

Advocates for Change

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Debris along the eastern shoreline of Eastern Island before a 2016 marine debris removal mission.

Photo Credit: NOAA PIFSC Coral Reef Ecosystem Program

Abstract

Every day, people use and discard single-use plastic items, many of which make their way to coastal areas as marine debris. As the population of Vero Beach, Florida continues to grow, so does our community's potential to use and discard single-use plastics unless something is done to inspire our members of our community to switch to more sustainable options. Through this project, funded by the NOAA Planet Stewards, middle and high school youth volunteers at the Environmental Learning Center in Vero Beach collected over 200 pounds of marine debris from local waterways. A large portion of this debris was plastics in various sizes and forms, ranging from plastic forks, beach toys, and candy wrappers to tiny, unidentifiable fragments. After collecting and analyzing the debris, the youth were given the platform to educate others about the causes and impact of marine debris and single-use plastics. They created an advocacy video for younger students and an artful, interactive display that incorporated all of the plastic they collected during their beach clean-ups. Together, these two advocacy pieces show the impact that youth can have in addressing environmental issues through direct stewardship action and by using their unique perspective to educate and inspire others to take action in our local community.

Introduction

The Environmental Learning Center (ELC) is a nature center located on an island in a coastal estuary in Vero Beach, Florida. Like many Florida towns, Vero Beach is a growing metropolis. Thousands of new residents move to the area each year and are joined by an even larger number of tourists looking to spend their holidays somewhere warm and sunny. Every day, visitors and residents alike use plastic straws, cutlery, bags, and to-go containers, which are often used only one time before being discarded. Plastics, both large and microscopic, are one of the largest components of the growing amount of marine debris found in our oceans and Great Lakes (Wessel et al., 2019, NOAA, 2023). A five-year study in Florida showed that the most common types of plastic marine debris included single-use plastic items, such as straws, plastic bottles, and plastic bags (NOAA, 2017). The impacts of marine debris include damage to habitats, ingestion by and death of marine life,

navigational issues, risks to human health, and even economic losses due to decreases in tourism (NOAA, 2017). As the number of people living in and visiting the Vero Beach area continues to grow, so will the use of plastics; unless we decide to make a change.

The ELC seeks to inspire and empower all people to be active stewards of the environment. This mission means engaging people in stewardship activities, as well as helping them to see themselves as people who can make a meaningful difference in the world and inspire others to do the same. With this project, generously funded by NOAA Planet Stewards, our goals were:

- actively engage youth in stewardship action to remove marine debris from local waterways.
- increase their knowledge about marine debris and single-use plastics and their impact on the environment.
- empower youth to educate others through a youth-directed advocacy project.

The First Steps

Before we could give our students the platform to educate others, we wanted them to see first-hand the impact of debris in marine environments. We rallied our Green Teen! high school volunteers to plan and execute a series of beach clean-ups at one of the area's publicly accessible beaches. However, the impacts of COVID-19 meant that we quickly had to alter our approach to this project. As a result of the pandemic, we had a much smaller number of high school volunteers than anticipated, so we refocused our efforts to also engage members of our middle school-aged environmental club. Our Junior Interpreters, as we call these dedicated middle school students, along with several community groups and professionals working in environmental fields, surpassed our expectations over a series of four coastal clean-ups, collecting double our targeted amount of 100 pounds of marine debris.

In tandem with these clean-ups, we wanted to provide opportunities for the youth to understand the impact of marine debris on marine environments. At each clean-up, students sorted and logged the debris they collected in the Marine Debris Tracker app (<https://marinedebris.noaa.gov/partnerships/marine-debris-tracker>) or (<https://debristracker.org>) allowing them to contribute to a larger database and understand how prevalent plastic debris in particular is in marine environments. Through this process, they began to understand that plastic does not just disappear but instead degrades into smaller and smaller pieces. As they spent time sorting and counting increasingly miniscule plastic remains, they quickly identified this topic as a key area to address for their future advocacy campaign. Back at the ELC, we provided the youth with supporting opportunities to learn more about the impacts of marine debris and plastic pollution. They researched the impacts of plastic and how plastics break down in the environment. They also had the opportunity to dissect albatross boluses filled with plastic marine debris to understand how debris can reach animals and habitats across the globe.

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Empowered with knowledge and first-hand experience, we then asked these youth to take the lead in educating ELC visitors. We had previously identified the need for an exhibit in the visitor center and a way to engage our on-campus program attendees about plastic use. We aimed to balance these identified interpretive goals with the desire for the advocacy pieces to be student-led and saw these projects as an opportunity to provide youth with an audience and platform to allow their voices and perspectives to be shared. Rather than beginning with

a preset curriculum, we provided supporting lessons as needed. These lessons ranged from learning the basics of environmental interpretation and exhibit design to video editing and how to use simple power tools.

Related Lesson Plan: <https://docs.google.com/document/d/1Nx3weUmb5VYHJbDwIFAW4C9mOpK9BwD1INXDjpbmnOU/edit?usp=sharing>



Image 1. Student shares small plastic pieces found during the beach clean-up.

Photo credit: Heather Kramer



Image 2. Student sorts the garbage found into categories to enter into the NOAA Marine Debris Tracker App.

Photo credit: Heather Kramer

Over several months, students carefully cleaned and separated the plastic debris they found on the beach, sketched and refined exhibit designs, and wrote and revised interpretive scripts.

The first advocacy piece they created was a video aimed at encouraging younger students to reduce the amount of single-use plastics they brought to on-campus events in their lunch boxes. The video featured a single-use plastic trash monster who is “trying to take over the world.” The trash monster is at the ELC attempting to spread plastic pollution. It highlights the various single-use plastics that younger students may bring in their lunch boxes to on-campus programs and provides suggestions for reusable alternatives helpful in the effort to “defeat single-use plastic trash monsters.”

The second advocacy project was an artful, interactive exhibit in the ELC’s visitor center. This display piece incorporated all of the plastic debris collected during the beach clean-ups arranged as a giant wave of garbage that feels as though it may crash down over you.

Since these students were struck by the particular prevalence of small fragments of plastics left behind as larger plastic items broke down in the sun and surf, their display included an interactive element that allows guests to sift through sand to see the small pieces of plastics hidden within. Accompanying interpretive signs focused on educating guests about marine debris and its sources and what happens to single-use

plastics after their single use, as well as encouraging them to reduce their use of single-use plastics and take steps to reduce marine debris.



Image 3. Student adds marine debris collected during beach clean-ups to the “Wave of Garbage” interpretive exhibit.

Photo credit: Heather Kramer



Images 4 and 5. “Wave of Garbage” interpretive, interactive exhibit on display at the ELC’s visitor center.

Photo credit: Amy Durham Shea

Results

Through this project, 57 youth were engaged in 375 hours of stewardship activities. They completed 4 clean-up activities and logged just over 223 pounds of marine debris in the Marine Debris Tracker app. The logged debris included thousands of individual pieces. In the first clean-up alone, students, volunteers, community mentors, and ELC staff members collected 1,343 individual pieces of debris, including 375 hard plastic pieces, 366 food wrappers, and 235 pieces of foam. In addition, pre- and post-assessments showed an increase of student knowledge about marine debris following the beach clean-ups and supporting learning opportunities, as shown in Figure 1. On the pre-assessment, students scored as an average of 69% compared to an average of 75% on the post-assessment.

ELC staff distributed the youth-created advocacy video to future program participants via email, asking participants and their parents or guardians to watch the advocacy video prior to coming to their on-campus program. ELC Youth Created Advocacy Video: <https://www.youtube.com/watch?v=Qk64Fdhs74I>

Staff, youth volunteers, and interns measured the amount of single-use plastics that program participants brought to on-campus programs both before and after the distribution of the advocacy video by collecting and weighing all single-use plastics used during meals by program participants. This included plastic cutlery, plastic bags, bottles, and food wrappers. As seen in Figure 2, program participants without an opportunity to view the advocacy video brought significantly more single-use plastics (Mean score = 0.09 pounds per person, SD = 0.07, n = 137) than those participants who had the opportunity to view the advocacy video prior to their scheduled program (Mean score = 0.06 pounds per person, Standard Deviation = 0.06, n = 140) ($p < 0.01$). It is, however, important to note that the ELC was unable to track or verify that program participants watched the video after it was made available, and additional factors, such as program participant demographics or frequency of participation in ELC programs, may have had an effect on single-use plastic use. Despite these factors, the results remain encouraging in showing the potential impact of youth-led advocacy for a local and global environmental issue.

Due to visitor limitations caused by COVID-19, there was limited opportunity to assess the impact of the visitor center exhibit. A visitor survey was implemented both before and after the installation of the exhibit in order to measure impact on visitors' knowledge of marine debris, beliefs about the importance of marine debris, and stated likelihood of taking actions to reduce marine debris. Visitors who completed the post-assessment after the installation of the exhibit scored an average score of 81% (n = 9) on the knowledge assessment portion compared to an average score of 63% (n = 6) by visitors who completed the pre-assessment prior to the installation of the exhibit. The majority of this increase in score can be attributed to an increased understanding of the sources of marine debris and ways to prevent marine debris. When asked to rank on a 5-point Likert scale how important of an issue they believe marine debris is and if their experience at the ELC increased that

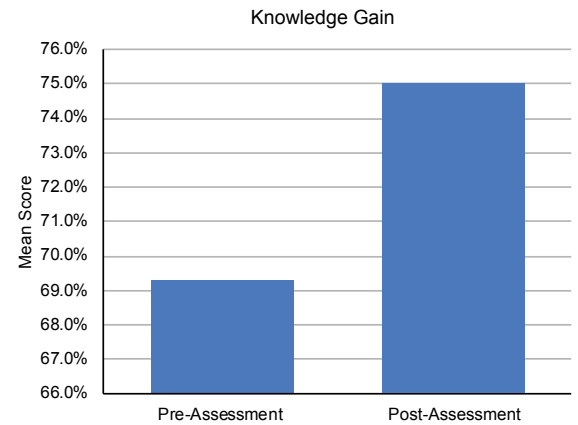


Figure 1. Results of pre- and post-assessments to measure knowledge gain about marine debris and its impact on the environment.

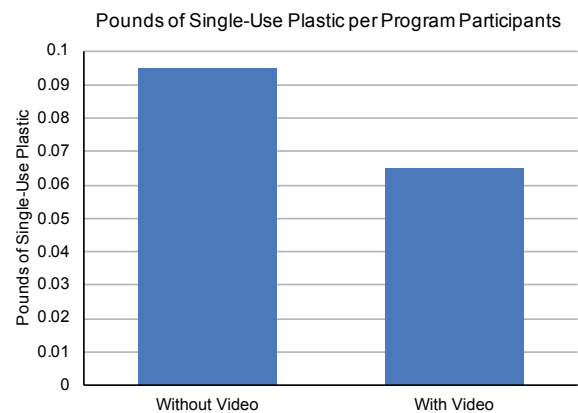


Figure 2. Amount of single-use plastics brought to on-campus programs by program participants without the opportunity to view and with the opportunity to view the advocacy video.

likelihood of taking action to help address marine debris, visitors who completed the post-assessment rated the importance of marine debris and their likelihood of taking action only slightly higher (Mean score = 4.90, n = 9 for both questions) than those visitors who completed the pre-assessment (Mean score = 4.67, n = 6 for both questions). Due to the small sample size, we were not able to determine if the exhibit had a significant impact on beliefs about the importance of marine debris or stated likelihood of taking action. However, the exhibit is undoubtedly a powerful reflection of these youths' experiences, and its creation provided them the opportunity to leave a lasting legacy of their work with the potential to educate thousands of annual visitors in the coming years.

Conclusion

In total, 57 middle and high school students spent 375 hours learning about and taking a stand against the growing problem of marine debris in our environment. They surpassed the amount of marine debris expected to be collected through this project, while carefully sorting each piece to contribute to a growing database tracking global marine debris. Beyond the direct impact of removing debris from local beaches, these youths used their collective voices to advocate for a more sustainable future. Supported with appropriate learning opportunities to create advocacy pieces that reflected their experiences and understanding of marine debris, these students demonstrated the impact a small group of dedicated youth can do to inspire the switch and make a larger impact on for their community and the environment.

References

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About the Author

Amy Durham Shea became a Planet Steward in 2020 while working as an environmental educator at the Environmental Learning Center in Vero Beach, FL. She has an undergraduate degree in psychology from the University of Arkansas, a master's degree in education from Vanderbilt University, and professional certificates in free-choice learning and fisheries management from Oregon State University. She is a Certified Interpretive Guide and Certified Interpretive Trainer through the National Association of Interpretation and a member of the National Network of Ocean and Climate Change Interpretation. She has worked in a variety of formal and informal educational settings since she relocated to Florida from Arkansas over twelve years ago. She enjoys educating people of all ages about fisheries, climate change, marine and estuarine ecosystems, and local Florida habitats through place-based experiences and has a strong interest in understanding how different messaging approaches impact people's perceptions of environmental issues. Amy currently works as a Curator of Education Programs at Brevard Zoo in Melbourne, FL and can be reached at akdurham@gmail.com.