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Coastal Plastics Abatement on Aquidneck Island, Rhode Island: Stakeholder Perspectives and Lessons Learned

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Coastal Plastics Abatement on Aquidneck Island, Rhode Island: Stakeholder Perspectives and Lessons Learned

By M. Paige Myatt
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And accepted on the recommendation of:

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With data collected in conjunction with Clean Ocean Access of Middletown, Rhode Island

Abstract

Coastal Plastics Abatement on Aquidneck Island, Rhode Island:
Stakeholder Perspectives and Lessons Learned
M. Paige Myatt

This practitioner research focuses on the stakeholder perspectives and lessons learned about mitigating plastic pollution in the marine environment of Aquidneck Island, Rhode Island. It uses a mixed method approach of surveys, interviews, focus groups, and active participation in mitigation strategies to answer four main research questions. These questions aim to gather perspectives on the problem from multiple stakeholders in the community, including the general public, the restaurant industry, and local and state governments. This research also investigates what factors make this community a leader in igniting social change and reducing plastic pollution. The active involvement of the researcher via internship allowed her to gain familiarity with the mitigation strategies present on Aquidneck Island. These research questions culminated in discovering what combination of community factors and mitigation strategies allow the opportunity for success in other coastal communities. Most notably, there is a strong sense of community on Aquidneck Island. Its members are increasingly aware and involved in solving the problem. There are individuals, community groups, businesses, and non-profit organizations who participate in meaningful discussions on the issue. The research concludes that these conversations and actions have positioned Aquidneck Island to be a model for other coastal areas facing similar problems.

Professor Tim Downs, D. Env.
Chief Instructor

Professor Dave Bell, Ed.D.
Assistant Professor

Dedication

I would like to dedicate this paper to my family and loved ones, for supporting me, inspiring me, and providing me with an endless fountain of much-needed optimism.

Acknowledgements

I would like to thank the following people for their contributions and support of this project:

- Dave McLaughlin, Eva Touhey, Max Kraimer, and Jess Frascotti of Clean Ocean Access for hosting and supporting my summer internship experience that allowed for the collection of this data.
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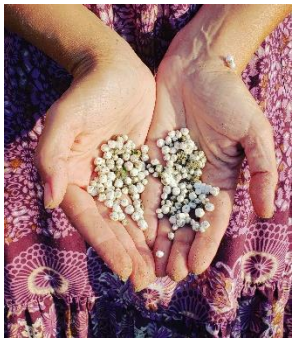
Table of Contents

List of Figures

List of Tables

Executive Summary

Since the 1950s and the introduction of plastics into everyday routines, the convenience of "throw-away" culture has encouraged society to shift away from sustainable habits, completely disregarding the destination of their waste. A large portion of this waste is comprised of single-use plastic products. The exponential increase in plastic production and its poor waste management have wreaked havoc on marine environments and detrimentally impacted numerous aspects of ocean health. Communities around the globe are innovating unique ways to tackle this problem. This paper will look at the efforts of Aquidneck Island, Rhode Island and their community-based, integrated solutions for addressing the issue of coastal plastic pollution.



This practitioner research was completed as an extension of my summer internship with local non-profit, Clean Ocean Access (COA). I sought to learn more about the perspectives on the problem, what community factors have allowed Aquidneck Island to have success, what mitigation strategies are present on the island, and what combination of community factors and mitigation strategies allow the opportunity for success in other coastal communities battling this pervasive problem. During my time at COA, I collected surveys, facilitated a focus group, conducted multiple interviews, and participated in community conversations, all to learn more about the mitigation efforts and the aspects of the community that position them be leaders in solving this problem.

These mixed methods painted a full picture of the status of the community and how these efforts have been used as a model for the entire state. My recommendations to the state of Rhode Island and the community of Aquidneck Island are summarized in the chart below:

Infrastructure

- Invest in the creation and improvement of industrial composting facilities
- Incorporate universal composting into the waste stream
- Improve waste management on the beaches and other high traffic, coastal areas

Business

- Support a unified movement in the restaurant industry towards sustainable practices and alternatives
- Create incentives for all businesses and customers to make sustainable choices
- Integrate programs to educate employees on transitioning to sustainable practices.

Education

- Invest in educational efforts across all populations that make reusable items feasible and practical in all lives
- Educate and involve the public on composting efforts
- Make ocean health and composting mandatory topics in schools
- Support opportunities to make youth voices heard

Support from Government, Movement towards a Circular Economy, Continuation of Community Conversations

1. Introduction

It is nearly impossible to go a day without encountering *single-use plastic products*. Plastic water bottles, coffee cups, straws, bags, and food packaging are all around us and almost unavoidable. Since the 1950s and the introduction of plastics into everyday routines, the convenience of these throw-away items has been shifting society's habits away from sustainable practices and furthering our dependence on the fossil fuels from which plastic is derived. We have recently begun to see the pendulum swing the other way, as Marcus Eriksen, who works to fight plastic pollution in the oceans with the 5 Gyres Institute, notes, "There have been more publications [on marine debris] in the previous four years than in the last four decades" (Cressey, 2016).

One of single-use plastic's greatest design flaws is that it does not mimic the natural cycle of Earth's elements: plastic does not naturally degrade and return as fuel for the next generation. We are beginning to realize the consequences of creating a material that lasts forever and is used about 90% of the time in a linear direction, as only an estimated 9% of recyclable plastic actually gets recycled (Geyer et al., 2017). This begs the question: *Where does the rest of it end up?*

Unfortunately, single-use plastics often end up in the ocean. The World Economic Forum presented a report in 2016 called "The New Plastics Economy: Rethinking the Future of Plastics", which notes that the equivalent of one garbage truck full of plastic enters the ocean every minute, and in 2050 there will be more plastic in the seas than fish, by weight (World Economic Forum, 2016). The increasing amount of plastic in the seas has proven to be a problem in coastal communities around the world, often for those in areas who have contributed little or nothing to the problem. As these plastics break down, they are absorbed by aquatic biota and enter the food chain, having broad adverse effects (Hahladakis, et al., 2018). New research published in the Royal

Society Open Science Journal has discovered that microplastics and synthetic particles are ingested by deep-sea amphipods in six of the deepest marine ecosystems on Earth and concludes, "This study reports the deepest record of microplastic ingestion, indicating it is highly likely there are no marine ecosystems left that are not impacted by plastic pollution" (Jamieson et al., 2019).

These burdens are illustrated in disturbing videos, often of rivers and beaches overflowing with plastic waste in communities around the world. We are bombarded by images of birds and whales who have met their demise due to stomachs filled with plastic mistaken for food. We see alarming photographs of sea turtles with straws in their noses, seals caught in discarded fishing nets, and a tiny seahorse hanging on to a cotton swab with its tail. If you ask most people what they know about plastic pollution in the seas, they might respond by mentioning a patch of garbage in the Pacific Ocean that is the size of Texas, and sadly they are only half correct, as the Great Pacific Garbage Patch is actually *twice* the size of Texas (Lebreton et al., 2018). The problem is well-publicized, but are people convinced that their individual actions will make a difference? What actions *are* having the greatest impact? What motivates them to start changing their own habits in the first place?

With these statistics and images in mind, it becomes clear that the throw-away, convenient, single-use lifestyle is highly unsustainable. The tap of plastic production ultimately needs to be turned off. Until this is possible, more emphasis needs to be put on "reduce" and "reuse", rather than "recycle". This mantra has been unofficially expanded to include more "re-" words such as "rethink" and "refuse". These words are of particular interest in this report, as I will examine one specific community whose citizens, businesses and local governments are rethinking single-use plastics and refusing their presence in many areas.

The Rhode Island community of Aquidneck Island provides an important case study of success in tackling this issue – one that others can replicate. This paper will examine their mitigation efforts and specific facets of the community that have led to their status of being a leader in reducing marine debris and implementing sustainable alternatives in the community.

2. Background

Reducing and managing plastic pollution is one of the world's greatest challenges. Communities around the world are taking various approaches, from beach clean-ups to plastic bag bans and educational outreach efforts. Nearly all of these strategies can be broken down into one of the following four categories seen in Figure 1 (Myatt, 2018):

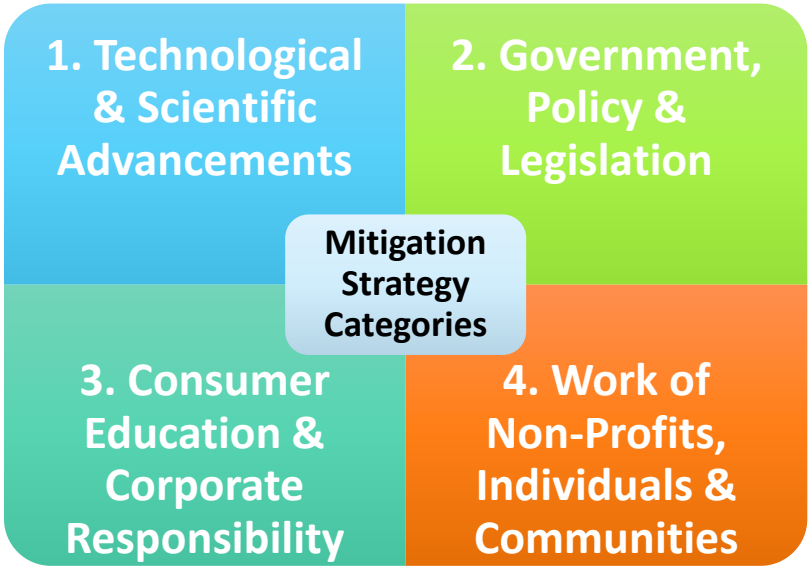


Figure 1: The Four Categories of Mitigation Strategies (Myatt, 2018).

These mitigation efforts are being increasingly coordinated in a global attack on plastics in the oceans. The United Nations Environment Program (UNEP) puts it most succinctly, stating in their report from May 2016 that "the presence of plastic litter and microplastics in the marine environment is a rapidly increasing serious issue of global concern that needs an urgent global response" (Cressey, 2016). However, everyone involved in working on the issue confronts deeply

rooted challenges. The barriers to reducing plastics in the environment are summarized in the following Figure 2 (Myatt, 2018):

Figure 2: Barriers to Reducing Single-Use Plastics in the Environment

Depending on a multitude of factors, such as access to information, governance, geography, capacity, and infrastructure, each community is differentially equipped to handle the problem. This paper looks at the community of Aquidneck Island in Rhode Island, which consists of the City of Newport, the Town of Middletown, and the Town of Portsmouth (Figure 3).

This community has become a beacon of hope among a literal sea of challenges. Newport is a popular summer destination, drawing an estimated 3.5 million tourists per summer season from all over the globe ("Economy | City of Newport," 2019). The chance to incorporate sustainable business practices into establishments frequented by tourists provides a unique opportunity to educate visitors from around the world, modeling a community moving away from single-use plastics. Initiatives that support the community in this movement will create tangible impacts on their own beaches, reducing marine debris in the waters surrounding the island.

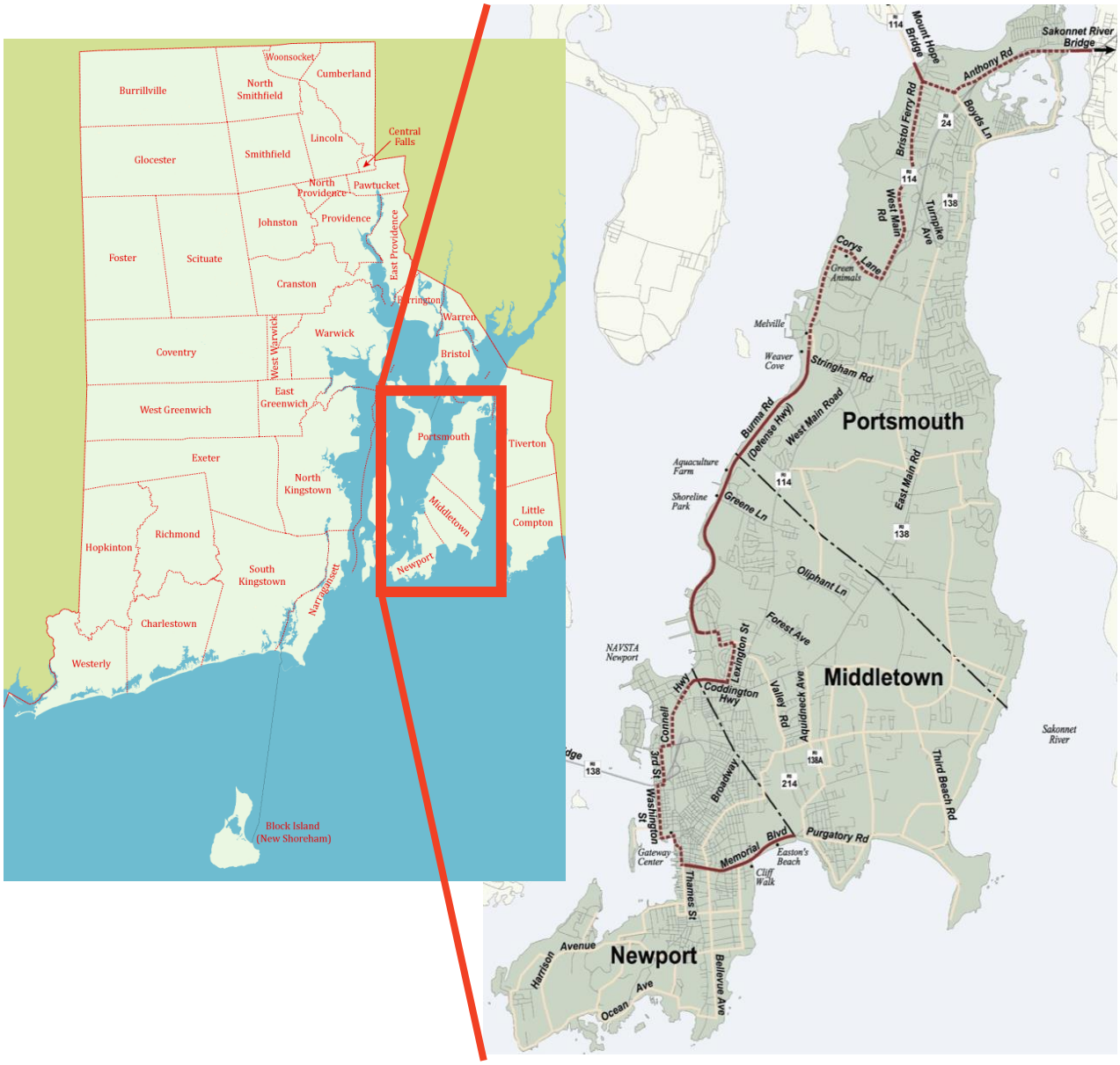


Figure 3: Map of Rhode Island and Zoomed-in Aquidneck Island ("Find a Rhode Island Land Trust", 2016)

During the Summer of 2018, I was an environmental science intern for a local non-profit called Clean Ocean Access (COA). COA is based in Middletown and works specifically on Aquidneck Island with its motto: "Action today so future generations can enjoy ocean activities" ("Our Mission – Clean Ocean Access," 2019). They focus on the three words that make up their name: "clean" refers to eliminating marine debris, "ocean" refers to improving coastal water quality, and "access" refers to protecting and preserving shoreline access ("Our Mission – Clean

Ocean Access," 2019). During my internship, I worked across all three categories, but mainly focused on the "clean" portion by leading beach clean-ups and collecting debris from Marina Trash Skimmers (Figure 4). This internship provided the perfect opportunity to delve deeper into the social change aspect of reducing the usage and careless discarding of single-use plastic in this coastal community, along the way discovering what distinguishes their efforts from others.

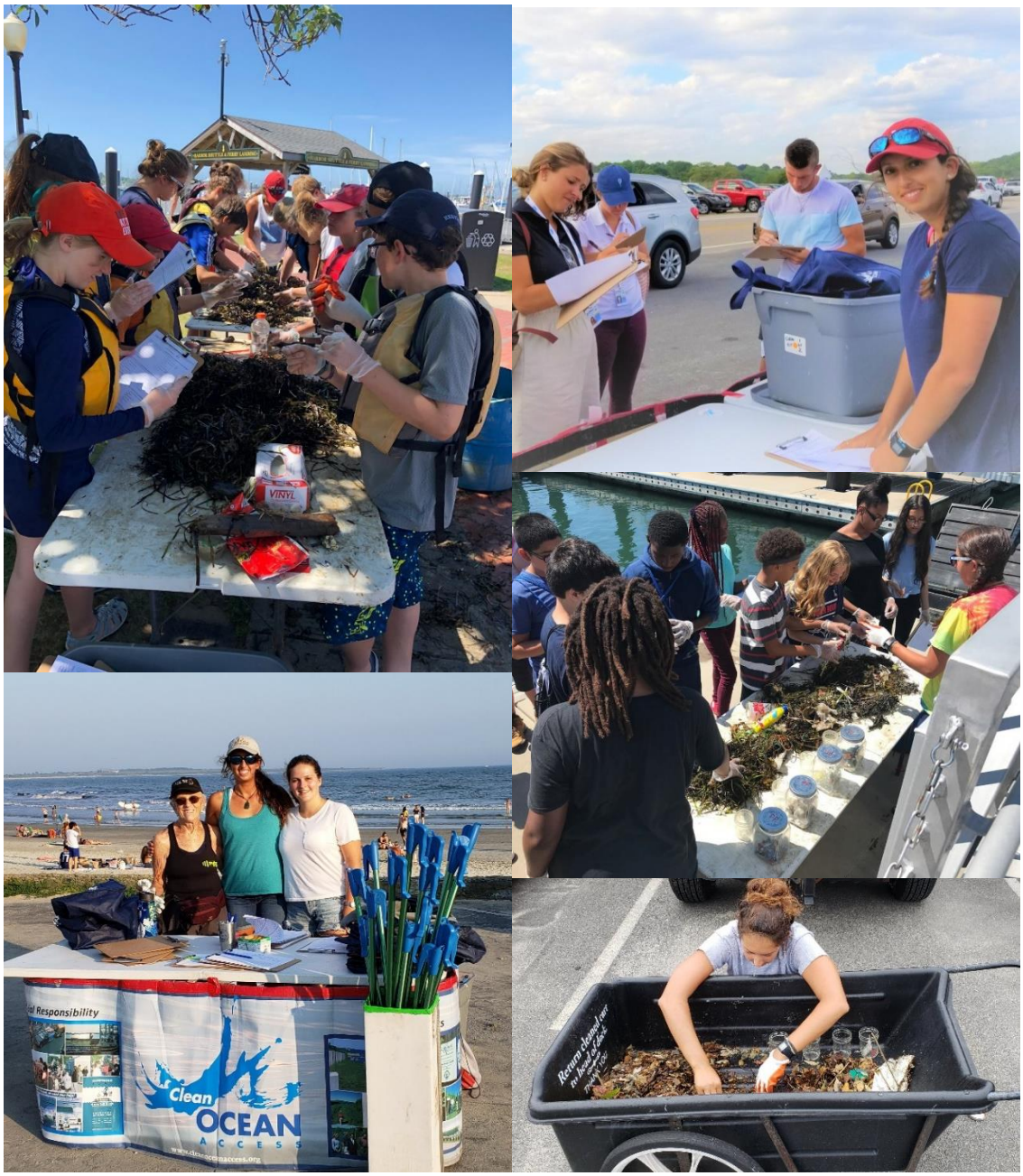


Figure 4: (From top left moving clockwise) Skimmer sorting with sailing camp, collecting surveys from beach clean-up participants, leading trash skimmer sorting with local youth, sorting microplastics from Portsmouth skimmer, leading beach clean-up with community volunteers (COA, 2018).

After living and working in Newport each summer since 2015, I quickly realized their commitment to protecting the coastline and ocean. With the recent rise in attention to plastic pollution in the media, it seemed that Newport was already ahead of the game. This internship with COA allowed me to see all of the factors that position Aquidneck Island to be successful leaders in this field and enable it to be an example for other coastal communities. Based on my internship and research, I assert that Newport and its surrounding towns are uniquely positioned to succeed in conquering plastic pollution in their coastal and marine environments, and to be a model for other coastal communities.

Research Questions

My research sets out to distinguish the factors, or combination of factors, that have allowed Newport to be on-track for battling ocean plastics, through the lens of social change. In this paper, I will look at the societal factors that exist on Aquidneck Island and identify strategies that the community has employed to reach not only locals, but visitors as well. To gain this information, I have developed the following research questions (Figure 5):

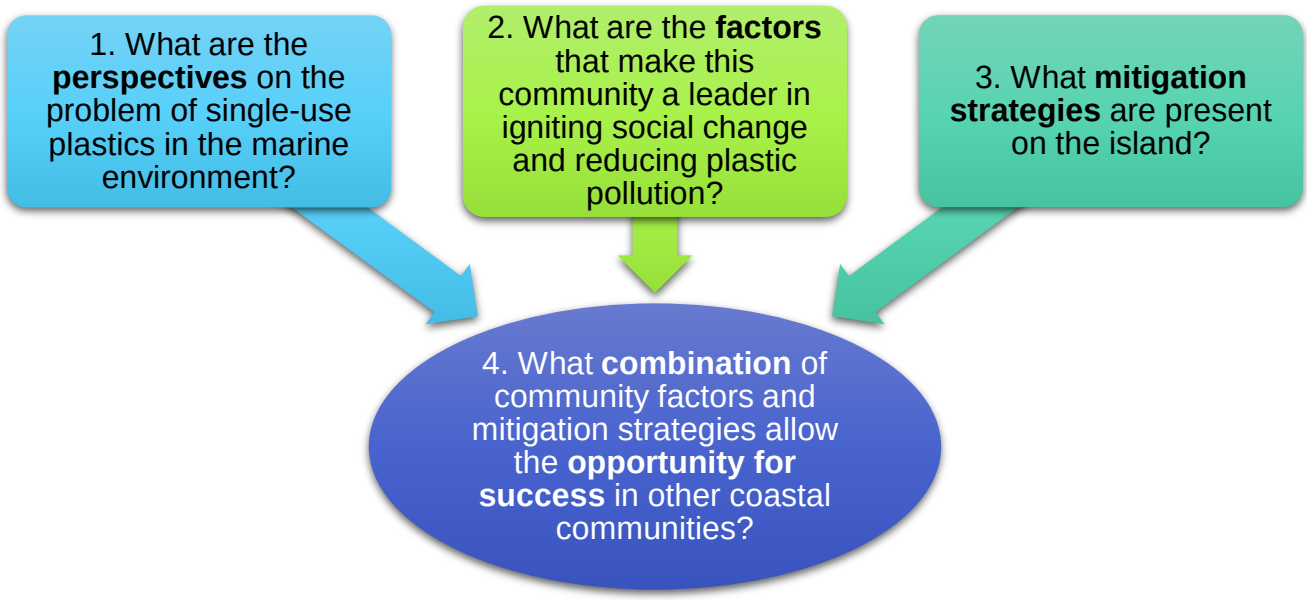


Figure 5: Research Questions

3. Methodology

To answer these questions, I conducted a literature review on global mitigation efforts, collected 70 surveys from beach clean-up participants, led a focus group, reached out to restaurant owners to learn more about their sustainability practices and perspectives, attended open meetings on zero-waste efforts and climate change impacts in the community, and journaled about my experiences. Before beginning my internship with Clean Ocean Access, my research questions were unrefined and originally aimed to discover the overall state of Aquidneck Island and its efforts to reduce marine debris by answering the following research questions:

1. What is the categorization of debris and what are its sources?
2. How effective are the recently implemented plastic bag bans?
3. How willing are restaurants to partake in mitigating the problem by reducing single-use plastics in their establishments?
4. How willing are people to bring their own reusable items, such as coffee mugs, water bottles and bags?
5. Is there a difference in perspectives on single-use plastics between visitors and locals?

Throughout the internship I had experiences and gained information that made me reconsider these research questions. Regarding the first research question, Clean Ocean Access has been collecting categorical data on marine debris for years. As part of my duties, I participated first-hand in this collection and categorization. According to the most recent of COA's "Clean Report", the top items collected in these clean-ups are: cigarette butts and filters, food wrappers, caps and lids (Frascotti, Touhey, & McLaughlin, 2018). This speaks to a greater health problem in our society, but that is research for another paper. This information, while useful, was no longer a

focus for my research. In addition, tracking the debris is difficult not only in Newport, but it is one of the greatest challenges in addressing this problem globally.

Upon meeting my colleges at COA, I learned that program manager Eva Touhey was completing her master's research on my second original research question. Her findings are summarized in Chapter 5. I did gather a few restaurant perspectives on reducing single-use plastics, but there is an opportunity for more research on Question Three in a future endeavor, which is already underway and lead by ReThink Disposable (see Chapter 4.5). Question Four was rephrased more generally and became my first research question, "What are the perspectives on the problem of single-use plastics in the marine environment?". While the willingness of people to change their habits and bring reusable bags and bottles was not explicitly addressed, the beach clean-up surveys did illuminate the perceived barriers to doing so. Regarding Question Five, the beach clean-up surveys also asked participants to distinguish if they were visiting or local, but with only 29% of people coming from off the island, and only 17% coming from outside New England, there was not enough information to correlate differing perspectives on the problem between the two populations. For these reasons, I revised my research questions to as they are laid out above in Figure 5, deciding to focus on the social science aspects of the problem.

3.1 Literature and Policy Review

In Fall 2018, I took a course called "Emerging Issues in Climate Change Science" for which I wrote a review paper entitled, "The Attack on Ocean Plastics: A Review of Mitigation Efforts from around the World". This allowed for the opportunity to review existing literature through many different lenses. To conduct this literature review, I gathered sources using the Discovery@Clark Libraries search engine. From there, I was able to find sources either immediately through Full Text Finder or get them through the Inter-Library Loan network. I searched for papers on this topic using keywords such as: marine debris, plastic waste

management, plastic pollution, bioplastics, ocean governance, bag bans, and beach clean-ups to get started. From there I found many articles on Science Direct and was able to look at the suggested related articles to find even more information. This work proved extremely helpful in writing the Introduction and Background chapters of this paper and aligning my experiences in Newport with global mitigation efforts.

I was also able to review Rhode Island's policies on plastic pollution, particularly regarding the town-by-town plastic bag bans. In addition, from July 2018 – February 2019, Governor Gina Raimondo signed an executive order, found in Appendix A: Governor Gina Raimondo's Tackling Plastics Executive Order

Appendix B: Beach Clean-up SurveyAppendix A, that assembled a task force to tackle plastic pollution in the state. The recommendations from this task force are summarized in Section 4.5 Restaurants' Perspectives, as they are closely tied to the upcoming work of "ReThink Disposable" and reducing plastic waste in Newport restaurants.

3.2 Beach Clean-Up Surveys

Part of my duties this summer as an environmental science intern for Clean Ocean Access included leading a series of 12 weekly beach clean-ups at Second Beach in Middletown, Rhode Island. These hour-long events provided me the opportunity to talk to members of the community about their perceptions on single-use plastic. Originally, I intended on holding a focus group after each clean-up. However, participants came and left throughout the hour at different times, and it was difficult to gather everyone after the cleanup ended. I put my focus group questions into a one-page survey, seen in Appendix B: Beach Clean-up Survey, which I printed out and brought with me to nine clean-ups on the following dates: June 20, June 27, July 11, July 18, August 1, August 8, August 15, August 22, and August 29, 2018.

As participants returned the trash they had collected and their clean-up supplies, I asked if they would like to complete a quick, five-question survey to gather data on the perspectives of single-use plastic in the area (Figure 6). I also explained that it was for my graduate research. If they said yes, I handed them a paper survey as well as a consent form from the Clark IRB which stated my research had been approved and was ethical. Some participants filled out the survey and left, while for others it sparked more conversation. These conversations yielded leads for future research.

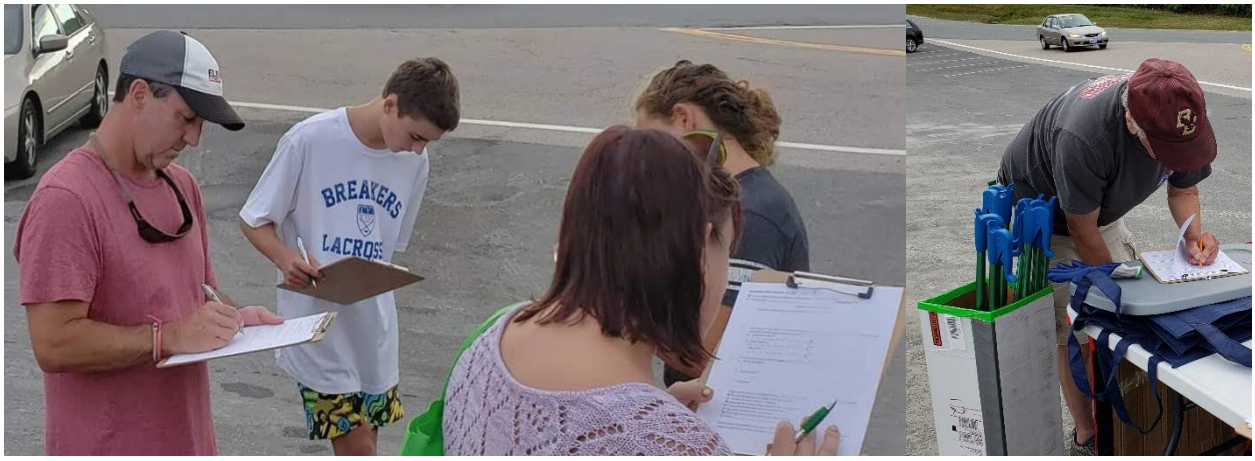


Figure 6: Beach Clean-up Survey Participants (Myatt, 2018)

To analyze these findings, I entered the data into an Excel® sheet. From there, I was able to manually code the responses by keyword to find re-occurring themes. These themes and their significance appear in Section 4.2.

3.3 Focus Group

Throughout the summer, I intended on holding a series of focus groups to gain more community perspectives. I assumed that people who came to beach clean-ups were already aware and informed of the problem. However, I found that sometimes participants of the clean-ups were volunteers from local groups, such as the Naval Health Clinic or Salve Regina University, who did not know the extent of the issue. I was thus able to gather a wide variety of perspectives from these beach clean-up groups.

Logistically, it was difficult to organize a focus group and I was only able to hold one session over the summer. To advertise this event, Clean Ocean Access made a Facebook event and advertised it on their page (Appendix C: Facebook Event for Focus Group). On August 13, 2018, I had three members of the community come to the Clean Ocean Access office and participate in this focus group, which lasted for about 45 minutes. I digitally recorded their responses on my phone and gave them a physical beach clean-up survey. I have synthesized their verbal responses in the Findings and Discussion section on community perspectives.

3.4 Zero-Waste Meetings

Clean Ocean Access generally hosts monthly, zero-waste meetings at their office to discuss issues and events going on in the community. Over the summer, there were two meetings held on July 17 and September 18, 2018. In these meetings, I heard perspectives from organizations and people around the community who are also working on reducing plastic waste on the island. There are typically 10-20 people engaged in this community-based discussion. I took written notes throughout these meetings and synthesized their impacts on the community.

3.5 Gaining Restaurants' Perspectives

One of the biggest consumers of single-use plastics exists in the Restaurant and Bar Industry. Many of these establishments in Newport use plastic straws, cups and take-out containers to serve their patrons and go through staggering amounts of plastic in a single weekend night. Often these items end up in the waters surrounding these restaurants. One bartender noticed this and helped to start a "final straw campaign" in town. Green Drinks organizer and Clean Ocean Access board member Kara DiCamillo formalized this campaign and launched the "Strawless by the Sea" effort in Newport restaurants on World Oceans Day, June 8, 2018.

With over 60 establishments in Newport, there was ample room to gain perspectives on the issue. To narrow my selection, I mainly focused on the restaurants that had already committed to

"Strawless by the Sea", although this provided a biased sample and lacked the perspectives from restaurants who had not yet committed to the campaign. In total, I reached out to ten restaurants and hotels. This message, as well as a summary chart of its recipients and the outcome, can be seen in Findings and Discussion Section 4.5.

3.6 Journaling

Throughout the summer, I kept a journal of my days working for Clean Ocean Access, often noting poignant quotes or interactions. In addition, I wrote about other sustainability initiatives I noticed in the community. These small encounters help to round-out my synthesis on the community and the actions that are setting it apart as a leader in reducing single-use plastics. These stories are detailed in Findings & Discussion Section 4.2.2.

4. Findings & Discussion

These mixed methods have allowed me to look at the challenge of mitigating ocean plastics through each of the four outlined mitigation strategies and their corresponding stakeholders, with particular attention paid to the fourth strategy: the work of non-profits, individuals, and communities. These efforts are particularly strong on Aquidneck Island and have impacted and facilitated work towards the other three mitigation categories. Again, these categories are:

1. Technological & Scientific Advancements
2. Government, Policy & Legislation
3. Consumer Education & Corporate Responsibility
4. Work of Non-Profits, Individuals & Communities

The following results show the progress being made on Aquidneck Island in each of these four categories. These results can inform actions in other coastal communities in New England and beyond. This chapter is organized by research question and their corresponding methods.

4.1 What are the perspectives on the problem of single-use plastics in the marine environment?

To answer this question and gain community perspectives on the issues, I conducted beach clean-up surveys, held a focus group, and had interviews with restaurants in the community working to reduce their single-use plastics.

4.1.1 Beach Clean-Up Survey Results

Demographic Results

The survey, (see Appendix B: Beach Clean-up Survey) has a small portion at the very top of the page for demographic information. I realized that people sometimes skipped this section all together as it could easily get hidden behind the clip on the clipboard. Thus, I have a few "no responses" in this section which could be attributed to respondents simply not seeing the questions, or not wanting to respond with their personal information.

To ensure I accounted for potential gender bias, I asked participants to select their gender. With those that responded, I gathered a diverse population. Although there were about 16% more female respondents than males, this is only 8% away from a perfect 50/50 spread. These results can be seen in Figure 7 below:

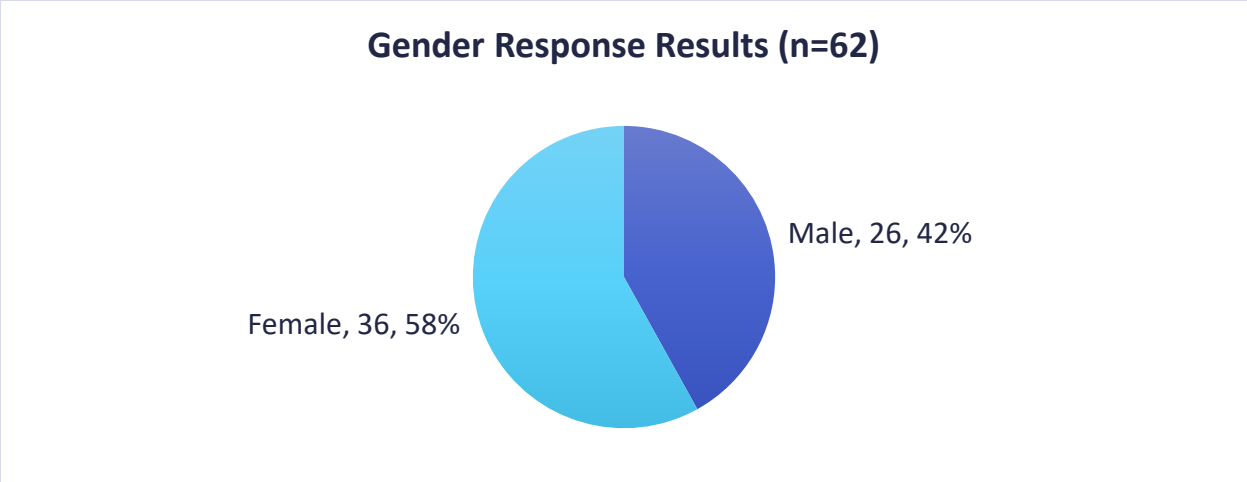


Figure 7: Gender Response Results from Beach Clean-up Survey

I next asked for their age. The respondents ranged in age from 10 (with parental permission) to 73 years old (Figure 8). This shows data from across generations, with the young adults being the most involved group. The average male age was 34 and the average female age was 27.

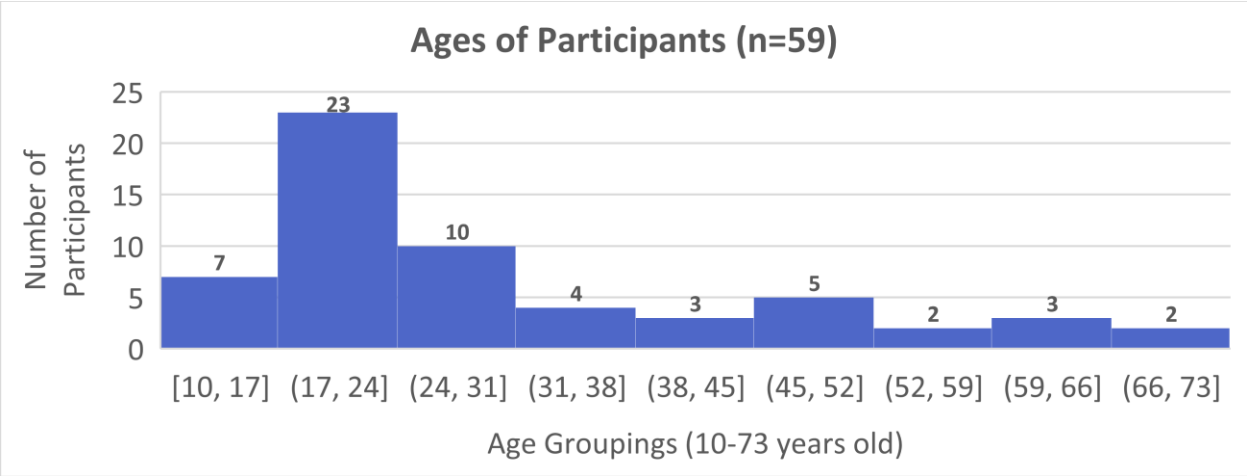


Figure 8: Ages of Participants of Beach Clean-up Survey

Finally, I asked participants where they are from to gather a potential correlation between location and concern for the topic. The map below (Figure 9) shows the locations of all respondents, spanning across the US and even a response from Mexico. Although in many cases respondents did not state their specific town, it is also important to note that only one state represented, Nebraska, does not have a coastline; proximity to the ocean may improve their awareness of the issue. Figure 10 shows the breakdown of locals and visitors. Of those visiting, the large majority were from New England, totaling 83% of respondents.

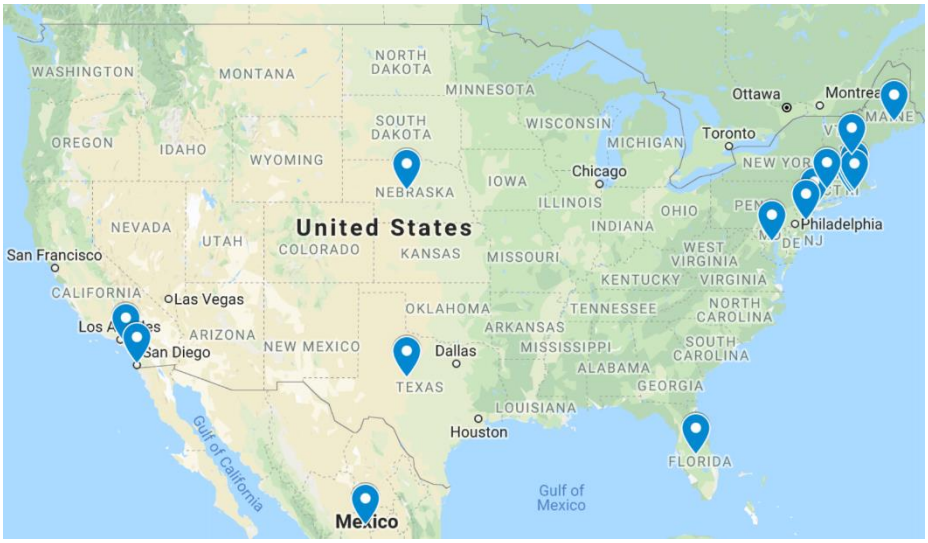


Figure 9: Map of Location of Participants (Google, 2019)

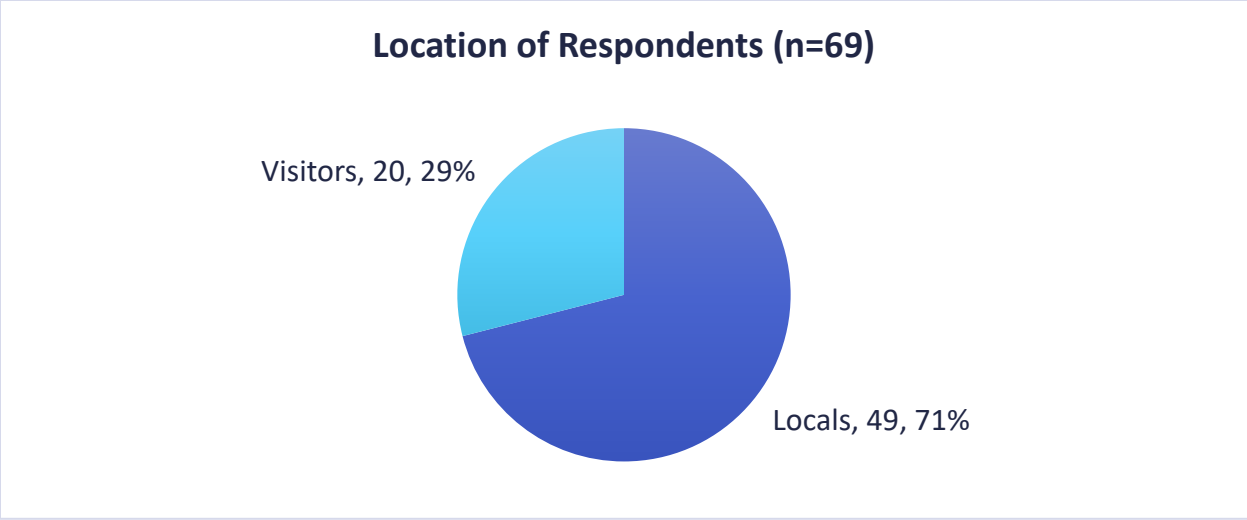


Figure 10: Location of Respondents, Local vs. Visitor

Perspectives on Single-Use Plastic (SUP)

The next portion of the survey asked participants: "In general, what are your perspectives on single-use plastics on Aquidneck Island". Their coded responses are summarized in Figure 11:

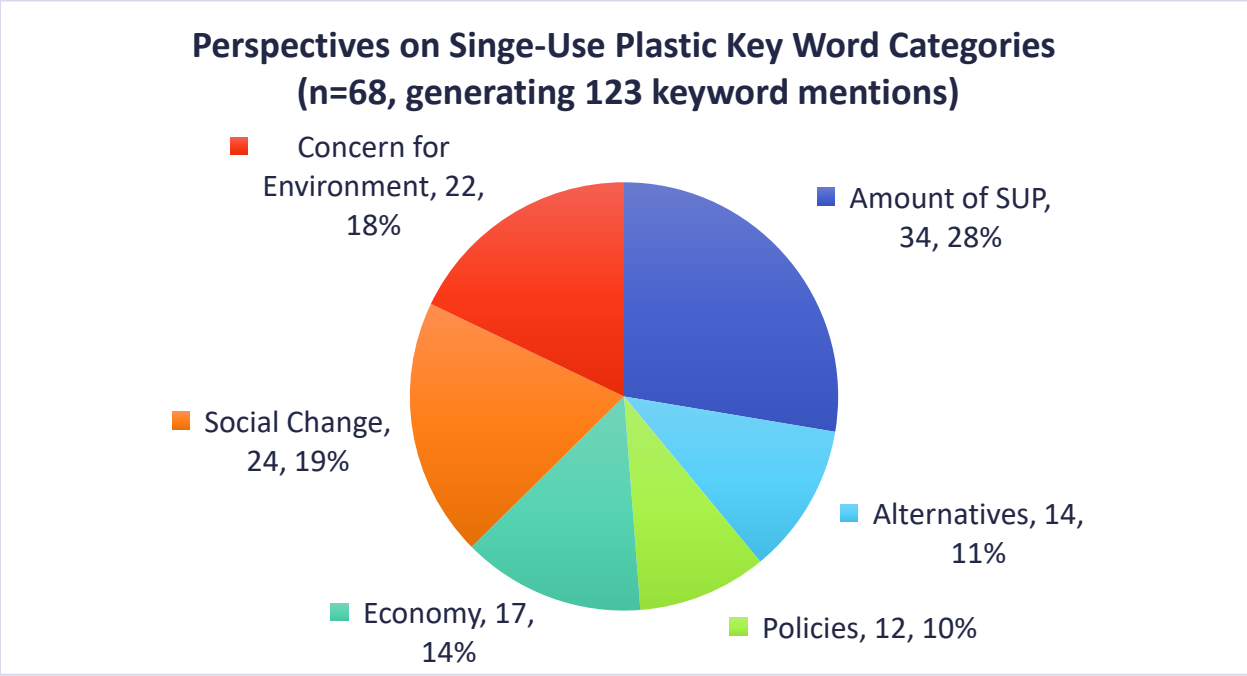


Figure 11: Perspectives on Single-Use Plastics Key Word Category Responses

This analysis reveals that the top concern is the sheer amount of single use plastic (SUP). This is the highest-ranking theme that appeared, with 28% of the key words mentioned relating to

this category. People are next concerned with the need for social change and its associated challenges. Close behind this category are participants' concern for plastic's impact on the environment. This shows that potential solutions lie in creating more accessible alternatives to single-use plastics, which would in turn reduce the amount of them in the environment. Solutions should mainly focus on convincing society to change their habits by leveraging people's concern for the environment. This accurately reflects many of the current efforts occurring in Rhode Island and globally. The question arises: Is this doing enough? The next step in working towards a solution is to examine the last three themes that arose from this question. These themes touch on how potential solutions may interact within the current economy, policies and government, and investing in more alternatives.

Concern for the Problem

The next question asked participants "On a scale of 1-10, with 1 = not concerned at all and 10 = extremely concerned, how concerned are you about marine debris and ocean plastics in the following locations: Aquidneck Island? New England? The World?". The results are displayed in Table 1 and Figure 12 below:

n = 70	**Aquidneck Island**	**New England**	**The World**
Average	8.29	8.57	9.27

Table 1: Results for Beach Clean-up Question regarding concern with marine debris in different locations

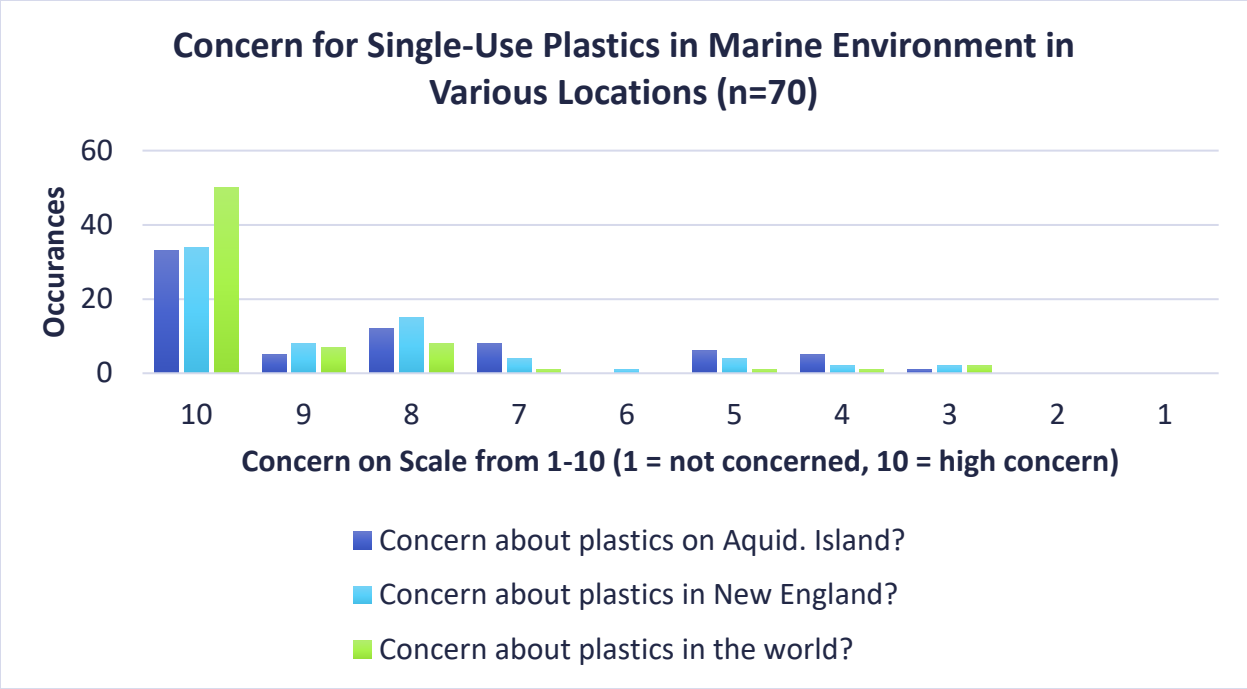


Figure 12: Concern for Single-Use Plastics in Marine Environment in Various Locations

As the area in question increased, so does the perception of the problem. Since participants answered these surveys at a beach clean-up, it is likely that this experience had some impact on their answers. Potentially, participants were less concerned about the state of ocean plastics on the island since they were participating in a mitigation effort and making a direct contribution. It is important to note that all of these responses are of relatively high concern, with a few outliers that will be discussed later in this section.

Perspectives on the Biggest Barriers to Reducing Single-Use Plastics

The third question targets specific areas of barriers in tackling this problem asking: "In your opinion, what are the biggest barriers to reducing single-use plastics? a. Socio-cultural? b. Economic? c. Political?". It is important to note that some people did not write down specific answers to this question, and simply circled A, B, or C without expanding on their selection. For the sake of analysis, these responses were not counted in the following sections. The following Figure 13 displays the reoccurring themes from Part A, socio-cultural barriers:

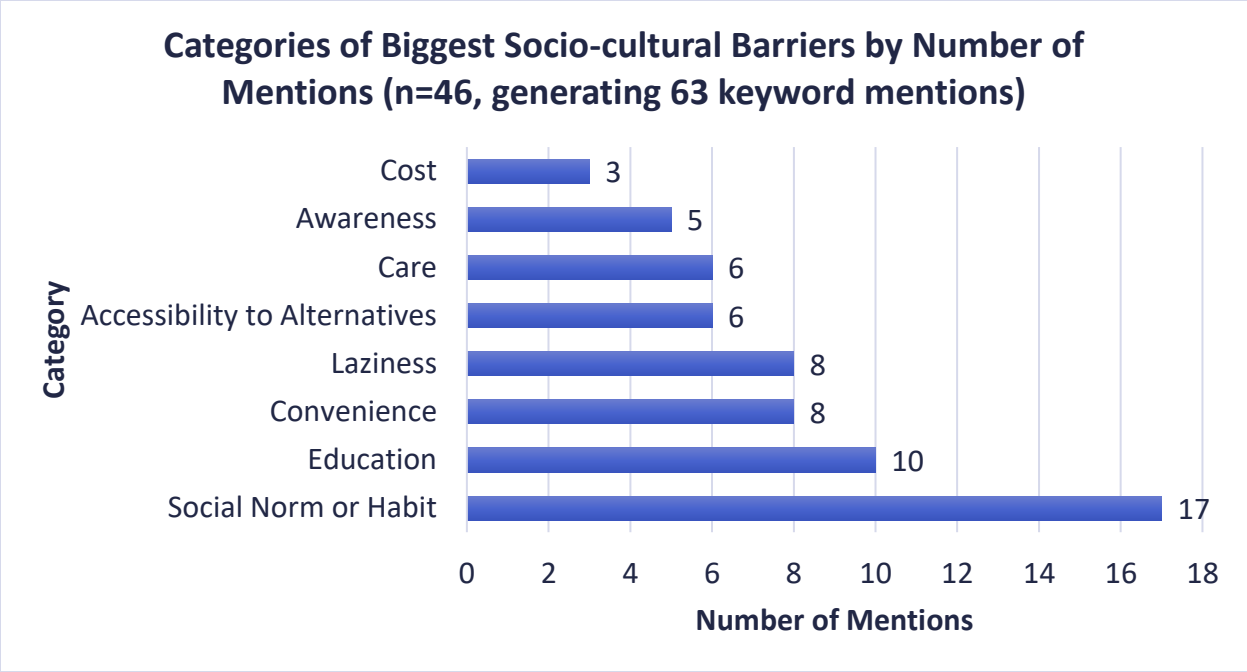


Figure 13: Thematic Categories of Socio-cultural Barriers by Number of Mentions

Forty-six people properly understood and responded to this part of the question, generating 63 mentions of keywords that break down into the eight themes shown above. The most mentioned theme refers to breaking people's habits or changing social norms. The next largest theme, closely tied to changing habits, is "education:. Habits are often formed and changed depending on the dispersion of information. This result suggests that making education on single-use plastics more widespread and accessible could contribute to changing social norms and habits. The society in which we live – mainly a convenience culture, has inspired a perceived laziness around the problem, and the two categories of "convenience" and "laziness" could arguably be used interchangeably. If people are too lazy to address the problem, chances are the solution is not convenient for them. Alternatively, it could mean a lack of access to reusable or alternative products. This also ties into "care", as there were six mentions of a lack of care at all for the issue. The low count of "awareness" responses suggests that awareness is not the issue, as we know the problem is already well-publicized. Lastly, "cost" appears as a socio-cultural barrier because

plastics are cheap and convenient, often catering to lower socio-economic classes. Thus, the issue of environmental justice arises along with the challenge of creating solutions that are accessible to everyone.

The next survey portion gathered information on economic barriers, shown in Figure 14:

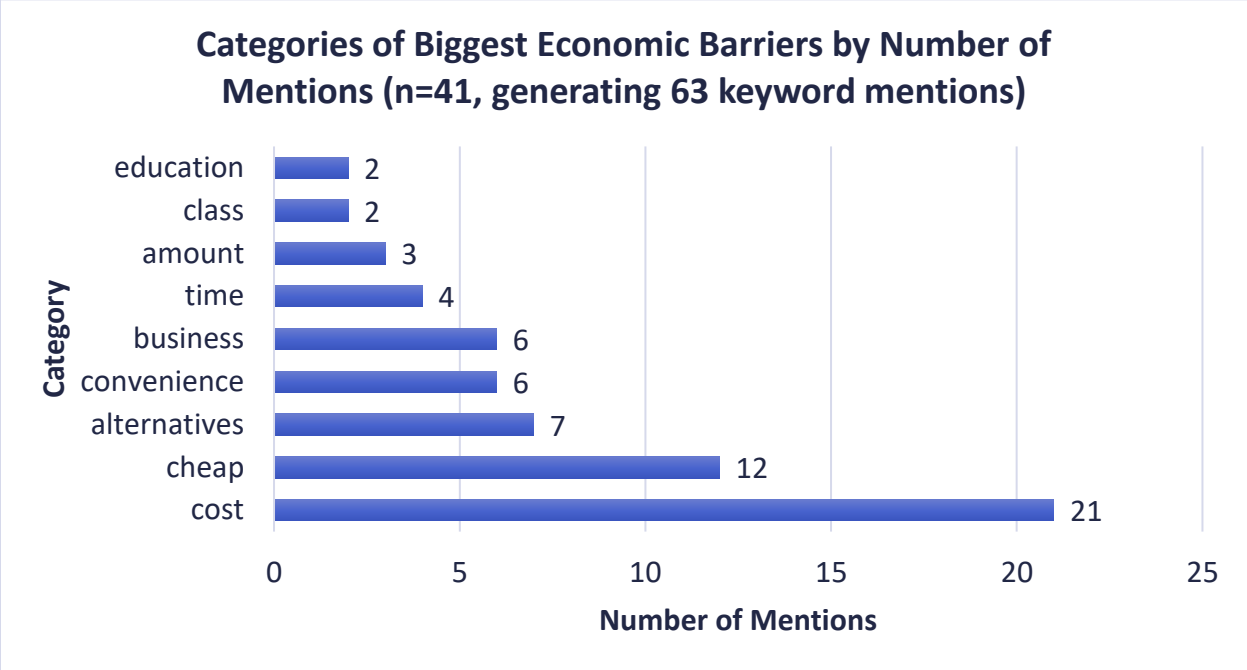


Figure 14: Categories of Biggest Economic Barriers by Number of Mentions

Not surprisingly, the most common key themes for this question were "cheap" and "cost". These are discrete categories because "cost" refers to the higher price of alternatives to single-use plastics, while "cheap" refers to the inexpensive nature of SUP. This combination makes for a difficult barrier, as in our current capitalist system, the bottom monetary line is ultimately the most important. "Alternatives" refers to the need for sustainable options and their accessibility in the community. "Convenience" appears again in this question, this time in the context of an economic barrier, following the logic of plastic is convenient because it is inexpensive. "Business" refers to the challenges of incorporating sustainable practices into businesses, which is hard to do beyond the context of plastic, as it is so ubiquitous in many areas of the economy. "Time" was an

interesting theme that arose from these results. Although there were only four mentions of it, they were each in the context of forward-thinking mindsets, or lack thereof, such as “people think it is cheaper in the short term” and another noted that “plastics are cheap and always will be”, while another said “replacement material may be more expensive at first”, signaling hope for the future of alternative materials. One potent response in this category was the concern for future generations. Social class and education made their way in this portion of the question. “Class” refers to the explicit mention of plastics and their role in the lives of those in lower socio-economic classes. One respondent noted, “packaged food is marketed to low income families as quick and easy” and “individuals of lower classes might not be educated about the cause”, which leads to the final keyword mention of “education”.

Finally, the third part of this question looked at political barriers, shown in Figure 15:

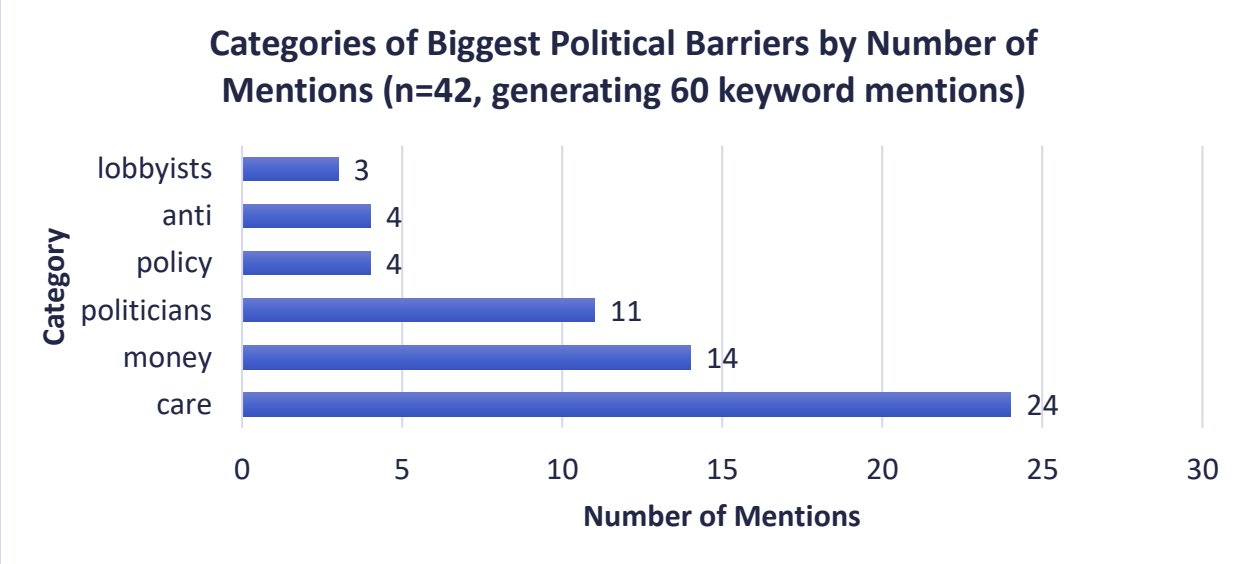


Figure 15: Categories of Biggest Political Barriers by Number of Mentions

By far, the biggest trend that emerged of this question was the lack of care for the environment present in today’s politics, at least in the United States. “Care” appears in 57% of responses from respondents. The next most discussed category was “money”, which displays how the public so closely perceive the connection between money and politics. “Politicians” refers to

responses blaming the people in office for not doing enough. “Policy” responses point to the lack of policies or the lack of their enforcement regarding plastic pollution. There were a few “anti” responses who said this should not be a political issue at all. Finally, there were mentions of lobbyists and their role in preserving the place of the plastic industry, which is really the oil industry, in politics.

Personal Actions

The next question in this survey asked: “What actions are you personally taking, if any, to reduce your consumption of single-use plastics?” (Figure 16). This question was used to gage the personal habits of respondents who are assumed to be relatively well-informed about the problem, since they participated in a beach clean-up.

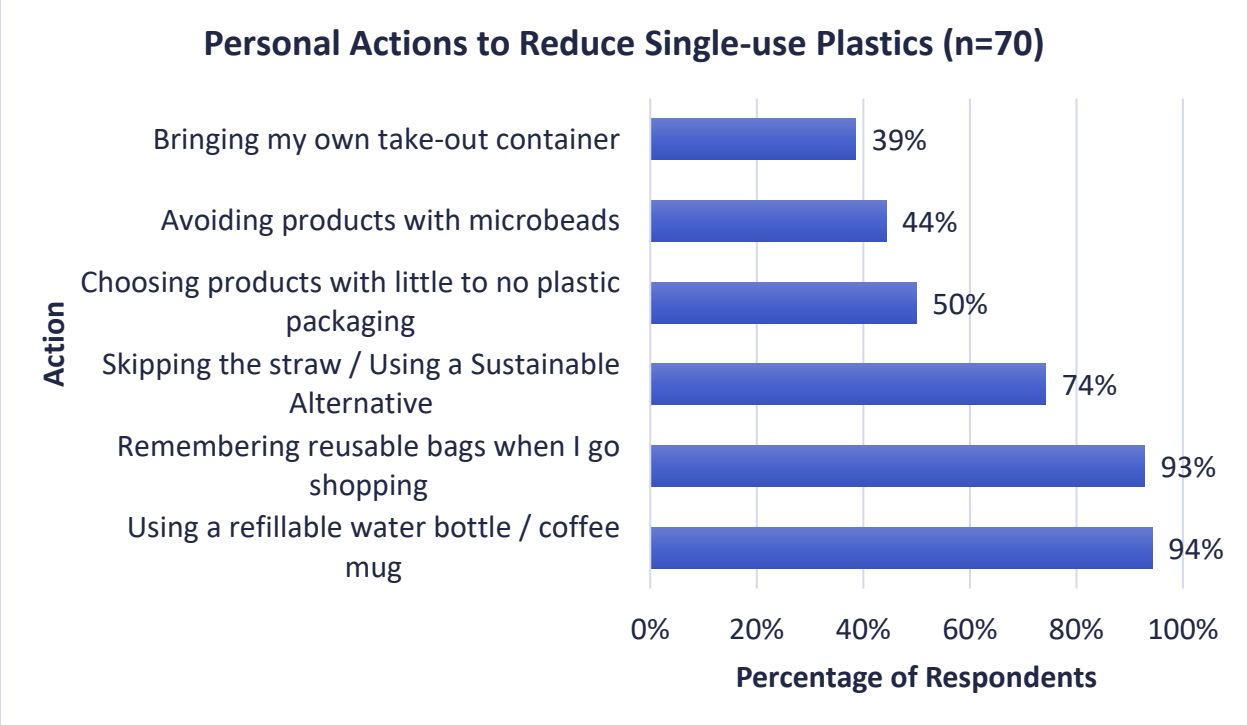


Figure 16: Personal Actions to Reduce Single-use Plastics

Using reusable bags, refillable water bottles and coffee mugs are becoming common practice and are relatively ubiquitous, as shown by the high percentage of respondents participating in this action. This habit change could be due in part to the recent plastic bag bans that have been

put in place on Aquidneck Island. In addition, there are an increasing number of spots available to refill water bottles and one of the local coffee shops, Empire Tea & Coffee, will give customers a discount for bringing their own coffee mugs. The next most popular action is the "skip the straw" movement, which has been supported by the "Strawless by the Sea" effort in Newport's bars, which will be discussed further in upcoming sections.

The greatest takeaway from Figure 16 is that it reveals categories with room for improvement. Choosing products with little to no plastic packaging, is often unavoidable. Many of today's common goods are packaged in plastic, and there are few options for alternatives. Recently, there have been movements in the food and beverage industry to reintroduce "milkman" models and reusable packaging. One such company is "Loop", which has partnered with many big-name brands to bring items in reusable packaging directly to your door ("Loop - Launching 2019," 2019). In talking to respondents after taking the survey, many people were not aware of microbeads in cosmetic products. This may be due in part to the Microbead-Free Waters Act of 2015, which "prohibits the manufacturing, packaging, and distribution of rinse-off cosmetics containing plastic microbeads" ("Laws & Regulations - The Microbead-Free Waters Act," 2017). However, many aspects of the law did not take effect until 2017 and 2018, and the last portion is due to be enacted this year. The last action, bringing your own take out container, has not yet caught on. However, I believe this will be the next big push to happen in communities that have already tackled straws, bottles and bags.

Potential Local Government Actions

Finally, to gain a more localized perspective, I asked participants, "What actions do you think local governments and businesses can take to support the reduction of single-use plastics, promote recycling, and integrate compostable options into the community?", seen in Figure 17.

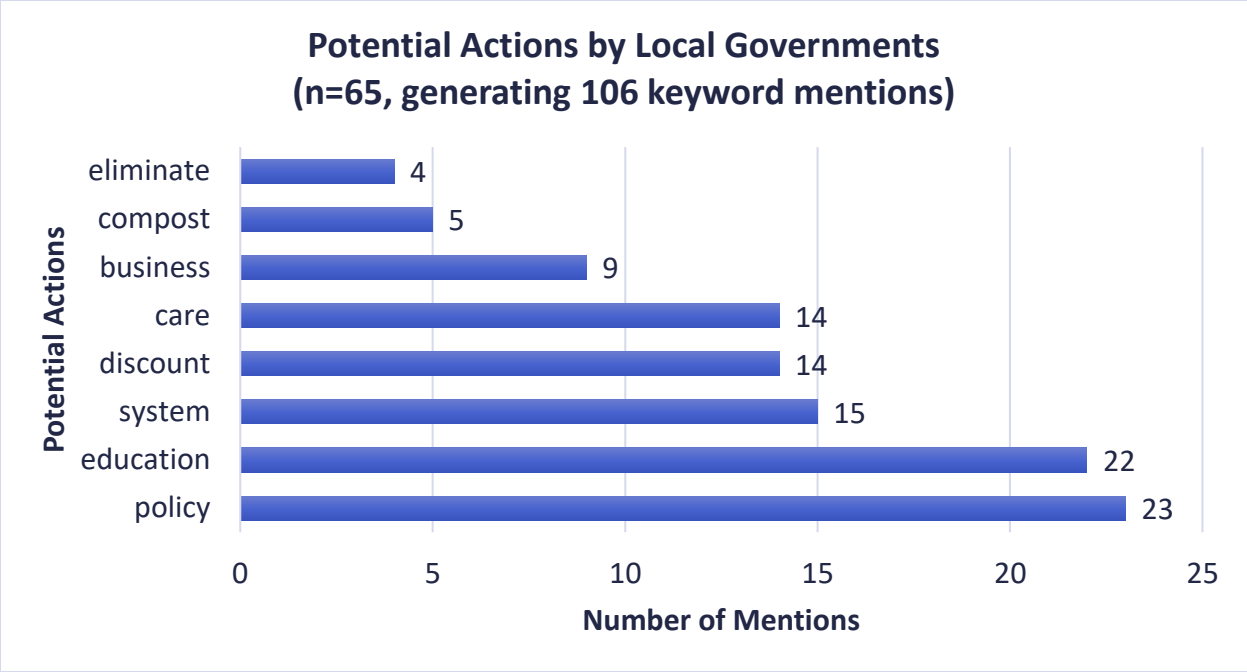


Figure 17: Potential Actions by Local Governments

The most common response to this suggests the public would be receptive to a policy-based approach. Many respondents cited a need for more policies banning other types of single-use plastic and stricter enforcement of fines for littering. "Education" was the next most mentioned theme, with a third of respondents voicing a need for additional and improved educational efforts, in schools and through the media as well. The "system" category refers to systematic improvements that could be made, such as waste management efforts and "employ[ing] smart people" to solve the greater waste management crisis in the community and throughout Rhode Island. Currently, the Rhode Island Resource Recovery Center's landfill is expected to reach capacity by 2034 (Pike, 2018), making this a timely issue. The "discount" category refers to respondents looking to see more incentives for businesses and customers who, for example, bring their own coffee cups. The logic is that customers, in this coffee shop example, should at least be rewarded a discount equaling the cost of the cup. The concept of "care" arose in this question, which has been a common theme throughout the entire survey, particularly in the earlier question

asking about political barriers as a whole. “Business” coded responses suggest putting more responsibilities on businesses to provide and integrate sustainable practices. The compost suggestion is becoming a reality with Clean Ocean Access’s new “Healthy Seas, Healthy Soils” campaign launching this year (“Clean Ocean Access HSHSRI,” 2019). A few respondents even called for the elimination of SUP altogether, which is an ideal scenario and certainly a goal to work towards for future generations.

Examining Outliers

While the large majority of survey-takers were completely supportive of mitigating the problem, there were a few outliers who showed low levels of concern, responding with less than a 5 in Question 2. One such outlier responded the following about their perspectives on single-use plastics: “They are fine and should not be restricted. People are able to make their own decisions in choosing the best type of material for things such as silverware and increased regulation leads to higher cost and frustration. Education and encouraging people to avoid littering or plastics is better”. This person’s main concern was for policies regarding the limiting of single-use plastics, but his other responses were encouraging as he uses a reusable bag and water bottle, and he supports education on the problem. Another outlier also voiced concern with policies stating, “I am conscientious about my use of all waste, so I am not in favor of government banning any type of container, plastics, etc.”. However, they did not take any personal actions to reduce their single-use plastics. This respondent has placed the onus on businesses taking the lead on solving the issues, not the government. In further examination of these low concern outliers, I thought there may be a correlation between in-land location and low concern. However, this was not the case, as there were an equal number of low-concern participants from both the local and visitor categories, with six people each.

4.1.2 Focus Group Results

The focus group had three participants, all of which were very much aware of the issue and active members of the community. The themes that appeared in the beach clean-up surveys were echoed and expounded up in this setting, further elucidating the community's perspectives on the problem. I will contextualize a few powerful quotes from this conversation.

One of the first issues to arise in this group was the notion that every little bit helps in tackling this global problem. One participant noted, "If 100% of the population could commit to reducing their plastic waste by 90%, that would be an enormous step in the right direction." This is echoed by popular zero-waste chef Anne-Marie Bonneau who also believes, "We don't need a handful of people doing zero waste perfectly. We need millions of people doing it imperfectly" (Bonneau, 2019).

In addition, the participants discussed the topic of convenience culture, which led to ideas for education and the associated challenges of inspiring a mindset shift. One important observation was offered by a participant who stated, "I think positive change needs to come from a positive social perception of the cause." This is extremely important in framing education for the youth, and equally applicable for adult educational efforts as well. The problem needs to be framed and broken down into achievable, realistic goals that the public can perceive as positive change. This participant also noted the economic barrier of overcoming the plastics industry, "there is a lot of money in the wheel of plastics. So much money in the wheel of plastics. To bring that wheel to a grinding halt is going to be tough." This served as the gateway into a larger discussion about the biggest barriers we need to overcome to tackle the problem.

When asked Question 3 from the beach clean-up survey, one responded noted that "one of these categories needs to be the energy to change the others. Socio-cultural [barriers] is maybe the [barrier] we need to [overcome to tackle] political and economic [barriers]. Corporations are not

assuming [responsibility] of the cause of pollution. They have to change that mentality." Another respondent echoed, "Corporations need to be held accountable by governments, and governments need to be held accountable by the people." These perspectives are important in gathering how the public views the responsibilities of governments and businesses. There is a desire to "stay positive, but when you start hitting people's pockets that's when change hits", calling for ramifications on businesses contributing to the problem. Furthermore, one participant thought that "businesses can and should offer discounts for customers bringing their own bag and reusable containers. I feel like that behavior should be rewarded." These rewards incentive and educate their customers.

These quotes highlight some of the most concrete ideas that came from this focus group. This type of conversation was very useful un gathering more community perspectives, and this method could be strengthened to incorporate strategic visioning exercises in future sessions.

4.1.3 Restaurants' Perspectives

With a sizable sampling of the general population through the beach clean-up surveys and focus group, I now needed to collect the perspectives of the restaurant industry, as they are a large contributor to single-use plastic consumption on the island. I reached out to ten restaurants, received responses from three, and had interviews with two establishments. The email sent to restaurants can be seen below in Figure 18: Email sent to restaurantsFigure 18 and the outcomes

Hello!

My name is Paige and I am currently a master's student at Clark University in Worcester, MA studying climate change and society. I interned for Clean Ocean Access this summer and am doing my research on Aquidneck Island's movement away from single-use plastics. I was wondering if anyone would be willing to speak with me about their perspectives on the movement, as well as the challenges and/or benefits that come with reducing single-use plastics in establishments like yours. Please don't hesitate to give me a call or shoot me back an email. I look forward to hearing from you!

Best,
Paige

Figure 18: Email sent to restaurants

of these outreach attempts can be seen in Table 2. The details of our interactions are explained in the following sections.

Restaurant	Outreach Method	Response	Outcome
1. Newport Vineyards (Brix, Tap Room)	Website forum	Yes	Interview with Cassandra Earle, Director of Sales and Marketing
2. Fluke	Website forum	Yes	Instructed to reach out to Kara DiCamillo of Strawless by the Sea
3. Hotel Viking	Website forum	Yes	Phone interview with Brett Nicolopoulos, Director Food and Beverage
4. Jo's American Bistro	Website forum	No	
5. Malt on Broadway	Facebook Messenger	No	
6. Meg's Aussie Milkbar	Website forum	No	
7. Mission Burger	Email	No	
8. Newport Shipyard – Belle's Café	Email	No	
9. Scales and Shells	Website forum	No	
10. Newport Restaurant Group (not signed on to Strawless by the Sea)	Website forum	No	

Table 2: Outcomes of reaching out to restaurants

Hotel Viking (Newport)

In this phone interview, I spoke with Brett Nicolopoulos, Director of Food and Beverage for the Hotel Viking. The first thing he noted was Newport's proximity to water and how that plays a role in their decision to join the "Strawless by the Sea" campaign. However, he was transparent in admitting that they have not completely eliminated plastic straws from their hotel bar and restaurant. He said that some drinks need them, but they are trying to reduce waste as much as possible. In line with the trends from the beach survey, he responded that his concern for marine debris on Aquidneck Island was a 5 (out of 10), and 8 for New England, and a 10 for the rest of the world. When I asked about their other sources of single-use plastics, he shared that they provide take-out meals very infrequently, but when they do, it is in cardboard boxes with plastic cutlery. Brett estimates that they have saved 2,000-3,000 straws per month since joining "Strawless by the Sea". They do not serve their drinks with straws, but they do provide them if customers want them.

I was surprised to hear that he estimated 50% of people end up asking for straws. People who agree with and understand the issue appreciate that they do not serve straws, while others understand, but still make the choice to ask for a straw. Brett admits that while they do save money, straws are so cheap it is not a lot. Ultimately, they joined this movement because it is better for the environment.

Newport Vineyards (Middletown)

This in-person interview was perhaps the most helpful, and it sets a prime example of an establishment rooted in sustainability. Cassandra Earle, Newport Vineyards Director of Sales and Marketing, took the time to sit down with me for an in-person interview and tell me all about their sustainability efforts. By nature, serving mainly beer from their Tap Room and wine from their vineyard, these drinks do not require straws. For the rest of their beverages, they use paper straws upon request and have received no pushback from guests. She said that paper straws are more expensive, but since they are not used as often, this is not a significant cost factor. They expanded six years ago and did so with the environment in mind, installing solar panels and repurposing existing structures wherever possible. Currently, their sustainability efforts are furthered by their "Cultivate Committee". Cassandra stressed that sustainability is at the core of their values and weaved into the culture, so having little to no single-use plastics in their establishment came naturally. Their take-out containers are cardboard, and the to-go cutlery is biodegradable. The only single-use plastic she could think of were the small plastic cups they use for takeout sauces.

While not directly related to reducing single-use plastics, Cassandra went on to inform me of their sustainable practices in the kitchen. They support local farms, make everything from scratch, and alter their menu to what is in season. These are important steps in supporting the community, but also in reducing their carbon footprint by sourcing locally. Cassandra said there is always room for improvement, and they are working towards incorporating composting into

their practices, which aligns with Clean Ocean Access's Healthy Seas, Healthy Soils composting campaign.

4.2 What are the factors that make this community a leader in igniting social change and reducing plastic pollution?

It does not take one long to notice the plethora of conversations hosted around the community on reducing waste and other environmental topics. I have attended a few of these conversations and have seen the impacts they have on the community:

4.2.1 Community Sustainability Meetings and Conversations

Clean Ocean Access holds monthly zero-waste meetings, and I was able to attend two of them over the summer to gather information on the latest initiatives in the community. The following bulleted lists describe topics discussed at these meetings:

Zero-Waste Meeting on July 17, 2018

- Focus on straws, "Strawless by the Sea" campaign recently launched
- Toppa's Food Service & Paper Supply Company distribution of plastic materials to restaurants. Is there a partnership or conversation that needs to happen?
- Need to bring together small businesses
- Furthering education efforts

Zero-Waste Meeting on September 18, 2018

- Focus on composting, announcement of Healthy Seals, Healthy Soils RI project launch
- Economics of composting
- Producer responsibility

As seen from these topics, one can get a sense of the benefits of having such community-based discussions. They have spurred actions that have immediate impacts on the community (i.e. the Strawless by the Sea movement and Healthy Seas, Healthy Soils project).

Additional Forums for Conversations in the Community

One facet of this community, which I think is a great contributor to their success in moving away from single-use plastics, is their effort to have community conversations on the topic and related issues. These meetings include monthly "Green Drinks Newport" and one-off programs such as the recent Pell Center for International Relations and Public Policy's "Climate Change Panel" discussion. In addition, Clean Ocean Access has created a program called "Ocean Science Speaker Series", running from November 2018 – May 2019. These are monthly talks from professionals and academics in the industry on various topics regarding ocean heath, held at the Newport Public Library for all to attend. These discussions are extremely important in that they draw attention to the issue, spark conversation, inspire innovation and collaboration, and often provide the push needed to create habit changes.

4.2.2 Journaling and Personal Reflection

I had a couple of very memorable interactions with the youth of the community this summer that I believe are important to include. These stories will give concrete examples of the sense of hope and promise that exists in the next generation. One of them was during a clean-up at Second Beach. A mother had brought her three young children, one who she carried on her chest in a carrier (Figure 19). The other two were full of energy and ran around the beach picking up trash. They denied the bag to collect their items and opted to pick up a piece of trash and run it back to our table or their mother every time. This carried on for a while, and when the mother gathered them up and said it was time to go, one of the little boys who was running back and forth handed over the bag of trash they had collected and

Figure 19: Mother with children at beach clean-up (Myatt, 2018)

said: “We are done - but not really because there is still a lot of trash left”. This five-year-old aptly summed up the enormity of the problem! We can work hard and pick up trash and change habits and refuse plastic, but the truth is, in our lifetimes, there will always be more. This is a sad truth, but the child’s statement did not hold any despair, as you might imagine a statement like that coming out of an adult’s mouth would. It was full of hope and excitement. I wondered why. I asked myself: “Is he unaware that his generation and ones to follow will inherit this problem?” or perhaps he is just extremely excited that there exist opportunities for improvement? Hopefully, he will become one of the world’s next great problem-solvers.

Another striking experience came from a morning going through the harbor trash skimmers with a local sailing camp. The counselors, who could have not been older than 15 or 16 years old, marched their fifth and sixth graders down the street from the yacht club to the table we had set up to go through the foul-smelling debris collected by the skimmer in the harbor. My co-worker and I explained how the process would work – we were looking for plastics still intact, as well as micro-plastics. We then dumped the seaweed/trash mixture onto the tables and the kids started to scream in disgust. They asked: “Why would anyone dump their trash in the ocean!?” The counselors who had walked them over took their uninvolved seats under the shade of a nearby tree, and most of them were already on their phones when one of the campers called out and said: “Hey, why aren’t you helping!?”. One of them replied with: “I already did a beach clean-up this week!” The camper responded very insightfully: “Just because you helped save the world once doesn’t mean you can’t help save it again!”

I learned a lot about the perspectives on the problem in this community through its youth. From them, I learned that they are one of the factors that make Aquidneck Island a leader in igniting social change regarding plastic consumption habits. Organizations like Clean Ocean Access allow

children to learn about the problem and realize the importance of having youth voices be heard. Today's children are going to inherit this horrible problem and be leading beach clean-ups for years to come. Fortunately, many kids have a sense of perpetual optimism. I am a firm believer that problems are best solved out of optimism, rather than a pessimistic, despairing state. These stories display one of the most important reasons I believe this community is positioned extremely well to continue to be leaders in solving this pervasive issue.

4.3 What mitigation strategies are present on the island?

Table 3 provides a summary, by category of mitigation strategy, in all the ways Aquidneck Island is fighting plastic pollution. This section will detail some of the efforts that have not yet been discussed.

Technological & Scientific Advancements	Government, Policy & Legislation	Consumer Education & Corporate Responsibility	Work of Non-Profits, Individuals & Communities
Marina Trash Skimmers in Newport Harbor and in New England Boat Works Marina (soon to be more locations)	Governor Gina Raimondo's "Tackling Plastics" Task Force	Local coffee shops offering discounts for bringing own mug	Clean Ocean Access
Brown University student project to more effectively sort organic debris from inorganic debris in Marina Trash Skimmer collections	Plastic bag bans in place in all three towns on Aquidneck Island	ReThink Disposable partnership with 11th Hour Racing Ambassadors to reduce single-use plastics in Newport restaurants	Sailors for the Sea
Solar-powered trash compactors around Newport		Strawless by the Sea campaign to limit plastic straw distribution in local restaurants and bars	11th Hour Racing
Waste management improvements motivated by landfill reaching capacity			Green Drinks Newport
			Newport Film (often shows free environmental documentaries)

Table 3: Mitigation Strategies by Category on Aquidneck Island

4.3.1 Strawless by the Sea

I first spoke with Kara DiCamillo from "Strawless by the Sea" in December 2018 via phone interview. I wanted to gain an overview of her progress in the campaign she leads to have restaurants commit to reducing the amount of plastic straws in their establishments, either by offering sustainable alternatives, only providing straws upon request, or eliminating them completely. Originally, she reached out to sixty restaurants in Newport and has had about twenty of them make the pledge to go "strawless" since launching on World Oceans Day in June 2018. However, in my interviews with the Hotel Viking and Newport Vineyards, two of the restaurants who had signed on to "Strawless by the Sea", I realized that committing to the campaign did not mean the same thing for each restaurant.

When they first launched, Kara shared that one of the biggest challenges in getting restaurants to commit was that they had often already placed their orders for the season. I asked her about efforts to reduce other single-use plastics, and she said that right now they are focusing on straws only, as it is a good first step. I asked her why restaurants choose to sign on: Was it mainly for environmental concerns, or economic reasons as well? She gave the example of the Clark Cooke House eliminating the plastic stirrers from their drinks because the bartenders would dump out the drinks in the sink and the stirrers would get stuck in the drain. Eliminating them had a logistical, unforeseen benefit as well as doing something good for the environment.

One thing I noted in my conversation with her was that there seems to be a lack of promotion for restaurants that sign on, and some just do it because it because it cuts down on costs. This aspect of promotion could be a promising future endeavor, especially with the statistics to support the progress of the campaign. Kara shared that since June and among the twenty restaurants that have signed on, approximately 10,000 straws have been reduced per month.

4.3.2 Literature and Policy Review

In reviewing literature on policy mitigation strategies and how it relates to Rhode Island's efforts, I have focused on Gov. Raimondo's executive order to form a task force to tackle plastics; I attended the signing of this order over the summer with Clean Ocean Access (Figure 20). There was a recent update on this issue on February 15, 2019, when a press release announced her proposal for a statewide plastic bag ban, which has been met with support, even from previous opponents ("Plastics Task Force and Gov. Endorse Statewide Bag Ban," 2019). The proposal would enact a fee for paper bags to encourage people to change their habits and bring their own bags. Realizing this fee may adversely impact Rhode Island's low-income communities, the task force aims to launch a program that would provide free, reusable bags to residents. This is in line with one of the executive order's points stating, "WHEREAS, plastic bags and other single-use disposable items are used by many Rhode Island residents and businesses, we must consider the impact of any new policies on all Rhode Islanders, including our low-income communities and small businesses" ("Executive Order: Tackling Plastics," 2018).

Figure 20: Governor Gina Raimondo signing Tackling Plastics Executive Order on July 16, 2018 at Scarborough State Beach (Photo: Kuffner, 2018)

4.3.3 ReThink Disposable Upcoming Efforts

Another mitigation strategy with impacts yet to be realized is the upcoming work of ReThink Disposable and their partnership with two of 11th Hour Racing's Ambassadors, Andy Green and Jamie Hines. 11th Hour Racing is an organization based in Newport that supports

environmental projects focused on improving ocean health, particularly in the sailing industry. Their grantees are from around the world, and work on topics such as plastic pollution and climate change. The goal of their partnership with ReThink Disposable is to reduce single-use plastics in the restaurant industry in Newport. I have reached out to them to learn more about their progress and discovered that their work is just now ramping up, following the conclusion of Governor Raimondo's Task Force to Tackle Plastics, which recently delivered their recommendations. Andy put me in touch with Johnathan Berard of Clean Water Action, who has been co-chairing the task force. He was able to send me their recommendations and the report they delivered to the Governor. He highlighted in his email that two of the main outcomes of their work were the hopeful passing of a statewide "ask first" plastic straw policy, as well as a statewide plastic bag ban. He is less optimistic about a polystyrene ban, at least at this time. Him and Michelle Beaudin, also of Clean Water Action, are looking to get in touch with participating restaurants and will schedule meetings with them before the summer season. These meetings will provide reliable numbers to compare with for their first audit in the fall. This is huge progress for the entire state and a great example of how initiatives that have been implemented in Newport can be learned from and scaled to statewide policies.

I will address my final research question of "What combination of community factors and mitigation strategies allow the opportunity for success in other coastal communities?" in the upcoming conclusion, as it relies on the synthesis of data gathered from answering the first three research questions.

5. Limitations and Recommendations for Future Research

In speaking and collecting surveys from people at beach clean-ups, there exists room to investigate more diverse sections of the population, such as those who are less aware of the issue.

Inherently, by participating in a beach clean-up, there is already some degree of concern. My sampling of beach clean-up survey participants had 89% of responses in the higher concern categories (rating Q2 from 6-10), so there were very few perspectives from those not concerned about the problem. Another limitation in my sample was speaking only with a couple of restaurants who had signed on to the "Strawless by the Sea" campaign, and thus lacked a cross-section of restaurants who had not yet made this commitment, as well as gathering more perspectives from those who had gone "strawless".

There is the opportunity for future research in many areas, one of which is the monitoring and evaluation of these mitigation efforts. One of the research questions may become, "does policy change lead to behavior change?". This research is currently being done by Clean Ocean Access Program Manager, Eva Touhey, who is working on her Master's in Marine Affairs from the University of Rhode Island. Her study, while not effective in showing behavior change, did show a correlation in support for a statewide plastic bag ban with Middletown, who had already implemented an ordinance banning plastic bags, as opposed to Warwick, RI, a town without the ordinance who does not support a statewide ban. There exists an argument that banning plastic bags and placing a fee on paper bags, or having to buy your own reusable bags, creates an economic hardship for people with low income. Some bans have addressed this critique by funneling the fee collected from paper bags to supplying free reusable bags to people in low-income communities. With the plastic bag bans on Aquidneck Island, it is worth learning more about the ban's effect on low-income communities.

To find the populations who have yet to change their habits to more sustainable alternatives, one might investigate sampling those who go to the grocery store and do not bring their own bags, and similarly those who go to coffee shops and do not bring their own mugs.

Bringing your own bags and mugs were the two highest ranking personal actions incorporated by those who took the beach clean-up survey. By finding those who have not yet incorporated these habit changes into their routines, we can learn more about their perceived barriers to doing so. The tourists' perspectives could be more explicitly investigated as well, potentially by standing on the Cliff Walk, a popular tourist destination in Newport, and surveying its visitors.

There is also future research needed to answer the question, "does behavior change lead to cleaner environments?". Clean Ocean Access is perfectly positioned to be able to answer this question, as they have data from clean-ups dating back to their inception in 2006. In addition, their pioneering installations of Marina Trash Skimmers in Newport Harbor and at New England Boatworks Marina in Portsmouth have proven to be effective in cleaning the waters in those areas ("Clean Ocean Access 2016 - 2018 Marina Trash Skimmer Report," 2018). COA is beginning installations of skimmers at a fishing wharf in New Bedford, MA and also in Providence, RI, which will become the first capital city in the nation with this technology. Additional prospective 2019 installations include Fall River, MA, Nantucket, MA and Stamford, CT. There is room for future research in these areas to determine if their presence and associated community involvement in these skimmers, as modeled in Newport, can have a larger impact on reducing marine debris.

6. Conclusion

From my research and experiences, it has become clear why Aquidneck Island is uniquely positioned to lead the charge in the movement away from single-use plastics. Most notably, there is a strong sense of community. Its members are increasingly aware and involved in solving the problem. There are individuals, community groups, businesses, and non-profit organizations who are all willing to have meaningful discussions on the issue. More importantly, they have pursued these ideas and incited action across all four previously mentioned mitigation categories (Figure

21). These efforts interplay with each other to create even stronger solutions. Aquidneck Island has set a great example of a successful, integrated, community approach.

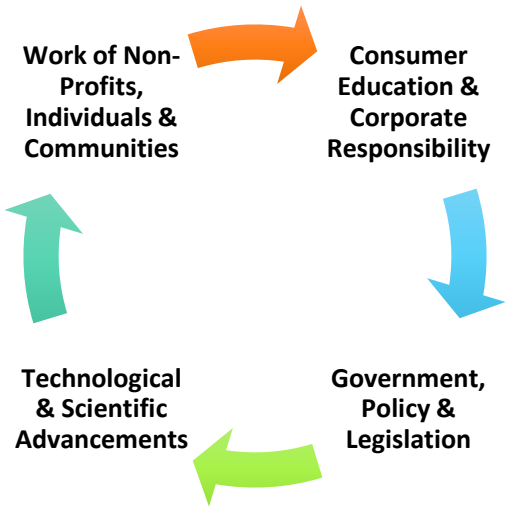


Figure 21: Interplay of Mitigation Strategies

The last research question left to answer is, "What combination of community factors and mitigation strategies allow the opportunity for success in other coastal communities?". Since the first three research questions culminated in this question, I thought it best to include these findings in the conclusion. In summary, the factors present on Aquidneck Island include:

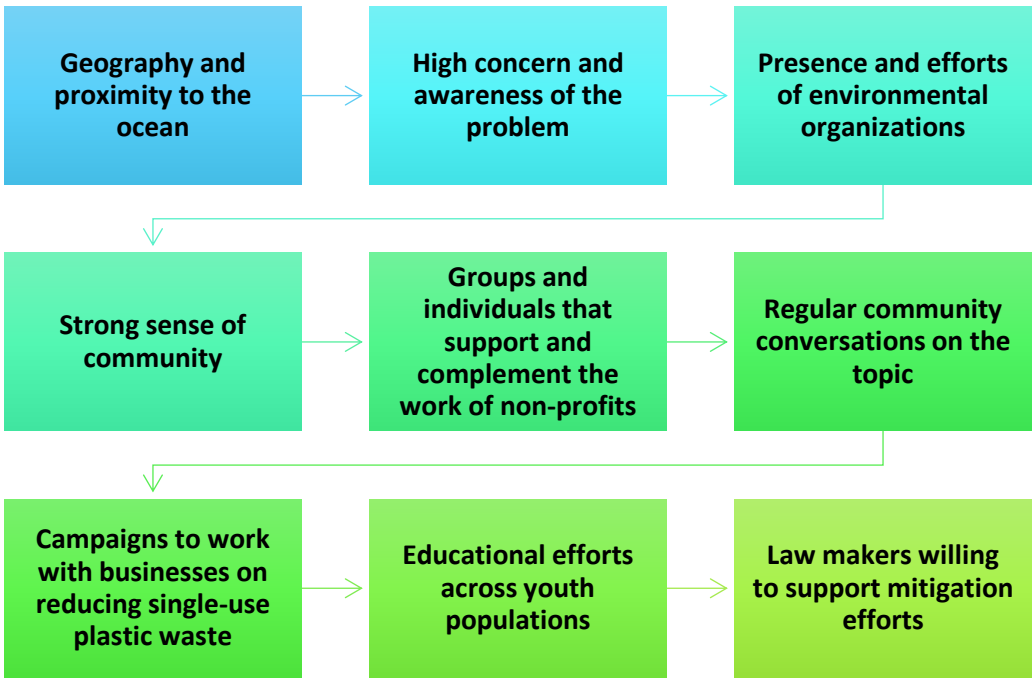


Figure 22: Community factors present on Aquidneck Island

Other coastal communities, particularly those in New England with similar problems, can look to Aquidneck Island as an example of how to successfully begin the fight against plastic pollution. This notion is reiterated by the state's Tackling Plastics Executive Order which outlines,

"WHEREAS, Rhode Island can and should be a leader on reducing and eventually eliminating plastics pollution, and with the geography and size of the state, an initiative here could demonstrate innovation and results that could be scaled up or down to different locations across the globe" ("Executive Order: Tackling Plastics," 2018). The factors outlined in Figure 22 expand on this statement and allow the for the continued success in tackling this pervasive problem.

7. Recommendations

By working within the community, I have gotten to know its many strengths in addressing plastic pollution in the environment, but it has also allowed me to be able to pinpoint areas for potential improvement. Many of these recommended actions are already underway in Rhode Island, and these findings are meant to strengthen the support for those efforts. I have thus prepared the following Figure 23 to summarize my recommendations, organized by sector:

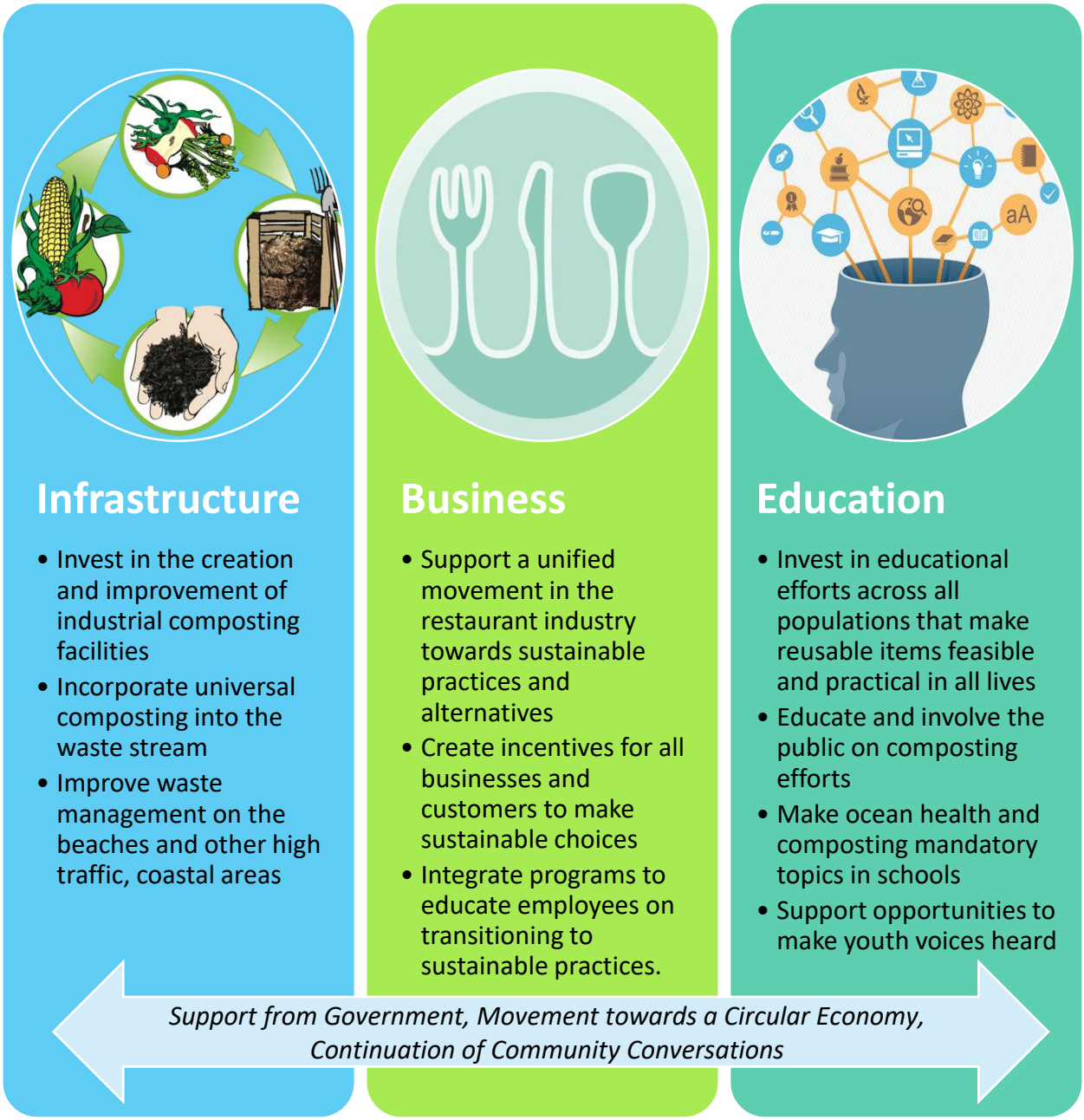


Figure 23: Summary of Recommendations by Sector

7.1 Infrastructural Improvements

Given the high concern for the sheer amount of single-use plastics in the marine environment, there is a great need for infrastructural improvements that support alternatives to SUP. This need leads to the discussion of incorporating bioplastics into the waste stream. It is extremely important to consider the difference between "compostable" and "biodegradable"

materials, as they are not the same and decompose in different conditions and over varying timescales. Compostable options are the desired alternative to SUP, but the ultimate goal is to move away from the single-use, disposable lifestyle. However, this widespread change may take generations to achieve. In the meantime, successful composting can only be accomplished with the appropriate waste management infrastructure. Industrial composters can process compostable bioplastics and food scraps, and thus would be needed when composting becomes universally integrated into the waste stream, alongside trash and recycling. This successful incorporation of composting relies heavily on educational outreach efforts, which are already underway with Clean Ocean Access's Healthy Seas, Healthy Soils Campaign.

There is also a need for improved recycling and waste management efforts on the beaches and throughout town. From leading beach clean-ups throughout the summer, one of the most common comments I got from participants is that there are not enough trash bins at the beach (Second Beach), and that there are no recycling bins. Providing beach-goers a place to responsibly discard their trash may help in reducing the amount of debris present on this beach. In addition, this is a great opportunity to provide some statistics on beach clean-ups and inform both visitors and locals on applicable and relevant data collected directly from the beach they enjoyed.

7.2 Recommendations to Businesses

Businesses also play a large role in mitigating plastic pollution by providing sustainable alternatives to customers. There needs to be monetary incentives or rewards for businesses who make the responsible changes in their operations and people who make the sustainable decision and bring their own mugs or bags. This harkens back to the need for an positive perspective in solving this problem.

More broadly, there is a need for restaurants to come together and host their own community discussions on making sustainable choices in their business. Sharing this information

in a conversational setting would be extremely powerful and elevate all parties involved. This is a movement hopefully facilitated by ReThink Disposable and their upcoming efforts in Newport's restaurant industry. They might be wise to incorporate strategic vision exercises into these conversations to incite action with achievable goals in a realistic timeframe. It is also extremely important to involve employees and educate them on the changes being made. Bringing these efforts to the media's attention will yield its own benefits: there is value in reading about such actions, inspiring others with new ideas who are working towards the same goal. Community conversations and the sharing of knowledge across all populations are *extremely* important, as thoughtful discussions are imperative in moving closer to solving this problem.

7.3 Recommendations for Education

Sustainable alternatives need to be accessible and affordable for all socio-economic classes for real social change to take root. Accessibility can be achieved by providing free reusable items to populations that cannot afford them. For lasting change to take place, these efforts *need* to be accompanied by education on the problem and emphasizing how small actions make a big difference. With reusable bottles and bags making their way into people's routines, and the current groundswell for the "strawless" movement, more education is needed on bringing one's own takeout container as well as choosing products with little to no packaging. These efforts can be supported by policies that limit "pointless plastic". Media and outreach efforts need to draw attention to potential *solutions* and *actions* that can be taken by individuals to make a change *today*.

7.4 Recommendations across all Sectors

All of these efforts can be supported by government officials who invest the time and money in discovering successful models and effective policies. In turn, people need to support politicians who are not only voicing their concern for the issue but acting on it as well. Before bans on plastic can be implemented, legislation that supports the infrastructural improvements for

composting need to be passed. In addition, once the infrastructure is place, there should be incentives to join the circular waste stream model, and ramifications for those who do not. The responsibility needs to be more equitably distributed to businesses and governments who should be providing consumers with sustainable alternatives. This mindset shift can be accomplished with strong educational efforts. Systematic changes are not only recommended, but *necessary*.

Finally, a higher focus needs to be put on the importance of education for all populations. Educational efforts on the harms of single-use plastics and benefits of composting need to be expanded upon and made mandatory in all schools. Most importantly, youth voices must be empowered, as it is their futures that will be most greatly impacted by this global problem.

Figure 24: Illustration of African Proverb from franzidraws.com

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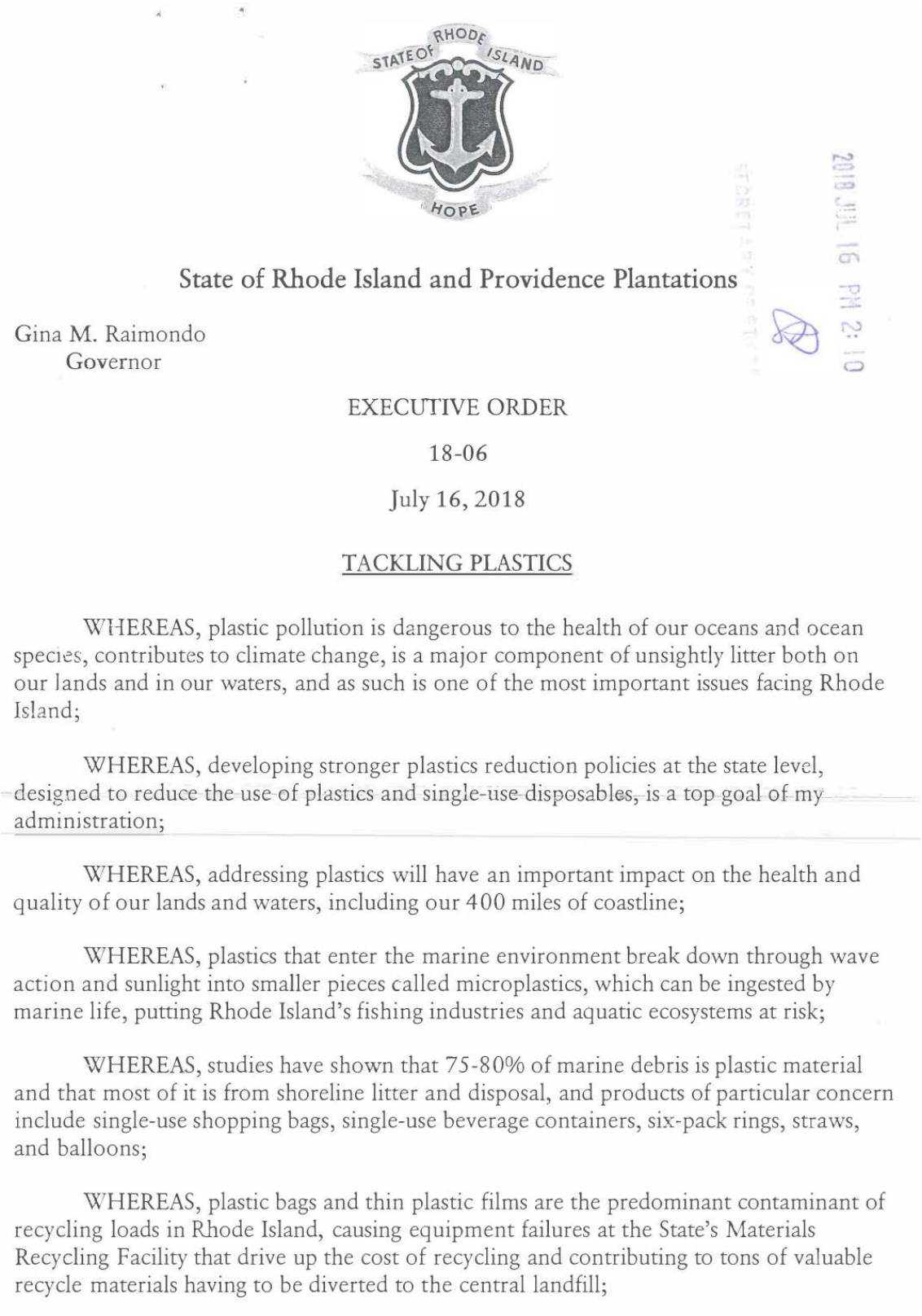
Appendix

Appendix B: Governor Gina Raimondo's Tackling Plastics Executive Order



STATE OF RHODE ISLAND
HOPE

2018 JUL 16 PM 2:10

State of Rhode Island and Providence Plantations

Gina M. Raimondo
Governor

EXECUTIVE ORDER

18-06

July 16, 2018

TACKLING PLASTICS

WHEREAS, plastic pollution is dangerous to the health of our oceans and ocean species, contributes to climate change, is a major component of unsightly litter both on our lands and in our waters, and as such is one of the most important issues facing Rhode Island;

WHEREAS, developing stronger plastics reduction policies at the state level, designed to reduce the use of plastics and single-use disposables, is a top goal of my administration;

WHEREAS, addressing plastics will have an important impact on the health and quality of our lands and waters, including our 400 miles of coastline;

WHEREAS, plastics that enter the marine environment break down through wave action and sunlight into smaller pieces called microplastics, which can be ingested by marine life, putting Rhode Island's fishing industries and aquatic ecosystems at risk;

WHEREAS, studies have shown that 75-80% of marine debris is plastic material and that most of it is from shoreline litter and disposal, and products of particular concern include single-use shopping bags, single-use beverage containers, six-pack rings, straws, and balloons;

WHEREAS, plastic bags and thin plastic films are the predominant contaminant of recycling loads in Rhode Island, causing equipment failures at the State's Materials Recycling Facility that drive up the cost of recycling and contributing to tons of valuable recycle materials having to be diverted to the central landfill;

WHEREAS, Rhode Island can and should be a leader on reducing and eventually eliminating plastics pollution, and with the geography and size of the state, an initiative here could demonstrate innovation and results that could be scaled up or down to different locations across the globe;

WHEREAS, I launched a Zero Plastics Initiative in May 2018 to partner with our marinas to prevent plastics pollution, increase public awareness of the issues, and begin efforts to remove plastics from Narragansett Bay and our coastlines, and I signed the Clean Seas Pledge in a commitment to reduce my use of plastics;

WHEREAS, the Rhode Island Department of Environmental Management (DEM) serves as the chief steward of Rhode Island's natural resources and has the mission of protecting, restoring, and promoting our environment, and the Rhode Island Resource Recovery Corporation is committed to providing safe, environmentally compliant, clean and affordable recycling services for Rhode Islanders;

WHEREAS, plastic bags and other single-use disposable items are used by many Rhode Island residents and businesses, and we must consider the impact of any new policies on all Rhode Islanders, including our low-income communities and small businesses; and

WHEREAS, it is critical to collaboratively develop the best approach to addressing the use, reuse, and clean-up of single-use disposable plastics in Rhode Island;

NOW, THEREFORE, I, Gina M. Raimondo, by virtue of the authority vested in me as Governor of the State of Rhode Island and Providence Plantations, do hereby order and direct the following:

1. There is hereby established the Task Force to Tackle Plastics ("Task Force") that shall advise the Governor.

2. The members and chair(s) of the Task Force shall be appointed by the Governor and shall serve at the pleasure of the Governor. The membership shall include, but not be limited to, representatives from:
    i. Environmental groups;
    ii. Marinas;
    iii. Relevant industries (e.g., retail, food service);
    iv. Municipalities;
    v. Elected officials; and
    vi. State agencies

3. The Task Force shall be organized and begin its work no later than September 17, 2018.

4. The Task Force shall provide recommendations to the Governor addressing the use, reuse, and clean-up of plastics in Rhode Island on or about February 18, 2019.

5. These recommendations shall include, but not be limited to:
   i. Encouraging the financial and market factors necessary to support reduction in and recycling of plastics;
   ii. Developing non-regulatory recognition and incentive programs, as well as potential legislation and/or regulations, and other measures to eliminate the sources of plastic pollution;
   iii. Supporting and building upon the Zero Plastics Initiative and our existing, successful recycling programs; and
   iv. Educating Rhode Islanders on the importance of and means to reducing and recycling plastics.

This Executive Order shall take effect immediately. Once the Task Force submits its recommendations to the Governor, it shall terminate its work.

So Ordered:

Gina M. Raimondo
Governor

Dated: July 16, 2018

Demographic Data (optional): Age: _____ Gender: _____

☐ Local to Aquidneck Island (Newport, Middletown, Portsmouth)
☐ Visiting from: _____

Focus Group Questionnaire

1. In general, what are your perspectives on single-use plastics on Aquidneck Island?

2. On a scale of 1-10, with 1 = not concerned at all and 10 = extremely concerned, how concerned are you about marine debris and ocean plastics in the following locations:
   a. Aquidneck Island?
      1-----2-----3-----4-----5-----6-----7-----8-----9-----10
   b. New England?
      1-----2-----3-----4-----5-----6-----7-----8-----9-----10
   c. The world?
      1-----2-----3-----4-----5-----6-----7-----8-----9-----10

3. In your opinion, what are the biggest barriers to reducing single-use plastics?
   a. Socio-culturally?

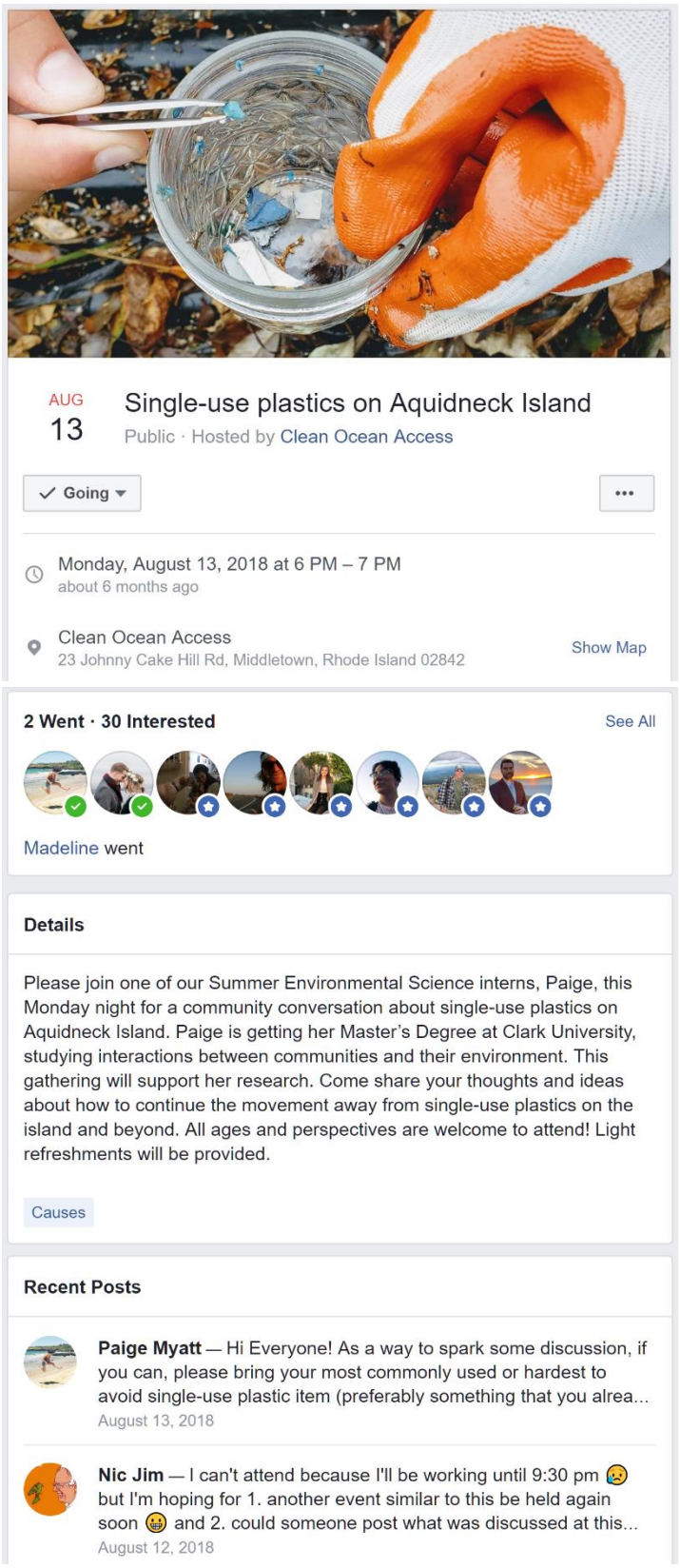
   b. Economically?

   c. Politically?

4. What actions are you personally taking, if any, to reduce your consumption of single-use plastics?
   ☐ Remembering reusable bags when I go shopping
   ☐ Bringing my own take-out container
   ☐ Skipping the straw / using a metal straw / using a paper straw
   ☐ Using a refillable water bottle / coffee mug
   ☐ Avoiding products with microbeads
   ☐ Choosing products with little to no plastic packaging
   ☐ Other: _____

5. What actions do you think local governments and businesses can take to support the reduction of single-use plastics, promote recycling, and integrate compostable options into the community?

Appendix E: Beach Clean-up Survey



Appendix F: Facebook Event for Focus Group