

## AN ABSTRACT OF THE THESIS OF

Kei Lin Ng Chang for the degree of Master of Arts in Environmental Arts and Humanities  
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Title: Analyzing *National Geographic* as a Case Study for Identifying and Utilizing Narrative Strategies in Environmental Communication

Abstract approved: \_\_\_\_\_

Gregg B. Walker

*National Geographic*'s June 2018 magazine titled "Planet or Plastic?" drew attention to a growing problem throughout the world: ocean plastic. The eight plastic-related articles in the magazine are an example of science communication as a critical method of not only disseminating information but also raising awareness of the marine debris issue and urging action to mitigate the plastic problem. Four of the articles are featured in this research, showcasing narrative strategies as a means to communicate the marine plastic crisis.

Narrative rhetoric looks at how stories are a persuasive method for people to understand the world. This research uses the narrative rhetoric approach of rhetorician scholar Robert Rowland to explore the narrative strategies used to communicate the urgency of addressing the marine plastic dilemma in *National Geographic*'s June 2018 magazine. Rowland's concepts of narrative rhetoric—which state that narratives inherently have a theme, a plot, a scene, and characters—are applied to the four featured plastic articles. The analysis illustrates how science communication can tell a story, using narrative to both inform and create a persuasive argument to take action on plastic waste in the environment.

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Analyzing *National Geographic* as a Case Study for Identifying and Utilizing Narrative  
Strategies in Environmental Communication

by  
Kei Lin Ng Chang

A THESIS

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

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Kei Lin Ng Chang, Author

## ACKNOWLEDGEMENTS

It must be made known that Oregon State University is on the traditional homelands of the Mary's River or Ampinefu Band of Kalapuya. After the Willamette Valley Treaty of 1855, Kalapuya were forcibly removed to reservations in Western Oregon. Today, living descendants of these people are a part of the Confederated Tribes of Grand Ronde Community of Oregon and the Confederated Tribes of Siletz Indians.

I would like to thank the following for their help in my graduate school journey.

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## DEDICATION

I dedicate my thesis to my Family. Thank you for being open to explore different experiences and for fostering my curiosity and interests, no matter how strange they may have been. I seek to be well-rounded because of the world exposure you've given me. I owe you all so many things, dedicating my thesis to you is the least I can do.

## PREFACE

Growing up on the coast of Southern California, I was thoroughly intrigued by marine life and was involved in volunteering at local aquariums. Marine education satisfied so many aspects of my social personality: I got to share marine knowledge and engage in conversation with others. The most rewarding part was seeing the looks and reactions of people's faces when they were amazed at what the marine realm had that the everyday land-dweller could not see. I was very confident in science during grade school, so much so that in seventh grade I envisioned myself getting a PhD studying marine biology and living on the beach. While either has yet to happen, I continued to harness that interest in marine biology and shared what I knew. I was also involved in the arts: summer musical camps, weekly drawing and piano lessons, and took any opportunity to express my creative side. In high school I considered going to college to major in marine biology and minor in studio art. (I ended up going to college and majored in the closest thing to marine biology that the school offered and participated in art events whenever possible.) All throughout my life experiences and interests I found myself at the intersection between "art" and "science" fields knowing full well that one could not exist without the other.

I went into Environmental Arts and Humanities wanting to challenge my science-trained self to be more interdisciplinary, to be more in the "in between", by immersing myself in a humanities program. As I refined my interests over time, I realized that science communication was the underlying driving factor in my passion for marine education. Since then, science communication is a prominent topic in my life and something I wish to continue pursuing beyond academia.

I first learned about the ocean plastic pollution problem in a class I took during my first year of graduate school. After watching a documentary in class, I was paralyzed when I walked

into the grocery market and realized that anything I bought contributed to the issue. I became hopeful and advocated that all one had to do was simply use a reusable mug and opt out of single-use plastics. It was more complicated than that, as I later learned. The understanding of plastics and how they are made is not understood well which leads to wish-cycling—the act of recycling even if the item cannot be recycled but is done so anyway in hopes of feeling better about the waste produced—and other misunderstood ideas, like the Great Pacific Garbage Patch. The nuances of plastic being a revolutionary material that also wreaked environmental havoc was the first instance that changed my graduate career.

It was in another graduate course of mine where I learned about rhetoric from a guest speaker. Although the definition of “rhetoric” is defined differently by different people, I understood the word to mean “what is being said and how it is said.” The professor discussed the power of influence words can have with the example of the “Crying Indian” commercial and how that was corporations turning the responsibility of waste to the consumers. It was that moment that struck me because I realized that the way things are said can manipulate how it is understood and perceived—this was the second instance that changed my graduate career.

That year started a cascade of things that led to where I am now. The Sixth Marine Debris Conference took place in San Diego, which hadn’t been held since several years prior. It seemed like there was lots of research potential for merging marine debris and science communication so this was going to be my thesis topic. A couple months later, *National Geographic* published their June 2018 magazine, and while I was volunteering at the International Association of Media and Communication Research conference (which held its first United States conference in Eugene, Oregon), I decided to change my thesis to study the magazine’s coverage of marine debris. Science Talk was another conference that I attended the following year and the year after. My

involvement in science communication grew and it's becoming more critical that information gets shared not only in a timely manner but, more importantly, that it gets shared effectively and accurately.

As an academic, it feels as if it is my duty to contribute to the communication field by recognizing different tactics to effectively get messages across to people. I appreciate the opportunities I had which got me where I am today. I'm fortunate to have the chance to combine a few of my multiple interests in this master's research and I look forward to continuing my oceanic science communication journey.

## CHAPTER I: INTRODUCTION

2018 was a momentous year when it came to plastic usage awareness; single-use plastic was featured in news headlines, such as “It’s Not Just the Oceans: Microplastic Pollution Is All Around Us” (Tutton, 2018), “European Parliament Approves Ban on Single-Use Plastics” (Yeginsu, 2018), and “The Great Pacific Garbage Patch Is Even Trashier Than We Thought” (Griggs, 2018). Movements also gained momentum through the method of sustainable lifestyles, like “The Final Straw”, a collapsible straw that started off as a Kickstarter project and is now a patented product (*Mission – FinalStraw*, n.d.), and the travel industry minimizing their plastic waste (Trejos, 2018). 2018 was described as the “summer of plastic” by two affiliates of the National Ocean and Atmospheric Administration Marine Debris Program and coordinators of the most recent International Marine Debris Conference (C. Kehoe & E. Tonge, personal communication, June 28, 2018).

The conversation about the overwhelming presence of plastic in the ocean was highlighted in one of many instances; when *National Geographic* released its June 2018 magazine, it began their own ongoing plastic awareness movement, titled “Planet or Plastic?”. Using *National Geographic*’s June 2018 magazine as a case study, this research seeks to identify narrative strategies employed to create a persuasive argument revolving around not only informing people about the ocean plastic issue but also creating a call to action to reduce plastic usage. The significance of this research comes at the intersection of science communication, the marine debris problem (particularly ocean plastic), and narrative rhetoric.

### **Why *National Geographic*?**

With iconic yellow borders on the magazine cover, *National Geographic* issues are renowned for its photographs depicting cultures, locations, and lifestyles around the globe.

Through photographs and stories, *National Geographic* readers can see across state and international borders to discover and learn about the natural world. *National Geographic*'s corporate responsibility policy begins by saying:

The National Geographic Society believes in the power of science and storytelling to change the world and our coverage of environmental and social issues has committed us to conducting our business as sustainably and responsibly as possible both in our direct actions and in our impacts through our suppliers, licensees, affiliates, and partners. (Sustainability Policy | National Geographic Society, n.d.)

Additionally, its "About Us" page states that they "aspire to achieve [its] goals through a unique combination of strong science, exploration, education and storytelling" and "critical to increasing understanding of our world is effective storytelling, and we are committed to supporting a community of innovative storytellers that is helping to convey the importance of nature and culture" (Society, n.d.).

*National Geographic* reaches a large global audience and has the advantage of using its acclaimed photography to visually emphasize the plastic problem. It claims to have "unparalleled brand recognition", to have "global credibility and a strong legacy in the areas of science, exploration, education and storytelling", and to reach "hundreds of millions of people around the world each month" (Society, n.d.).

We amplify the impact of our programs through a unique combination of media, events, experiences, and the extensive NGP network, which reaches audiences all over the globe. By activating these audiences, we aim to introduce millions of people to the human experience and engage them with the wonders of the natural

world, helping them value different cultures and species and to take responsibility for maintaining a healthy planet. (Society, n.d.)

“National Geographic is no longer just a magazine, but a multi-mediated experience” (Todd, 2010, p. 209); this statement encapsulates *National Geographic*’s presence across print and online forms of media. Its demographics consist of over 20 million people, a third of which are millennials who are “the largest segment of [its] readership” (*National Geographic 2019 Media Information Kit*, 2019). Therefore, *National Geographic*, along with Discovery and Learning Channel, “constitute the largest and most diverse audience for science-related content” in the United States (Nisbet & Scheufele, 2009, p. 1775).

While *National Geographic* has many communication venues, this study focuses on the print magazine rather than the matching magazine material online. Frozen in time and space, the print magazine is eternalized and can be referenced in a timeless fashion. Furthermore, the online material cannot surpass the insurmountable and tangible experience of turning the magazine’s pages of colorful images. One image that the website does not have is the cover photo of the print magazine—the striking image of what initially appears to be an iceberg in the ocean is instead a plastic bag (see Figure 2). The online material is accessible to anyone who has access to internet; however, the print magazine is distinctive and offers visual material not found on the website.

### **What to Expect**

Following this introduction, Chapter Two presents a review of relevant literature. It consists of three sections highlighting the major parts of this thesis: marine debris (marine plastic specifically), science communication, and narrative rhetoric. The “Marine Debris” section addresses the ocean’s state of pollution, the current conversation involved, and where one could

find information regarding marine debris. “Science Communication” will look at science communication as a field of study, a method of addressing marine debris and narrative rhetoric, as well as seeing the importance of narrative as a method of science communication. “Narrative Rhetoric” will give the reader contextual information with regards to narrative theory and narrative rhetoric. I hone in on Robert Rowland’s explanation of narrative rhetoric and I explain applications of narrative in science communication under the topic of marine debris. The material covered in the second chapter will provide the reader with the necessary information to understand the third chapter.

Chapter Three features an analysis of key *National Geographic* articles as persuasive discourse. The narrative analysis will look at the four components of Rowland’s interpretation of narrative rhetoric using four of the eight plastic-related articles that are featured in *National Geographic*’s “Planet or Plastic” June 2018 issue. The four components together serve the functions listed in the literature review, calling to live more environmentally aware. This analysis chapter is divided into the four components where I investigate my research question of what narrative strategies are present in *National Geographic* to achieve its call to action to persuade people to reduce plastic usage.

The fourth and final chapter locates the research in the broader scheme of the communication and science field and discusses the implications of the identified narrative strategies in *National Geographic*’s “Planet or Plastic?” magazine. I conclude with future research ideas should this study or related studies continue.

## CHAPTER II: LITERATURE REVIEW

I intend to integrate narrative strategies with environmental science communication involving ocean-related topics, particularly that of marine debris. Before analyzing the articles in *National Geographic*, this literature review provides a foundation for this critique by addressing the following subjects and purposes: marine debris, the overall topic of study with an emphasis on marine plastic; science communication, the underlying motivation for this research; and narrative rhetoric, the strategies used to analyze four of eight *National Geographic* plastic articles.

### Marine Debris

The ocean takes up the majority of the Earth's surface and contributes to the health of the planet such as regulating the climate and providing the air needed to breathe (National Oceanic and Atmospheric Administration, n.d.). However, the ocean harbors a myriad of environmental crises as a result of humans consuming natural resources. These dilemmas include, but are not limited to, acidification, deoxygenation, depleting fisheries, warmer water temperatures, sea level rise, and marine debris (Gall & Thompson, 2015; Kouwenhoven et al., 2015; Lentz et al., 2015; Wright, 2015).

Marine debris is defined by the National Ocean and Atmospheric Administration's Marine Debris Program as "any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes" (Office of Response & Restoration's Marine Debris Division, 2019). Gall and Thompson (2015) sorted literature surrounding the impacts of marine debris into four broad categories: entanglement in and ingestion of debris by organisms, species transportation via debris, additional habitat for species, and "where [debris] causes physical

damage to ecosystems” (p. 172). Similarly, Worm et al. categorized the effects of marine debris into ingestion and entanglement, toxic effects, microplastics, and bioaccumulation (2017).

Marine debris encompasses glass, metal, and discarded fishing gear, but plastic is the most ubiquitous and notorious culprit with six different compositional types and uncertain lifespans only understood through models (Geyer et al., 2017). Of the different types of marine debris, I focus my analysis on marine plastic as it has gained attention in the recent years. Within this research, I refer to marine debris as the overall topic of ocean pollution caused by human actions, which includes marine plastic pollution. Unfortunately, plastic saturating the ocean has become the canary in the coal mine for ocean health.

Plastic has an ephemeral lifespan when it comes to its intended function, but it has an eternal lifetime in the ecosystem due to its ability to continuously break down into smaller pieces via physical force and photodegradation (Worm et al., 2017). Global dependence on plastic is inevitable; since its inception in the late 19<sup>th</sup> century (Ryan, 2015; Worm et al., 2017), its durability, flexibility, and relative affordability makes it a perfect substance for products. But when plastic is discarded, even in the simple act of washing clothes made of synthetic fibers, they end up in the environment. With oceans comprising the majority of the planet, many plastic items find their way there.

Ocean and shoreline plastic commonly consists of single-use disposable plastic (Joyce, 2018) that is heavily used in on-the-go lifestyles. The repercussions of ocean plastic is not just an environmental problem, it affects the interests of people—since ocean plastic gets washed up and resides on shorelines, they inherently impact tourism and recreation by decreasing value in aesthetic appeal (*Marine Plastics*, 2018) and costing time and money to clean up (*USAID and the Private Sector: Blended Finance Partnership to Combat Ocean Plastic Pollution*, 2019). But

plastic is more than just an aesthetic surface problem as it has been found in the deeper parts of the ocean circulating in underwater currents (Kane et al., 2020; Martin et al., 2017), further proving how invasive plastic is to the environment. Plastic has become so prevalent in the aquatic and terrestrial ecosystem that it might be considered as an indicator for the Anthropocene (Geyer et al., 2017; Worm et al., 2017). Plastic characteristics are similar to persistent organic pollutants, leading to a claim that plastic to the ocean is DDT to Rachel Carson's *Silent Spring* (Worm et al., 2017). This is disastrous for aquatic and terrestrial ecosystems because plastic becomes small and has physical and chemical impacts in the surrounding environment. It is even predicted that by 2050 there will be more plastic in the ocean than there are fish (*The New Plastics Economy*, 2016).

While reports of marine debris date back to the 1960s, quantitative research on marine debris is limited (Ryan, 2015). To quantify the amount of ocean litter, one study uses multiple methods of data collection within a designated region (Lebreton et al., 2018). Other studies review existing literature in attempt to understand the amount of plastic and its impact on the ocean (Gall & Thompson, 2015; Ivar do Sul & Costa, 2014; Worm et al., 2017). Microplastic research is more prevalent than before, but it is difficult to detect the microscopic particles to research their environmental impact (Worm et al., 2017). Despite increased research on the lifespan of plastic, there is still much to learn about how it affects ecosystem and human health. In fact, there are ongoing studies that explore the amount of plastic in what humans consume (Cox et al., 2019) as well as the air humans breathe (Allen et al., 2019). The dissemination of this information is critical because it can inform people the dangers of plastic and why it is important to take caution when purchasing plastic products.

The Great Pacific Garbage Patch is one of the most well-known cases of marine debris. Descriptions of this patch have estimated that it covers a surface area equivalent to twice the size of Texas and has grown to be “roughly four times the size of California” (Albeck-Ripka, 2018; Broad, 2019). However, a description of the patch’s equivalent size is not to be confused with its actual size. The way media has portrayed the Great Pacific Garbage Patch illustrates the significant role of the media in understanding—or misunderstanding—the marine debris dilemma. News headlines, informational sites, and early understandings of the patch, such as “40 Tons of Fishing Nets Pulled From Great Pacific Garbage Patch” (Rodriguez, 2019) and “Trash Islands” (Briney, 2019), make the patch seem like an entity that can ultimately be removed by extracting the trash. In reality, the patch is more representative of concentrated plastic particles drifting throughout the ocean’s water column (*5Gyres.Org*, n.d.; *The Great Pacific Garbage Patch*, 2019).

This concentration is what makes the marine debris crisis the problem it is; pieces of plastic break down into smaller and smaller pieces without ever going away which not only affects the environment, but it becomes difficult to track for research purposes and collect for cleaning purposes. Some information, like in “The ‘Great Pacific Garbage Patch’ Is Ballooning, 87,000 Tons of Plastic and Counting”, aptly address the myth that the garbage patch is a physical entity; however, the title is still possibly misleading—the explanation of the patch’s actual looks are in a subheading of the article titled “The garbage patch is not exactly a ‘patch’” (Albeck-Ripka, 2018). Another source, “The Great Pacific Garbage Patch Was the Myth We Needed to Save Our Oceans,” addresses the myth in the title, debunks the myth within the article, and says that the myth was the awakening to understanding the ocean’s peril (Engber, 2016). An additional source of confusion is the claim that plastic degrades and simply disappears in the

ocean, as implied through headlines such as “In the Sea, Not All Plastics Last Forever” (Broad, 2019). As prevalent as plastic is in the environment, it has a strong presence in the media as well.

### *Locating sources of marine debris information*

Communication about marine debris occurs across various sources and formats such as programs, newspapers, and online magazines. There are programs dedicated to providing information about marine debris such as the National Oceanic and Atmospheric Administration’s Marine Debris Program. In addition to providing information, the Marine Debris Program offers funding for projects pertaining to marine debris and has educational material and other resources for those who want to learn about the marine debris situation. Non-profit organizations, such as 5Gyres and Surfrider Foundation, have educational material that share facts about ocean plastic and what individuals can do to lessen their plastic impact. The Clean Seas project, started through the United Nations Environmental Program, “[aims to engage] governments, the general public and the private sector in the fight against marine plastic pollution” (Cleanseas, n.d.).

Reports of marine debris appear in local, national, and international news stations and media sources. News topics include beached whales with plastic found in their stomachs (Irfan, 2019; Robinson, 2019), derelict fishing gear retrieved from the ocean (Rodriguez, 2019), the Great Pacific Garbage Patch being larger than originally thought and continuously growing (Griggs, 2018; Lebreton et al., 2018), cities and even entire countries banning—or at least pledging to reduce—plastic most commonly in the form of straws and bags (Adams, 2019; *Canada to Ban Single-Use Plastics as Early as 2021*, 2019; UN Environment, 2019; Yeginsu, 2018), and China rejecting international recyclables (Joyce, 2019). These news stories are likely in response to the growing pressure of people demanding regulations on single-use disposable

plastic. Other reports include video footage of people swimming and surfing through floating trash and a sea turtle having a straw removed from its nostril (Lamb, 2018; Rosenbaum, 2018).

National Public Radio has an interactive guide about plastic as a product of their own project called “The Plastic Tide”. This interactive guide walks readers through what type of plastic is and is not recyclable and why, as well as describing more about the recycling process. According to National Public Radio’s guide, “one reason so much plastic packaging ends up in incinerators...is that it isn’t designed to be recycled” and that “sometimes it’s cheaper for packagers to make things out of raw, virgin plastic than it is to buy recycled plastic” (Davis & Joyce, 2019). An item’s recyclability depends on the recycling facility. Items, such as plastic wrap and beverage bottles, have a description of what the product is and what to do with the item, if not disposing it in the trash. Additionally, its “The Plastic Tide” project has a multitude of articles pertaining to plastic.

The data from PlasticAdrift.org, which are based on Erik Sebille et al.’s (2012) research on how drifting plastic moves through the ocean, are visualized to show how plastic navigates the ocean currents. Marine Debris Tracker is an app operated by the University of Georgia College of Engineering that encourages citizen scientists to help document the amount and type of trash picked up using global coordinates. The assortment of sources and media is an example of how information can proliferate through accessible methods. Thus, it is important to communicate not only effectively but accurately.

### **Science Communication**

Science communication is a growing field of research. Guenther and Joubert’s analysis of science communication literature provides an introduction to the matter. By asking four research questions pertaining to publication statistics over time in three science communication journals

(*Science Communication, Public Understanding of Science, and Journal of Science Communication*), Guenther and Joubert were able to “confirm that science communication is maturing as a field of scholarly activity, as shown by a steady and significant increase in the number of peer-reviewed research outputs...over the last 30+ years” (2017, p. 13). They also cited studies that reported increased publication numbers per year for the three science communication journals, showing that “science communication research seems to follow the overall trend in growing output in scientific research” (p. 13).

While science communication continues to grow as a field, a collective definition has yet to be reached with its ever-changing boundaries. Trench and Bucchi (2010) addresses the lack of boundaries in science communication and assert how “it developed as a field of formal study only after it was named practice with associated training and education programmes” (2010, p. 3).

The delimitation of the science communication field appears at first sight not that difficult: it concerns the communication between communities of scientists, interest groups, policy-makers and various publics. But, on further reflection, we have to consider whether science communication also includes communication between and within various scientific institutions and communities of scientists. This has received significantly less attention than the cross-sectoral communication between scientific communities and those of wider society. Even less attention has been given to the communication between various publics—without the involvement of scientists—on scientific issues. Thus, it can be seen that relatively narrow and relatively broad definitions are available to mark out the territory for science communication. (Trench & Bucchi, 2010, p. 1)

After 20–30 years of growth of “science communication as a defined field of study” (Trench & Bucchi, 2010, p. 3), the *Journal of Science Communication* put out a call for papers with the heading for its special issue “Re-examining Science Communication: models, perspectives, institutions”. The call stated that by saying “science communication continues to develop and change, as a discipline, practice and professional career path, with significant growth in both professional practice and academic study” (*Call for Papers: Special Issue “Re-Examining Science Communication: Models, Perspectives, Institutions,”* 2020, para. 1). The call explained the following:

Changes in the relationships between science and society and its increasing inclusion in official discourses have opened new opportunities for dialogue and collaboration. At the same time, this may have produced challenges for the authority of science, which can be openly contested, negotiated and transformed in public arenas. (*Call for Papers: Special Issue “Re-Examining Science Communication: Models, Perspectives, Institutions,”* 2020, para. 2)

Today the parameters for science communication are still being formed given the ever-changing nature of media. Despite the lack of established boundaries, this research defines science communication as a multi-directional conversation among those who are experts in a field and those who are not. Trench and Bucchi (2010) summed the various directions of communication that this research includes: between a scientific community and other scientific communities, between the public and itself, and between scientists and the community at large. A science communication definition that this research avoids is the information deficit model.

The information deficit model is the premise that providing information to people, regardless if they wanted information or not, would increase people’s knowledge simply because

they have the information there. “Until recently, in the field of science communication, the deficit model was the main means favored for communicating science to nonspecialists” (Rodríguez Estrada & Davis, 2015, p. 142). This is problematic because one-way communication leaves information receivers with little to no chance of providing feedback or dialogue to information providers—getting information in a deficit model is based on the method in which it was given and not the method in which information receivers prefer. “If the public is not allowed early and meaningful participation in decision-making, critics argue that these engagement exercises become just another form of deficit-model public relations and outreach [Wynne, 2006; Borchelt, 2008]” (Nisbet & Scheufele, 2009, p. 1770). A different approach allows for the involvement of specialists and nonspecialists, deviating from the transmission model of communication or otherwise known as one-directional transfer of information.

Burns et al. (2003) believed that “all science practitioners are challenged to be science communicators and to enter into dialogue with their peers, with the public, and with mediators” with the realizations that “there is critical need for feedback in any effective communication” and “clear, consistent, appropriate and interactive dialogue is required. The use of jargon and other exclusive practices must be avoided” (p. 195). Similarly, Nisbet and Scheufele (2009) described engagement initiatives where “a UK House of Lords report urged science institutions to move beyond just a one-way transmission model of science communication toward a new focus on deliberative contexts where a variety of stakeholders could participate in a dialogue and exchange of views about science policy” (p. 1770) and, for this particular instance, lay participants were recruited to learn and engage in science policy decision making. As a result of the initiatives, “studies find that participants not only learn directly about the technical aspects of the science involved, but perhaps more importantly, they also learn about the social, ethical, and

economic implications of the scientific topic [they were given]” (Nisbet & Scheufele, 2009, p. 1770). Another outcome had participants feeling “more confident and efficacious about their ability to participate in science decisions, perceive relevant institutions as more responsive to their concerns, and say that they are motivated to become active on the issue if provided a future opportunity to do so [Besley et al., 2008; Powell and Kleinman, 2008]” (Nisbet & Scheufele, 2009, p. 1770).

This initiative demonstrates the impact a larger, integrated discussion has within science communication. “Science communication provides skills, media, activities, and dialogue to enable the general public, mediators, and science practitioners to interact with each other more effectively” (Burns et al., 2003, p. 199). The multi-faceted connection provided by science communication allows people in different sectors with different knowledge bases to engage with each other over science, ultimately serving as the definition for science communication within this research.

One way to participate in scientific discourse is through narrative forms of communication. Dahlstrom (2014) mentions that “research suggests that narratives are easier to comprehend and audiences find them more engaging than traditional logical-scientific communication” (p. 13614). Dahlstrom and Rosenthal (2018) state that science communication has become increasingly important and the use of narrative to communicate science is more common. They observe that “science communicators are increasingly looking to narrative to help reach and influence audiences” (Dahlstrom & Rosenthal, 2018, p. 356). Their comments support Dahlstrom’s earlier assertion that “narratives represent the dominant form of science communication non-expert audiences are receiving” (2014, p. 13616).

## Narrative Rhetoric

“In all cultures and throughout history, human beings have told stories to amuse, inform, and persuade” (Rowland, 2012, p. 113). Alasdair MacIntyre, a well-known moral philosopher, has stated that humans are creatures of storytelling (Fisher, 1984; Foss, 2017); however, some people believe that storytelling does not fall within the science realm and therefore should have no association with it (Katz, 2013). Science and storytelling can exist symbiotically and narrative communication may be crucial to conveying science topics to various groups of people. This research explores how narrative and science (by means of science communication) interact with each other to cover the topic of marine debris. It should be noted that stories and narrative are related but are not synonymous with each other. Stories are a series of events, but it is the order in which those events are told that creates a narrative. Storytelling is an act of narration, or the way a story is told, and storytellers are the person creating a narrative, or telling the story.

Rhetoric theorist Walter Fisher proposed the “Narrative Paradigm” as a basis for critiquing texts and as a way of resolving the structural problems that come with using the rational world paradigm for examining public moral argument. Fisher (1984) explained that the rational world paradigm, or traditional argumentation, has parameters where “humans are essentially rational beings...rationality is determined by [subject skill level]...and the world is a set of logical puzzles which can be resolved through appropriate analysis and application of reason conceived as an argumentative construct” (p. 4). According to Fisher, the rational world paradigm presumes that humans are rational and use logical arguments. Fisher (1984) presents the idea that “the narrative paradigm be contemplated as worthy of co-existing with the rational world paradigm” for “the narrative paradigm...may offer a better solution, one that will provide substance...for human communication in general” (pp. 3, 6). Fisher emphasizes that the narrative

paradigm is not to replace the “traditional rational paradigm of human decision-making and action” but presents “the narrative paradigm as an alternative view” (Fisher, 1984, p. 2).

The narrative paradigm has a few assumptions, such as “humans are essentially storytellers” (Fisher, 1984, p. 7). One of the assumptions is narrative rationality which consists of two components measuring a story’s validity: narrative probability, to gauge a story’s logic and “whether or not a story coheres” or “whether or not the story is free of contradictions” (Fisher, 1985, p. 349); and narrative fidelity, to gauge a story’s truth within its values (Fisher, 1985). In other words, narrative rationality tests the “reliability, trustworthiness, and desirability of the message” (Fisher, 1985, p. 357). Fisher elaborated that the narrative paradigm “is not a model of discourse” and “predicates that all normal human discourse is meaningful and is subject to the tests of narrative rationality” (1985, p. 351) but also clarifies that “adoption of the narrative paradigm...does not mean rejection of all the good work that has been done; it means a rethinking of it and investigating new moves that can be made to enrich our understanding of communicative interaction” (1984, p. 6).

Robert Rowland, an argumentation and rhetoric scholar, has critiqued Fisher’s narrative paradigm; much like how there is a call for more specifications in the definition of science communication, Rowland called for more definitive parameters for the narrative paradigm while acknowledging that the concept of narrative is important but needs specifications to maintain integrity. Rowland (1987) agreed with Fisher to the extent that “narrative is important because people love stories. And they love stories because the plot, character development, and aesthetic quality of the language in stories make them more interesting than discursive argument” (p. 266). However, Rowland (1989) claimed that “use of a narrative approach may obscure the critical significance of some works”—someone “might spend so much critical energy looking for the

plot and characters in a work or applying tests of narrative fidelity or probability that he or she would miss a far simpler explanation of rhetorical effectiveness” (p. 51). Rowland (1989) also argued that not all discourse is narrative as “any claim that a critical approach is universal is dangerous because it may encourage a critic to apply the particular method to works which it is inapplicable” (p. 52).

Narrative can both make powerful arguments and be extremely effective works of rhetoric. Through stories, average people can put into perspective the problems of the world. Stories also may produce identification, which in many cases leads to persuasion. But all rhetoric is not a story. (Rowland, 1987, p. 268)

To prove his claim that not all rhetoric is a story, Rowland (1989) challenged the narrative paradigm by providing three different works as a case study and, “if Fisher is correct that narrative functions as a paradigm for illuminating all communication” (p. 42), they would stand against narrative rationality. Rowland (1989) asked, “The question is whether it makes more sense to treat narrative as one among many critical tools that can be applied to a text...or as a paradigm, a model for understanding the world” (p. 43). After he applied narrative rationality to the three works, he concluded that “what makes a narrative paradigm unique is the claim that it can be applied usefully to all communication” before providing the suggestion that “a more valuable approach would limit the scope of the paradigm and treat narrative as one among many modes of discourse and epistemic instruments” (Rowland, 1989, p. 53). He proved his point after analyzing the three separate works; “the narrative paradigm works quite well when applied to works that are stories,” however “not all good stories contain coherent plots and consistent characterization” (Rowland, 1989, p. 51). He made sure to emphasize that he had “not denied the value of a narrative approach to rhetoric, but only demonstrated that such a perspective should

not be applied in all cases” and that “Fisher deserves praise for his efforts in identifying the power of narrative” (Rowland, 1989, pp. 51, 52). His case study’s conclusion “[revealed] that narrative approaches are of little use when applied to discourse that does not tell a story” (Rowland, 1989, p. 39).

Much appeal of the narrative paradigm comes from its status as a universal model for all discourse. Absent that universality, narrative is simply one among many methods of describing and evaluating a text. The case studies developed here do not deny the value of narrative as a method, but they do cast doubt on a treatment of narrative as a paradigm. (Rowland, 1989, p. 52)

Rowland’s critique says that Fisher’s narrative paradigm is too broad and needs more specifications; coherence and plausibility, for example, are not adequate standards for testing rationality (narrative fidelity and narrative probability). Furthermore, the paradigm does not apply to all communication, and Rowland suggested that the paradigm is a tool rather than a paradigm.

Rowland’s interpretation of narrative rhetoric presented his book, *Analyzing Rhetoric*, provides a framework of characteristics to look for in narrative; conversely, Fisher does not provide traits or boundaries aside from narrative fidelity and narrative probability. To see narrative as a tool that can be applied to text is why I chose to model this research after Rowland’s interpretation of narrative rhetoric as described in *Analyzing Rhetoric*. The framework he presents in his book satisfies his 1987 critique on Fisher’s narrative paradigm.

This essay should be interpreted as suggesting limitations on the narrative paradigm as currently developed, in order to make the study of narrative more productive....the study of narrative should focus upon rhetoric that either explicitly tells a story or that clearly

implies a story. Only rhetoric that tells a story can fulfill the functions that Fisher and others identify as being served by narrative. Through the development of the plot and identification with characters, narratives can make powerful and persuasive arguments. (Rowland, 1987, p. 273)

In *Analyzing Rhetoric*, Rowland provides parameters and establishes that each story has the following four components: theme, plot, scene, and character. Additionally, there are six functions that narratives can utilize to be persuasive: added interest via narrative, identification, persuasion, encapsulating a point, use of emotion, and ability to transport reader to a different place and time. While I introduced Fisher's foundational work on the narrative paradigm, Rowland's interpretation of narrative rhetoric is appropriate for critiquing *National Geographic's* four articles and to identify the narrative traits that serve as communication strategies.

*Applications of narrative, science communication, and marine debris*

Previously in this chapter I discussed where to find marine debris information. This section, connects narrative to marine debris communication and its impacts on the environment and humans, recognizing that "narratives are intrinsically persuasive" and that "they describe a particular experience rather than general truths" (Dahlstrom, 2014, p. 13616). Dahlstrom (2014) contends that "entertainment media, such as movies, television comedies and dramas, documentaries, novels, and even video games, routinely use narrative formats" (p. 13616). The following examples utilize narrative and science communication to address the topic of marine debris.

*Moby Duck: The True Story of 28,800 Bath Toys Lost at Sea and of the Beachcombers, Oceanographers, Environmentalists & Fools Including the Author Who Went in Search of Them* is a book written by Donovan Hohn that embodies narrative and science communication by

showcasing the author's journey to discover lost bath toys in the ocean. National Public Radio and Public Broadcasting Service's *Frontline* put together a documentary called *Plastic Wars* while Public Broadcasting Service's *NewsHour* has a documentary called *The Plastic Problem*. *A Plastic Ocean* and *Oceans: The Mystery of the Missing Plastic* are two more documentaries, all of which illustrate and educate people about the marine plastic issue in a narrative manner. *Albatross* is led by Chris Jordan, a decorated artist who brings attention to human impacts on the environment. He and his team filmed and photographed albatrosses on Midway Island for eight years, noting the amounts of plastic that the birds come across. Jordan photographed bird carcasses with exposed stomachs filled with plastic fragments, which was the ultimate cause of death for many birds on the island. "My wish was not only to tell the factual story of the albatrosses from an observational standpoint, but to convey the intensely vivid sensual, emotional, and spiritual experience of being with them on the island," says Jordan (2017) with regards to the creating the film (para. 5).

I explore narrative tactics in *National Geographic* that engage people in becoming more environmentally aware and changing their lifestyles in hopes to avoid repeating plastic's history. My analysis will not only break down the narrative components in the *National Geographic* articles but will show how the components and functions potentially create persuasive discourse. In the following section I analyze the four *National Geographic* articles using Robert Rowland's depiction of narrative structure. I will also describe the components and apply the functions as they appear in the analysis.

### CHAPTER III: NARRATIVE ANALYSIS

*National Geographic's* June 2018 magazine serves as an exemplary case study for examining communication about a significant environmental issue: marine plastic in the broader context of marine debris. To explore key articles from the June 2018 issue, this chapter applies Robert Rowland's approach to narrative rhetoric as presented in his book, *Analyzing Rhetoric*. As noted in the literature review, Rowland (2012) proposes that there are four structural components that "are found in all stories" (p.110): theme, plot, scene, and character. Within the following sections, I use Rowland's concept of narrative rhetoric to identify narrative strategies in *National Geographic* that communicate its messages about ocean plastic. I describe each component and use article descriptions as evidence to identify ways in which a narrative can function persuasively. Rowland summarizes six persuasive functions: added interest via narrative, identification, persuasion, encapsulating a point, use of emotion, and ability to transport the reader to a different place and time. For the purpose of my analysis, I focus on the first five potential functions of narrative. Understanding these functions in the articles will help explore my question regarding whether narrative strategies are present in *National Geographic's* communication of the plastic crisis to its global audience in the form of a call to action to get people to change the course of plastic's future by reducing plastic usage.

Rowland (2012) states in *Analyzing Rhetoric* that "in narrative rhetoric a story is told to make a point" (p. 110). Contrary to scientific journals that strive for objective and direct reporting, *National Geographic* uses narrative text and photography to blend visual and written, detailed storytelling to appeal to its diverse audience. This combination reflects "the guiding principle and single most important characteristic of photojournalism." (Fahmy et al., 2014, p. 12). Lazard and Atkinson (2015) state that "visual representations, when integrated with text-

based content, function as a tool for increased audience evaluation of message content, a critical step for persuasive science communication” (p. 25). O’Neill, Boykoff, Niemeyer, and Day (2013) note that “for many decades, mass media images have been harnessed and woven into texts in a variety of ways to develop narratives on complex and abstract issues about climate and the environment” (p. 414). *National Geographic*’s combination of text and images is crucial because “the narrative approach is particularly important now, when mass media play a huge role in the construction of environmental issues” (Shanahan et al., 1999, p. 408).

In what follows, I analyze four of the eight plastic-related articles from *National Geographic*’s print magazine because of their ability to be read as a cohesive narrative. These four articles are titled “Plastic”, “A Toll on Wildlife”, “A Threat to Us?”, and “How We Can Stem the Tide”. The writers of each article convey a unique style and voice but operate together as a product of *National Geographic*’s June 2018 issue, creating a unified narrative and call to action. I retain the individual author’s names for the sake of identifying the articles.

#### *A brief overview of the four articles*

This section summarizes the overarching narrative connecting these four distinct pieces. The narrative starts with Laura Parker’s article “Plastic” where readers are taken back to the not-so-distant past to provide a time parallel by showing that plastic would still be present today if the Pilgrims had it when they landed on America. The article flashes forward to the present-day and addresses the magnitude by which plastic has affected the environment since its accelerated production in the 1950s, citing the amount of plastic in the environment to its potential hazards. When discussing the origins of plastic, Parker describes how plastic came to be and what benefits it gave since then. But over time, plastic gave way to becoming cheap and dispensable which polluted the environment because waste management could not maintain speed with

plastic production and usage. Parker transitions into a plastic production by showing the challenges plastic posed, including the health of the environment and people who inhabit Manila, Philippines. Thousands of waste pickers, who experience health issues and often cannot purchase items that are not in single serving packages, rummage through heaps of plastic to find any plastic of value. Some of the waste, like the packaging from single serving items, saturates the environment because it is not recyclable and has no profit. The article ends with how corporations and individuals reacted to the attention plastic has gained over recent years, from pledges and preventable measures to beach clean ups.

The second article, “A Toll on Wildlife” (hereafter referred to as “Wildlife”) by Natasha Daly, summarizes the negative impacts that plastic has on animals and the environment. Accompanied by a few images of animals in their respective habitat with plastic, Daly highlights the unknown effects of plastic on the environment and humans as well as how plastic production was only a fraction of what it is today when the plastic problem was first discovered in 1966.

While Daly’s article addresses plastic’s impact on animals, the third article, Elizabeth Royte’s “A Threat to Us” (hereafter “Threat”), considers plastic’s potential impact on humans. An image of a water flea that ingested microplastic, “pieces smaller than one-fifth of an inch” (Royte, 2018, p. 85), greets the reader above the article’s heading. Readers begin the article in a collegiate laboratory where a researcher uses a microscope to look at a shrimp bought from a fish market and found plastic pieces inside. Here Royte describes the research being done to learn about plastic’s impact, going into the physical and chemical properties and influences plastic has on biological life. Yet despite ongoing research, there are still many uncertainties to how plastic impacts humans.

“How We Can Stem the Tide” (hereafter “Tide”), also written by Laura Parker, is the fourth article I examine. It highlights what has and has not happened with plastic management and what solutions are available to mitigate the issue. Parker (2018a) discusses the buzzword “biodegradable”, debunking any misconceptions that people may have about the term before stating how biodegradable items “require the 130-degree heat of an industrial composter....and if you throw some biodegradables in with recyclables, you might ruin the latter, creating a mix that can no longer be relied on to make durable new plastic” (p. 90). The article continues with solutions being pursued around biodegradable plastic and downfalls to biodegradables and recycling. The article ends with a list of things people can do to offset the usage of plastic in their lives; this list includes numerical reporting of plastic bags used and percentages of waste types from beach clean ups in addition to images of beeswax food wrap, reusable straws, a toothbrush with a replaceable head, and compostable six-pack holders as examples of how to deviate from plastic.

I begin the analysis of the four articles using Rowland’s approach to narrative rhetoric. The sections are divided into the components Rowland claims each narrative contains: Theme, Plot, Scene, Character. Within each section is evidence from the magazine articles and their application to five persuasive functions in Rowland’s interpretation of narrative rhetoric.

### **Theme**

Rowland (2012) states that Theme is the underlying message of a story and “is built by the combination of the actions of the characters in a given setting” (p. 112). As an awareness campaign and also the title of the magazine, “Planet or Plastic?” points out past and current interactions with plastic and how humans choose to move forward can change the course of the future of plastic, effectively serving as the overall theme: living and being environmentally

conscious acknowledges what plastic can do the planet and implies taking the chance to change human interactions with plastic and its future. It should be noted that “plastics aren’t inherently bad. It’s what we do, or don’t do, with them that counts” (“Planet or Plastic?,” 2018, p. cover).

Specifically, the current plastic crisis is not solely about plastic as an object; the problem lies within the interaction between people and plastic that have the effects seen in news headlines and videos. Because people were not able to comprehend the negative impact of plastic when it was initially created, people’s behavior and knowledge about plastic’s effects on the environment lead us to the situation today where the synthetic material infiltrates all corners of the earth. These four articles not only reveal ways in which plastic is a problem in the environment, in animals, and in humans, but also show that people are in a position to determine the future fate of plastic. For reference, “Theme” applies to Rowland’s component while “theme” refers to the themes seen throughout the four articles.

While the general theme is that plastic is a problem in the environment, there are three subthemes present throughout the four articles. The first subtheme, which is prominent in “Plastic”, is that plastic was made with good intentions of replacing natural resources; as something cost-effective and convenient, it was easily integrated into a variety of uses. Substituting certain natural materials, such as elephant ivory, which was once used for billiard balls and piano keys, the inventor of plastic, John Wesley Hyatt, “boasted that it would eliminate the need to ‘ransack the Earth in pursuit of substances which are constantly growing scarcer’” (Parker, 2018b, p. 58). Plastic helped the Allies win World War 2—“think of nylon parachutes or lightweight airplane parts” (Parker, 2018b, p. 50)—and then continued in people’s everyday lives through transportation as they “lighten every car and jumbo jet today, saving fuel—and pollution”, food preservation “in the form of clingy, light-as-air wraps”, and distribution of

“clean drinking water to poor people in those now demonized disposable bottles” (Parker, 2018b, pp. 50–58). Other uses include medicine, safety, and space travel. These examples show the many uses of plastic; however, since the rise of plastic, its use over time has been a complicated issue as the invention of plastic did not come without consequences and challenges.

The second subtheme is that plastic’s impacts on animals and humans are unknown. This is embodied mostly in Royte’s piece but builds off Daly’s introduction to what plastic is known to do to marine life. Daly (2018) iterates in “Wildlife” that “what makes plastic useful for people—its durability and light weight—increases the threat to animals” and mentions that “we don’t fully understand plastic’s long-term impact on wildlife (nor its impact on us). We haven’t been using the stuff for very long” (p. 81). Royte solidifies this point by adding the few known impacts of plastic on animals in “Threat” before introducing the notion that, while there is a lot that is unknown about how plastic affects animals, there is even more to be known about how plastic affects people. The subheading to “Threat” summarizes the ambiguity of plastic on the environment: “Tiny bits of plastic harm marine life, including the fish and shellfish we eat. Do they harm people? Scientists are racing to find out” (Royte, 2018, p. 84). Royte references research on what plastic is doing to animals. She writes that “scientists have found microplastics in 114 aquatic species, and more than half of those end up on our dinner plates,” (Royte, 2018, p. 85)—but the knowledge of plastic effects on human health is not as extensive. Research on plastic is relatively new and “now [scientists] are trying to determine what [microplastic in aquatic species] means for human health..” (Royte, 2018, p. 85).

The second subtheme continues when Royte (2018) points out that “scientists remain concerned about the human-health impacts of marine plastics” because plastic breaks down into pieces called nanoplastics, “which measure less than 100 billionths of a meter” (p. 86).

Consequently, nanoplastics are practically invisible to the human eye while seeming like food to some marine organisms. Moreover, “these tiny plastics can penetrate cells and move into tissues and organs” (Royte, 2018, p. 86). This is problematic since smaller organisms are food for animals higher up in the food chain, which includes humans, and “because researchers lack analytical methods to identify nanoplastics in food, they don’t have any data on their occurrence or absorption by humans” (Royte, 2018, p. 86). Research on how marine plastic affects animal health has been done, but it is more difficult to gauge how marine plastic affects human health because of three things: “people can’t be asked to eat plastics for experiments”, “plastics and their additives act differently depending on physical and chemical contexts”, and “[plastic] characteristics may change as creatures along the food chain consume, metabolize, or excrete them” (Royte, 2018, p. 86). Royte (2018) emphasizes that “we know virtually nothing about how food processing or cooking affects the toxicity of plastics in aquatic organisms or what level of contamination might hurt us” (p. 86) which is the epitome of the second subtheme. “Threat” ends on a dire note masked as hopeful—a researcher states that a better understanding of plastic’s harm and how the situation can address it within a decade but “by then at least another 25 million tons of plastic would have flowed into our seas” (Royte, 2018, p. 87).

The third subtheme is that the plastic crisis has reached a stage where its future can be changed. Parker’s first and second article, “Plastic” and “Tide”, respectfully, showcase prime examples of moving forward in the plastic crisis. This subtheme is the most prominent portion of the overall theme that allows *National Geographic* to create a call to action for the future of plastic and the health of the environment.

Parker’s first article, “Plastic,” features the attention plastic has been getting over the years and the initiatives to remove it from use. She explains that “the most heartening thing

about the plastic waste problem is the recent explosion of attention to it, and even serious, if scattered, efforts to address it” (Parker, 2018b, p. 68). Industries are taking pledges to change their plastic packaging while individuals are forming solutions, ranging from innovation to using fame. Quoting a resource economist, Ted Siegler, the “fastest way to make a big difference” is that “we need garbage trucks and help institutionalizing the fact that this waste needs to be collected on a regular basis and landfilled, recycled, or burned so that it doesn’t end up going all over the place” (Parker, 2018b, p. 69). Parker (2018b) comments that one of the “fundamental ways that industry can help” is to “design new plastics and new plastic products that are either biodegradable or more recyclable” (p. 69). Parker (2018a) asserts that even biodegradable plastic has flaws and addresses anyone thinking that biodegradables can solve the entire plastic problem— “even the best biodegradable product won’t magically disappear” (p. 90).

Parker (2018a) opens “Tide” by asking, “In a world that can seem overwhelmed by potentially eternal plastic waste, are biodegradables the ultimate solution? Probably not” (p. 88). The understanding of biodegradable plastic, or lack thereof, contributed to people’s initial attitude and behavior towards plastic. Parker (2018a) quotes Ramani Narayan, a Michigan State University Chemical Engineering professor: “What is it we are promoting? Throw it away, and eventually it will go away?” (p. 90). This dilemma ultimately results in a situation where people can decide how their plastic usage contributes to the ongoing plastic story, essentially serving as the premise of the third subtheme. “Biodegradable plastics have been around since the late 1980s. They were initially marketed with the implied promise that they’d somehow disappear once they were disposed of” (Parker, 2018a, p. 88). What may have seemed like an ideal solution to feel better about the plastic purchased only ended up being more complicated. Parker (2018a) notes in her second article that “the United Nations Environment Programme wrote off

biodegradables as an unrealistic solution” and “concluded that the label ‘biodegradable’ may actually encourage littering” (p. 90). Parker also mentions people and groups that are trying to work around the biodegradable problem. In contrast with work involving biodegradable solutions, Parker (2018a) poses an opposing view saying that “biodegradables...don’t address the fundamental problem: our throwaway culture” (p. 90). The same Chemical Engineering professor believes “the more responsible approach...is a ‘circular economy’ model” where everything that is used is reused and recycled (Parker, 2018a, p. 90). Lastly, Parker (2018a) shares an increasingly common message that “recycling can only go so far. Part of the solution, many say, must be to use less disposable plastic in the first place” (p. 90).

Further emphasizing the subtheme of possibility changing plastic’s future, the magazine’s last plastic-related article, “Tide,” ends with a list of “six things you can do (and feel no pain)” to integrate in people’s lifestyles: first, eliminate plastic bags, “a trillion plastic shopping bags are used worldwide every year, and 100 billion in the United States alone—that’s almost one per American per day”; second, avoid disposable plastic bottles, “nearly a million plastic beverage bottles are sold every minute”; third, opt out of straws, “Americans toss 500 million plastic straws every day, or about 1.5 per person”; fourth, recycle when possible, “globally, 18 percent of all plastic is recycled”; fifth, eschew plastic wrapping, “buy bar soap instead of liquid. Buy in bulk. Avoid produce sheathed in plastic”; and sixth, avoid littering, “in 2016 [The Ocean Conservancy] collected 9,200 tons of trash in 112 countries—around a thousandth of what enters the ocean each year” (Parker, 2018a, p. 91). This list opens the possibilities of how people integrate plastic substitutes consciously into their lives, thus setting the course to stray away from plastic through environmentally conscious decisions.

Rowland (2012) states that “[narratives] persuade not with proof in the sense of formal logic, but by encapsulating a point” (p. 115). He explains that “the capacity of narrative to encapsulate a point makes it difficult to refute the claims in a narrative” (Rowland, 2012, p. 116). The four articles show that it is difficult to refute the idea that plastic was well-intended but soon got out of hand and is now causing problems not only in the environment and animals but also possibly, and likely, in humans. With the right precautions, people can change the course of action that plastic takes in the environment. Taken as a whole, the four articles contribute to a broader story, which Rowland (2012) says, “functions as a rhetorical whole, rather than as a supporting example” (p. 115).

The idea that plastic usage comes with consequences is emphasized in the three subthemes of the four articles: the creation of plastic was historically well-intended, plastic has unknown impacts on animal and human health, and plastic’s future can change based on people’s decisions regarding plastic consumption and usage. *National Geographic* encapsulates a point that, despite the advancements people have made due to plastic, there is no denying that people’s behavior towards plastic and actions with it creates a problem for the environment, animals, and humans. People were not aware of the unintended implications of plastic when the material was first used. Consequently, people need to act intentionally, knowing that plastic is inseparable from their lives and, thus, inseparable from the environment. What people choose to do moving forward can determine the future fate of plastic in the environment.

### **Plot**

The Plot, or storyline, is often revealed in an introduction, rising action, ultimate conflict, and resolution. In a typical story, the rising action leads to “a point of greatest conflict or tension...and the conflict or tension is resolved. This is followed by a return to normalcy. Often,

in this final period, the narrative draws implicit or explicit conclusions.” (Rowland, 2012, p. 111). Each of the articles represent the characteristics of the storyline with the first article representing the introduction and the rising action, the second and third article corresponding to the ultimate conflict, and the fourth representing the resolution. Contrary to Theme where the articles represent contain one or more subthemes, I analyze Plot in the four articles as a set because each article contribute to the overall storyline.

Parker’s “Plastic” article contains most of the introduction and rising action of the plot seen in *National Geographic*’s plastic narrative with some climax and possible steps towards resolution. With information on how “plastics save lives daily” (p. 58), Parker (2018b) ties in the first subtheme where plastic was made with good intentions. Plastic was convenient, affordable, and simplified people’s lives. Since plastic was a cheap, lightweight, and durable material, it replaced other costly materials—environmentally and financially—such as billiard balls originally made from elephant ivory (Parker, 2018b). Other uses for plastic included travel and kitchen purposes, leading to an increase in plastic production.

The “era of material abundance...accelerated in the early 20<sup>th</sup> century, once plastics began to be made from the same stuff that was giving us abundant, cheap energy: petroleum” (Parker, 2018b, p. 59). Then “a whole world of possibilities opened up. Anything and everything could be made of plastic, and so it was, because plastics were cheap” but that also meant “we began to make things we never intended to keep” (Parker, 2018b, p. 59). This was the transition between the plastic story’s introduction and rising action.

Included in “Plastic” is a black-and-white image featured in a 1955 *Life* magazine, showing a family of three standing by an overflowing trash can, tossing disposable plastic into the air (see Figure 1). “The items would take 40 hours to clean” (Parker, 2018b, p. 59) but

cleaning them would not be necessary as the premise of disposables were to make people's lives easier. Parker (2018b) then asked, "When did plastics start to show their dark side?" (p. 59). Her response, "You might say it was when the junk in that photo hit the ground" (Parker, 2018b, p. 59) pinpoints the moment when plastic started becoming a problem—people's behavior of carelessly disposing plastic indicated the start of the rising action and happened not too long after the rise of plastic.



Figure 1. Disposable trash tossed as a product of the "Throwaway Lifestyle" presented in a *Life* magazine issue of 1955. From "Plastic," by L. Parker, 2018, *National Geographic*, p. 48.<sup>1</sup>

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<sup>1</sup> To avoid copyright infringement, the images used in this thesis are portions of the full images used in *National Geographic's* magazine under the basis of Fair Use. To view the full images, visit <https://www.nationalgeographic.com/magazine/2018/06/>.

The rising action, or the buildup of events to the story's ultimate conflict before being resolved, starts from the moment the material made life easier—causing a spike in plastic production—and leads up to the current issue of an environment inundated with the unnatural material. People were unaware of the consequences that came with using plastic, particularly, the idea of plastic waste as a result of discarding plastic. Over time plastic was used in various products intended to be discarded, contributing to the rising action.

Parker highlights the background of a man who saw the story of plastic unfold. When Richard Thompson was pursuing a Ph.D. in 1993, he noticed small bits of plastic in a beach cleanup. “Scientists wondered why they weren’t finding even more plastic in the sea. World production has increased exponentially...but the amount of plastic drifting on the ocean and washing up on beaches...didn’t seem to be rising as fast,” to which Thompson wondered, “‘That begs the question: Where is it?...We can’t establish harm to the environment unless we know where it is’” (Parker, 2018b, p. 49). Noticing an anomaly in the data versus what was being seen was one of the first steps in realizing people’s interactions with plastic in attitude and action.

Without plastic as evidence, there was no case to make that people were harming the planet. But Thompson later contributed knowledge that plastic was continuously breaking into smaller pieces and he even “coined the term ‘microplastics’” after predicting “that they had ‘potential for large-scale accumulation’ in the ocean” (Parker, 2018b, p. 49). People were introduced to the potential dangers of plastic when “other researchers had collected 504 fish of 10 species and given them to Thompson. Dissecting the fish, he was surprised to find microplastics in the guts of more than one-third of them. The finding made international headlines” (Parker, 2018b, p. 50). The rising action spans to the moment where plastic waste became a problem. From the invention of plastic in the “late 19<sup>th</sup> century...we have a mere 9.2

billion tons of [plastic] to deal with. Of that, more than 6.9 billion tons have become waste. And of that waste, a staggering 6.3 billion tons never made it to a recycling bin” (Parker, 2018b, p. 46).

The second subtheme, which is that plastic has unknown impacts on the environment and humans, is closely tied with the premise of the climax, or the current conflict. The rising action built in Parker’s “Plastic”—which consists of carelessly discarding plastic without knowing the consequences of doing so—leads to the climax represented in Daly’s “Wildlife” and Royte’s “Threat”. Both articles emphasize the research on plastic and its harm to animals and humans and that the continued use and disposal of plastic causes environmental harm. This serves as the equivalent of a story’s climax, or ultimate conflict.

“Wildlife” highlights the dangers that plastic poses for oceanic animals. Daly opens the piece by describing the infamous YouTube video of a sea turtle getting a straw pulled out of its nose with the help of people on a boat. A few images of land and sea animals show that the environment is riddled with so much plastic that “some 700 species of marine animals have been reported...to have eaten or become entangled in plastic” (Daly, 2018, p. 81). The visual evidence in “Wildlife” shows that people’s neglect for discarded plastic has the odds stacked against animals in a one-sided battle with plastic.

Royte’s article contains the bulk of the plastic story climax which corresponds to the second subtheme that plastic has unknown effects on the environment. One image caption for Royte’s (2018) article says, “In a lab, [water] fleas were exposed to round beads and irregularly shaped fragments in amounts higher than in nature. The irregular pieces pose a greater threat because they can clump and get stuck in the gut” (p. 85). Other experiments have shown that “oysters exposed to tiny pieces of polystyrene...produce fewer eggs and less motile sperm” and

that fish that ate contaminated plastic “suffered more liver damage than those that had consumed virgin plastic. (Fish with compromised livers are less able to metabolize drugs, pesticides, and other pollutants.)” (Royte, 2018, pp. 85–86). Marine species ingest plastic because not only is there copious amounts of plastic being input into the environment—“every year five million to 14 million tons flow into our oceans from coastal areas” (Royte, 2018, p. 85)—but also environmental elements such as “sunlight, wind, waves, and heat break down [plastic] into smaller bits that look—to plankton, bivalves, fish, and even whales—a lot like food” (Royte, 2018, p. 85).

In “Threat”, Royte (2018) describes the physical influences plastics have on aquatic animals and how “they block digestive tracts, diminish the urge to eat, and alter feeding behavior, all of which reduce growth and reproductive output. Their stomachs stuffed with plastic, some species starve and die” (p. 85). Plastic is then explained to have chemical influences when ingested by organisms, due to the “free-floating pollutants that wash off the land and into our seas” which then “tend to adhere to [plastic] surfaces” (Royte, 2018, p. 85). Plastic also “comes in many forms and contains a wide range of additives...that can leach into their surroundings” and “some of these chemicals are considered endocrine disruptors—chemicals that interfere with normal hormone function, even contributing to weight gain” (Royte, 2018, p. 86). Furthermore, “flame retardants may interfere with brain development in fetuses and children; other compounds that cling to plastics can cause cancer or birth defects...many of these chemicals...appear to impair lab animals at levels some governments consider safe for humans” (Royte, 2018, p. 86). Considering what little is known about plastic, such as the negative effects of endocrine disruptors, the potential for plastic to transfer pollutants to humans via consumption of contaminated seafood contributes to the plastic story climax.

Research on marine species is not comprehensive, “but enough research has been done now to show that the fish and shellfish we enjoy are suffering from the omnipresence of this plastic” (Royte, 2018, p. 85). Yet research on marine species is more extensive than the research on humans since plastic may be processed differently when going up the food chain and “people can’t be asked to eat plastic for experiments” (Royte, 2018, p. 86). Information about plastic damage to marine species and the limited evidence on plastic’s impact on human health combine to represent the climax of *National Geographic*’s plastic story. To ease some potential worries, Royte (2018) reports that scientists found “most microplastics...seem to remain in the guts of fish and do not move into muscle tissue, which is what we eat. The United Nations Food and Agriculture Organization...concludes that people likely consume only negligible amounts of microplastics” (p. 86).

Parker’s “Plastic” is nothing short of additional evidence for the climax of *National Geographic*’s plastic story. The “Throwaway Living” encouraged the intake of disposable items which outlasted their lifespan; consequently, “roughly 40 percent of the now more than 448 million tons of plastic produced every year is disposable, much of it used as packaging intended to be discarded within minutes after purchase,” and “virtually half the plastic ever manufactured has been made in the past 15 years” (Parker, 2018b, p. 59). Since “the growth of plastic production has far outstripped the ability of waste management to keep up,” scientists have deemed “disposable plastics...as hazardous material” (Parker, 2018b, p. 59). As stated earlier, the problem is not just the hazardous material. Rather, the true problem is how production, usage, and improper disposal of this hazardous material impacted the environment. “Ocean plastic is estimated to kill millions of marine animals every year” (Parker, 2018b, p. 46) because over time people carelessly released plastic into the environment, intentionally or not. As a

result, “nearly 700 species, including endangered ones, are known to have been affected by it. Some are harmed visibly—strangled by abandoned fishing nets or discarded six-pack rings. Many more are probably harmed invisibly” (Parker, 2018b, p. 46). These statistics contribute to *National Geographic*’s plastic story’s climax.

Adding not only the plot’s climax but also the second subtheme of unknown impacts, Parker’s (2018b) “Plastic” shares that “there’s little evidence yet that [plastics] pass from the gut of a fish to the flesh we actually eat” (p. 50). Thompson, the researcher who coined the term microplastics, says, “‘Nobody has found nanoparticles in the environment—they’re below the level of detection for analytical equipment. People think they’re out there’” (Parker, 2018b, p. 50). Parker clarifies that “‘We do know the concentrations of chemicals at the time of manufacture in some cases are very high....We don’t know how much additive is left in the plastic by the time it becomes bite-size to a fish’” (Parker, 2018b, p. 50). She asserts that the concern of lingering plastic lies in the possibility that it may “‘have the potential to be sequestered in tissue’” (Parker, 2018b, p. 50) and “the chemicals added to plastics to give them desirable properties, such as malleability, and the even tinier nanoplastics that microplastics presumably degrade into....might pass into the tissues of fish and humans” (Parker, 2018b, p. 50). Without knowing what plastic is capable of doing to marine life or humans, the epitome of the second subtheme, Royte’s and Parker’s articles show sufficient reason to be worried about plastic in the ocean environment.

*National Geographic*’s climax ties into the second subtheme of unknown plastic impacts because plastic has saturated the environment and its dangers are unclear. Understanding the fact that plastic can contract dangerous chemicals in the environment and that plastic is getting into the food that humans eat, there is concern about how much of the chemicals absorbed in the

plastic can affect the humans that consume the seafood. The ultimate conflict of *National Geographic*'s plastic story is that people do not know how it affects humans while simultaneously the environmental damages that plastic caused are already being seen.

The transition from the climax to the resolution is the moment where plastic is recognized to cause damage and actions to mitigate that issue are starting to take place. But before going into the final stage of the plot, it is crucial to first discuss Rowland's function of added interest via narrative. The unusual part about *National Geographic*'s plastic narrative is that it is ongoing rather than one with a clear resolution—there is a setting, rising action, and climax, yet no resolution. Rowland (2012) recognizes that “[real] life rarely develops in the set pattern of plot development [he] described...in real life, the point of greatest conflict may be in the beginning, the end, or anywhere in between” (2012, p. 111). This is where Plot's major function comes into play. Rowland's function of added interest via narrative helps to understand that the *National Geographic*'s plot does not provide a set conclusion. A classic story's plot will have a resolution to a conflict, but in this story of plastic, people will find themselves in the crux of the conflict and rushing to find solutions to remedy the conflict. For example, Parker's first article, “Plastic,” goes into the historical context of why plastic was made and how people have benefitted from it. But as time went on and plastic usage continued, “the growth of plastic production has far outstripped the ability of waste management to keep up” (Parker, 2018b, p. 59). As China stopped taking plastic from other countries, recyclables started “piling up in the countries that generated them”, innovators began “constructing an ocean-sweeping machine”, celebrities started using their platforms for environmental activism against plastic, people talked about a “‘circular economy’ model, in which everything is reused or recycled”, researchers continued developing biodegradable plastic, and communities took part in zero waste movements (Parker,

2018a, p. 90, 2018b, pp. 59, 68–69). Despite the above, there is still no resolution to people’s behavior with plastic.

The potential solution in *National Geographic*’s plot corresponds with the third subtheme of plastic’s future; although people cannot necessarily revert the damages done, they can understand where this problem is headed if action is not taken now. In spite of the incomplete knowledge on plastic’s full capabilities, when Parker (2018b) interviewed researcher Richard Thompson, he said, “I don’t think we should be waiting for a key finding of whether or not fish are hazardous enough to eat....We have enough evidence to act” (p. 50). Similarly, Royte (2018) mentioned in “Threat” that “we know enough to act to reduce plastic pollution from entering the oceans, lakes, and rivers” (p. 87). Both accounts describe the notion that people understand enough about what plastic can do and people have the power to prevent environmental plastic from getting worse. Parker includes the thoughts of Ted Siegler, a resource economist, in “Plastic”. ““There isn’t a problem where we don’t know what the solution is....We know how to pick up garbage. Anyone can do it. We know how to dispose of it. We know how to recycle”” (Parker, 2018b, p. 49). Parker (2018b) continues saying that “it’s a matter of building the necessary institutions and systems, [Siegler] says—ideally before the ocean turns irretrievably and for centuries to come, into a thin soup of plastic” (p. 49) implying that people know what needs to be done and are capable of coming up with a means of addressing the plastic issue but just need to take action.

The plastic story’s undecided conclusion is given to the hands of people in the list of “six things you can do (and feel no pain).” This is presented at the end of Parker’s “Tide” and is also the concluding piece of the eight plastic-related articles in the June 2018 issue of *National Geographic*. Similar to how story resolutions are placed at the end of stories, the placement of

the plastic mitigation list is symbolic of how the future of plastic in the environment is up for people to decide.

In addition to not having a set conclusion, Rowland's explanation of plot describes a return to normalcy; however, what normalcy is there to return to without plastic? This question utilizes Rowland's function and encapsulates the point that the amount of plastic waste produced is problematic. People did not know plastic's decaying time would outlive its usage time, and while plastic is inseparable from people's current lives, the plastic packaging that food comes in cannot be separated from the contents of a beached whale that died from ingestion of plastic. Royte (2018) explains that "we're steeped in this material—from the air we breathe to both the tap and bottled water we drink, the food we eat, and the clothing we wear" (p. 86).

There is, however, an implied conclusion that elicits people to take action. Given the events from the articles and adding Rowland's persuasion function, Plot persuades people to be a part of a solution. They can take heed to what has happened and take more intentional action by being environmentally aware, knowing that plastic will have an impact regardless of what people choose to do with it. Parker's list of "Six Things You Can Do (and Feel No Pain)" provides people a starting place to create the resolution. Furthermore, the concept that people can determine the fate of plastic based on their level of environmental awareness builds off Rowland's added interest function. This ties into the third subtheme where people have the chance to change the future course of plastic. The possible resolution of plastic usage overlaps with Scene and what the future will look depends on how the marine plastic problems are addressed.

## Scene

Defined by Rowland (2012) as “the place/time where the story occurs” (p. 111), the scene from each of the four articles is set in the present day, although Parker’s “Plastic” and “Tide” have settings in the past and future, respectively. The articles will be analyzed individually to identify the past, present, and future settings, and analyzed as a set, like Plot, where each article contributes to the overall Scene. Scene is presented clearly with imagery and *National Geographic* illustrates the plastic story through both images and text. Images provide visuals for telling the story of marine plastic and they illustrate the magnitude of plastic in the environment. Throughout the four articles, images may encourage people to take action towards alleviating plastic from their lifestyles and, thus, from the environment. Historical images show plastic as a savior to the simple lifestyle and other images show those same types of plastic now wrapped around animals. The “Throwaway Lifestyle” image of a family of three tossing plastic items into the air as if it were confetti (see Figure 1). The magazine cover (see Figure 2), which contains an image not seen on the magazine’s online material, illustrates the scene today by presenting itself as disastrous. Displayed with the caption, “Planet or Plastic? 18 billion pounds of plastic ends up in the ocean each year. And that’s just the tip of the iceberg” (“Planet or Plastic?,” 2018), the magazine cover shows what initially seems to be an iceberg floating in the sea. Further inspection reveals that the iceberg is in fact a plastic bag floating in the ocean.

This cover of *National Geographic* does not have any headings for the non-plastic articles; rather, it is solely dedicated to the “Planet or Plastic?” movement that the issue and its articles address. A plastic bag posing as an iceberg in a scenic landscape is similar to a plastic bag posing as food for animals, except when plastic is ingested, animal stomachs are full with things that cannot satiate their appetite. This embodies the story’s climax and relates to the third

subtheme, providing a glimpse of how things may look if people continue to use plastic as usual. A quote from Sylvia Earle, a *National Geographic* Explorer-in-Residence, is located in the bottom left corner of the magazine cover and says, “Plastics aren’t inherently bad. It’s what we do, or don’t do, with them that counts” (“Planet or Plastic?,” 2018, p. cover). The cover image relates to the present-day situation regarding marine plastic; the synthetic material that has been produced and discarded all these years has now become an inseparable part of the environment people live in, reaching even the areas deemed most pristine. Parker addresses the origins of plastic that show up on a beach in Hawaii and on Henderson Island in the South Pacific, painting a picture of the pervasive plastic scene and noting that no matter where they originate, plastic will find its way to places imagined to be pristine, untouched environments.

On some beaches of the Big Island of Hawaii, as much as 15 percent of the sand is actually grains of microplastic. Kamilo Point Beach, the one I walked on, catches plastic from the North Pacific Gyre, the trashiest of five swirling current systems that transport garbage around the ocean basins and concentrate it in great patches. At Kamilo Point the beach is piled with laundry baskets, bottles, and containers with labels in Chinese, Japanese, Korean, English, and occasionally, Russian. On Henderson Island, an uninhabited coral island in the South Pacific, researchers have found an astonishing volume of plastic from South America, Asia, New Zealand, Russia, and as far away as Scotland. (Parker, 2018b, pp. 49–50)

One estimate says that “microplastics have been found everywhere in the ocean...from sediments on the deepest seafloor to ice floating in the Arctic—which, as it melts over the next decade, could release more than a trillion bits of plastic into the water” (Parker, 2018b, p. 49).

These descriptions create the image of today’s plastic-riddled environment, making this an illustrated portrayal of the plot’s climax.



Figure 2. Cover for *National Geographic*’s June 2018 “Planet or Plastic?” magazine. From 2018, *National Geographic*, p. cover.

Collectively, the articles convey what could happen to the environment if people use and dispose of plastic as previous generations have done. Parker (2018b) starts “Plastic” in the present day and then flashes back to the past by asking, “How did we get here? When did the

dark side of the miracle of plastic first show itself?” (p. 50). In the “Plastic,” Parker provides a time period with a hypothetical situation: “If plastic had been invented when the Pilgrims sailed from Plymouth, England, to North America—and the *Mayflower* had been stocked with bottled water and plastic-wrapped snacks—their plastic trash would likely still be around, four centuries later” (Parker, 2018b, p. 46). By providing a hypothetical historical scenario, Parker’s comparison of plastic’s lifespan to a classic piece of history shows the reader just how long the material can last and how much longer it will stay in the environment as plastic production continues. Specifically, Parker pinpoints the continued behavior of how people treat plastic is the problem, as mentioned before.

If the Pilgrims had been like many people today and simply tossed their empty bottles and wrappers over the side....those bits might still be floating around the world’s oceans today, sponging up toxins to add to the ones already in them, waiting to be eaten by some hapless fish or oyster, and ultimately perhaps by one of us. (Parker, 2018b, p. 46)

The narrative that imagines the Pilgrims having plastic and treating it as people do today highlights that plastic is not the sole problem but rather how people deal with it. Recalling the first subtheme of plastic initially having good intentions, it was people’s actions with plastic that has the synthetic material inundating the environment. This ties in the second subtheme that plastic will ultimately affect humans and the current knowledge of what plastic can do to humans is limited. People’s behavior towards plastic indicates the time span it took for the plastic problem to get as bad as it is now, relating to the third subtheme by presenting an opportunity to alleviate the damage plastic has done to the environment.

The hypothetical scenario that Parker describes in “Plastic” allows people to imagine the future and see what could happen should plastic continue to be used as it does today. While the

articles are situated in different locations all across the globe, the articles are individually laid out to display the timeline of what plastic has done, what it is doing now, and, using the hypothetical scenario with the pilgrims, what it may do in the future.

The timeline overlay emphasizes a cause-and-effect relationship between plastic, humans, and the environment; when plastic was first made, people treated it without care which caused the state of the environment as it is today. Given this, if the inception of plastic was dated to when the Pilgrims arrived to America, and if the plastic crisis the world is facing was only a product of less than one hundred years, one can only imagine how much worse the state of the environment can be if people's behavior towards plastic continues.

This *National Geographic* issue does what the magazine is known to do—it transports the reader to another location from the comfort of one's home and discusses the marine plastic issue located in real life places in the present day. Parker's "Plastic" uses visual images, aiding the setting of the scene. The title page has the title, subtitle, and an image of a plastic bag with brief facts on plastic, including both its contributions and the environmental damage it is currently causing. These short facts state, "150 years ago we created a lightweight, strong, and inexpensive material," "Today this miracle material helps keep hearts beating and planes in the air," "More than 40 percent of it is used just once, then tossed," "Some 9 million tons of it end up in the ocean each year," and "The 'working life' of a plastic bag is 15 minutes" (Parker, 2018b, pp. 40–41). One image shows a mother and her son in a landscape of plastic sheets, waiting for the sheets to dry before selling them to a recycler. Another image shows plastic bottles intentionally floating in a fountain in Madrid through an art collective "as a way of calling attention to the environmental impact of disposable plastics" (Parker, 2018b, p. 45). The photographer that captured a seahorse trailing around a cotton swab larger than itself (see Figure

3) says it is “a photo I wish didn’t exist” (Parker, 2018b, p. 47). More pictures of people immersed in plastic show parts of the developing world where waste pickers sort through massive amounts of plastic. A snapshot of a recycling center in San Francisco shows the processing of plastic. Below that image is a blurred image of the plastic water bottles moving along a conveyor belt at Poland Spring’s largest plant in Hollis, Maine. The images involve movement of plastic on conveyor belts; however, one is before use and the other is after use.

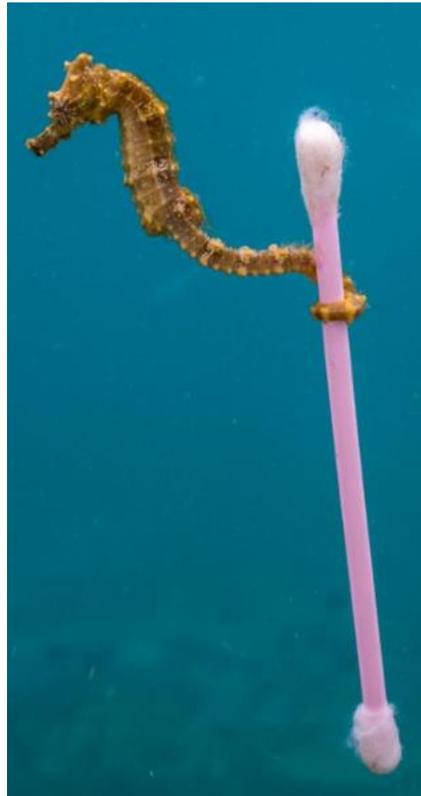


Figure 3. Seahorse latched on to a cotton swab. From “Plastic,” by L. Parker, 2018, *National Geographic*, p. 47.

Parker’s (2018b) visit to Hawaii creates a visual image of the plastic situation today: “On Hawaii’s Big Island, on a beach that seemingly should have been pristine—no paved roads lead to it—I walked ankle-deep through microplastics. They crunched like Rice Krispies under my feet” (pp. 46, 49). Again, plastic has made its way to places that are typically deemed

untouchable by any wrongdoings. Parker then devotes time to describing the plastic scene in Manila, Philippines, pointing out its once-beautiful scenery.

The Pasig River once flowed majestically through downtown Manila, capital of the Philippines, and emptied into pristine Manila Bay. It was a treasured waterway and civic point of pride. It's now listed among the top 10 rivers in the world that convey plastic waste to the sea. As many as 72,000 tons flow downstream every year, mostly during the monsoon. In 1990 the Pasig was declared biologically dead....

The river is fed by 51 tributaries, some of them overflowing with plastic waste from squatter settlements that cantilever precariously over creek banks. A tributary near Chinatown, where rickety shanties are wedged between modern buildings, is so choked with plastic debris you can walk across it, forgoing the footbridge. Manila Bay's beaches, once recreational respites for greater Manila's 13 million residents, are littered with garbage, much of it plastic. (Parker, 2018b, pp. 59, 67)

Even though "volunteers picked up 54,260 pieces of plastic, from shoes to food containers," "by the time [Parker] visited a few weeks later, the beach was littered again with bottles, wrappers, and shopping bags" (Parker, 2018b, p. 67). Parker painted the picture of what the Pasig River once was and what it is now which further distinguishes the issue at hand with regards to the Plot's climax.

The imagery in Daly's article "Wildlife" provides a sense of how far plastic has come to negatively impact the environment it so easily assimilated into. Plastic was initially found to be a problem when "the first documented cases of seabirds ingesting plastic were 74 Laysan albatross chicks found on a Pacific atoll in 1966, when plastic production was roughly a twentieth of what it is today" (Daly, 2018, p. 81). Since then, "microplastics have been found everywhere in the

ocean that people have looked, from sediments on the deepest seafloor to ice floating in the Arctic” (Parker, 2018b, p. 49).

Royte’s article “Threat” paints the image of the current plastic problem through the mystery of the second subtheme, beginning the article in a laboratory with Debra Lee Magadini, a researcher at Columbia University’s Lamont-Doherty Earth Observatory. “Scrutinizing the liquified digestive tract of a shrimp she bought at a fish market, she makes a *tsk*-ing sound. After examining every millimeter of the [microscope] slide, she bursts, ‘This shrimp is fiber city!’ Inside its gut, seven squiggles of plastic, dyed with Nile red stain, fluoresce” (Royte, 2018, p. 85). Royte also captured the work of Chelsea Rochman, a professor of ecology at the University of Toronto. Rochman fed treated plastic to fish for two months: “The fish that had ingested the treated plastic suffered more liver damage than those that had consumed virgin plastic. (Fish with compromised livers are less able to metabolize drugs, pesticides, and other pollutants.)” (Royte, 2018, pp. 85–86). Oysters are less reproductive when “exposed to tiny pieces of polystyrene—the stuff of take-out food containers,” as found in another experiment (Royte, 2018, p. 86).

An image caption for a picture of hatchery fish in a bottle states “fish caught...next to a hatchery on Manila Bay in the Philippines live in an ecosystem polluted by household waste, plastics, and other trash. Whether microplastics ingested by fish affect humans is unknown, but scientists are looking for answers” (Royte, 2018, p. 86) capturing the third subtheme of plastic’s unknown impacts. “So far science lacks evidence that microplastics...are affecting fish at the population level. Our food supply doesn’t seem to be under threat—at least as far as we know” (Royte, 2018, p. 85). Researchers like “Magadini and her colleagues are keen to see how levels of exposure have changed over time. Others will painstakingly untangle how microbeads, fibers,

and fragments affect these forage fish, the larger fish that consume them, and—ultimately—us” (Royte, 2018, p. 87).



Figure 4. Sea turtle tangled in discarded fishing gear. From “A Toll on Wildlife,” by N. Daly, 2018, *National Geographic*, p. 80-81.

Given the events in Plot, Scene ties in two subthemes in two ways. First, people did not realize the potential danger plastic posed when it was disposed of into the environment (the subtheme of unknown impacts of plastic). Secondly, Scene presents the question of what the future will look like if people do not take the chance to change their plastic usage habits (the ability to change the future of plastic). The possibility of changing the future includes Parker’s examples of what other countries have done. For example, as Norway is recovering most of its plastic with deposit returns and China is rejecting recyclables from other countries. In addition, Parker’s list of six things people can do is accompanied by images of a compostable six-pack ring, a metal straw, a toothbrush with a replaceable head, and reusable food wrap. Pictures help illustrate products that offer alternatives to plastic.

Scene utilizes Rowland's function of added interest by looking into the future of plastic beyond the current crisis. By setting the scene and highlighting the question of what the future may look like if action is not taken today, *National Geographic* may convince people that they need to support plastic mitigation efforts and take action at every scale. Scene uses Rowland's function of encapsulating a point that the future of plastic and the state of the environment depend on how people think about their plastic usage. This is where *National Geographic's* call to action comes into view. Paired with images of what plastic has done, the scene throughout the four articles "makes it difficult to refute the claims in a narrative" (Rowland, 2012, p. 116) by showing what plastic does now and what it can possibly do in the future should people not make changes in their behavior towards plastic. Images such as a sea turtle in discarded fishing gear (see Figure 4), a hermit crab with a plastic cap shell, a stork standing in a bag, hyenas scavenging a landfill, and a water flea with plastic in its body are featured in the four articles. *National Geographic's* caption for the image of the sea turtle says "an old plastic fishing net snares a loggerhead turtle in the Mediterranean off Spain. The turtle could stretch its neck above water to breathe but would have died had the photographer not freed it" adding that "'ghost fishing' by derelict gear is a big threat to sea turtles" (Daly, 2018, p. 80). The extent of plastic disposal has infiltrated the environment so much that animals are literally swimming and walking through trash people made; if people do not want animals to continue living in human garbage, then people should be more environmentally conscious.

Scene also employs Rowland's use of emotion function. "Narrative rhetoric provides a powerful vehicle for creating an emotional response, especially through the creation of pity and guilt....If you want to move people emotionally, one powerful way to do it is to tell a story" (Rowland, 2012, p. 116). Both guilt for contributing to the plastic problem and pity for seeing

things suffer the consequences may be felt by people. Scene situates readers in the plastic problem. Images and written text are important to persuade and empower readers to adapt a more environmentally aware lifestyle. Rowland (2012) explains that “stories are important forms of persuasion, in part because they sometimes possess aesthetic qualities that make a message far more appealing than it otherwise would be” (Rowland, 2012, p. 115). *National Geographic* has the advantage of its renowned photography to aid the plastic story, providing the “aesthetic qualities” to make its call to action palatable. Parker’s (2018a) list of six things to do is accompanied with four “products that could help reduce plastic waste”: a “toothbrush with a replaceable head,” “reusable food wrap made from beeswax and cotton,” a “metal, reusable straw,” and a “compostable six-pack ring made from brewery waste by the company E6PR” (p. 91). Perhaps seeing animals in plastic can convince people that the plastic they use may be the plastic engulfing marine life.

An example of someone being environmentally conscious is shown in an image of one jar holding “two years’ worth of Kathryn Kellogg’s unrecyclable, uncompostable waste” (Parker, 2018a, p. 89) (see Figure 5). Displaying a quantifiable amount of waste that someone consciously put aside provides proof that making steps towards eliminating plastic from one’s life can be done. Such actions done to prevent plastic from overcoming the environmental scene are executed by characters, such as Kellogg, and are discussed in the next section.



Figure 5. Glass jar holding one person's two years' worth of disposable waste. From "How We Can Stem the Tide," by L. Parker, 2018, *National Geographic*, p. 88-89.

### Character

Antagonists and protagonists are two types of characters that Rowland mentions in his interpretation of narrative rhetoric. "Narratives generally revolve around the conflict between the protagonist (also known as the hero) and the antagonist or villain" (Rowland, 2012, p. 112). Victims are briefly described by Rowland to be "innocent victims of some act of the villain" (Rowland, 2012, p. 112). I will examine how antagonists, protagonists, and victims are portrayed in the *National Geographic* articles. The four articles will be analyzed together because the characters, despite making different appearances in different articles, are all part of the entire plastic story that *National Geographic* published in its June 2018 magazine. For the purpose of

this analysis, note that the singular, capitalized term "Character" refers to the component while the often plural, lower-case term "characters" refers to those involved with the story.

Because the current context of people's involvement with plastic is a prominent part of *National Geographic's* narrative, its use of characters is a critical part of the issue's persuasive message. The main characters of *National Geographic's* story that I identify are plastic, animals, industry, people, and *National Geographic* itself as an organization. These characters fall under three categories listed above: antagonists, victims, and protagonists: animals are portrayed as victims, plastic and plastic industry serve as antagonists, and *National Geographic* operates as a protagonist. While characters in stories often belong to only one category, in *National Geographic's* plastic story, people can play different roles, acting as antagonists, victims, and protagonists. People are victims of plastic's unknown health impacts yet are interestingly presented as antagonists for their careless use of plastic while simultaneously given the option to become the heroes of the plastic story. The lack of the story's definitive conclusion grants people the chance to become protagonists of the story and respond directly to the magazine's call to action.

Starting with antagonists, plastic is, undoubtedly, a main character and antagonist in *National Geographic's* plastic story. Appearing in all four *National Geographic* articles I analyze, plastic is initially a hero and "saves lives daily" by "[helping to] keep hearts beating and planes in the air" (Parker, 2018b, pp. 40, 58). It then became an antagonist despite the good work it does, such as providing clean water to locations that do not have their own and servicing the medical field with sterile equipment. Plastic was created without its disposal in mind and are pinned animal killers because "one bag can kill more than once; carcasses decay, but plastic lasts and can choke or trap again" (Daly, 2018, p. 82). Plastic became an antagonist when people were

realized the harmful impact that plastic has on marine life and that anyone using plastic is not immune to contributing plastic to the environment.

Industry is an antagonist that should own up to its contribution to the marine plastic problem as a creator and distributor of plastic. In 2017, “the Coca-Cola Company, perhaps the world’s largest producer of plastic bottles, acknowledged for the first time just how many it makes: 128 billion a year. Nestlé, PepsiCo, and others also churn out torrents of bottles” (Parker, 2018b, p. 59). Parker (2018b) notes in “Plastic” that industry can help the plastic problem by “[designing] new plastics and plastic products that are either biodegradable or more recyclable” or support Siegler’s proposal (a resource economist) that there be “a worldwide tax of a penny on every pound of plastic resin manufactured” (p. 69). By doing so, the industry could assume responsibility through the taxation of the plastic products they continue to produce. 193 nations passed The United Nations Clean Seas agreement but it “doesn’t impose a tax on plastic...it’s really just a declaration of good intention—the intention to end plastic pollution” (Parker, 2018b, p. 69). However, good intentions are not equivalent to direct action. Some corporations made pledges which have yet to be fulfilled.

Coca-Cola...announced a goal to ‘collect and recycle the equivalent of’ 100 percent of its packaging by 2030. It and other multinationals, including PepsiCo, Amcor, and Unilever, have pledged to convert to 100 percent reusable, recyclable, or compostable packaging by 2025. And Johnson & Johnson is switching from plastic back to paper stems on its cotton swabs. (Parker, 2018b, p. 68)

As users and consumers of plastic, people are part of the plastic problem and are thus antagonists. People have become dependent on plastic and are “steeped in this material—from the air we breathe to both the tap and bottled water we drink, the food we eat, and the clothing

we wear” (Royte, 2018, p. 86). Society has embraced plastic as a substitute for natural materials when “anything and everything could be made of plastic...because plastics were cheap” (Parker, 2018b, p. 59). Without realizing its potential harm, people continued to use and dispose plastic and “six decades later, roughly 40 percent of the now more than 448 million tons of plastic produced every year is disposable” (Parker, 2018b, p. 59) leading to an inundation of plastic in the environment. “The growth of plastic production has far outstripped the ability of waste management to keep up. That’s why the oceans are under assault” (Parker, 2018b, p. 59). The actions of people impact the victims of plastic by virtue of using plastic.

Rowland briefly mentions antagonists committing acts on “innocent victims”. Plastic is the antagonist negatively impacting the victim, which are marine life and humans in the *National Geographic* plastic story. While people are antagonists for using and consuming plastic, the unknown effects of plastic on human health make people victims as well. Parker describes the living situation in Manila, Philippines where people are victims of plastic waste.

The Philippines is a densely populated nation of 105 million people that is still struggling with the most basic public health issues, including waterborne diseases such as typhoid and bacterial diarrhea. It’s no surprise that it has trouble managing the explosion of plastic garbage. Manila has a metropolitan garbage collection system that stretches across 17 separate local governments—a source of chaos and inefficiency. In 2004 the region was already running out of land to safely dump garbage. The shortage of landfill spaces, and thus the crisis, continues today. (Parker, 2018b, p. 67)

“A small part of the [waste crisis] is taken up by Manila’s informal recycling industry, which consists of thousands of waste pickers” (Parker, 2018b, p. 67) like Armando Siena and his wife who live in undesirable conditions of “a garbage-filled slum named Aroma, next to another

slum named Happyland” (Parker, 2018b, p. 67). They “have lived their entire lives surrounded by trash. They were born on Smokey Mountain, an internationally notorious dump that was officially closed in the 1990s” (Parker, 2018b, p. 67). Waste pickers are visible victims of plastic trash as they traverse landscapes “scanning the streets for recyclable rubbish,” picking out the pieces that are of value so they can sell their findings for money; “plastic soup containers are high-value finds, paying...(38 cents) a kilogram” (Parker, 2018b, p. 67). There is a catch-22 when the work of waste pickers is almost futile. “The waste that clogs Manila’s beaches and waterways....consists of sachets....sold by the millions to poor people like Siena and his family, who can’t afford to buy more than one serving at a time” (Parker, 2018b, p. 67). However, these sachets are “not recyclable, so no waste picker will retrieve them” (Parker, 2018b, p. 67). As a result, the amount of plastic that waste pickers live in increases. Abigail Aguilar, a Greenpeace affiliate, said, “We believe that the ones producing and promoting the use of single-use plastics have a major role in the whole problem” (Parker, 2018b, p. 68). Aguilar points the onus towards plastic industry, the antagonist fueling the plastic crime against victims.

The unseen and unknown impacts of plastic on human health puts people in a position of danger. “Scientists remain concerned about the human-health impacts of marine plastics because...they are ubiquitous and they eventually will degrade and fragment into nanoplastics...in other words, they are invisible” (Royte, 2018, p. 86). Since plastic is so small, it can “penetrate cells and move into tissues and organs. But because researchers lack analytical methods to identify nanoplastics in food, they don’t have any data on their occurrence or absorption by humans” (Royte, 2018, p. 86). This does not include the possibilities of chemical transfer via plastic. “Because plastic and their additives act differently depending on physical and chemical contexts,” and since plastic characteristics may change depending on how a marine

organism metabolizes the foreign material, “we know virtually nothing about how food processing or cooking affects the toxicity of plastics in aquatic organisms or what level of contamination might hurt us” (Royte, 2018, p. 86). Thompson shares that “the concentrations of chemicals at the time of manufacture in some cases are very high....We don’t know how much additive is left in the plastic by the time it becomes bite-size to a fish” indicating that “the chemicals added to plastics....might pass into the tissues of fish and humans” (Parker, 2018b, p. 50).

Forms of marine life, which include microscopic organisms, plants, and characteristic fauna, are the second victim and the main characters of “Wildlife” and “Threat.” Both articles declare the hazards and damage that plastic has already done. “The dead albatross, its stomach bursting with refuse. The turtle stuck in a six-pack ring, its shell warped from years of straining against tough plastic. The seal snared in a discarded fishing net” (Daly, 2018, p. 80). As victims of a human-made product, “the list of freshwater and marine organisms that are harmed by plastics stretches to hundreds of species” (Royte, 2018, p. 86). These two articles place marine species in a position of helplessness with images depicting the consequences of plastic in the environment. There are accounts of marine animals starving because they consume a product they cannot digest; Daly (2018) reports that 90 percent of fledglings in a flesh-footed shearwater population consumed plastic since “seabirds, expending energy their malnourished bodies don’t have, roam farther in search of real food, only to drag back plastic waste to feed their young” (p. 81). “A plastic shard piercing an intestine can kill a bird quickly. But typically the consumption of plastic just leads to chronic, unrelenting hunger” (Daly, 2018, p. 80).

Unfortunately, birds are not the only ones to unintentionally consume plastic. “Marine species of all sizes, from zooplankton to whales, now eat microplastics” (Parker, 2018b, p. 46).

However, there is no nutritional value in plastic to sustain marine species so they are left hungrier the more plastic they consume. Marine life cannot distinguish real food from faux food as Daly (2018) notes that “fish...eat plastic because it smells like food once it’s covered with algae” (p. 81). The subheading of “Wildlife” states “Animals eat it, get stuck in it, and die from it. For them, plastic is turning the ocean into a minefield” (Daly, 2018, p. 80); animals are entangled in plastic while others are starving to death, not realizing that “the consumption of plastic just leads to chronic, unrelenting hunger” (Daly, 2018, p. 80).

Royte shares research done on animals that shows the impact plastic has on their bodies. She presents the research of Chelsea Rochman, a professor at the University of Toronto, to provide evidence that “the fish that had ingested the treated plastic suffered more liver damage than those that had consumed virgin plastic” (Royte, 2018, pp. 85–86). Other research on smaller organisms show that microplastics “block digestive tracts, diminish the urge to eat, and alter feeding behavior, all of which reduce growth and reproductive output” and “oysters exposed to tiny pieces of polystyrene...produce fewer eggs and less motile sperm” (Royte, 2018, pp. 85, 86). Referencing the third subtheme of changing the fate of plastic in *National Geographic*’s plastic story, there is a chance to save the marine life and prevent plastic from causing more chaos by changing one’s actions towards plastic and choosing to be a protagonist.

Protagonists can save victims from antagonists. Rowland presents two types of protagonists in his representation of narrative rhetoric. The first “serves as a model to be followed or emulated” (Rowland, 2012, p. 112), a type of hero for characters to model after. The second type of protagonist “is not greater than all of us, but he/she is one of us and serves as an example of what an average person can accomplish” (Rowland, 2012, p. 112). This average

person “can create a sense of shared identity between the character and the audience” (Rowland, 2012, p. 112).

*National Geographic* as an organization serves as the first type of protagonist where it emulates the behavior of living with plastic responsibly. In an article that I did not analyze in the June 2018 magazine, *National Geographic* sets the stage by showing how it is doing its part of reducing plastic. “That’s why, if you’re a U.S. or U.K. subscriber, this month’s issue arrived in a paper rather than plastic wrapper. This change will save more than 2.5 million single-use plastic bags every month” (Goldberg, 2018, p. 4). *National Geographic* is also “working to revamp plastic usage across [its] businesses and to recruit other groups and individuals to join [it]” (Goldberg, 2018, p. 4). Primed with the last article’s list of six things for people to begin making change, it is implied that people follow suit.

The *National Geographic* articles, both through text and photographs, give people a chance to redeem their antagonist selves by adopting a protagonist mindset and behavior towards plastic, moving from carelessly tossing plastic (i.e., not behaving like the “Throwaway Living” family in Figure 1) to making deliberate decisions on plastic usage (see Kellogg’s glass jar of two years’ worth of waste in Figure 5). This redemption sets the course of the future scene and how characters can contribute to the undetermined resolution, whether for better or for worse. Before recognizing what plastic can do to the environment and humans, people have been antagonists, starting from promoting “Throwaway Living” to being the cause of plastic ending up in remote regions “from sediments on the deepest seafloor to ice floating in the Arctic” (Parker, 2018b, p. 49). In the search for remains of Malaysia Airlines Flight 370, “satellite images revealed collections of objects floating on the sea surface....It was all trash—pieces of broken shipping containers, abandoned fishing gear, and of course, plastic shopping bags”

(Parker, 2018b, p. 68). Despite the tragic loss, ““It’s a good time for people to understand that our oceans are garbage dumps,”” says Kathleen Dohan, a scientist and president of the Earth and Space Research in Seattle (Parker, 2018b, p. 68). Those who are subjected to using plastic in their lives are not doomed to be antagonists forever as there is an opportunity to change one’s position by emulating protagonist behavior and living an environmentally conscious lifestyle. Parker (2018b) shares that “the most heartening thing about the plastic waste problem is the recent explosion of attention to it, and even serious, if scattered, efforts to address it” (p. 68). Although people are taking protagonist roles to attend to the plastic problem, people cannot completely absolve their environmental sins of plastic usage because of how intertwined plastic has become in their lives. Thus, there exists varying degrees of antagonistic tendencies within people. However, that does not mean that people should not try to enact protagonist values.

Protagonists in *National Geographic*’s plastic pollution story are those involved with mitigating the plastic problem, either through physical removal or learning more about its effects on the environment. Protagonists come in many forms. “Hundreds of communities worldwide are embracing [the zero waste movement]—including the downtrodden industrial town of Roubaix, France” (Parker, 2018a, p. 90). Waste pickers clean the environment during their search for profitable plastic waste. Researchers, such as Chelsea Rochman and Jenna Jambeck, conduct studies on how plastic impacts the environment. Innovators, like Boyan Slat, a 26 year-old from the Netherlands who “is charging ahead with his teenage vow to clean up the largest garbage patch in the North Pacific” (Parker, 2018b, p. 69), are working on solutions to rid the planet of plastic. “[Slat’s] organization has raised more than \$30 million to construct an ocean-sweeping machine that is still under development” (Parker, 2018b, p. 69). Celebrities lead campaigns against plastic, such as Adrian Grenier who “has lent his celebrity to the campaign

against the plastic drinking straw” (Parker, 2018b, p. 68). Grenier’s actions are comparable to *National Geographic* using its world-renowned recognition to broadcast its awareness campaign. Thompson, the researcher who coined microplastics, believes that “the real solution...is to stop plastic from entering the ocean in the first place—and then to rethink our whole approach to the amazing stuff” (Parker, 2018b, p. 69). Thompson’s quote ties into the third theme of future solutions to the plastic problem. “Ellen MacArthur, a British yachtswoman, has created a foundation to promote the vision of a ‘circular economy,’ in which all materials, including plastics, are designed to be reused or recycled, not dumped” (Parker, 2018b, p. 68). Kathryn Kellogg managed to fit two years’ worth of “unrecyclable, uncompostable waste” into a glass jar (see Figure 5). These people tie in characteristics of both protagonist values. The fourth Plot element of defining a resolution to the plastic story goes hand in hand with the third subtheme of future solutions, whether it is creating a new plastic, establishing a circular economy, finding a method of cleaning up discarded plastic, or avoiding existing plastic when possible—all of which are performed by characters of the plastic story.

There has been movement towards preventing plastic from entering the environment. A variety of approaches to addressing and mitigating the multi-faceted plastic problem involves industries, nations and its leaders, engineers or innovators, and consumers. These approaches are mentioned in Royte’s “Threat” and both of Parker’s pieces and they add to determining the plastic story’s resolution. Industry has a large role in shaping the plastic story resolution. Parker mentions in “Plastic” how corporations are helping write the conclusion of the plastic story.

Corporations are responding to public opinion. Coca-Cola...announced a goal to ‘collect and recycle the equivalent of’ 100 percent of its packaging by 2030. It and other multinationals, including PepsiCo, Amcor, and Unilever, have pledged to convert to 100

percent reusable, recyclable, or compostable packaging by 2025. And Johnson & Johnson is switching from plastic back to paper stems on its cotton swabs. (Parker, 2018b, p. 68)

Other possible conclusions include “industry and government...[investing] in infrastructure to capture and recycle these materials before they reach the water” (Royte, 2018, p. 87). Another way to prevent plastic from getting into the environment is to enact bans. “Bans on plastic microbeads in cosmetics...take effect this year in the U.S., Canada, the U.K., and four other countries. The industry is phasing them out” (Parker, 2018b, p. 68). Nations can help by “[enacting] bans on certain types of plastic, focusing on those that are the most abundant and problematic” (Royte, 2018, p. 87). Parker (2018b) shares that “Kenya joined a growing list of nations that have banned plastic bags, imposing steep fines and jail time on violators. France said it would ban plastic plastics and cups by 2020” (p. 68). Norway has been able to recover “97 percent of [plastic bottles]. Its trick: deposits as high as...(32 cents) and machines, found at most supermarkets, that ingest bottles and spit out refunds” (Parker, 2018a, p. 90). China is another nation that is causing the world to evaluate plastic’s prevalence in people’s lives. “For nearly three decades [China] has bought about half of the world’s recyclable plastic. But this year it called a halt to most scrap imports. Recyclables are now piling up in the countries that generated them” (Parker, 2018a, p. 90). Incentive to address the plastic issue not only comes in the form of bottle deposits and bans, but also in the form of removing the option to elect plastic. Former “Prime Minister Theresa May called for supermarkets to set up plastic-free aisles, where food is sold in bulk. She’s also considering a tax on single-use plastics such as take out containers.” (Parker, 2018a, p. 90).

“Chemical engineers can formulate polymers that biodegrade” (Royte, 2018, p. 87) and, to combat the idea that biodegradables encourage littering, “Jenna Jambeck and her colleagues at

the University of Georgia's New Materials Institute are using polymers synthesized by microbes to make packaging they hope will compost readily and biodegrade in the ocean" (Parker, 2018a, p. 90). "Polymateria, a British firm, is taking a different approach, developing chemical additives to help biodegrade any plastic...more quickly" (Parker, 2018a, p. 90).

These efforts relate very well with the third subtheme which is the chance to change the future course of plastic. Plastic is entwined with people's lifestyles so, while people "can eschew single-use plastics" (Royte, 2018, p. 87), creating a plastic that can ideally have less impact on the environment is what some protagonist researchers are doing. One step above the individual person is the community of people who can work together. "Hundreds of communities worldwide are embracing [the 'zero-waste movement']—including the downtrodden industrial town of Roubaix, France, where the success of a citizens' campaign shows that zero waste is more than an affection of wealthy liberals" (Parker, 2018a, p. 90).

Rowland (2012) states "[narrative] can show us a wholly innocent victim being hurt by monstrous evil. Or it can create guilt by showing us the terrible results of innocent people of some action that we may have taken" (p. 116). The articles in the June 2018 *National Geographic* magazine present both innocence and guilt. Guilt comes into play when people realize that they and the plastic industry are the cause of plastic in the environment. Images in "Plastic" show waste pickers amongst piles of trash, selecting bits of profitable plastic that they sell to companies that "pay a premium for bottles and hard plastic collected by waste pickers...sells that plastic at a higher price to multinationals, which market their recycled products as socially responsible" (Parker, 2018b, p. 67).

Moreover, seeing animals suffocating and entangled by plastic may evoke feelings of pity. Rowland (2012) describes how "narrative rhetoric provides a powerful vehicle for creating

an emotional response, especially through the creation of pity and guilt” (p. 116). Guilt and pity may be felt when people see the images of marine life surrounded, if not immersed, in plastic (see Figure 5) leaving wildlife in a position where they are nothing but victims suffering the dangers of a human-made material. People may feel more compelled to make an informed decision to decline plastic when they see animals suffering the consequences of the plastic plight. Daly’s (2018) subtitle for her article “Wildlife” states, “From getting stuck in nets to eating plastic that they think is food, creatures worldwide are dying from material we made” (p. 80). Her discussion of animals that suffer the consequences of environmental plastic places the responsibility on people.

Guilt can lead to taking action, though this is contingent on people’s decision regarding their involvement with plastic. There is a sense of power and control if people decide to take action like *National Geographic* advocates. Parker’s “Tide” is the quintessential example of how *National Geographic* uses emotion, even to the extent of guilt and hope, to get the message across that the decision to use plastic can be changed. Parker (2018a) provides examples of hopeful accounts of ridding plastic from lifestyles such as “the downtrodden industrial town of Roubaix, France, where the success of a citizens’ campaign shows that zero waste is more than an affectation of wealthy liberals” (p. 90).

Additionally, “the Church of England asked its flock to give plastic packaging and disposables for Lent” and former Prime Minister Theresa May “called for supermarkets to set up plastic-free aisles,” and was “considering a tax on single-use plastic” (Parker, 2018a, p. 90). Parker ends the written story with China’s monumental decision to refuse imported plastic and then leads into the list of six things that people can do to reduce their plastic usage.

People can be heroes working to solve the plastic problem, villains by using plastic and discarding it thinking it will be taken care of, and victims to plastic by not knowing how it affects the human body. Character as a component creates reader identification with the people addressed throughout the articles; while not everyone is a plastic researcher like Thompson or living in poverty amongst plastic waste like Siena, people are all part of the plastic dilemma and are affected by plastic as it has infiltrated all corners of the world. Parker's list of things to do at the end of "Tide" is geared towards people as individuals, providing the opportunity for them to take a protagonist role in *National Geographic's* plastic story. The narrative component of Character utilizes Rowland's encapsulation of the point that people have the opportunity to take the matter into their own hands starting with individual changes. Together, people can recognize the intertwined journey that plastic has with humans and be more intentional with their plastic usage, realizing that there is no living on the planet without causing harm to it in some manner. Through Character, *National Geographic* readers participate in the story.

As the analysis demonstrates above, the overarching theme reveals that people are in a position to change the future of plastic in the environment. Being environmentally aware and taking deliberate steps towards changing the future is driven by the history of plastic and how it went from being a hero to villain. Industry contributes the input of plastic while animals suffer because of people's behaviors and attitudes towards the synthetic material. Yet *National Geographic* shows that there is a chance to take part in claiming the responsibility of plastic in the environment. People, who are varying degrees of antagonists, can take this opportunity to be a savior and redeem a portion of themselves by opting to be a protagonist.

The analysis is situated in the larger scheme of the communication field and explores ways to communicate effectively, efficiently, and accurately. Taking into account *National Geographic's* global following and the influence of mass media in the current day, I identified narrative strategies within the magazine to serve as a unique case study for communication methods, particularly around topics that are often contested. This case study stands out because of the combination of narrative strategies with science communication to create a persuasive argument.

## CHAPTER IV: CONCLUSION

The first chapter addressed the environmental crisis of marine debris, marine plastic in particular, and why I chose to analyze *National Geographic's* June 2018 magazine. The literature review provided background information on the three topics this analysis involves: marine debris with a focus on marine plastic, science communication, and narrative rhetoric. The main analysis, presented in the previous chapter, explored the narrative strategies present in the four articles which communicate the marine plastic problem and assists *National Geographic's* call to action. This concluding chapter will discuss how the analysis is situated in the larger picture of communication strategies for environmental topics and will pose future research ideas. Based on Robert Rowland's interpretation of narrative rhetoric, I identified how *National Geographic* utilized narrative strategies to not only inform readers about the plastic issue but to construct a persuasive case for plastic awareness and action to mitigate its presence in the environment. Through narrative, readers could experience the story of plastic and environmental impacts as well as learn ways in which they could participate in solving the plastic problem.

Marine plastic contributes to a large percentage of marine debris and is a prominent environmental issue that, as with any environmental crisis, needs information shared widely and accurately. Science communication, a multi-directional conversation between those who hold specialized information and those who receive it, involves effectively sharing that information. Mass media allows information to be shared quickly, albeit not necessarily accurately, so it is imperative that science communication methods are investigated to produce timely, effective, and correct information to disseminate because "science communication is a significant field of enterprise worthy of ongoing practice and research" (Burns et al., 2003, p. 199). Narrative rhetoric looks at how stories are a persuasive method for people to understand the world.

Combined with science communication, narrative strategies can be utilized to share information in an engaging and understandable manner. Randy Olson (2015), a former marine biologist who changed careers to filmmaking, writes in his book *Houston, We Have a Narrative: Why Science Needs Story* that there exists a “need to bring greater understanding of narrative...to the world of science” (p. 184). Environmental science impacts people’s lives through health, technology, and more. Therefore, the communication of environmental science deserves more research because information can influence what people do. Utilizing narrative strategies in science and environmental communication, particularly when the situation is dire, is one method of contributing a solution to mitigating plastic (and debris) in the environment.

Rowland’s five persuasive functions I used—added interest via narrative, identification, persuasion, encapsulating a point, and use of emotion—are applicable in the four of eight plastic articles analyzed, indicating that narrative strategies were present in the June 2018 magazine. This means that *National Geographic* may have been effective in its persuasion and using narrative strategies in science communication shows promise. Dahlstrom (2014) poses the question, “How should narratives be used to communicate science appropriately because of their power to persuade?” (p. 13616). In a 2010 publication, Dahlstrom states that “results from studies of narrative persuasion generally suggest that narratives can be an effective tool for altering attitudes and behavior because narratives provide an emotional experience that may result in involvement or identification with characters” (p. 859). “Stories can also be powerful tools for persuading people to change their attitudes and/or behaviors” (Riedlinger et al., 2019, p. 3), supporting the notion that *National Geographic*’s call to action may persuade people to change their behavior towards plastic.

Narratives can include written and visual material. *National Geographic's* plastic story “[possesses] aesthetic qualities that make a message far more appealing than it otherwise would be” (Rowland, 2012, p. 115). The images throughout the four articles are an appealing addition to *National Geographic's* message. “Presenting emotive imagery is therefore one way in which to attract people’s attention and may motivate people to act” (Nicholson-Cole, 2005, p. 60). *National Geographic's* images and written storytelling advantageously situates its call to action well in its belief that the “power of science and storytelling to change the world” (Society, n.d.). Additionally, “the potential of stories to stimulate emotions in readers and viewers make them an emotional communication strategy for science communication *par excellence*” (Bilandzic et al., 2020, p. 1). As described in Chapter Three, *National Geographic's* images set the scene of the plastic story. “Photographs have had an important role to play in the ‘environmental awakening’ since the 1960s” and “images serve to arouse emotions, to stimulate action or to open up windows on the nature that still seems to exist somewhere out there” (Seppänen & Väliverronen, 2003, p. 59). *National Geographic* provides access to that window given the difficulty for people to see under the ocean’s surface with their own eyes. The photographs featured in the *National Geographic* articles exemplify how images accentuate the point that another environmental awakening is needed to address the plastic issue. Moreover, the environmental impacts of plastic and the direct results of people’s actions towards the plastic problem allow for a tangible understanding. It is easy to visualize less plastic in the environment as a result of reducing plastic consumption and usage. In this way, Rowland’s function of encapsulating a point is incorporated in the magazine’s call to action.

If people can identify as a character in *National Geographic's* plastic story, they may feel encouraged to take part in forming a future with less plastic. “Stories have the potential to

influence people's understandings and beliefs, and essentially, promote a societal and cultural change [Schank & Berman, 2002; Brock, Strange, and Green, 2002]" (Avraamidou & Osborne, 2009, p. 1687), strengthening the idea that *National Geographic's* plastic story can incite action per the third subtheme. People as a character in *National Geographic's* plastic story have the opportunity to live a more environmentally conscious lifestyle and be more aware of plastic usage. This pro-environmental behavior is defined by Kollmuss and Agyeman (2002) as "behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world" (p. 240). Visual information, such as the photographs in *National Geographic's* articles, that "guide an audience through complex information is a reliable communication strategy to increase a viewer's willingness to critically evaluate pro-environmental information" (Lazard & Atkinson, 2015, p. 27). But foundationally, "narratives may allow for a more 'realistic' assessment of thoughts about the environment...well-constructed narratives tap into some of the different ways that people actually think about environmental issues" (Shanahan et al., 1999, p. 417). This goes along with Dahlstrom's 2010 explanation of understanding narrative to help communication practitioners increase effectiveness in persuasion: "Narratives remain an influential, yet complex mode of communication that individuals use to learn about and respond to the world. Expanding our understanding of the effects of internal variables of narrative may help to better understand its persuasive nuances" (p. 870). The article images that set the plastic story scene (see Figures 3 and 4) have the potential to persuade people to engage in pro-environmental behavior, which entails reducing plastic entering the environment in the case of *National Geographic's* plastic story.

In the broader context of environmental communication, this research shows that narrative strategies can serve to persuasively get a message across to an intended audience

regarding environmental topics. Shanahan, Pelstring, and McComas (1999) argue that “narratives are important to an understanding of environmental issues” (p. 408). They also state that “the narrative approach is particularly important now, when mass media play a huge role in the construction of environmental issues” and “media typically rely on narrative forms of communication, even when communicating important scientific information about the environment” (Shanahan et al., 1999). *National Geographic* and other information distributors fall under mass media and thus play a part in how people receive information pertaining to environmental topics. Researchers have studied how written narrative and images influenced people’s understanding of the world around them with some of these studies looking at people’s perception of climate change (Avraamidou & Osborne, 2009; Dahlstrom & Rosenthal, 2018; Nicholson-Cole, 2005; O’Neill et al., 2013). What is intriguing is that no studies to date look at the effects of narrative on people’s understanding of marine debris. Of course, narrative strategies alone in communication cannot solve the world’s environmental crises so narrative techniques in a field like environmental behavior warrant further research. This investigation of *National Geographic* articles can contribute to work that addresses how narrative strategies can be used in environmental communication. However, there are potential unintended consequences as a result of merging written and visual narrative with science communication. This has been observed in research involving narrative and climate change communication.

O’Neill et al. (2013) conducted a study where they tested people’s reactions to climate change imagery “to begin to shed light on how people may engage with climate imagery in mass media sources” since “...fear-inducing images [can] distance or disengage individuals, rendering them feeling helpless, overwhelmed and not empowered to act” (p. 414). While climate change is different than marine debris, with the latter being more tangible and less contested than the

former, they are both pressing environmental issues that may benefit from narrative. O'Neill et al. (2013) found that “in making the intangible tangible, climate imagery can also [paralyze] and [demobilize]” (p. 414). This presents a potential problem, especially if a factor of environmental communication revolves around people taking action. This paralysis is addressed in another study looking at “people’s visual conceptions and feelings about climate change” (Nicholson-Cole, 2005, p. 255).

Presenting emotive imagery....needs to be managed carefully because responses to emotional visual appeals can simply end up triggering defensive psychological responses, leaving the audience desensitized with a sense of ‘issue fatigue’ or leading to feelings of powerlessness to do anything to reduce the causes of climate change. (Nicholson-Cole, 2005, p. 160)

People should be concerned with environmental issues but communication can lead to unwanted effects. Therefore, the combination of narrative and science communication should proceed with care, especially with pressing environmental issues. The work of Blanton and Ikizer (2019) found that unintended consequences may arise from the otherwise well-intended message science communicators are wanting to convey. The first of Blanton and Ikizer (2019) two analyzed case studies looked at an “Implicit Association Test” that “could cause well-meaning individuals to begin the work of correcting for their hidden discriminatory biases” (p. 10). Their second case study looked at “researchers who work to combat historic inequities affecting minority populations” wanting “to identify singular psychological processes that can be directly targeted, to help remedy social problems” (Blanton & Ikizer, 2019, p. 13). Unintended consequences may cause an alternate and undesired effect; in Blanton and Ikizer’s (2019) case studies, there was more implicit bias in the first case study results and the second case study

possibly advocated for “the view that the historically disadvantaged are deserving of blame for enduring disadvantages that they themselves could just have easily fixed” (pp. 13–14). In comparison, *National Geographic*’s call to action aided by images and statistics may pose the danger of action paralysis, effectively causing people to do the exact opposite of a call to action which is not to do anything at all. This paralysis of “the ocean is too big to fix” leads to “depression and lack of engagement and motivation” (Lubchenco & Gaines, 2019, p. 911). Unlike climate change, there is less likelihood of marine debris denial, but the magnitude of the problem may differ between people; someone in a land-locked area might not understand how big of a problem the marine debris crisis is compared to someone who lives along a coast. Additionally, people may be resistant when told to reduce their plastic usage. Thus, it is critical that science is deliberately communicated, factoring in the potential unintentional consequences that may arise. This is because it is “important for scientific disciplines to engage the public through science communication and, as a result, to grapple with the influence such efforts are having” (Blanton & Ikizer, 2019, p. 7). Planning for undesired aftereffects can allow communicators to create responses in advance. While it would take more than just individual action for the plastic problem to subside, someone who may feel overwhelmed and paralyzed by the marine debris issue can be assured by communicators that taking a small individual action is a worthy starting point towards the plastic story’s resolution. A calculated approach in communicating science “might mitigate backlash against scientists, such that they not only better inform the public but also more strongly influence public discourse and policy” (Blanton & Ikizer, 2019, p. 23). At the very least, carefully composing a message takes into consideration the context of the audience. In all, crafting a science-based message using narrative strategies shows

promise of reaching people because of the accessible manner stories hold, but it must also take into account the potential for unintended affects.

Analyzing *National Geographic*'s June 2018 magazine using Robert Rowland's representation of narrative rhetoric shows how the communication of science-based messages can be done through narrative text and images. The four plastic articles analyzed used narrative strategies to convey the environmental problem of marine debris, particularly plastic, offering an example for future research involving the integration of narrative strategies in environmental communication.

### **Future research**

My research identified narrative strategies present in *National Geographic*'s June 2018 "Planet or Plastic?" magazine and reveals that there is potential for integrating narrative strategies in environmental communication. Future research could explore how narrative can influence people's behavior regarding a more tangible environmental topic, such as marine debris. The effectiveness of *National Geographic*'s call to action can be evaluated as a case study similar to those looking at climate change and narrative. Once participants have been selected, the study can be completed in three parts. The first would survey participant knowledge on marine debris and their plastic usage. The second part would involve the participants reading the articles from the *National Geographic* June 2018 magazine and then taking a survey on how the articles made them feel and whether there were any articles or topics that resonated with them. Lastly, the third part of the study would be a follow-up survey set some time after the second survey. This would ask participants if their plastic usage and behavior changed since reading the *National Geographic* magazine, whether the magazine inspired them to look into the topic and change the amount of plastic they use or, like Blanton and Ikizer's work, see if there

were any unintended consequences. The data collected can provide insight to whether *National Geographic's* magazine impacted readers.

The narrative strategies present in the *National Geographic* articles can extend into other works of communication that are meant to be narratives. Rowland's approach to narrative rhetoric can be applied to communication mediums such as documentaries, informational videos, and books. By conducting an analysis similar to this research, narrative strategies can be detected in other works and assessed for effectiveness. Conversely, Rowland's approach can also be used to construct narrative. Noting the parts that make a story persuasive can allow for the maximum potential of building a persuasive argument. Regardless of whether Rowland's approach is used to analyze a narrative piece or construct one, my research revealed the potential usage of narrative strategies in science communication.

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