**Committee: Environmental Sub-Commission 2**

**Issue: The Question of the Great Pacific Garbage Patch**

**Student Officer: Kymberley Chu**

**Position: Deputy President**

## INTRODUCTION

Since the emergence of non-renewable resources such as fossil fuels (coal, petroleum) and the growth of the human population, more solid waste and other harmful contaminants are released into various oceans such as the North Pacific Ocean. The ocean gyres are formed due to rotating ocean currents trapping marine debris, leading to the formation of garbage patches (also known as trash vortexes).

The Great Pacific Garbage Patch consists of the Western Garbage Patch (located in Japan) and Eastern Garbage Patch (located in the west coast of the United States), and it can be found in the North Pacific Ocean but unified by the North Pacific Subtropical Convergence Zone.

As a result, the Great Pacific Garbage Patch is one of the many garbage patches that have led to devastating environmental and economic damage. Such consequences have included the disruption of marine animal migration patterns and the poisoning of marine life such as sea turtles. Bearing these devastating consequences in mind, there have been both individual and organizational efforts in order to eradicate such garbage patches.

## DEFINITION OF KEY TERMS

### Garbage Patch (Trash Vortex)

A garbage patch is an "island" of solid waste (e.g: plastic), formed by marine debris gathered through ocean currents and the wind.

### Ocean Gyre

An ocean gyre consists of circular ocean currents formed by the rotation of the Earth and wind patterns. In addition, an ocean gyre uses its ocean currents to trap marine debris, thus forming garbage patches.

### North Pacific Subtropical Convergence Zone

The North Pacific Subtropical Convergence Zone is an ocean region where warm ocean currents and cold ocean currents interact with each other. The North Pacific Convergence Zone is located in the Pacific Ocean.

### Photo degradation

Photo degradation is defined as the process of breaking down plastic into smaller molecules via the sun.

### Marine Debris (Pollutants)

Solid waste/litter that is disposed into the marine environment (oceans, seas).

### Types of Marine Debris:

#### Ghost Nets

Ghost nets are discarded fishing nets. Trapped in the garbage patch, ghost nets cause marine wildlife to be entangled and eventually die from suffocation.

#### Floating Consumer Plastics

This type of plastic was fully produced and disposed into the ocean. An example would include laundry detergent.

#### Small Plastic Articles and Crushed Plastics

The plastic products are smaller and include products that have been crushed before disposal. Such products include children's toys or toothbrushes.

#### Micro Plastics

Micro plastics are plastic pellets. These pellets can be described as small cylinder shaped plastics.

## BACKGROUND INFORMATION

### North Pacific Subtropical Convergence Zone

The Great Pacific Garbage Patch is located in the North Pacific Subtropical Convergence Zone. This convergence zone is located in the North Pacific Ocean, however due to the ocean gyres that trap marine debris with their rotating water currents, the convergence zone contains marine debris, creating "plastic islands". Not only does the

marine debris reside in the ocean, but also some of the debris reaches the shore, such as the uninhabited Northwestern Hawaiian Islands. Marine wildlife such as sea turtles and albatrosses eat the debris, assuming it was food. In addition, seals and other wildlife are trapped in the discarded fishing nets.

## North Pacific Subtropical Gyre

The North Pacific Gyre's water currents collect the marine debris in clockwise direction. In fact, the gyre consists of four ocean currents: California current, North Equatorial Current, Kuroshio Current, and the North Pacific Current (see Figure 1). The estimated size of the North Pacific Gyre is 7-9 million square miles.

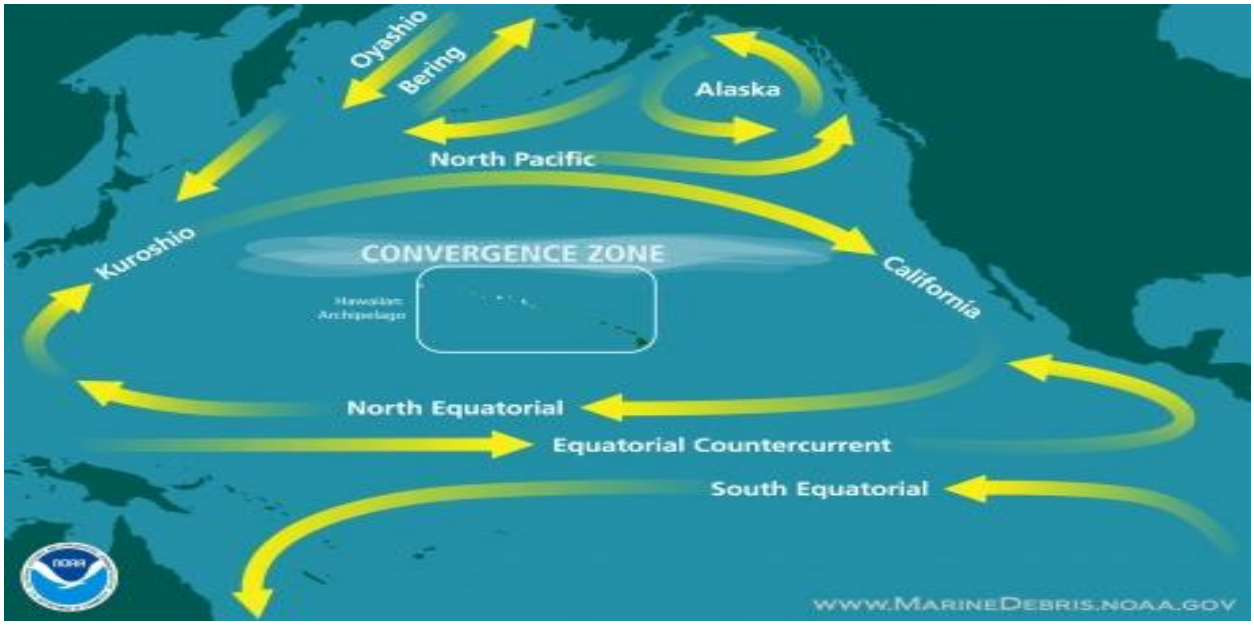


Figure 1: The North Pacific Convergence Zone featuring the four major water currents (California Current, North Equatorial Current, Kuroshio Current and the North Pacific Current).

## Economic Impact

Due to the vast amount of plastic in the garbage patch, countries such as the United States (US) need to spend about 500 million USD per year cleaning up marine debris. Nations and Non-Governmental Organizations (NGOs) will have to spend money on equipment and volunteer efforts to eradicate marine debris on shores and islands. Additionally, the marine debris affects fishing and tourism industries. Ship propellers can be easily entangled in the marine debris and can cause damage to fishing boats.

### Environmental Impact

The marine debris in the garbage patch can be considered to be hazardous for both marine wildlife and the environment itself. For example, marine animals such as the sea turtle entangle themselves in discarded fish nets and have suffocated. In addition, marine wildlife has eaten plastic debris, mistaking it for plankton and smaller living organisms. Another impact is fish contamination. The fish consume plastic debris; as a result, the chemicals in the plastic contaminate the fish we consume. Therefore, the plastic pollution has led to a decrease in marine biodiversity and environmental damage overall.

### Health Impact

Not only is the marine debris endangering marine wildlife, it is also harming humans as well. The plastic molecules break down into smaller pieces and can release pollutants. The plastic molecules can also soak up other toxins in the ocean and these toxins are ingested by marine wildlife. Thus, humans consume fish and other marine mammals that have been exposed to plastic toxins. For example, toxins such as lead and cadmium have been found in fish. Toxins are considered carcinogens and can lead to health effects such as birth defects. A major type of plastic toxin is known as bisphenol-A (BPA), can be found in packaging materials and plastic bottles and affects human hormonal function, leading to other health issues.

## MAJOR COUNTRIES AND ORGANIZATIONS INVOLVED

### Japan

The **Ministry of Environment** in Japan and other environmental agencies have been aware of the Great Pacific Garbage Patch's presence in the North Pacific Ocean. Thus, the Japan Ministry of Environment has permitted grants for both Japanese and non-Japanese NGOS such as the North Pacific Marine Science Organization (PICES) to conduct scientific research on the marine debris in the Great Pacific Garbage Patch. In addition, both the Ministry of Education and the Ministry of Environment have conducted scientific conferences to present their findings on marine debris in the North Pacific Ocean.

The Ministry of Environment has voted upon several legislative measures to reduce the amount of plastic used. For example, **the Law for the Promotion of Sorted Collection and Recycling of Containers and Packaging** was amended and adopted by the Japanese government on March 10, 2006. This law would ensure collaboration with both the national

government and business operators to improve the efficiency of recycling packaging and containers. Also, this bill will implement a system where business operators will have to provide financial aid to the national government and other environmental agencies in Japan while attempting to reduce the quantity of plastic utilized. Therefore, the Ministry of Environment implemented this law to promote the usage of the three R's (Recycling, Reducing and Reusing) in order to reduce the amount of plastic reaching the Great Pacific Garbage Patch.

## United States of America

In the United States, the **Environmental Protection Agency (EPA)** and the **National Oceanic and Atmospheric Administration (NOAA)** have conducted scientific research, monitored the gyres and were involved in beach cleanup initiatives. The EPA currently funds the **National Marine Debris Monitoring Program (NMDMP)** which standardizes data collection about marine debris via a scientific protocol. Hence, this monitoring program can determine the status of the Great Pacific Garbage Patch and develop scientific trends in marine debris. Furthermore, EPA monitors the **National Pollutant Discharge Elimination System** (NPDES). The NPDES controls water pollution through the regulation of point sources (such as pipes) that release pollutants into the national waters.

Furthermore, the NOAA monitors and manages the Pacific Islands Marine National Monument (which consists of islands such as Johnston Island). The NOAA prohibits commercial fishing within the designated islands and conducts scientific research on marine debris. In addition, the NOAA maintains the facilities and wildlife on these islands while collaborating with other NGOs for scientific research.

## United Arab Emirates

Another notable example of innovative legislative reforms is the United Arab Emirates (UAE)'s **Resolution NO. 5/77**. The UAE introduced a law to ban non-biodegradable plastic products. In fact, this law would also enforce manufacturers and suppliers to use biodegradable plastic bags while being assessed under **the Emirates Conformity Assessment System (ECAS).** In addition, the Ministry of Environment and Water also encouraged manufacturers to register their inventory of both biodegradable and non-biodegradable products used. Resolution No. 5/77 was implemented after the Ministry of Environment discovered that plastic bags were hazardous to marine life. Also, **The Gulf News** (a daily English newspaper based in the UAE) distributed free environmentally friendly tote bags to its subscribers and supermarkets also offered jute bags for shoppers to reduce the amount of plastic bags utilized.

## United Nations Environmental Program

**The United Nations Environmental Programme (UNEP)** has coordinated regional and international activities to reduce the amount of marine litter in the oceans. The UNEP collaborates with the Clean up the World Program to provide cleanup activities globally and raises awareness through publishing environmental reports and encouraging legislative reforms for environmental policies. Furthermore, the UNEP developed a global initiative to concentrate on regional ocean affairs. The **UNEP Global Initiative** is responsible for acting as a global platform for coordinating volunteer efforts (such as beach cleanups) and for the creation of partnerships.

In addition, the UNEP publishes various leaflets and books on the topics of marine debris and garbage patches such as "Marine Litter: A Global Challenge". Besides publishing various books, scientific voyages have occurred. **David de Rothschild**, a UNEP climate hero and environmentalist, led a voyage from San Francisco, United States to Sydney, Australia in 2010. The goal of the voyage was to spread awareness about plastic debris in the Pacific Garbage Patch and to encourage the formulation of possible solutions.

Moreover, the UNEP has coordinated workshops for UN member states to raise awareness on marine debris and to address debris management policies. An example would be the First **Northwest Pacific Action Plan (NOWPAP)** workshop. Two NOWPAP workshops were coordinated on November 15th, 2005 and June 8th, 2006. Topics such as monitoring marine debris, management policies on waste and pollution of coastal waters were covered. Hence, the UNEP is responsible for assessing global environmental conditions, facilitating environmental alliances and developing solutions for environmental issues such as the Great Pacific Garbage Patch.

## Project Kaisei

**Project Kaisei** is an ocean clean up initiative for the Great Pacific Garbage Patch developed by **the Ocean Voyages Institute** (a Non-Governmental Organization) consisting of 26 member nations. The ocean cleanup initiative raises awareness about marine debris. Furthermore, Project Kaisei has conducted three scientific research voyages in the North Pacific Gyre in order to provide possible solutions and to determine the types of marine debris that has affected the Great Pacific Garbage Patch.

Furthermore, Project Kaisei's three scientific expeditions (occurred in 2009, 2011, and 2012) led to testing collection device prototypes and scientific data collection in the North Pacific Gyre. Another goal was to provide possible solutions and to determine the

types of marine debris that has affected the Great Pacific Garbage Patch. The results of the expeditions revealed the four major types of marine debris existing in the Great Pacific Garbage Patch: **ghost nets** (fishing equipment abandoned), **micro plastics** (pre-manufactured small pieces of plastic), **floating consumer plastics** (plastic products such as laundry detergent), and **small/crushed plastics** (such as toothbrushes).

Project Kaisei also formed a think tank known as **the Marine Debris Collection Equipment Think Tank**. This think tank includes a group of marine scientists and naval architects who invent and analyze marine debris technology prototypes. Under the team, the prototypes are created and evaluated to ensure marine debris collection.

Besides providing ocean based solutions, Project Kaisei focuses on awareness events on marine debris through educational workshops, seminars, and the creation of a documentary.


Figure 2: The North Pacific Convergence Zone featuring the two garbage patches: Western Garbage Patch and Eastern Garbage Patch.

## TIMELINE OF EVENTS

| Date | Description of Event |
|---|---|
| 1856 | Alexander Parkes creates and patents **Parkesine,** the first form of plastic. |
| 1940s | **The mass global production of plastic.** |
| 1988 | The possible formation of the Great Pacific Garbage Patch is predicted by **the National Oceanic and Atmospheric Administration (NOAA)** in a research paper. |
| 1997 | Sea captain and scientist **Charles Moore** discovers the Great Pacific Garbage Patch in the North Pacific ocean. |
| 2005-2006 | The **United Nations Environmental Programme (UNEP)** reports that 13,000-18,000 pieces of plastic and other solid waste floating in the North Pacific Ocean and in other gyres as well, thus increasing the size of the Great Pacific Garbage Patch. In addition, more marine life such as birds have consumed plastic which led to a decrease in marine life population. |
| January, 2009 | The **Pacific Remote Islands Marine National Monument** is established by the NOAA. The area protects marine life in the Central Pacific Ocean after concerns were raised about the endangerment of marine life consuming plastic in the Pacific Garbage Patch. |
| 2011 | Algalita Marine Research and Education (AMRE) creates **the Plastic Ocean Pollution Solutions (POPS) Education Program** in order to raise awareness and solutions about the Great Pacific Garbage Patch. |
| January 7th, 2011 | The United Micronations Multi-Oceanic Archipelago (UMMOA) publishes the **Great Pacific Garbage Patch Treaty (GPGPT).** |
| June 23rd, 2011 | The GPGPT plans to extend to all global oceans, the GPGPT is renamed as **Multi-Oceanic Garbage Patch Treaty.** |

## UN INVOLVEMENT: RELEVANT RESOLUTIONS, TREATIES AND EVENTS

- "United Nations Convention on the Law of the Sea"- 9/12/1993/RES/48/28
- "Fisheries by-catch and discards their impact on the sustainable use of the world's living marine resources"- 19/12/1994/RES/49/118
- "Development of an international legally-binding instrument under the United Nations Convention on the Law of the Sea on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction"- 11/5/2015/RES/UNGA/99/292

## PREVIOUS ATTEMPTS TO SOLVE THE ISSUE

**The United Nations Convention on the Law of the Sea** was ratified on December 9th, 1993. This resolution was ratified in order to manage marine resources and ensure the protection of marine environment. In addition, the Law of the Sea has given various countries the opportunity to settle sea related disputes in the International Tribunal for the Law of the Sea.

Moreover, in 2009, the United States national government established the **Pacific Remote Islands Marine National Monument** (located in the Central Pacific Ocean) through the creation of Presidential Proclamation 8336 and 9173 after concerns were raised about the Great Pacific Garbage Patch. The designated islands are under the protection of the National Oceanic and Atmospheric Administration (NOAA). Also, legislative actions such as banning commercial fishing within the monument areas occurred under the presidential proclamation policies. In addition, the NOAA is responsible for maintaining island facilities and permitting scientific research within the islands. As a result, the monument's biodiversity has flourished under the NOAA.

In addition, the **Ministry of Environment in Japan** conducts research on marine debris and promotes marine technology development by collaborating with **the National Institute for Environmental Studies (NIES).** Through the NIES, the ministry conducts policy research about environmental conservation as well.

## POSSIBLE SOLUTIONS

Possible solutions include the development of advanced ocean cleanup technology, raising awareness about global marine debris, and developing legislative reforms to be environmentally friendly.

Project Kaisei raised awareness about global marine debris in order to illustrate the impacts of garbage patches on marine wildlife through educational seminars and the creation of a documentary. Also, the Algalita Marine Research and Education (AMRE) has innovative educational approaches instead of traditional awareness events (such as providing pamphlets). **The Algalita Marine Center** established the POPS International Youth Summit. Furthermore, the summit provides advanced training for youth leaders to create solutions for reducing plastic waste through networking activities and workshops.

In addition, an ocean cleaning system will be deployed by **The Ocean Cleanup** in 2016, a group of scientists that develop future technology for ocean related issues. The first ocean cleaning system is considered the longest floating structure (2000 meters) and will attempt to collect plastic waste before the plastic reaches the Great Pacific Garbage Patch. This prototype will later expand to 100 kilometers more between Hawaii and California if considered successful. Hence, this type of technology for cleanup initiatives can be considered efficient and can maintain the marine environment, however, this ocean technology may be costly as well.

Besides purchasing environmentally friendly jute bags for shopping, individuals can also use other environmentally friendly products. For example, Singer Pharrell Williams collaborated with **RAW for the Oceans** initiative. This initiative sells clothing made out of recycled ocean plastic into denim. Furthermore, individuals can participate in volunteer events such as the **International Coastal Cleanup (ICC).** The ICC is an annual coastal cleanup event that occurs globally and usually happens in September.

Thus, there have been both individual and organizational efforts in order to eradicate such garbage patches. For example, multiple cleanup efforts and study projects have been conducted on the Great Pacific Garbage Patch, such as Project Kaisei, and the development of environmental treaties, such as the UN Convention on the Law of the Sea by the United Nations Environmental Programme (UNEP), in order to provide a sustainable future for both humanity and marine life.

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