



BEST PRACTICES OF **MARINE LITTER MANAGEMENT IN FISHERIES, AQUACULTURE AND SHIPPING SECTORS IN THE NOWPAP REGION**

NOWPAP MERRAC

Northwest Pacific Action Plan
Marine Environmental Emergency Preparedness and Response
Regional Activity Centre

BEST PRACTICES OF MARINE LITTER MANAGEMENT IN FISHERIES, AQUACULTURE AND SHIPPING SECTORS IN THE NOWPAP REGION

MARINE LITTER IN THE NOWPAP REGION



Marine litter has been defined as any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter gives rise to a wide range of negative environmental, social and economic impacts, causing damage to marine ecosystems and human activities such as fishing, aquaculture, shipping, tourism and recreation.

NOWPAP region is experiencing marine litter problems and has been bidding to curb marine litter in the region. NOWPAP member states have been encouraged to implement actions to prevent, monitor and remove marine litter at national and local level and have been addressing the problem of marine litter collectively through the formulation and implementation of the Regional Action Plan on Marine Litter (RAP MALI).

There are **many measures and methods of marine litter management** implemented by the NOWPAP members and the sharing of the best practices of marine litter management in fisheries, aquaculture and shipping sectors in the NOWPAP region will help to reduce the amount of marine litter and strengthen actions taken against marine litter.

EFFICIENT COLLECTION SYSTEM

There is a significant portion of sea-based marine litter created in the process of fishing activities such as abandoned, lost or otherwise discarded fishing gear (ALDFG) giving numerous negative impacts to the marine environment and fishing activities.

To prevent dumping and to effectively collect marine debris derived from fishing activities, following programs have been introduced by the Ministry of Oceans and Fisheries (MOF, former MLTM) of Korean Government.

THREE COLLECTION PROGRAMS BY KOREAN GOVERNMENT

■ Buy Back Program

To encourage fishermen to bring back the marine litter collected in the process of their fishing activities by introducing economic incentives.

- Distribution of garbage bags to fishermen for the collection of litter by the Fisheries Cooperatives
- Incentives paid to fishermen according to the amount of the collected litter



4L-USD 4



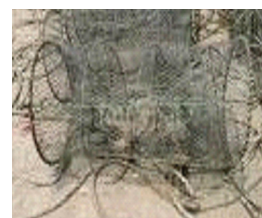
100L-USD 10



200L-USD 20



USD 0.14/kg



USD 0.25/kg (MOF)

- Expansion of the program to 12 major ports in Korea after the first success in Incheon City
- Purchase of 30,959 tons of litter between 2009 and 2012 with the investments of USD 20 million by the central and local government
- Saving of about USD 35 per ton when compared to the cost of direct removal of marine litter

EFFICIENT COLLECTION SYSTEM

■ Collection by Floating Receptacles

To encourage fishermen's volunteerism for marine litter collection, the program aims to enhance fishermen's accessibility to the collection facility, by installing and operating barges (floating facilities) in vicinity of ports and harbors.

- 128 barges have been installed with total investment of USD 3.7 million during the period of 2010-2012 and 51 are planned to be installed in 2013



Haenam, Korea, 2009 (MOF)

■ Clean Fishery Communities Program

By encouraging fishermen to voluntarily bring back garbage originated from ships and bilge water (waste water from the bottom of the ships), Korean government aimed at realizing 'Clean Fishery Communities'.



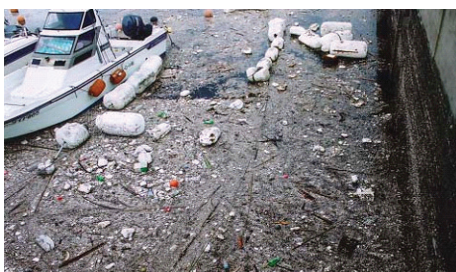
- To encourage fishermen to bring their general garbage back to small size litter receptacles onshore
- 122 receptacles (2012)
- Total collection: from 309 to 1,372 tons (2008-2012)

- To improve the capacity for collection of bilge water originating from small fishing vessels
- Total collection: from 10 to 128 tons (2010-2012)

- Other results:
Award to 8 fishery communities individually with around USD 19,000 for their best practices

ENVIRONMENT-FRIENDLY DISPOSAL TECHNIQUES

Expanded Polystyrene (EPS) floats are used for various aquaculture operations in coastal areas. If these floats are not well maintained and managed, they disintegrate into pieces or scatter along the beaches after drifting at sea, causing many environmental problems. Incineration of EPS floats is prohibited by regulation therefore development of eco-friendly disposal & recycling system is required.



COMPACTING EPS FLOATS BY PORTABLE COMPRESSOR

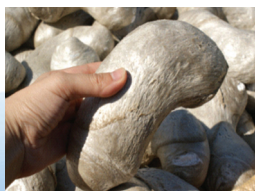
In order to tackle the problem of wasted EPS floats, Japan has introduced the portable compressor for the wasted EPS floats at the fishing ports near mariculture areas.

- Total compressing of 183 tons of EPS floats from 2003 to 2012
- About 85.7% of total EPS production including floats and other products recycled in over 133 recycling stations (2011)
- Recycling compressed EPS floats as foam plastic brings subsidiary income to fishermen



Portable compressor of EPS floats (Styros Buoy, Elcom Co. Ltd-Japan)

Korea has also introduced both fixed and mobile types of thermal volume reduction system. The total number of compressors increased from 5 to 35 between 2003 and 2013.



Use of portable compressor in Korea (Korea Marine Environment Management Corporation, KOEM)

ENVIRONMENT-FRIENDLY DISPOSAL TECHNIQUES



SHIFT FROM THE CONVENTIONAL EPS FLOATS TO HIGH DURABILITY FLOATS IN JAPAN

Conventional EPS floats which are used in aquaculture are fragile and degrade into fragments easily. When Kagoshima Bay was hit by the typhoon in 1989, all floating aquaculture rafts went under water. The EPS floats crashed, broke and water penetrated into EPS beads and eventually floats lost their buoyancy. The fishermen in the area realized the importance of changing the use of EPS floats in order to keep the rafts floating even in adverse weather.

In order to prevent marine litter deriving from EPS floats, Tarumizu City of central Kagoshima Bay in Japan introduced the use of high durability floats ("power floats") which are easier to handle and recycle. They also have longer period of service without fragmentation.



Conventional EPS Floats



High durability floats (New PE floats)



New 'power floats', Yasui Co.Ltd

- 100% use of the new floats in the area after 10 years of first introduction
- Popular in other aquaculture areas in Japan
- Aiming for sustainable development of aquaculture as well as maintenance of clean fishing grounds

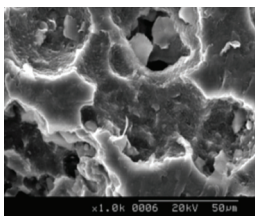
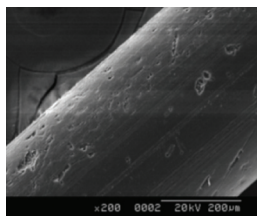
RESEARCH & DEVELOPMENT

Removing litter from the sea is costly and labor-intensive therefore prevention is the top priority for marine litter management. Different techniques of marine litter prevention have been developed by Korean government.

■ Biodegradable Fishing Gear

The fishing gear used for fishing activities in the NOWPAP region is mostly synthetic and resistant to degradation in the water. Derelict fishing gear causes 'ghost fishing' and economic damage to fisheries.

To reduce damage caused by 'ghost fishing', the National Fisheries Research & Development Institute developed biodegradable fishing gear. The degradation starts after two years of being disposed under the water and takes over 7 years, while ordinary nylon fishing gear usually lasts for more than 500 years.



■ Fishing Gear Identification

Korean government introduced the 'fishing gear identification' program (2006) under which fishermen are asked to tag personal information on the fishing gear. The program has contributed to preventing inappropriate disposal of fishing gear.

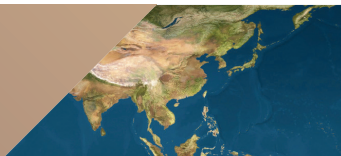


■ Fiber Reinforced Plastic Vessel melting treatment system

The vessels which are made of fiber reinforced plastic (FRP) are often abandoned as the disposal of such vessels is expensive and requires complicated treatment methods.

To prevent illegal disposal of FRP vessels that may hamper vessel traffic and harbor safety and to prevent inappropriate methods of FRP vessel treatment which may threaten the marine environment and human health, Korea Institute of Ocean Science & Technology (KIOST, former KORDI) developed the melting treatment system of FRP vessels.

POLICY-BASED MANAGEMENT



In order to effectively control marine litter, policy-based management system is necessary. A successful management will require collection of accurate statistics through systematic surveys, enactment of legislation, policy-making, cooperation between public and private sectors and international collaboration.

MARINE GARBAGE MANAGEMENT WORK IN CHINA'S COASTAL CITIES

In view of the seriousness of marine litter problem, China's coastal provinces and municipalities including Dalian, Xiamen, Shanghai and Guangzhou have been actively carrying out the relevant work, controlling and disposing sea-based marine litter through detailed and effective control and management system.

■ Dalian

To strengthen the marine litter prevention and treatment and to preserve the seawater quality, the Dalian municipal government and private environment protection organizations worked collaboratively.

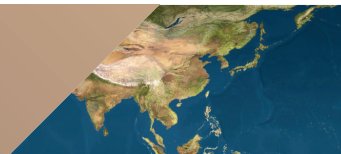
- Comprehensive management of southern seaside (polluted offshore aquaculture areas)
- Reinforcement of port sewage and garbage management through full use of the port's shipping service and port-stationed companies for the ship garbage management
 - ▷ 7,800 ships serving the garbage discharge each year receiving more than 6,000 tons of ship garbage
- Environment-protection philanthropic activities to combat the marine litter pollution
 - ▷ 2006-2007: Dalian's environment-protection volunteer association with corporate and social forces collected more than 4,000kg of floating garbage

■ Xiamen

To tackle the problem of marine litter, the Fujian government proposed new methods and introduced the special plan of marine environmental sanitation in Xiamen.

- Establishment of Xiamen Offshore Environment Sanitation Management Center and implementation of the divisional management of marine sanitation
- Setting up marine environmental sanitation base, equipped with the relevant facilities and personnel
- Setting up offshore ship-based garbage collection system with three transfer modes
 - ▷ Setting up stations at the seashore
 - ▷ Operation of specialized boats to regularly collect garbage from big ships
 - ▷ Making use of small wooden boats to collect garbage from ships at key scenery spots
- Dramatic decrease of Xiamen's marine litter volume as a result

POLICY-BASED MANAGEMENT



SHIP WASTE MANAGEMENT IN RUSSIA

The monitoring of Russian coastal and marine areas showed that harbors are the most littered areas. Ship waste management system has been introduced to improve the effectiveness of marine litter collection and treatment.

■ Organizational aspects of marine litter management

To create an effective and systematic management system for collection and recycling of ship waste, following elements are defined under the system and managed accordingly.

- Definition of the port policy in waste management, its purpose and payment system
- Organizational structure, duties and responsibilities of parties

In order to clean up harbors, specialized litter collecting vessels are operated in the Russian part of the NOWPAP region: 2 in Vladivostok, 7 in Vostochny, and 2 garbage collecting vessels in Vaninsky.



Collection of waste from vessels in Vladivostok port - Specialized vessels operating to transport waste from the ships to the specified reception facilities

■ Technologies of collection and disposal of waste on ships

Direct collection and sorting of litter in place of its generation on ships

- by dividing wastes into categories
- with the installation of garbage tanks at different spots of the vessel
- with waste incinerators, food waste grinders and plastic litter press devices on board

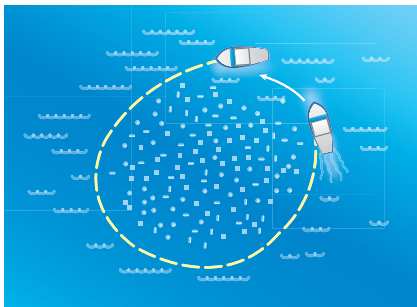


Bins for waste collection on vessels

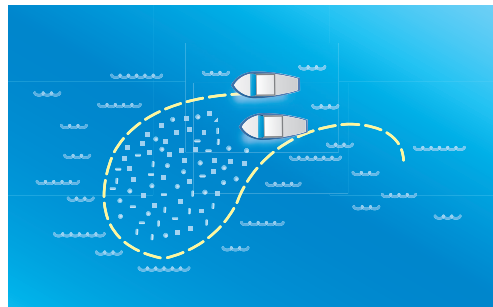
POLICY-BASED MANAGEMENT

Development of a manual for marine litter collection techniques

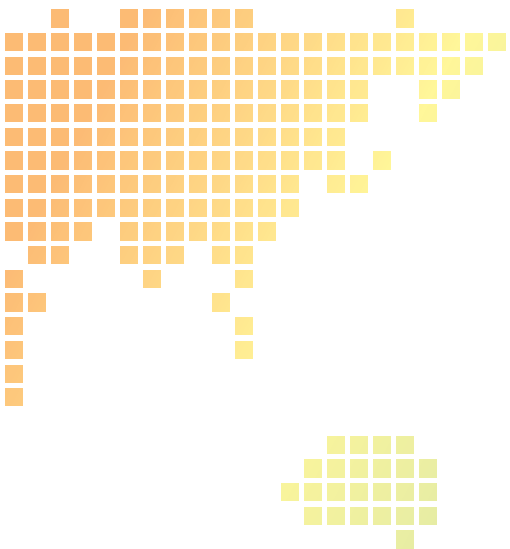
- cleaning open water areas by surrounding of the polluted site with booms
- cleaning closed sites, for litter accumulated between vessels and moorings
- collecting litter at moorings, piers and seawalls
- cleaning in corners of piers
- cleaning in dead zones under piers and moorings



Enclosure of polluted site by booms



Marine litter collection by booms from the open water area



NOWPAP

The Northwest Pacific Action Plan (NOWPAP) was adopted in 1994 by the four member states, namely the People's Republic of China, Japan, the Republic of Korea and the Russian Federation as part of the UNEP Regional Seas Programme. The NOWPAP Regional Coordinating Unit (RCU) was set up in Toyama, Japan and in Busan, Republic of Korea, in November 2004 and maintains close contacts with and supports the work of the four Regional Activity Centers (RACs).



NOWPAP (<http://www.nowpap.org/>)

MERRAC

The Marine Environmental Emergency Preparedness and Response Regional Activity Centre (MERRAC) is one of four RACs of NOWPAP. The center is responsible for regional co-operation in the field of marine pollution preparedness and response in the Northwest Pacific region with technical support from UNEP and the IMO.

More detailed information is introduced in “The Case Study Report on Compilation of Best Practices in dealing with Marine Litter in Fisheries, Aquaculture and Shipping in the NOWPAP Region” (NOWPAP MERRAC 2013)

Disclaimer

The brochure on “Best practices of marine litter management in fisheries, aquaculture and shipping sectors in the NOWPAP region” was prepared by NOWPAP MERRAC in cooperation with the National Experts from China, Japan, Korea and Russia and is published with the kind support of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA).

NOWPAP MERRAC

Northwest Pacific Action Plan
Marine Environmental Emergency Preparedness and Response
Regional Activity Centre