



O·S·E·A·N  
Our Sea of East Asia Network



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# Marine Litter News

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\* New member - GreenHub



Asia Pacific Civil Forum on Marine Litter

Dear readers,

We are very pleased to release this issue, which includes fascinating stories from China (the mainland and Taiwan), Vietnam, South Korea, Australia and the United States. All stories in this issue came from our members in the Asia Pacific Civil Forum (APML) who are passionate about reducing quantities of marine debris and mitigating negative impacts in the Asia Pacific region. We have learned very practical lessons from our member countries. We believe sharing best practices from other countries and regions motivates and encourages our efforts. We have learned very practical lessons from our member countries.

This issue introduces visual achievements. Exciting experiences from the Marine Debris Symposium held in Taiwan are vividly illustrated with photos. Some of our members in the APML have participated the global project undertaken by CSIRO (see the latest issue of Marine Litter News) and our Taiwanese members describe their first experience. There is also a story on the successful reduction of synthetic weather balloon releases in Australia. Moreover, two articles from Vietnam motivate us to put more effort and support to the country. Recycling system in the villages of Vietnam introduced a challenging issue which provides not only job opportunities to local people and businesses while at the same time raising concerns about human health and environment.

Understanding of plastic pollution in China has increased through cooperation between NGOs and researchers. Furthermore the government (SOA) launched the monitoring of offshore microplastics and 170 researchers have come together through the Chinese social network of WeChat. France-South Korea forum held in South Korea reminds us the issue we are facing is truly global. OSEAN in its research continues to improve the understanding of meso-sized marine plastic debris along the coasts by publishing a paper in Marine Pollution Bulletin and targeting the most abundant marine debris (which is the same regardless of the size of the marine debris). This is none other than debris from Styrofoam buoy, which can be traced back to aquaculture of oyster and seaweed.

As the editor, I can say for certain that our members' efforts for many years are enough to be admired and I wish their efforts to be long lasting and sustainable despite their struggles against lack of financial and human resources.

We've been empowering the key persons of our member organizations through monthly webinars. In the upcoming spring, many of us will present our efforts at the 6th International Marine Debris Conference in San Diego. I hope I can meet those of you readers who are interested and concerned in this issue

With love,  
December 2017

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(Ph.D., President of OSEAN)



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\* Ms. Hyunjung Kim voluntarily assists to edit Marine Litter News.

## The First Taiwan Marine Debris Symposium

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On May 20-21, 2017, more than 220 participants from different professions and international pioneering practitioners attended the Marine Debris Symposium held in Keelung, Taiwan. This symposium was organized by Tse-Xin Organic Agriculture Foundation (TOAF), National Museum of Marine Science and Technology (NMMST) and other organizations. It marked the very first time in Taiwan that representatives from academia, government, and NGOs, as well as experts from overseas convened together to discuss potential strategies to tackle the problem of marine debris, and to come up with advice for policy makers.



Group photo of invited speakers and participants

Having dedicated itself to promoting organic farming and environment protection in Taiwan for 20 years, TOAF is turning its attention to the ocean after realizing how seriously marine debris impact the well beings of marine life and humans. Since the beginning of 2016, TOAF has been actively advocating plastic-reduction and plastic-free education. Over the past 2 years, hundreds of lectures and beach cleanup activities were hosted by TOAF, helping more than 60 thousand attendants learn the ways of leading plastic-free lives so as to protect the ocean and marine species.

In the past decade, many NGOs in Taiwan began promoting beach cleanup, conducting education programs, and initiating relevant campaigns in order to raise public awareness about marine debris. Also, there has been a small number of researchers in Taiwan studying issues associated with marine debris. Experiences from other countries showed that the results of scientific research would quite possibly become an important guidance for solutions and policy making towards addressing an environmental issue. However, compared with other countries in Asia, Taiwan's marine debris research is still at a preliminary stage, and the overall effort engaged with marine debris issues remains quite limited. Therefore, this symposium was aimed to strengthen the communication network and encourage conversation among relevant stakeholders. Introducing the topics and methods used by foreign scholars served as good references for domestic scholars. Exchanging the experiences of policy advocacy practices based upon research results also provided demonstrations on how to leverage efforts from academia.

This symposium was composed of six sessions, and both foreign guest speakers and domestic speakers had direct interactions to share their perspectives and experiences under the respective topic. On the first day, participants were informed on the types and impacts of marine debris, especially on the study of microplastic pollution and derelict fishing gears. At the same time, international NGOs shared how to integrate their expertise and seek government-backed partnerships, and noted the importance of starting a dialogue with industries in order to seek a variety of solutions to the marine debris issue. On the second day, the focus was on the challenges from the Taiwanese government's perspective and the education plans on marine debris. Domestic industry and government officials respectively proposed forward-looking suggestions on solutions to the problem of marine debris, including beach adoption and education to raise public awareness. In panel discussion, enhancing communication with upstream industries, actively engaging in dialogue with the government to obtain integrated policy support, and monitoring of the marine environment were also topics addressed by our guest speakers.

Three initiatives were finally proposed by the representative of the main organizer (TOAF). First, actively conducting education and outreach on marine debris is necessary since education is the basis for raising public awareness. Second, promoting research and international cooperation in order to provide the basis for integrated policy making is urgent. The third conclusion was to, widely encourage the industries to practice the concept of circular economy in order to mitigate the threat of marine debris from the source.

The two-day symposium is a new milestone for Taiwan, and many participants were encouraged by the collective energy and cross-sectoral communication. However, much work remains to be done to get the whole picture of the current situation. There are already many pioneering NGOs in Taiwan spending lots of effort on solving the problem. TOAF, as a new face in this field, intends to be humble and hopes that through the symposium, more and more people will work together to contribute. Greater engagement and collaboration with Asia-Pacific countries are also needed in the future to stop plastic from entering the ocean. We will continue to jointly protect the ocean beyond our own borders.





During Session 6 - Panel Discussion



Snapshots of the Marine Debris Symposium in Taiwan

# Marine Debris Symposium Agenda

## May 20-21, 2017

### NMMST, Taiwan

May 20 – Day 1	
09:30-10:00	Registration
10:00-10:30	Opening Ceremony
10:30-12:00	<b>SESSION 01 Research on Marine Plastic Pollution and Government Policy</b> <ul style="list-style-type: none"> <li>• Dr. Marcus Eriksen - 5 Gyres Institute</li> <li>• Dr. Julia Hsiang-Wen Huang - National Taiwan Ocean University</li> </ul>
12:00-13:30	Lunch
13:30-15:00	<b>SESSION 02 Research on Derelict Fishing Gears</b> <ul style="list-style-type: none"> <li>• Dr. Sun Wook Hong - Our Sea of East Asia Network</li> <li>• Dr. Chung-Ling Chen - National Cheng Kung University</li> <li>• Ms. Po-Hsiu Kuo - National Cheng Kung University</li> </ul>
15:00-15:30	Coffee Break
15:30-17:00	<b>SESSION 03 Practice and Participation of NPO/NGO on the Marine Debris Issue</b> <ul style="list-style-type: none"> <li>• Mr. Hiroshi Kaneko - Japan Environmental Action Network</li> <li>• Mr. Chieh-Shen Hu - The Society of Wilderness</li> </ul>
May 21 – Day 2	
09:30-10:00	Registration
10:00-11:30	<b>SESSION 04 Circumstance and Challenge of Marine Debris Pollution: Domestic Government Perspectives</b> <ul style="list-style-type: none"> <li>• Ms. Hsin-Chen Sung - Department of Water Quality Protection, EPA</li> <li>• Mr. Kuo-Su Chiu - Department of Environmental Sanitation and Toxic Substance Management, EPA</li> <li>• Mr. Wei-Sung Shieh - Kinmen National Park</li> <li>• Dr. Zhen-Han Tsai - National Taiwan Ocean University</li> </ul>
11:30-13:00	Lunch
13:00-14:30	<b>SESSION 05 Education Plans on Marine Debris</b> <ul style="list-style-type: none"> <li>• Ms. Li-Shu Chen - National Museum of Marine Science and Technology</li> <li>• Mr. Patrick Yeung - WWF Hong Kong</li> </ul>
14:30-15:00	Coffee Break
15:00-16:45	<b>SESSION 06 Panel Discussion</b> <ul style="list-style-type: none"> <li>• Dr. Marcus Eriksen - 5 Gyres Institute</li> <li>• Mr. Hiroshi Kaneko - Japan Environmental Action Network</li> <li>• Dr. Sun Wook Hong - Our Sea of East Asia Network</li> <li>• Ms. Hsin-Chen Sung - Department of Water Quality Protection, EPA</li> <li>• Mr. Chieh-Shen Hu - The Society of Wilderness</li> <li>• Dr. Kwang-Tsao Shao - Biodiversity Research Center, Academia Sinica</li> </ul>
16:45-17:00	Closing Ceremony

## Successful story of reducing weather balloon release and its impact in Australia

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Operating for over 13 years, Tangaroa Blue Foundation (TBF) has created the largest and longest running marine debris database in Australia. Each item of rubbish collected during clean-ups has been categorised and entered into the Australian Marine Debris Initiative Database. This data is irrefutable evidence, and has been used to inform initiatives such as source reduction plans and management and policy decisions on local, regional, state and national levels.

In 2011, TBF identified weather balloon targets and components during beach clean-ups in Queensland, Australia (see photo 1). TBF then attempted to consult with the Australian Bureau of Meteorology about the release of these weather balloons, and its harmful impacts on the environment. After conversations did not bear any fruit, we decided to partner with colleagues at James Cook University (JCU) in Townsville to see if we could create a case.

The study in 2012 predicted and quantified the impact of weather balloons released by the Australian Bureau of Meteorology (BoM) on the Great Barrier Reef World Heritage Area (GBRWhA). Modelling by JCU assessed the probability of ocean endpoints for released weather balloons and predicted pathways post-release. In addition, 21 months of data from beach clean-up events was used to validate our results and assess the abundance and frequency of weather balloon fragments in the GBRWhA. The article Predictable Pollution: An assessment of weather balloons and associated impacts on the marine environment was published in the journal Marine Pollution Bulletin in 2014.

We found between 65% and 70% of balloons land in the ocean, and ocean currents largely determine final endpoints. Beach clean-up data revealed 2460 weather balloon fragments were recovered from 24 sites within the GBRWhA. Up to 100 weather balloons were released into the environment daily from BoM offices around Australia, 68 adjacent to the coast. Each helium balloon had a polystyrene target with a silver lining, and if released at night a torch with AA batteries. Once the balloon reaches a certain height it bursts, and all the components fall back to earth, often ending up in the ocean.



Since publication, we are pleased to announce that the BoM has now discontinued releasing weather balloons from a number of locations and plan to reduce it further in future. The BoM has also replaced the polystyrene targets with cardboard ones, further reducing the environmental impact, see article: <http://www.tangaroablue.org/amdi/campaigns/60-bom-weather-balloons/779-no-more-polystyrene-for-bom-s-weather-balloons.html>

These efforts can be seen clearly in the data too, a drastic decline in weather balloon components has been found all over the GBRWHA, including our regular monitoring sites such as Cape Kimberley (Figure 1). Tangaroa Blue Foundation is pleased to have new engagement with the BoM, and to continue collaborating in the future.



Figure 1. Photos of weather balloon targets and components

### Cape Kimberley Data 2011-2017

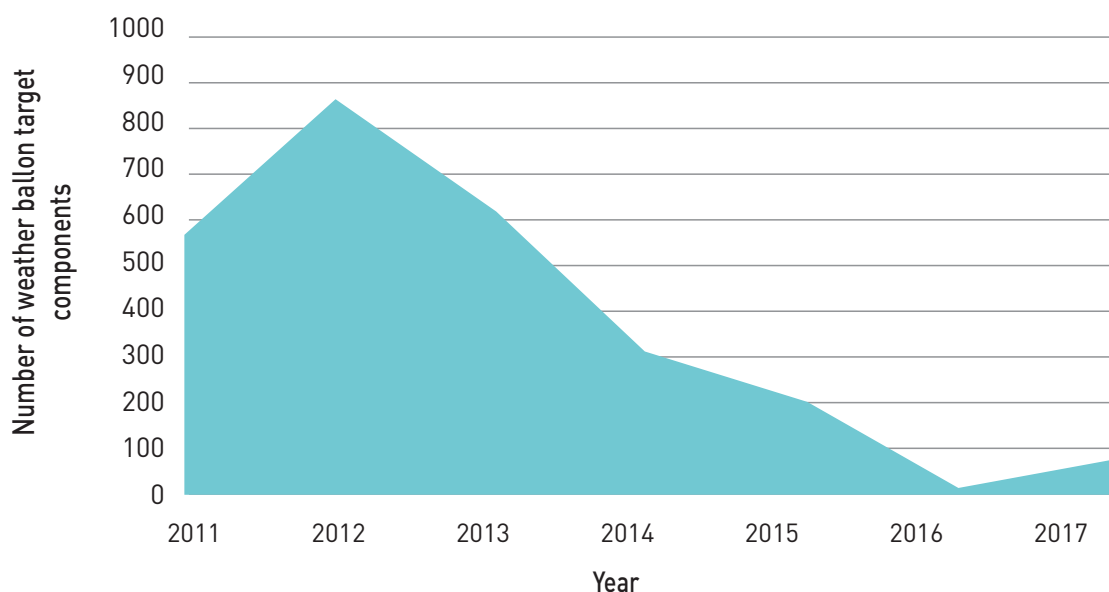


Figure 2. Temporal trend of the number of weather balloon targets and components in Cape Kimberley, Australia



## The polystyrene issue in the Ha Long-Cat Ba coastal area of Vietnam – More effort and cooperation needed

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Only 10% of all waste generated in Vietnam are recovered for recycling or reuse (Ministry of Resources and Environment). Some reasons for this include the lack of treatment facilities, lack of community participation in waste management and recycling practices, poor coordination between collection, transportation and treatment, and a lack of regulations and enforcement (Pariatamby and Tanaka (eds.), 2014). Plastic marine debris, and specifically polystyrene, cause significant environmental issues, including injuring and killing sea-life, as well as public health concerns from the accumulation of persistent organic compounds in the food chain (Moore, 2013).

Vietnam has participated in international coastal cleanups (ICC) annually since 2003, especially driven by enthusiastic Vietnamese youth. In 2016 and 2017 results indicated around 50-70% of marine debris were polystyrene plastic, with the remainder being both recyclable and non-recyclable materials.

So far, GreenHub, IUCN and partners have organized three coastal clean-ups in the Ha Long beach with the enthusiastic participation of more than 300 volunteers. 4 tons of trash got collected from 3.9 km of beach.

After the first coastal clean-up, the Ha Long City People's Committee issued Decision No. 349/TB-UBND banning the use of polystyrene in floating structures of Ha Long Bay.

*"The Decision has been strictly enforced by the local authorities of Ha Long City. Currently, there are 55 floating structures in Ha Long Bay. Since the promulgation, 50% of individuals/households providing aquaculture and tourism services have replaced polystyrenes with sustainable materials. 3,520 out of 4,141 buoyancies have used composite barrels instead of styrofoam. This shows the strong commitment of the Ha Long City People's Committee,"* said Pham Dinh Huynh, Deputy Director of Ha Long Bay Management Board.

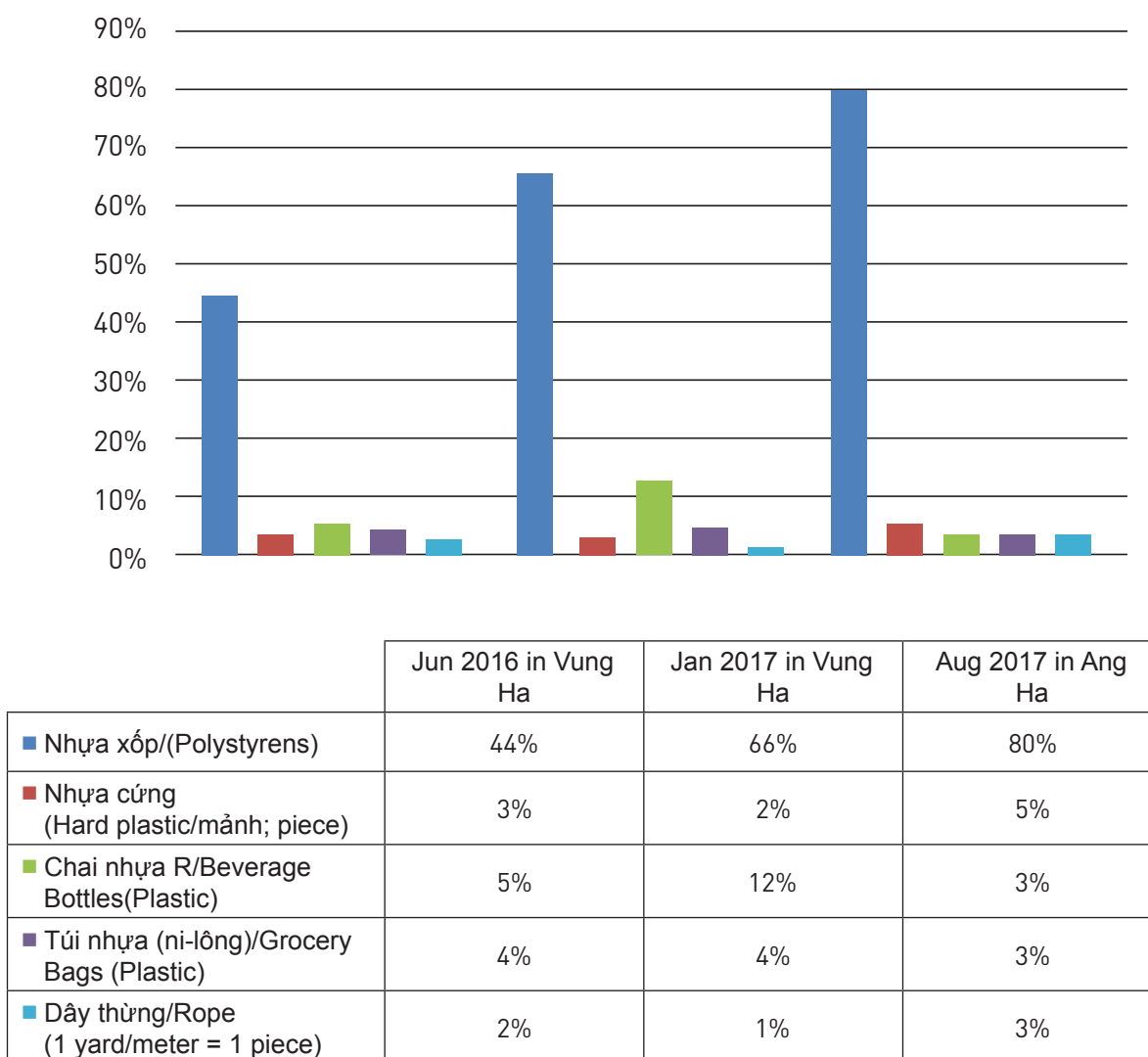


Figure 1. Details of trash components

However, action by Quang Ninh alone can not solve the problem. There is no boundary for polystyrene between Hai Phong and Quang Ninh. While Quang Ninh has acted to control polystyrene, floating farms in Lan Ha Bay continue to use polystyrene for buoyancy.

In Cat Ba, Polystyrene accounts for more than 50% of all garbage, tainting its World Biosphere reserve icon. As known, the main income of households living in those farms comes from fish and mollusk culture. A combination of polystyrene and plastic drums are used within the farms for floatation (IUCN, 2016). Statistic report of Cat Ba Bay Management Board shows that in February 2016, there were 486 floating farms with more than 8,600 cages and 463 orchids mainly in Lan Ha Bay, Ben Beo, Cat Ba, Gia Luan and Tra Bau Bay in the Cat Ba Archipelago. Polystyrene is known as a material for making floats used in fishing boats in Cat Ba. Floats made of this material are low cost and are very popular for use by residents here. However, this is also a serious environmental pollutant and affects human health as well as marine life, because of the toxic components produced in it. Also, polystyrene in the environment can damage the aesthetics of the area since the foam from polystyrene drums are released into the environment and will blight the beauty of the bays as well as create a bad impression to tourists.

Cat Hai District People's Committee has a plan to reduce the number of floating farms to 150 by 2020 and ensure that these farms meet certain environmental standards before being allowed to operate. It is vital that Hai Phong, like Quang Ninh, bans the use of polystyrene in flotation devices. At the same time, more effort should be made to raise awareness from fishing communities and to start replacing polystyrene with more environmentally friendly materials.



Figure 2. The third clean-up in August, 2017 in Ha Long



## Observations from Craft Recycling Villages

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The growing threat of trash entering our ocean is a global problem, but this is truly an instance where thinking globally and acting locally applies. Scientists have estimated that about 8 million metric tons of plastic are entering the ocean every year and about 80% of this starts on land (Jenna R. Jambeck 2015). Left unabated, this translates to an ocean with 1 ton of plastic for every 3 tons of fish by 2025! These same scientists also found that the majority of this plastic currently comes from inadequate waste management - either trash that is never collected and spills directly into the environment, or trash that is collected but escapes because it's not properly handled. Moreover, countries experiencing rapid economic growth may not have a waste infrastructure to keep pace with increased household consumption. This mismatch has led to large amounts of plastic waste entering our ocean.

I was fortunate to travel to Hanoi, Vietnam recently to better understand some of the challenges and realities in the waste management system on the ground, particularly in rural areas. It's true that the plastic waste challenges are substantial, but we also found hard working entrepreneurs who have created recycling systems, members of national and local government working to address waste management challenges, and dedicated non-governmental organizations working with communities to help solve these issues. We visited several villages and met business owners on the outskirts of Hanoi who were responsible for the various links of the value-chain required to effectively process recyclable materials. Although there is a formal waste collection system in these places (primarily servicing the urban and some peri-urban areas), the materials seemed to flow through an informal series of waste pickers, middlemen and aggregators that help transport and generate significant volumes of material to small cottage industries in plastic recycling villages that specialize in recycling various materials, products, and packaging formats.



Figure 1. Bales of material collected from pickers in Hanoi and transported to business owners that can process them.

Many of the business owners that we spoke with have family operated facilities and employed fewer than 10 people. Each business was very specialized in a specific step in the recycling process and well connected with other family business owners up and down the value-chain, which in some instances was a neighbor or nearby facility. The collection and recycling of the materials they process—whether that is nylon bags or beverage bottles or industrial film—can be quite comprehensive, and provides an income to many families. However, in many instances, the safety and environmental conditions in these small businesses create issues for the workers and communities as a whole.





Figure 2. A worker separating bales of mixed materials. For this facility, sorting was being done by material color and not necessarily material type.

In the villages we visited, the process of sorting, separating and processing the materials in many instances is very labor intensive and much of it is done by hand. As a result, the effectiveness of such processing practices is relatively high as each piece of material entering the recycling stream is being handled, but the efficiency in which it is being done could be improved to help facilitate the processing of more material in safer working conditions. Many of the facilities that we visited had stock piles of material that would take weeks, if not longer, to process. The equipment used is often outdated, with limited safety or environmental protections, leading to lower quality end products and significant environmental and health impacts. Local governments and the communities are aware of these challenges but are also balancing the need to create and maintain jobs as priority in many of these communities. The efforts observed in the areas we visited surrounding Hanoi demonstrate local solutions to address waste and marine debris, but also an enormous lack of resources and capacity to do so in a way that is safe and efficient. Speaking with local NGOs and government officials, we know that the challenges become even more visible the further outside of the city that you get, where formal (city contracted) waste collection stops and waste is often openly burned or dumped. The desire for change is strong—what is needed are resources and additional technical support. We believe there are ways organizations like Ocean Conservancy can help, and we are looking forward to continuing to understand the challenges facing the communities and working with partners on the ground to leverage opportunities to strengthen waste management practices and eliminate the threat of land-based marine debris.



## A Brief Introduction of Plastic Marine Debris in China

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### 1. Current situation of plastic marine debris

In general, the amount of marine debris is continually rising. According to research overseas, about 1 million tons of trash enters the sea. Many sampling surveys show that the problem is getting worse in terms of both number and weight.

Over 80% of marine debris consists of marine plastics, which means that the general conclusions and solutions regarding marine debris can also be applied to plastics. Marine litter can be divided into three categories in terms of its space distribution: debris floating on the ocean surface, debris washed up on coasts and debris which has sunk onto the ocean floor. The floating litter consists of polystyrene snack boxes, plastic bags, plastic bottles, plastic tableware, fishing line and nets, buoys, and pieces of wood; litter on beach includes cigarettes, plastic bags, plastic ropes, polystyrene or plastic snack boxes, fishing gear, cans, and bottles; ocean floor debris includes plastic bags, pieces of plastic, cans, bottles and fishing nets. Take floating litter as an example, according to the monitoring data in 2016-2017, the top 3 litter were plastics, polystyrene and wooden pieces. The wooden pieces accounted for the smallest percentage and its variation in amount remained constant in recent years, while the other two take up a much greater percentage and showed large differences before and after 2011. Before 2011, the plastics took up a higher percentage, reaching its maximum in 2010 of 54% of all debris; while the amount of polystyrene greatly increased after 2011, about 57% of all debris in 2012.

Beach debris has a relatively high density and experiences a lot of variability. According to statistical analysis from 2007 to 2016, its quantity density stayed at a magnitude of 104 piece/km<sup>2</sup>. Floating litter ranked second, with a magnitude of 103 piece/km<sup>2</sup>. The seafloor debris had the lowest quantity density, at a magnitude of 102 piece/km<sup>2</sup>. What's more, small pieces of litter accounted for the majority of floating litter, over 96%. In terms of the long-term trend, the density of litter on beaches varied the most, we could see an obvious rise from 2008 to 2012 and then a slight dip between 2013 and 2014. By contrast, the quantity density of floating and seafloor litter stayed at a consistent level with little fluctuation in weight density.

By analyzing the data from Coastal Cleanup and Monitoring Project in China (CCMC), we find that marine litter experiences seasonal variation, with a peak in May. The amount found in January, March and July differed very slightly. With an increase in September and a slight decline in November. The amount of the most common type of debris, packaging and hygiene-related, reached its maximum in May and remained relatively stable for the other periods. While debris smaller than 2.5cm and other kinds of debris showed the opposite, with its minimum in May and maximum in November, with a dramatic increase from September to November. The amount of packaged-related litter varied dramatically in the whole year, with its peak in May and nadir in March. Packaging related debris experience the most fluctuations during the year, with its peak in May.

Over 80% of plastic litter was generated by onshore human activities, which corresponds to the result of most global marine litter source analysis. Another 10% are the result of fishing activity such as ghost nets. The remaining 10% comes from recreational marine activities. However, this ratio of marine litter is not definite, as it varies based on many other local factors.

The findings of CCMC concludes that coastal debris is positively correlated to population and GDP. The correlation between the average number of beach garbage and the population in cities is  $r=0.608$ ,  $p=0.047$ , which indicates that the average number of beach garbage in the cities is moderately positively related to the population. Meanwhile, the correlation coefficient between the average number of beach garbage and GDP in cities is  $r=0.626$  and  $p=0.039$ , indicating that they are also moderately positively correlated.

At present, areas with a high density of marine waste in China are mainly found in tourist and recreational sites, areas for aquaculture, ports, shipping lanes, as well as the surrounding local areas. Generally, most of the marine waste in tourism and recreational areas are plastic bags, plastic bottles, and other domestic waste. Whilst in areas with agriculture and aquaculture there are more domestic plastics and polystyrene.

## 2. Harmful Effects of Plastic Marine Debris

As for the harmful effects of marine debris, especially of plastic marine debris, currently there are several observations as follows.

1. The main harmful effects of marine debris on oceans is the damaging of marine ecosystems, the continuous threat to individual species may cause the deterioration of certain parts of the ecosystem.

1) In terms of threat to marine species, it is reported that about 268-800 marine species worldwide have been affected by marine litters. Marine mammals like whales were stifled by the ropes and ghost nets; marine invertebrates like corals perish due to the wide deposition of marine litter on the seabed; seabirds, turtles and fishes are harmed due to ingestion of plastics and the subsequent effects of poisoning from toxins; marine life is poisoned by the organic toxins which have been continuously accumulated through the food chain.

2) Long-term effects will include ecosystem breakdowns and marine desertification. The existence of large-area marine garbage patches inhibits photosynthetic effects of phytoplankton and prevents some marine animals such as zooplankton from consuming prey at the ocean surface. Plastic marine debris also acts as a carrier of exotic species for long-distances. Marine debris also affects the activity of animals living in intertidal zones and limits the effectiveness of natural processes.

2. Marine debris can cause huge economic losses to coastal countries and regions, even to inland countries. Tourism, shipping industry, fisheries and other relevant industries are directly affected. The cleaning of marine litters may

**also incur large additional costs.** The huge amount of plastic rubbish scattered on beaches degrades local aesthetics, is harmful to health, and reduces the number of tourists. Therefore, it severely affects the development of marine tourism and decreases the income from the tourism sector. The substances which are leaked from the decomposition of marine debris can directly harm fish and affect fishery stocks. Meanwhile some rubbish can get tangled with fishing boat paddles and nets, which impedes the work of these fisheries. Plastic debris can become entangled with ship propulsion units and cause navigational accidents. Besides, large floating plastic pieces can collide with ships and block buoys, which can further impede the navigation of ships. Additionally, over-accumulated plastic debris on the seabed is very likely to form shoals and further influence the safety of navigation. It is difficult and expensive to collect marine debris and thus these resources cannot be recovered, which is another aspect of economic losses.

**3. Toxic substances released from or adsorbed by plastic marine debris will damage human health ultimately through bio-magnification along the food chain.** Besides, the reduced seafood production can threaten human food security. Some marine litter will release toxins after being submerged for a certain time and will also adsorb persistent toxic chemicals dissolved in ocean water. Small pieces of plastic marine debris are often ingested by zooplankton, seabirds and fish by mistake. During digestion, the toxins seep into the organism's muscles and eventually, these toxins will end up on our plates and affect our health. The breakdown of marine ecosystems will badly influence human food security. It is predicted that the ocean is going to provide more than 50% of our food in the future.

### **3. Observations and comments on China's marine plastic waste from the international community**

The international community is highly interested in China's marine plastic management, with high expectations. As the fastest developing country, China's marine plastic management is of global significance. Whether it's research into the origins of marine plastics, or methods of dealing with marine plastics, all draw major international response.

The international community generally accepts that China is the greatest contributor to marine plastics. A paper published in February of 2015 by James Baker et al is one of the most authoritative studies on marine debris in recent years. This paper looked at marine plastics which were produced in 2010, and deduced that from the 192 coastal countries and regions around the world, between 4.8 million and 12.7 million tons of marine plastic were produced, of which 1.32 million to 3.53 million tons were from China, ranking as the number one producer of marine plastics. Organizations in Europe and the US concerned with marine debris, such as the global study conducted for Race for Water, have successively come to China to carry out marine debris related exchange programs and studies and publish relevant reports.

Japan, South Korea and other neighbouring countries see China as the main contributor to marine debris in their marine environment. In 2011, Japan demanded rubbish disposal fees from South Korea after finding marine debris which originated from South Korea, while South Korea claimed that the rubbish originated from China. Since then, Japan and South Korea set up government financial support for NGOs to monitor marine debris, strengthening research into marine debris. In 2013, a study using barcodes to identify the producers of beach debris found that roughly 50-75% of marine debris in the prefecture of Okinawa in Japan originated from China.



## 4. Research and countermeasures regarding marine plastic debris in China

Research on marine debris is focused on marine micro plastics and common marine plastics.

In the past 3 years, research into microplastics has become a hot focal point, with an established research community. The earliest experts in the research of marine micro-plastic were Li Daoji, a professor at the State Key Laboratory of Estuarine and Coastal Research of East China Normal University, and Wang Juying, deputy director of the State Marine Environmental Monitoring Center. In the monthly issue of American Scientific Monthly in 2015, an article published by Shi Huahong, an associate professor at East China Normal University's Estuarine and Coastal Research Institute, noted that microplastics first garnered nation attention and concern after 15 brands of salt purchased in China's supermarkets, contained microplastics including polyethylene, cellophane, and a variety of other plastic particles. In 2016, the State Oceanic Administration (SOA) launched the monitoring of offshore micro-plastics in China. At present, based on studies of micro-plastics from the Marine Environmental Monitoring Center of Marine Rubbish and Plastics Research Center, and Ocean University of East China Normal University Marine Plastic Research Center, the academic community has formed a group of researchers that study microplastics who have organized seminars on the topic since 2016. Over 170 researchers from Yantai Institute of Coastal Research, Chinese Academy of Sciences, Institute of Oceanology, Chinese Academy of Sciences, Institute of Rescue and Aquatic Environment, China Institute of Oceanography, China Oceanographic Research Institute and China Oceanographic Research Institute have come together to form WeChat group "Microplastics go online" which focuses on providing information on microplastics to the public.

Rendu Ocean and Eco Canton, as representatives of marine conservation NPOs, are developing partnerships with research institutions to tackle the issue of microplastics. The research requires laboratory environment and therefore, NPOs must perform divisions of cooperation. Eco Canton, as a highly devoted institution, concentrates on the issues of micro-plastics presented in cosmetics. They mainly strive to raise public awareness of the issue, persuade companies to stop using micro-plastics as raw materials, and explore potential methods of governance. Another field marine conservation NPOs are actively participated in is assisting research institutions with field sampling. Currently, Rendu Ocean has cooperated with the State Key Laboratory of Estuarine and Coastal Research, East China Normal University, and are in collaboration talks with three additional institutions: the Institute of Oceanography, Chinese Academy of Sciences, the Institute of Urban Environment, Chinese Academy of Sciences and the Institute of Oceanology, Chinese Academy of Sciences.

The Coastal Cleanup and Monitoring Project in China (CCMC), operated by Rendu Ocean, is a platform for marine conservation NPOs to take part in marine debris research. Rendu Ocean has initiated various effective projects, including three periods of ocean litter monitoring of 17 stations in 14 coastal cities during 2015, 2016, and 2017. Fourteen environmental organizations are in charge, and volunteers are called on to conduct the cleanup and monitoring at the end of each odd month, investigating thoroughly in the categories of coastal litters and the composition ratio and conducting data collection and correlation analysis, which provides more detailed and updated data for general studies of ocean plastics litter in China. China Marine Environmental Monitoring has proposed SOA to bring monitoring network into ocean litter monitoring system and consider taking further responsibility on ocean litter monitoring work.

The combination of The Offshore Litter Monitoring Report written by SOA and the program of CCMC by Rendu Ocean delineates a more thorough description of the current situation of marine debris. It could be seen from the China Marine Environmental Quality Bulletin published since 1997 that the index of ocean litter in offshore area was included as a common monitoring criteria only after 2017. The monitoring work is organized by China Marine Environmental Moni-

toring and the responsibility is redistributed to ocean monitoring stations across the country. The monitoring work is held annually from June to September, and the data collected generally provide an insight for peaks and dips in the amount of marine debris, which could be used for comparison and analysis across years. The monitoring by CCMC could provide more detailed data including seasonal fluctuations and regional differentiation of marine debris.

**Facing with marine litter problems, the government and the public have all made concerted effort.** There are two great cases where the government has taken initiative in combatting the issue of marine debris. The first case involved Xiamen and Weihai taking part in the “Sino-US Sister City initiative for the prevention and control of marine debris”, the second case is Guangdong’s provincial government launching programs to tackle the issue marine debris after large amounts of litter from Guangdong Province appeared around the waters of Hong Kong. The first coastal cleanup organized by a NPO happened in Qingdao, in 2004. Similar activities were held nationwide in the following years. However, most of them were small scale and geographically dispersed. Rendu Ocean has organized volunteering activities responding to the call of International Coastal Cleanup Day and World Environmental Day and has organized the public to participate in coastal cleanups since 2015. In 2017, forty organizations from twenty-one coastal cities called upon a total of 4905 volunteers, who cleaned up 12.152 tons of litter along 60.31 kilometers of coastline. In addition, the national wide coastal cleanup is trying to normalize coastal cleanup activities and mobilize both enterprises and the public to devote to routine cleanup activities. Fujian Provincial Department of Ocean and Fisheries, as representatives of the marine departments from various regions, have given substantial attention and support for these cleanup activities.

## 5. Thoughts on the management of marine plastic debris

The problems caused by plastics and the rate of litter decomposition should be taken into consideration when it comes to dealing with marine litter.

The fundamental prerequisite of tackling environmental issues is the participation and collaboration of all human-kind. International cooperation should be established among countries, whilst governments, enterprises, environmental NPOs and NGOs, research institutions, the media, and the public should all be involved to make a difference domestically. Unfortunately, in reality, most individuals rely solving environmental issues only on the government, and even worse, governors and researchers hold the same belief, which makes the treatment of marine litter even harder.

The government should control the production of plastic litter from the root through legislation, which is the most effective and powerful action to take currently. Four policies are impending to be set or revised. First, to raise the costs of raw materials for making plastics such as petroleum to promote recycling and increase usage efficiency. Secondly, to assign responsibility to plastic producers and force them to construct the recycling system. This policy makes the primary producers the most responsible party in charge of treating plastic litter and puts public management second. Thirdly, to encourage research and application of recycling plastics through providing innovation funds and preferential tax, etc, increasing the market value of plastics as a recycling material. Fourth, to forbid the production and consumption of disposable products, assigning it to the producers as extended product responsibility and supporting the environmental nonprofit litigation. The rising costs of plastics production would increase the prices of plastics and further reduce the usage of plastic products and enhance recycling processes by changing the behavior of customers, who are sensitive to market prices. This is a potentially possible way to reduce plastic litter at its source.

The government must actively support the establishment of recycling system across counties and cities, invest in garbage classification in communities, and build up management system of collecting, storing, and classifying litter across rural areas to provide basic infrastructure of plastic litter management for the whole society. The enthusiasm for managing litter and participating in litter classification would be maintained by well-established recycling channels. The government, on the other hand, should provide substantial base support for litter management within communities, and fund public education and community services offered by environmental institutions. Also, the extended product responsibility could be a supporting force. On the other hand, the government must set up litter collection, storage, and classification management system to provide basic condition for public litter management, which is the most urgent action that needs to be implemented. The chance for plastics products to become plastics waste and uncontrolled litter would significantly reduce as soon as the public become aware of litter recycling, classification, and management, which is a potentially practical way to end plastic litter at the source.

To reduce mismanaged waste, governments need to strengthen street cleanup, intercept waste in waterways, and encourage volunteers to participate in cleanups. Small amounts of mismanaged plastics may still appear on streets, thus environmental sanitation workers and cleanup volunteers should be the third line of defense; some other plastics may enter waterways, therefore local government should play a role as the fourth line of defense, inputting resources to intercept waste, volunteers may be involved in coastal cleanups, and it is feasible to subsidize fishermen to retrieve floating waste; currently, the only feasible and economical way of cleaning up plastic debris that has entered oceans are coastal and near-shore cleanups. Marine conservation NPOs may take on this responsibility and tackle this issue.

20% of marine plastic debris comes directly from marine activities, to reduce this kind of plastic debris, every state should strictly execute international laws and legislations, as well as encourage environmental protection NPOs to supervise the implementation. This 20% of marine plastics is an independent issue. At present, international covenants and national laws already prohibits the dumping of trash into the sea, and set standard management processes, therefore the key factor of erasing ocean-sourced plastic is implementation. It seems to be feasible that marine conservation NPOs are involved in supervising management through information disclosure.

Monitoring of marine debris (including all mismanaged waste) is the foundation of effective management. It provides complete and exact information, and should be given priority for development. This is what Rendu Ocean, China Zero Waste Alliance and many other NPOs concerning topic of waste are currently engaged in.

Rendu Ocean  
Nov. 24, 2017



## The role of civil society in environmental protection and climate change response

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The forum in the name of 'The role of civil society for environmental protection and climate change response' was held in Gwangju, Korea in commemoration of the Climate Change and Paris Climate Change Conference. The forum was hosted by the Asia Culture Center and the Embassy of France in Korea on November 10, 2017. The event aimed to contribute towards 'The United Nations Framework Convention on Climate Change (COP 23)' held in Bonn, Germany from November 6 to November 17, 2017, and the 'Paris Climate Change Conference' held in Paris on December 12, 2017. Stakeholders from civil society, industries, and the government from France and Korea gathered together to present and exchange their ideas regarding sustainable transportation, improvement for air pollution, and marine environment conservation.

The specific title on the third day was marine environment conservation and response against marine pollution by plastic debris. Sunwook Hong, the president of OSEAN, which is a non-governmental organization and research institute specialized in marine debris issues, introduced its activities and researches. She presented research results for main sources of marine debris in Korea and international cooperation hosted by OSEAN to cope with marine debris issues in the Asia region, which is pointed out as the hot spot of marine debris sources. She said that OSEAN's activities have been based on scientific researches and sources and led to positive results such as the reduction in coastal marine debris. OSEAN is now sharing its experiences with other NGO's in the Asian region through webinar and hosting monthly international seminars with research papers. It has issued newsletter every month for many years to spread and encourage similar activities and drew much attention to marine debris from various groups. Anne-Laure PATY who is the president of Zero Waste France introduced citizen activities to reduce plastic debris. Patrick Fabre, who is co-president of Sea Cleaners, talked about his dream to create a vessel to collect buoyant marine debris. Mingyu, Park from the Busan branch of Badasaligi introduced the activities of his organization towards reducing marine debris.

Marine debris issues have been one of the main topics in G7 and G20 and the member states should establish an implementation plan and work towards a satisfying result. Intensive efforts over a long amount of time are required to solve this issue, and the recognition of the role that civil society plays is more important than ever. The forum was a meeting to promise future efforts and practices to cope with global environmental issues.



Figure 1. Round forum related to Saraceno's 'Our interplanetary bodies'



Figure 2. Aerocene moving without fossil fuel



Figure 3. Thomas Saraceno: Our interplanetary bodies

## The first experience in Taiwan to join the world's largest marine pollution survey

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### What is the survey project?

The biologist will say, "The life started from ocean to land," and this process took billions of year. However, there is one converse process within just near tens of year, which is from land to ocean, and the main cast become the pieces of plastic. People ask how and where the pieces comes from, when they are aware of that marine debris is an issue need to be addressed. Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia investigated in the local environment and found that the marine debris is mostly disposed locally and come through three mechanisms; the tourist on the beach, stormwater and coastal run-off in surrounding area, and the transportation from marine system (Willis et al., 2017). However, we cannot certain it is the same around the world without further investigation, and we would like to know if the result can answer the situation in Taiwan. To figure out the answer, we Society of Wilderness (SOW) in Taiwan cooperated with CSIRO and execute the survey project in November 2017.

### Where does the survey occur?

We chose the biggest river basin in Taiwan as our target, Kao-ping river, which cover 3,257 km<sup>2</sup> and 23 towns and cities. The main city is Kaohsiung, which is the second large city and the biggest industrial city in Taiwan. Twelve SOW volunteers from around the country are recruited to join the field survey, and they are experienced in International Coastal Cleanup (ICC) and passionate in the solution for marine debris issue. In two weeks, we carried out an investigation with 286 transect surveys at 95 sites on land, river, and coast, and 36 trawls at 12 sties on sea surface in the estuary of Kao-ping river (see Figure 1). After the field survey, CSIRO will analyse the data we collected and figure out the situation in Taiwan.

### What are the practical challenges during survey?

Unlike the ICC event participant, the transect survey need executor to have more scientific knowledge background, so the surveyors were trained by the CSIRO in the beginning 3 days of investigation period and capable to follow the standard procedure of field survey to collect the data and information for further analysis (see Figure 2). There are several practical difficulties and challenges we faced, and we did debriefing for the similar field survey in the future. First of all, the geo-

graphical condition is one key factor to affect the efficiency of traffic transportation. Taking the condition of inland sites as an example: since Kao-pin river has four tributaries, and each tributary is isolated from each others by mountains without road connection, we did spend effort to coordinate the field traffic. Although twelve volunteers and two SOW staffs were involved in two weeks, but not all surveyors can fully be on duty everyday, so we divided the surveyors into small groups with 3 to 4 people daily and distributed the groups in different areas to maximum the efficiency of traffic transportation. The surveyors need to sleep overnight outside if they need to go further on the next day. Also, the requirement of local driver is recommended, especially when the road condition is uncertain due to recently weather or events.

For the condition of river sites, in Taiwan the water yield differs from summer and winter season; the river has only few of water in winter, which is dry season in Kaohsiung. In the downstream lots of the exposed river bank is soft mud (see Figure 3), which makes it hard to do the transect line from the water to the top of bank (see Figure 4). The proper rain boots are suggested to equip for this type of river bank. There are also lots of artificial boulder river bank in the downstream, which need time to find the access point on sites, so the scouting in advance is highly suggested as well. As for the coastal site condition, there is lots of artificial offshore breakwaters along with the coastal line of Kaohsiung city (Figure 5), which may affect the transportation of marine system mechanism. So we could only find a nearest spot without offshore breakwaters when the sampling site occurs the situation, when we cannot certain its influence on the marine system mechanism.

### What is the next step?

The marine debris become one of the recognisable environmental issue in Taiwan in recent years, and more and more people devoted themselves to the related public campaign, political lobby, environmental education, and scientific research. SOW is founded for 22 years and has 11 chapters and many volunteers around the country, which is a good basis to execute a wide range of field survey and local education. We expect there are more and more scientific research to support the public campaign, political lobby, and environmental education.

#### *Citation:*

Willis, K. et al. Differentiating littering, urban runoff and marine transport as sources of marine debris in coastal and estuarine environments. Sci. Rep. 7, 44479; doi: 10.1038/srep44479 (2017).



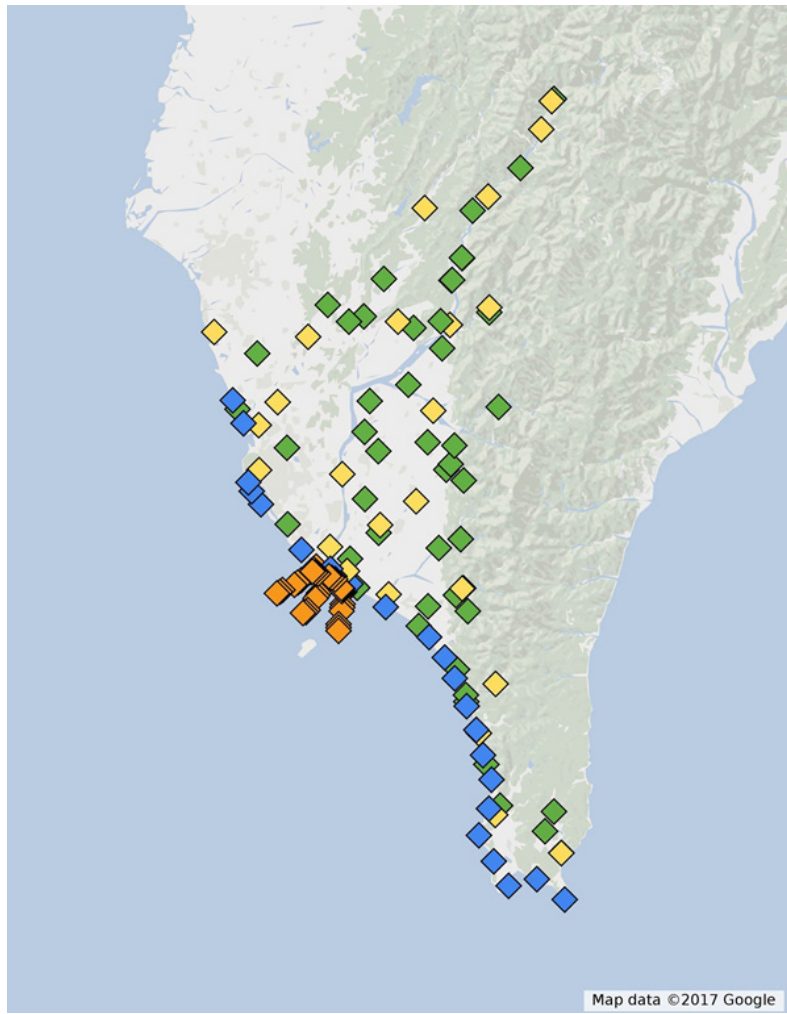


Figure 1. The Google map of survey sites around Kao-ping river basin. The orange refers to sea surface trawl, the blue refers to the coastal sites, the yellow color refers to river sites, and the green refers to inland sites.



Figure 2. The group photo after 3 days training for the surveyors.

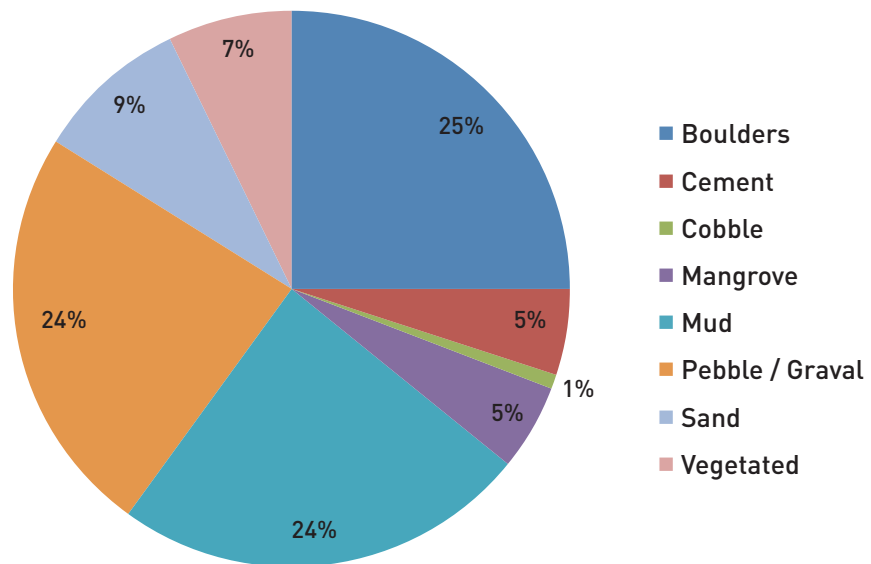


Figure 3. The bank type of river we investigated.

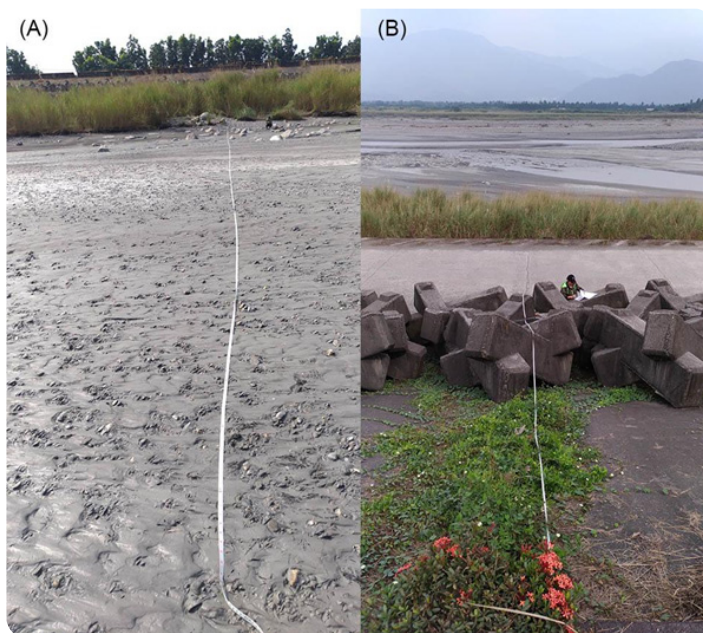


Figure 4. The transect pictures at the river sites, (A) is mud bank, and (B) is artificial boulder bank.



Figure 5. The satellite picture of offshore breakwaters along with Kaohsiung city.

## Addressing Styrofoam buoy marine debris pollution with stakeholders' participation

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Styrofoam buoy is the most abundant marine debris item in the coastal areas of South Korea. According to the annual reports of the Korea National Marine Debris Monitoring Program, Styrofoam buoy was the most abundant item since the beginning of the program in 2008. It has accounted for over 10% of marine debris in number. Styrofoam buoy can become easily detached and drift away or end up on beaches. Styrofoam buoys are mainly used in the oyster and laver aquaculture farms in Korea. For hanging oyster, about 1,000 of 60-liter Styrofoam buoys are used per 1 ha. For laver about 500 buoys per ha are used. So it is assumed that oyster aquaculture is the main source of Styrofoam buoy debris in Korea. Styrofoam buoy enters into the surrounding oceans via various ways. It is detached from the line of oyster or laver when serious winds or waves occur. Vessels passing the farm inadvertently break farm lines that Styrofoam are hanging to. Poor maintenance by farmers is one of the main reasons behind buoy debris. They discard buoys into the ocean for easy harvesting. Once the buoys enter the ocean they are easily broken down into small particles and can't be cleaned-up. In this context, it is essential to address Styrofoam buoy debris in order to reduce marine debris in Korea.

OSEAN has been working towards addressing the Styrofoam debris problem since 2009 in many ways such as by hosting workshops in which stakeholders from several fields participated in, visiting Styrofoam industries, and inviting Korean Packaging Recycling Cooperative members to hear their opinions. OSEAN also tried its best to push the government to set up a management plan against Styrofoam buoy with problem-solving strategies.

Through the workshop OSEAN created conceptual model and result chain to gain schema and details, as well as draw out strategies and steps to reduce Styrofoam buoy debris (Fig. 1). Finally, Korean government ordered OSEAN to implement the project 'Establishment of an integrated management system for aquaculture Styrofoam buoy'. The project started in 2016 and will continue for two consecutive years. OSEAN is in charge of estimating the inflow of Styrofoam buoy debris and the pilot project to retrieve them. For estimation, OSEAN conducted interviews and surveys with aquaculture

farmers and held several briefing sessions for them in 2016 (Fig. 2). The pilot project consisted of installing receptacle for Styrofoam buoys that cannot be used any longer and retrieving them (Fig. 3). The results were successful and the effects significant. The amount of buoys retrieved was huge and the farmers were actively involved in the project. The survey and retrieving project has continued for two more years. OSEAN hopes this project contributes toward reducing Styrofoam buoy debris and making the coast cleaner and safer in Korea.

### Styrofoam buoy pollution in the coastal areas of South Korea

Styrofoam buoys	2008	2009	2010	2011
Rank (by count)	1	1	1	1
Ratio (%)	13.2	12.5	10.8	11.7

Source : Korea Marine Debris Monitoring Program (MOF, 2008; 2009; 2010; 2011)

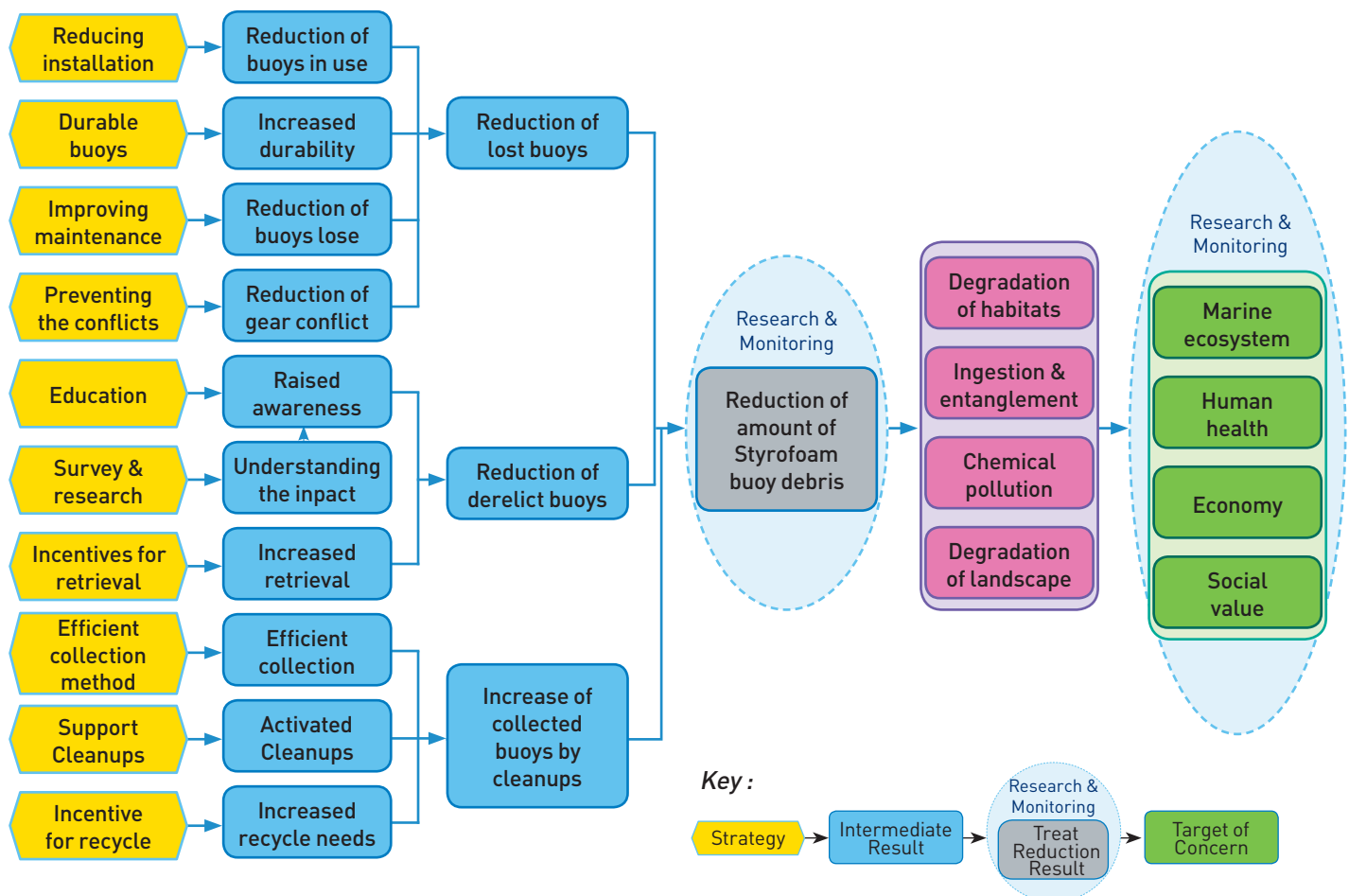


Figure 1. Result chain of Styrofoam buoy debris management.





Figure .2 Educating aquaculture farmers against Styrofoam buoy debris



Figure .3 Retrieving Styrofoam buoy debris

### A paper titled 'Characteristics of meso-sized plastic marine debris on 20 beaches in Korea' published on the Marine Pollution Bulletin

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A paper title 'Characteristics of meso-sized plastic marine debris on 20 beaches in Korea' was published on the Marine Pollution Bulletin. The paper elucidated the abundances, compositions, and distribution patterns of meso-sized plastic marine debris on 20 beaches encompassing the Korean Peninsula. It was the result of the research that was conducted by OSEAN (Our Sea of East Asia Network) upon the request of KIOST (Korean Institute of Ocean Science and Technology) in spring of 2016. In particular, the paper suggested that abundance of meso-sized plastic marine debris may largely differ based on the sampling spot within the beach.

In most research plastic marine debris were quantified with samples collected on high strandlines. However, in most cases plastic marine debris tend to be concentrated on high strandlines and thus if the samples are collected only from the high strandlines, the result will represent the pollution level of only the heavily polluted area of the beach and thereby overestimate the beach contamination. In this research, samples were collected from backshores, middle lines, and water edges on the beach and the abundance in total was much lower than that of the high strandlines only. The result showed that sample spots within the beach should be selected based on the research purposes. If the research aims to determine the highest pollution level of the beach, the sample should be collected from the high strandlines, whereas if it aims to find the average pollution status, the sample should be collected from several spots to get representative samples.

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## Marine Pollution Bulletin

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### Characteristics of meso-sized plastic marine debris on 20 beaches in Korea



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#### ABSTRACT

We surveyed the abundance and accumulation patterns of mesoplastic marine debris (5–25 mm) on 20 beaches in Korea. The mean abundance of it was 13.2 items/m<sup>2</sup>, and the mean weight was 1.5 g/m<sup>2</sup>. Hard plastic and Styrofoam were the dominant types. The proportions of hard plastic and Styrofoam were highly variable among the beaches, each accounting for 0–100% of the total debris on a given beach with 32% and 48.5% (by number) on average, respectively. Relatively lower abundances of mesoplastic marine debris compared with our previous studies were likely due by differences of the sampling areas within the beach. The samples of this research were selected from backshore, middle line, and water edge whereas they were selected from high strandline and backshore in our previous studies. It should be considered when discussing the level of mesoplastic marine debris.



### Executive Summary

#### Mission

To develop and implement effective, evidence-based practices that enables sustainable livelihoods, promotes eco-friendly development and creates resilient communities.

#### Vision & Leadership

Vietnam is undergoing rapid change, with annual GDP growth averaging 5-6% annually for more than 10 years. Fundamental changes are from a rural agricultural to an urban industrial economy, and from a centrally planned to a market economy. These changes produce economic benefits but also increase environmental threats. Green Hub was created to be an agent of change regarding environment issues.

GreenHub is a Vietnamese, non-governmental, not-for-profit organization under the Vietnam Union of Science and Technique Associations (Vusta) with oversight from the Ministry of Science & Technology. GreenHub was established by under the leadership of three Vietnamese women experts committed in the fields of environmental management. GreenHub has gradually built up trust to be positioned as leaders in the field of evidence-based, sustainable economic and environmental practices and development.

#### GreenHub Impact Areas

##### 1. Marine and Coastal waste management

With over 30 million tons of waste is generated annually, Vietnam is among the top 5 largest contributors of plastic waste. Of all the waste generated in Vietnam, only 10% is recovered for recycling or reuse, including items such as paper, metals, glass, rubber, and some plastics. Plastic marine waste causes US\$ 13 billion worth of damage annually to communities, fisheries, maritime transportation, tourism industries in terms of health, economic, and environmental issues. As a result, **GreenHub's** waste management efforts are centered around raising consumer awareness and influencing behavioral change to reduce, reuse, and recycle (3R's) waste, marine debris monitoring and Coastal Clean-up Campaigns including volunteer activities to engage the community.



## 2. Energy efficiency

The global furniture industry is estimated to be a \$460 Billion USD industry. With a target of \$7.5 Billion USD in exports of wood and wood products in 2017, Vietnam is among the top five exporters of wooden furniture. Most of the furniture manufacturers in Vietnam are small businesses who suffer from limited capacity, insufficient skilled labor and inefficient manufacturing processes that produce too much waste. As demand for furniture continues to increase, wood waste will also increase. **GreenHub's** efforts focus on converting wooden furniture and agricultural waste into an alternative, more efficient energy source.

## 3. Sustainable Agricultural Production and Livelihoods

Vietnam has made significant progress in its agricultural sector over the last 25 years. This growth has helped Vietnam to emerge as a leading global exporter of agro-food commodities and puts Vietnam among the top five exporters for aquatic products, rice, coffee, tea, cashews, black pepper, rubber, and cassava. However, high consumption of natural resources and high costs for production, has increased waste generation and inappropriate waste disposal, leading to significant environmental pollution. **GreenHub** promotes sustainable agricultural production and livelihoods by providing evidence-based practices, business development training and support, and connecting farmers to cooperatives and to national technical expertise and resources.

## 4. Natural Resource Conservation

Vietnam, with GDP growth it produces strong economic benefits but it also creates significant environmental challenges including but not limited to: deforestation, depletion of natural resources, and water, soil and air pollution in urban and rural areas. **GreenHub** recognizes the need to harmonize development and conservation in order to create sustainable livelihoods and conserve the environment for future generations. In this area, GreenHub focuses on empowering local communities to engage in conservation and management of key biodiversity areas such as the Cat Ba Biosphere Reserve.

## Join our cause and donate

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**Ocean Conservancy**



AGENZIA ITALIANA  
PER LA COOPERAZIONE  
ALLO SVILUPPO

**CIAI**  
per tutti i bambini del mondo





## 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 Sum-

mit - 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](mailto: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,  
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