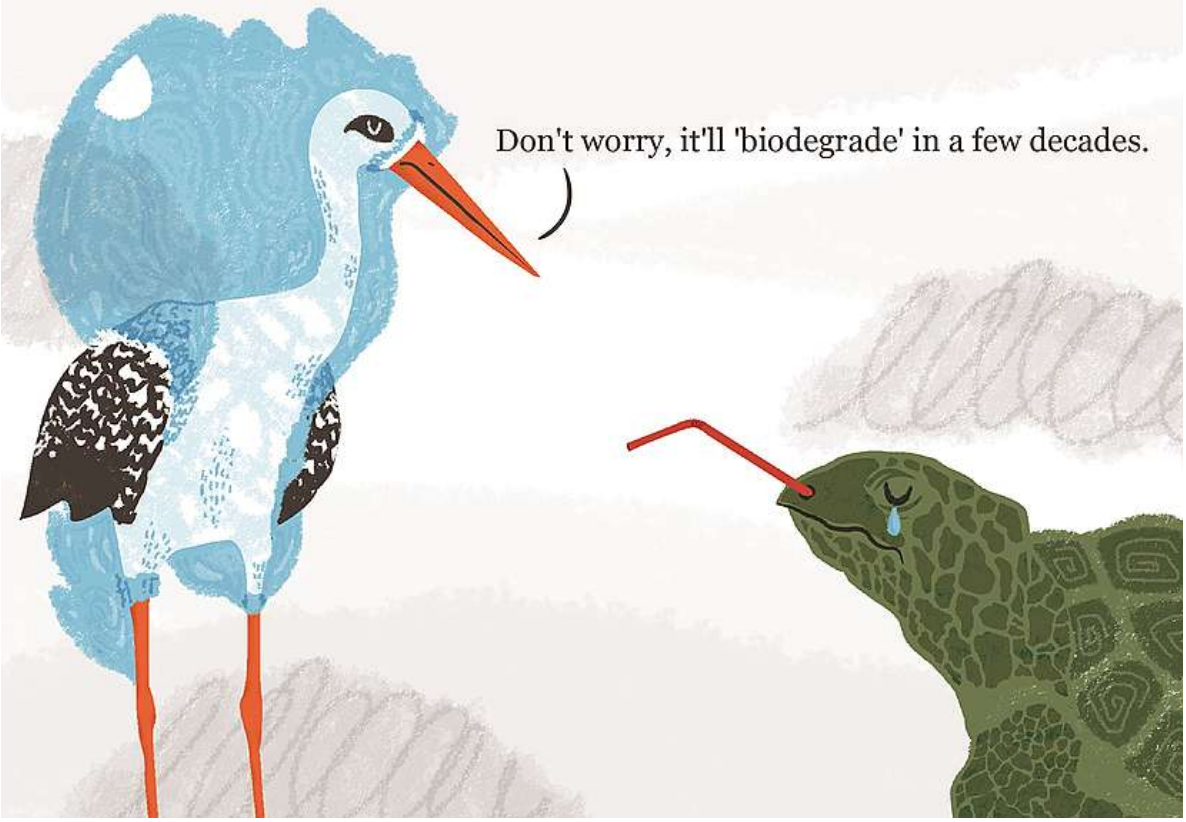
12-2018

Trash Talk: The Effects of Plastic Pollution on Seabirds in Narragansett Bay

Erin A. O'Neill
Salve Regina University, oneillerin30@yahoo.com

TRASH TALK:

The Effects of Plastic Pollution on Seabirds in Narragansett Bay



Erin O'Neill
Salve Regina University
December 2018

Table of Contents

ABSTRACT

Plastic pollution in the ocean is a global concern with more than 8 million tons of plastic dumped into our oceans every year. This policy paper assesses plastic pollution in Narragansett Bay and the negative implications it holds on local seabird populations. Also, essential background information on plastic production and throwaway culture is provided. Moreover, the biological significance of seabirds is described, highlighting the vital role such populations play in local ecosystems such as Narragansett Bay. This paper contributes research to the global issue of plastic pollution by observing declining native wildlife life populations, such as seabirds, on a local scale in Narragansett Bay. Furthermore, domestic policy is examined in relation to plastic production and wildlife conservation. This paper examines the effects of the Rhode Island Task Force to Tackle Plastics, which focuses on the mitigation of single-use plastics in Rhode Island to preserve ecological integrity. In addition, The Narragansett Bay Estuary program is evaluated to ensure the productivity of scientific research that contributes to the restoration and preservation of Narragansett Bay. Lastly, the final policy scrutinized includes the Rhode Island Wildlife Action Plan that is utilized to analyze the quality of native habitats and the overall ecological health of Rhode Island. Scholarly articles, relevant research, and other secondary sources are further examined in tandem with previous knowledge of conservation biology in order to contribute to these findings. As a result, final recommendations are provided, calling for additional regulations and policy adoptions that aid in environmental efforts on a domestic scale. Some recommendations include initiating a statewide ban of single-use plastics, development of financial incentives that promote sustainable efforts, and instituting better waste management systems.

INTRODUCTION

Background

Throwaway Culture

Presently, we live in a throwaway society where humans are ruled by consumerism and the rapid production of goods. Industries are excessively producing cheap, single-use products that are viewed as short lived. Throwaway culture is fueling the pollution crisis by encouraging an abundance of waste amongst the human population. Understanding throwaway culture is pivotal in further comprehending the current plastic pollution crisis. In society, plastics are commonly viewed as single-use items that can only be used once and then easily disposed of, however that is not the case. Studies show that 33% of plastics are used once and thrown away, with only 8% of plastics to be recycled. It has been found that Americans dispose of more than 30 million tons of plastics each year. Plastic is the product of human-driven consumerism, with people utilizing plastic for everyday goods such as containers, bags, packaging, utensils, and so on. Failure to properly dispose of these products can lead to pollutants amassing in the ocean. Plastic is cheap to produce but costly to the environment.

Pollution

Plastic pollution is rapidly accumulating and has become a global crisis, altering the biosphere. Currently, it is estimated that there are 51 trillion pieces of plastic in the ocean and that number is steadily rising (A Global Tragedy, 2018). In fact, by the year 2050, it is anticipated that plastic will outweigh fish in the sea (A Global Tragedy, 2018). Billions of pounds of plastic end up in the ocean and wreak havoc over marine systems. Today, there is no area within the ocean that is completely plastic free. Instead, there are macroplastics and microplastics that taint the water and flood into marine systems.

Figure 1: Plastic pollution invading the shoreline (Source: News Deeply).

A macroplastic can be defined as large visible plastic debris, such as a milk carton, plastic bag, or water bottle. Whereas, a microplastic is a degraded, broken down piece of plastic usually less than the size of one millimeter. Typically microplastics are slowly broken down over time by solar radiation and ocean currents. Plastics are not biodegradable, meaning it cannot decompose naturally via bacteria and other organisms. Instead, it can only break down into smaller pieces, known as microplastics. According to the EPA, "every bit of plastic ever made still exists" (A Global Tragedy, 2018).

Both macroplastics and microplastics cause deleterious effects on our ecosystems and can be found in all depths of the oceans, where this synthetic material can reside for centuries. Plastics are especially harmful when broken down into microplastics because this process releases harmful contaminants into the water. In result, a serious consequence of plastic pollution includes the biomagnification of toxic chemicals up the food chain. Biomagnification can be defined as the concentration of toxins in an organism as a result of it ingesting plants or animals that contain toxicity. Through consumption such toxicity can accumulate up the food chain, causing detrimental effects on wildlife. Specifically, plastic pollution plays a pivotal role in the health and declining species diversity of seabirds.

Ramifications of Plastic Pollution on Seabirds

Hundreds of thousands of seabirds ingest plastic each year, by 2050 it is predicted that 99% of seabirds will have consumed plastic (A Global Tragedy, 2018). Seabirds fall victim to the production of mass goods, in which they suffer fatalities, injuries, and even death due to human consumer culture. This is extremely lethal because seabirds play a key role in maintaining ecosystems and biodiversity. Today, seabirds are suffering firsthand from manufactured plastics in the ocean via entanglement and ingestion.

Seabirds are consuming plastics, which then cause health complications such as digestion problems, malnutrition, and asphyxiation. Frequently, species will mistake these man-made plastic products for prey and consume them, then causing a variety of health risks. Organisms consume this item that cannot be digested or processed in their system, filling their stomachs with plastic that has no nutritional content. Often times, by consuming copious amounts of plastic it can lead to starvation and death. That is because, these animals think that they are satisfied and full so they do not eat, but instead this proves to be a roux. This results in the death and malnourishment of many seabirds.

Figure 2: Juvenile albatross with plastic content in stomach (Source: Midway Film Project).

Moreover, seabirds and other aquatic creatures experience entanglement. Entanglement occurs when a fishing line and packaging restrict animals from eating, breathing, and swimming. Thus, reducing their quality of life and mobility. With industrialism rapidly rising and growing, the effects of pollutants on sea life are only going to be amplified.

Also, plastic is highly toxic and when brought into marine ecosystems this toxicity has a cascading effect. Ingestion can lead to the build-up of harmful toxins and blockage in the digestive system. Harmful toxins build up and transfer throughout the food chain, intensifying more and more. Moreover, toxic chemicals from plastic will seep into the water, often impacting the hormones, reproductive rate, fertility, and behavior of marine organisms. With the production of plastics growing, the side effects from pollution will only intensify, thus wreaking havoc over the ecosphere—as projected in Narragansett Bay.

The Significance of Narragansett Bay

Narragansett Bay is located the north side of Rhode Island Sound and consists of over 400 miles of coastline. Narragansett Bay is an estuary, which can be defined as an inlet of the sea, typically where the mouth of a river meets the sea. Estuaries are infamous for being home to a variety of life and extremely diverse. Some species native to the estuary of Narragansett Bay includes clams, crabs, lobsters, mussels, shrimp, oysters, eels, and so on. With over 350 bird species, some species include the American Black Duck, Bufflehead, Common Goldeneye, Great Egret, Common Loon, and the Great Blue Heron. Moreover, estuaries are highly productive ecosystems, generating massive amounts of biological energy that supports large quantities of life.

Figure 3: 1892 Map of South West Narragansett Bay (Source: Save The Bay).

However, pollutants are seeping into the bay and causing a variety of health impacts on the wildlife. Narragansett Bay has become a resting place for sewage and other pollutants, such as plastics and chemical runoff. Like many coastal communities, plastic has flooded our waters and has increased environmental risks. It has been found that local species are declining due to pollution, which can drastically impact both humans and existing wildlife.

This is especially concerning for locals because Narragansett Bay is the epicenter for businesses. Individuals who earn a living in The Bay thrive off the bounty of the ocean and depend on the environment for income. For instance, Narragansett Bay is home to commercial fishermen who fish off the coast and depend on a diverse catch to provide for their families. In fact, The Bay attracts over 100,000 fishermen each year. Moreover, the area relies on its ecotourism, in with tourists from all around the world gather to see the many beaches and stunning coastline. Over twelve million visitors each year visit Narragansett Bay and participate in the many recreational activities the coast has to offer. The Bay generates a lot of profitability for the state of Rhode Island and is a hub for business. Narragansett Bay is a public asset and an aesthetic symbol for the state of Rhode Island. Failure to properly conserve Narragansett Bay and all species that inhabit it will lead to the downfall of a flourishing community.

Problem Definition

With 90% percent of seabirds with trace plastic in their digestive system, plastic pollution has become a pressing issue. Seabirds are threatened by human decision-making or the lack thereof, in regards to consumerism. Consumerism and excessive production is the result of a growing population, for in order to support a large populace there must be a surplus of resources and goods. However, there are not enough resources here on earth to support a large population so humans generate cheap, unsustainable goods, such as plastic, to adapt. In turn, these goods are manufactured to be disposable and short-lived, which generates large quantities of waste. Instead of producing items that

are durable and can last multiple uses, humans participate in throwaway culture. This plastic byproduct of consumerism then fails to get disposed of properly and leaks into our water systems.

As a result, plastic filters into streams, rivers, and oceans, which then directly affects all marine life. Largely impacting seabirds in coastal communities, such as Narragansett Bay. These marine birds suffer either from ingestion or entanglement of plastic, both of which hinder their ability to perform daily functions. Seabirds are essential to the ecological community, in which they act as predators and prey to different species. In addition, seabirds play a crucial role in maintaining biodiversity. The main issue at hand is that consumerism and the rapid production of single-use plastics are unsustainable and negatively affects our biosphere. The domestic policy in Rhode Island in regards to plastic pollution is lackluster and requires additional countermeasures to conserve nature.

Statement of Purpose

This paper researches the direct relationship between consumer-driven plastic pollution and marine degradation, as seen in seabirds projected in Narragansett Bay. It describes the essential background on seabirds and their importance in marine ecosystems in preserving biodiversity. The purpose of this inquiry is to examine the severity and history of plastic pollution. Moreover, the objective of this paper is to analyze existing policy options regarding plastic pollution to those that are instilled in the Narragansett Bay area. In which, both the advantages and disadvantages of the three policies will be examined in order to provide a final recommendation. The resolution of this policy paper is to promote further conservation methods that can be adopted based on existing policies. Ultimately, the paper intends to analyze the global issue of plastic pollution on a local scale.

Methodology

In this policy paper, the research provided will result from a variety of dependable sources. This includes information from scholarly journals, articles, peer-edited papers, and books. The information utilized for this policy paper will be extracted from credible and reliable sources. Moreover, I will be utilizing information from Clean Ocean Access, a local non-profit, for additional information on pollutants in Rhode Island.

As an environmentalist, I am passionate about the Earth and humans relationship with the environment. With a major in Environmental Studies, my diverse course load has prepared me to discuss the following issue. Courses such as conservation biology, ecology, marine biology, environmental justice, and global environmental politics have increased my environmental awareness. Moreover, as a Rhode Island native, I have first hand seen the effects of plastic pollution on our marine systems.

Contrastingly, there are some limitations to my research. I am not collecting the data firsthand; instead I am relying on outside sources to aid in my policy paper. Additionally, I anticipate challenges when comparing policies from other states, countries, or regions to Rhode Island's current stand on plastic pollutants. It will be crucial to not be hypercritical and suggest unrealistic policies that Rhode Island could adopt.

PROBLEM HISTORY

What is plastic?

Plastic can be defined as pliable or easily shaped, specifically it is a name for a category of materials called polymers. The word polymer means many parts, and logically they are comprised of long chains of molecules (History & Future of Plastics, 2016). Within the last century, industrialized nations have manufactured synthetic polymers composed of carbon atoms provided by petroleum and other fossil fuels (History & Future of Plastics, 2016). Plastic is a synthetic material, comprised of long chains of atoms, contrasting to those found in nature (History & Future of Plastics, 2016). The long chains of atoms provide plastic with its malleable form and the patterns in which they are bonded determine a products strength, weight, and flexibility (History & Future of Plastics, 2016). Over time, humans have learned how to perfectly control these bonds and plastics have become essential to daily life.

The Chronicle of Consumerist Plastic Production

In 1862, Alexander Parks introduced the world's first ever man-made plastic at the London International Exhibition (History of Plastics, 2017). This prototype plastic was called Parkesine and it was an alternative to ivory (History of Plastics, 2017). Parks discovered Parkesine when attempting to develop a substitute for shellac waterproofing, however, it was not successful in the commercial world (History of Plastics, 2017). The idea of a synthetic material was not deemed as a success until John Wesley Hyatt discovered a new way to modify this version (History of Plastics, 2017).

In 1869, John Wesley Hyatt was motivated to invent a product contingent on a New York's firm offer of $10,000 for anyone who could provide a substitute for ivory (Freinkel, 2011). At the time ivory was being exhausted due to the growing popularity of billiards (Freinkel, 2011). Hyatt then invented the first synthetic polymer, in which he utilized cellulose derived from cotton with camphor (History of Plastics, 2017). He soon discovered that this plastic material could be molded and formed into different shapes (Freinkel, 2011).

This event was the catalyst for change and altered the way in which industrialized nations manufactured goods. Humans no longer had to rely on nature for sources of material instead they could simply produce their own (History & Future of Plastics, 2016). Originally, the creation of plastic was viewed as a means to help the environment (History & Future of Plastics, 2016). Plastic would help reduce the depletion of natural resources and preserve animals, such as elephants for their tusks (History & Future of Plastics, 2016). People quickly became thrilled with the concept of plastic because it liberated people from economic constraints imposed by the scarcity of natural resources (History & Future of Plastics, 2016).

Later in 1907, Leo Baekeland invented a product called Bakelite (History of Plastics, 2017). Bakelite was the first fully synthetic plastic, no longer containing

elements from nature (History of Plastics, 2017). Baekeland was attempting to find a replacement for shellac, an electrical insulator (Freinkel, 2011). The invention of this plastic proved to be a great insulator, durable, heat resistant, and well suited for mass production (History & Future of Plastics, 2016). Similarly to the other mentioned plastics it could be easily shaped or molded into anything.

As a result of World War II, the plastic industry flourished in the United States. The production of synthetic materials such as plastic was made a priority in order to preserve natural resources during such a hectic age (History & Future of Plastics, 2016). Mass quantities of synthetic products were being invented and manufactured. This includes the production of nylon, an artificial silk material, invented by Wallace Carothers in 1935 (History of Plastics, 2017). Nylon was utilized for a variety of productions including parachutes, ropes, body armor, and so on (History & Future of Plastics, 2016). Plexiglas was also invented during this time in order to be an alternative to glass, proving to be more durable for aircrafts (History & Future of Plastics, 2016).

Thus, as a result of World War II plastics were on the rise and were being used for new uses (History & Future of Plastics, 2016). During the war, plastic production in the United States of America increased by 300% and the rapid production of plastic continued long after the war (History & Future of Plastics, 2016). After the war, post Great Depression, Americans were eager to participate in the economy and spend money (History & Future of Plastics, 2016). They were hasty to buy new products, many of which were comprised of plastic. Americans were dazzled by the endless possibilities of plastics. Ultimately leading to a false vision of society in which material was bountiful, inexpensive, and safe (History & Future of Plastics, 2016).

In the 1960's the postwar conception of plastics began to shift in society. The general public no longer had optimistic views on synthetic plastics (History & Future of Plastics, 2016). It was during this period in which society experienced an awakening, prompting the environmental movement. This decade specifically was a time of environmental awareness and consciousness (History & Future of Plastics, 2016). The release of Rachel Carson's *Silent Spring* is believed to be the catalyst for the movement, which exposed the negative implications of pesticides on human and environmental health. It was in the 1960s that plastic pollutants were first observed in the ocean and environmental events came into the forefront of media (History & Future of Plastics, 2016).

In the 1970s and 1980s anxiety over plastic waste began to arise (History & Future of Plastics, 2016). The public became more conscious of the negative implications of plastic, realizing that this material had long-lasting effects on the natural world. This prompted a response from the plastic industry, resulting in the proposal of recycling programs (History & Future of Plastics, 2016). In the 1980s the plastic industry encourages municipalities to collect and process recyclable materials as apart of their waste management systems (History & Future of Plastics, 2016). Moreover, during this time period plastic was declining due to growing concern over the effects of this synthetic material on human health (History & Future of Plastics, 2016). The public was concerned

about chemical additives that get into the plastic during manufacturing (History & Future of Plastics, 2016). It was of apprehension that such toxic additives could then leach from the plastic into our bodies, food, and water systems (History & Future of Plastics, 2016).

Today, plastics still play an integral role in everyday life. By 2050 it is estimated that roughly 12 billion metric tons of plastic waste will reside in landfills or the environment (University of Georgia, 2017). Plastic is everywhere, it is in our cell phones, computers, cars, and even modern medicine (History of Plastics, 2017). It also aids in insulation and helps to save fossil fuels utilized in heating and transportation (History & Future of Plastics, 2016). The use of inexpensive plastics has raised the standard of living and made this synthetic material readily accessible (History & Future of Plastics, 2016). By replacing natural materials with plastics it has made possessions less expensive, lightweight, and stronger. Currently, scientists are attempting to make plastics more safe and sustainable, including the invention of bioplastics. Bioplastics are made from plants crops instead of synthetic polymers (History & Future of Plastics, 2016). More efficient recycling programs also need to be implemented in order to move forward. Plastic pollution is an urgent issue that needs to be addressed and mitigated in order to ensure the future of our planet.

Current Policy Environment

There are no current policies that apply to all municipalities in the state of Rhode Island. Instead, some towns have started their own initiatives to a greener future these towns include: Barrington, Jamestown, Middletown, New Shoreham, Newport, and Portsmouth. Only six out of thirty-nine total municipalities are practicing eco-friendly initiatives to aid in the war against plastic pollution.

Figure 4: Illustration by Pia Mileaf-Patel (Source: The College Hill Independent).

The six listed towns in Rhode Island have a plastic bag ban in place, with Portsmouth currently pending on the decision. However, it is highly anticipated that Portsmouth will partake in the ban and join the rest of Aquidneck Island on this stance. These listed areas have their own definition of the plastic bag ban initiative. Differing on the types of plastics that are permitted, the definition of a reusable bag, fees for alternative bags, and the stores in which the ban is applied.

For instance, Newport no business is allowed to make any single-use plastic carryout bags for any sales transaction (*City of Newport Ordinance*, 2017). In which single-use carryout bags do not include plastic barrier bags, double opening plastic bags, plastic bags learner than twenty-eight inches by thirty-six inches, or plastic bags four mils or more in thickness (*City of Newport Ordinance*, 2017). Furthermore, businesses that provide plastic produce, product, or double opening bags much offer a recycling opportunity on site and must recycle the plastic collected (*City of Newport Ordinance*, 2017). Such businesses are permitted to allow reusable carryout bags for customers. Those who do not comply will be written a notice and can be fined for up to one thousand dollars (*City of Newport Ordinance*, 2017).

In Middletown, no business is permitted to provide or make available any plastic carryout bag at the point of sale (*Town of Middletown Ordinance,* 2017). Businesses that provide plastic barrier bags or double opening bags shall offer a recycling opportunity onsite (*Town of Middletown Ordinance*, 2017). The town has allowed the sale of reusable bags at business establishments (*Town of Middletown Ordinance*, 2017). Also, the ordinance does not apply to laundry dry cleaning bags, door hanger bags, newspaper bags, or packages of multiple bags indented for garbage, pet waste, or yard waste (*Town of Middletown Ordinance*, 2017). Moreover, bags from pharmacists or veterinarians to contain prescription drugs are exempt for this policy (*Town of Middletown Ordinance*, 2017). Violation of this policy results in a warning letter, informing the business of the nature of the infringement and the fourteen-day time period in which the violation must be corrected (*Town of Middletown Ordinance*, 2017). The second offense includes a one hundred and fifty dollar fine after the fourteen day time period, third offense includes a three hundred dollar fine and a hearing before Municipal Court (*Town of Middletown Ordinance*, 2017).

RI TASK FORCE TO TACKLE PLASTICS

Overview

On July 16, 2018, Governor Raimondo signed an Executive Order aimed to reduce the utilization of single-use plastics (Task Force to Tackle Plastics, 2018). This is due to the influx of plastics that compile in Rhode Island's waters and coastline. The Tackling Plastics Executive Order targets single-use disposable items including shopping bags, bottles, cups, straws, six-pack rings, and balloons (Task Force to Tackle Plastics, 2018). These products are damaging the coastline of Rhode Island and filter into the ocean (Executive Order No. 18, 06, 2018). The task force is comprised of multiple environmental groups, marinas, academia, municipalities, elected officials, and agencies (Task Force to Tackle Plastics, 2018). In which these facilitators aim to generate progress by addressing the growing issue of single-use plastics that invade the ocean, causing environmental damage. The order aims to make Rhode Island a stronger, safer, and greener place (Task Force to Tackle Plastics, 2018). The Executive Order was to begin work no later than Sept 17, 2018 (Executive Order No. 18, 06, 2018). It aims to provide recommendations to the Governor concerning the use, reuse, and cleanup of plastics in Rhode Island (Executive Order No. 18, 06, 2018). In which, all findings and research should be reported around Feb 18, 2019 (Executive Order No. 18, 06, 2018).

Figure 5: Governor Gina M. Raimondo signs Executive Order to Tackle Plastics (Source: RI DEM).

" Specifically, The Executive Order creates a task force that will:

1. Encourage the financial and market factors needed to support reducing and recycling plastics

2. Develop non-regulatory recognition and incentive programs, potential legislation and/or regulations and other measures to eliminate the sources of plastic pollution

> *3. Support and build on the new Zero Plastics Initiative with the Rhode Island Marine Trades Association and on the state's existing, successful recycling programs*
> *4. Educate Rhode Islanders on the importance of and means to reducing and recycling plastics "*
>
> (Executive Order No. 18, 06, 2018).

The Executive Order was signed to make Rhode Island a leader in this fight against plastics, aiding in the reduction and elimination of single-use plastics (Executive Order No. 18, 06, 2018). Within the Task Force to Tackle Plastics, Raimondo includes the Zero Plastic Marinas Initiative, which was launched in May 2018 (Zero Plastic Marina Initiative, 2018). This was done in collaboration with partners to prevent plastic pollution in Narragansett Bay and further increase public awareness of the issue (Zero Plastic Marina Initiative, 2018). Partners include the Rhode Island Department of Environmental Management, Rhode Island Marine Trades Association, and local marina operators (Zero Plastic Marina Initiative, 2018). Through collaboration, progress can be made by creating a comprehensive approach to address the issue of plastic pollution. However, this effort is voluntary, in which marinas pledge to commit to plastic prevention and take actions (Executive Order No. 18, 06, 2018). The initiative includes plastic prevention education, plastic pollution prevention, and reduction, recycling, and coastline cleanup (Zero Plastic Marina Initiative, 2018). Along with, developing stronger plastic reduction policies at the state level to reduce the use of disposables (Zero Plastic Marina Initiative, 2018). Moreover, the initiative seeks to increase efforts to remove plastics from Narragansett Bay and coastline.

Within the Zero Plastics Marina Initiative, a list of ten pollution preventative actions has been developed by this partnership in order to help marina owners to implement this initiative. Such actions include designating a "Zero Plastics" steward, development and implementation plan to reduce single-use plastic water bottles, providing water-refilling stations in public areas, eliminating single-use plastic bags, and providing opportunities for recycling (Zero Plastic Marina Initiative, 2018). Along with, posting proper signage, providing responsible service ware, participating in a Shrink Wrap Recycling Program, organizing a shoreline clean up, and installing a trash skimmer (Zero Plastic Marina Initiative, 2018). The activities listed are then rated on a scale and when they are reached the facility is recognized a Zero Plastics Marina (Zero Plastic Marina Initiative, 2018).

Pros

This program takes preventative measures to protect marine life and coastal ecosystems in Narragansett Bay. Although not explicitly outlined in the Executive Ordinance, the policy offers hope in preserving aquatic wildlife. Through the construction of the Task Force and the adoption of the Zero Plastic Marine Initiative, the program can be connected to the protection of seabirds. Such a connection can be made through the adoption of the given policy, which aims to reduce the utilization of plastics and preserve the natural environment. This then limits the total amount of plastic entering

Rhode Island's water systems, therefore reducing the exposure of plastic to seabirds. Hence, the less plastic in the ocean and along the coastlines, the less plastic consumed by marine birds. This directly benefits the health of seabirds along Narragansett Bay, further promoting the preservation of biodiversity. Overall, marine life will improve if municipalities, businesses, and organizations adopt the initiative.

In addition, The Task Force to Tackle Plastic offers progress in Rhode Island's journey to a more sustainable future. Rhode Island government officials have acknowledged there is a plastic problem and is finally taking the initiative to preserve this ocean state. The program has constructed infrastructure to address plastic pollution and the negative implications it is having in the state of Rhode Island (Executive Order No. 18, 06, 2018). In which Governor Raimondo acknowledges the negative implications plastic is having on the bay, severely impacting wildlife and natural assets (Executive Order No. 18, 06, 2018). Moreover, the initiative has outlined clear goals and objectives that it strives to meet. Providing a sense of transparency and accountability that further encourages the program to achieve their goals.

Moreover, another benefit of the Task Force is the involvement of various governmental and non-governmental agencies, along with organizations, and the public. The program incorporates numerous departments, organizations, environmental groups, academia via partnership. In turn, this provides an interdisciplinary approach in which partners can collaborate to further evoke change. The diverse range of partners can contribute a wide array of ideas and solutions to battle against plastic. Through collaboration, the program can better network and reach all aspects of society. Another benefit of The Task Force to Tackle Plastic and Zero Plastic Marine Initiative is that it requires a collaborative effort from the community. These programs are heavily dependent on society to solicit change and incorporate multi-use plastics into daily life. The initiatives encourage the public to adopt sustainable practices that aid in the conservation of the coastline, ocean, and marine life. By involving the public, it can create a further sense of community in which people gather to engage in conservation and preservation of Rhode Island.

Cons

Although the Executive Ordinance, Task Force to Tackle Plastic, has positive aspects, there are also negative implications of this policy. One major issue with this initiative is that the policy is based on voluntary action. Currently, there are no fully enforced policies within the state of Rhode Island that requires all municipalities to dispose of single-use plastics. Instead, policies and ordinances on plastic vary throughout the state, depending on the city or town. Statewide legislation regarding plastic bans has not made it out of a committee at the General Assembly; instead, these policies have been turned down. Specifically, bag legislation introduces at the recent General Assembly session failed to progress forward. Currently, some municipalities are adopting preventative measures against plastic use, while others are not. In order to create effective change, this program needs to be adopted by all municipalities.

However, this proves to be troublesome in areas that are concerned about the socioeconomic effects of such policies. For instance, his year Providence failed to pass the plastic bag ban (Kuffner, 2018). If the city of Providence had approved this policy would have been the most progressive policy in the state (Kuffner, 2018). During the month of March, the ordinance that banned plastics bags and requires retailers to charge a fee for paper bags or reusable bags was approved by City Council (Kuffner, 2018). However, Mayor Jorge Elorza vetoed the ordinance after council members raised concern about the bags feeds and the burden it would bring on low-income residences (Kuffner, 2018).

The Task Force to Tackle Plastics fails to fully address the social and economic barriers of this policy. Specifically, low-income communities and small businesses will face difficulty when presented with extra fees. Poorer communities will not be able to pay for bag fees that range from five-to-ten cents per bag. Moreover, the program requires industries to adopt a new way of sustainable business, which may be difficult to achieve. Today, society is assimilated to the low cost, accessibility, and convenience of plastics. This will be a difficult trend to revert, which is what this program is attempting to accomplish. For the program to be successful, it is heavily reliant on the market to generate plastic alternatives that are affordable, sustainable, and equally as accessible.

Evaluation

Overall, the effectiveness of the Task Force to Tackle Plastics cannot yet be examined. The program began in July 2018 and is still in its preliminary stages. There is no data or actions provided since the first meeting on October 5, 2018 (Task Force to Tackle Plastics, 2018). In which presenters introduced the side effects of plastics and the issues of single-use plastics. Moreover, they discussed the guiding principals fueling this initiative and Task Force objectives (Task Force to Tackle Plastics, 2018). Some objectives include developing legislative solutions, leading by example, educating the public, innovating greener technology, and documenting the progress that has been done in Rhode Island to aid in the fight against plastic (Task Force to Tackle Plastics, 2018). The Task Force will be meeting each month in order to further progress and strengthen the initiative.

As time progresses, the efficiency of this program will be able to be better analyzed. Currently, there is no strict data to analyze or severe progress made. Instead, The Task Force to Tackle Plastic and Zero Waste Marina Initiative are newly conceived programs that require more time to be assessed. With no yielded results, it cannot be properly evaluated to see its overall impact and effectiveness. In February 2019, recommendations will be made from the Task Force to the Governor in regards to the use, reuse, and cleanup of plastics in Rhode Island (Executive Order No. 18, 06, 2018). Therefore, after this meeting further insight will be provided on the productivity of the established Task Force. Ultimately, there is no guarantee that the policy will be effective and easily incorporated into state legislation.

Despite the proof of productivity, there are additional positive and negative aspects to the Task Force to Talk Plastic Pollution that the state has developed in collaboration with

outside agencies. The policy aims to protect and preserve the natural assets of Rhode Island, specifically Narragansett Bay. Protecting local marine systems and wildlife by encouraging the market to adopt sustainable methods of production and developing incentive programs that eliminate plastic (Task Force to Tackle Plastics, 2018). The environment is also protected under the Zero Plastics Initiative and further educating the public on the importance of reducing and recycling plastics (Task Force to Tackle Plastics, 2018). Unknowingly this aids in the conservation of seabirds by mitigating plastic pollution. By the state taking initiative against plastic production and pollution, it protects marine ecosystems. Moreover, these programs aid in the preservation of the natural beauty of Rhode Island. Conserving local flora and fauna that make Rhode Island unique. However, the program is yet to address the socioeconomic and market barriers to adopting more sustainable systems. Overall, the plan aims to promote better environmental health by protecting the shoreline and ocean. Rhode Island is taking initiative to become a leader and mark progress.

NARRAGANSETT BAY ESTUARY PROGRAM

Overview

In 2015, the Narragansett Bay Estuary Program celebrated thirty years of nature protection and wildlife conservation of Narragansett Bay watershed (About, 2017). The Estuary Program was launched on July 12, 1985, with federal support aboard the Research Vessel Endeavor (Estuary Program, 2017). Providing researchers with the opportunity to develop over one hundred research and policy studies on a broad array of topics that help to protect, restore, and preserve the Bay (Estuary Program, 2017). This is a non-regulatory program established by Congress, authorized by Section 320 of the Clean Water Act in 1987 (Estuary Program, 2017). In 1988, the United States Environmental Protection Agency's Estuary Program named the Narragansett Bay an "Estuary of National Significance" (Estuary Program, 2017). Narragansett Bay is one of the twenty-eight programs designated as "Estuaries of National Significance" under the National Estuary Program. All twenty-eight estuary programs are a part of the Association of National Estuary Programs, a nonprofit dedicated to the preservation and restoration of our country's bays and estuaries (About, 2017). The program is guided by a Steering Committee made up of partners and stakeholders in Rhode Island and Massachusetts (Estuary Program, 2017). With 60% of the Narragansett Bay's Watershed lying in Massachusetts, and 40% remaining in Rhode Island, the state of Massachusetts plays a pivotal role in preserving the Bay (Bay Facts, 2017).

Figure 6: Aerial view of Narragansett Bay (Source: Rhode Island Sea Grant).

The Bay is one of the largest estuaries with 196 square miles of estuarine waters and over one million acres of land surrounding the Bay (About, 2017). It is home to a variety of plant and animal species and plays a pivotal role in the local economy. Today, due to climate change and the growing population the dynamic of the Bay is being altered. Affecting the air and water temperatures, precipitation, sea level, and species abundance in the Bay (Bay Facts, 2017). Overall, the Narragansett Bay Estuary Program helps protect and restore the water, in addition to maintaining the ecological integrity of the Bay.

"*The mission and vision of the Narragansett Bay Estuary Program is to protect, restore, and preserve Narragansett Bay and its bi-state watershed through partnerships that conserve and restore natural resources, enhance water quality, and promote community involvement and stewardship"*

(Estuary Program, 2017).

The Estuary Program helps combat the negative implications of climate change and additional anthropocentric decisions. The program works to attract and direct federal, along with other resources to build upon needed scientific information (About, 2017). Moreover, the Estuary Program helps inform public policy makers, support collaborative groups, and support local and grassroots organizations. It utilizes interdisciplinary skills in science, policy, and management to provide a basis for the program (About, 2017). It seeks to address and advance issues in Narragansett Bay's watershed with a logical, more scientific approach (About, 2017).

Moreover, the program outlines thorough guidelines in which the plan can be implemented and accomplished. Firstly, the task can be completed by utilizing a more holistic approach to the preservation and protection of the Bay's watershed (Estuary Program, 2017). This can help further comprehend its environmental, economic, and social significance. In order for the Narragansett Bay Estuary Program to be successful, it also needs to be structured with strict guidelines, rules, regulations, and policies (Estuary Program, 2017). In addition, the program requires immense cooperation among governmental and non-governmental agencies, along with local organizations and non-profits (Estuary Program, 2017). It also requires the initiative to integrate various environmental, social, and economic dimensions to unite towards a common goal (Estuary Program, 2017). The Narragansett Bay Estuary Program strongly relies on collaboration and unity. Furthermore, in order for the plan to be effective ecosystems must maintain their integrity, remaining fruitful and productive (Estuary Program, 2017). The Estuary Bay program can be further accomplished by the leveraging of program resources and compromise (Estuary Program, 2017). Lastly, the plan must stimulate discussion on Narragansett Bay and its natural resources, along with the many issues it is currently facing (Estuary Program, 2017). The program hopes to increase public awareness and provide an open dialogue with the surrounding community to better protect, preserve, and conserve the Bay.

Furthermore, the Narragansett Bay Estuary Program has also implemented The Comprehensive Conservation Management Plan (CCMP), which was enacted in 2012 (CCMP, 2017). It was established with the help from federal, state, and local agencies, in partnership with universities and nonprofits (CCMP, 2017). With each year, the program committee creates a mission-based plan to apply the Comprehensive Conservation Management Plan (CCMP, 2017). Ultimately is it directed by the following principles:

" The Narragansett Bay Estuary Program is guided by the goals of the Comprehensive Conservation and Management Plan to:

1. *Protect and restore clean water*
2. *Manage land for conservation and community*
3. *Protect and restore fish, wildlife, and habitats, and*
4. *Manage climate change impacts to human and natural systems "*

(CCMP, 2017).

Pros

The Narragansett Bay Estuary Program takes initiative to protect wildlife and restore water quality in Narragansett Bay. In the mission statement, it explicitly states the objective of the Estuary Program is to "protect, restore, and preserve Narragansett Bay". Specifically, this policy option can be related to the original statement of purpose within this paper. Further analyzing the effects of plastic pollution in Rhode Island on water quality. A large component of the Estuary Program specializes in research on water quality, specifically external sources of pollution. The task force discovers ways in which water quality can be improved and pollutants, such as plastic, can be prevented from entering the local water systems. Water quality can be enhanced by discouraging the filtration of macroplastics and microplastics into the water systems. Thus aiding in the defense against harmful plastic pollutants, contributing to the overall preservation and conservation of the Bay. Removal of trace plastics from the watershed is crucial in improving environmental health and restoring Narragansett Bay. Thus, by improving water quality in Narragansett Bay it promotes the prosperity of native species, including native birds species such as the Blue Herron and Cormorant.

Moreover, this policy option can be further connected to the original statement of purpose of this policy paper. The mission of the Estuary Program also strives to preserve local flora and fauna surrounding the natural landscape of Narragansett Bay. Particularly, in the Comprehensive Conservation Management Plan it notes its outlines the protection of wildlife and marine habitats, which in turn can be related to the protection of seabirds in Narragansett Bay. In many estuarine environments, seabirds play an integral role in the food chain and maintaining local ecosystems. These birds feed on a diverse range of food, acting as both predator and prey to a variety of species. Without these marine birds, the natural order would be disrupted and skewed. Hence, the importance of seabird preservation and protection in Narragansett Bay. In order for seabirds to be protected, plastics need to be prohibited from entering the Bay and water quality needs to be improved. Fortunately, the Narragansett Bay Estuary Program aims to restore water quality, which will further improve the preservation of marine species such as seabirds.

Overall, this policy option can connect to the protection of seabirds against harmful plastic pollutants, because it promotes research and other measures of progress to conserve Narragansett Bay. This comprehensive program provides beneficial guidelines, outlining ways in which it can mitigate harmful effects to the Bay. Furthermore, it benefits the health of Narragansett Bay. The Estuary Program encourages a sustainable way of living that preserves natural resources located on Narragansett Bay. It improves the quality of life on the Bay for aquatic and terrestrial species. Further supporting the communities surrounding Narragansett Bay. By protecting natural assets it aids in the growth and development of the local economy.

Another benefit of the Estuary Program is the support of the program from The State of Rhode Island, along with external agencies. This state program is backed by the federal law and is financially supported by the government. With the Environmental Protection Agency contributing an annual matching grant of $500,000 to the Narragansett Bay Estuary Program (Salit, 2013). The EPA plays an integral in the success of this program and the program is heavily reliant on the participation of this agency for funding. The collaboration of powerful figureheads and key players further legitimizes the policy. Support from the government on this program provides funding, resources, and exterior knowledge on the subject. Furthermore, this Estuary Program depicts success alongside twenty-eight other estuaries that are apart of the program.

The program also requires the involvement of outside organizations, governmental agencies, non-profits, and universities. Therefore, creating an interdisciplinary platform that incorporates a variety of skilled people. It utilizes people from all fields of studies, ranging from biologists, management executives, politicians, and so on. All skill sets and occupations play a pivotal role in the success of the Narragansett Bay Estuary Program. It allows experts from all walks of life to provide their expert advice, contributing to the overall understanding of the Bay dynamic. Moreover, the program requires participation from the public and engages society to participate in an open dialogue concerning the Bay. The Estuary program aims to educate and brings to light the major issues plaguing Narragansett Bay.

Moreover, the program is proof of progress and effectiveness. The Narragansett Estuary Program has been in place for over thirty years and in 2015 celebrated its thirty-year anniversary. This is one of the more established environmental policies in Rhode Island. Over time, this program has provided its proof of concept. It has appeared to be successful in supply research and knowledge on Narragansett Bay. With a slew of published scientific journals and articles relating the health of the Bay. The program is able to perform continual research and provide summaries to the public. It has accomplished goals, such as reducing toxic pollutants in the Bay. Overall, the program is an indicator of progress and marks success through the protection of local flora and fauna.

The Narragansett Estuary Program also outlines clear guidelines and addresses the issue at hand. The program is explicit when citing goals and objectives, making

information transparent to the public. Including the Estuary Program's mission and the Comprehensive Conservation Management Plan. This program is extremely forthcoming and does not hide its true purpose, instead, it clearly states the purpose is to preserve, protect, and conserve Narragansett Bay. The program provides accountability and challenges shareholders to strive to meet these goals. It focuses on participants and brings environmental concerns to the forefront.

Cons

Negative aspects of the Narragansett Bay Estuary Program are surprisingly limited. The website of the Narragansett Bay Estuary program provides thorough information and resources. Allowing full access to reports and summaries of the research, which is accomplished through this program. Moreover, the site includes access to important PowerPoint presentations and features the most recent scientific news regarding the Bay. However, when searching for outside sources in order to gain a broader sense of data relating to the Narragansett Bay Estuary Program, there is limited external information on the success of the program. Instead, much of the information about the program based on the information on the Narragansett Bay Estuary Program's website, which can be biased. In which the organization is only supplying the beneficial and productive aspects of the program, hiding negative implications from the public. One article that was prevalent was from The Providence Journal, which provided information that was not necessarily disclosed on the website of the Estuary Program. The journal disclosed that in 2012 the program received considerable criticism from the Environmental Protection Agency (Salit, 2013). This parent agency and chief funding source noted the program either had to change or risk downfall (Salit, 2013). The EPA noted that in the past the program had success, however it's program was inconsistent in its efforts (Salit, 2013). After this alarming news, the entire staff of the Narragansett Bay Estuary Program was parted (Salit, 2013). Today, the program has a new director, a larger board, and more organized structure (Salit, 2013). Ultimately, this reveals that the Narragansett Bay Estuary Program may not be as faultless as it appears.

Evaluation

The Narragansett Bay Estuary Program has both positive and negative aspects. It has provided researchers with the opportunity to develop various research and policy studies that aid in the conservation of the Bay. It is designated as an "Estuary of National Significance" due to its immense natural resources and diverse landscape. The program helps to restore, preserve, and protect Narragansett Bay, along with all the flora and fauna that occupy it. It also aims to renew the water quality of the Bay, focusing on pollutants that leach into the water. One benefit of the Narragansett Bay Estuary Program includes support from federal agencies, such as the Environmental Protection Agency. Which provides funding and performs an assessment on the program every five years. Moreover, the program engages various governmental and nongovernmental agencies, in collaboration with universities, non-profits, and grass-root level organizations. Another advantage of the Estuary Program is that it is well established and has existed for over thirty years. Making it one of the older policy options in the state of Rhode Island.

In addition, the program outlines clear objectives and goals that aid in the improvement of Narragansett Bay.

However, despite the apparent success, there are limits to this conventional program. There is limited external information on the Narragansett Bay Estuary Program, outside of the organization's website. Featuring little to none, journal articles discussing the program's success. Although the Estuary Program website features the latest news and published articles, the site can be biased. Selecting only specific information that makes the program appealing and reputable. For instance, when performing research a Providence Journal article appears, providing information that was not featured on the host website. It revealed the startling news that in the year 2012, the Narragansett Bay Estuary Program was not as successful as it appeared. Instead, the EPA demanded that the organization needed to be altered or else it would be terminated. Overall, the Narragansett Bay Estuary Program plays a pivotal role in preserving wildlife and restoring water quality. The program is an integral component to combatting pollution in Rhode Island through the conduction of effective research and studies.

RHODE ISLAND WILDLIFE ACTION PLAN

Overview

In 2000, Congress developed the State and Tribal Wildlife Grants (SWG) program (RIWAP, 2015). With the objective to aid in funds in order to restore declining fish and wildlife populations prior to becoming endangered (RIWAP, 2015). However, these matching grants are only available to states that complete a State Wildlife Action (SWAP) program every ten years (RIWAP, 2015). This policy examines the quality of habitats and health of wildlife in order to assess potential and existing threats (RIWAP, 2015). Moreover, the program outlines the necessary actions required to conserve natural resources long-term (RIWAP, 2015). In the state of Rhode Island, the first Wildlife Action Plan was formerly known as the Comprehensive Wildlife Conservation Strategy (RIWAP, 2015). The Rhode Island Department of Environmental Management adopted this strategy in 2005, with approval from the United States Fish and Wildlife Service (RIWAP, 2015). The program was a component of the unparalleled national framework of comparable strategies created by every state in the United States (RIWAP, 2015). Which provided a nationwide agenda for preventing wildlife from becoming threatened and preserving natural resources (RIWAP, 2015).

In 2015, Rhode Island completed its ten-year assessment of the Wildlife Action Plan, making it the first state in the nation to publish the first revised action plan (RIWAP, 2015). The strategy was updated with assistance from the Rhode Island Chapter of The Nature Conservancy, University of Rhode Island, and the Rhode Island Department of Environmental Management (RIWAP, 2015). Specifically, the 2015 Rhode Island Wildlife Action Plan provides direction and coordination of wildlife preservation efforts for the coming future (RIWAP, 2015). Rhode Island is home to over nine hundred vertebrate and twenty thousand invertebrate species, all of which need to be conserved (RIWAP, 2015). Species of greatest conservation need (SGCN) include mammals, birds, reptiles, and amphibians, fish, and invertebrates (RIWAP, 2015). With over four hundred and thirty species of birds in Rhode Island, which is currently the most dominant taxonomic group (RIWAP, 2015). Rhode Island is home to a diverse range of plant and animal species that thrive off the natural landscape of the state, ranging from estuaries, bays, woodlands, and wetlands (RIWAP, 2015). The Rhode Island Wildlife Plan provides essential guidelines and recommendations for protecting local ecosystems (RIWAP, 2015).

Furthermore, the plan highlights the benefits the Rhode Island Wildlife Action Plan provides the state, which includes:

- *"A comprehensive approach to wildlife conservation*
- *Millions of dollars in matching funds for the conservation of non-game species and their habitats*
- *New local and regional partnerships and increased support for statewide conservation priorities"*

(RIWAP, 2015).

In part with the 2015 Rhode Island Wildlife Action Plan, the Department of Environmental Management sought input from the public and local, state, and regional stakeholders (RIWAP, 2015). In which these individuals would help aid in the formation of the action plan, provided beneficial and much-needed information to the conservation strategy (RIWAP, 2015). Through this collaboration, it fostered an inclusive relationship with outside scholars, educators, scientists, political figures, researches, and business owners (RIWAP, 2015). The aim of the Rhode Island Wildlife Action Plan was to be transparent, establishing joint ownership for the strategy by utilizing a diverse range of experiences, expertise, and ideas (RIWAP, 2015). Also, the Rhode Island Department of Environmental Management acknowledges the necessity to put this policy into action in local communities (RIWAP, 2015). Especially in areas where conservation and land use decisions are made every day (RIWAP, 2015). In order to assist these communities, the 2015 Wildlife Action Plan includes important tools to utilize the plan more efficiently (RIWAP, 2015). This includes species and habitat profiles, conservation opportunity areas mapping, educational materials for citizens, along with workshops and events (RIWAP, 2015).

Figure 7: Example of a species habitat profile within the Rhode Island Wildlife Action Plan (Source: Peter Paton/RI DEM).

Pros

The objective of the Rhode Island Wildlife Action Plan is to provide a basis of framework and strategy the aid in the conservation of local fauna. Providing thorough assessments on the ecological health of the state's wildlife and habitats (RIWAP, 2015). Overall, the plan contributes to local conservation efforts to protect both terrestrial and marine life. Although the Wildlife Action Plan does not specifically outline the issue of plastic pollution and the effect on seabirds in depth, the policy offers hope in conserving this taxonomic group. Through the adoption of this action strategy, the program can be

connected to the protection of seabirds. Seabirds play an integral role in maintaining Rhode Island's biological diversity, with a majority of seabirds located on the coast in locations such as Narragansett Bay. Seabirds are apart of the local fauna and are to be better protected under the Action Plan, which aims to conserve all wildlife. The conservation of seabirds requires limiting the amount of plastic waste that enters the coastline of Rhode Island. Which can be achieved by reducing the consumption of plastic, producing biodegradable items, utilizing multi-use products, and creating an infrastructure that supports a sustainable future.

Another benefit of the Rhode Island Wildlife Action plan is the involvement of multiple governmental and non-governmental agencies. The policy incorporates non-profits, environmental groups, organizations, and the public to contribute to the plan. Again, the Wildlife Action plan is an interdisciplinary strategy that incorporates various fields of expertise. The benefits of an interdisciplinary plan include the wide-range of knowledge on Rhode Island and the state's natural resources, which then can be applied to conserve wildlife. Overall, through diverse partners, the action plan can be better established through unique ideas and solutions. Furthermore, the strategy to conserve Rhode Island's wildlife requires the participation of the public. In order to facilitate change and conserve local species, the community must work with the Rhode Island Department of Environmental Management. The public must recognize the ways in which they are failing to aid in the conservation of local wildlife and correct such behavior. The Action Plan encourages communities to participate in sustainable methods and protect Rhode Island's natural bounties. The Department of Environment promotes participation from the public in local conservation efforts through the utilization of species habitat profiles, accessible education materials, workshops, and events.

Moreover, the imposed strategy has outlined an organized and well-developed action plan. Built upon the foundation of a strong framework, that highlights explicit goals and standards. Also, within the Rhode Island Wildlife Action Plan objectives are clear and thorough. Through collaboration with the public and external agencies, the Rhode Island Department of Environment seeks to be transparent with the provided action plan. Specifically, allowing the public full access to reports, supplemental materials, and opportunities to expand knowledge on conservation practices. In addition, the plan well devised and routinely revised every ten years. Allowing for an adequate amount of time to pass before assessing the overall effect and structure of the Wildlife Action Plan. The revision allows developers to update the strategy in order to make it more relevant to the potential environmental issues plaguing wildlife in Rhode Island. Ultimately, the structure and organization of the Rhode Island Wildlife Action Plan plays an integral role in the implementation of local conservation efforts. Providing individuals with the framework and knowledge to protect Rhode Island's flora and fauna.

Cons

Disadvantages of the Rhode Island Wildlife Action Program are limited, with little drawbacks. The plan outlines actions prescribed for the next decade that address threats and conserve wildlife in Rhode Island. Today, Rhode Island is facing a variety of

environmental challenges and within these difficulties, the state must prioritize the most alarming circumstances. There are many ecological issues plaguing the state including overfishing, agricultural runoff, pollution, water quality, wildlife conservation, and so on. Such copious and diverse ecological issues make it difficult to target a specific problem in aims to find a solution. In order to be more efficient, the plan should prioritize the most important issues. Unfortunately, the agenda has aspects that are overly ambitious and not realistic. For within this ten-year agenda not all improvements can be met, that would be naïve and over assuming. Moreover, another negative aspect of the Wildlife Action Plan is that it is at the mercy of the ever-changing environmental conditions. The plan is at whim to the degrading environment and the ever-growing ecological problems. Some of the most pivotal environmental challenges facing Rhode Island include:

- *" Habitat loss and fragmentation from lack of conservation*
- *Lack of GCN species and key habitat data needed for incorporation into the strategy*
- *Lack of research to guide threat assessment and prioritization of conservation planning*
- *Lack of strategy to support priority research*
- *Lack of advocacy for environmental review*
- *Lack of authority from enforcement of current regulations*
- *Lack of advocacy for wildlife conservation*
- *The Broad scale of temporal and spatial climate change "*

(RI Wildlife Action Plan, 2018).

The Wildlife Action Plan recognizes the diverse range of species that need conserving, although, it is unsure if seabirds will be given priority. This policy option protects wildlife, however, certain species will be given more attention and care than others. Today, there are no existing policies specifically protecting seabirds. Within the Rhode Island Wildlife Action Plan, the conservation of this taxonomic group is largely dependent on the implementation of governmental agencies and the public. The conservation of wildlife relies heavily on the actions of locals to restore the ecological community. The plan requires action and cannot simply exist as a framework. It is urgent that the biodiversity of Rhode Island is conserved and the public is informed on the issues plaguing the natural environment. However, the Wildlife Action plan cannot guarantee the future of wildlife in Rhode Island. Again, the policy is dependent on public use and an ecological movement that aids in green efforts. The agenda is intended and designed for the public. The logistics of the plan must be spread, providing a foundation for conservation in Rhode Island.

Evaluation

The Rhode Island Wildlife Action Plan has both advantages and disadvantages. This federally funded program was developed in the aim to assess the quality of habitats and wildlife in Rhode Island. In which potential and existing threats are further examined in order to conserve local flora and fauna. Moreover, the program seeks to preserve the

state's natural resources and maintain biological diversity. The Wildlife Action Plan has developed a comprehensive strategy for the conservation of Rhode Island's wildlife. Another benefit of the plan is that it incorporates many areas of expertise, involving governmental and non-governmental sectors. Furthermore, the policy unites the public in the conservation of local wildlife. In addition, the program outlines clear objectives and goals that aid in the preservation and restoration of Rhode Island. Yet, despite notable successes, there are disadvantages to this action plan. Currently, Rhode Island is facing many environmental problems, including the loss and decrease of many species populations. The Action Plan does not prioritize any declining species in particular, making it extremely difficult to target species of highest concern. Instead, the plan is idealistic in its attempt to offer solutions to declining wildlife populations. The ever-changing environmental conditions make it difficult to target a particular species. Unfortunately, the plan cannot guarantee the future for local wildlife, it can only provide an agenda and information that must be utilized by the public. Overall, the Rhode Island Wildlife Action Plan plays a crucial role in the conservation of wildlife and the restoration of local habitats. The plan is an integral component in combatting declining species populations in Rhode Island by providing supplemental materials and information to the public.

CONCLUSION

Overview

Pollution is a growing issue many communities, cities, states, and countries around the world are currently facing. Plastic pollution has become a global crisis and is directly impacting the health of our intricate ecosystems. Billions of pounds of plastics are flooding our marine systems and coastal environments, succumbing our waters to toxic chemicals and harmful plastic byproducts. Today, seabirds fall victim to the negative implications of plastic pollution. In thirty years it is predicted 99% of seabirds would have ingested plastic. Resulting in death and tremendous species loss of seabird populations. With birds mistaking plastic as food, many birds die of starvation or malnourishment. Frequently, seabirds also become trapped and entangled in plastic products that reside in the ocean, resulting in asphyxiation or other negative health impacts.

The decline of various seabird species can be related to coastal communities, such as Narragansett Bay, which relies on a diverse range of species to maintain ecological integrity. The Bay is home to a plethora of seabirds, however, due to the influx of plastic pollution in coastal waters, it is causing detrimental effects on the residing population. Failure to mitigate and adopt measures that prevent plastic pollution can result in the decline of seabird populations. Which then alters The Bay's sophisticated food wed and complex nature. Upon the depletion of existing seabird species, other native plant and animal species will rapidly flux. Resulting in a drastic increase or decline in local flora and fauna populations in Narragansett Bay. Ultimately disrupting the ecological balance of Narragansett Bay and damaging coastal communities.

Currently, there are no policies in Rhode Island that directly aid in the preservation of seabirds in regards to plastic pollution. No one has yet addressed the impending issue of the declining seabird population. However, some municipalities have adopted small approaches that contribute to a greener future. As of date, six out of thirty-nine municipalities in Rhode Island have placed a ban on plastic bags. With areas placing their own definition on the plastic bag ban initiative. Differing on the types of plastics that are permitted, the definition of a reusable bag, fees for alternative bags, and the stores in which the ban is applied.

The harmful effects of plastic pollution on seabird populations is an issue that is presently plaguing Narragansett Bay. In order to combat such negative implications of plastic pollution on marine systems, Rhode Island has implemented programs that aid in the conservation of wildlife and natural resources. This includes the Rhode Island Task Force To Tackle Plastics, an Executive Order signed by Governor Raimondo. Which aims to reduce the utilization of single-use plastics in Rhode Island in order to preserve the state's coastline. Furthermore, the Task Force intends to provide recommendations to the Governor concerning the use, reuse, and cleanup of plastics in Rhode Island. Unfortunately, the effectiveness of the Task Force cannot yet be examined due to its preliminary stages. The program began in July 2018, hence at the moment, there is no

proof of concept. In order to better analyze the outcome of the Task Force, it must take time. Although, it proves to be promising with its mission to develop legislative solutions, lead by example, educate the public, and innovate green technology that aids in this plastic pollution crisis.

Another policy option being implemented on a domestic level, as mentioned previously, includes the Narragansett Bay Estuary Program. This program is supported by the federal Research Vessel Endeavor, which provides researchers with the opportunity to develop research studies that help to protect, restore, and preserve Narragansett Bay. The program is a non-regulatory agenda established by Congress, as apart of the 1987 Clean Water Act. The project aims to attract and direct federal, along with other resources to build upon needed scientific information. The Estuary Program helps inform public policy makers, support collaborative groups, and support local and grassroots organizations. With little negative implications, overall the Estuary Program plays a crucial role in maintaining wildlife and preserving water quality.

The remaining domestic policy, as mentioned in this paper, involves the Rhode Island Wildlife Action Plan. This program was developed from the State and Tribal Wildlife Grants program in an aim to restore declining fish and wildlife populations. Under this program, the State of Rhode Island generates an assessment every ten years in order to examine the quality of habitats and analyze ecological health. Outlining specific actions necessary to preserve the natural resources of Rhode Island long-term. However, the Action Plan does not prioritize any declining species in particular making it difficult to identify the species of highest concern. Making the plan appear too idealist in its attempt to offer feasible solutions to combat species loss. Overall, the program aids in the effort of species conservation and ecological restoration in Rhode Island.

Recommendations

1. *The State of Rhode Island must enact a statewide plastic bag ban*

Currently, only select municipalities in Rhode Island have implemented a plastic bag ban. The towns include Barrington, Jamestown, Middletown, New Shoreham, Newport, and Portsmouth. With only six out of thirty-nine total municipalities practicing environmentally conscious initiatives to aid in the war against plastic pollution. The remaining municipalities must adopt this ban in order to aid in the conservation efforts of The State of Rhode Island and its natural bounties. In order for this interdiction to be beneficial and most effective, remaining cities, towns, and counties must prohibit the plastic bags from being sold and utilized.

2. *Legislators must create a ban on single-use disposable plastics*

It may appear too idealistic for the State of Rhode Island to enact a ban on single-use disposable plastic products due to the state's lack of environmentally progressive efforts. However, this sanction is possible and has proved to be successful in other areas of the United States, specifically in Seattle, Washington. Within this city, Seattle has created a ban on plastic bags, along with plastic food service-ware. In which the city requires all food service businesses to find recyclable or compostable packaging and dining ware

alternatives to all disposable food service items. This includes alternatives to disposable containers, straws, cups, utensils, and other products. Such a policy is applicable to all food service businesses including restaurants, grocery stores, coffee shops, and so on. Rhode Island must adopt this policy, as exemplified in Seattle, in order to progress the environmental movement and aid in conservation efforts.

3. *Infrastructure must make paper and reusable alternatives affordable to low-income communities*

The utilization of recyclables, biodegradables, and multi-use products is essential in solving this current plastic crisis. However, low-income families and communities cannot be ignored when transitioning away from plastic products. Often these plastic products are cheap and easily accessible to low-income communities. The shift to more costly, recyclable products would create a financial burden on such marginalized groups. For instance, some families cannot afford the twenty-cent fee charged at the supermarket for recyclable paper bags. Local businesses and government officials need to collaborate in order to make such environmentally conscious products accessible to low-income communities.

4. *The Government must develop financial incentives to promote sustainable, green efforts*

In order to encourage sustainable efforts, the state must create financial incentives to motivate the public to become environmentally conscious. This effort includes a green tax, which is a fee imposed on consumers for products or services that are not eco-friendly. Ideally, this tax is to combat the negative impacts that result from the use of non-green products and services. Other economic incentives include reducing the cost of goods or services when utilizing a sustainable product, which requires cooperation between industries and the state legislature. For example, simple actions such as bringing a reusable cup to a local coffee shop can save consumers money and contribute to sustainable efforts. Often, such shops provide a discount when customers bring their own cups, containers, or reusable bags. Providing the public with economic incentives is crucial in promoting green efforts that overall protect local wildlife and the planet.

5. *The State of Rhode Island must effectuate better waste management systems*

Furthermore, in order to promote better environmental health, Rhode Island's waste management systems need to be regulated and improved. Across the state, there are a variety of policies that differ amongst municipalities in regards to waste management. Often such policies are unclear to the general public and lack consistency. This requires further education of the public on proper recycling methods and the disposal of goods. Moreover, this crisis calls for the improved collection, management, and disposable of waste. With better strategies to reduce litter that enters Narragansett Bay and surrounding water systems. This calls the enhancement of waste reduction, separation, processing, management, and recycling of waste management companies. Promoting better separation of recyclables from regular waste and the utilization of compostable products.

6. *The Government must implement stronger programs that aid in the protection of seabirds*

Although the state legislature has developed a variety of programs that promote the conservation of local flora and fauna, there is no direct policy protecting seabirds. Rhode Island government has not directly implemented a domestic policy that specifically aids in the conservation of local seabirds. As mentioned previously, seabirds play a crucial role in maintaining the integrity of local ecosystems and food webs. In order to promote the health of seabirds, further programs and policies are required to protect these species from anthropogenic effects. In order to better preserve the declining population legislature needs to increase the number of wildlife sanctuaries and conservation areas. This will ensure the quality and health of local marine habitats. Moreover, this includes the utilization and implementation of Marine Protected Areas (MPA) to conserve local seabird populations. The State of Rhode Island has failed to recognize the importance of seabirds and needs a policy that targets the declining population.

Concluding Remarks

The conservation of seabirds must take continued efforts on a domestic and global scale. In order to ensure the future of seabirds, local and international policy needs to be set in place to mitigate the effects of plastic pollution. The preservation of seabird populations in Narragansett Bay and around the world requires stronger efforts to combat irreversible species loss. Legislature must take an interdisciplinary approach in relieving this plastic crisis in an aim to conserve precious wildlife taxa, such as seabirds. It would be naïve and irresponsible to believe that one policy could solve this environmental crisis. Instead, multiple policies and regulations must be applied to the existing problem, for one policy cannot combat all issues. If seabirds are to be conserved it requires the effort from all disciplines and walks of life. Local businesses, politicians, educators, scientists, and researches all need to contribute towards a solution. There need to be multiple political, environmental, financial, and social efforts that aid in the conservation of seabird populations. In order to preserve a declining seabird population, on a local and global scale, it requires collaboration.

Presently, seabirds play an integral role in Narragansett Bay and its surrounding ecosystems. In which native birds maintain the integrity of intricate ecosystems and diverse food webs. Without dominant seabird populations, there would be detrimental alterations in the ecosystems, causing a cascade of negative implications. Ultimately, such modifications would then impact local businesses, fisheries, and coastal communities. For the success of Rhode Island in terms of profitability and economic success is heavily reliant on the quality of surrounding ecosystems. Natives pride Rhode Island as “The Ocean State”, however little is being done to protect these oceans and the wildlife that inhabits them. Instead, The State of Rhode Island must live by this motto and aid in the preservation of marine life. Conserving seabirds and maintaining ecological integrity is essential in improving the quality of our oceans and water systems, on a local and global scale.

Ultimately, in order to preserve seabirds, society needs to limit the utilization and rapid production of plastic products. This will then reduce the total amount of plastic pollutants that enter waterways and marine systems. There is a need for stronger policies that regulate the production and consumption of plastic products. The government must place bans and strict regulations on plastics in order to conserve wildlife and natural resources. However, diverging away from single-use plastics will be a difficult transition for society to make. Presently, humans are heavily reliant on plastic products for convenience and cost efficiency. Plastic is so largely a part of our daily lives and this idea of throwaway culture has been readily accepted as a societal norm. Today we live in a world where everything is disposable and can be easily replaced. However, our environment is not something that can be tossed away and bought anew. We only have one Earth and one chance to make it last. Therefore, humans must do everything in their power to preserve the life that exists on this planet. This requires actions and humans must start thinking in the long term, with the aim to adopt more sustainable practices. This is not just a problem for future generations; it is a problem for present-day populations. Narragansett Bay is not the only community facing the negative implications from plastic pollution. Plastic pollution is plaguing coastal communities around the world, causing detrimental effects on aquatic life. Narragansett Bay is a local example of a global issue and is not unique in this convoluted issue. Instead, this is a worldwide problem that needs to be addressed and mitigated with effective policy.

However, within the current political climate, the ecological health of our planet is in danger. Under the Presidency of Donald Trump, environmental progress has regressed. On January 20, 2017, Trump was inaugurated as the President of the United States. This marked trouble for the environmental movement due to Trump's stance on human-induced climate change, in which he believes it is a hoax. Since becoming president he has repealed a variety of environmental initiatives, including the Paris Agreement (Hansler, 2017). On June 1, 2017, Trump pulled the United States of America from the Paris Agreement, which sought to mitigate the effects of climate change (Hansler, 2017). The President then explained that involvement in the Paris Agreement would undo economic progress and result in further damage to the United State economy (Hansler, 2017). Furthermore, President Trump openly endorses and promotes the utilization of fossil fuels as sources of energy (Eilperin, 2017). Investing in energy sources that undermine previous environmental efforts toward a more sustainable future (Hansler, 2017). Moreover, in 2018 Trump implemented a 31% cut to the EPA's budget (Eilperin, 2017). Failure of the current Presidential Administration to accept and acknowledge the current environmental crisis is alarming for the potential ecological well-being of the Earth. By the government ignoring anthropocentric effects on current climate conditions and promoting unsustainable practices it threatens all walks of life. Presently, under Trump's Administration, it is unapparent what environmental progress will be made for future endeavors.

REFERENCES

A global tragedy for our oceans and sea life. Ocean Plastics Pollution, *Center for Biological Diversity* (2018). www.biologicaldiversity.org/campaigns/ocean_plastics/.

A global tragedy for our oceans and sea life. Ocean Plastics Pollution, *Center for Biological Diversity* (2018). www.biologicaldiversity.org/campaigns/ocean_ plastics/.

A treasure that needs protecting. Discover Your Bay, *Save the Bay Organization* (2018). http://www.savebay.org/discover

About. 2017. *Narragansett Bay Estuary Program*, Narragansett Bay Estuary Program, nbep.org/about/.

Bay facts. 2017. *Narragansett Bay Estuary Program*, Narragansett Bay Estuary Program, http://nbep.org/narragansett-bay-watershed/bay-facts/.

Brander, S., Fontana, R., Mata, T., Gravem, S., Hettinger, A., Bean, J., Szoboszlai, C., Keiper, C., Marrero, M. (2011). The Ecotoxicology of Plastic Marine Debris. *The American Biology Teacher, 73*(8), 474-478.

City of Newport Ordinance, Cap 8.32 § 1, 3-8 (2017).

Comprehensive conservation management plan. 2017. *Narragansett Bay Estuary Program*, Narragansett Bay Estuary Program, http://nbep.org/about/comprehensive-conservation-management-plan/.

Cózar, A., Echevarría, F., González-Gordillo, J., Irigoien, X., Úbeda, B., Hernández-León, S., Palma, A., Navarro, S., Garcia, J., Ruiz, A., Fernandez, M., Duarte, C. (2014). Plastic debris in the open ocean. *Proceedings of the National Academy of Sciences of the United States of America, 111*(28), 10239-10244.

Eilperin, Juliet, and Brady Dennis. "White House Eyes Plan to Cut EPA Staff by One-Fifth, Eliminating Key Programs." *The Washington Post*, WP Company, 1 Mar. 2017, www.washingtonpost.com/news/energy-environment/wp/2017/03/01/white-house-proposes-cutting-epa-staff-by-one-fifth-eliminating-key-programs/?utm_term=.0277cbda12fb.

Food service packaging requirements. *Seattle Public Utilities* (2018). http://www.seattle.gov/util/forbusinesses/solidwaste/foodyardbusinesses/commercial/foodpackagingrequirements/

Freinkel, S. A brief history of plastic's conquest of the world. *Scientific American*, 29 May 2011. www.scientificamerican.com/article/a-brief-history-of-plastic-world-conquest/.

Hansler, Jennifer. "US, Syria Are Now Only Ones Not in Climate Deal." *CNN*, Cable News Network, 24 Oct. 2017, www.cnn.com/2017/10/24/politics/nicaragua-paris-climate-accord-us-syria/index.html.

History of plastics. *Plastics Industry Association*, 6 Dec. 2017, www.plasticsindustry.org/resources/power-plastics/history-plastics.

Kuffner, A. Governor creates Task Force to study reducing plastics use in R.I. 2018. *Providence Journal*, GateHouse Media. www.providencejournal.com/news/20180716/governor-creates-task-force-to-study-reducing-plastics-use-in-ri.

Rhode Island Wildlife Action Plan (RI WAP). 2015. *Rhode Island Department of Environmental Management,* Department of Environmental Management, *http://www.dem.ri.gov/programs/fish-wildlife/wildlifehuntered/swap15.php*

Rhode Island Wildlife Action Plan. 2018. *LandScope America*, NatureServe, http://www.landscope.org/rhode-island/priorities/

Rothstein, S. (1973). Plastic Particle Pollution of the Surface of the Atlantic Ocean: Evidence from a Seabird. *The Condor, 75*(3), 344-345.

Salit, R. Environmental journal: narragansett bay estuary program gets a top-to-bottom makeover. 2013. *Providence Journal*, GateHouse Media. www.providencejournal.com/breaking-news/content/20131229-environmental-journal-narragansett-bay-estuary-program-gets-a-top-to-bottom-makeover.ece.

State of Rhode Island and Providence Plantations, Exec. Order No. 18, 06, 3 C.F.R. 1-3 (2018).

State Plastic and Paper Bag Legislature. *National Conference of State Legislatures* (2018). http://www.ncsl.org/research/environment-and-natural-resources/plastic-bag-legislation.aspx

Task force to tackle plastics. 2018. *DEM Rhode Island*, Rhode Island Department of Environmental Management. www.dem.ri.gov/programs/environmentalprotection/plastics-task-force.php.

The estuary program. 2017. *Narragansett Bay Estuary Program*, Narragansett Bay Estuary Program, http://nbep.org/about/the-estuary-program/.

The history and future of plastics. *Science History Institute*, 20 Dec. 2016, www.sciencehistory.org/the-history-and-future-of-plastics.

The problem. *Plastic Pollution Coalition* (2018). plasticpollutioncoalition.zendesk.com/hc/en-us/categories/202673368-The-Problem.

Town of Middletown Ordinance, Cap 92B § 1-8 (2017).

University of Georgia. More than 8.3 billion tons of plastics made: most has now been discarded. *ScienceDaily*, 19 July 2017 www.sciencedaily.com/releases/2017/07/170719140939.htm

Wilcox, C., Van Sebille, E., & Hardesty, B. (2015). Threat of plastic pollution to seabirds is global, pervasive, and increasing. *Proceedings of the National Academy of Sciences of the United States of America, 112*(38), 11899-11904.

Worm, B. (2015). Silent spring in the ocean. *Proceedings of the National Academy of Sciences of the United States of America,112*(38), 11752-11753.

Zero plastic marina initiative. 2018. *DEM Rhode Island*, Rhode Island Department of Environmental Management. www.dem.ri.gov/programs/environmentalprotection/zero-plastics-marina.php.