbon Reader, (2010)

the inevitable shocks of climate change by new development strategies.¹¹² These strategies must abandon traditional market-based economies of maximization of resources in favor of social equity and ecological stability.¹¹³

- Introduce laws and policies requiring industrial polluters, who have been fined for noncompliance with EPA pollution standards, have the revenue from fines go directly back into the community where the pollution activity occurred.
- Revisit minimal pollution permits for polluters and make sure the minimal amounts are a sufficient amount to keep the ecosystem and citizens healthy and reflect current environmental assessments.
- Policymakers and public administration could, instead of focusing on the tension between environmental considerations and the desire for economic growth, focus on the integration of environmental considerations into public administration values by beginning with considerations of equity.¹¹⁴
- The integration of environmental considerations into the public administration of land use decisions around citing of noxious land uses (Steel Mill, Paper Mill polluting air and water) could be evaluated in terms of justice frameworks. They could utilize both Rawlsian and Senian theories of justice as an initial step in furthering defining a justice framework around the environmental movement and sustainability.¹¹⁵

¹¹² Rees, William E. Post Carbon Reader, (2010)

¹¹³ Rees, William E. Post Carbon Reader, (2010)

¹¹⁴ Nijaki, L.K. (2015)

¹¹⁵ Nijaki, L.K. (2015)

BIBLIOGRAPHY

Nijki, L.K. Justifying and Juxtaposing Environmental Justice and Sustainability: Towards an Intergenerational and Inter-Generational Analysis of Environmental Equity in Public Administration. *Public Administration Quarterly*. Spring 2015, Vol 1.39 Issue 1, p.85-116

Shrader-Frecette, K. S. (2002). Creating Equity, Reclaiming Democracy. *Environmental Justice (electronic resource)*. Oxford; New York: Oxford University Press, 2002.

Klass, A.B. (2015). The Public Trust Doctrine in the Shadow of Environmental Rights Laws: A Case Study. *Environmental Law*. (0462276), 45 (2), 431-462.

Torres, G. (2015). Joe Sax and the Public Trust. *Environmental Law*. (00462276), 45(2), 379-398.

Pope, Dockery, and Shwartz. (2008). Review of Epidemiological Evidence of Health Effects of Particulate Air Pollution. *Inhalation Toxicology: International Forum for Respiratory Research*. (published online September 27 2008). P. 1-18.

Rees, William E. (2010) Thinking “Resilience”. *Post Carbon Reader: Managing the 21st Century’s Sustainability Crises*. Eds. Richard Heinberg and Daniel Lerch. Watershed Media in collaboration with Post Carbon Institute. 25-40.

Cutter, Susan, Mitchell, Jerry, Scott, Micheal. (2000). Revealing the Vulnerability of People and Places: A Case Study of Georgetown. University of South Carolina, Bloomsburg University, Salisbury State University.

Kanner, A. (2015). Natural Resource Restoration. *Tulane Environmental Law Journal*. 28, no(2). 355-391.

Johnson-Anumonwo, Ibipo. (2009). Environmental Pollution, Race and Place: Research and Policy Implications. *Chapter, Proceedings of the 2007 National Conference of Environmental Science and Technology*. p. 77-84. April 30 2009.

Neff, Cheyenne, Brown, Stephanie.(2015). Eutrophication and Hypoxic Bottom Waters Resulting From Anthropogenic Input of Excess Nutrients in a River Dominated Coastal Plain Estuary Winyah Bay SC. CCU Marine and Wetland Studies research paper.

Moss, Kenneth, R. (1998). USC The Public Trust Doctrine in SC. *SC Environmental Law Journal*.

Chen, Hong; Burnett, Richard T; Kwong, Jeffery C; Villeneuve, Paul J; Goldberg, Mark S; et al. (2013). Risk of Incident Diabetes in Relation to Long Term Exposure to Fine Particulate Matter in Ontario, Canada. *Environmental Health Perspectives*. (online). 121.7 (July 2013)

Allen, D.M., W.B. Allen, R.F. Feller, and J. S. Plunket, eds. (2014). Site Profile of the North-Inlet-Winyah Bay National Estuarine Research Reserve. *North Inlet-Winyah Bay National Estuarine Research Reserve*. Georgetown, SC.

Shelly, Barry, G., Boyce, Boyce, James K. (2003). Natural Assets Democratizing Environmental Ownership. *University of Massachusetts at Amherst*.

CCU Marine Science Today.

Wenz, Peter, S. (2010). Just Garbage. *Environmental Ethics, The Big Questions*. Ed. David R. Keller. Blackwell Publishing. 501-508.

Anthony, R. (2014). Atmospheric Commons as a Public Trust Resource: The Common Heritage of Mankind Principle in Dialogue with the Duties of Citizenship. *Ethics, Policy, & Environment: A Journal of Philosophy and Geography*, 17(1), 43-48.

Buzzelli, C. O. Ackman, T. Buck, E Koepfler, J. Morris, and A.Lewitus. 2004. Relationships Among Water-Quality Parameters from the North-Inlet Winyah Bay National Estuarine Research Reserve. South Carolina. *Journal of Coastal Research* 45:59-74.

Cousins, M., M. Koons, A. Macek, L., C. Starovas. (2014). Water Quality Analysis of Effluent Discharge Effects on the Sampit River from International Paper Mill in Georgetown, SC. Coastal Carolina Center for Marine and Wetland Studies.

Lords, Courtney. (2008). Protection of Public Trust Assets: Trustees' Duty of Loyalty in the Context of Modern American Politics. *Journal of Environmental Law and Litigation*: Vol. 23, No 2. 519-542.

Mayor Jack Scoville of Georgetown, SC. March 2016. Personal Interview.

Interviewee One. February 2016. Phone Interview.

EPA Toxic Release Inventory. Detailed Facility Report International Paper. February 10, 2016. <https://www.echo.epa.gov/detailed-facility-report?fid=110000353466>

APPENDIX A – POLICY BRIEF

To: Honorable Governor Nikki Haley

From: Kelly Shelton

Date: April 11, 2016

Re: State Mandate for Industrial Polluters Payment for Natural Assets of Public Trust

Resources

Statement of Issue

The City of Georgetown, South Carolina currently has a minority population of 59% with the average median income of \$26,364 and 10.3% of population earning less than \$10,000 a year. A concentration of minorities are living in zones of high particulate matter, pm 2.5 and pm 10, which does not meet EPA regulations at all times. A formal enforcement of noncompliance was filed by the state on July 22, 2014 of \$97,000 for pollutants. However, as documented on the EPA Toxic Release Inventory, there were two significant violations that the state did not address in 2013 and 2014 which were total particulate matter violations. There are studies that have shown a link between higher levels of disease and high levels of particulate matter. To further concerns the industrial sites are also releasing effluents into the waterway adjacent to Georgetown, the Winyah Bay, a part of the Long Bay embayment. The Winyah Bay is an estuary, watershed, and a public trust resource. Georgetown is socially vulnerable to geographic and environmental hazards such as sea level rise and flooding due to climate change. These hazards are compounded with other perilous socioeconomic and environmental factors. Other fundamental causes of human vulnerability include a lack of access to resources, information and knowledge, and limited access to political power and representation.

Public Trust Resources are navigable waters and submerged lands held in trust for the public and future generations according to the South Carolina Supreme Court. Many states amended their constitutions in the 1970's to include provisions declaring that the citizens of the state have a right to clean air, pure water, and the preservation of natural resources; these provisions also declare that the government has an obligation to protect those natural resources for its citizens and future generations.

Particulate Matter has been associated with the daily deaths and hospital emissions in numerous studies in the past decade. Acute exposure to elevated levels of particulate air pollution has been associated with increased cardiopulmonary mortality, increased hospitalization for respiratory disease, exacerbation of asthma, increased evidence of incidence and duration of respiratory symptoms, declines in lung function, and restricted activity. Further, persons with diabetes are an important at risk group with particle-associated heart disease emissions. Georgetown in particular, has a high rate of diabetes disease compared to the rest of the state of South Carolina.

Georgetown has a high minority population with a lower socioeconomic status. Many of these citizens have been marginalized by generational poverty, high unemployment, and a lack of representation in state government. These citizens deserve to be protected from high levels of pollution, their natural resources protected currently and for future generations, and the public health ensured by a cleaner environment.

When public trust resources are damaged from long-term destructive effects such as industrial pollution in the Winyah Bay estuary, state, federal, and tribal public trustees are tasked with ensuring that the parties responsible for the damage sufficiently compensate the public for the loss. It has been documented by the EPA that there has been violations in regards to particulate matter and there have also been studies conducted by students in the Marine and Wetland Studies of CCU since 2004 confirming areas of hypoxia and eutrophication.

Public Trustees have now reached a consensus that seeking restoration, reparation, and replacement of natural resources-and not a monetary award paid into the government treasuries-is the best practice to compensate the public for its losses associated with natural resource damage. Public Trustees have fiduciary duties to maintain and grow the trust resources for the use of present and future beneficiaries and to use sound judgement in ensuring that the “trust property” is productive and to manage trust resources as a prudent guardian.

Policy Option #1

A state mandate requiring industrial polluters to pay to pollute public trust resources even if meeting EPA minimal guidelines. Restoring our natural resources preserves biodiversity and natural assets along with public enjoyment. These resources are imperative to human health and economy, thus the public trust guardians need to ensure the protection of such resources. These protections are termed Natural Resource Damage Law and the law seeks to make the public whole by restoring natural resources lost as externalities to polluters. The mandate would ensure the restoration of natural resources and reparation to be paid directly into community stakeholders or community government.

Advantages: The advantages of the “pay to pollute” policy would be that the community that endures the consequences of health impacts and environmental impacts could incur some reparation for such impacts. Taken into consideration the public trust resource law, i.e. public ownership, and the fiduciary duties of the public resource guardians or Department of Natural Resources. The state holds more power in regulation of industrial polluters, retains the reparations, and also creates a tri-regulatory stature to protect public trust resources.

Disadvantages: The disadvantages of the “pay to pollute” policy would be an additional governing agency to regulate the payment for pollution from industrial polluters and to monitor the funds coming onto affected communities.

Policy Option #2

Transparency needs to be incorporated into state enforcement and documentation of noncompliance of pollutants. The need for transparency lies within the monetary enforcement by the state in order to make sure that the fines are directly retained for affected communities and for public engagement purposes.

Advantages: The advantages of transparency lies within social and environmental justice issues currently being addressed across the nation. Findings reveal racial inequalities in environmental pollution that are consistent with a systematic and widespread pattern of defacto racial residential segregation in the contemporary United States. With transparency in policy, an environment of environmental justice is implemented statewide along with sustainable options for low-income minority citizens.

Disadvantages: The disadvantages in transparency could be demands made by the public for the funds to go directly into certain capacities not delineated by the policy. Transparency could cause social discord with regards to the amounts of pollution being permitted by state agencies in public trust resources.

Policy Option #3

Revisit past pollutant violations as documented by the EPA Toxic Release Inventory and reevaluate state's enforcement of fines or no enforcement of fines. Create a local database of pollutant inventory and fines to create transparency, best practices, and accountability.

Advantages: The advantages of revisiting past violations are the incurring of reparations, monitoring of toxic releases, and promotion of best practices in industry. After trustees have identified the types of restoration actions that will be considered, it must be determined how the scale of those actions will make the environment and the public whole from past violations.

Disadvantages: The disadvantages of revisiting past violations could create questions in local industry of cost-benefit complications due to increased fines. These fines and reparations could encourage industries to move elsewhere, which would not be beneficial to the state.

Policy Recommendation

Due to the current implications of climate change in our state and the nation, the documentation of hypoxia, pollution violations by industry, historical poverty, and geographic hazards on the coast of South Carolina, a policy of resiliency needs to be implemented. This implementation includes state mandates on polluters of public trust resources, transparency in allocation of fines, and state subsidies to instrument resiliency action plans in communities. The public trustees need to come back to Georgetown and investigate additional pollutants that were not addressed for noncompliance to EPA standards. The state law needs to require that the revenue from the fines for noncompliance to EPA standards goes directly back into the community where the pollution activity occurred. Additionally, permitting needs to reflect current climate change data and quick reform needs to reflect such data. While these options will reflect a change in infrastructure, public trustees of public trust resources have a fiduciary duty to protect and to make polluters pay to restore the natural resources without exhausting the public monies.

Sources

Kanner, A. (2015). Natural Resource Restoration. *Tulane Environmental Law Journal*. 28., no (2) 355-391.

Klass, A.B. (2015). The Public Trust Doctrine in the Shadow of State Environmental Rights Laws: A Case Study. *Environmental Law (00462276)*, 45 (2), (431-462).

Pope, Dockery, Schwartz. (1995). Review of Epidemiological Evidence of Health Effects of Particulate Air Pollution. *Inhalation Toxicology: International Forum for Respiratory Research*. Vol.7, Issue (1), (1-18). Published online 27 September 2008.

Libes, Susan, Kindelberger, Scott. (2010). Hypoxia in the Nearshore Coastal Waters of South Carolina Along the Grand Strand. *Center for Marine and Wetland Studies*.

US Census Data 2015

EPA Toxic Release Inventory <https://echo.gov/detailed-facility-report?fid=11000035466>

APPENDIX B - SURVEY

Survey Questionnaire

Public Trust Resources and Public Administration

For Department of Health and Environmental Control and Department of Natural Resources

Do you inform the public of the amount of pollutants that they are subjected to by permitted polluters?

- Always
- Sometimes
- Never

Do you use the public trust doctrine when regulating or advising industrial polluters?

- Always
- Sometimes
- Never

Do you protect the public trust resources from damage as much as possible?

- Always
- Sometimes
- Never

Are there public hearings conducted when new industrial polluters move into coastal regions?

- Always
- Sometimes
- Never

How can the public ensure that all measures are being taken to protect and conserve their public trust resources? **Do you help facilitate these actions?**

- Always
- Sometimes
- Never

By what means can we as citizens, regulating bodies, communities, governing bodies act together to create sustainable and resilient communities?

Do you help facilitate these actions?

- Always
- Sometimes
- Never

As guardians or stewards of natural resources do you put your focus on relieving the burden of toxic polluting from already distressed communities?

- Always
- Sometimes
- Never

APPENDIX C – PRESS RELEASE

For Immediate Release

Contact: Kelly Shelton
Edgar Dyer Institute for Leadership and Public Policy
Coastal Carolina University
Tel: 843-222-9672

Public Trust Resources, Sustainability and Sacrifice Zone: A Case of Georgetown, South Carolina

Georgetown, SC, March 29, 2016-- Everyone deserves the right to a clean environment including the public's treasured public trust resources; our coastal waterways. The public trust doctrine (PTD) may be used by state agencies and nongovernmental organizations (NGO) to protect the public's natural resources from industrial or any unwanted pollution that may have an adverse effect on such resources. The PTD is a doctrine that holds certain natural resources, notably submerged lands under tidal and navigable waters, in trust for the use and benefit of public and future generations.¹¹⁶ Further, the PTD protects citizens' rights over common resources that could become privatized, polluted or developed. No state may alienate the public's rights over public lands.¹¹⁷ The South Carolina Supreme Court under the state's PTD, states, "Everyone has the inalienable right to breathe clean air, to drink safe water, to fish and sail; to recreate upon the high seas and navigable waters, as well as to land on seashore sand riverbanks."¹¹⁸

In Georgetown the particulate matter that is released into the atmosphere has been documented by the EPA's Release Toxic Inventory. There are also known effluents and carcinogens being released into our public resources. These toxins are regulated monthly by the Department of Health and Environmental Control (DHEC) but are the standards high enough? Are these known human carcinogens affecting public health and destroying the very resources that we love?

Are any environmental injustices occurring in minority neighborhoods? The entire population, particularly, the 59 percent minority, have been exposed to known human carcinogens deposited in the Winyah Bay and the Sampit River. The carcinogens released as particulate matter are formaldehyde, acetaldehyde, carbon dioxide, and other toxic chemicals. The International Paper Mill (IP) and what is left of the former Arcelor Mittal Steel Mill have been releasing these pollutants for decades. In 2009, 135 residents and homeowners filed a civil law suit against IP, stating their health and property were adversely affected by the known human carcinogens being released daily.¹¹⁹ This case, Anderson vs IP, and Winleyns vs IP, went to trial and later dismissed. The SC State Federal Court cited that there was not sufficient evidence from

¹¹⁶ Klass, State Environmental Rights

¹¹⁷ Environmental Law, 2008

¹¹⁸ McQueen vs. S.C. Coastal, 580.2d 116,119 (S.C. 2003)

¹¹⁹ EPA Toxic Release Inventory website

residents, for failure to provide adequate data. Residents in Georgetown have been told their whole lives that the paper mill is their “bread and butter” so they should get used to the pollutants. According to the Environmental Protection Agency (EPA) and public trust resource law the air and the water in the Winyah Bay and the Sampit River should be valued and protected for the public.

Who is actually facing the costs and who gains the benefits? The current incidence of diabetes, cardiovascular and respiratory health problems faced by Georgetown citizens are some of the highest levels in the state. Apart from health impacts, Georgetown has a higher poverty level based on the national average (census 2015) with 10.3 percent of the population earning less than \$10,000 a year. The degree to which populations are vulnerable to hazards is not solely based on proximity but also includes other social factors, such as wealth and housing, which can contribute to a greater vulnerability¹²⁰

According to the EPA, and other NGO’s, marginalized communities endure the effects of pollution and environmental degradation on a larger scale than higher income communities. City, county, and state regulatory boards need to address the consequences of industrial polluting on public trust resources and marginalized communities such as Georgetown. In this circumstance, there is human vulnerability aside from pollutants; there is lack of access to resources for public goods, there is a lack of knowledge and limited access to power and representation.¹²¹ With newer climate change impacts such as flooding and sea level rise facing lower income coastal communities such as Georgetown, compliance with the public trust doctrine, sustainable initiatives and the reallocation of resources would present commonsense solutions to modern dilemmas.

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The Edgar Dyer Institute for Leadership and Public Policy believes that individuals across the community, state and nation can improve governance and solve problems by working together on a basis of mutual knowledge and understanding. Our mission is to engage Coastal Carolina University students in active learning opportunities while creating public value, untangling public problems, and finding public solutions that have positive and measurable impacts. For more information please contact ilpp@coastal.edu or 843-349-6952.

¹²⁰ Cutter, Michael Scott

¹²¹ Cutter, Michael, Scott