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## Governing a Continent of Trash: The Global Politics of Oceanic Pollution

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Honors Thesis in Political Science

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**Governing a Continent of Trash: The Global Politics of Oceanic  
Pollution**

Convenience is King and Plastic is the King of Convenience:  
So, Who is the King of the Great Pacific Garbage Patch?

**Abstract**

There is a new continent growing in the North Pacific Ocean known as the Great Pacific Garbage Patch. The Patch is composed of a vast array of marine pollution, discarded single-use items, and mostly microplastics. This thesis explores how and why governments and other entities do or do not deal with the growing problem of ocean pollution. Sovereignty roadblocks and balance of power prove to be obstacles for such efforts. This thesis then attempts to create the ideal model of governance for ocean plastics using the policy-making process. The policy analysis reviews bilateral, multilateral, and non-governmental solutions for the removal of the Great Pacific Garbage Patch and subsequent maintenance efforts. Following the analysis of these three policies, this thesis concludes that a combination of factors from each solution is likely the best course of action.

## Introduction

Imagine: you are on a boat, sailing along on a nice, sunny day in the North Pacific Ocean. There is no land in sight. You are miles from the coast. Something shiny on the ocean surface catches your eye. You keep going. You see that the reflection of light is coming from a piece of plastic. As you continue on, you see more and more plastic: plastic bags, old fishing nets, balloons, lost footballs, and more. What you have always pictured when you dreamed of the Pacific Ocean is clouded by millions of tiny pieces of plastic called microplastics. Instead of the crystal clear waves you dreamed of, you see a soupy mass that should be teeming with wildlife and biodiversity.



Image of ocean plastics from Turn the Tide on Plastic's 2018 race, Sky News

“One side of the boat is paradise, and the other side of the boat is our human waste that’s destroying the ocean.” This is a quote from Liz Wardley, a sailor aboard

Turn the Tide on Plastic, a racing boat in the 2018 edition of the Volvo Ocean Race. She describes her experience in the middle of the ocean, miles away from any sign of human life except the never-ending flow of plastic she sees in her wake. Roughly 8 million tons of plastic enter the ocean each year (Lebreton & Slat, 2018). Because the ocean is so vast and lacks its own government, the plastic problem continues to worsen. Turn the Tide on Plastic added a new element to the world-famous ocean race in 2018; in addition to competing in the round-the-world race, the team dedicated themselves to collecting samples to bring to port for land-based scientists to measure microplastic levels in different parts of the ocean. The results were astounding: in the most remote place on earth, Point Nemo in the Arctic Ocean, the closest humans are in the International Space Station. Even here, the Turn the Tide on Plastic team collected water samples containing microplastics (Sky News, 2018).

The Great Pacific Garbage Patch in the North Pacific Ocean, twice the size of the state of Texas, is an example of a global lack of governance on a common-pool resource (CPR) (Lebreton & Slat, 2018). The ocean makes up the majority of the earth, and yet, there is no government that controls it. Thus, the sea fills up with plastic spoons and discarded fishing gear, leaving little room left for the survival of marine life. The influx of plastic leads to reduced ability of the ocean to act as a carbon sink, which speeds up climate change and global warming. Ocean pollution also causes a decline in biodiversity of marine ecosystems (Craig, 2012).

In order to combat the ocean pollution problem, the hard science needs to get into the hands of people other than just scientists and academics. It needs to be

accessible and open to the public. Politicians and lawmakers around the world need to be able to have a comprehensive understanding of the ocean pollution issue and recognize that it is an interdisciplinary topic. Scientists in a lab are not going to solve the problem on their own. Lawmakers in a landlocked capital are not going to come up with the solution on their own. Social justice advocates cannot solve the plastic problem without help from others. Studies of ocean plastic pollution have failed to come up with a realistic, sustainable solution. I hypothesize that this in part is due to a lack of significant and meaningful cooperation between disciplines, the absence of a government to control the ocean and what goes into the world's largest common-pool resource, and the inability to stop the flow of trash into the sea.



Image of sailor Liz Wardley collecting samples during the 2018 Volvo Ocean Race, Sky News

The ocean pollution problem is complicated for a multitude of reasons: the first being that marine pollution cannot be treated as any other global issue because it transcends boundaries. Everyone in the world benefits from the ocean and its resources. However, there is no hard law that prohibits an endless influx of trash.

Furthermore, scientists are not aware of the full extent of the problem because there is not data available for all marine species and ecosystems and the harm that has been caused to habitats as a result of marine debris. Ocean pollution is likely harming more than just the creatures that are visible to the human eye. The question remains: how can an island made of trash be governed? How can the ocean, an entity bigger than anything else on Earth, be regulated?

To understand why these questions need answers, one must first find out why and how ocean pollution has become a boundary-transcending issue. The Great Pacific Garbage Patch is growing rapidly and is made up of trash from all over the world (Lebreton et. al, 2018). The main component of the trash vortex is plastic. Most of the plastics in the Patch are single-use, disposable items. This includes 386 objects with recognizable words or sentences written in nine different languages. Items with visible writing show that the debris in the trash vortex was produced in at least twelve different countries (Lebreton et. al, 2018). This increase of oceanic plastic pollution is adversely affecting marine ecosystems (Gall & Thompson, 2015). As of 2015, there are at least 690 species being affected by marine pollution, of which 17% are endangered. 92% of marine life interactions with debris in the ocean are with plastic, of which 10% resulted in animals ingesting microplastic (Dauvergne, 2018). The world's oceans are in a compromised state due to a lack of proper governance (Dauvergne, 2018). One of the most challenging parts of the plastic pollution problem is how long plastic takes to degrade. It breaks down into smaller pieces called microplastics that can be just as, if not more, harmful than macroplastics (larger pieces of plastic that are visible to the

human eye). Plastic also has the ability to absorb harmful chemicals which then leak into the ocean, adding to the destruction of marine ecosystems (Dauvergne, 2018).

The plastic problem is beyond the scope of present-day government capabilities because of the fragmented nature of different governments and the lack of alignment between states. In general, current governance mostly focuses on short-term business goals and political interest over ecosystem health. The increase of plastic pollution in the ocean, especially in the case of the Great Pacific Garbage Patch can be credited with a rise in global consumption rates (Dauvergne, 2018). The convenience and durability of plastic is part of why it is overused today. This contributes to increasing profits of companies that make and distribute plastic, which disincentivizes legitimate action of any kind (Dauvergne, 2018). As a result, the plastic industry continues to grow, despite the bleak fate of the world's oceans. Consumers are unaware of the process in which their goods are made and often fail to realize that the plastic waste these processes produce are harmful to the environment. Thus, corporations are rarely held accountable and will not adjust their practices (Dauvergne, 2018).

The vast majority of marine pollution comes from dry land. A significant amount comes from fishing nets and equipment. Some pollution ends up in the ocean because of shipping failures and crashes (National Geographic Society, 2019). The Great Pacific Garbage Patch is more than just a pile of trash floating in the Pacific Ocean. It has been accumulating pollution and growing for years. Beneath the surface, there is much more. Under and around the patch are thousands of particles called microplastics which are smaller pieces of plastic waste that have been broken down to almost invisible sizes,

much of it coming from discarded fishing equipment. Though these microplastics are small, they cause significant environmental degradation, as they contribute to loss of biodiversity and dangerous algal blooms (Gall & Thompson, 2015).

This policy analysis aims to determine what works and what fails in terms of marine pollution governance. Three different solutions are analyzed: bilateral cooperation, a multilateral agreement, and citizen/NGO action. The analysis outlines the strengths and weaknesses of each proposed solution and comes to the conclusion that a combination of all three is needed to tackle the Great Pacific Garbage Patch. This issue will not be solved without the cooperation of actors all over the world as it is a global issue.

## **Background**

The Great Pacific Garbage Patch is a collection of marine debris in the Pacific Ocean that is made up of two patches - the Western Garbage Patch off the coast of Japan and the Eastern Garbage Patch between Hawaii and California. The North Pacific Subtropical Convergence Zone, a large circulating ocean current, links the two areas of spinning debris. Marine debris gets caught up in major currents that carry it to centralized locations known as trash gyres. There are five main trash gyres on Earth: the North Pacific Gyre, the South Pacific Gyre, the North Atlantic Gyre, the South Atlantic Gyre, and the Indian Ocean Gyre. The most well-known is in the North Pacific because of the Great Pacific Garbage Patch (National Geographic Society, 2019). 54% of the pollution in the Patch comes from land-based activities in North America and

Asia. 20% comes from boaters, offshore oil rigs, and cargo ships that lose or dump their contents at sea. 705,000 tons of discarded or lost fishing nets are the most abundant debris in the gyre. Computer monitors, LEGOs, cigarette butts, food wrappers and containers, Styrofoam cups, and plastic water bottles are among the items that are found in the Great Pacific Garbage Patch (National Geographic Society, 2019).

Plastic is the most abundant material found in trash gyres of the world. This is due to plastic's unbeatable combination of durability and affordability. Plastic is not biodegradable, so it breaks down into smaller pieces (microplastics) and perpetuates the problem (Boerger, 2010). It is relatively easy for plastic debris to make its way to the ocean, as 50% of the world's human population lives within 50 miles of the ocean. Plastic debris also enters the ocean through inland urban storm drainage systems (Harse, 2011). Ocean plastic poses significant threats to the health of marine ecosystems, water quality, human health, economies, and environmental justice. Marine life mistakes plastic for food in the trash gyre, often resulting in injury or death. Seals and other marine mammals often become entangled or trapped in discarded fishing nets and drown. Marine debris, especially the clouds of microplastics on the ocean's surface, disrupt marine food webs, as well, by blocking sunlight from reaching plankton and algae. The animals that feed on plankton and algae suffer without sufficient sunlight. Consequently, the food chain is disturbed. Water quality is compromised when plastic breaks down in the ocean, releasing harmful chemicals and toxins into the environment, further jeopardizing the health of marine ecosystems (Boerger, 2010). Plastic enters the human food chain through sea life's ingestion of plastic trash. This

increases the risk of cancer and birth defects. Beachgoers are also put at risk when medical waste and other harmful marine debris collects close enough to the shoreline. Not only does excess plastic pollution in the ocean pose a threat to ecosystems and humans, it also creates economic risk: 85% of tourism revenue in the United States comes from coastal states. Clean and scenic coastlines draw tourists that may be less inclined to visit because of an increase of plastic pollution (Butt, 2007). Social and news media tend to show images of turtles, fish, and marine mammals suffering as a result of ocean plastic pollution. What the news fails to report on, however, is the effects of ocean plastics on humans. The United States, the United Kingdom, Germany, and Japan are the world's top exporters of plastic waste. When China stopped accepting these exports in 2018, plastic waste began to flood into Southeast Asia where global southern countries are not prepared to stop or manage it. Open plastic burning of this trash to ease the physical burden of ten-foot high piles of plastic in some cases has instead led to the release of harmful toxins into the air (Lin, 2019).

Ocean pollution has already contributed to the degradation of human health, the environment, climate justice, and economics. The literature review section of this policy analysis dives into the obstacles that hinder sufficient action against ocean pollution, including sovereignty, balance of power, and common-pool resources. The literature review also outlines what efforts have been put into place and how they can be models for future solutions.

## Literature Review

The literature relevant to marine plastic pollution focuses on these main subjects: the overarching theme of sovereignty, common-pool resource theory, balance of power, and the study of areas beyond national jurisdiction. Sovereignty determines what and where a government rules. The ocean has no single government that wholly controls it which is partly why plastic and other types of marine pollution continue to cause destruction to marine ecosystems, global sustainability, and climate justice with no end in sight. Common-pool resource theory addresses the concept of resources like the ocean that are used by many, but not necessarily well regulated, and often show deterioration with overuse. The open ocean is an area beyond national jurisdiction, so it is used freely by many and regulated by few. These theories and concepts provide authors with the tools to suggest solutions to the plastic pollution problem. Authors identify governance improvements, sustainable development suggestions, marine protected areas, and the cooperation of governments and other entities to clean up and prevent ocean trash vortexes like the Great Pacific Garbage Patch.

### Sovereignty

In international law, sovereignty is the means by which statehood is defined. Sovereignty requires states to consent to treaties and international law (Goldsmith, 2000). A review of issues involving sovereignty and international law argues that sovereignty has changed with the rise of globalization, transportation, and communication. As the world becomes increasingly interconnected, there is an erosion

of the concept of national sovereignty because of non-governmental organizations and international human rights law. Sovereign states are now following the rules of governing bodies that they never had to before (Goldsmith, 2000). International law is a coordinating device that can help states to work collectively and does so through various restrictions. The unilateral agreement is that international law is to be followed by all, despite common and repeated failures to do so, because international law goes against sovereignty. International agreements are regularly violated, yet few nations believe they can completely disregard international law. This is because of the “organized hypocrisy” of international law: nations have unequal levels of power. Thus, some states are able to break away from sovereignty norms and international law without consequences (Goldsmith, 2000). This uneven distribution of power is difficult to combat in terms of international laws and agreements because there is no final authority to resolve disagreements (Krasner, 2004). Some hypocrisy in international politics can be necessary, as it decides which actors will control which initiatives. There is the potential for states that have more of a responsibility for a certain issue to take the lead in solving that problem (Finnemore, 2009). On the other hand, organized hypocrisy is dangerous in that it can lead to countries like the United States with its “American exceptionalism” to take charge of certain matters and fail to follow up. Instead, justifications and excuses are used because of the unequal amounts of power that lie in the hands of some world leaders (Finnemore, 2009). The uneven balance of power allows some states to push back against international law and the limits it imposes, thus undermining the intended collective outcome. Solving global problems requires global

collaboration. American exceptionalism and organized hypocrisy can hinder the success of international agreements and laws by allowing some states to do less work to achieve the goals of said agreements and laws.

### Common-Pool Resources

An important aspect of the literature on plastic waste and marine pollution in general is the concept of common-pool resources. Common-pool resources are resources that are not confined by traditional property rights, meaning that anyone within a defined group can use them. When valuable common-pool resources are left unregulated, which is part of their nature, the result is degradation and destruction (Ostrom, 1999). Misregulation of the ocean and marine pollution can be used as an example of the tragedy of the commons. The tragedy of the commons, in this case, refers to the phenomenon of overharvesting of an open-access common-pool resource (Ostrom, 2008). The result of unregulated commons is a mess that no one takes responsibility for due in part to the difficulty of international coordination.

The definition of common-pool resources can be used politically in a number of ways, but has the potential to hinder international cooperation (Barkin and Rashchupkina, 2017). One of these definitions includes the idea that common-pool resources require international cooperation. International law, however, is designed in a way that makes this cooperation difficult. The pursuit of individual interests can inhibit collective action. As such, common-pool resources go unregulated. Collective action for common-pool resources typically occurs when relevant actors seek to overcome the

problems associated with said resource and agree on the means by which they will do so (Steins and Edwards, 1999).

The increase in popularity of public goods literature can be credited to the recent upward trend of international development. This increase is also due to global concerns about environmental degradation and natural resource depletion. Failures of state management and market-based policies have caused policy-makers to push for community-based conservation (Agrawal, 2003). With an increase of international development, however, there is potential for more, larger common-pool resources to go unregulated. There is also the potential for international development to remedy the marine pollution problem, so long as the regulation and monitoring of common-pool resources are taken into account by relevant actors to protect these resources. The expansion of international development may provide common-pool resources with the protection of larger numbers of actors and governments. However, analyses of common-pool resources are for the most part unpromising and highlight the need for better governmental regulation to slow ocean pollution.

### Areas Beyond National Jurisdiction

The study of areas beyond national jurisdiction (ABNJ) is another concept that complicates the governance of marine pollution and speaks to the transboundary nature of the issue (Vince and Hardesty, 2016). Areas beyond national jurisdiction have not one entity, organization, or government that is in charge of their maintenance. Unlike common-pool resources that may be closer to or part of certain states' jurisdictions,

ABNJ more commonly refer to the “high seas” and as such, lack the global framework necessary to stop degradation caused by humans (IUCN, 2019). The United Nations Environmental Program has put forth guidelines for mitigating the harmful effects of climate change, including in ANBJ, but these guidelines are non-binding.

Areas beyond national jurisdiction pose challenges to governance because of the absence of consequences for users (Merrie et. al, 2014). This is due in part to a lack of unified and consistent institutional framework for governance that connects different groups of users of ABNJ. Research provides evidence that future uses of ABNJ may be unregulated, as development and technological advancements continue to expand. The predicted trend is that international laws and frameworks will not move as quickly as development will. As a result, current users of ABNJ are expected not to slow, but to speed up development and increase use of these areas (Merrie et. al, 2014).

The key to governing ABNJ is already in the United Nations Convention on the Law of the Sea: the answers that scholars have been looking for exist, but have not yet been put into place (Elferink, 2012). The implementation of a comprehensive set of principles for the governance of the ABNJ of the world would prove useful. The purpose of these principles is to provide a basis for governing ABNJ, the most relevant to this policy analysis being “Respect for law of the sea, in particular the LOSC and related instruments; International Cooperation; [and] Sustainable and Equitable Use” (Elferink, 209). These principles, if implemented properly, would aid in the process of cleaning and maintaining common-pool resources.

### Current and Past Legislation

The Great Pacific Garbage Patch can be seen as a gap in international law. Soft law dominates global efforts to govern the ocean, yet has not solved the issue. Soft law includes any legal instruments that are technically non-binding, like principles and regulations (Vince & Hardesty, 2016). Trash vortexes around the world continue to grow despite soft law principles that attempt to combat this problem, much of which were formed at non-binding United Nations conferences. Prior to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Dumping Convention) in 1972 and the International Convention for the Prevention of Pollution from Ships (MARPOL) in 1973, there was not much in the way of regulation of marine pollution from on-land or on-water sources. The legislation that came out of the London Dumping Convention was effective in terms of controlling and limiting ocean dumping. However, the imposed restrictions are not self-regulating, meaning states around the world have not been in full compliance or enact the legislation at different levels and times (Vince & Hardesty, 2016). While the London Dumping Convention and MARPOL have implemented some valuable regulations, they fail to address how sovereignty and power may affect intended results. To improve these initiatives, it is suggested that coastal nations create their own legislation in compliance with the restrictions. The 1973 MARPOL is a way of trying to fill in the gaps left by the London Dumping Convention (Vince & Hardesty, 2016). It explicitly prohibits dumping of any kind of plastic at sea. However, compliance of coastal states is impossible to ensure because of the soft law nature of the Convention.

Law of the Sea is meant to regulate marine pollution because, as the largest common-pool resource, the world's oceans have been treated as dumping grounds (Joyner, 2005). The 1982 United Nations Convention on the Law of the Sea puts forth the obligation of states across the globe to protect the ocean. The obligation the UN gives to states is not just to the surrounding waters and immediate shores, but to the ocean as a whole. The issue with this idea is that it does not account for ABNJ because of the non-binding nature of UN laws and agreements. It also does not address the issue of sovereignty, which hinders the potential for cooperation of international actors.

To reduce the harmful effects of overfishing, the 1982 United Nations Conference on the Law of the Sea established Exclusive Economic Zones (EEZs) (Ostrom, 1999). These zones extend 200 nautical miles off the coasts of ocean-bordering states. Sovereign powers are in control of EEZs and are meant to monitor and regulate the ocean. EEZs make up about a third of the world's oceans. However, this has not proven successful in terms of environmental protection and mitigation or prevention of ocean pollution. Some of the states that control EEZs have used the given legal power to increase fishing instead of the necessary and crucial decrease, hence the issue of governing common-pool resources. EEZs also do not make up for the lack of governance of ABNJ even farther from coastlines (Ostrom, 2008).

### Suggestions from the Literature

Suggested improvements to governance of the ocean to reduce marine pollution include: (1) the incorporation of marine spatial planning in governance; (2) increasing

the resilience of ecosystems by reducing stressors; and (3) anticipating future effects of climate change (Craig, 2012). To incorporate marine spatial planning into ocean governance, all present and future uses of the ocean must be considered (Craig, 2012). This can be accomplished through the implementation of marine protected areas, which are heavily regulated by the government. The laws of marine protected areas (MPAs) limit how much fishing, recreation, and shipping can occur. MPAs help avoid shipping accidents and collisions by shifting shipping lanes so that there is more than enough room between trade routes. Rezoning of marine protected and similar areas can also help with ocean governance. Australia's Great Barrier Reef Park is an example: rezoning began in 2004 and resulted in the successful protection of examples of all seventy different bioregions in the area (Craig, 2012). MPAs and marine reserves protect biodiversity.

As development increases around the world, it is necessary to improve the resilience of marine ecosystems. This can be done by limiting fishing, recreational activities, removing litter, and reducing land pollution in oceans. Land-based pollution is one of the most difficult obstacles to ocean planning and management (Craig, 2012). Ocean managers are able to make efforts to limit marine pollution when their communities are aware of the issue. Climate change threats to marine ecosystems that are already recognized as important have a better chance of being solved. In Australia, for example, farmers, ranchers, and the government worked together to reduce runoff pollution coming from agricultural fertilizers when it was discovered to be detrimental to the Great Barrier Reef. The wellbeing of the Great Barrier Reef is important enough for

the Australian government to adjust or implement environmental regulations because of the revenue it creates as the biggest tourist attraction in the country. Lastly, ocean governance needs to anticipate the needs and uses of the ocean (Craig, 2012). To do so, anticipatory planning and regime adjustment are suggested (Ostrom, 2008). Anticipatory planning allows governments to prohibit the building of expensive and harmful infrastructure, like offshore energy developments.

Building off of the United Nations Sustainable Development Goals will lead to successful mitigation of plastic pollution (Haward, 2018). Past United Nations conferences and the Montreal Protocol can be used as a model for dealing with marine pollution. Community action and the participation of civil society can also aid in the governance of the ocean and its pollutants (Haward, 2018). Over the past 50 years, soft law advancements have protected oceans, but often from oil spills and dumping and not from land-based sources (Dauvergne, 2010). Individualizing of responsibility is suggested to clean up and solve the plastic problem in certain countries and the delegation of responsibility to corporations that are causing the pollution. Because of the vastness of the ocean and its nature as a common-pool resource, soft law does not accomplish enough to protect it from human pollution. Scholars suggest a bottom-up approach and for nations to implement their own policies for better governance.

#### Public opinion regarding marine pollution

This policy analysis reviews potential solutions for cleaning up the Great Pacific Garbage Patch. While there is not an official consensus on whether or not public

opinion affects policy output in general, in “public welfare” cases, the success of policies and efforts are dependent on support from the public. Monetary contributions and political support are also crucial to the success of public welfare policies, but supportive public opinion is especially important because it provides environmental groups with a lobbying tactic (Dunlap, 1997).

In May of 2019, around 180 United Nations countries came to an agreement that is aimed at decreasing the amount of plastic that enters the ocean. This policy should increase transparency and regulation of the global plastic waste trade (Miles, 2019). In a statement from the executive secretary at the UN Environment for the Basel, Rotterdam & Stockholm Conventions, Rolph Payet, plastic waste is “acknowledged as a major environmental problem of global concern” (Miles, 2019). This statement validates the idea that public support increases the success of environmental policies.

According to a United Kingdom poll, most people in that country believe that banning single-use plastics will help combat ocean pollution. Many citizens of the UK also believe that businesses and the government are not doing enough for mitigation. Ricardo Aguilar, a Research Director at Oceana, a nonprofit dedicated to influencing policy to preserve and restore the world’s oceans (Oceana mission statement), said in a statement regarding the UK poll that it is clear that the public is invested in the reduction of plastic waste to preserve oceans (Madina & Lawson, 2019). Two-thirds of US residents polled by PBS NewsHour and Marist Poll said that they would pay extra to avoid plastic when shopping (Santhanam, 2019). However, not everyone is in favor of paying more to contribute less waste: 2018 Rasmussen Reports revealed that US

citizens prefer the plastic bag ban over the five-cent fee for plastic bags (Rasmussen Reports, 2018).

Fortunately for marine pollution policy efforts, the trend in public opinion is, for the most part, supportive. This proves useful for the solutions outlined in this analysis to clean the Great Pacific Garbage Patch. Public support for marine pollution mitigation efforts should likely also mean support for maintenance of the North Pacific Ocean after cleanup efforts have completed.

#### The theories as they relate to plastic pollution

Sovereignty is a concept in international law that determines nationhood, including a state's tendency - or lack thereof - to abide by international laws and regulations. The marine pollution epidemic has the potential to worsen so long as nations prioritize sovereignty over environmental protection. Decreased sovereignty and increased participation in international laws and treaties are a result of increased global awareness of environmental issues due to globalization, for example (Goldsmith, 2000). Plastic pollution and degradation of the ocean as a major common-pool resource in general are getting more attention on the international level because of increased communication. The ocean is the world's largest common-pool resource, thus, it is crucial to this policy analysis to identify ideas and theories for solutions. Common-pool resources are prone to destruction because of their nature, and the ocean is no exception. Most of the literature on areas beyond national jurisdiction focuses on the high seas because of its undiscovered mystery that humans have not yet captured or

controlled. ABNJ literature includes suggestions and studies that are intended to provide insight as to how to regulate the presently unregulated and undiscovered ocean. Legislation so far has made some progress as to limiting the abilities of some entities and bodies to pollute freely, but the lack of a central governing body over the ocean prohibits the full success of these agreements and regulations.

The literature regarding ocean pollution reveals that it is an issue that cannot be solved by just one actor, but rather must be tackled by a group of different types of people working together. Different researchers propose related ideas on how to govern the Great Pacific Garbage Patch and other trash vortexes. Most recognize the need for global cooperation. What is missing is an emphasis on individual and consumer choice, as well as viable, non-anthropocentric solutions, and clear plans on how to incentivize different actors to work together and prioritize the ocean, arguably Earth's most valuable resource. This policy analysis dives into what the literature so far lacks and leads to the discovery of solutions to marine pollution and the governing of an island made purely of human-produced trash.

## **Methods**

The research question of this policy analysis is: how can the transboundary issue of rampant ocean pollution be governed in today's world? In order to come up with a solution to the governance issue concerning plastic and other oceanic waste, my research takes an inductive approach to the literature. Using meta-analyses, I discover what works and what fails in terms of international law on the Great Pacific Garbage

Patch and other trash vortexes. From this, I create my own policy solutions.

Meta-analytical works from authors like Dauvergne (2018) and Craig (2012) aid in my determination of how marine pollution governance thus far has succeeded and how it has failed. These works provide insight on how to adjust and implement suggested policies.

This policy analysis considers three potential solutions to ocean pollution in the Great Pacific Garbage Patch: US-Japan bilateral effort, a multilateral agreement, and citizen/NGO effort. To assess the feasibility of these options, I consult the three main sections of the policy-making process: adoption, implementation, and impact (Boyer, 2019). I also use the visualization of the policy design process as outlined in the Handbook of Public Policy to inform my reviews of each proposed solution (Bobrow, 2006). Adoption is the first part of the policy-making process, as a policy must first be accepted by the relevant decision-making bodies. Here, the structure of the policy as well as the appropriate level of government (or other entities) are decided. Before the next step of the policy-making process, it must be decided whether or not that policy can be implemented. Implementation is determined by whether or not the policy will be carried out and the problems and choices the policy will face. To be implemented, it must be supported by the right parties. Experts and the bodies that will be implementing must also be chosen. The impact is then assessed to determine whether or not the policy will do what it is meant to and if that impact will be optimal or satisfactory. Then, the question is whether the impact can be adopted and implemented despite or in conjunction with external factors, reactions, and responses. The final stage of

policy-making is evaluation/impact. Evaluation is crucial to the process because policies often need to be re-worked after implementation to ensure success. To find which solutions have the potential to work in terms of pollution in the North Pacific Ocean, each is reviewed through the lens of this policy-making process. My research uses this framework to consider each step in terms of the three solutions I propose. I consider the benefits and the shortcomings of international law, ABNJ, sovereignty, and common-pool resources to determine the best practice for governing the Great Pacific Garbage Patch and ocean pollution in general. I apply the policy analytic framework to analyses of the ocean pollution problem to determine the success of the potential solutions identified.

The variables I study are the constraints against action, level of ocean pollution governance in different nations, attitudes toward plastic, and the adoption, implementation, and impact of each suggested policy. I create three diagrams for each proposed solution; these diagrams analyze the adoption, implementation, and impact phases of the policy-making process. The analyzed policy suggestions are bilateral effort, multilateral agreement, and citizen/NGO action.

The main factors that I consider in my research are sovereignty, balance of power, and the idea of common-pool resources in terms of what prohibits sufficient action for ocean governance improvements. Sovereignty and power balances help determine which parts of each suggested solution will or will not be successful. I use common-pool resource theory to understand how to better regulate the biggest CPR in the world: the ocean. In this policy analysis, I outline three different potential solutions to

the Great Pacific Garbage Patch, where they may fail and where they may succeed, and how the implementation, adoption, and impact phases of each will look.

The main cause of the Great Pacific Garbage Patch is lack of governance and all of the factors that contribute to it, including sovereignty, balance of power, and common-pool resource theory. The relevant effect in this case is the increase in ocean pollution. In order to identify the cause of marine pollution as a lack of governance, proper governance must be defined. Proper governance in this case will be defined as meaningful, realistic legislation concerned with oceanic pollution (Dauvergne, 2018). Common-pool resources, like the ocean, are likely to be damaged or destroyed when unregulated (Ostrom, 1999). Therefore, the cause being sovereignty and the lack of jurisdiction and the effect being harmful oceanic pollution are related in the sense that inaction contributes to the growth of the Great Pacific Garbage Patch and other trash vortexes around the world.

My research question, how to govern the global plastic pollution issue, requires answers from analysis of the three suggestions that I propose to clean up the Great Pacific Garbage Patch. I utilize the policy-making process to make these analyses. Focusing on the Great Pacific Garbage Patch gives my research a geographic area to analyze that is large enough to encompass multiple potential areas of jurisdiction, and small enough to see significant change with the right policy.

The most challenging aspect of this policy analysis is to create a solution to an unprecedented and boundary-transcending problem. Without a global police force, existing solutions to this problem are difficult to enforce. One of the biggest obstacles to

overcome in the ocean pollution problem is determining responsibility, which is addressed in each of the analyses of the solutions. Differentiating what pollution comes from what corner of the world can pose a challenge, but these suggested policy frameworks encourage international cooperation so that not just one state is held responsible.

I have identified some of the gaps in the litigation on plastic pollution in the ocean and the factors that are contributing to oceanic pollution. I have looked at efforts to clean up the ocean, as well. These ideas, theories, and concepts are expanded as I analyze the three suggested solutions to the Great Pacific Garbage Patch problem.

## **Analysis**

Cleaning up the Great Pacific Garbage Patch - and preventing future accumulation of waste in this area - is no small task and cannot be done by one actor or state alone. This policy analysis reviews three different ways to clean up the Patch and determines which will be most successful: bilateral effort of the United States and Japan, global multilateral action, and billionaire philanthropy/NGO action. The traditional policy-making process is used in this analysis to determine the viability of each solution. This process is made up of adoption, implementation, and impact. The first suggestion that this policy analysis considers is a bilateral effort between the United States and Japan to rid the North Pacific Ocean of the largest oceanic collection of garbage in the world.

The two main concepts that have protected oceans and limited marine debris thus far are marine protected areas (MPAs) and Exclusive Economic Zones (EEZs) established in the 1982 United Nations Conference on the Law of the Sea. MPAs were created to protect the ocean resources and therefore limit the amount of pollution allowed in the area (Craig, 2012). EEZs provide states with a certain area of ocean that the government monitors (Ostrom, 2008). If used for conservation efforts, EEZs and MPAs may provide the key to reducing harmful trash vortexes like the Great Pacific Garbage Patch. Thus far, however, the North Pacific Ocean does not belong to an MPA or an EEZ and will not be protected by these laws. As such, the proposed solutions put forth in this policy analysis recognize the need for specific action for the Great Pacific Garbage Patch.

#### US-Japan Bilateral Effort

The Great Pacific Garbage Patch is surrounded by Japan and the US West Coast. Governing of the Patch is almost nonexistent because it is in the North Pacific Ocean, a territory untamed by traditional boundaries. However, the Patch affects a marine sanctuary that is incorporated within Title III of the US Ocean Dumping Act. Title III “calls for the protection and maintenance of natural biological communities” (Dautel, 2009). The US Ocean Dumping Act concentrates on the municipal and industrial waste entering waterways that lead to the ocean. Though these two types of dumping were significant contributors to oceanic waste, they are not the most significant in terms of what fills ocean trash vortexes (US EPA, 1988). Large-scale plastic dumping began

decades before the Ocean Dumping Act passed and the Patch was not discovered until 1997 (Parker, 2018). The Ocean Dumping Act has made strides in terms of reducing municipal and industrial waste levels that enter the ocean, not enough to slow accumulation of waste in the North Pacific Gyre. The United States and Japan are the two countries closest to the Great Pacific Garbage Patch, so it can be argued that their respective governments should be responsible for cleaning it up.

To get rid of the Great Pacific Garbage Patch, the implementation of a new government coalition can facilitate cleanup efforts. Cooperation between US and Japanese Naval officers could be the beginning of this process. Besides merchant marines, Navies and Coast Guards have the most interaction with the sea and therefore will be better able to understand and deal with the Patch. Before any humans or machines actually go out into the North Pacific Ocean where the Patch is located, a team of experts will be assembled. Naval officers, waste management experts, environmental scientists, policy-makers, climate and social justice activists, and financial experts will make up the intergovernmental panel. Naval officers will carry out the cleaning process. Waste management experts will work with environmental scientists to determine which parts of the Patch to prioritize at the start of cleaning. Policy-making experts will determine which initiatives will be approved by the governments and the public. Climate and social justice advocates also need to be consulted as ocean pollution (as many other issues involved with climate change) affects impoverished groups the most. Not only does plastic pollution in the ocean lead to contamination of the food chain when ingested by fish and other marine life, it can

harm livelihoods even before the seafood makes it to the plate. 4Ocean, a company that sells bracelets made out of plastic from their beach cleanups worldwide, started because of the founders' experience in the developing country of Bali, Indonesia. Peoples' lives are at stake when they can barely get their fishing boat off the beach because of the sea of trash that awaits them (4Ocean). The needs of fishermen like those in Bali and in other developing countries around the world and other groups that rely on the ocean for their main source of income need to be taken into account throughout the cleanup process. Financial experts also need to be consulted in order to come up with the funds and how they will be allocated to facilitate this process.

The efforts of the US-Japan coalition will be too large-scale to be funded by any current environmental protection funds in either country. A new fund will need to be created. This will be organized and facilitated by both countries' environmental protection agencies, the US EPA and the Japan Ministry of the Environment. A project of this size will cost between \$122 million and \$489 million in a year, before disposal of pollution or labor costs (Moore, 2018). Allocated funds for the cleanup project should come out of sectors that benefit as a result of plastic and other oceanic pollution, including government assistance to organizations and corporations that produce large amounts of plastic waste.

The largest cleanup in history, the Ocean Cleanup started by Boyan Slat, created new passive technology that uses a large net with a floater at the surface and a sea anchor beneath. This allows for ocean currents to push plastic and other marine debris to collect in the net (The Ocean Cleanup, 2019). Though this technology is still being

developed, it is thus far the most effective method to clean up the Patch. Nets like these, however, must be used with extreme caution, as they can unintentionally trap marine wildlife (Fox & Henry, WWF). Wildlife experts and environmental scientists can aid in cleanup efforts by helping to avoid bycatch and choosing which parts of the Patch to focus on first, thus eliminating threats to marine life.

The bilateral effort of the US and Japan is able to get around the obstacles of sovereignty and common-pool resource theory. Bilateral effort manifests as the classic solution to the collective action problem: the most affected group puts forth the leadership and bears the cost because it expects to gain significant rewards. In this case, the two closest countries to the problem, the Great Pacific Garbage Patch, are the affected groups that will solve the issue because they arguably have the most to gain. However, balance of power between the two states' leaderships may prove to be an obstacle, as one state may want to contribute more or less than the other.

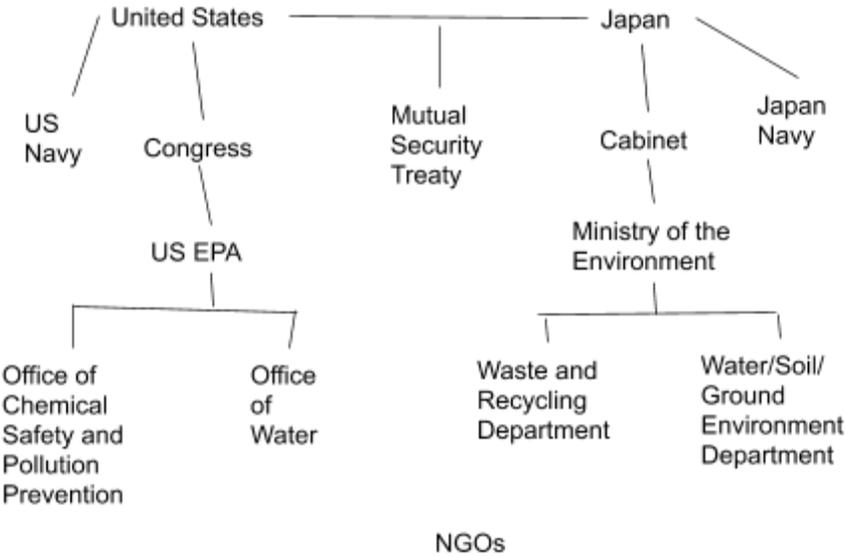


Figure 1. US-Japan Bilateral Effort - Adoption

Before any of the action outlined in the bilateral policy suggestion takes hold, it must pass through the adoption part of the policy-making process. For the intergovernmental coalition to be successful in its cleanup efforts, both the US government and the Japanese government need to be fully committed. This will not happen without support from the general public of each nation. Fortunately, the general trend of public opinion in the US is looking favorable in terms of ocean pollution action. A study was published in 2019 that found US consumers to be more concerned with plastic in the ocean than with climate change in general. When confronted with circular alternatives and local plastic bans, consumers are more focused on how they can help change the ocean pollution narrative (Shelton Group, 2019). In Japan, images of the Great Pacific Garbage Patch have been garnering support for elimination of plastic waste and exposing the gravity of the situation in the North Pacific Ocean (Johnston, 2019). As one of the leaders of waste management in Asia and the Pacific and having begun efforts to eliminate plastic waste in the 1990s, it is likely that Japan will be committed to the cause (Kojima & Iwasaki, 2019).

Figure 1 above represents the model that this policy analysis suggests for the US-Japan bilateral effort to remove the Great Pacific Garbage Patch in terms of the adoption part of the policy-making process. The Mutual Security Treaty between the US and Japan states that both countries promote economic stability and well-being of all of their citizens (MOFA). As such, a bilateral effort to eliminate the Great Pacific Garbage Patch is upheld by this treaty. Both the US Congress and the Japanese Cabinet need to adopt the policy before implementation. If the policy is approved by Congress, it will be

adopted by the Environmental Protection Agency and dealt with by the Office of Chemical Safety and Pollution Prevention and the Office of Water (US EPA). Within the Japanese government, the Ministry of the Environment must adopt the policy. From there, the Waste and Recycling Department and the Water/Soil/Ground Environment Department will go forward with adoption (Ministry of the Environment). Navies from both countries will also need to adopt the policy, as they will be the main facilitators of cleanup efforts. The diagram also includes the possibility of support from NGOs in the adoption process to advise and assist in the policy-making process.

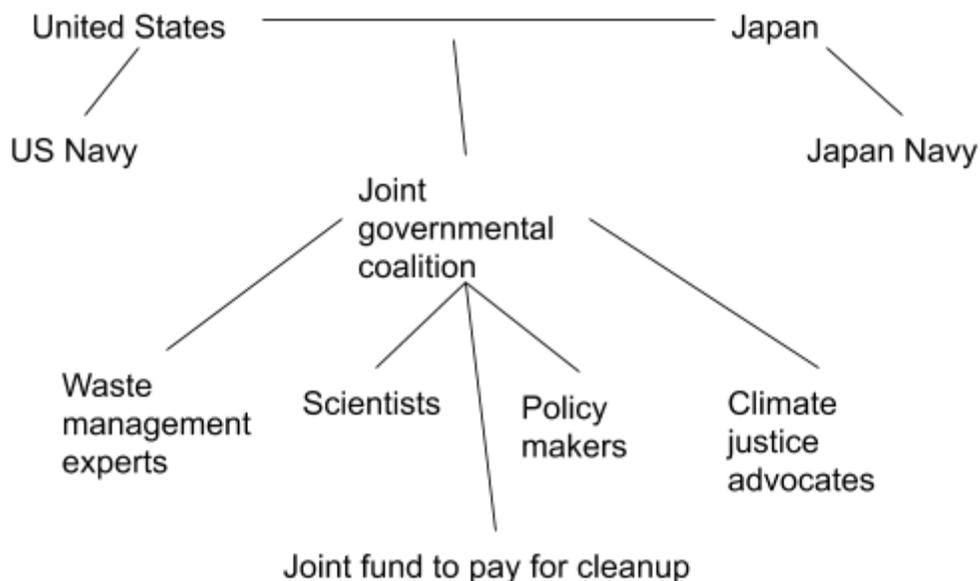


Figure 2. US-Japan Bilateral Effort - Implementation

The next step is the implementation portion of the policy-making process, that is, how the job will be carried out by the responsible parties. Public opinion trends show that there will likely be enough citizen support for these policies to pass. Thus, this

pressure will help the actions of the intergovernmental coalition to work efficiently. If adopted, it will be crucial for each group within the coalition to work together despite being on two different continents. Because the Great Pacific Garbage Patch is so vast and difficult to contain, it will be important for the coalition to have regular meetings to update each country on the other's progress and to be sure that all resources are being utilized. Citizens of the US and Japan will have to hold their governments accountable in order to ensure the bilateral effort is successful.

Figure 2 above outlines the implementation process of the US-Japan bilateral effort to eliminate Great Pacific Garbage Patch. Mainly, the policy will be carried out by both the US and Japan navies. The plan, however, will be made and enforced by a joint government coalition made of waste management experts, scientists, policy-makers, and climate justice advocates from both countries. Financial experts from both the US and Japan will organize and implement a joint fund to pay for the project.

Peer pressure will be a helpful factor in carrying out the implementation part of the policy-making process. The United Nations' Intergovernmental Panel on Climate Change will be a useful tool. Both the US and Japan are members of the United Nation. If pressure is needed from other UN countries to expedite the policy process, the coalition could be monitored and advised by the IPCC. Peer pressure can be a useful tool in making sure states are fulfilling promises. Peer review has become a popular tactic with the increase of self-assessment. Governments take closer looks at their own policies when they know they will be reviewed by other governments (Sawyer, 2011). In the case of the bilateral effort solution, this idea may prompt better collaboration

between the US and Japan. If the US and Japan partake in peer review within the new coalition, progress is likely to increase. Peer pressure from the IPCC will also be effective. If done right, the peer review mechanism will allow for the coalition to gain support from the international community (Sawyer, 2011).

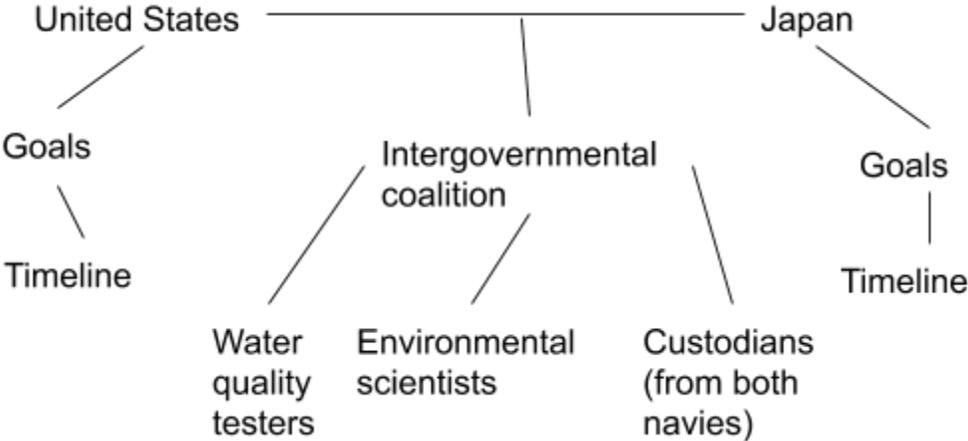


Figure 3.a. US-Japan Bilateral Effort - Impact

The final part of the policy-making process is impact. Impact refers to whether or not the policy will achieve what it is meant to. The impact also takes into account whether or not the policy was the optimal choice. Because it is estimated to take years to clean up the entirety of the Great Pacific Garbage Patch, it will be difficult to measure the impact of the bilateral effort solution. In order to make this process easier, policy goals need to be set. These will include: eliminating the Great Pacific Garbage Patch by targeting the most detrimental parts first, doing so efficiently and cost-effectively, keeping environmental justice in mind throughout the process, and ultimately limiting the amount of waste that enters the ocean from Japan and the US.

Figure 3.a. outlines what the impact of the bilateral effort between the US and Japan will look like. Goals and timelines will be set by the intergovernmental coalition created in the bilateral agreement. If the goals are reached and the timeline is followed, the policy should be successful. Figure 3.b. below shows which parts of the US-Japan bilateral effort will aid or hinder success.

<u>Successes</u>	<u>Failures</u>
Two countries focus on one problem and hold each other accountable	Only two countries involved so other countries are less inclined to decrease waste
Policy will be put into place sooner than an agreement involving more parties	Current US administration does not prioritize environmental protection
Japan-US Security Treaty	US and Japan may not contribute to cleanup effort as much because other countries also contribute to the GPGP

Figure 3.b. US-Japan Bilateral Effort - Impact (cont.)

When the cleanup efforts of Japan and the US conclude, the success of the coalition will be measured by whether or not the Patch continues to accumulate waste. The Japanese and US Navies will serve as the custodians of the North Pacific Ocean by creating branches within their Navies to monitor ocean dumping and boats on major shipping routes. Monitoring the Patch will also entail monitoring of coastal communities in the US and Japan to limit land-based pollution. Unfortunately, the intergovernmental coalition will not be able to monitor other countries that contribute to the collection of marine debris in the North Pacific Ocean. Because of this, it is likely that the coalition will need to regularly check the area until marine debris is no longer a cause for environmental concern.

There are some factors to take into account that will prove to be obstacles to passing this initiative. For example, the current federal administration in the US does not prioritize environmental concerns. In fact, after his inauguration, President Trump archived the EPA's website's section on the Ocean Dumping Act (EPA, 2016). Besides political opposition, the scale of this issue is beyond what any government has taken on in terms of environmental management.

Management of the North Pacific Ocean after the cleanup will be necessary to ensure a worthwhile impact. Waste management experts involved in the intergovernmental coalition can pull data from collections of oceanic pollution to then create public education campaigns on how to limit personal plastic waste. Though consumers have the power to change the markets to an extent, a lot of the responsibility for plastic waste lies in the hands of major corporations who consistently produce plastic packaging for worldwide exportation. Companies like Coca-Cola and Amazon produce significant amounts of plastic waste. Data from waste management experts will ideally expose these companies and others and motivate citizens of the US and Japan to want to keep the ocean clean.

Climate and social justice advocates will publish stories of how plastic waste has contributed to the detriment of humankind. When China stopped accepting the majority of the world's plastic waste in 2018, garbage began to accumulate in the developing countries of Thailand, Malaysia, and Vietnam. When these countries were not fully able to handle waste from the developed countries of the world, it made its way to Indonesia, which was already suffering because of plastic waste. The waste that North America

and Europe now have to handle on their own ends up in low income communities. Because they lack the political and monetary resources to prohibit the accumulation of trash in their towns, impoverished and poor people must watch the waste pile up and contribute to already compromised environments (Lin, 2019). Stories like that of the fishermen in Indonesia and the trash mountains in South Korea may motivate citizens to fight corporations that profit off of plastic waste.

### Global Multilateral Action

The second proposed solution to the Great Pacific Garbage Patch that this policy analysis reviews is global multilateral action and the creation of a multilateral agreement. Before any type of global action occurs, the Great Pacific Garbage Patch must be considered a global crisis. Countries around the world must recognize how trash vortexes threaten national security. As discussed above, the Patch does not only threaten marine ecosystems; it harms humans and economies, as well. Plastic from the Patch ends up in the food chain and subsequently in the fish served in restaurants around the world. The Patch and trash vortexes like it have the potential to disrupt tourism industries in coastal communities. Fishing stocks are threatened by marine pollution, as well. Ocean pollution will continue to worsen and to increase its negative effects on the health of the planet, of humans, and of economies around the world without meaningful action.

Some scholars argue that the marine pollution problem is one that needs to be taken care of by the entire world because it has been caused by “global

mismanagement” of the production of plastic and other types of waste that litter the ocean. Worldwide cooperation in cleanup efforts may be crucial to the elimination of trash vortexes like the Patch (Gold et. al, 2014). Over the last decade, international governmental and nonprofit organizations have recommended a variety of strategies to remedy ocean pollution. In general, there has been agreement that global efforts are necessary. Because of increasing awareness of environmental issues internationally, the trend of treaties and agreements since the 1970s leans toward reduction and control of pollution, rather than research efforts (Weiss, 1993). Despite agreement, there has still not been one plan that solves the ocean pollution problem (Gold et. al, 2014). Existing limitations and restrictions on the production of plastic have been insufficient. The most promising efforts have been regional, not international. While smaller in scale, regional initiatives can be useful when combined with other legislation. Otherwise, limiting plastic waste significantly is unlikely because every state adds to ocean pollution (Gold et. al, 177). Some scholars suggest combining new international legal mechanisms with existing regional, national, and subnational plans to clean and reduce marine litter while focusing on plastic debris.

Oceanic trash vortexes are a global issue that will continue to become more harmful to marine ecosystems, humans, economies, and planetary health. Thus, global multilateral action could be the answer. Not only would global efforts be useful to the cleanup of the Patch in terms of the availability of personnel to execute the plan, global effort may lead to a collaborative sense of responsibility to keep the oceans clean afterwards. This policy analysis reviews the plan laid out by Gold et. al to create new

legal mechanisms to combine with existing mechanisms to eliminate the Patch and prevent growth.

Gold et. al cite the Montreal Protocol as a model for a new international agreement to remove marine litter and to prevent accumulation (Gold et. al, 186). The Montreal Protocol on Substances that Deplete the Ozone Layer was signed in August of 1987. Since its acceptance in 1989, it has gone through nine revisions. The Montreal Protocol is one of the most effective environmental policies in history as it significantly decreased the size of the hole in the ozone layer through restrictions on chlorofluorocarbons and other ozone-depleting substances.

To solve the ocean pollution problem, Gold et. al require domestic action to accompany new international law (Gold et. al, 2014). Features of the proposed international law include altogether banning the most harmful types of plastic that become marine litter, regulation of waste disposal, tracking, monitoring, reporting, and enforcing mechanisms. Further, the ideal framework includes an international body of scientific experts, a revamp of public education internationally, convening international leadership, and funding for data collection (Gold et. al, 2014).



Figure 4. Global Multilateral Effort - Adoption

To begin the process of a multilateral agreement, world leaders will meet in a United Nations conference. Before a conference like this is called, the UN must agree that marine pollution is an international crisis. Once this happens, world leaders will meet and use the Montreal Protocol as guidance (Gold et. al, 186). Cooperation from all states is crucial and goes further than an international agreement. Existing state regulations and agreements will continue if working correctly and will be revamped as needed. World leaders and state governments at all levels will adopt this idea as part of the multilateral agreement.

Figure 4 above shows how the adoption process of a global effort to remove the Great Pacific Garbage Patch would look. First, the United Nations must recognize the need for a multilateral agreement to address the marine pollution problem. From there, the UN will form an intergovernmental coalition that includes scientists, naval officers,

and climate justice advocates from the involved UN states to ensure the needs of all parties are adequately addressed in the agreement and subsequent plan of action.



Figure 5.a. Global Multilateral Effort - Implementation

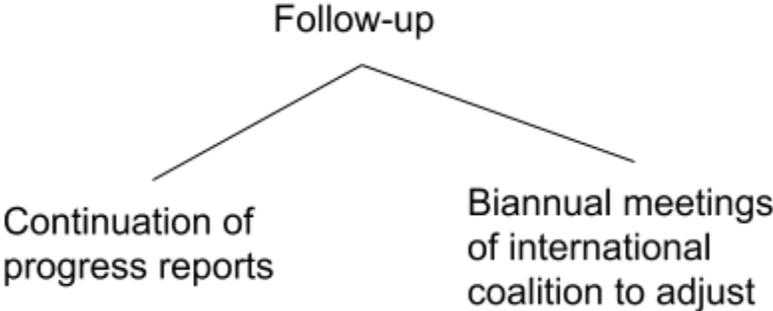


Figure 5.b. Global Multilateral Effort - policy follow-up

An international group of scientific experts will be present at the initial conference and also play a critical role in the entire process. This group will be responsible for creating regular progress reports about the cleanup effort (Gold et. al, 2014). The Montreal Protocol was an exceptional case in the sense that the science behind the

problem was discovered and less than two decades later, the solution was already being implemented. The hole in the ozone layer was discovered in 1985 and the Montreal Protocol was created by 1987 (Leahy, 2017). Conversely, the Great Pacific Garbage Patch was discovered in 1997 and there has been no sufficient legislation for removal in the way legislation was quickly and efficiently created to close the hole in the ozone layer (Parker, 2018). Further, the public has been aware of marine pollution in general since the 1970s (History.com Editors, 2018). In theory, using the Montreal Protocol as a guide for this an international agreement to remove the Great Pacific Garbage Patch and the dismantling of the plastic waste markets is a sound idea. However, the lack of sufficient action thus far given the length of time the public has been aware of ocean pollution is something that needs to be taken into account and may hinder the implementation process.

Figure 5.a. above represents the beginning of the implementation process of the global multilateral effort to remove the Great Pacific Garbage Patch. The plan will be executed by navies and environmental scientists from the involved UN states. The scientists will be in charge of creating and distributing progress reports to the necessary actors. Implementation will also require the cooperation of global efforts and regional/state efforts. The follow-up of this plan, after the Patch is removed, will include continued progress reports to ensure that pollution is no longer entering the ocean at high rates and biannual meetings of the international coalition to adjust the policy accordingly.



Figure 6.a. Global Multilateral Effort - Impact

<u>Successes</u>	<u>Failures</u>
Support from the general public	Global agreements take a long time to create and to implement
Many states contributing to the multilateral fund	Some states may not pull contribute their required amount (especially if responsibility is unevenly distributed)
States will hold each other accountable	Compromises in policy to accommodate many states

Figure 6.b. Global Multilateral Effort - Impact (cont.)

In terms of the impact of a multilateral agreement to eliminate the Great Pacific Garbage Patch, a shift in public opinion may occur. A global effort to solve a global problem will get a lot of media attention, thus garnering public support. In that sense, the policy will do what it is meant to. Multilateral agreements take a lot of time to go into effect and to make real change. An international policy of this caliber may take years or decades (Gold et. al, 2014). However, for the health of the ocean and marine ecosystems, time is running out, which may make international cooperation a suboptimal choice.

Figure 6.a. above represents the impact of a global multilateral effort. The newly created intergovernmental organization will likely cause a shift in public opinion toward action on marine pollution in any state that has adopted the policy. The goals and timeline of the multilateral effort must be met for the impact to be optimal. Outlined in Figure 6.b. above, the success of a multilateral agreement will be supported by UN states holding each other accountable and a multilateral fund with contributions from most participating states. The process of creating international environmental law is expensive and lengthy. It is more cost-effective to create new treaties and agreements within an existing governing body, like the United Nations (Gehring, 2007). The success of a global multilateral effort to remove the Great Pacific Garbage Patch may be hindered by the traditionally long timeline that is characteristic of international agreements, the possibility of some states not contributing their required effort, and potential policy compromises to please many actors.

Sovereignty and balance of power may prove to prohibit the success of a multilateral agreement. An agreement like this creates international law for many states to follow. However, sovereignty can get in the way and some actors may choose to contribute less than agreed upon with no hard law to enforce the goals of the agreement. Furthermore, each state has a different level of power that will determine how much they are able to contribute to begin with. The nature of the North Pacific Ocean as a common-pool resource, though, will be useful in the implementation and subsequent maintenance of the removal of the Great Pacific Garbage Patch. The acknowledgment of the North Pacific Ocean as a common-pool resource will call for all

involved actors to uphold the multilateral agreement even after cleanup efforts are complete.

The Montreal Protocol was taken on by 196 states and the European Union. For the developing countries who have not yet been able to fully phase out chlorofluorocarbons, the Multilateral Fund for the Implementation of the Montreal Protocol was created. The Multilateral Fund eases the transition away from chlorofluorocarbons and prevents developing countries from being left out of the process (Secretariat of the Multilateral Fund for the Implementation of the Montreal Protocol). This Fund is a major contributor to the success of the Montreal Protocol. Thus, any global multilateral efforts to clean up the Great Pacific Garbage Patch should include something similar. It will be difficult for any country, but especially for developing nations to completely eliminate plastic from their markets.

#### Billionaire Philanthropy & Nonprofit Organization

The third proposed solution to the Great Pacific Garbage Patch reviewed in this policy analysis is the philanthropic efforts of a billionaire combined with the technology and resources of a non-profit organization dedicated to cleaning up ocean pollution. The idea is that nonprofit organizations have the technology and some of the personnel to facilitate a major cleanup but lack the necessary funding. If a billionaire were to bear the costs, a cleanup has the potential to get started much quicker than the law-making process would require in the first two solutions discussed in this policy analysis. For this solution, though there are other non-profit organizations that have been making

valuable contributions to the field of oceanic pollution cleanup, this policy analysis focuses on the Ocean Cleanup, a non-profit organization based in Rotterdam, Netherlands. The Ocean Cleanup is known as the largest cleanup effort in history and has already concentrated on the Great Pacific Garbage Patch (The Ocean Cleanup, 2020). In this scenario, the cooperation of the government of the home state of the specified nongovernmental organization or nonprofit coupled with the cooperation of the government of the state in which the project will be based is critical to the success of this policy.

There are a few notable nonprofits and NGOs that should be considered in the case that this proposed solution to the Great Pacific Garbage Patch were to be adopted. Besides the Ocean Cleanup, there is 4Ocean, which this policy analysis has discussed, as well as other organizations that have created substantial efforts to reduce ocean pollution, such as Surfrider Foundation and Take 3 (Goodnet, 2014). While these organizations promote, sponsor, or fund beach and ocean cleanups, this policy analysis focuses on the Ocean Cleanup because of its technology specifically dedicated to removing trash vortexes like the Great Pacific Garbage Patch.

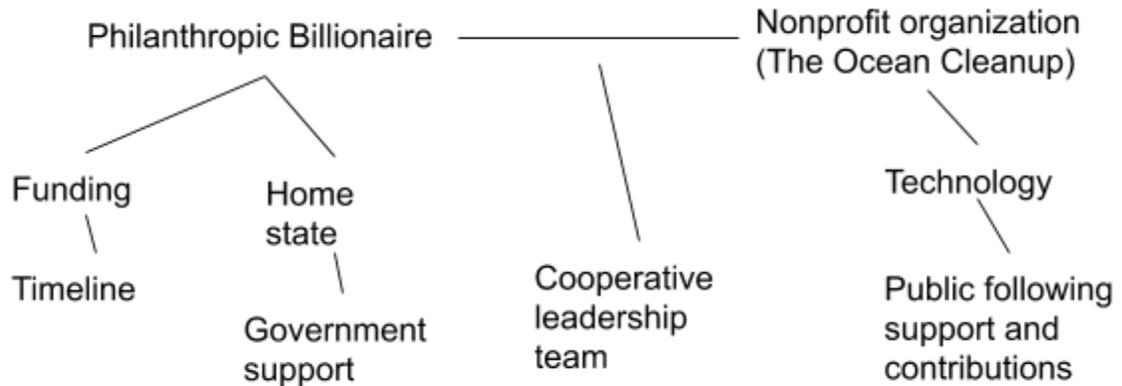


Figure 7. Billionaire Philanthropy & Nonprofit Organization - Adoption

In terms of adoption of a partnership between the Ocean Cleanup and a philanthropic billionaire, the first part of the policy-making process will be determining how much money will be donated. This will require the efforts of the Ocean Cleanup to request the funds needed for the removal of the Great Pacific Garbage Patch, including personnel and technology costs. As demonstrated by Figure 7 above, the billionaire and the Ocean Cleanup will form a cooperative leadership team composed of scientists and engineers from the nonprofit and the billionaire's financial experts. The members of this group will work together to establish what funding is necessary and how long the project will run. The Ocean Cleanup will be in charge of maintaining the technology used in the cleanup process and will gain support and monetary contributions from its public following to aid in the process.

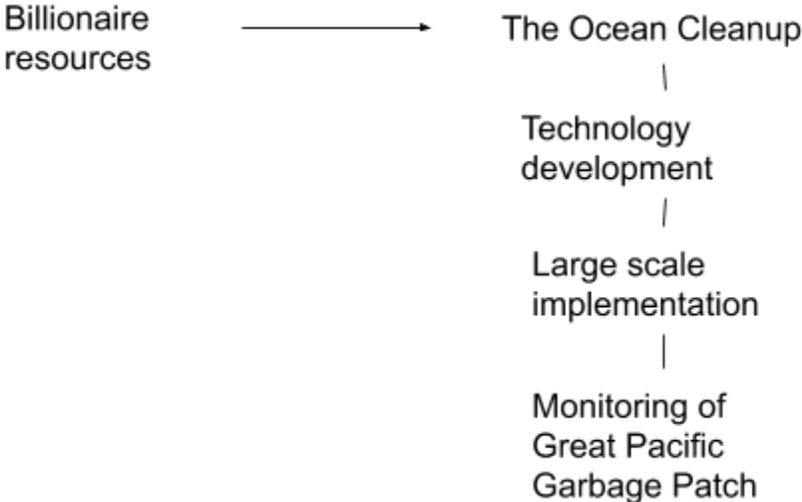


Figure 8.a. Billionaire Philanthropy & Nonprofit Organization - Implementation



Figure 8.b. Billionaire Philanthropy & Nonprofit Organization - Implementation (cont.)

Figure 8.a. above represents the implementation portion of the policy-making process for the collaboration between a billionaire and the Ocean Cleanup. The funds provided by the billionaire will go toward ramping up the existing efforts of the organization. Funding will also contribute to the monitoring of the North Pacific Ocean after the Ocean Cleanup has removed the Great Pacific Garbage Patch. Figure 8.b.

above represents the collaboration between the billionaire and the Ocean Cleanup that will be necessary for implementation. The joint leadership team will ensure that the funds are being put to use as intended and that management of the North Pacific Gyre is being facilitated after removal efforts are complete.

<u>Successes</u>	<u>Failures</u>
Waiting for government approval is not required	Billionaire could choose to end the project with no follow-up plans
Waiting for funding is not required	Few actors involved so few states inclined to limit waste to keep North Pacific Ocean clean
Process moves faster with few actors involved	No mandate/law requires the project to be finished by a certain date

Figure 9. Billionaire Philanthropy & Nonprofit Organization - Impact

The citizen/NGO effort to clean up the Great Pacific Garbage Patch is unlikely to be adversely affected by sovereignty as the two main actors, the billionaire philanthropist and the Ocean Cleanup are not restricted by any new international law. On the other hand, however, balance of power may still become an obstacle, if the two actors have conflicting views on the cleanup process. Also, with only two main actors, the issue of common-pool resources comes into play: there is little incentive for other actors/states/governments to do their part in keeping the ocean free of pollution to prevent the accumulation of a new Great Pacific Garbage Patch after cleanup efforts have ceased, arguably the most salient obstacle to the success of this proposed solution.

The table displayed in Figure 9 above represents the factors that will contribute to the success or failure of the policy. Because the policy does not need to be approved or implemented by a government, the impact can be greater because it will not be delayed by governmental processes or restrictions. The funding also comes with the involvement of the billionaire and does not need to be allocated by any governing body. Typically, policies with fewer actors move faster than those with many actors (Krasner, 2004). On the other hand, with fewer actors involved, there is the potential for states to feel uninvested and to choose not to limit their production of waste to maintain the health of the North Pacific Ocean. There is no law that requires the project to be finished by a certain time. While follow-up is necessary, there is the possibility of the billionaire choosing not to fund any post-cleanup monitoring, which may hurt the impact of the policy. To avoid this, before the start of the cleanup the billionaire and the Ocean Cleanup should agree on a management plan following the elimination of the Great Pacific Garbage Patch.

The success and failure criteria of the US-Japan bilateral effort, global multilateral action, and the billionaire philanthropy & nonprofit organization solutions are the same. The solution will be deemed successful if almost all or all of the marine debris is removed from the Great Pacific Garbage Patch and if maintenance of the area is successful to keep the ocean clean. This will be determined by whether or not there is enough money to fund the cleanup, if the existing technology and equipment is sufficient, and if the organizational and/or scientific capacity exists to accomplish the goals set forth by each policy.

## Findings & Conclusion

The three proposed solutions that this policy analysis reviews, a bilateral effort between the US and Japan, global multilateral action, and citizen/NGO cooperation, highlight the need for a change in current legislation to address the ocean pollution crisis. A US-Japan bilateral effort may move more quickly than a global effort, but may not provide the Great Pacific Garbage Patch with enough actors to ensure it will not return to the ocean. This proposed solution avoids the problems involved with sovereignty and common-pool resources as it puts the most affected leaderships at the forefront of the issue, therefore they can expect significant reward if cleanup is completed. Balance of power may disrupt the proposed solution, however, because two actors with unequal resources may not be inclined to contribute the same amount of effort. A multilateral agreement to create global multilateral effort for the cleanup of the Great Pacific Garbage Patch may take too long and the ocean could pass the point of no return. In this case, both sovereignty and balance of power may get in the way of the success of this policy suggestion as so many actors may allow for the slacking off of some. Common-pool resource theory, however, will aid in the success of a multilateral agreement: many actors involved in one problem will see it through and maintain the cleanup of the Great Pacific Garbage Patch afterwards. The combined efforts of a billionaire citizen and the Ocean Cleanup may do enough to remove all of the garbage in the Patch, but could once again allow its return to the North Pacific Ocean if no states or actors feel responsible for keeping their waste out of the ocean. This policy option

avoids the issue of sovereignty as no new international law is involved, but balance of power between the two actors may pose a threat to success if their ideas conflict with one another.

Given these considerations, I suggest that a combination of these three frameworks is the best way to remove the Great Pacific Garbage Patch and prevent the accumulation of waste after the fact in the North Pacific Gyre. From the proposed solution of a global multilateral agreement, my suggested policy pulls the global aspect; in order to prevent the growth of the Patch, the global community needs to be mindful of and adjust waste management and production policies. There needs to be a worldwide reduction of plastic and other single-use packaging materials. The multilateral fund suggested in the global multilateral agreement policy suggestion will also be a part of my proposed solution. In order to ensure the success of a cleanup of the Patch, actors worldwide need to have a stake in the game and be invested in keeping the ocean clean after the fact. The team in charge of a worldwide ocean cleanup will include waste management experts, environmental scientists, policy makers, climate justice advocates, and the leadership of the Ocean Cleanup (or another similar nonprofit organization), as suggested in the US-Japan bilateral effort solution. A billionaire will be responsible for kickstarting global action to clean up the Great Pacific Garbage Patch. Fortunately, public support, for the most part, favors action to reduce ocean pollution and will aid in the success of the elimination of the Patch.

First, world leaders will meet to begin the process of a multilateral agreement to ensure the consistent and effective cooperation of actors around the world. From this

meeting, the team of waste management experts, environmental scientists, policy makers, climate justice advocates, and the leadership of the Ocean Cleanup will be formed. This team will plan, oversee, and implement the removal of the Great Pacific Garbage Patch. The team will also determine how much will be allocated to the global multilateral fund for the cleanup of the Great Pacific Garbage Patch. Next, the contributions of a billionaire donor will kickstart the cleanup effort. Finally, after the cleanup is completed, a new coalition for maintenance of the area will be created from the original implementation team. Global cooperation and involvement in the cleanup process will keep the implications of common-pool resource theory from becoming an issue because states around the world will be invested in keeping the North Pacific Ocean clean. Balance of power and the issue of sovereignty will be addressed at the first meeting to ensure that no state is given too big or too small of a role in the process, depending on their resources and size, with guidance from climate justice advocates.

The ocean pollution crisis will not be solved by one actor, one state, one NGO, or one billionaire; this crisis will only be stopped if the world comes together to prioritize the health of marine ecosystems and humanity in general to rid the ocean of the Great Pacific Garbage Patch, and eventually, all of the trash vortexes of the ocean.

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