

Marine Litter in the NOWPAP Region



November 2011

Northwest Pacific Action Plan
<http://www.nowpap.org>

This document was prepared as part of a Northwest Pacific Action Plan (NOWPAP) Regional Action Plan on Marine litter (RAP MALI) implementation and includes data from 2006 to 2009.

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ISBN: 978-89-961000-0-3

For bibliographical purposes, this document may be cited as:
NOWPAP 2011: Marine Litter in the NOWPAP Region



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Northwest Pacific Action Plan
2011

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1. Introduction

Marine litter has been defined as any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. It consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; or accidentally lost, including material lost at sea in bad weather (<http://www.unep.org/regionalseas/marinelitter/about/default.asp>).

Marine litter originates from many sources and causes a wide spectrum of environmental, economic, safety, health and cultural impacts. The very slow rate of degradation of most marine litter items, mainly plastics, together with the continuously growing quantity of the litter discarded, are the major reasons that marine litter became a major threat at sea and on the shores.

Industrial development, urbanization, and irrational consumerism lead to an increase in the use of disposable and non-degradable products, including excessive packaging, which results in increased generation of solid waste. Inappropriate management of land-based sources of waste is also to blame for marine litter.

Given the diversity and abundance of sources, the persistent nature of plastics and other garbage, and the ability of tides and currents to carry debris long distances, marine litter is a global concern and is likely to remain a major problem in the near future. Solving the marine litter problem requires global, regional and national programs and their effective implementation and enforcement.

Concerned about the marine litter problem, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) in 1995 identified it as one of nine pollutant source categories and UNEP recognized it as a priority issue in a decision of UNEP's Governing Council/Global Ministerial Environmental Forum in 2004. In 2005, the UN General Assembly has adopted the Resolution A/60/L.22 on Oceans and the Law of the Sea where marine litter was addressed. UNEP commenced a global initiative on marine litter, called the Marine Litter Partnership, which was presented at the second

Intergovernmental Review Meeting (IGR-2) of the GPA in 2006. As one of UNEP Regional Seas Programmes, NOWPAP currently participates in the UNEP global initiative.

Under this initiative UNEP is working with International Maritime Organization (IMO), Food and Agriculture Organization (FAO), Intergovernmental Oceanographic Commission (IOC) and Basel Convention. UNEP Division of Technology, Industry and Economics (DTIE), GPA and UNEP Regional Seas Programme (RSP), individual Regional Seas programmes, national governments and NGOs are also involved.

The IMO is addressing pollution from ship-based sources, through the International Convention for the Prevention of Pollution from Ships (MARPOL). Annex V of MARPOL deals specifically with the disposal of garbage from vessels, and includes a total ban on the disposal of plastics from vessels anywhere in the world seas and oceans.

GPA continues its efforts to reduce the amount of litter reaching the marine environment by prevention or reduction of the generation of solid waste.

In 2009, two technical reports dealing with marine litter have been published by UNEP and FAO: "Marine litter: Global challenge" and "Abandoned, lost or otherwise discarded fishing gear". These reports assist policy makers and support efforts by regions, countries and relevant organizations to tackle different aspects of marine litter problem.

Further international efforts have been culminated recently (March 2011) during the 5th International Marine Debris Conference concluding with the adoption of the Honolulu Commitment (http://www.unep.org/pdf/PressReleases/Honolulu_Commitment-FINAL.pdf). This Commitment marks the first step in developing a comprehensive approach for the prevention, reduction and management of marine debris, to be known as the Honolulu Strategy (<http://5imdc.wordpress.com/about/honolulustrategy/>). This Strategy is aimed at halting and reversing the accumulation of man-made litter in the coastal and marine environment by 2030.

Since NOWPAP Regional Action Plan on Marine Litter (RAP MALI), as one of the outcomes of NOWPAP Marine Litter Activity (MALITA), was approved in March 2008, NOWPAP member states have been encouraged to implement actions to prevent, monitor and remove

marine litter at a national and local level. Within the RAP MALI framework, several activities have been implemented:

- A marine litter database has been maintained and updated;
- The workshops on marine litter and the International Coastal Cleanup (ICC) campaigns have been organized annually;
- Several reports and brochures/leaflets have been published and widely distributed;
- Cooperation with other regional organizations and projects has been strengthened.

RAP MALI has been implemented mainly through national actions which are critical for the successful tackling of marine litter problem in the region. NOWPAP institutional infrastructure (Intergovernmental Meeting, Regional Activity Centres, Regional Coordinating Unit, and National Marine Litter Focal Points) has been used during the MALITA implementation in 2006-2007 and for implementing RAP MALI since then.

During the implementation of NOWPAP MALITA, a regional overview regarding marine litter in the NOWPAP region was prepared in October 2007, based on the data and information available in the region (from 2002 to 2005) on existing legal instruments, institutional arrangements, programmes and initiatives. It was then slightly updated and reprinted in 2008. As the third regional overview, this report covers recent developments related to marine litter problem in the NOWPAP region and includes data from 2006 to 2009.

2. Assessment of the Current Status of Marine Litter

The main objective of this assessment is to understand the current status of the marine litter problem in the Northwest Pacific region, its composition and possible sources.

Several national initiatives on marine litter surveys and beach cleanups with the help of NGOs have been implemented yielding data and information on marine and coastal litter pollution in the Northwest Pacific region. However, data to assess the regional situation of marine litter are very unevenly distributed geographically in the region. In addition to data on marine litter provided in this overview, some national information is available at the NOWPAP marine litter database (<http://dinrac.nowpap.org>). For example, in China, the State Oceanic Administration (SOA) has surveyed coastal and offshore areas since 2007, and has focused on marine litter located on the sea surface, beaches and sea bottom. In Korea, marine litter monitoring activities have been carried out within a program called “Korean National Marine Debris Monitoring” since 2008.

Although UNEP and IOC have developed guidelines on survey and monitoring of marine litter, best data available for the NOWPAP region are still those obtained from the research results of the Northwest Pacific Region Environmental Cooperation Centre (NPEC, Japan). NPEC has initiated a research on washed-up driftage on the coasts on the Northwest Pacific region since 1996 and extended gradually its survey area to the People’s Republic of China, Republic of Korea, and Russian Federation (Table 1). The research was carried out once a year using the relatively unified methods.

Table 1. The number of survey locations in each of the NOWPAP member states
(NPEC, 2006-2009)

Year	China	Japan	Korea	Russia	Total
2006	12	43	6	7	68
2007	12	57	8	6	83
2008	7	58	6	7	78
2009	6	53	3	7	69

2.1. Amounts of Marine Litter

According to the NPEC monitoring guidelines, marine litter was classified into eight categories: plastic, rubber, polystyrene, paper, cloth, glass and ceramic, metals, and others. Data used for this assessment were results of surveys conducted in the last 4 years (2006-2009).

Table 2 presents the percentiles of marine litter items collected from NOWPAP region. As indicated, the most common marine litter item in the NOWPAP region is plastic (73.1 % in number and 57.4 % in weight). The plastic items are highly persistent, which allows them to continue accumulating over time and to travel vast distances helped by sea currents and winds, impacting the other neighboring countries in the NOWPAP region.

Table 2. Marine litter items in the NOWPAP region in the last 4 years (data from NPEC)

Items	% of litter items in number	% of litter items in weight
Plastic	73.1	57.4
Rubber	1.1	4.5
Polystyrene	16.5	3.2
Paper	1.8	1.2
Cloth	0.5	2.9
Glass and Ceramic	3.8	8.5
Metals	1.1	3.9
Others	2.2	1.8

2.1.1. People's Republic of China

As indicated in Figure 1, plastic was the most prevalent along the coastal areas of China, accounting for 35 % of the total collected litter in number, followed by paper (18 %) and polystyrene (14.9 %). As for the total weight, plastic was also dominant (27.7 %) followed by glass and ceramic (27.2 %) and polystyrene (12.3 %).

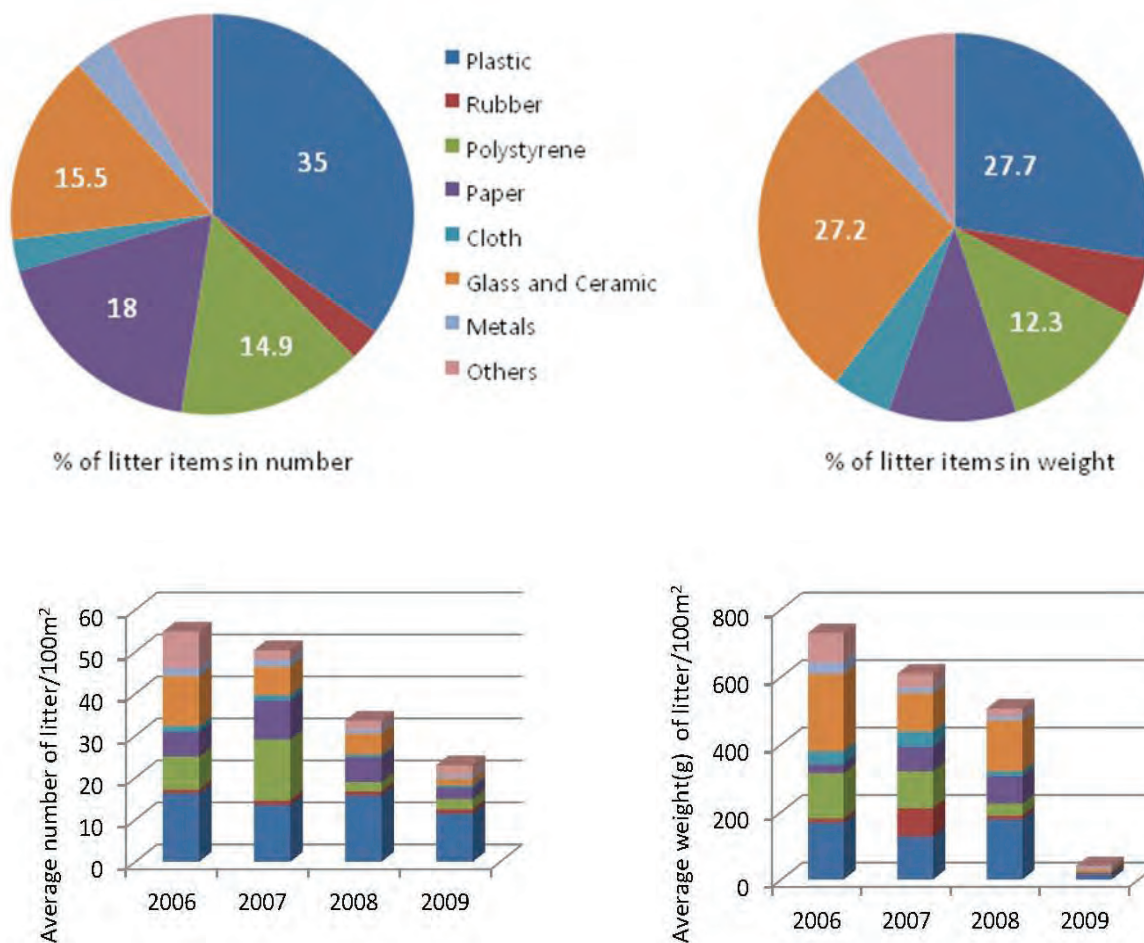


Figure 1. Composition of marine litter in the surveyed coastal areas of China from 2006 to 2009 (data from NPEC)

Approximately 40 pieces of marine litter were, on average, found per 100 m² from 2006 to 2009. The annual average number of marine litter collected per 100 m² varied from 23 to 55. The annual average weight of marine litter collected per 100 m² was estimated to be 471.6 g ranging from 40 to 730.3 g. In general, heavy items such as glass and ceramic observed on the sampling sites were responsible for the increase of marine litter weight observed.

2.1.2. Japan

As shown in Figure 2, plastic accounted for about 75 % of the marine litter items, while all other major categories (polystyrene, glass and ceramic, metals and paper) accounted for only 24.9 %.

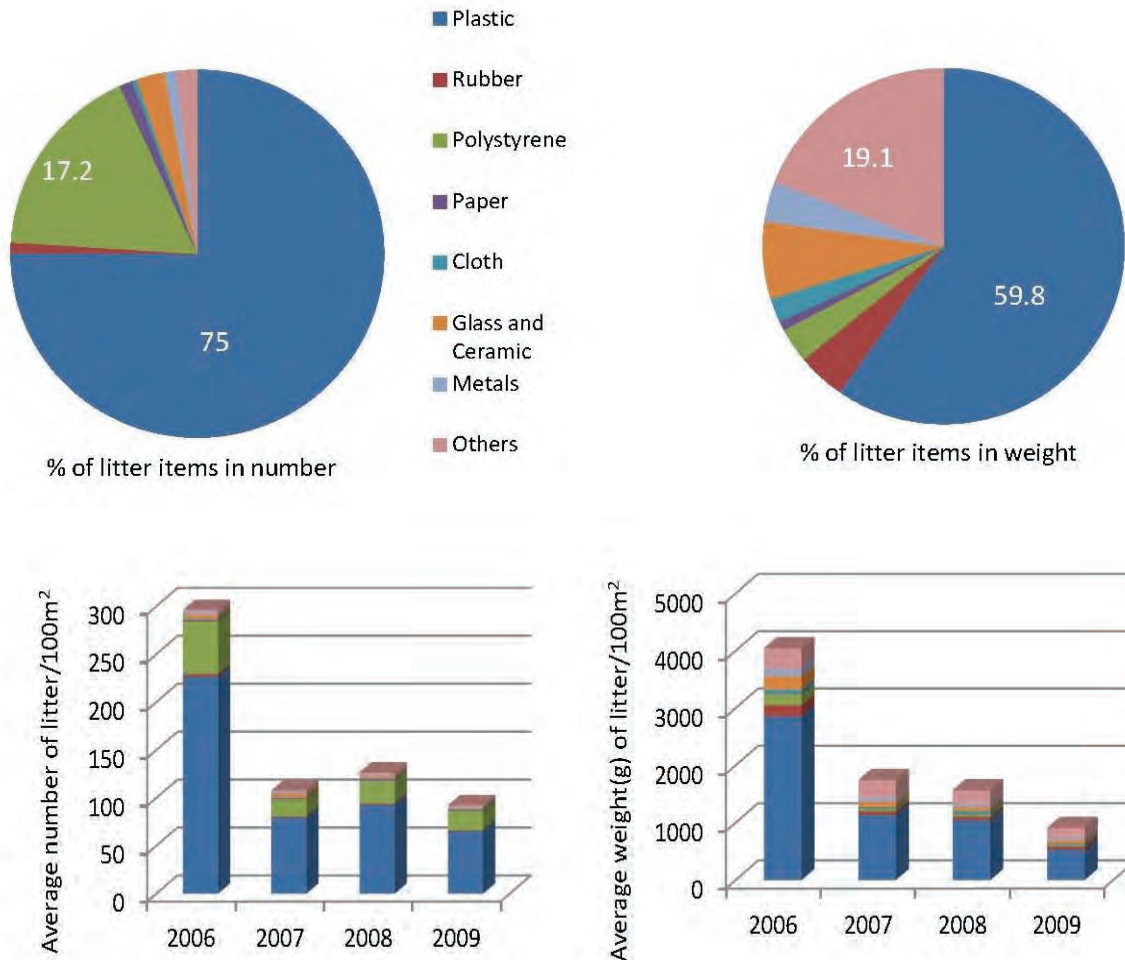


Figure 2. Composition of marine litter in the surveyed coastal areas of Japan from 2006 to 2009 (data from NPEC)

Approximately 156 pieces of marine litter were, on average, found per 100 m² from 2006 to 2009. The annual average number of marine litter collected per 100 m² varied from 92 to 296 (Figure 2). The annual average weight of marine litter collected per 100 m² was estimated to be 2,068 g ranging from 911 to 4,046 g.

2.1.3. Republic of Korea

The most prevalent litter item along the coastal areas of Korea was plastic, accounting for 52.1 % of the total collected litter in number and 48.6 % in the total weight (Figure 3). The next dominant item was paper in the total number of collected litter (31 %) and metals in the total weight collected (10.4 %).

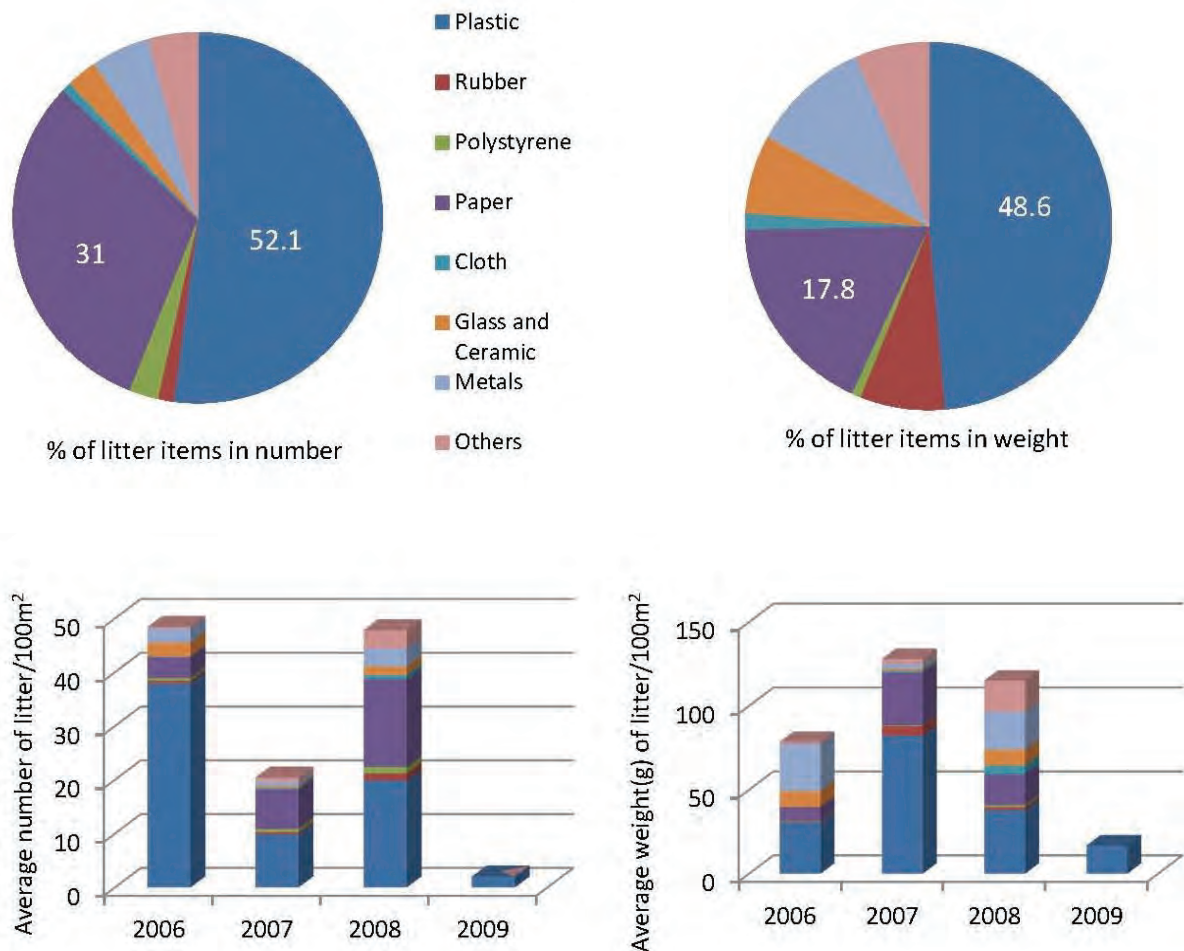


Figure 3. Composition of marine litter in the surveyed coastal areas of Korea from 2006 to 2009 (data from NPEC)

Approximately 30 pieces of marine litter were, on average, observed at every 100 m² of NPEC survey areas along the coastal zone of Korea from 2006 to 2009 (Figure 3). The annual average number of marine litter collected per 100 m² varied from 2 to 48. The annual average weight of marine litter collected per 100 m² was varied from 16.8 to 128 g.

2.1.4. Russian Federation

In the Russian Far East, plastic (52.1 %) was the most dominant item collected, followed by glass and ceramic (24 %) in the total number of marine litter (Figure 4). As for total weight collected, plastic (29.5 %) was also the most prevalent item among litter categories, followed by glass and ceramic (25.9 %).

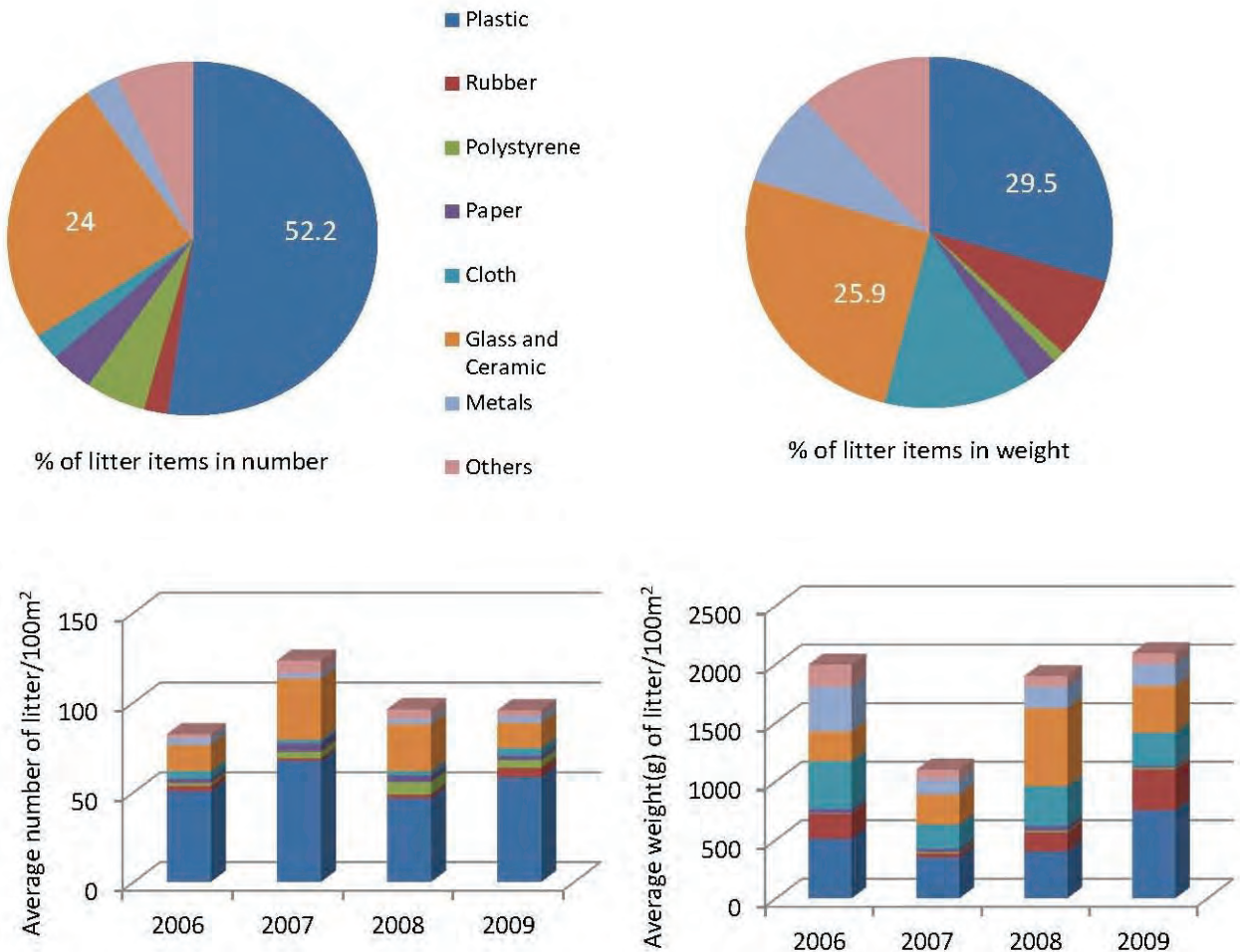


Figure 4. Composition of marine litter in the surveyed coastal areas of Russia from 2006 to 2009 (data from NPEC)

According to the NPEC surveys, approximately 90 pieces (1,771 g) of marine litter were, on average, found per every 100 m² of the coastal areas of the Russian Far East from 2006 to 2009. The annual average number of marine litter collected per 100 m² ranged from 82 to 96. The annual average weight of marine litter collected per 100 m² was between 1,099 and 2,093 g.

The NPEC surveys verified the overwhelming presence of plastic in the NOWPAP region both in terms of items observed and weight estimated. Comparing to the previous record during 2002-2005, plastic remains dominant among all categories. The proportion of glass and ceramic litter in China and Russia was higher than those in Japan and Korea (during 2006-2009 as well as 2002-2005). It should be noted however that annual average values presented in Figures 1-4 do not represent the actual interannual variation in the quantities of marine litter because they can vary depending on the intensity of each survey (e.g. different number of participants, duration), survey locations, weather conditions (e.g. before or after heavy rain or typhoon) and other factors.

2.2. Types and Possible Sources of Marine Litter

Sources of marine litter are traditionally classified into land-based or ocean-based, depending on where litter enters the water. Factors such as ocean current patterns, weather and tides, as well as proximity to urban centers, waste disposal sites, industrial and recreational areas, shipping lanes, and commercial fishing grounds, influence the type and amount of marine litter found in open ocean areas or collected along beaches and on the sea bottom. According to the Joint Group of Experts on the Scientific Aspects of Marine Environmental Pollution (GESAMP) and UNEP, land-based sources account for up to 80 % of the world's marine pollution.

Over the past 25 years, the International Coastal Cleanup (ICC), initiated and promoted by Ocean Conservancy (OC), has become the world's largest volunteer effort for ocean health. OC has been receiving data from annual ICC campaigns to get a clear picture of the marine litter impacting the health of humans, wildlife, and economies. During the ICC in 2010, 615,407 volunteers picked up more than 8 million pounds (3,629 tons) of trash and other debris at 5,438 cleanup sites around the world.

According to OC annual report, cigarette butts are the most prevalent item found over the past quarter century, accounting for more than three times the number of any other item (Table 3). Nine of the top ten items are consumer products made from plastic (much of the rope made today is synthetic, rather than more readily degradable natural fiber).

Among the NOWPAP member states, China has started to organize an ICC campaign in Rizhao from 2007, and Russia implemented a pilot ICC campaign in 2007 as well. The ICC

data produced by these countries, together with Japan and Korea, have contributed to better understanding of sources of marine litter. With a raising concern of the general public on marine litter in China and Russia, the number of participants in the ICC campaign has been increased (Table 4).

Table 3. Top ten marine debris items over 25 years (data from the Ocean Conservancy)

Rank	Debris item	Number of debris items	Percentage of total debris items
1	Cigarettes/cigarette filters	52,907,756	32 %
2	Food wrappers/containers	14,766,533	9 %
3	Caps, lids	13,585,425	8 %
4	Cups, plates, forks, knives, spoons	10,112,038	6 %
5	Beverage bottles (plastic)	9,549,156	6 %
6	Bags (plastic)	7,825,319	5 %
7	Beverage bottles (glass)	7,062,199	4 %
8	Beverage cans	6,753,260	4 %
9	Straws/Stirrers	6,263,453	4 %
10	Rope	3,251,948	2 %
Top ten total debris items		132,077,087	80 %
Total debris items worldwide		166,144,420	100 %

Table 4. NOWPAP member states participation in the ICC (data from the OC)

Countries	ICC information	2006	2010
China	Number of volunteers participated	30	1,889
	Total length cleaned up (km)	24.1	112.3
	Total litter weight collected (kg)	50.3	1,552
Japan	Number of volunteers participated	16,878	1,067
	Total length cleaned up (km)	2,732.6	10.46
	Total litter weight collected (kg)	17.3	6.3
Korea	Number of volunteers participated	3,655	3,862
	Total length cleaned up (km)	89.8	28.2
	Total litter weight collected (kg)	323.9	273.6
Russia	Number of volunteers participated	-	80
	Total length cleaned up (km)	-	161.4
	Total litter weight collected (kg)	-	199.1

Identifying sources of marine litter is difficult as many items can come from multiple sources. According to the ICC reports of NOWPAP member states, however, around 80 % of marine litter collected originated from shoreline and recreational activities followed by smoking related activities (Figure 5). This trend has been shown distinctively in China, indicating more than 90% of marine litter attributed to shoreline and recreational activities. The items that could be related to these activities are bags (paper and plastic), beverage bottles, clothing, shoes, food wrappers and straws. These litter items are highly persistent and do not degrade quickly in the environment, which allows them to continue accumulating over time and to travel vast distances with sea currents and winds, impacting the NOWPAP region.

Marine litter from shoreline and recreational activities is also strongly connected to tourism. Many of the tourist destinations are concentrated along the coast, with a heavy dependence on the marine environment, and therefore it could be a big challenge for municipalities handling large amounts of solid waste.

In Japan, smoking related activities turned out to be second (accounting for 32.4 %) after shoreline and recreational activities, with similar pattern found in Korea (23.9 %). In Japan and Korea, ocean and waterways related activities came in third and the majority of these activities was fishing-related items (e.g., bait containers, floats, traps, fishing line and nets). Dumping activities and medical and personal hygiene were responsible for less than 5%.

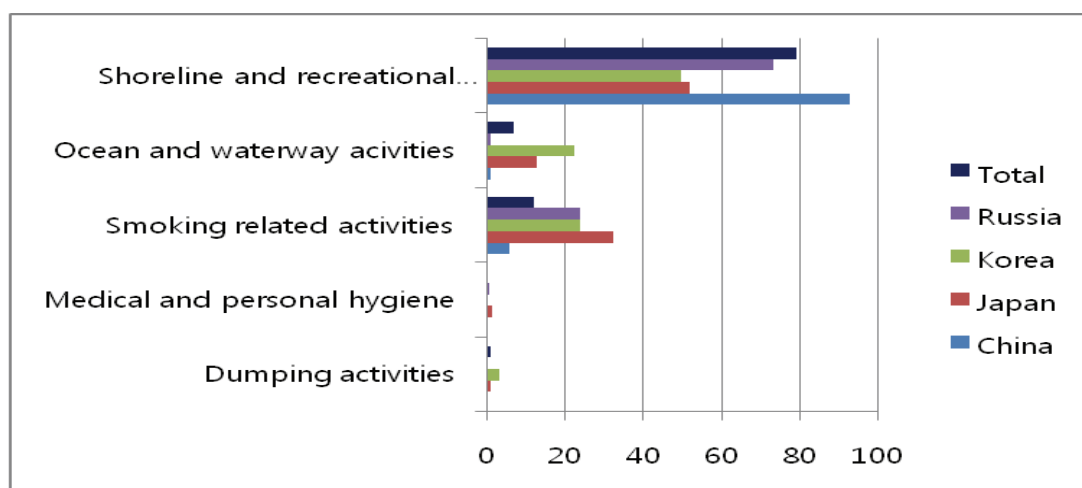


Figure 5. Sources of marine litter in NOWPAP member states in percentage (2010 data from Ocean Conservancy)

3. Legislation, Policies, Institutional Arrangements and Outreach

3.1. Legislation and Policies

Marine litter originates from various land- and sea-based sources as a result of numerous human activities and causes negative impacts on the environment, human health, and some sectors of economy. Floating marine litter and marine litter items suspended in the water column are transported by currents and winds throughout the sea and, thereby, cause transboundary problems.

In 2011, updated information on legal instruments, institutional arrangements and programmes related to marine litter management had been submitted from member states to NOWPAP Regional Coordinating Unit. This chapter has been updated by reflecting subsequent changes in the NOWPAP member states (comparing with the version of the “Regional Overview of Marine Litter in the NOWPAP region” published in 2007).

In China, there are several laws and regulations which are related to marine litter management (Table 5). To establish a sound management system and measures to reduce generation and discharge of wastes, “The Circular Economy Promotion Law” has entered into force in 2009. As a result, it is expected that the recycling rate and resource recovery level will be improved. More recent actions related to marine litter management will be also reflected in the 12th 5-year plan.

In Japan, in order to promote 3R (Reduce, Reuse, and Recycle) system, “Fundamental Law for Establishing a Sound Material-Cycle Society” was promulgated in June 2000 and the second Fundamental Plan was developed in 2008. It is important to note that the East Asia Sound Material-Cycle Society vision based on 3R concept has been announced taking into consideration increase of the transboundary movement of wastes. Concrete measures to establish the Sound Material-Cycle Society have been implemented by the Ministry of the Environment. According to the second Fundamental Plan, the amount of non-recycled garbage final disposal is expected to be 23 million tons by 2015, equivalent to 60% reduction from the 2000 level (approximately 57 million tons). These measures related to solid waste

management and establishing Sound Material-Cycle Society are strongly related to reduction of marine litter generation.

“Basic Policy for the Comprehensively and Effectively Promoting Measures against Marine Litter” was adopted by the Cabinet in March 2010. This policy describes measures to be implemented against marine litter including smooth disposal and effective reduction of the amount of marine litter, mutual cooperation among relevant bodies, and promoting international cooperation, based on the “Law for the Promotion of Marine Litter Disposal” which was enacted in July 2009.

In Korea, Marine Environment Management Act came into force in 2008 after revision of the Marine Pollution Prevention Act. This Act describes protection of the marine and coastal environment from hazardous pollutants (mainly from ships) such as oil, sewage and garbage, as well as measures to be implemented against marine litter.

In the Russian Federation, administrations of sea ports under the instruction of the State Marine Pollution Control, Salvage & Rescue Administration have developed “Shipboard Waste Management Plans” in 2009. These plans are intended to specify waste management policy including ship-based collection of garbage and its disposal in the ports. “Clean Port” program has been elaborated to establish Cleanup and Surface Water Pollution Prevention System in the waters of Vladivostok port. It is expected to be functioned through coordination of Administrative bodies (Primorsky Krai Administration), industries, research and academic institutes.

National legal instruments of the NOWPAP member states comply with marine litter-related international conventions and agreements such as the International Convention for the Prevention of Pollution from Ships (MARPOL Convention); the Convention for the Prevention of Marine Pollution from Dumping of Wastes (London Convention); the Basel Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal; and the Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities (Table 6).

The regional overview on legal instruments related to marine litter management is available at the NOWPAP marine litter database (<http://dinrac.nowpap.org>).



Table 5. Marine litter-related national laws and regulations in the NOWPAP region

Member states	National laws and regulations
China	<ol style="list-style-type: none"> 1. Marine Environment Protection Law (1982) aims to supervise the nationwide marine environment protection, conserve marine resources, prevent pollution, safeguard human health and promote economic and social development. 2. Law on Control of Ocean Waste Dumping (1985) regulates waste dumping at sea. 3. Environmental Protection Law (1989) sets the overall supervision and management of the environmental protection throughout the country. 4. Regulations on Prevention of Pollution Damage to Marine Environment by Land-based Pollutants (1990) prohibit piling up, discarding or disposing of solid waste along seashores and beaches without authorized permission. 5. Regulations on Strengthening Management of Plastic Package Wastes along Main Roads, in River basins and at Tourist Attractions (1998) prohibit littering plastic waste into rivers, lakes and their banks and to use non-degradable tableware on passenger ships and cruise lines. 6. Regulations on Prevention of Pollution Damage to Marine Environment by Coastal Construction Projects (2007) concern the protection of the marine environment from the coastal development and construction. 7. Regulations on the Control of Environmental Pollution by Ship-based Wastes (2009) describe the treatment of garbage from ships.

Member states	National laws and regulations
Japan	<ol style="list-style-type: none"> 1. Port and Harbor Law (1950) describes the maintenance and management of port areas and facilities. 2. The Seacoast Law (1956) aims to protect the seacoast area from damages caused by oceanic phenomenon (e.g. tsunami, storm surges and high waves) and to promote coastal zone conservation and its proper use. 3. Law Related to Prevention of Marine Pollution and Maritime Disasters (1970) regulates the discharge of waste from ships to sea and waste management onboard. 4. Waste Management and Public Cleansing Law (1970) regulates waste disposal, including waste dumping at sea, and concerns the maintenance of ports and harbors. Marine litter will be managed as waste in accordance with this law, after its collection. 5. Basic Environment Law (1993) sets forth basic principles for the environmental policy. 6. Fundamental Law for Establishing a Sound Material-Cycle Society (2000) is a fundamental framework law to establish a Sound Material-Cycle Society in Japan through promotion of 3R (Reduce, Reuse and Recycle) activities. The law contributes to the marine litter management issue in view of reduction of its generation. 7. Second Fundamental Plan for Establishing a Sound Material-Cycle Society (2008) aims to promote 3R principles to conserve living environment. 8. The Law for the Promotion of Marine Litter Disposal (2009) is a fundamental law for marine litter issues in Japan to promote smooth disposal and reduction of generation of marine litter, in order to conserve the good landscape and environment of the coasts. The law defines the responsibility of various sectors, for instance, Coast administrators shall take all necessary measures in order to dispose of marine litter and provides necessary matters concerning “Marine Litter Countermeasures”, which include both measures necessary to promote smooth disposal of marine litter and measures necessary to promote reduction of generation of marine litter. 9. Basic Policy for the Comprehensively and Effectively Promoting Measures against Marine Litter (2010) describes a basic policy direction to implement measures against marine litter including smooth disposal and effective reduction of generation of marine litter, mutual cooperation among relevant bodies, and promotion of international cooperation, based on the Law for the Promotion of Marine Litter Disposal. The basic policy was adopted by the cabinet in March 2010.

Member states	National laws and regulations
Korea	<ol style="list-style-type: none"> 1. Environmental Policy Basic Law (1990) provides the overall supervision of management of the environmental protection. 2. Waste Management Act (1991) concerns the collection and treatment of industrial waste and household waste. 3. Coastal Management Act (2000) aims towards the sustainable use of the coastal environment, including beaches and public swimming areas, and regulates coastal construction. 4. Marine and Fisheries Development Basic Law (2002) sets forth basic principles for the development of ocean-related industries including fisheries. 5. Port Management Law (2008) prohibits the discharge of waste in the port area for safe navigation and describes the development, maintenance and management of ports and their facilities 6. Marine Environment Management Act (2008) aims to prevent the marine and coastal environment from hazardous pollutants (mainly from ships) such as oil, sewage and garbage.
Russia	<ol style="list-style-type: none"> 1. Polluted Harbor Waters Cleanup Operation Rules (1990) deal with cleaning polluted water in the port areas, including oil spill incidents. 2. Regulations on Waste Disposal and other Kinds of Abuse (1992) define environmental pollution and related adverse effects where procedures of waste disposal are included. 3. Fishery Fleet Instructions on Preventing Pollution from Ships (1994) focus on preventing marine pollution from fishing vessels. 4. Inland Sea Waters, Territorial Sea and Contiguous Zone Law (1998) describes surveillance in case of incidents. 5. EEZ (Exclusive Economic Zone) Law (1998) contains the protection and conservation of special areas to prevent marine pollution from ships. 6. Production and Consumption Waste Law (1998) focuses on the waste management from production and consumption 7. Environment Protection Law (2002) sets basic policies for the environmental protection and ecological safety 8. Water Code (2006) deals with the water protection from pollution and abuse. 9. Compulsory Regulations on Sea Ports (2007) address the management of garbage from ships.

Table 6. The current status of compliance of the NOWPAP member states with marine litter-related international conventions and agreements

	China	Japan	Korea	Russia
MARPOL Convention Annex V	Implements nationally through Regulations on Prevention of Ship-based Sea Pollution	Implements nationally through Law Related to the Prevention of Marine Pollution and Maritime Disasters	Implements nationally through Marine Environmental Management Act	Implements nationally through Fishery Fleet Instructions on Preventing Pollution from Ships; and Compulsory Regulations on Sea Ports
London Convention	Implements nationally through Regulations on Control over Waste Dumping to the Marine Environment	Implements nationally through Law Related to the Prevention of Marine Pollution and Maritime Disasters	Implements nationally through Marine Environment Management Act	Ratified
Basel Convention	Implements nationally through Regulations on Prevention of Environmental Pollution by Solid Waste	Implements nationally through Waste Disposal and Public Cleansing Law and Law for the Control of Export, Import and Others of Specified Hazardous Wastes and Other Wastes	Implements nationally through Marine Environment Management Act	Ratified
GPA	Implements nationally through Regulations on Prevention of Pollution Damage to Marine Environment from Land-based Activities	Implements nationally through Water Pollution Control Law and Law Concerning the Examination and Regulation of Manufacture	Implements nationally through National Clean Water Action Plan	(No clearly defined regulations for the prevention of the marine pollution from land-based activities)

Unfortunately, there are only a few national laws directly addressing marine litter in the NOWPAP countries, mostly in Japan. Instead, there are general statutory orders, regulations, bylaws and acts governing mainly waste handling.

Since most legal instruments in NOWPAP countries are related to other marine and coastal environmental protection and health issues, perhaps marine litter could be addressed by the existing national legislation with participation of various sectors to jointly take measures to prevent, reduce and control the discharge of land-based and ship-generated wastes, and to reduce the loss of fishing gear from fishing vessels. Revising existing legislation will be necessary in that case.

3.2. Institutional Arrangements

A variety of governmental agencies are responsible for the management of marine and coastal pollution at the national and local levels. Most of these entities, represented by ministerial and municipal structures and services and port administrators are involved in activities addressing and combating marine litter problem. The institutional arrangements to deal with marine litter in NOWPAP countries are shown in Table 7.

For institutional arrangements, environmental ministries take the lead for the overall supervision of land-based marine litter and maritime ministries/administrations take responsibility for sea-based marine litter. Local governments are in charge of the general management of waste generated within their jurisdiction area. Therefore, at the both national and local level, a mechanism to strengthen cooperation between different national institutional bodies is needed for better management of marine litter.

Table 7. Institutional arrangements to deal with marine litter issues in the NOWPAP

member states

Member states	Institutional arrangements
China	<ol style="list-style-type: none"> 1. Ministry of Environmental Protection (MEP) is responsible for the overall supervision and management of environmental protection issues 2. State Oceanic Administration (SOA) is in charge of surveys, monitoring and surveillance of the marine environment (including scientific research) and waste dumping at sea 3. Fishing Management Bureau (FMB) is responsible for fisheries resources related issues, including the supervision of the pollutant discharge by fishing vessels, under the Ministry of Agriculture 4. State Harbor Superintendent Administration is responsible for supervision, investigation of the pollutant discharge by ships, surveillance of water quality of harbor areas, and prevention of pollution caused by ships 5. Environmental Protection Department of the Armed Forces is responsible for the supervision of the pollutant discharge by military vessels and surveillance of naval port waters 6. Local People’s Government in Coastal Areas is responsible for protection of the marine environment from construction and land-based pollutants
Japan	<ol style="list-style-type: none"> 1. Meeting for Promotion of Measures against marine Litter is Director-General level meeting by ministries of central government dealing with marine litter issue to promote effective an efficient measures against marine litter 2. Ministry of Environment (MOE) is responsible for the overall supervision, promotion and management of environmental issues. MOE is competent ministry for the Law for the Promotion of Marine Litter Disposal and supervises all the measures against marine litter and executes various measures including investigations, financial support and so on. 3. Fisheries Agency (Ministry of Agriculture, Forestry and Fisheries) is responsible for marine litter issue as competent authorities for fisheries 4. Ministry of Land, Infrastructure and Transport (MLIT) is responsible for marine litter issues with respect to land, river (first class river), vessels, and tourism 5. Japan Coast Guard (JCG) is responsible for the enforcement of marine-related laws and regulations, including marine litter issues 6. Local governments are responsible for the protection of the coastal zone and the general management of waste including marine litter (in collaboration with MLIT and MOE)

Member states	Institutional arrangements
Korea	<ol style="list-style-type: none"> 1. Ministry of Land, Transport and Maritime Affairs (MLTM) is responsible for the overall supervision of the protection of the marine and coastal environment including the management of marine litter 2. Ministry of Environment (MOE) is in charge of the overall environmental protection issues in inland areas including the management of land-based waste 3. Korea Coast Guard (KCG) is responsible for the enforcement of marine related laws and regulations, including waste discharge from ships at sea 4. Local Governments are responsible for the protection of the coastal zone and the general management of waste including marine litter (in collaboration with MLTM) 5. Korea Marine Environment Management Corporation (KOEM) is responsible for implementing several projects and initiatives to deal with marine litter under the Marine Environment Management Law
Russia	<ol style="list-style-type: none"> 1. Ministry of Natural Resources and Environment (MNRE) is responsible for marine environmental protection issues including the management of biological resources 2. Ministry of Transport (MOT) is in charge of shipping-related issues including safe navigation of ships 3. Administrations of Sea Ports are responsible for merchant shipping-related issues in subordination to MOT

3.3. Programmes, Initiatives and Outreach

3.3.1. Programmes and Initiatives

Since NOWPAP Regional Action Plan on Marine Litter (RAP MALI) was launched in 2008, several programmes and initiatives have been undertaken to address marine litter problem (Table 8). According to RAP MALI, most activities are suggested to be implemented at the national level, in cooperation with local governments and authorities.

China has recently paid more attention to the improvement of marine environment, and extends its efforts to establish a nationwide monitoring and supervision network to assess environmental quality and to release the data on a regular basis. This explains that marine litter is newly included in the monitoring targets of the State Oceanic Administration (SOA)

and data on its quantities and distribution have been reflected in the annual state of the marine environment report.

Promoting the market-based instruments in Japan, Toyama Prefecture introduced ban for free distribution of plastic bags at major grocery stores and dry cleaners in 2008 which was the first such initiative at Prefectural level. According to recent survey, after the introduction of such policy instrument, the number of consumers who bring their own bags for shopping has risen to 93% (from 20% before the introduction).

In Korea, Korea Marine Environment Management Corporation (KOEM) has implemented several projects and initiatives to deal with marine litter based on the “Marine Environment Management Act”. Those projects were focused on the collection and treatment of garbage, and have been implemented together with “Marine Environment Project” and “Port Clean-up Project” by placing cleaning-up vessels at 19 major ports.

In 2009, Ministry of Land, Transport and Maritime Affairs (MLTM) has developed “National Integrated Management Strategy for Marine Litter”. Activities under this Strategy will be implemented till 2013 by local governments, research institutes, private sector and NGOs. The program suggested the extension of “Charge for Plastic Bags” which had been introduced since 2001 to reduce the use of plastic bags previously provided free of charge by shops and stores. Five major shopping centers are involved in the ban of selling plastic bags since October 2010.

In Russia, the target-oriented program called “Wastes” that has been initiated since 2010, included the following elements: 1) SWOT (Strength-Weakness-Opportunities-Threats) analysis of the existing waste management system; 2) Creating a system of state regulation of (and information support to) waste management activities; 3) Developing regulatory framework in the field of waste management; 4) Starting up a system of environment friendly management of solid domestic waste; 5) Starting up businesses in waste treatment and disinfection; and 6) Raising public awareness and training of experts.

Table 8. Marine litter-related programmes and initiatives in the NOWPAP member states

Member states	Programmes and initiatives
China	<p>1. Strengthening the Management of Plastic Package Waste along Main Roads, in the River Basins and at the Tourist Attraction Sites, approved by the State Council, prohibits throwing away plastic litter into rivers, lakes and their banks</p> <p>2. The Ministry of Communication prohibits the use of disposable tableware on passenger ships and cruise lines sailing along the Yangtze River, the Taihu lake, etc.</p>
Japan	<p>1. The Model Survey on Domestic Methodology for Reduction of Marine Litter have been conducted at 11 sea coast model areas in 7 Prefectures from FY2007 to FY2008 and at 10 sea coast sites in 10 Prefectures from FY2009 to FY2010, which are damaged severely by marine litter, to find out effective and efficient methodology/ measures for disposal and reduction of marine litter amounts in each area. The survey has been promoted under consultation with various entities including local governments, NGOs, academics, local citizens (through working groups)</p> <p>2. Subsidy for Projects to Discharge Disaster Waste financially supports projects to collect, transport, and discharge disaster waste (including huge amounts of marine litter) by municipalities</p> <p>3. Subsidy for Promoting a Sound Material-Cycle Society supports expenditure for waste management facilities and equipment for disposing waste (including marine litter) by municipalities</p> <p>4. Measures to Prevent Inappropriate Waste Disposal (including illegal dumping of waste) through strengthening the enforcement of regulations based on Waste Disposal and Public Cleansing law and promoting comprehensive measures in cooperation with local governments</p> <p>5. Regional Green New-Deal Fund is a subsidy which helps concerned parties to cooperate for effective measures to combat marine litter issues in the region. The subsidy can be used from FY2009 to FY2011</p> <p>6. Charge for Plastic Bags was initiated by Toyama Prefecture in April 2008 to charge 5 Japanese Yen (approximately USD 0.065) for a plastic bag in grocery stores. In 2007-08 several other municipalities introduced a similar charge for plastic bags (e.g., Sugunami ward in Tokyo and Ise City). It aims to reduce the number of plastic bags used and to encourage carrying reusable bags for daily grocery shopping</p>

Member states	Programmes and initiatives
Korea	<p>1. National Integrated Management Strategy for Marine Litter has been developed since 2009 and will be implemented till 2013 by MLTM. Relevant local governments, research institutions, private sector and NGOs are involved. This covers a wide range of surveys and monitoring of marine litter and the development of environmentally sound technologies and marine litter-related policies. The results of these ongoing efforts provide a solid basis for a national action plan on marine litter that is currently under development</p> <p>2. Waste Fishing Gear Buy Back Project has been implemented since 2003 by MLTM to collect fisheries related marine litter (e.g. fishing nets, traps, lines, floats, etc.) deposited in the sea and on the seabed. This project primarily encourages fishermen to bring ashore litter caught in their nets while fishing by providing large hardware bags to easily collect it. When fishermen bring waste fishing gear, it is purchased at the cost of approximately USD 10 per 100 liter bag</p> <p>3. Cost-Sharing Programme has been initiated since 2001 based on “an Agreement for Litter Disposal in Incheon Coastal Waters and the Han River Watershed” between Seoul, Incheon and Gyeong-gi Province. Three local governments share the cost of improving coastal water quality around Incheon, including the marine litter removal and treatment cost. In 2007, this programme was further extended to the Nakdong River Basin where the four local governments are involved. By 2009, this programme was also applied to the Geum River, Youngsan River, and Seomjin River in Korea. Responsible local governments will cooperatively cope with the marine litter problem through a cost-sharing</p> <p>4. Charge for Plastic Bags has been introduced by the Ministry of Environment since 2001 to pay 50 Korean Won (approximately USD 0.05) for plastic bags in all kinds of shops and stores. In addition, selling plastic bags was forbidden in 5 major malls in Korea since October 2010. It aims to reduce the number of disposal plastic bags used and to encourage carrying reusable bags</p>

Member states	Programmes and initiatives
Russia	<ol style="list-style-type: none"> 1. Specific Activities on Coastal-Source Pollution have been carried out based on Polluted Harbor Waters Cleanup Operation Rules 2. “City Territories Accomplishment” Programmes and “Waste” Target-oriented Programme are implemented in Primorsky Kray 3. Interdepartmental Commission on Peter the Great Bay Cleanup was established in 2005 to improve the port water quality and prevent oil and marine litter pollution in Vladivostok 4. Shipboard Waste Management Plans were developed by Administrations of Sea Ports at the instruction of the State Marine Pollution Control, Salvage & Rescue Administration of the Russian Federation. The aim of these plans is to specify the waste management policy within the areas of responsibility of Administrations of sea ports, the payments system as well as systems of shipboard waste collection and disposal 5. Clean Port Program has been elaborated in Vladivostok to primarily aim at establishing and providing the Cleanup and Surface Water Pollution System in the Port of Vladivostok waters

3.3.2. Outreach

The marine litter problem cannot be solved only by means of legislation, law enforcement and technical solutions; changing attitudes and behavior of the public are also needed. Marine environment in our region can be improved only by the combined efforts of all interested parties.

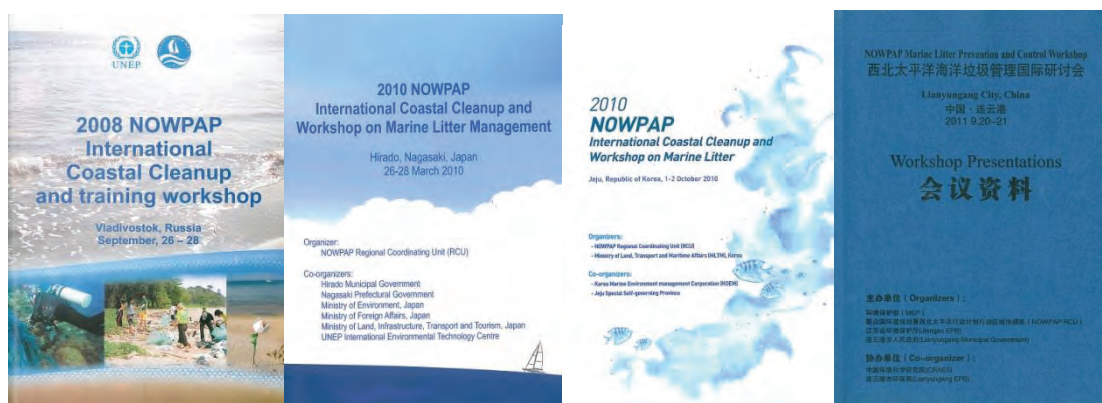
To increase the public awareness of the marine litter problem, extensive educational programmes for a variety of sectors (e.g., fishing, shipping and tourism) and the general public are important and have to be developed and implemented.

NOWPAP Marine Litter Workshops

Since the initiation of the NOWPAP Marine Litter Activity (MALITA) in 2005, NOWPAP marine litter workshops have been held to exchange marine litter related information between member states and interested parties including UNEP, IMO and other Regional

Seas Conventions and Action Plans. Government representatives, national experts and NGOs have been participating in the workshops.

The efforts to reduce and mitigate marine litter impacts were continued since NOWPAP Regional Action Plan on Marine Litter (RAP MALI) has been launched since March 2008. The NOWPAP RAP MALI working meeting is held every year, in conjunction with the ICC workshops and campaigns. The meeting participants discuss the progress of the RAP MALI implementation and further steps to be taken based on the agreed RAP MALI workplan. These workshops and meetings have been contributing to sharing information and best practices among member states.



NOWPAP International Coastal Cleanup (ICC) campaigns

The NOWPAP ICC campaign is held annually, in conjunction with workshops, with the goals of raising the public awareness, sharing information, and collecting data of marine litter sources. All data collected have been submitted to Ocean Conservancy (OC) and were disseminated with annual ICC reports.

In Japan, since the first ICC campaign in 1991 organized by a Japanese NGO, Japan Environmental Action Network (JEAN), the ICC campaigns have been held annually on the beaches throughout the country. According to JEAN Activity Report, an estimated total 47 thousands of volunteer-days were spent on 200 beaches in 2008. The annual activity reports have been utilized by the central government of Japan for the purpose of planning effective measures and actions against the marine litter.

To help organizing the ICC campaigns in the Russian Far East, Japan has provided financial support in 2008 for a training workshop aiming at the continuation of annual ICC events. This initiative served as a trigger for ICC campaign in the Russian Far East (see below). In 2010, the NOWPAP ICC and workshop on marine litter management were successfully organized in Hirado, Japan with a generous support from the Japanese government as well. To attract public attention, Ministry of Environment (MOE) of Japan developed pamphlets on marine litter and disseminated to Prefectures and the public. At a Prefecture level, regional briefing sessions were held to explain the “Law for the Promotion of Marine Litter Disposal (2009)” together with sessions for the “Basic Policy for the Comprehensively and Effectively Promoting Measures against Marine Litter (2010)”.

In 2010, Korea has commemorated the 10th anniversary since joining the ICC campaign in 2001. Within the framework of NOWPAP, ICC campaign and workshop were organized in Jeju Island in October 2010. More than 100 domestic and foreign participants have shared their opinions and know-how on the marine litter issue. It was also a good opportunity to raise public awareness.

In 2011, the NOWPAP ICC and workshop on marine litter prevention and control were organized successfully by the Chinese government in Lianyungang, China. The workshop was focused on discussing and sharing information on government measures on the marine litter prevention and control, public participation and private sector involvement. During the meeting, participants agreed that efforts on addressing marine litter, including exchange of information and best practices as well as further promotion of ICC, should be continued in the region.

Russia has participated in ICC campaigns since 2007 on a regular basis, after the pilot ICC campaign was held in Vladivostok. In 2008, the another ICC campaign was also held in Vladivostok. Since then, the number of for beach clean-up sites has been extended every year.



Vladivostok,
Russia



Hirado, Japan



Jeju, Korea

Publications

To enhance preventing and reducing generation of marine litter in the NOWPAP region, NOWPAP published several technical reports, booklets, brochures and leaflets, in collaboration with the nominated Marine Litter Focal Points of the member states and the four Regional Activity Centres. Those covered a variety of issues related to marine litter such as interpretation of monitoring results, introduction of best practices on waste management, recent technologies and research outcomes to prevent, collect and treat

marine litter, etc. All these outcomes are available at the NOWPAP DINRAC website (<http://dinrac.nowpap.org>).

4. Achievements, Gaps, and Proposals for Action

4.1. Achievements

Marine litter is not a geographically isolated issue; it affects all coastal states and countries, and does not adhere to jurisdictional boundaries. Due to its transboundary nature, the global challenge posed by marine litter has been addressed by UNEP Regional Seas Programme (RSP) as well as the Global Program of Action for the Protection of the Marine Environment and from Land-based Activities (GPA).

As one of Regional Seas Programmes under UNEP, NOWPAP has been increasingly concerned about marine litter issues in the Northwest Pacific region since the initiation of the NOWPAP MALITA in 2005. As a successor of MALITA, NOWPAP RAP MALI has been implemented since 2008. Most of RAP MALI activities are being implemented at the national level, in cooperation with local governments and authorities within the NOWPAP region. RAP MALI suggests a series of detailed actions to be taken by the member states as well as at the regional level with three key elements: (1) prevention of marine litter input to marine and coastal environment; (2) monitoring of marine litter quantities and distribution; and (3) removing existing marine litter and its disposal.

The NOWPAP member states have demonstrated strong willingness to implement the RAP MALI activities with the full extent of ownership and cooperation between the member states. First, the NOWPAP marine litter database was maintained and updated with national data and information provided by member states. Second, this regional overview describing the current situation with marine litter in the Northwest Pacific was developed and updated on the basis of national summaries provided by the Marine Litter Focal Points. Third, the International Coastal Cleanup (ICC) campaigns have been held annually, in conjunction with workshops in order to raise public awareness, share information, and collect data on marine litter composition and possible sources. Lastly, close cooperation between government

agencies of different levels, NGOs and research institutions has been strengthened through the ICC campaigns and workshops organized by NOWPAP.

National efforts within NOWPAP RAP MALI are expected to lead to the improvement of the overall status of marine litter pollution in the NOWPAP region. Good examples, such as the “Buy-back Programme”, which was designed in Korea to encourage fishermen to bring ashore the litter collected at sea, and efforts of Japan to protect marine environment through integrated coastal management, have proven to be effective.

4.2. Gaps

Despite all positive developments bringing along active participation and efforts of member states, there are still problems, and those are due to different priorities set by each member state among a variety of marine and coastal environmental issues; the different extent of the coverage of marine litter issues by national legal instruments and administrative arrangements; inadequate enforcement of national and international laws and regulations; and still lack of public awareness.

Among barriers and gaps found in this overview, political will and follow-up commitment should be stressed as well as giving marine litter a higher profile within national priorities in order to release the funding required to tackle the marine litter problem. This may require policy makers to develop new programmes and measures or revise existing legislation to ensure that the political will and commitment are translated into reality. Current international legislation is quite clear in relation to marine litter: e.g., the IMO MARPOL Annex V bans all dumping of wastes at sea. However, due to lack of political commitment and weak enforcement, there is little deterrent to breaking the law at a national level.

As marine litter is addressed by different authorities (e.g. maritime and environmental ministries, local authorities), coordination among the different entities is essential with strong political commitment through improving relevant legislation for marine litter issues.

The most effective long-term solutions to marine litter at local and national level could be changes in management practices and behavior of the people concerned, in order to reduce waste generation from daily life and industry. As emphasized in the Honolulu Commitment,

improved life-cycle design, sustainable packaging and extended producer responsibility are essential for resource efficiency and reduced waste. Furthermore, given the transboundary nature of marine litter, enhancing coordination across jurisdictional boundaries with different authorities such as ministries, provincial and municipal governments and agencies is essential.

A good example could be explained by US NOAA “Clean Marinas Program” encouraging managers to adopt best management practices in dealing with trash in the US (<http://coastalmanagement.noaa.gov/marinas.html>). It was found that inadequate port facilities and high disposal costs are a major impediment to the proper disposal of wastes. Ships need to be able to discharge their waste fishing gear at ports and should have incentives to do so (e.g., no special fees). Public awareness and training in marine environmental protection for specific groups of people are also important.

Education and public awareness of the ecological and financial impacts of marine litter is critical to its reduction and prevention. Without increased public awareness, efforts to prevent the habit of illegal dumping and to raise the recycling rate will not be successful. However, formal or informal educational programmes on the nature of marine litter, proper disposal and recycling of marine debris, have not been widely provided to the public yet.

4.3. Proposals for Action

It is recommended that NOWPAP member states consider the following actions to fill in the gaps described above:

- Raise a profile of marine litter issue within national priorities and increase political commitment to solve the problem at a national and regional level;
- Promote the application of best management practices focusing on prevention of garbage input to the marine environment from land-based sources;
- Introduce “no special fee” practice for port reception facilities in the NOWPAP region (including reception of fishing gear);
- Introduce market-based economic instruments in order to prevent marine litter generation and encourage applying 3R principles (reduce, reuse, recycle), e.g., introduce bans (or charges) for plastic bags and low-quality polystyrene buoys, increase fines for illegal garbage disposal, etc.;

- Continue to national marine litter monitoring programmes in all NOWPAP member states;
- Conduct education and outreach programmes on marine litter impacts, prevention and removal for the general public, media, industry, municipal authorities, ship crews and various groups within the tourism sector, to raise awareness of the impacts of marine litter on marine ecosystems, human health and safety;
- Encourage member states to support research and development (R&D) activities on emerging issues including micro-plastics and issues related to derelict fishing gear.

This regional overview is trying to offer a glimpse of the current state of marine litter problem in the Northwest Pacific region. NOWPAP RAP MALI was developed and is being implemented through the four Regional Activity Centers and Marine Litter Focal Points of the member states in close collaboration with the UNEP Regional Seas Programme (RSP) and other UN agencies and programmes. As RAP MALI implementation mechanism has been proven successful during the past several years, it might continue to play the major role to cope with marine litter problem in the region.

This overview will be updated regularly to illustrate status and developments related to the marine litter problem in the Northwest Pacific.

5. References

DINRAC, 2010. *Regional overview on legal aspects related to NOWPAP regional action plan on marine litter*. Northwest Pacific Action Plan (NOWPAP) Data and Information Network Regional Activity Centre (DINRAC). 19 pp.

GESAMP, 2010. *Proceedings of the GESAMP International Workshop on plastic particles as a vector in transporting persistent, bio-accumulating and toxic substances in the oceans*. GESAMP Reports and Studies, No. 82. 68 pp.

UNEP/IOC, 2009. *Guidelines on Survey and Monitoring of Marine Litter*. UNEP Regional Seas Reports and Studies, No. 186; IOC Technical Series No. 83: 120 pp.

NOWPAP 2008a. *Regional Overview: Marine Litter in the NOWPAP Region* (second edition). Northwest Pacific Action Plan. 30 pp.

NOWPAP, 2008b. *Marine Litter in the Northwest Pacific Region*. Northwest Pacific Action Plan. 63 pp.

OC, 2011. *Tracking trash: 25 years of action for the ocean*. Ocean Conservancy (OC). 79 pp.

OSPAR, 2009. *Marine litter in the North-East Atlantic Region: Assessment and priorities for response*. OSPAR Commission. 127 pp.

UNEP, 2005. *Marine Litter: An analytical overview*. United Nations Environment Programme (UNEP). 47 pp.

UNEP, 2009. *Marine Litter: A Global Challenge*. United Nations Environment Programme (UNEP). 232 pp.

UNEP/FAO, 2009. *Abandoned, lost or otherwise discarded fishing gear*, United Nations Environment Programme (UNEP) and Food and Agriculture Organization (FAO). 115 pp.

UNEP, 2011. *UNEP Yearbook: Emerging issues in our global environment*. United Nations Environment Programme (UNEP). 79 pp.



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