ISSN 2287-8971

Marine Litter News

Volume 12 • Issue 1 • September 2020

In this volume

Asia Pacific Civil Forum on Marine Litter

Recommended Citation for the whole volume:
Hong, Sunwook.(ed.) (September 2020). Marine Litter News from Asia Pacific Civil Forum on Marine Litter, Our Sea of East Asia Network, Vol. 12(1): 48pp, Tongyeong, South Korea.

ISSN 2287-8971
Marine Litter News Vol. 12(1): 48pp. September 2020.

The newsletter is biannually published by APML.

Preface

Dear readers,

In late July 2020, 29 scientists, including Dr. Winnie W. Y. Lau, published a paper titled 'Evaluating Scenario Toward Zero Plastic Pollution' in the prestigious journal, 'Science'. The paper warns that plastic waste pollution on land and sea around the world will become more serious, and that we must use every means to reduce plastic use and waste right away.

In this issue, you can see vividly what the NGOs and researchers are doing in the Asia-Pacific region to respond to the plastic crisis and to reduce its impact.

First, readers can see an exemplary story in which civil scientists evaluate the amount of trash along Taiwan's main island coast and, based on the results, government officials manage highly polluted areas.

Balloon releasing in many celebrating events are very common in most of countries and balloons finally fall and affect wildlife at sea. In Korea, OSEAN first identified balloon releasing events organized by the government or public organizations. It urged the main organizers to cancel the events to prevent the potential damage and received a promise to stop the event from most of the local governments.

You can see what happened in Hong Kong after the largest plastic pellet spill on the 23rd July 2012. So many volunteers and NGOs have put their great efforts to get clean beaches back. The pollution situation has been improved a lot but remains as a big concern.

From writings from China, one can see how Shanghai Rendu Ocean is engaged in various activities with Chinese NGOs. Their outstanding leadership is helping more organizations become interested in the marine environment and become more active. I'd appreciate it if you could applaud their efforts.

This issue also introduces an environmental fairy tale especially for adults. It is the work of Mr. J.S. Choi, an adviser to OSEAN, who is also an expert on plastic waste recycling in Korea. It is a work that has become a new start as an environmental fairy tale after retirement. I hope you enjoy it together.

In this issue, two manuscripts introduce the latest research findings. First, research results on damage of leisure fishing gears in Korea and investigation of anglers' consciousness, and secondly, estimate of the amount of marine debris generated in Vietnam. I hope you will read those new findings interestingly.

The marine plastic crisis will get much worse in the future. The more we feel about this, the more active our actions will be. Your participation is essential. If you don't know what to do first, it would be good to start with inhibiting the use of disposable plastic used daily.

We will continue to introduce our readers to the great efforts being actively made in the Asia-Pacific region through the Marine Litter News. Please look forward to the next issue.
With love,

Sunwook Hong

Editor, **Sunwook Hong**
(*Ph.D., President of OSEAN*)

Assistant editor, **Jongsu Lee**
(*Researcher of OSEAN*)

Marine Litter News
Vol. 12(2): 2-4, September 2020
Asia Pacific Civil Forum on Marine Litter

Taiwan government embarks upon a new round of rapid assessment on coastal debris

Ning Yen
Co-founder of IndigoWaters Institution
ning@indigowaters.org

Marine debris has become one of the most serious environmental issue to many countries, especially island states which face endless debris transported by ocean currents. Taiwan, located at the western edge of the subtropical North Pacific Ocean, where the Kuroshio Current and China littoral current travel by, also suffers from the impact of marine debris. Recently the Executive Yuan of Taiwan announced a new policy called “Respect to Oceans” addressing systematic beach clean-ups started from 2020. In the policy, the Taiwan Environmental Protection Agency (EPA)’s role was clearly defined to execute regular coordination and inspection of the coastal environment. With its previous experience of coastal debris survey, IndigoWaters Institution, an environment consultant company, will use its expertise and a group of citizen scientists to carry on the survey at EPA’s request.

Fig. 1. On April 11, April 18 and April 22 2020, we conducted three training workshops in Keelung, Kaohsiung and Peng Hu to train 32 surveyors.

In 2018, two Taiwanese environmental NGOs Greenpeace Taiwan and Society of Wilderness (SOW) initiated the first large scale of marine debris survey “rapid assessment” of the entire coastline along Taiwan’s main island. After the one-year survey which was repeated every season, the two NGOs found out that the total volume of anthropogenic debris on the coastline of the main island of Taiwan is estimated at 12,272,000 litres. The most polluted hotspots were concentrated at the northern coast (Keelung, New Taipei City and Taoyuan) and at the southwestern coast (Changhua, Yunlin, Chiayi and Tainan).

After the result of rapid assessment released, the Taiwan Environment Protection Agency (EPA) soon created an inter-government meeting to coordinate the coastal clean-up with other various governmental institutions. Later, the wide media coverage of rapid assessment and polluted coastline has brought attention from caught the central government’s attention and clean-ups therefore became the essence of “Respect to Oceans” policy. Expect In addition to coordinating and leading the coastal clean-up works, the EPA decided to continue the survey work of rapid assessment to build long term data as the reference for checking the implementation of clean-ups and clarifying the polluted hotspots.

The method of rapid assessment was slightly amended from the same method used in Japan and Korea. In 2006, Japan’s Ministry of Land Infrastructure and Transport first made a visual rapid assessment of more than 3,000 of the country’s shorelines. The survey discovered that marine debris was distributed differently across different regions, with quite a considerable amount of variation. In particular, northern Kyushu, northern Tohuku and enclosed water areas such as the Seto Inland Sea, the Ryukyu Islands (Okinawa prefecture) and so on, have relatively large amounts of floating marine debris.

The new round of rapid assessment will expand to remote outlying islands with 168 sampling stations. With 100 meter transect at every sampling stations, the 168 transects represent nearly 1% of the total Taiwan coastline length. The core technique of rapid assessment is to use visual quantifying the volume of marine debris. In Taiwan, we use the big black garbage bag which Taiwanese people are familiar with the its size as the basic unit to count the volume of marine debris. When the garbage bag is 90% full and can be wrapped up, the volume is 80 Liter. At every sampling station, the surveyor transforms the volume of debris into number of garbage bags through naked eyes in the 100-meter sampling transect. Before the survey, all surveyors will take training and repeat examining their estimation of debris’ volume by picking up debris and actual calculation for several times. During the survey, the surveyor will take at least four photos of the transect including the beginning, the end, the representative and the dirtiest spot of the transect to show different perspectives of the in situ debris for later inspection by experienced researchers.

Fig. 2. Reference photo: the volume of 1 big black garbage bag

In the first round of rapid assessment in 2018, the surveyors had to record the basic information of the sampling station including the date, time, location (county and local beach name), longitude, latitude, car accessibility, topography, substrate, orientation and nearby land-use. At that time, we prepared a small clapperboard for surveyors to record the environment information and take the four transect photos with the clapperboard. After counting the volume of debris, the surveyors had to tick the top three abundant (by volume) debris at the sampling station from the 14 debris items revised from the Taiwan version of International Coastal Cleanup lead by American NGO, Ocean Conservancy. In the new round of rapid assessment in 2020, we simplified the procedure and used digital tools such as photography APP with time and location information, and replace paper form with online Google form.

Furthermore, the EPA plans to build a clean-up protocol at different substrate and recreational density. Through combining the first-hand data of rapid assessment and the clean-up activities including effort and cost reported by local government, EPA can better allocate the resource and budget to tackle the complicated issue of marine debris. With continuous survey data, we look forward to understand the distribution, travel route and possible source of marine debris which can contribute to effective environmental management policies in the future.

Marine Litter News
Vol. 12(2): 5-9, September 2020
Asia Pacific Civil Forum on Marine Litter

No balloon release campaign in Korea

Sanghyun Choi, Jongmyoung Lee
Internship student and Chief Science Officer, Our sea of East Asia Network
intern@osean.net, jmlee@osean.net

Fig.1. Balloon releasing events commonly held in Korea as well as in the world

Background

At many events, balloons are being blown into the sky in the hope that the wishes will be achieved. While balloons account for a small portion of marine debris, the risk to the wildlife of them is up to several tens of times higher than ordinary marine debris. Balloons are entangled and ingested by wildlife and causing death. Seabirds and sea turtles are known to mistake balloon as prey and swallow it. However, there is a lack of information in these risks and what damage is currently occurring. While many local governments in South Korea have announced that they will not be holding balloon release events from 2020, media reports of balloon-release events show that they are still being implemented in various places. Some countries are legally prohibited balloon release in public events, but there is no regulation in South Korea.

Fig. 2. Balloon trash that fell on the beach after a ballooning event in some other area.

Balloon release events in Korea

A total of 207 balloon release events were detected in Korean news media from January 1, 2019 to January 1, 2020 (Figure 3). The balloon release events were common throughout the country. In particular, we can see more events were held in the eastern coast. The most popular event to release balloons is the new year's sunrise event, which accounts for about one-third of the total events (Figure 4). Looking at the timing of the event, many events were held in January 2019 and 2020 (Figure 5).

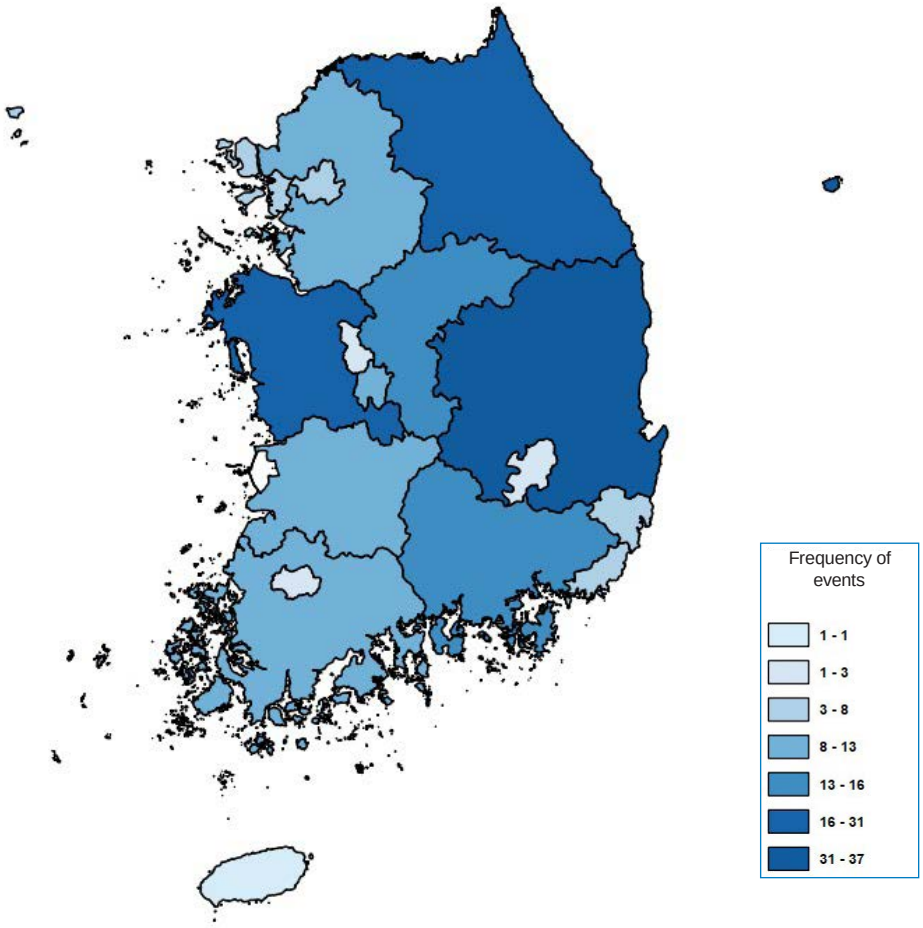


Fig.3. The geographical distribution of balloon release events. Balloon release is widespread in the country. The number means frequency of events and was counted from news media.

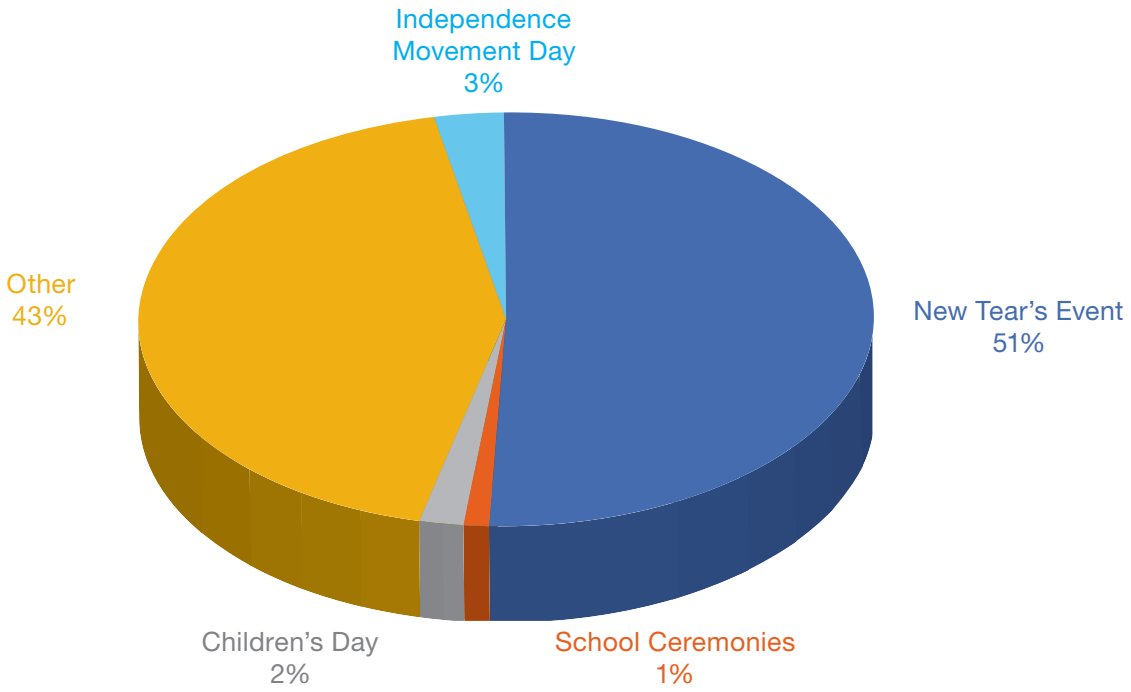


Fig. 4. Local provinces which organize balloon release events (left) and type of events (right) identified in news media

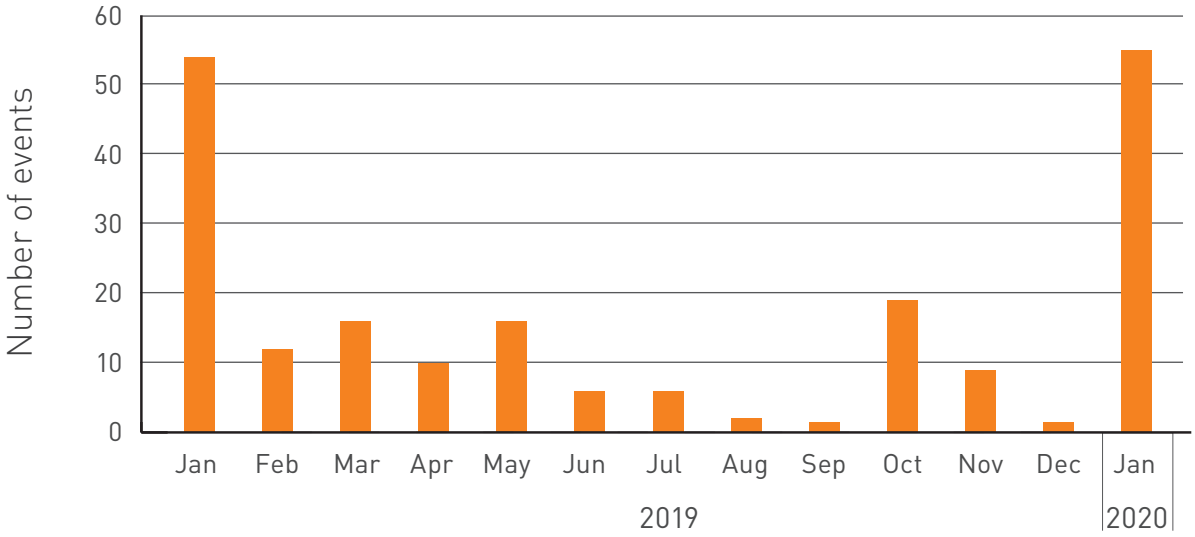


Fig. 5. Number of balloon release events per month in South Korea collected from the news media

Local government response

As a part of our No Balloon Release Campaign, we filed complaints on the websites of local governments, asked them to ban balloon release events at the New Year's Eve and subsequent events. In response, most local governments sent official letters to the municipalities and local authorities stating that they would ban balloon release.

Civic activities related to balloons

In collaboration with OSEAN, the Korean NGOs, Seoul Federation for Environmental Movement and Political Moms took actions. Federation for Environmental Movement has raised press announcement on the risks of New Year's balloon release events, and it developed a guide for sustainable events in which a direction for no balloon release was included. Political Moms has promoted its media partners and used social media activities to encourage local governments to more aggressively regulate balloon release. It aims to include a ban on balloon release and penalties for violations in the Waste Control Act of Korea.

Fig. 6. Collaboration among OSEAN, Seoul Federation for Environment Movement and Political Moms to ban balloon release in Korea

Balloon release regulations

There are many cases that prohibit or regulate balloon release by law. In some parts of the United States, the Environmental Conservation Act requires that companies or associations that fill more than 25 balloons filled with helium and other substances should not be intentionally released from a single outdoor event, promotional activity, sports or other public event within 24 hours, which can result in a fine of $10 per balloon. In Australia, there is a local law stating that unsafe balloons containing helium should not be released, and a penalty unit (1 penalty unit =133.45USD) is imposed for violation.

In Korea, Gyeonggi Province and Changwon city have begun to ban balloon release events through their own regulations. However, there are no regulations yet to specifically prohibit balloon release in Korean laws. With our campaign, local governments have issued statements calling for the reducing balloon-release events, but there has been no significant reduction in the number of balloon release events at the 2020 New Year's Eve celebrations. Therefore, it is necessary to amend the law to prohibit balloon release in force.

Marine Litter News
Vol. 12(2): 10-15, September 2020
Asia Pacific Civil Forum on Marine Litter

Plastic pellets still a big issue in Hong Kong

Tracey Read
CEO & Founder of Plastic Free Seas
www.plasticfreeseas.org

On the 23rd July 2012, Hong Kong was the location for the world's largest documented plastic pellet spill. Seven 40ft shipping containers were lost at sea during Typhoon Vicente. Of the seven containers, six held one thousand 25 kg bags of pre-production plastic resin pellets or nurdles as they are also known. These pellets are used to make all our plastic products. A total of 150 tonnes of pellets were lost at sea in this one environmental disaster. Much of the plastic pellets were washed ashore on south facing Hong Kong beaches.

The spill was first noticed by Tracey Read from the newly founded charity Plastic Free Seas. Thirty bags of pellets were found bearing the name SINOPEC on Lantau Island at Discovery Bay's Sam Pak Wan beach along with a deep layer of pellet 'snow' covering the length of the beach. The first cleanup included volunteers and government contractors where over 5 tonnes of pellets were removed from one beach. During this cleanup, a further 170 bags were found.

Over the course of the weekend it became known that six containers full of plastic pellets were lost and this problem was not isolated to one Lantau Island beach but likely an event that could impact all of Hong Kong's coastline and coastal waters. A comprehensive plan was initiated to discover the impact and mobilise government contractors and community volunteers to immediately scale up the cleanup. Many Hong Kong non-government groups (NGOs) came together for the common goal of emergency cleanup.

The harmful implications of spilled plastic pellets are widely known and documented. The pellets are easily mistaken as food due to their size, colour and shape resembling fish eggs, or as in the case of the fish farms in Hong Kong, resembling pelletised food that is often fed to the farmed fish. Some of these fish did die, likely because of plastic pellet ingestion, or were found floating on the sea surface with their stomachs full of plastic.

After the word got out through social and traditional media, Hong Kong beaches were flooded with volunteers – one hard to reach beach that had been badly impacted saw 1,000 volunteer cleaners help on one weekend! Intense cleanup operations continued for many weeks, with thousands of volunteers coordinating through Facebook pages. Volunteers developed their own methods for removing pellets including a rotating sand sifting machine as well as hand-held colanders and even industrial vacuum cleaners! The new Hong Kong craze of nurdling had started with individuals, families and groups of friends descending on beaches and sifting sand to remove the nurdles.

The plastic pellet spill cleanups continued over the long hot summer and for several months afterwards. The last government statistics reported that about 70% of pellets had been recovered – 102 tonnes.

Despite the exhaustive efforts of all the committed volunteers in 2012 and the very regular cleanups that have become more popular with each passing year, there is still a significant number of plastic pellets found on all Hong Kong beaches, some worse than others, depending on the currents or the storms.

Of course, Hong Kong's plastic pollution problem is not limited to microplastics. There is a huge issue with macro debris constantly washing up on beaches. Plastic Free Seas organises monthly beach cleanups with volunteers on two beaches and there has never been a time when there has been no rubbish unfortunately.

This year Plastic Free Seas (PFS) instigated the Hong Kong collection of plastic pellets for The Great Global Nurdle Hunt. This annual event organised by Scottish charity Fidra is held in March and encourages participants globally to go to their beaches and waterways and hunt out nurdles for collection and counting towards a global database. Their goal is to highlight the extent of this insidious problem and ultimately end nurdle pollution.

The results in Hong Kong were astounding. Three beach locations were chosen and Nurdle Hunt events were organised with 100 volunteers participating. The volunteers used simple colanders or sieves to sift through the sand or at times just picked the plastic pellets from the surface.

PFS ran a competition to guess how many pellets were collected during two of the Nurdle Hunts. Due to the large number of pellets collected, a strategy was needed to count the pellets efficiently. With the help of PFS friend and supporter Dr Christelle Not from the Department of Earth Sciences at Hong Kong University, a scientifically sound counting method was determined. After counting and weighing several large batches of pellets to establish an average weight per pellet, it was possible to accurately estimate the total number of pellets collected.

The pellets collected during the Nurdle Hunts varied greatly in colour, size, shape and age. There seemed to be a significant amount that likely originated from the 2012 plastic pellet spill, identified by their translucent colour and blood cell-like shape. There were pellets collected of every colour and it looked like a mix of virgin plastic as well as

some recycled plastic pellets. The pellets that are continuing to be found on Hong Kong's beaches are from myriad sources: flushed out from recycling plants, accidentally spilled during transport or during production and use.

A whopping 11,557 and 10,637 pellets were collected during two of the Nurdle Hunts! These were collected over the space of a couple of hours. One can only imagine how much microplastic is buried in the sand, lying on top of the sand, stuck between in rocks, hidden in the coastal vegetation and soils and constantly washing up with all the other large plastic detritus.

This plastic pollution crisis will not be solved by relying on the good will of volunteers to endlessly clean up the plastic pollution mess. We need to be 'turning off' the plastic tap so to speak at the source. We all need to be using less plastic – especially avoidable single-use 'disposable' plastic packaging, but more importantly we all need to be pushing our governments for stronger legislation to ensure that plastic waste is avoided in the first place. We also all need to tell companies to stop externalising their costs of doing business and to stop pushing the responsibility of managing plastic waste on to the consumers to deal with properly. Many South-East Asian countries do not have the infrastructure nor the technical capabilities to handle all the plastic waste created. It has been reported that the plastics industry is planning to quadruple the amount of plastic produced by 2050. Companies cannot continue on this path of 'business as usual'; they need to make changes in the way they use plastic and stop ignoring the end-of- life requirements of the products and packaging they put on the market. We need to all be working together to push for real solutions for stopping this global plastic pollution crisis.

Shipping container, pellet bags floating and plastic pellets washed ashore like snow (Beaufort Island)

Millions of plastic pellets washed up on Hong Kong's beaches (Lantau Island)

Clean-up of the plastic pellets was difficult in the vegetation and rocky coastline.

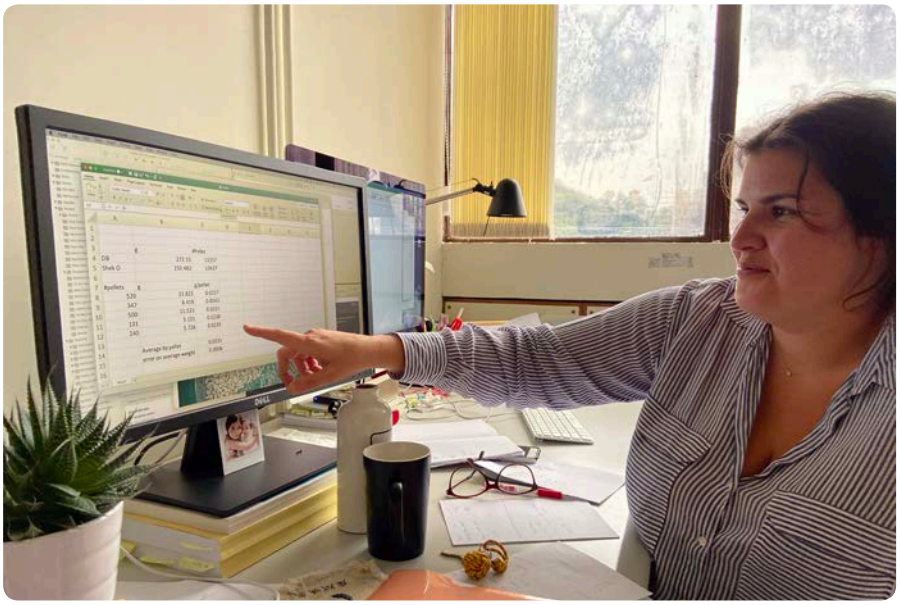
Volunteers sifting the sand to remove plastic pellets in 2012.

Volunteers sifting, sweeping and using water to float the pellets and remove them from beaches in 2012.

Volunteers hunting for nurdles at The Great Nurdle Hunt.

Removing debris to prepare for accurate weighing and counting.

A wide variety of collected pellets



Dr Christelle Not sharing the results of the number of pellets counted.

Number of pellets removed by sieving and picking off from 2 Hong Kong beaches April 2020.

Marine Litter News
Vol. 12(2): 16-21, September 2020
Asia Pacific Civil Forum on Marine Litter

Review on Marine Litter Management in China in 2019 from the perspective of non-profit organizations

Xue Mei
Volunteer Researcher
info@renduocean.org

The collection coverage was still unsatisfying in China especially in rural areas, resulting in randomly littered waste uncollected in the open environment. And a great percentage of the uncollected waste eventually flowed into the marine environment. Without specific outflux, all inputs to the marine environment were recognized as a huge stock to marine litter over time, which put a heavy burden on the oceans. Fortunately, there are more groups taking part in the project of Marine Litter Management through different approaches in China in 2019, mainly including coastal cleanup, monitoring and research, publicity and education, communication and cooperation.

1 Coastal Cleanup

Coastal Cleanup is a direct and convenient approach to marine litter management, which can reduce the storage of marine debris in the oceans to a certain extent. In recent years, coastal cleanup activities in China have been carried out mainly by marine environmental protection organizations, who have also changed from participants to a more important role, the organizers. These organizations have led more volunteers to take part in beach cleanup activities and become movers in marine litter removal gradually.

According to the List of China Marine Environmental Protection Organizations in 2018, there are 224 organizations in the field of marine environmental protection in China. Marine litter is the top topic that these organizations are most concerned about, and coastal cleanup is also the main working method to the related organizations.

Taking Rendu Ocean as an example, the coastal cleanup project named as “Love the Origin Of Our Life” is one of the core tasks of the institution. In 2019, there are 19,500 volunteers, 95% more than that in 2018, involved in this project. They cleaned up 75.5 tonnes of wastes, nearly 5 times more than 12.7 tonnes in 2018, alongside coastal areas in China in total last year. Rendu Ocean organized 81 times coastal cleanup activities in Shanghai over 2019, and also 18 times in other seaside cities, including Guangzhou, Shenzhen, Zhoushan, Tianjin, Dalian, Fuzhou, Xiamen and Zhuhai. These voluntary activities were organized by Rendu Ocean or through its relationship in the network of China’s marine environment protection organizations, and the organizer recruited public volunteers or cooperated with companies, schools and communities. All the volunteers were expected to collect litters in the coastal areas together over several hours, especially near the beach. Finally, the collected wastes were weighed and recorded to achieve the aim of cleaning in a certain area during few days or more.

At the same time, Rendu Ocean actively organized joint coastal cleanup projects. In June 2019, the cleanup activity with the theme of “Cross-Straits Triangle Protect Ocean Together” covered 41 cities across the country, with a total of 88 teams of 5,973 volunteers who cleaned up a total of 41.6 tonnes of marine debris. During 2019 International Coastal Cleanup time, Rendu Ocean coordinated 66 teams from 32 seaside cities to carry out cleaning activities on the beaches. A total of 4660 volunteers participated in the clean-up of 21.9 tonnes of marine litters.

In addition, Rendu Ocean and the other monitoring partners in different areas also picked up coastal litters before monitoring and collecting data. These organizations carried out 320 times of monitoring throughout the year with 6,400 volunteers cleaned up 4.9 tons of coastal wastes in 2019.

Coastal Cleanup, as a relatively simple marine litter management method, is valuable to absorb more attention and participation to increase the frequency of cleanup activities and expand the area of cleaning.

2 Monitoring and Research

Monitoring is a commonly used method in environmental issues to help us understand the situation clearly and deeply through surveys and statistics. In China, environmental protection organizations are still the main force in the monitoring of marine litter pollution.

In 2014, the Mangrove Wetlands Conservation Foundation (MCF) and Rendu Ocean jointly launched the Coastal Cleanup and Monitoring Project of China, focusing on marine litter monitoring in China, which is currently the only project in China that regularly monitors coastal wastes. The goal of the project is to use data to depict the real map of China’s coastal garbage pollution. In 2019, the project has been developed to 58 monitoring points in 36 cities across the country, an increase of 115% over 2018. It has completed 320 times of monitoring throughout the year, with 316 valid data sessions and more than 670,000 pieces of litters monitored and recorded. The monitoring spots are strictly selected, and the monitoring activities are implemented every two months under a strict standard guide. These are to promise the research value of the data collected in the project.

Number of pellets removed by sieving and picking off from 2 Hong Kong beaches April 2020.

In 2015, the State Oceanic Administration also issued technical regulations for marine litter monitoring and evaluation, which regulated the basic requirements for on-site monitoring of marine litter, sample classification, data compilation, and quality assurance.

In 2019, marine environmental protection organizations made a breakthrough in marine monitoring work. At the 2019 China Ocean NGO Forum, Zhihui Nature, which is a platform for marine litter monitoring was officially launched. The platform was jointly developed by Beijing Cihai Ecological Environmental Protection Public Welfare Foundation, Rendu Ocean and Beijing Xinzhigan Technology Co., Ltd. This is a software product that can perform statistics and analysis automatically on the classification, quantity, weight, and brand of marine debris, which strongly promotes the efficiency and convenience of monitoring even further research.

The platform Zhihui Nature

Some scholars in this field are good at analyzing marine environmental problems and reasons through marine litter monitoring data in China. According to their research, novel management approaches or new scientific technologies will be subsequently exploded. During recent years, microplastics in marine debris have become a research hotspot in academic circles.

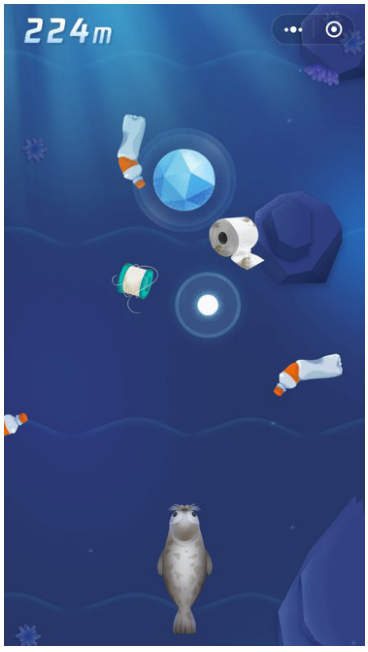
3 Publicity and Education

Environmental protection education is still the main way for governments or environmental protection organizations to influence more people to change the current status of the environment.

Traditionally, volunteers in environmental protection organizations have entered classes to teach students, presenting the severe situation of marine litter pollution to make children aware of the seriousness of the problem and give some suggestions to children. Rendu Ocean achieved a total of 99 lessons with 126 volunteers over last year for environmental education, benefiting nearly 3458 students. Environmental protection organizations also publicized marine litter related science information, including basic knowledge of the marine environment, the hazards of marine debris, the diversity and troubles of marine life, through official and popular media, like Weibo, Wechat in China.

What's more, Chinese environmental protection organizations are also constantly exploring more ways of publicity and education related to marine litter issues.

In April 2019, Tencent, together with Rendu Ocean, China Environmental Protection Foundation, Guangxi Beibu Gulf Ocean Research Center, and Green Collar, jointly created a recreational game with the theme of marine living environment, which was named as Guard the Sea. In this game, players need to help our marine animals avoid the wastes in the ocean by clicking. On the other side, players will experience the struggling survival of marine creatures and have a considerable understanding of marine litter pollution. This game aims to call attention to marine debris, marine pollution, marine life and marine ecosystems.



The game page of "Guard the Sea"

Art exhibitions have also become a form of drawing attention that is both novel and highly accepted. From May to July 2019, the Shanghai Science and Technology Museum launched an art exhibition, “The Plastic Era-An Elegy of Albatross” on the theme of plastic waste. Through the form of paintings, installations, videos, documents and interactive activities, the cruel reality of this global marine ecological disaster became visible and close to the public, aiming to attract more public attention to marine plastic waste pollution and call for reducing excessive consumption of plastic products. Besides, Rendu Ocean continued to promote the production and roving exhibition of the Marine Litter Mobile Museum to influence more people to practice waste reduction.

The exhibition advertisement of “The Plastic Era-An Elegy of Albatross”

Of course, the processes of coastal cleanup and marine litter pollution monitoring themselves are excellent practices of environmental publicity and education.

4 Communication and Cooperation

Marine litter pollution is a global challenge. It is undoubtful that communication and cooperation between different organizations in different countries can help explore more efficient solutions to this worldwide issue. Chinese environmental protection organizations are actively involved in mutual communication. Taking Rendu Ocean as an example, in 2019, this organization was invited to participate in the Shanghai Environmental Protection Annual Conference, Okinawa Waste Exchange Conference, Australia CSIRO Waste Investigation Workshop, Standard Annual International Conference, and Northwest Pacific Data Center Liaison Conference, etc., 17 times in total.

Marine litter is the top concerned topic for marine environmental protection organizations. In recent years, Rendu Ocean has actively built an action network to deal with marine environmental issues. The 2018 Directory of Chinese Marine Environmental Protection Organizations was published in June 2019, and various organizations engaged in

marine environmental protection in China were included in the directory. During the last season of 2019, there were several important and meaningful things to the further communication of marine environmental protection organizations. The 2019 China Ocean NGO Forum was convened in Hainan, the second phase of China Ocean Protection Ability Build Network Project was officially launched, the China Marine Environmental Protection Profession Development Research 2019 was completed and released. These networks for organizational internal learning are enhancing the power of leaders in marine litter management in China.

2019 China Ocean NGO Forum

Public welfare profession is an important link in the social operation chain, but marine public welfare is only the tip of the iceberg in the entire public welfare profession. The individual capabilities of related organizations are generally weak. To solve such a severe environmental problem of marine litter pollution, the government, companies, environmental protection organizations, and the public must work together to protect the 71% area of our earth.

Marine Litter News
Vol. 12(2): 22-27, September 2020
Asia Pacific Civil Forum on Marine Litter

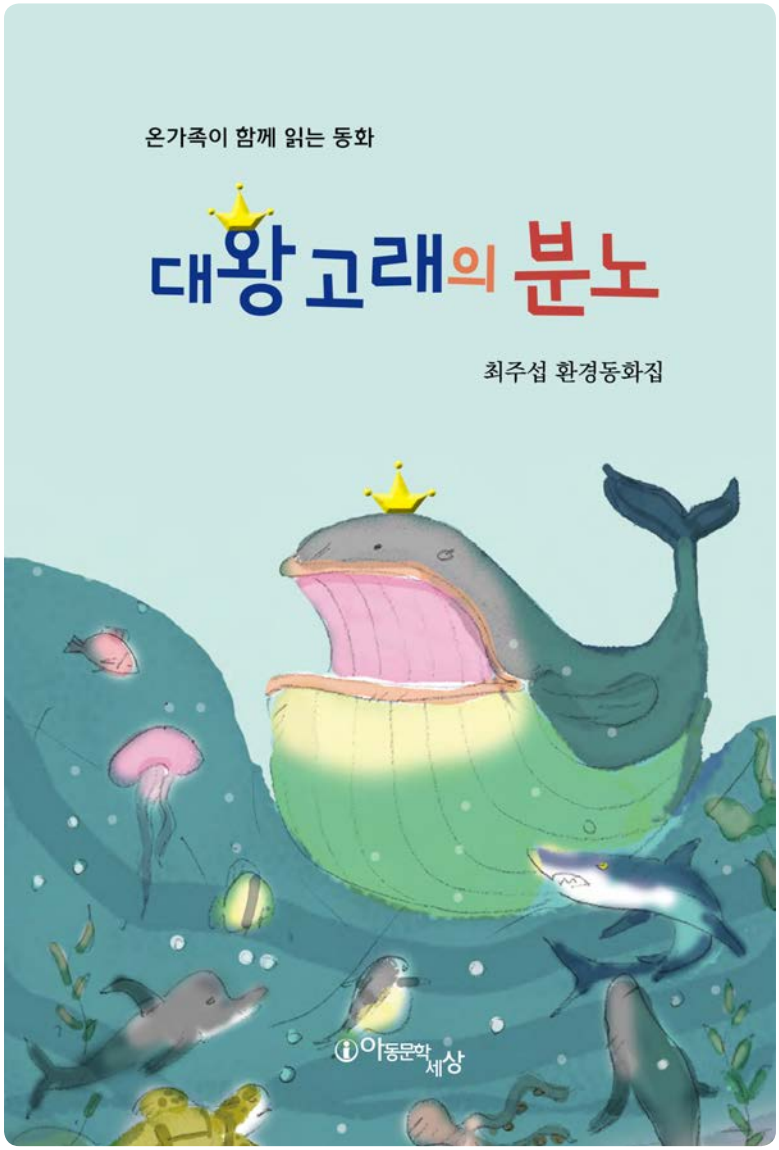
The Anger of The Blue Whale (Fairy tale)

Joo Sub Choi
josephchoi49@naver.com

Mr. Joo-Sub Choi, an authoritative expert in the field of waste recycling in Korea, an adviser to and a longtime supporter of OSEAN, first published his short story as an environmental fairy tale writer. We introduce the main story, 'The Anger of The Blue Whale' to Marine Letter News readers.

From the editor-in-chief

** Ms. Hyunjoo Bahk (teecee@hanmail.net) translated the Korean fairy tale into English.*



Book cover

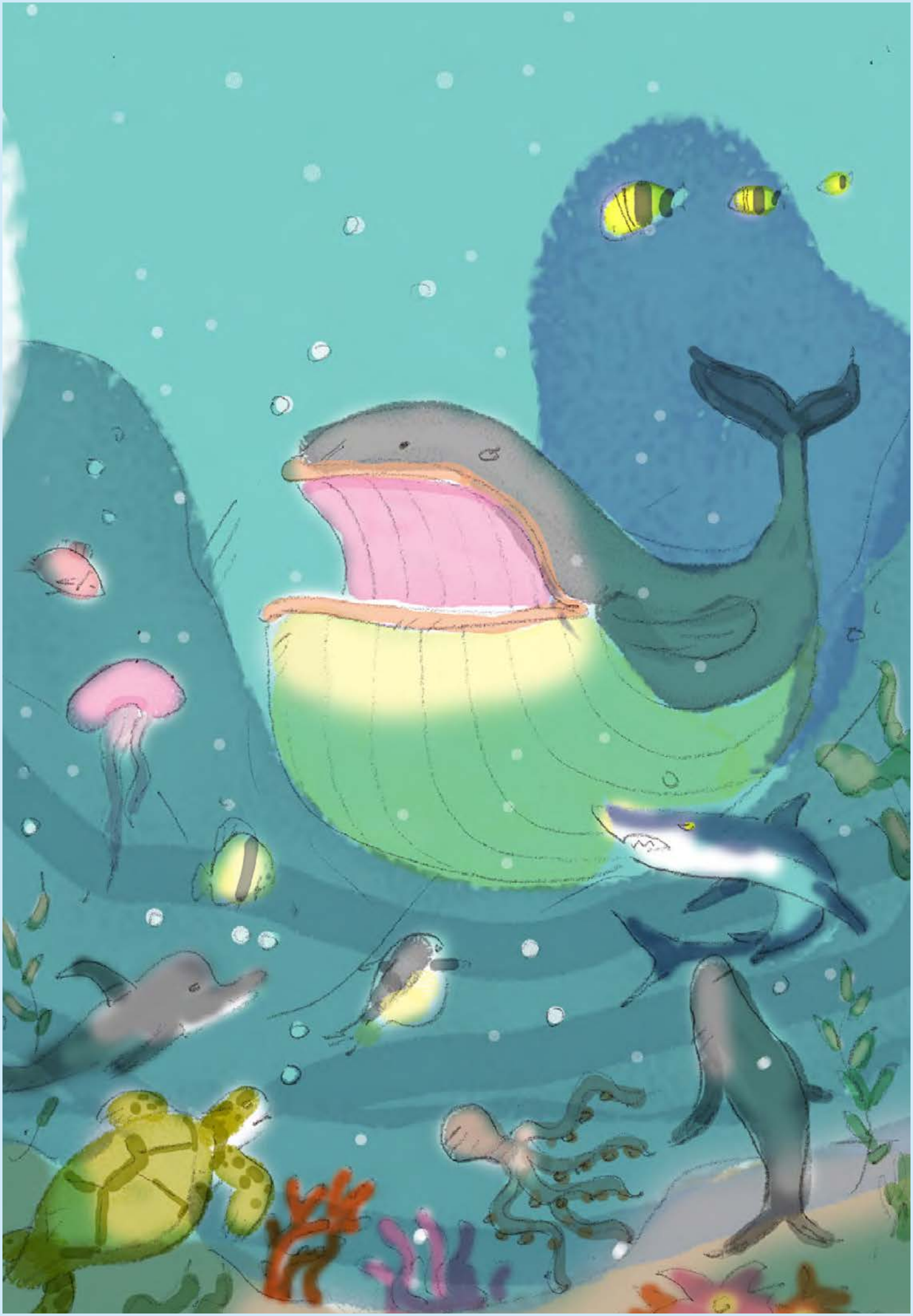
The blue whale is the biggest creature in the ocean. A mother whale is 12 meters long and weighs about 10 tons. The animals that live in the ocean were invited to an important meeting. The blue whale was the leader of the meeting.

"Thank you for coming from the Pacific, Atlantic, Indian ocean, and even from the Arctic and Antarctica. There is an emergency, life in the ocean is in peril and we need to find a solution."
Animals affected by sea pollution came forward to speak up. A sea turtle was first on the stand, the turtle was crying because he had a straw stuck in his nose. A dolphin followed, "I ate dozens of plastic bags in the ocean that I mistook for food." An albatross, which is a sea bird wiped her tears off her face repeatedly. "I mistakenly fed Styrofoam to my baby, as soon as I fed it to her, she died." Next, a seal whose neck had a fishing string tied to it came forward and said, "I got caught in a fishing line." The horror stories of how the animals were affected by sea pollution were endless.

The blue whale who had been listening sitting in a chair burst into anger. "How could this happen? We cannot allow this to continue!" Everybody held their breath. The blue whale looked left and then right. "Come on animals of the ocean, let's find a way to stop this atrocity."

First the jelly fish shook his body angrily and said, "We jellyfish can sting the arms of swimming children at the beach." Next a blowfish came forward, "We're going to spread more of our poisonous eggs on the beach. They have a lethal poison in them and any human being that eats our fish eggs will suffer from severe abdominal pain and even die."
A group of small fish made a large sound rubbing against each other. The blue whale looked around impressed. "As small as you are, you are a loyal bunch, bigger animals, come out and give us more solutions to this problem." A sturgeon came forward looking very mad and shouted, "With poisonous blow fish eggs how many humans can you attack? We sturgeons can crack yachts sailing in the sea and make them sink." A great white came forward in a huff and a puff, "We great white sharks have the ability to break off a whole human leg in one bite!" The animals continued discussing different ways of getting back at humans for polluting the beautiful seas.

Just then, a wise octopus straightened her 8 legs and said, "I don't think that violence is the answer to our problem with the human race."
The blue whale opened his eyes wide and waited for further explanation.
"You mean to tell me you have found a way to live in peace with humans who always pride themselves on being the center of everything?
The octopus shook her big head hard. "I suggest we invite the Greenpeace crew, the world environmental conservation group and present our problem to them."



On hearing that, a seal frowned and said, “But how will we bring the Green Peace crew into the water?”
Disgruntled voices of complaint could be heard from the other animals.

“Tut tut…”

Just then, an electric stingray came forward shining and sparkling. “We had reached a compromise with the humans and made an agreement that they would farm some fish for themselves and therefore limit the number of fish caught by ships.”
A sea turtle slowly walked forward. “Actually, last month, two people from the Greenpeace crew fell into the sea while helping to protect silk whales from a ship which had been illegally catching whales. Fortunately, sea turtles passing by at the time saved them from drowning, and the two men are under our care at the moment.”
The blue whale perked up joyfully. “Thank God! Bring them here!”

The two Greenpeace people were brought to the table and given a very nice meal. They sat close to the blue whale, and he thanked and praised them for the great work they had done. “Thanks to you, the lives of many sea animals were saved. Let’s enjoy this meal before we talk further.”

All the sea animals around the table happily devoured the excellent food.

The blue whale called up the dolphin to come to him and said, “Since you are very smart and have a good memory, please explain to the Greenpeace people what our problem is. Remember to show them all the damage that the pollution has caused in our lives.”

The dolphin began to explain to the people, “There is garbage that floats to the sea, some of it is in little pieces, these are then mistakenly eaten by fish and the fish die. There are plastic bags, straws and Styrofoam cups and containers that will not dissolve in water but float on the sea for centuries. Please persuade eco biologists and other environmental experts to look into this issue and implement solutions. These solutions need to be implemented worldwide, just like the Climate Agreement, and the guidelines for all countries can be presented at the UN General Assembly.”

The Greenpeace people nodded in agreement. “Yes, humans and animals should live together in harmony. All of our members will join forces to preserve the natural ecosystem.”

The blue whale smiled, “Thank you very much. This will be good for both humans and animals.”
The Green Peace people agreed.
The blue whale called a warehouse keeper. “Fill up a sack with beautiful pearls and bring it here.”
All the animals applauded, the blue whale added, “Deep in the sea, there is a golden valley discovered by the fish. If our requests are met and all changes implemented successfully, I will give development rights to the organization that has done the best job.”

The Green Peace crew rode on a turtle again, another turtle carried the sack full of pearls.

Years later, research reports on damage to marine life began to be presented all around the world.

[Mercury has been known to accumulate in tuna due to the pollution in the ocean, and if a pregnant woman eats the tuna, the mercury is absorbed by the fetus, and the fetus then dies from this.]

[In the oysters and clams caught in the southern coast of Korea, micro plastic was found. Zooplankton and other fish also ate the micro plastic, confusing some of it with food. The plankton and other fish are then served on dinner tables, and this micro plastic is eaten along with the fish.]

Press all around the world started reporting these findings in the news.

[In the middle of the Pacific Ocean, there is now a plastic island. Every year, 144 billion dollars' worth of plastic is discarded into the sea. By 2050, there will be more plastic garbage than fish.]

[Only if we save our seas and marine life can we then protect our own health too.]

UNEP (United Nations Environment Program) has decided that the topic for World Environment Day will be "Defeating Plastic Pollution". That was on behalf of globally implementing changes like recycling plastic and reducing needless production significantly.

OSEAN (Our Sea of East Asian Network) led the campaign against discarding trash in the ocean. It also shared various methods of how to achieve this with NGOs from each country.

Gradually many countries have been reducing the use of disposable straws, cups and plastic bags. They've also been making products using natural eco-friendly materials.

1) Greenpeace: The international environmental organization established in 1971. Greenpeace is trying to save the environment and pave the way towards a greener, more peaceful world. Its headquarters are in Amsterdam, in the Netherlands. In June 2011, Korea got involved as the 41st nation to do so since the establishment of the organization. In Seoul, Greenpeace has been behind campaigns on climate change and saving marine life.

2) United Nations Environment Program: After a resolution at the UN Human Environment Forum, it was set up to protect Earth's ecology system. It is behind international cooperation, planning and research. Under the title 'Defeating Plastic Pollution', every country joined in on World Environment Day. UNEP published the "Disposable Plastic: A road map for sustainability" report, which is one of the first comprehensive research projects containing guidelines on how countries can overcome plastic pollution.

Joo Sub Choi

Vita

1986. 11 ~ 1992. 5
Head of Industrial Waste Division, Household waste manager of the Ministry of Environment

1995. 5 ~ 2013. 12
(Incorp.) Full-time Vice Chairman of Korea Styrene Recycling Association

2013. 12 ~ 2014. 12
(Incorp.) Full-time Chairman of the Korea Packaging Recycling Corporation

2016. 9 ~
(Incorp.) Director of the Institute of Resource Circulation Policy, Korea Federation of Resource Recycling Organizations

Marine Litter News
Vol. 12(2): 28-33, September 2020
Asia Pacific Civil Forum on Marine Litter

Monitoring survey of recreational fishing debris on Gyeongi Province and Incheon Metropolitan City, South Korea

Jongsu Lee
Researcher, Our Sea of East Asia Network
Jongsulee@osean.net

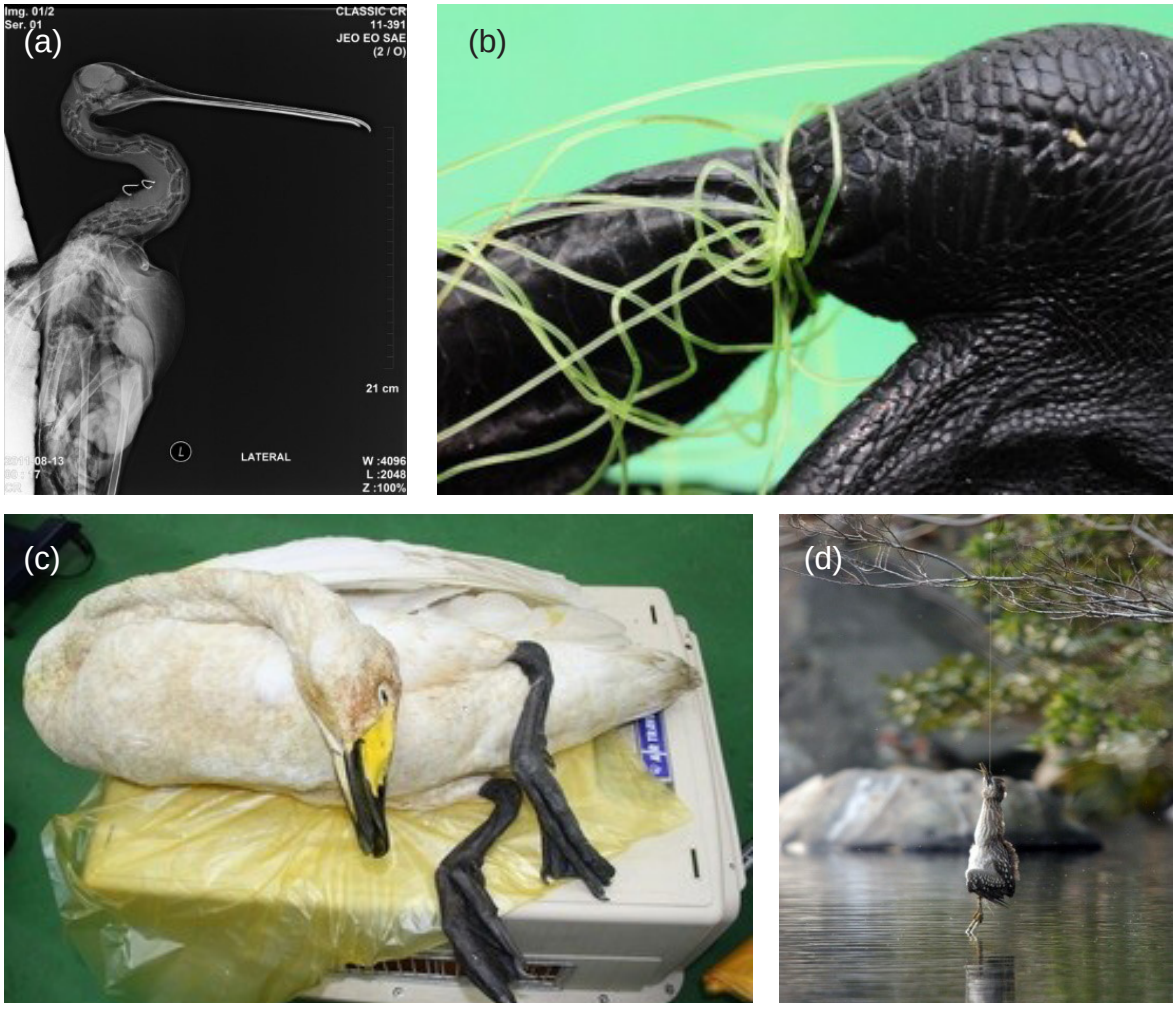


Fig.1. Photographs of animals impacted by fishing debris in Korea. (a): a black-faced spoonbill that ingested a small fishing hooks (© Young-jun Kim) (b): A cormorant that died from entanglement with a fishing line (© Young-jun Kim) (c): a whooper swan that ingested a lead sinker and other metallic fishing gears (© Young-jun Kim) (d): A night heron entangled with a fishing line (© Namjun Jee).

Marine litter has been known to have adverse impacts on wildlife. Especially recreational fishing debris occupied just 4-6% of all marine litter in Korean International Coastal Cleanup result (Final report of 2016 and 2017 Korean ICC result). However, they were revealed most frequently impacted marine litter on wildlife in Korea (Hong et al., 2013). They can entangle animals' body or can be ingested by wildlife. Once entangled, animals are to be restricted on their movement, starved, and eventually to be driven to death. Ingested fishing items such as hooks and lead sinker also have detrimental impacts on wildlife. Fishing hooks can be stuck on the neck of the animals and cause serious physical problem and infection. Once swallowed just one lead sinker can kill the animals due to lead poising (Hong et al., 2013; Figure 1).

Recently, recreational fishing topped the list in Korea as a hobby. Accordingly, population enjoying fishing for fun has increased to 8 million in 2019. As the recreational fishing activities increased, so does the potential of the occurrence of fishing debris and consumer debris around the fishing grounds. To understand status of recreational fishing debris in Korean coast, OSEAN started the monitoring survey of them in 2018 with Patagonia's financial support through the '1% for the planet' program. In 2018, it started the litter survey in Gyeongnam Province which locates in south-east of Korea. In 2019 OSEAN surveyed 15 sites in Gyeongi Province and Incheon Metropolitan City (north-west of Korea) with the same support program. This report is the result of monitoring survey of recreational fishing debris in 2019.

• Sampling location and survey method

Sampling sites are shown in Figure 2. The sites were chosen from the well-known recreational fishing grounds in the region. The sampling procedures are as follows. In each sampling site, we randomly selected three sections and placed 10 m^2 quadrat at each point (Figure 3, left). All debris larger than 2.5 cm were collected and surveyed according to the classification guideline (Table 2; Table3; Figure 3, right). All debris were placed in the polyethylene bag and weighed on the basis of quadrat because some items of the debris like fishing line weighed less than a gram.

The questionnaire survey was also conducted on anglers who enjoyed fishing. The questions consist of three areas: frequency and preferred spots of fishing activities, fishing gear and loss, the amount of general garbage, fishing license system, taxation, and ways to enhance awareness.

• Survey result of recreational fishing debris

In total, 1,636 pieces of recreational fishing debris were collected. They weighed 5,170.5 g. They can be converted 1.21 pieces/m^2 and 3.83 g/m^2. Most frequent item was the fishing line shorter than 100 cm, followed by plastic bag. Fishing line longer than 100 cm and fishing hook were the third and fourth abundant items, respectively. Fishing line and hook were notorious recreational fishing debris to impact on wildlife. Fishing line and hook together accounted for 46% (Figure 4). They can entangle or be swallowed by animals. Considering adverse impacts of the debris, urgent countermeasure policies and awareness program should be implemented. Plastic bag classified recreational fishing debris is not used for fishing but packing for fishing devices such as hooks and baits. Abundance of the item indicate anglers do not care for the debris and carelessly dispose it.

Among consumer items, cigarette butt was the most abundant item, comprising 31% (Figure 4). This also support the idea that anglers discard debris on the fishing ground unintentionally.

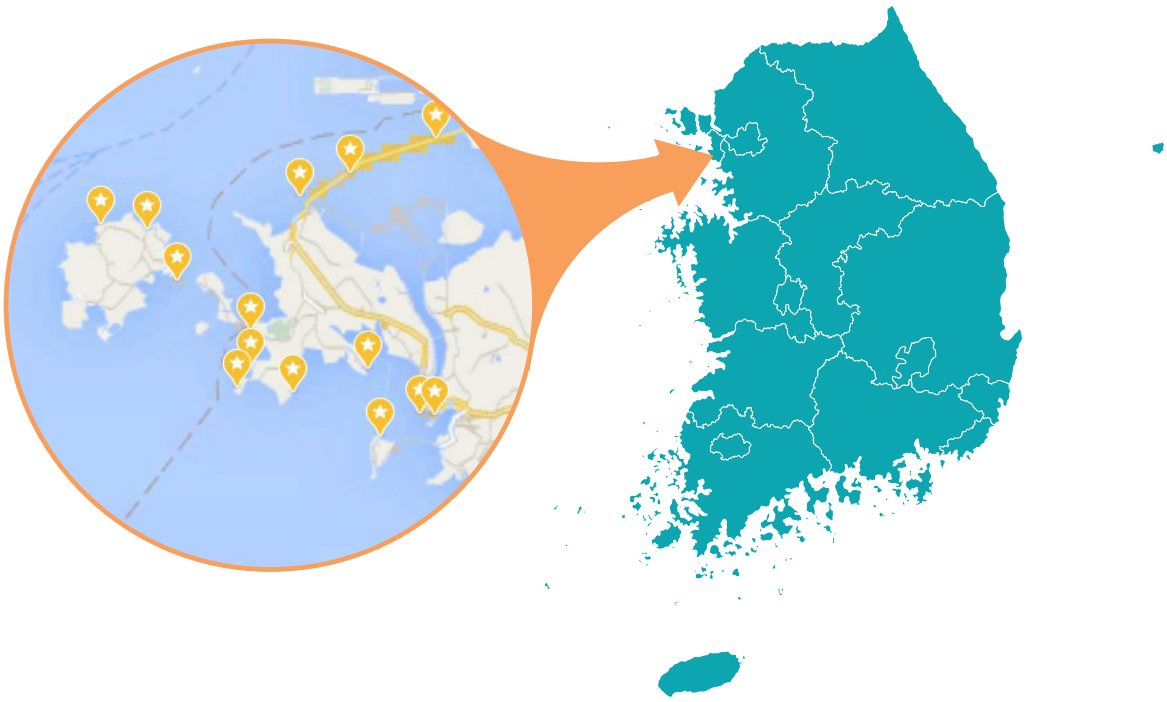


Fig.2. Survey location of the recreational fishing debris

Table 1. Classification of recreational fishing debris. It has two categories which are separately surveyed: fishing debris is directly related to fishing gears and consumer debris is related to fishing activities

Fishing debris	General consumer debris
Fishing hook	Plastic bag for house
Fishing line (<100 cm)	Cigarette butt
Fishing line (>100 cm)	Wet wipe
Fluorescent float	Food container
Fake bait	Plastic bottle
Bait container	Glass bottle
Fishing rod holder	Cotton gloves
Lead sinker	Can
Other sinker	Rubber band
Plastic bag for bait	Lid
Plastic bag	Styrofoam piece
Battery	Plastic piece
Others	Others

Fig.3. Example of survey sites

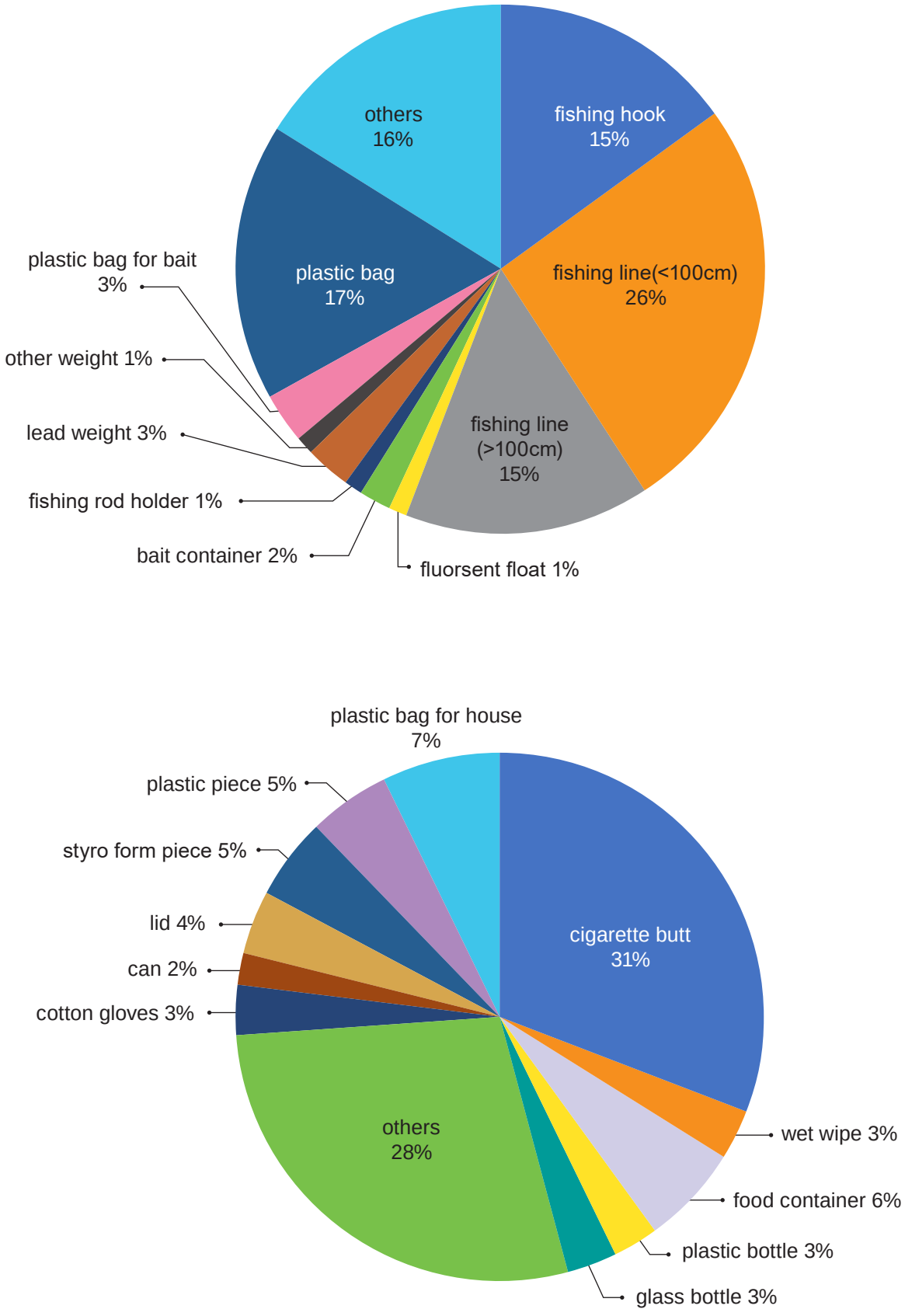


Fig. 4. Proportion of the recreational fishing (above) and consumer debris (below)

Fig.5. Example of collected fishing lines and plastic gears (green or orange color) which hold the fishing line and sinker to prevent the line from twisting.

• Result of questionnaire survey

Questionnaire survey result showed that anglers enjoyed fishing on the seawall and spend 3-4 hours when they went out for fishing. Most of them used iron or lead sinkers. They dropped 0-2 fishing sinkers per one-time fishing, followed by 3-5 sinkers. Both cases comprised 89%, indicating most of them drop 0-5 fishing sinkers. Ninety three percent of them didn't collect fishing sinkers and left them on the fishing ground when they lost. Ninety one percent of the anglers did the same way with the useless fishing lines. Most of the anglers were aware of the adverse impacts of the fishing debris on the environment. They wanted trash can on the fishing ground for the countermeasure program against fishing debris.

The survey result showed that anglers generate recreational fishing debris as well as consumer debris when they go fishing. Furthermore, they leave the debris on the fishing ground even though thy know about the negative impact of them on the environment. Immediate measures including education programs should be implemented to prevent the impact.

Marine Litter News
Vol. 12(2): 34-42, September 2020
Asia Pacific Civil Forum on Marine Litter

Plastic pollution and its solutions in Viet Nam

Ca Thanh Vu
Faculty of Environment
Ha Noi University of Natural Resources and Environment
41A Phu Dien, Bac Tu Liem, Ha Noi, Viet Nam
Email: cavuthanh@gmail.com

Abstract: This report presents results of researches conducted by authors with data obtained by some students of Ha Noi University of Natural Resources and Environment and other authors in Viet Nam on present situation of plastic wastes, and measures for reducing plastic wastes in Viet Nam. The first part of the report presents results of worldwide researches on damages caused by plastic pollution, especially by marine plastic pollution. The second part of the report presents the author's assessment on the present situation of plastic pollution in Viet Nam. And the last part of the report presents analysis on the feasible and effective measures for reducing plastic pollution in Viet Nam.

It was found that the amount of plastic wastes that potentially enters the East Sea from Viet Nam is in the range of 0.07 - 0.20 million tons, and is much smaller than the the values of 0.28 - 0.73 million tons of Jambeck et al. (2015). In comparison with the use of single-use plastic products, the use of biodegradable materials may cause more environmental damages; and thus it is better not to replace single-use plastic products by biodegradable materials. Therefore, the best way to deal with plastic waste problem is doing research for the development of methods for effectively processing the plastic wastes; and replacing the single-use plastic products by multiple-use plastic products.

Keywords: Plastic wastes, plastic marine debris, environmental impacts, plastic wastes in Viet Nam, measures for reducing plastic waste

1. INTRODUCTION

It can be said that the World has passed through the Stone Age, the Copper Age, the Iron Age, and now, the World is experiencing the Plastic Age. Plastic products can be found everywhere, such as the cover of a tiny candy, yogurt containers, infusion fluid bottles, straws, shopping bags, shoes, sandals, chairs, tables, cars, ships, airplanes etc. Plastic products are very convenient for use; and therefore, the production of plastic continuously increases world-wide, especially in Asia. The production of plastics in the world has increased from 2 million tons per year in 1950 to 381 million tons in 2015, or about 200 fold[1] . The increase in the production, trade and usage of plastics lead to the increase of plastic wastes. According to UNEP (2016), about 80% of marine debris in the ocean is plastic wastes and more than 8 million tons of plastic wastes are leaked to the ocean every year. According to Jambeck et al (2015), in 2014 the world ocean had 275 million tons of plastic wastes. In average, every square kilometer of the world ocean surface had 13,000 to 18,000 pieces of plastic wastes (UNEP 2005, 2006). According to the Environmental Protection Agency (EPA, 2008), about 49% of plastic wastes are floating and will be transported over the entire area of the ocean world, and then aggregate to large scale gyres. A large part of the plastic wastes will sink to the sea bottom and cause damages to living creatures (Greenpeace, 2017). The plastic wastes cause US$ 13 billion in financial damage to marine ecological systems (UNEP, 2014).

Plastic wastes can be classified as macro-plastic wastes (with size greater than 5mm), microplastic wastes (with size from 5mm to 1μm) and nanoplastic wastes (with size less than 1μm). Plastic wastes have very small degradation rate and break into smaller plastic pieces, and at last, microplastic.

Plastic waste is also an environmental problem for developed countries. Cauwenberghe et al. (2013) did a survey at some beaches in Belgium and found that plastic waste is present at all beaches with the amount of 0.5kg/km - 50kg/km along the beach. There are 1,600 - 8,500 pieces of plastic waste in every square kilometer of beach. For nearshore beaches, in 2011, at some places there are 2,724 - 3,875 pieces of macroplastic per square kilometers of beach, or 0.255kg/km^2 - 0.829kg/km^2. At the sea bottom, there is in average 4,198 - 8,594 pieces of plastic waste per square kilometer, or 0.429kg/km^2 - 0.703kg/km^2 sea bottom. For microplastic waste, Claessens et al. (2011) and Cauwenberghe et al. (2013) found that there is about 23kg/km^2 microplastic waste in the sea bottom mud and 7kg/km^2 in the water column.

Plastic pollution is the most dangerous threat to the world ocean nowadays, and is damaging marine and coastal socio-economic activities, such as tourism, recreation, transport, environment, biodiversity and fisheries resource, and health and safety of human being. Abandoned fishing gears, such as fishing nets, can have marine animals being caught and killed by what called “ghost fishing”. Many marine animals are killed or being prey due to abandon fishing nets.

Marine mammals, turtles, birds and crustaceans are vulnerable for swallowing and getting choked by plastic wastes. Swallowing plastic wastes can have bad impacts to marine animals, for example, reducing fecundity and increase the discomfort. Marine animals with stomachs full of plastic wastes can be starved to death (Laist, 1997). Beach sand with plastic wastes has large water permeability and small thermal conductivity. Thus, it is difficult for heat from

1 https://ourworldindata.org/plastic-pollution

surface to conduct to deep sand layers, and this makes reptiles with temperature-dependent sex at hatch to lose the sex balance and might be extinct (Carson et al., 2011). Researchers found that terrestrial mammals such as sea lions or polar bears are infected by pollutants originated from marine plastic debris. Marine plastic debris can transport invasive marine species, and thus can cause a change in species composition, and even the extinction of some species (Aliani and Molcard, 2003).

Microplastic particles swallowed by filter-feeder marine animals can infiltrate into the animal tissues. Cauwenberghe et al. (2013, 2014) found that microplastic particles infiltrate to tissues of mussels, oysters and worms at Belgium coasts. Scientists found microplastics in table salt, portable water and famous brand bottle water, and beers. Microplastic exists not only in water, but also in the air.

Plastic wastes can absorb persistent organic pollutants (POPs) when floating in the sea and the toxic pollutants can infiltrate into inner organs of marine animal through digestion (Fendall and Sewell, 2009; Teuten et al., 2009). Due to biomagnification, concentration of toxic pollutants will increase from the bottom (phytoplankton) to the top (billfish or tuna) of the food chain and can be harmful to seafood consuming human.

McIlgorm et al. (2011) estimated that damages due to plastic marine debris for maritime industries in Asia-Pacific can be amounted to US$ 1.26 billion annually. With the increase of the maritime economic activities, it is expected that damages caused by plastic marine debris to maritime industries are increasing.

2. MATERIALS AND METHODS

The research was carried out by using research results and data obtained by various authors from Viet Nam and other countries all over the world, and data obtained from field survey by some students of the Faculty of Environment, Ha Noi University of Natural Resources and Environment led by the author.

During three years, from 2018 to 2020, eleven undergraduate student in the Faculty of Environment, Ha Noi University of Natural Resources and Environment while doing field survey for writing the graduation thesis, did the survey on the domestic solid waste generation in the Red River Delta and surrounding areas in North Viet Nam. Each student choosed three communities and small towns in the rural areas of North Viet Nam to do the field survey. In each community or small town, the student randomly choose ten households for survey, and for each household, distributed twelve garbage collection bags, with the first four bags labelled as organic garbage (for redundant foods, waste vegetable, tree leaves etc.), the next four bags labelled as recyclable garbage (paper, carton, metal, PET bottle and other kinds of recyclable plastic wastes etc.), and the last four bags labelled as non-recyclable wastes (bottle labels, nilon bags, ceramic, rubber, CD disks etc.). Also, students have to record number of people living in each households and train households on the method to classified solid wastes into three above mentioned categories. The field surveys were carried out during one week. On Saturday afternoon, bags were distributed to households, and bags filled with solid wastes were collected in the afternoon of Monday, Wednesday, Friday and Sunday next week. The collected bags were weighted to determine the total amount of solid wastes, and then the students checked soild wastes contained in each bags to sort out recyclable and nonrecyclable plastic wastes from the solid wastes. Total amount of recyclable and nonrecyclable plastic wastes for each community were weighted separately to determine the percentage of recyclable and nonrecyclable plastic wastes, and total plastic waste.

The amount of plastic waste in Viet Nam and the plastic waste discharged to the East Sea are evaluated by the obtained data and averaging process. Measures for reducing plastic wastes in Viet Nam are proposed based on the analysis of research results from developed countries and present situation in Viet Nam.

3. RESULTS AND DISCUSSIONS

3.1. Plastic marine debris in Viet Nam Water and East Sea

Recent research (Jambeck et al., 2015) found that 50% of plastic wastes in the world ocean are originated from Asian countries such as China, Indonesia, Philippines, Viet Nam and Thailand; and Viet Nam ranks fourth in the world in discharging plastic wastes to the ocean. However, there are some problems in the estimation of Jambeck et al. (2015). The authors of this research used data from World Bank Research (Hoornweg and Bhada-Tata, 2012) assessed for urban areas in Viet Nam. According to the research, total population living in the area adjacent to the coast of Viet Nam is 55.9 million people with the percentage of plastic waste in total solid waste is 13%, and the solid waste that is not properly collected and processed is 88%. From this, the authors found that the amount of plastic waste that has not been properly collected and process is 1.83 million tons/year and total amount of plastic waste leaking to the sea in Viet Nam ranges from 0.28 to 0.73 million tons, or 6% of plastic waste leaking to the sea worldwide.

In reality, a majority of coastal population in Viet Nam is living in rural areas. At present, there is no data on the population of coastal urban areas in Viet Nam, but if assume that the percentage of people living in the coastal urban area higher than the national average, or about 40%, the urban coastal population is about 22.4 million people. According to the surveys conducted by students of the Ha Noi University of Natural Resources and Environment, as presented in Section 2 of this paper, the solid waste in the rural areas has a small percentage (5% to 8%) of plastic waste, mainly cheap nylon shopping bag from rural open markets. Rural dwellers rarely buy goods from supermarket, and there is almost no Styrofoam waste. Besides, rural dwellers in Viet Nam rarely buy bottle water, and almost 100% of discarded water bottles in Viet Nam are collected for recycled. On the other hand, according to the National State of Environment (MONRE, 2015), about 46% of solid wastes in Viet Nam is originated from urban areas, and 17% is industrial wastes, and the remaining is from rural areas, trade villages and medicine wastes. The collection rate of solid wastes in urban areas is very high, more than 85%. The percentage of collection of domestic wastes in the rural areas is only about 40% to 50%, mainly at towns (Le et al., 2018).

Common methods for solid waste processing are landfill or incineration. There are still certain places where people throwing wastes to rivers or the sea. According to the Viet Nam Environmental Administration, the recyclable part (plastic and metal) of solid wastes in Viet Nam ranges from 8 to 18%. The results of this study show that plastic waste has 5% to 8% of solid waste from rural coastal areas, and from 8% to 12% of solid waste from urban coastal areas in Northern Viet Nam. According to Le et al. (2018), Viet Nam collects 33,167 tons/day of urban solid wastes with 81% of which (or 27,067 tons/day) are properly processed by landfill, incineration and other methods. The improperly processed portion of collected urban solid wastes is about 6,100 tons/day. On the other hand, in average, the domestic waste for the rural areas in Viet Nam is about 0.33kg per person per day. With the rural area population of 63.1 million people by 2019, the domestic waste in the rural area of Viet Nam is 7.6 million tons. The uncollected solid waste (55%) amounts to 4.18 million tons. Thus, if the plastic waste portion is in average 6.5%, the uncollected and improperly processed plastic wastes in the Viet Nam rural areas is about 0.27 million tons. The uncollected or improperly processed collected urban solid waste amounts to 11,900 tons daily, or 4.34 million tons per year. If the

percentage of plastic wastes in urban solid waste is 12%, then the total uncollected or improperly processed collected urban plastic waste amounts to 0.521 million tons. It should be mentioned that in Viet Nam the construction solid wastes are also counted as domestic solid wastes; and industrial wastes are almost 100% collected and properly processed. Then, the total unmanaged plastic waste in Viet Nam is about 0.79 million tons. If the percentage of coastal population (living within 50 km from the coast) is 62%, then, the total mismanaged plastic waste for the coasts of Viet Nam will be 0.49 million tons. It is not clear about the percentage of this mismanaged plastic waste that will enter the ocean, but if we follow Jambeck et al. (2015) to take it from 15% to 40%, then the plastic wastes that potentially enter the East Sea from Viet Nam is from 0.07 million tons to 0.20 million tons. The figures of 0.49 million tons and 0.07-0.20 million tons in this study are respectively much smaller than the figures of 1.83 and 0.28-0.73 million tons of Jambeck et al. (2015).

Nevertheless, it should be mentioned that the seas of Viet Nam now have an enormous amount of plastic wastes. At many recreation beaches which are not regularly cleaned, it is easily to find many plastic shopping bags floating in water. At some areas, as shown in Fig.1, a huge amount of plastic bags have been accumulated on the beaches or in the mangrove forests.

(a) (b)

Fig.1 (a) Plastic waste at a mangrove forest in Thanh Hoa Province (source: Tuan Minh, *https://nld.com.vn/thoi-su/kinh-hoang-canh-rung-rac-khong-lo-ven-bo-bien-o-thanh-hoa-20180416111618 02.htm*) and plastic wastes near Cai Rong Harbour, Van Don (source: author)

At present, understanding about plastic waste in Viet Nam is still very limited. Due to low price and convenient for use, plastic products are now widely used, but plastic wastes are still not managed and recycled, reused. At present, policies and regulations on the management of production, trade and use of plastic product, and management of plastic waste in Viet Nam are still primitive, and not enough for effectively reducing the damages caused by plastic wastes. It is predicted that with socio-economic development, if no urgent measure is taken, the amount of plastic wastes in Viet Nam will increase rapidly, and cause serious damages not only to environment, ecological systems, biodiversity, but also to the economic development, especially maritime economic development; and cause significant damages to the maritime areas of other East Sea states and of states outside the region.

3.2. Measures for reducing marine plastic wastes in Viet Nam

The largest source for plastic pollution is single-use plastic products. Therefore, at present, the measures for reducing plastic wastes are concentrating on the replacement of single-use plastic by bio-degradable plastic products or replacement of plastic products with bio-degradable products, such as paper bags or cotton bags. However, recent research found that the what-called "environmentally friendly" measures in reality are not environmentally friendly. To produce bio-degradable products, people must cultivate, i.e. damages natural forest cover with its own ecological systems and replace it with agricultural fields, which need to disturb the original soil layers, and use pesticide, artificial fertilizers etc. All these activities cause soil degradation and environmental pollution. Results of a research sponsored by UK Environmental Agency (Edwards and Fry, 2011) shows that plastic shopping bags use less water and energy for manufacture than that for paper bags or cotton bags. It is necessary to use paper bags three times to have its environmental impacts equal to that of single-use plastic bags. The same figure for cotton bag is 131 times. On the other hand, recent research by Danish Environmental Protection Agency (DEPA, 2018) found that if not counted for plastic waste leakage to the environment, paper bags cause environmental impacts of more than 43 times compared to that caused by single-use plastic bags. The same figure for organic cotton bags is more than 20,000 times. And, the most environmentally friendly bag is the polyester bag which is reused for more than 35 times.

Thus, the problem of reducing environmental pollution caused by plastic wastes is very difficult to be solved by replacing plastic bags by what called "environmentally friendly" products. On the other hand, some single-use plastic products, such as yogurt containers or infusion liquid bottles cannot be replaced by other products which have less environmental impacts or human health impacts.

Not all used plastic products can be recycled or reused. Researchers found that there are more than 50 kinds of plastic wastes, and it is very difficult to automatically classify plastic wastes for recycling. On the other hand, some plastics are synthesized products from some kinds of plastics, and it makes the recycling process more difficult. Even for recyclable plastics, it is required to clean it before recycling; and this process requires a large amount of clean water and energy use and increases waste water. For example, in UK, at present, only 23% of total plastic wastes can be recycled.

Care should also be taken when reuse plastic products. Only some plastic products can be reused for sometimes. For other plastic products, the reuse can be harmful for human health since aging plastics can release additive agents which are harmful or toxic to human health.

Thus, many single-use plastic products cannot be replaced by other products and thus cannot be banned. Even in UK, a developed country, the Government only requires supermarkets to stop use packaging plastics if it is possible, and to ensure that until 2025, all plastic wastes originated from packaging must be recycled, reused or composted. With the above-mentioned reasons, right direction for reducing plastic waste and its impacts is developing measures that make people refuse and reduce the use of plastic products, and reuse, recycle and properly process plastic wastes. There are many single plastic products that can be replaced by multiple use plastic products. For example, instead of using single use shopping bags, we can use multiple-use plastic shopping bags. Measures for reducing single-use plastic products must be feasible and effective, and organized by government authorities with the participation of people and other stakeholders.

For effectively reducing plastic waste and its impacts, it is necessary to improve the national and local laws and regulations on the production, trade and use of plastic products, and better manage plastic wastes.

The activities for reducing plastic wastes involves better assessment of the present state of plastic wastes in Viet Nam, better study on the experiences in the management of plastic products and plastic wastes from developed countries, and developing and implementingeducation and communication programs to raise understanding about plastic waste and its impacts to environment, human health and socio-economic activities. Laws and regulations on the management of production, trade, use of plastic products, and management of solid wastes should be revised to minimize the use of single-use plastic product and better management of plastic wastes.

One of the best ways to solve the problem of plastic waste is increase public understanding about plastic waste and its bad impacts. This helps people to change their attitude on the use of plastic products and understand alternatives to replace plastics. This can be implemented by education and communication. Also, it is necessary to encourage the usage of multiple-use plastic products for packaging, for example, reusing plastic boxes as food container and reducingpolyester film for food packaging in refrigerator.

There should be appropriate financial and control policies for reducing shopping bags. For example, only permit the production and trade of multiple use of plastic bags and ban trading points (such as supermarkets) to provide free plastic shopping bags. It is necessary to strictly ban the production, trade and use of single use plastic shopping bags.

It should be noted that Viet Nam is a country with low per capita consumption of plastic products, and socio-economic development requires the use of more plastic products. Thus, better management of plastic waste should have the priority for reducing plastic wastes. For this, it is necessary to urgently develop and implement laws and regulations on the classification at source, collection, transport and processing of classified solid wastes. For rural areas, it is necessary to develop and apply models for home processing of solid wastes, with plastic wastes and other toxic wastes (such as used battery) are collected, transport and properly processed; and biodegradable wastes should be buried at home gardens. It is necessary to develop and apply a sustainable financial mechanism for this.

With the above-mentioned facts, it is possible to summarize measures for reducing plastic waste and its impacts as follows:

1) Do not replace the single use plastic with biodegradable products if such products are not made from wastes (for example cane-trash, corncob, rice polish etc.) or plant species that need to be reduced (such as water hyacinth etc.);
2) Encourage the use of plastic products that can be recycled or reused for packaging;
3) Strictly prohibit free single-use plastic bags at all trade points, including urban and rural open markets, and require at all trading points selling multiple-use plastic shopping bags with an appropriate price;
4) Invest in education and communication on the system for classification at source, collection, transport and recycle, reuse and properly process plastic wastes;
5) Invest in research to invent effective and environmentally friendly technology for processing plastic wastes, and step by step, approach to reduce and eradicate landfill for plastic waste;

6) Increase the education and communication to raise public understanding on the impacts of plastic waste and benefits of reducing plastic products, and plastic waste;

7) Increase import tax for plastic raisins and enact an effective system of permission and control of plastic production;

8) Develop a synchronized and effective system of policies and regulations based on best science on the production, trade, use of plastic products, and management of plastic wastes.

4. CONCLUSIONS AND RECOMMENDATIONS

1) Impacts of plastic waste are very serious and exist for many years, and very difficult to be overcome. Thus, it is necessary to urgently reduce plastic waste.

2) Present state of plastic waste in Viet Nam is not as serious as in some international assessment, but the plastic waste is really a very serious environmental problem; and thus, it is necessary to mobilize the entire political system to cope with this problem.

3) Do not replace plastic products with biodegradable organic products if there is no sound science base.

4) It is necessary to invest in research to find feasible and effective measures for classification at source, collection, transport and recycled, reuse and properly process plastic wastes.

REFERENCES

1. Ministry of Natural Resources and Environment (2015) National Report on the state of Environment.
2. Aliani S, Molcard A (2003) Hitch-Hiking on floating marine debris: macrobenthic species in the Western Mediterranean Sea. Hydrobiologia 503(1):59–67
3. Cauwenberghe L.V., M. Claessens, M.B. Vandegehuchte, J. Mees, C.R. Janssen (2013) Assessment of marine debris on the Belgian Continental Shelf. Marine Pollution Bulletin, 73. 161-169.
4. Cauwenberghe L.V. and C. R. Janssen (2014) Microplastics in bivalves cultured for human consumption. Environmental Pollution, 193. 65-70.
5. Carson HS, Colbert SL, Kaylor MJ, McDermid KJ (2011) Small plastic debris changes water movement and heat transfer through beach sediments. Mar Pollut Bull 62(8):1708–1713.
6. Claessens, M., De Meester, S., Van Landuyt, L., De Clerck, K., Janssen, C.R. (2011) Occurrence and distribution of microplastics in marine sediments along the Belgian coast. Mar. Pollut. Bull. 62, 2199–2204.
7. DEPA (2018) Life Cycle Assessment of grocery carrier bags. Environmental Project no. 1985. Danish Environmental Protection Agency.
8. Edwards C. and J. M. Fry (2011) Life cycle assessment of supermarket carrier bags: a review of the bags available in 2006. Report: SC030148. Environment Agency, Horizon House, Deanery Road, Bristol, BS1 5AH.
9. EPA (2008) Municipal solid waste generation, recycling and disposal in the United States: facts and figures for 2008, United States Environmental Protection Agency.

10. Fendall LS, Sewell MA (2009) Contributing to marine pollution by washing your face: microplastics in facial cleansers. Mar Pollut Bull 58(8):1225–1228.
11. Greenpeace (2017) https://www.greenpeace.org/international/story/11871/the-ocean-plastic-crisis/
12. Hoornweg D., P. Bhada-Tata (2012) What a waste: A global review of solid waste management. The World Bank, Washington, DC. *https://openknowledge.worldbank.org/handle/10986/17388*
13. Jambeck J.R., R. Geyer, C. Wilcox, T. R. Siegler, M. Perryman, A. Andrady, R. Narayan, K. L. Law (2015) Plastic waste inputs from land into the ocean. Science 347, 768-771.
14. Laist DW (1997) Impacts of marine debris: entanglement of marine life in marine debris including a comprehen sive list of species with entanglement and ingestion records. In: Coe JM, Rogers DB (eds) Marine debris: sources, impacts, and solutions. Springer Series on Environmental Management, pp 99–139.
15. Le H.A, Mac T.M.T, Nguyen T.B.L (2018) Present state, collection and processing of solid wastes in Viet Nam. Journal of Environment, No. 10/2018. *http://tapchimoitruong.vn/pages/article.aspx?item=Hi%E1%BB%87n-tr%E1%BA%A1ng-ph%C3%A1t-sinh,-thu-gom-v%C3%A0-x%E1%BB%AD-l%C3%BD-ch%E1%BA%A5t-th%E1%BA%A3i-r%E1%BA%AFn-%E1%BB%9F-Vi%E1%BB%87t-Nam-49458*
16. McIlgorm A, Campbell HF, Rule MJ (2011) The economic cost and control of marine debris damage in the Asia-Pacific region. Ocean Coastal Manage 54(9):643–651.
17. Teuten EL, Saquing JM, Knappe DRU, Barlaz MA, Jonsson S, Björn A, Rowland SJ, Thompson RC, Galloway TS, Yamashita R, Ochi D, Watanuki Y, Moore C, Viet PH, Tana TS, Prudente M, Boonyatumanond R, Zakaria MP, Akkhavong K, Ogata Y, Hirai H, Iwasa S, Mizukawa K, Hagino Y, Imamura A, Saha M, Takada H (2009) Transport and release of chemicals from plastics to the environment and to wildlife. Philos Trans Royal Soc B: Biol Sci 364(1526): 2027–2045.
18. UNEP (2005) Marine Litter. An analytical overview. *http://www.unep.org/regionalseas/Publications/Marine_Litter.pdf*
19. UNEP (2006) Ecosystems and Biodiversity in Deep Waters and High Seas. UNEP Regional Seas Reports and Studies No. 178. UNEP/ IUCN, Switzerland 2006. ISBN: 92-807-2734-6.
20. UNEP (2014) UNEP Year Book 2014 and Valuing Plastic reports: Plastic Contamination Threatens Marine Life, Tourism, Fisheries and Businesses.
21. UNEP (2016) Marine plastic debris and microplastics – Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi.

What is Asia Pacific Civil Forum on Marine Litter?

Asia Pacific Civil Forum on Marine Litter is a network established in 2009, made of NGO groups dedicated to protection of marine environment from marine litter in Asia Pacific countries.

Network member groups are:

Japan Environmental Action Network (JEAN)
Our Sea of East Asia Network (OSEAN)
Taiwan Ocean Cleanup Alliance (TOCA)
Shanghai Rendu Ocean NPO Development Center
Kewkradong Bangladesh
ICC Philippines
Tangaroa Blue Foundation
Ocean Conservancy
Greenhub

To the readers,

East Asian countries are connected to each other environmentally, geographically, historically, or culturally through shared regional seas. The East Asian region is one of the most dynamic economic centers with some of the busiest shipping lanes in the world. With the spread of mass production and consumption over the last decades came the huge increase in solid waste generation. There are, however, not enough waste treatment facilities and management measures, which makes the region vulnerable to marine debris pollution.

Entering the seas in large amounts, floating debris has become a source of concerns and conflicts among some neighboring countries. This transboundary environmental problem requires concerted efforts of all the relevant stakeholders beyond sectoral and political boundaries. In this regard, OSEAN (Our Sea of East Asia Network) and JEAN (Japan Environmental Action Network), the marine debris NGOs in Korea and Japan, have shared a vision in which people in the East Asia could act together as one community in protecting our precious marine ecosystems. We believe that NGOs in the East Asian countries have an important role in sharing experiences and acting together to address the marine debris issue in the region from the bottom up.

The city governments of Shimonoseki and Nagato, and JEAN co-organized '2009 Marine Litter Summit - Shimonoseki•Nagato Meeting' on October 16-18, 2009, in Shimonoseki, Japan. OSEAN suggested in the meeting to start an 'East Asian Civil Forum on Marine Litter' through which relevant NGOs and organizations in the East Asia could share experiences and information and work together on the marine debris problems. OSEAN and JEAN have reached a consensus to launch the forum and publish biannual newsletters. So we have launched the East Asian Civil Forum on Marine Litter and we are delivering marine debris news from member countries via e-mail to people who are concerned with this problem on local, national, and regional levels. In late 2012 now, we have four members above. We hope that the forum could provide a venue for all of us to share our vision, experiences, and creative actions.

This is the first effort to link the East Asian people beyond geographical and language barriers to a common goal of protecting our seas from marine debris pollution. NGOs and organizations that have interests and passion to make our seas clean and healthy are more than welcome to join us. For more information, you can contact us at loveseakorea@empas.com. Please let us know if you have any problem in receiving the newsletter. These articles are also available online at http://cafe.naver.com/osean.

Secretariat,
Sunwook Hong (OSEAN) and Kojima Azusa (JEAN)

ISSN 2287-8971

Marine Litter News

Volume 12 • Issue 1 • September 2020

The newsletter is biannually published by APML.

Asia Pacific Civil Forum on Marine Litter

Japan Environmental Action Network (JEAN)
202, Mansion SOPHIA,
3-4-12, Minami-Cho, Kokubunji-Shi, Tokyo, Japan
URL http://www.jean.jp E-mail Cleanup@jean.jp
TEL +81-42-322-0712 FAX +81-42-324-8252

Our Sea of East Asia Network (OSEAN)
717, Leadersvill, 23-96, Jukrim 4ro, Tongyeong, Gyeongnam, 650-826, South Korea
URL http://cafe.naver.com/osean E-mail loveseakorea@empas.com
TEL +82-55-649-5224 FAX +82-303-0001-4478

Taiwan Ocean Cleanup Alliance (TOCA)
97057, No.87, Fuyang Rd., Hualien City, Hualien County, Taiwan
URL http:// www.icctaiwan.org.tw E-mail kuroshio@seed.net.tw
TEL +886-3-857-8148 FAX +886-3-857-8948

Shanghai Rendu Ocean NPO Development Center
Room 222, Building C, No.633, Eshan Rd, Shanghai, China, Zip Code 200127
URL http://www.jintan.org E-mail liuyonglun@163.com
TEL +86-21-61762119

Kewkradong Bangladesh
C4 Arambag Eastern Housing, Mirpur-7, Dhaka 1216, Bangladesh
Muntasir@gmail.com
TEL +88 01911 310 275

ICC Philippines
Units 8 & 9, CCP Bay Terminal, CCP Complex, Roxas Blvd., Pasay City, Philippines,
URL http://sites.google.com/site/iccphilippines/home
Blog: coastalcleanupphilippines@blogspot.com
Email: iccphilippines@gmail.com
Mobile No. : +63917 372 87.02

Tangaroa Blue Foundation
PO Box 757, Port Douglas, QLD 4877, Australia
Web: www.tangaroablue.org Email: info@tangaroablue.org
TEL+61.410166684

Ocean Conservancy
1300 19th Street, NW, 8th Floor, Washington, DC 20036, USA
Web: ww.oceanconservancy.org Email: cleanup@oceanconservancy.org
TEL +1-202-429-5609

Greenhub
Planning and Investment Ministry Building, 10th floor, office 1008, 8b Ton That Thuyet, Hanoi, Vietnam
Web: www.greenhub.org.vn Email: info@greenhub.org.vn
TEL +84 4 629 26764

CECR
R.501-502, E1 Building, Trung Tu Diplomatic Compound, No 6 Dang Van Ngu, Dong Da, Ha Noi,Vietnam.
Web: www.cecr.vn Email:cecr.vn@gmail.com
TEL +84 243 972 8063/64.