

## **UNEP Regional Seas Programme, Marine Litter And Abandoned Fishing Gear**

Report to the Division of Ocean Affairs and the Law of the Sea,  
Office of Legal Affairs, UNHQ

By: Regional Seas Coordinating Office, UNEP, Nairobi; April 2005

### **A. THE REGIONAL SEAS PROGRAMME**

UNEP's Regional Seas Programme, initiated in 1974, provides a legal, administrative, substantive and financial framework for the implementation of Agenda 21, and its chapter 17 on oceans in particular. The Plan of Implementation of the World Summit on Sustainable Development (WSSD, Johannesburg 9/2002) also focuses on the issue of oceans, seas, islands and coastal areas as critical elements for global food security and for sustaining economic prosperity. It restates that sustainable development of the oceans requires effective coordination and co-operation, at the global and regional levels, and between relevant bodies. The Regional Seas Conventions and Action Plans provide a platform for the implementation of this concept. The UNEP's Regional Seas Programme is based on regional Action Plans, related to a common body of water. These plans are usually adopted by high-level intergovernmental meetings and implemented, in most cases, in the framework of a legally binding Regional Seas Convention and its specific protocols, under the authority of the respective Contracting Parties or Intergovernmental Meetings.

Currently, seventeen regions are covered by adopted Action Plans: Thirteen regional Action Plans have been established under the auspices of UNEP: The Wider Caribbean (Cartagena Convention), East Africa (Nairobi Convention), East Asia (COBSEA), Mediterranean (Barcelona Convention), North-West Pacific (NOWPAP), West and Central Africa (Abidjan Convention), are directly administered by UNEP and the Black Sea (Bucharest Convention), the ROPME Sea Area (Kuwait Convention region), North-East Pacific (Antigua Convention), Red Sea and Gulf of Aden (Jeddah Convention), South Asia (SAS – SACEP), South-East Pacific (CPPS, Lima Convention) and South Pacific (SPREP Noumea Convention), which are independently administered by their regional secretariats. Similar independent regional programmes and agreements are in place in the Antarctic (CCMLAR), the Arctic (PAME), the Baltic Sea (Helsinki Convention, HELCOM), the Caspian (Teheran Convention) and North-East Atlantic (Oslo Paris Convention, OSPAR). Plans for a new programme in the South-West Atlantic are under consideration.

Altogether, more than 140 countries participate in at least one Regional Seas Action Plan and/or conventions aiming for sustainable use and management of the ocean and coastal areas.

The Regional Seas Conventions and Action Plans serve two major objectives:

1. As a principal **platform for regional implementation of global conventions, MEAs** (Multilateral Environmental Agreements) **and global programmes** or initiatives – that is, to provide the UN agencies or global programmes an existing regional mechanism through which they could implement their activities on a regional scale; and
2. as a **regional platform** for co-ordination of activities that **will contribute to sustainable development** of the shared marine and coastal environment.

In addition the individual Regional Seas Programmes increase both regional and inter-regional collaboration by promoting horizontal ties among the Regional Seas Programmes and partner programmes; strengthening their co-operation with international organizations; and forging new partnerships. **The most important partner programmes and organizations are:**

- The Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities (LBA)
- The International Maritime Organization (IMO)
- The Intergovernmental Oceanographic Commission (IOC) of UNESCO
- The Food and Agriculture Organization of the United Nations (FAO)
- The International Atomic Energy Agency (IAEA)
- The Global Environment Facility (GEF)
- The biodiversity conventions and programmes (CBD, CMS, CITES, Ramsar)
- The chemical conventions (Basel, PICs, POPs, BAT/BEP, etc.)
- Atmosphere and Climate Change Conventions (Ozone, UNFCCC)
- The United Nations Convention on the Law of the Sea (UNCLOS)
- The Marine Mammal Action Plan (MMAP)
- The Global Invasive Alien Species Programme (GISP)
- The International Coral Reef Initiatives (ICRI) and other Coral Reef programmes such as ICRAN, GCRMN and others.
- The Global International Waters Assessment (GIWA)
- The World Wide Fund For Nature (WWF) and the World Conservation Union (IUCN)
- The Small Island Developing States Programme of Action (SIDS/POA)
- Bi-lateral donor governments

As mentioned, each of the RSP's Action Plans is based on the respective region's particular environmental concerns and challenges, as well as its socio-economic and political situation. It may cover issues ranging from chemical wastes and coastal

development to oil spill preparedness and response or the conservation of marine species and ecosystems. However, all Regional Seas Programmes evolve around a common axis and their identified **shared priorities include:**

- Land-based sources of marine and coastal pollution
- Ship-generated marine pollution (oil, chemicals, litter, invasive species)
- Increased urbanization and coastal development causing destruction of ecosystems and habitats
- Conservation and management of marine and coastal ecosystems
- Integrated Coastal Area Management (ICAM) and Integrated Coastal Area and River Basin Management (ICARM)
- Over-exploitation and depletion of living marine resources, including fisheries
- Monitoring, reporting and assessment of the marine environment

A decision of the 22<sup>nd</sup> UNEP Governing Council (Nairobi, February, 2003) set out the elements of a new global strategy for the Regional Seas Programmes. The strategy is based on the central idea that the Regional Seas Conventions and Action Plans should, first and foremost, be used as regional instruments contributing to sustainable development. The Strategic Directions for 2004-2007 were later reaffirmed and developed by the 5<sup>th</sup> Global Meeting of the Regional Seas, Nairobi, November 2003, and then formally endorsed by the chairpersons/representatives of the COPs and IGMs at the 6<sup>th</sup> Global Meeting, Istanbul, November/December 2004.

The new global strategic directions identify actions to be implemented during 2004-2007 to enhance the RSP at the global level, while continuing the implementation of the action programmes of the individual RSPs as agreed upon by their governing bodies. They provide an opportunity to improve efficiency, individually and collectively in the RSCAPs, increase co-operation, and incorporate new elements in future programmes of work.

**The following are the new strategic elements or directions:**

- 1. Increase the Regional Seas Programme's contribution to sustainable development** through the enhancement of local, national, regional and global partnerships with relevant social, economic and environmental stakeholders, building upon the WSSD Plan of Implementation and the goals associated with the Millennium Declaration within the context of the Regional Seas mandate.
- 2. Enhance sustainability and effectiveness** of the Regional Seas Programmes through increasing country ownership, translating Regional Seas conventions and protocols into national legislation, promoting compliance and enforcement mechanisms, involving civil society and the private sector, building capacities, ensuring viable financial arrangements, as well as developing

assessment/evaluation procedures, where appropriate.

3. **Enhance the Regional Seas Programme's visibility and political impact** in global and regional policy setting, through the establishment of a strengthened 'Regional Seas Alliance', addressing emerging and priority issues, promoting a joint information policy, and ensuring participation and promotion of Regional Seas in the relevant regional and global *fora*.
4. **Support knowledge-based policy-making**, development and implementation of relevant environmental **legislation**, improve knowledge on the state of the marine environment and **enhance public awareness** by contributing to the establishment/strengthening of appropriate national and regional **monitoring and periodic assessment** of the marine and coastal environment.
5. **Increase the use of the Regional Seas Programme as a platform** for developing common regional objectives, promoting synergies and coordinated regional implementation of relevant MEAs, global and regional initiatives and responsibilities of United Nations Agencies, such as IMO, IAEA, IOC of UNESCO and FAO, as well as other international actors as a contribution to the sustainable management of the coastal and marine environment.
6. Promote the development of a universal vision and integrated management, based on the **ecosystem approach**, of priorities and concerns related to the coastal and marine environment in Regional Seas Conventions and Action Plans, initiating proactive, creative and innovative partnerships and networks.

The new strategy encourages the Regional Seas Programmes to increase monitoring and assessment activities; facilitate a science-based decision-making system, including participation in the project of the United Nations General Assembly known as the Global Assessment of the State of the Marine Environment (GMA) and of the Global International Waters Assessment (GIWA); to promote the ecosystem-based management of the marine and coastal environment; and to promote Large Marine Ecosystems within the Regional Seas assessment and management areas linked to the Regional Seas Conventions.

Further, the strategy identifies a number of specific activities to be undertaken at the level of the individual Regional Seas Conventions and Action Plans as well as at the level of the Regional Seas Coordinating Office at UNEP Headquarters. RS provides a platform for developing common regional objectives, promoting synergies and coordinated regional implementation of relevant MEAs, global and regional initiatives and responsibilities of United Nations Agencies, such as the GPA, IMO, IAEA/MEL, IOC of UNESCO and FAO, as well as of other international actors as a contribution to the sustainable management of the coastal and marine environment.

## **B. MARINE LITTER**

### **B.1 The Problem**

Marine litter is found in all sea areas of the world – not only in densely populated regions, but also in remote places far away from any obvious sources. Marine litter travels over long distances with ocean currents and winds. Studies from various parts of the world have confirmed that marine litter is found everywhere in the marine and coastal environment, from the poles to the equator and from continental coastlines to small remote islands. Marine litter has a truly global distribution and can, thus, be categorized as a global marine and coastal problem. Marine litter originates from many sources and has a wide spectrum of environmental, economic, safety, health and cultural impacts. Considering the very slow rate of degradation of most marine litter items, a continuous input of large quantities of marine litter will result in a gradual increase of litter in the coastal and marine environment. This negative trend has been confirmed by a number of studies in various regions.

Despite efforts made internationally, regionally and nationally, there are indications that the marine litter problem keeps growing worse. As long as the input of non-degradable or slowly degradable litter into the marine environment continues at the current rate, the result will be increased quantities of marine litter in the coastal and marine environments. Deficiencies in the implementation and enforcement of existing international, regional and national regulations and standards that could improve the situation, combined with a lack of awareness among main stakeholders and the general public, are other major reasons that the marine litter problem not only persists but appears to be increasing worldwide.

### **B.2 Sources of Marine Litter**

Marine litter comes from both sea-based sources and land-based sources, and it is obvious that measures to reduce or prevent marine litter in the marine and coastal environment have to be taken in many communities, as part of a large number of activities over a wide range of societal sectors, and by many individuals in many different circumstances.

The main sea-based sources of marine litter are merchant shipping, ferries and cruise liners; fishing vessels; military fleets and research vessels; pleasure craft; offshore oil and gas platforms; and aquaculture installations.

The main land-based sources of marine litter are municipal landfills (waste dumps) located on the coast; riverine transport of waste from landfills and other sources; discharges of untreated municipal sewage and storm water; industrial facilities; medical waste; and tourism (recreational visitors, beach-goers).

### **B.3 Quantities**

Due to the lack of systematic and comprehensive surveys on the quantities of marine litter on both global and regional scales, only selected information from different parts of the world, collected through a literature search, can be presented here.

In 1997, the U.S. Academy of Sciences estimated the total input of marine litter into the oceans, worldwide, at approximately 6.4 million tonnes per year, of which nearly 5.6 million tonnes was estimated to come from merchant shipping. According to other calculations, some 8 million items of marine litter have been estimated to enter oceans and seas every day, about 5 million of which (solid waste) are thrown overboard or lost from ships. Furthermore, it has been estimated that over 13,000 pieces of plastic litter are floating on every sq. km of ocean today. In the central Pacific gyre, there was found to be, in 2002, six kg of plastic for every kg of plankton near the surface.

The Ocean Conservancy (a US NGO) has been organising every year in September International Coastal Cleanup campaigns. In 2002 over 390,000 volunteers in 100 countries took part in these campaigns. They removed marine litter from more than 21,000 kilometres of coastline and waterways collecting more than 6.2 million pieces of marine litter, weighing over 4,000 tonnes. Almost 58 percent of the coastal marine litter found could be attributed to shoreline and recreational activities, such as beach-picnicking and general littering. Many other such cleanup operations are carried out every year by thousands of school children, volunteers and local authorities in a large number of countries in all parts of the world.

During one decade (1992–2002), over 73,000 m<sup>3</sup> of marine litter had been gathered on some 300 km of rocky shores on the Swedish west coasts (including thousands of islands and islets), i.e. the easternmost part of the North Sea. The average annual amount of litter cleaned up on those beaches is 6,000–8,000 m<sup>3</sup> (20-26 m<sup>3</sup> per km).

Using figures from the North Sea and the waters around Australia, as well as from other places, it has been estimated that up to 70 percent of the marine litter that enters the sea ends up on the seabed, whereas half of the remaining amount (i.e. 15%) is found on beaches and the rest (another 15%) floats on the water surface.

### **B.4 Effects of Marine Litter**

Marine litter is an environmental, economic, health and aesthetic problem. Marine litter kills, injures and causes pain and suffering. It is a vicious killer of wildlife. Entanglement and ingestion are the primary kinds of direct damage to wildlife caused by marine litter. Sea Life Surveys scientists estimate that globally, more than one

million birds and 100,000 marine mammals and sea turtles die each year from entanglement in, or ingestion of, plastics. Other threats to wildlife and the environment from marine litter include smothering of the seabed, and disturbance of habitats from mechanical beach cleaning. Plastic litter is increasingly believed to be a source of persistent toxic substances. Pieces of marine litter can also transport invasive species between seas. Medical and sanitary waste constitutes a health hazard and can seriously injure people. Every year, marine litter entails great economic costs and losses to people and communities around the world. It spoils, fouls and destroys the beauty of the sea and the coastal zone.

Damage to people, property and livelihoods caused by marine litter can be grouped into a number of general categories. These include damage to fisheries, fishing boats and gear, damage to cooling water intakes in power stations, contamination of beaches (requiring cleaning operations), contamination of commercial harbours and marinas (demanding cleaning operations), and contamination of coastal grazing land, causing injury to livestock. Problems with propeller fouling, blocked intake pipes and damaged drive shafts have been reported. According to two studies made in 1976 and 1978 in the Bering Sea and the Gulf of Alaska, 40–60 percent of bottom trawls collected plastic and metal debris. Marine litter-related damage to people also includes safety risks at sea (demanding rescue services) due to fouling of propellers, *etc.*, as well as damage to people's health (injuries, disease) from litter on beaches and in bathing water, including medical waste.

## **B.5 Costs and Economic Damage**

Only a few economic assessments have been made of the costs and financial damage caused by marine litter to municipalities or to specific activities such as fisheries.

In a report published by KIMO, it was estimated that the annual cleaning cost to 56 local communities in the United Kingdom were US\$ 3.9 million. This cleaning campaign covered 900 km of the coastline and 10,000 tonnes of waste were collected. On the basis of this information it is easy to extrapolate that the cost for cleaning the coastlines of Europe or even the world would be enormous. Swedish municipalities on the country's west coast (facing the North Sea) spend an estimated US\$ 1.6 million on cleaning beaches, each year (involving only about 3,600 km). In 1999, Orange County in California collected garbage every week from a six-mile (nearly 10 km) stretch of beach at a cost to taxpayers of US\$ 350,000. Other counties spent even more. About US\$ 12 million was spent in Korea during 2003 on issues related to marine litter.

According to the KIMO report, the total cost of marine litter in Shetland (the islands in the extreme north-east of the UK), assuming that all parties affected were hit equally badly, could be in the range of US\$ 9.9 million per year. The cost to the fishing industry could be US\$ 8.7 million. Bearing in mind that the Shetland coastline represents only a fraction of the European total the costs could run into billions if this approximation was extended to cover coastal communities throughout Europe.

In Shetland, 92 percent of the fishermen reported recurring problems with accumulated litter in nets: 69 % reported catches contaminated by litter, and 92 % had snagged their nets on litter on the seabed. Many also reported fouled propellers and blocked intake pipes. On average, they spent 1-2 hours a week clearing litter from nets. The catch, nets and other equipment are contaminated by oil containers, paint tins, and oil filters. Each time they may cost up to US\$ 3,500 in lost revenue. Lost items, such as wires and old nets, are collected from the seabed and may damage nets. A fouled propeller can cost up to US\$ 500 for hiring a diver to entangle it, and much fishing time can be lost. It is estimated that each boat could lose between US\$ 10,000 and US\$ 50,000 per year due to the effects and presence of marine litter. If 50% of the Shetland fishing fleet was affected in the same way, the cost to the local fishing industry could be between US\$ 874,000 and US\$ 4.37 million. The cost of marine litter to the fishing community on the Swedish Skagerrak coast has been estimated to be over US\$ 1.1 million each year.

In a survey conducted in Newport, Oregon, 58% of the fishermen indicated that they had experienced vessel problems due to plastic debris and incurred an average expense of US\$ 2,725 per vessel. Based on statistics of damage insurance for fishing vessels in Japan, the leading cause of engine damage is due to plastic at sea. Insurance companies estimate that a total of US\$ 50 million has been awarded for repairs from damage incurred by marine litter.

In 1998, the British Royal National Lifeboat Institution (RNLI) attended over 200 incidents to vessels with a fouled propeller. The rescues were divided equally between fishing vessels and pleasure craft. There are more incidences of recreational boats becoming fouled in the summer months. It has been estimated that the annual cost for the RNLI to undertake these rescues is about US\$ 1.6 million.

## **B.6 Challenges in Preventing and Combating Marine Litter**

Today, there is generally a lack of appropriate management of waste, from the location where the waste is produced through to its final disposal or processing. However, marine litter is not an environmental problem that can be solved solely by means of legislation, law enforcement and technical solutions. It is also a cultural problem and has to be addressed as such, namely by efforts to change attitudes, behaviours, by management approaches and education, and by involvement of all sectors/interests, including the public at large.

Marine litter should be included in global and regional agreements, action plans, initiatives and negotiations and in national legislation. It is also an issue that is connected to other marine environmental, economic and health problems, including the possible distribution of toxic substances, the destruction of marine habitats and biodiversity, and the transfer of invasive species.

Measures to reduce or prevent marine litter are part of waste management in the society as a whole. People who are waste-wise in general, and who realize that waste is a common problem and not one that ‘someone else should take care of’, have a responsible attitude towards the handling of waste – the waste that could end up as marine litter. Good waste management must begin with preventing waste being generated – what is never produced does not have to be disposed of and cannot become marine litter. The second step is to collect waste that has nevertheless been generated and make sure it is being taken care of properly, either for reuse and recycling of materials and products (to as large an extent as possible) or for disposal in a manner that is as safe as possible from an environmental and health point of view.

Education, information and training are vital components in all efforts towards more waste-wise thinking in society as a whole. Education and training is needed for many sectors of society and the general public to raise the awareness of everyone’s responsibility to prevent marine pollution. Education on the sources and effects of marine litter and ways of reducing the problem at source needs to be incorporated into curricula at various levels in the educational sector.

A wide range of marine litter-related instruments already exist and actions are being taken at a global and regional level. Nationally, a number of countries have taken comprehensive action to address the marine litter issues through legislation, enforcement of international agreements, providing reception facilities for ship-generated wastes, improving their waste management practices and supporting extensive beach-clean up activities, as well as information, education and public awareness programmes. Thus, much is already being done – but obviously not enough.

### **B.7 Relevant Activities of UNEP**

UNEP and its Regional Seas Programme have been developing and implementing a number of activities on the management of marine litter.

Considering the magnitude and the severity of the marine litter problem, UNEP has initiated a ***“Feasibility Study on Sustainable Management of Marine Litter”***. After a series of consultations with IMO, IOC of UNESCO, FAO, Basel Convention UNEP/DTIE and the Mediterranean Action Plan it was recommended that UNEP should take a lead in developing global and regional activities, in co-operation with other agencies. The resulting document ***“Feasibility Study on Sustainable Management of Marine Litter”*** by UNEP/Regional Seas and the GPA, is in press. The document deals with the problem of marine litter, as well as the measures to prevent the problem and with an analysis of the situation and proposals for action. A leaflet on marine litter ***“Tightening the noose”*** was also published recently by UNEP.

The Regional Seas Programme of UNEP has been developing a series of regional actions on marine litter in the several Regional Seas Conventions and Action Plans. In the **North West Pacific region (NOWPAP)** the document ***“Development of an Activity***

on the Sustainable Management of Marine Litter in the NOWPAP Region” was prepared and presented to the 9<sup>th</sup> Intergovernmental Meeting of NOWPAP (Busan, Republic of Korea, 2-4 November 2004). The proposal was adopted by the Intergovernmental Meeting. The relevant activities are being developed and will be implemented in the NOWPAP Region in the near future. Other regional initiatives include the development of programmes of action for management of marine litter in **the Black Sea** (a development of a regional action plan); **the Caribbean** (through the assessment and management of marine pollution sub programme (AMEP) and within its Specially Protected Areas and Wildlife Protocol (SPAW), to develop a management plan with pilot projects in 4-5 countries); **the Mediterranean** (within its Programme for the Assessment and Control of Marine Pollution in the Mediterranean (MED POL) has conducted an assessment of marine litter in the Mediterranean basin and developed ‘*Guidelines on Management of Coastal Litter*’ and covers the issue of abandoned fishing gear within its Protocol Concerning Specially Protected Areas and Biological Diversity which includes the Action Plan for the Conservation of Mediterranean Marine Turtles and threats to marine biodiversity from marine litter, **the South Asian Seas** (SACEP) region and **the Baltic Sea (HELCOM)**).

UNEP/Regional Seas Programme has been developing activities relevant to the marine litter issue in consultation and, if appropriate, in co-operation with UN Agencies, like the International Maritime Organisation (IMO); Intergovernmental Oceanographic Commission (IOC) of UNESCO; the Secretariat of the Basel Convention; and the Food and Agriculture Organization of the United Nations (FAO). Internal consultations and plans for co-operation were held also with the GPA and the Division of Technology Industry and Economics (DTIE).

UNEP/RSP is considering proposing the development of a ‘*global initiative on marine litter management*’. While marine litter is found in all sea areas of the world, this proposed initiative would concentrate on pilot regions that are particularly affected. It would also provide a global platform for co-operation and co-ordination of activities for the control and management of marine litter. A first step in this direction is planned as a proposal for a GEF Medium Sized Project. This would establish the necessary regional foundations and regional/national capacities to address the problem of management of marine litter. The results of this project, through activities in pilot regions, will allow further development of a global initiative.

The global challenge of sustainable management of marine litter is a perfect illustration of a global and transboundary marine environmental problem, and for this reason it is anticipated that the United Nations system would be instrumental in tackling this challenge.

## **B.8 What could be done?**

UNEP's Regional Seas 'Feasibility Study on Sustainable Management of Marine Litter' is recommending some directions for dealing with the wider scope challenge of management of marine litter. *Inter alia*, the study recommends developing a Global Initiative or a Global Action Plan on Marine Litter Management that may include the following activities:

### **Initiation of the Global Activity on Marine Litter based on selected pilot regions**

- Review of relevant legal instruments and programmes in selected pilot regions in order to identify gaps and needs in the coverage of marine litter and make proposals for the revision, if appropriate, of existing legal and institutional instruments.
- Collection and review of existing information and data relevant to marine litter in each of the pilot regions.
- Organizing regional meetings on marine litter in order to assess the situation and to launch Regional Action Plans on Marine Litter in these regions.
- Development of regional and national strategies on integrated management of marine litter.

### **Building ownerships and partnerships**

- Approach to the civil society (private sector actors, environmental NGOs and the scientific community) to develop partnerships and, if appropriate, develop voluntary agreements with partners from civil society. This activity should involve all major stakeholders (e.g. the shipping industry, ship operators; tourism industry, manufacturers of plastics; waste managers/services; local authorities and municipalities; NGOs and general public).

### **Information and outreach**

- Formulation and implementation of awareness and education campaigns for the general public, industry, municipal authorities, local communities, shipping companies, ship officers and crews of recreational, commercial and fishing vessels, various groups within the tourism sector, and media.
- Development and implementation of long-term regional and national monitoring programmes in order to detect and determine amounts, distribution patterns, effects and trends of marine litter in pilot regions.
- Establishment of campaigns and /or permanent services for cleaning and collecting of solid wastes that pollute coastal and marine areas.
- Preparation of brochures in languages of pilot regions for the purpose of promoting public awareness on the reduction of marine litter.

### **Sectoral activities**

- Development of sectoral guidelines for management of marine litter (e.g. fisheries, tourism, boating, diving, shipping and specifically cruise lines, coastal construction).
- Improvement of port reception facilities and services for garbage collection from the shipping and the fishing industries.
- Development and improvement of waste management policies and systems.
- Development of 'responsible citizenship' guidelines for different target audiences, in particular children and tourists. Practical demonstration through awareness-raising campaigns in selected destinations and with selected tourism companies.

### **Fundraising**

- Identification and approach to potential funding sources (including Governments) for various components and activities on marine litter.
- For high-cost initiatives (port reception facilities, landfills, fisheries, etc.), approach the World Bank, Regional Investment Banks, Global Environment Facility (GEF) and other International Financing Institutions in order to obtain financial support of relevant regional and national efforts.

Lost and abandoned fishing gear is only one aspect (or component) of the global marine litter problem and needs to be separately addressed.

## **C. LOST AND ABANDONED FISHING GEAR AND RELATED DEBRIS**

Lost or abandoned fishing gear is a significant and very persistent form of marine litter. It poses a threat to the marine environment, as well as human life and activities. The United Nations Environment Programme (UNEP) Regional Seas Programme recognises the immediate and direct interconnection between marine litter and lost/abandoned fishing gear and related debris. It also puts significant emphasis on the development of solutions on the basis of international co-operation within the framework of a broader Marine Litter Initiative. UNEP considers the Food and Agricultural Organization of the United Nations (FAO) and its related Regional Fishery Bodies, with their long experience in the area of fisheries, as a significant element of this cooperative process on the issue.

### **C.1 The Problem**

During the 1950s, most of the world's fishing industries largely replaced nets and gear made of natural fibres such as cotton, jute and hemp with those made of synthetic materials, such as nylon, polyethylene and polypropylene. The problem with this is that unlike natural fibre gear that degrades over time, synthetic fishing gear is functionally resistant to degradation in the water. Hence, once discarded or lost, this gear remains in the marine environment, with negative economic and environmental impacts.

Fishing gear can become “**lost**” due to marker buoys cut by passing vessels or by trawl or seine warps breaking during the fishing process. In some cases, fishing vessels must cut gear adrift for safety reasons in very bad weather conditions. (Given that the loss of fishing gear under these circumstances represents a financial loss to the operator, it is more than likely that an attempt will be made to recover it). “**Abandoned**” fishing gear on the other hand, implies that the gear has no financial value to the fisher and that leaving it in the sea is a convenient means of disposal for the careless and irresponsible fisher. Lost/abandoned fishing gear is lately becoming increasingly a world wide evident nuisance. UNEP’s ‘Feasibility Study on Sustainable Management of Marine Litter’ reports that in 2002, the National Oceanic and Atmospheric Administration (NOAA) collected 107 tonnes of nets and lines and other fishing gear on the Pearl and Hermes Atoll (northern Hawaiian Islands) alone. In 2003, another 90 tonnes were found near the Pearl and Hermes, and Midway Islands.

Other statistics or estimates on quantities are hard to find, but it is assumed that hundreds of thousands tonnes of undegradable fishing nets are abandoned or lost in the world oceans every year.

## **C.2 Effects**

When a fishing net is abandoned it may break into smaller parts or stay as a very long single piece, often with a complex structure. When breaking apart (by passing vessels, waves, storms and high winds) it may be broken into its lighter plastic and Styrofoam parts (still connected to net fractions) which will continue to float, and eventually end up on beaches and litter them. Some parts of the nets and ropes may be in suspension in the water column and hence will continue to act as ghost nets (they continue to trap passing fish ‘unintentionally’) often ending up being snagged in coral reefs, tearing the corals apart and kill thousands of reef fish. Floating parts and suspending parts of abandoned fishing gear entangle wildlife such as marine mammals, sea turtles, sea birds and fish, and causing great aesthetical nuisance. The heavier parts, the leaden sinking devices of the fishing gear, sometimes still connected to large parts of the original net, may sink to the bottom and cause damage to trapped benthic life. Lost/abandoned fishing gear gives rise to a range of adverse ecological impacts. Other than the physical entanglement and death of fish and wildlife, effects include indigestion, smothering, disturbance and removal of habitat on the bottom and in the water column.

A wide diversity of marine animals becomes entangled in plastic debris and lost/abandoned fishing gear, including fish (Stewart and Yochem, 1987), turtles (Carr, 1987), seabirds (Schrey and Vauk, 1987; Piatt and Nettleship, 1987), whales (Volgenau et al., 1995) and seals (Hofmeyr et al., 2002). Debris that entangles a living creature can hamper its mobility, prevent it from eating, or suffocate it. Fishing gear can inflict lethal cuts and wounds. When wrapped around limbs, and fins it can cause circulation loss and amputation, especially as the animal grows. Monofilament line, fishing nets and ropes, six-pack rings, and packing strapping bands are some of the more harmful culprits related to entanglements. It is estimated that some 100,000 marine mammals

die every year from entanglement or ingestion of fishing gear and related marine debris. According to the U.S. Marine Mammal Commission, 136 marine species have been reported in entanglement incidents in the wider US area, including six species of sea turtles, 51 species of seabirds, and 32 species of marine mammals (Marine Mammal Commission, 1996). Based on recent entanglement studies, estimates suggest that 1,478 seals die from entanglement each year in Australia (Page et al, 2003).

Of the different types of marine mammals, seals and sea lions are the most affected (particularly by entanglement) because of their natural curiosity and tendency to investigate unusual objects in the environment. Packing straps and net fragments are a major problem for these animals. Some studies have linked the decline of the northern fur seal of Alaska and the endangered Hawaiian monk seal to entanglement in debris. Whales, including the endangered humpback whale, right whale, and gray whale, have been found entangled in fishing nets and line. Manatees, another endangered species, have become entangled in crab-pot lines, and dolphins and porpoises have been caught in fishing nets. Right whales are at risk from entanglement in fishing gear and collisions with ships (ENN, 1999). They are especially vulnerable because they move slowly and spend extended periods of time at or near the surface. In the summer of 2001, the attempted rescue of a right whale entangled in fishing gear off the coast of Massachusetts became a top news story. This right whale, fondly referred to as Churchill, was suffering from a severe infection caused by a synthetic line embedded in his upper jaw. The rescue effort entailed tracking Churchill for 100 days by beacon satellite, injecting him with drugs, and strapping a harness to his tail to keep him from thrashing, while attempting to remove the entangled fishing gear. The mission eventually failed and Churchill became the sixth right whale to die in 2001 and the second in the area that year as a result of entanglement (Dooley, 2001).

Nearly a million seabirds are thought to die from entanglement or ingestion of floatable material each year. Because most seabirds feed on fish, they are often attracted to fish that have been caught or entangled in nets and fishing lines. Seabirds are some of the most frequent victims of abandoned nets. As many as 100 birds have been found in a single abandoned net. Many birds, including ducks, geese, cormorants and gulls, have been found entangled in six-pack rings and other encircling debris. The ingestion of plastic resin pellets (the small, round pellets that are melted and used to form plastic products) is a major concern. Many types of birds have been found to feed on these pellets, most likely because they mistake them for fish eggs or other types of food (USEPA, 1992b).

In addition, lost or abandoned gear can continue trapping fish for a long period out of the fisher's control. Such an uncontrolled, unproductive process is known as "ghost fishing". The extent and time it continues depends on the type of fishing gear. Quantifying the loss of marine resources due to "ghost fishing" is difficult, but several studies on static gears have shown it to be about 10% of the target population. Fish and crustaceans such as lobsters and crabs are frequently caught in lost or discarded fishing gear. For example, a ½-mile section of nylon net was found in Lake Superior. It had been abandoned for an estimated 15 years and contained 100 pounds of fish, much of

which was decomposing. Lost traps also continue to attract fish and crustaceans, which enter them in search of food or shelter. In New England alone, nearly 500,000 lobster pots are lost every year (USEPA, 1992b). Ghost nets, it has been said, are perpetual “killing machines” that never stop fishing (Esteban, 2002). Worldwide, this phenomenon is having an impact on the sustainability of already stressed fisheries. The biological impacts of marine debris on coral reefs may be considerable, resulting in long-term impacts to the biota and unknown degrees of recovery. Ghost fishing kills thousands of fish that might otherwise have found their way to the market. An estimated US\$ 250 million in marketable lobster is lost each year from ghost fishing.

Furthermore, derelict fishing gear in the form of nets and ropes, invisibly floating just below the water’s surface, can cause significant risks to vessel operations. Nets, ropes and other derelict gear, it has been documented, have entangled vessel propellers and rudders resulting in costly repairs, significant loss of operational time, and endangering boater and crew safety.

Moreover, lost/abandoned fishing gear has the capacity to travel for very long distances and through different habitats, transporting with them invasive species from one sea area to another. This poses a significant threat to marine environments. UNEP’s Regional Seas Programme is working with the Global Invasive Species Programme (GISP) on developing a training toolkit on marine Invasive Alien Species (IAS), which will initially be implemented in several regions during the end of 2005. Alien species have been identified as one of the most significant threats to aquatic biodiversity. This training toolkit includes a section on abandoned fishing nets, which provide a significant drift mechanism for IAS in the Pacific Ocean. Fishing nets drift ashore after being abandoned in or lost in the Pacific Ocean, and are covered with many marine invasives, introducing these species to areas/locations where they do not occur naturally. This means that the problem of lost/abandoned fishing gear is of a transboundary nature, affecting the marine environment as whole, rather than individually restricted regions.

### **C.3 Addressing the problem of Lost or Abandoned Fishing Gear**

Within the broader scope of marine litter, the problem of lost and abandoned fishing gear requires more specific and sectoral solutions. Possible remedies to the problem may include the following directions:

**Quantification and understanding of the problem** – successful management of any pollution problem requires a comprehensive understanding of the nature and root cause of the problem.

Initial actions should be taken by national administrations (assisted by Regional Fishery Bodies) to quantify the problem. The first point to examine is to estimate the amount of gear being purchased by fishers within a country, the number of fishers, the number of vessels, and estimate the loss versus the collection of used and expired fishing gear.

Also, a thorough understanding should be obtained of the root cause of abandoning gear by individual fishers versus disposing of it properly ashore and the reasons for losing still functioning gear. It is only then that a national administration could consider the magnitude of the problem and plan practical preventive and response measures.

**Recovery** – knowing the exact location of lost gear greatly enhances chances of recovery. Close to shore this can be achieved by using landmarks: artisan fishers are skilled in this method. Further offshore, defining the exact position of the fishing gear could be a problem, though the recent emergence of inexpensive GPS tracking systems means that in most cases the position can be known and recorded. Fishing gear, particularly drift nets, should be marked to make it possible to find them again if they are lost at sea.

Often, due to the fact that the lost gear is already used or old, the fisher deliberately decides to abandon the gear when facing the complexity and cost of the relocation and recovery operations. National administrations should consider providing assistance to fishers to recover their lost gear from the water.

**Reception and Collection** – fishing ports administrations should ensure that convenient and ‘friendly’ reception facilities are available for the disposal of disused fishing gear and other wastes from vessels. Small-scale fishing communities should also be encouraged to recycle nylon and synthetic nets, using the proceeds for the benefit of the community.

**Prevention through Education, Regulation and Compensation** – no fishing gear should ever be deliberately discarded in the sea. All disused fishing gear should be taken ashore for proper disposal. This message and rule has to spread throughout the global, regional and national fishing sectors, all the way to the small, professional and artisanal fisher, even in the remotest places. This is a vast task, which FAO the RFBs and other organizations should consider as a major challenge. Laws, regulations, enforcement and compliance are only one aspect of introducing these sustainable fishing practices. The other is public awareness and education – provided to the whole range of the fishing community. Compensation or subsidies schemes or regulations regarding the return of old or damaged gear and the purchase of new fishing gear could be developed.

**Review of fishing gear materials and developing of new technologies** – the materials that the gear is made of should be reconsidered. The development and gradual introduction of high-quality degradable materials should be encouraged. The development of more responsible and more environmentally friendly new fishing techniques and technologies should also be supported..

Finally, FAO, the Regional Fishery Bodies, the scientific community and the fishing industry (including the industry which manufactures fishing gear) should join forces to find urgent solutions to this problem with its transboundary and harmful effects and to help reduce the negative impact of abandoned fishing gear.

#### **C.4 The Regional Seas Programme and Lost/Abandoned Fishing Gear**

Although several initiatives are being undertaken worldwide, mostly at the national level, to prevent, reduce and/or remove derelict fishing gear, regional and international co-operation are of vital significance for the development of a common jurisdiction for the prevention, as well as the eradication of the problem, because of its transboundary nature. Putting prominent emphasis on the effort to address the issue of lost or abandoned fishing gear within the wider context of marine litter, UNEP's Regional Seas Programme can act as a platform for developing common regional objectives, promoting synergies and coordinated regional implementation. This already takes place through the relevant Multilateral Environmental Agreements (MEAs), global and regional initiatives and United Nations Agencies, such as FAO, IMO, and IOC of UNESCO, as well as other international actors, especially the Regional Fishery Bodies. Marine litter in the broader framework is becoming a priority issue for UNEP and especially for the Regional Seas Programme and the GPA.

The "Feasibility Study on Sustainable Management of Marine Litter" is a major attempt, which the Regional Seas Programme has made to assess the need for, as well as the benefits of, a global programme or initiative for the reduction and management of marine litter globally and to assess the benefits of implementing such projects in particular regions. Furthermore, in the framework of the development of a Global Marine Litter Initiative, RSP is preparing a GEF MSP (Medium Sized Project) on Marine Litter. The initiative would provide a global platform for co-operation and coordination of activities for the control and management of marine litter and derelict fishing gear as part of the project.

Most importantly however, the Regional Seas Programme places great emphasis on co-operation with partners for the achievement of successful outcomes to the problem of lost/abandoned fishing gear. For example, abandoning fishing gear as a convenient means of disposal by careless and irresponsible fishers breaches the International Convention for the Prevention of Pollution from Ships (MARPOL). It should be highlighted that MARPOL 73/78, including Annex V, is fully applicable to fishing vessels. The International Maritime Organization (IMO) has also set standards relating to the organization of marine traffic, protection of the marine environment and the prevention of damage to or loss of fishing gear. IMO is also concerned by the damage that abandoned fishing gear is causing to the safety of vessels and navigation. Furthermore, IMO is concerned that States should "cooperate to develop and apply technologies, materials and operational methods that minimize the loss of fishing gear and the ghost fishing effects of lost or abandoned fishing gear".

The UN Food and Agriculture Organization (FAO) and its related Regional Fishery Bodies are extremely important partners of UNEP/RSP on the issue of abandoned fishing gear. FAO's programme on fisheries is aimed at promoting sustainable development of responsible fisheries and contributing to food security. The FAO

adopted a “Code of Conduct for Responsible Fisheries” in 1995. Under the Code, management objectives include taking appropriate measures to provide *inter alia* that “pollution, waste, discards, catch by lost or abandoned fishing gear, catch of non-target species, both fish and non-fish species and impacts on associated or dependent species are minimized, through measures including, to the extent practicable the development and use of selective, environmentally safe and cost-effective fishing gear and techniques”. Implementation of the Code of Conduct is a high priority issue for FAO, globally and regionally. In this process, the requirements to minimize loss of fishing gear, the responsibility to recover lost gear, and to deliver damaged gear to port for destruction, should be continuously emphasized. It would be particularly appropriate to raise these issues at relevant meetings of the FAO and the Regional Fishery Bodies and in fisheries development projects implemented by FAO and its subsidiary bodies.

The Regional Seas Programme lays significant emphasis on international co-operation and particularly values FAO’s years of experience in the area of fisheries. Hence, it gives prominence to cooperating with FAO and its related Regional Fishery Bodies by correctly placing the issue of abandoned/lost fishing gear within the more general framework of marine litter in order to actively confine, prevent and diminish this problem. Marine litter (discarded fishing gear, *etc.*) could be one issue for strengthened co-operation between the FAO Regional Fisheries Bodies and the UNEP Regional Seas Programme in various parts of the world.

**The following are concrete suggestions for strengthening co-operation between Regional Fishery Bodies and Regional Seas Programmes (and between UNEP and FAO), which in turn, would assist in better management of abandoned fishing gear:**

1. Agree on strengthening co-operation between FAO and UNEP, at both HQ and regional levels: Regional Fishery Bodies and their respective Regional Seas Programmes.
2. Such co-operation should be of mutual benefit for all partners. Partners should identify objectives and desired outcomes of these partnerships. An ‘Umbrella Memorandum of Understanding’ could be developed between FAO and UNEP, serving as a basis for further regional MoUs between RFBs and RSPs.
3. Formalize the observer status of the RSPs (Regional Seas Conventions and Action Plans) at the meetings of the governing bodies of the RFBs and their technical subsidiary organs, and vice versa.
4. Establish joint’ institutional committees’ on equal footing.
5. Exchange data and information available at the level of RFBs and RSPs that may be of mutual interest.

6. Establish joint advisory/scientific/technical panels and organize joint technical meetings on subjects of mutual interest, as presently takes place between Helsinki and OSPAR Commissions and ICES.
7. Seek agreement, association and co-operation with the regional components of global programmes (such as GPA, UNESCO/IOC, IMO, FAO, GEF projects) on mutual provision of data and information relevant to the implementation of an Ecosystem Approach to Fisheries and the FAO Code of Conduct for Responsible Fisheries. Start by agreeing on what data, at what scale in time and space, needs to be brought together.
8. Design and implement joint programmes, activities, capacity building, education and public and sectoral outreach between RFBs and RSPs, focusing, among other topics on abandoned fishing gear, taking fully into account the respective mandates, objectives and scope of the RSPs and RFBs.

#### **D. REGIONAL REPORTS ON MARINE LITTER AND LOST AND ABANDONED FISHING GEAR**

The following are reports received from individual Regional Seas Conventions and Action Plans on their respective activities vis-à-vis the problems of marine litter and abandoned fishing gear.

##### **D.1. The Mediterranean Action Plan (MAP)**

###### **Assessment of marine litter in the Mediterranean**

Pollution caused by discharge of solid wastes and litter into the sea is a significant cause of degradation of both the land and marine coastal fringe in the Mediterranean.

The MED POL Programme, the marine pollution assessment and control component of the Mediterranean Action Plan/Barcelona Convention, has recently prepared an assessment of the situation related to coastal litter in the Mediterranean. The study shows that the major source of litter into the marine environment is from coastal urban centres due to the lack and/or inadequate and/or failure of coastal solid waste management. Coastal urban centres are generating annually 30 to 40 million tonnes of municipal solid waste. The generation of solid waste is estimated to be: 254 kg/cap/y with an annual generation growth of 2-3%. The main source is direct disposal by households (Figure 1), followed by the impact of tourist facilities and run-off from waste dumps (waste from land sources). This means that, in fact, the majority of marine waste comes from coastal areas. The sources of marine waste vary from one country to another (Figure 2).

**The main findings of the MED POL assessment of coastal litter in the Mediterranean are:**

1. Solid waste management in the coastal strips is generally not covered by the national environment policy.
2. Solid waste management policies in coastal strips are implemented under the national health policy.
3. Most coastal urban centres do not have a municipal policy for solid waste management.
4. The municipalities' strategy regarding solid wastes is to satisfy the public hygienic standards.
5. Municipalities are lacking qualified solid waste managers. The issue is much more evident in medium and small urban centres.
6. Environment authorities lack reliable information on solid waste management issues. There are large gaps in the regional information system for solid waste management.
7. Decision makers are bombarded by contradictory information provided for purely commercial reasons. The two major sources of solid waste in the marine environment are:
  - a. - Urban centres (up to 75%)
  - b. - Commercial and tourist activities
9. For economic and technical consideration, it seems that the sea is still considered as the most common disposal site. Sea disposal of solid wastes is still a common practice for medium and small urban centres.
11. Solid wastes reach the sea through wash out process from poorly sited/rehabilitated landfills.

**Guidelines on management of coastal litter for the Mediterranean**

In order to assist Mediterranean countries in better management of coastal litter, the MED POL Programme has recently prepared a set of Guidelines with its objective to assist the governments of the Mediterranean region to improve their knowledge on the common problems they have to face and develop appropriate coastal litter management, both in the sea and in the coastal areas. The Guidelines attach special importance to the development of appropriate legal, institutional, and financial frameworks at both national and local levels, and to capacity building to ensure the sustainability of waste management mechanisms. Support should also be given to initiatives that will encourage participation of the private sector, in accordance with each country's priorities.

The MED POL Guidelines for waste management contain some concrete elements for the appropriate management of marine litter. They refer in particular to the identification of marine litter and its classification, anthropological and natural factors which contribute to its presence, classification of marine litter, recognition of the organizational, legal and institutional systems concerning marine litter, the technical and logistical organization of waste management and public participation including proposals on the economic and financial means and mechanisms that could be applied.

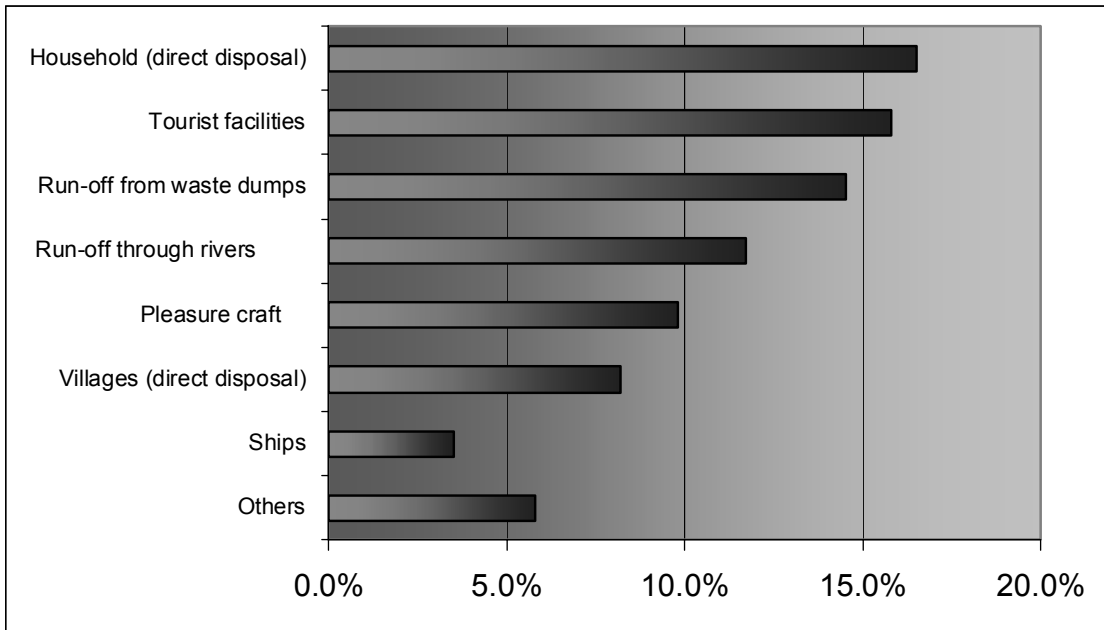


Figure 1: Sources of waste (Source: UNEP MAP 2001)

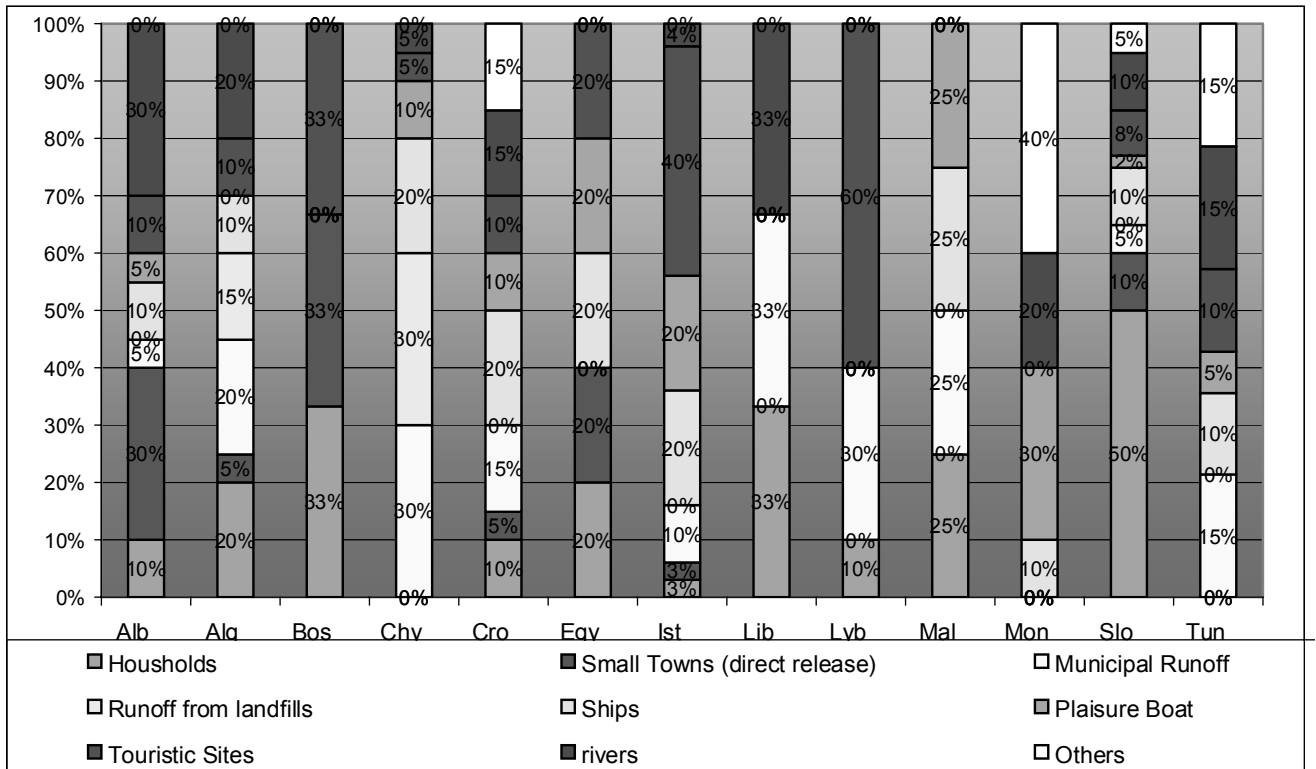


Figure 2. Sources of marine solid waste in selected Mediterranean countries (Source: UNEP MAP 2001)

### **The Mediterranean coastal litter pilot project**

On the basis of the assessment and the Guidelines prepared, the MED POL Programme developed a Pilot Project for coastal litter management in a number of locations in Lebanon. The outputs and deliveries of this project will be used to replicate it elsewhere in Lebanon and in other Mediterranean cities.

The objectives of the project are as follows:

1. To test and apply the MED POL Guidelines for the Management of Coastal Litter;
2. To ensure the public participation of different stakeholders; To produce a code of practice; To produce information kits to be distributed to communities, schools, universities and others concerned partners throughout the country and later in other Mediterranean countries.

The activities of the pilot project, jointly implemented by MED POL, local authorities, local NGOs and RA.MO.GE will be:

1. Improvement of the institutional arrangements for coastal solid waste management of the municipality of Al Mina. MED POL will carry out this task in coordination with the mayor, the municipality committee and NGOs.
2. Improvement of co-ordination between stakeholders. MED POL will assist the national and local authorities in better co-ordinating activities regarding the management of coastal solid waste. In particular, in the framework of the project, a coordination committee, including all stakeholders, will be set up to review the processes of collection, transfer and disposal of coastal solid waste in each sector, to propose measures of legal, institutional and technical natures to be adopted and to propose instruments to be considered to ensure the sustainability of measures.
3. Technological advice concerning the different elements of the management of solid waste in coastal areas. Throughout the project, technological advice will be provided by local and regional experts to develop and improve the following:
  - Collection, transfer and disposal of coastal solid waste generated by municipalities, villages, ports, marines, pleasure boats, fishermen and others;
  - Management of illegal coastal dumping sites;
  - Management of legal dumping sites.
4. Identification of the distribution and the possible sources of solid wastes in the marine environment close to Palm islands. This task will be carried out by RA.MO.GE. through the use of a specialized GIS system in co-operation with university students (on a voluntary basis).

5. Public Participation and awareness. An assistant to coordinate the activities will be provided for the duration of the project by RA.MO.GE. on the basis of its specific experience in the RAMOGE area (France, Monaco, Italy).

#### Community-wide Pilot Project

NGOs will promote awareness and implement initiatives addressing marine debris and their impact on marine ecosystems. Communities, universities, schools and other stakeholders could carry out a range of sub- projects in the framework of the Pilot Project including shoreline cleanups, campaign to conserve aquatic habitats, etc.

### **D.2. The North West Pacific (NOWPAP)**

#### **Marine Litter issue in the Northwest Pacific Action Plan (NOWPAP) region**

Marine litter has become an issue of concern in the Northwest Pacific region because it is linked to other marine environmental, economic, health and aesthetic problems, including possible transfer of toxic substances and invasive species, destruction of marine habits and loss of biodiversity. The NOWPAP members adopted a resolution at the Ninth Intergovernmental Meeting (Busan, Republic of Korea, 2-4 November 2004) to develop a joint initiative to prevent and reduce marine litter in the marine and coastal environment and its harmful and costly effects. In the NOWPAP region, therefore, marine litter activity is presently at the development stage, with the aim of initiating work in 2005.

The overall objective of the currently scheduled project is to seek sustainable management of marine litter in the NOWPAP region in line with the sources, quantities and adverse effects of marine litter (this information will be collected during the implementation stage in the 2005-2007 biennium). However, the outstanding previous work done by other Regional Seas Programmes of UNEP shows that measures to prevent and reduce marine litter need to be part of waste management practices as a whole. It has, on the other hand, been widely recognized that waste-wise management should begin not only by preventing marine waste from being generated but also by collecting waste that has already been generated and making sure it is being treated properly, either for reuse and recycling purposes or for disposal in a manner that is as safe as possible, in accordance with the exiting Conventions and Agreements such as the MARPOL 73/78, the London Convention, the Basel Convention and so on. Marine litter activity within the NOWPAP framework relies on practical approaches that can be taken as easily as possible. Education, awareness-raising activities, cleanup operations and campaigns will also be included, because these are essential components in all efforts towards the sustainable management of marine litter.

NOWPAP activities are being implemented through its Regional Activity Centres (RACs), and four RACs are currently in operation. One of them is MERRAC (Marine Environment Emergency Preparedness and Response Regional Activity Centre) based in Daejeon, Korea. The hosting institute of MERRAC is KRISO/KORDI (Korea Research Institute of Ships and Ocean Engineering/Korean Ocean Research and

Development Institute), which has carried out a variety of marine litter-related research since the late 1990s. Valuable data has been gathered on types, quantities and distributions of marine litter in ports including important fishing grounds in the Republic of Korea. Also, several kinds of technical equipment and facilities have already been developed or are at a stage of the pilot study, such as trash booms to prevent river-born floating waste, multi-functional marine debris recovery systems in shallow water, vertical deep-sea cameras to survey seabed waste to depths of 1000m; pre-treatment and RDF (Refuse Derived Fuel) production facilities to reuse marine litter, and an incineration facility. These wide-ranged experiences and advanced technologies will be of great use in NOWPAP marine litter activities.

In Japan, the Toyama Prefectural Government and Northwest Pacific Region Environmental Co-operation Centre (NPEC), the hosting organization of CEARAC (Special Monitoring and coastal Environmental Assessment Regional Activity Centre), have initiated an international survey on washed-up drift material along the coasts in NOWPAP region since 1996. It aims at understanding the actual status of buried materials and washed up driftage on the coasts in the NOWPAP region and raising awareness of the necessity of marine environmental preservation at the same time. In 2003, 24 local governments in four countries conducted the survey and the number of participants reached 1,500 persons. The Japanese Government also has a deep concern for marine litter including the transboundary marine litter issue. The Ministry of the Environment plans to implement a 3-year project (starting in FY2005) for developing regional measures to reduce marine and coastal litter. This project includes a research on the current status of marine and coastal litter; a study of prediction methods for marine and coastal litter; organization of international workshops and so on. It is expected that through this project, a consensus regarding marine and coastal litter will be formed among NOWPAP country members. Therefore, we hope that NOWPAP would be one of good examples of the sustainable management of marine litter in the near future.

### **D3. The Caribbean Environment Programme**

#### **National, sub-regional or regional projects and programmes for the management of marine litter**

Currently, UNEP CAR/RCU within its Caribbean Environment Programme (CEP) does not have any specific national or regional projects that deal exclusively with marine litter. However, activities under the Assessment and Management of Environment Pollution sub-programme (AMEP – including the Land Based Sources of Marine Pollution Protocol) and those that promote the implementation of the Specially Protected Areas and Wildlife Protocol (SPAW) are directly related to Marine Litter. These include assessments of marine litter as a land based pollutant and its impact on critical coastal and marine ecosystems.

In this context, the following ongoing and new initiatives are highlighted:

- Promotion of the integrated management of solid and hazardous wastes, and an integrated life-cycle approach to the management of chemicals in the Wider Caribbean. This is a joint initiative with the Basel Convention Secretariat expected to commence in 2005 with the main objective of developing a regional strategy on best management practices to control run-off and leachate from sanitary landfills and recycling operations that may impact coastal areas or marine watersheds.
- Regional Network in Marine Science and Technology for the Caribbean: The Know-why Network. This is a joint initiative with the LBS Regional Activity Centres and Regional Activity Network expected to commence in 2005 to strengthen the capacity of the countries of the Wider Caribbean Countries to implement the LBS Protocol and to provide a baseline of information of all point and non-point sources of pollution into the Convention area.
- Second regional overview of land-based sources and activities in the Wider Caribbean Region.
- Development of National Programmes of Action (NPAs) Demonstration Projects. This ongoing initiative is to build capacity in CEP countries for the development of NPAs to assist in the protection of the Caribbean marine environment from pollution from land-based sources and activities.
- International Coral Reef Action Network (ICRAN) in the WCR. This is an ongoing collaborative effort with several international agencies aimed at reversing the decline in coral reef health and conducting assessment and monitoring activities to enable efficient management of coral reefs.
- Conservation and Sustainable Use of Coastal and Marine Ecosystems. This is an ongoing collaborative effort with several international agencies aimed at assisting in the management of coastal and marine ecosystems of the region. One of the key components of this project will be capacity building in socio-economic monitoring. Most of the countries of the Wider Caribbean do not have any national, regional or international initiatives focusing on the problem of marine litter with the exception of the United States which has a broad range of activities at the Federal; State; local and community levels; non-governmental and private sector.

### **Main marine litter management activities taking place in the Caribbean**

Marine litter activities in many of the countries of the Wider Caribbean and in particular for the SIDS are limited to periodic beach-clean up and community clean up exercises which are coordinated by local non-governmental organizations, schools, private sector organizations, dive associations, tourism authorities, hotels, solid waste management agencies, community groups, environmental departments, coastal zone agencies and/or departments of fisheries. These are often associated with commemorative events such as National Clean up day, Earth Day, and/or National Environment Day. Most of the countries commemorate and participate in activities as part of International Coastal Clean up (ICC) day. 18 Caribbean countries and 10,472 persons took part in the 2003 ICC.

Routine monitoring in the majority of countries is lacking and the emphasis in many of those countries is towards improving the management of municipal solid waste. However, some countries including Bahamas, Jamaica and Aruba have incorporated beach litter management as part of the Blue Flag Certification Programme.

The United States does have a number of marine litter and debris activities. For example, both NOAA and the EPA work in close collaboration with State and local governments and non-governmental organizations (NGO), to sponsor and participate in national and local beach clean-ups. Some examples of such activities include: (a) In 2004, NOAA implemented a project in Puerto Rico to reduce marine debris caused by discarded fishing lines; (b) The International Coastal Cleanup (ICC) is the largest volunteer environmental data-gathering effort and associated cleanup of coastal and underwater areas in the world. It takes place every year on the third Saturday in September. In 2001, over 140,000 people across the US participated in the ICC. They removed about 3.6 million pounds (1,600 tonnes) of debris from more than 7,700 miles (12,320 km) of coasts, shorelines, and underwater sites; (c) the National Marine Debris Monitoring Program (NMDMP) is designed to gather scientifically valid marine debris data following a rigorous statistical protocol. This scientific research is carried out every 28 days by teams of volunteers at randomly selected study sites along the US coastline.

#### **Evidence of the negative impact of marine debris including lost and abandoned fishing gear on marine and coastal ecosystems**

Generally, specific information on this area is lacking for the region in general although many studies have been carried out in the United States by the EPA, Ocean Conservancy and NOAA. These studies have documented the effects of marine debris/abandoned fishing gear on marine ecosystems and species such as coral reefs, seals, turtles, etc. Costs of beach clean ups vary widely from country to country and in many cases are not assessed. The major damage reported by countries is from the deterioration of visual aesthetics. Economic losses associated with discarded fishing gear have not been assessed.

#### **Priority thematic areas and activities relating to marine debris in the Wider Caribbean Region**

The following are proposed thematic areas and activities for further implementation in the Wider Caribbean:

- Outreach and Education (in particular for the fishing, maritime and tourism sectors)
- Monitoring/Data Collection and Research
- Economic Impact Analysis
- Engaging all stakeholders
- Policy, Institutional and Legal frameworks (e.g. improving port reception facilities; and developing comprehensive strategy for discarded fishing gear)
- Developing Sustainable Financing Mechanisms.

#### **D.4 The South Pacific (SPREP)**

Waste management is one of the major environmental issues within the Pacific region. Marine debris comes from both land- and ship-based sources. Land-based sources of marine litter need to be considered as part of overall waste management activities. All countries have activities in this field, including improving infrastructure, strengthening regulatory mechanisms, management procedures, raising awareness and education. These are undertaken as part of bilateral programmes or as internally funded national activities by national and local governments, the private sector and also NGOs.

At the regional level the region has designated 2005 as the Regional Year of Waste. A number of regional programmes are being undertaken that address waste management, including drafting of a regional waste management strategy and work programme, plus community-based waste management projects as part of the International Waters Programme.

There are two main areas where marine litter congregates in the Pacific. These are around the inter-tropical convergence zone around the equator where currents accumulate debris and these form-accumulated rafts of material, and around the North Hawaiian Islands where currents deposit a lot of the debris in the North Pacific.

Ship-based marine debris from commercial shipping has been addressed by assisting countries to put in place arrangements to manage ships' waste. A review of the ships waste management situation has been undertaken. Regional arrangements to meet MARPOL requirements for ships' waste management obligations have been approved by a SPREP Meeting and also the IMO. This is the first instance of a region putting in place regional arrangements to meet MARPOL obligations. The Association of Pacific Ports has formed an environment-working group to work with SPREP to assist ports to improve their waste management capabilities and procedures.

The fishing industry is a major contributor to marine debris. SPREP and Secretariat of the Pacific Community (SPC) have collaborated in putting together and distributing awareness-raising materials. A training programme on Marine Environment Protection was formulated and is used by the national Maritime Training and Fisheries Institutes in the region. One of the modules is on ships waste management and marine debris. Reporting of pollution incidents both from oil and illegal dumping of waste has been included as part of the regional and national fisheries observer programme. Model legislation has been drafted to enable regulation of pollution incidents. Two NGO initiatives involve coastal cleanup activities in different countries in the region these are the US based Oceans Conservancy and the Australian-based Clean Up the World organization.

## **D. 5 The Kuwait Convention region – ROPME**

### **Marine litter management, and the cross impact of abandoned fishing gear and related marine debris, on the marine and coastal ecosystems of ROPME Sea Area.**

In the ROPME Sea Area (RSA) (The Regional Organization for the Protection of the Marine Environment, the Kuwait Convention region) litter is an increasing problem, generated from land, shore and ship based activities. The waste from ship-based activities alone is estimated as 1.2-2.6 kg/person/day, most thrown overboard (Anbar, 1996). The coastline of RSA is also being used as repositories for large quantities of industrial, commercial and residential trash and other solid waste. In the RSA, litter is found in the form of plastics, metal containers, wood, abandoned fishing gears, broken fishing nets, tires and even entire automobiles in certain places. In the waste, oil sludge constitutes the most important type of solid waste in terms of quantity (Linden *et al.*, 1990). Anthropogenic activities and accumulation of solid wastes (e.g. discarded fishing nets, traps, anchors, debris and tyres) can be a threat to the marine habitats, creating anoxic conditions for benthic fauna and having a negative impact throughout the marine ecosystem.

‘Ghost fishing’ by lost/abandoned fishing gear has been found in ROPME Region. Lost fishing nets and traps, as has been pointed out, can ‘ghost fish’ for a long period. The negative impacts of abandoned fishing nets, especially gillnets on coral reefs, are tremendous and have been recorded in the Region (SOMER, 2003). Abandoned fish traps were also noted to have continued fishing. For example, a giant grouper (about 125 cm long and weighing 50 kg) was rescued from an abandoned fish trap lost several months earlier in Muscat waters (Mee, 1991).

Discarded and abandoned fishing nets are catching and killing marine turtles. In the sea, the nets drown turtles. On nesting beaches they entangle young ones (Ross, 1987). No national/regional regular scientific data is available on lost/discarded fishing gear. Nor is there any estimate of the loss to the economy due to ‘ghost fishing’.

As a part of litter management, ROPME Member States are involved in beach cleaning activities. For example, the Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR) of Oman has established a ‘Beach and Reef Clean-up Project’ which has conducted clean-up operations on coral reefs and beaches in the Damaniyat Islands Natural Reserve and at Ras Al-Hadd (Gulf of Oman) during 2001-2002. Clean-up efforts were also carried out at Sidab, Bandar Jissah and Bandar Khayran in the Muscat area as well as a beach clean-up on nesting grounds for marine turtles at Ras Al-Hadd.

MRMEWR of Oman has frequently been involved in beach and underwater clean-up operations organized by diving clubs (Blu Zone, Diveco, and Oman Dive Centre). In 1999, MRMEWR was awarded an appreciation certificate from Project AWARE (Aquatic World Awareness, Responsibility and Education) from International PADI

Inc., through Blu Zone Water Sports, for its contribution to the aquatic environment and in recognition of efforts by the Ministry teams (MRMEWR-Oman, 2003).

## **References**

Anbar, H. (1996). Litter in the Gulf. Marine Pollution Control, 32, 455-456.

Carr, A. (1987). Impact of non-degradable marine debris on the ecology and survival outlook of sea turtles. Marine Pollution Bulletin 18, 352-356.

ENN (1999). Report: Northern right whale on path to extinction.

Esteban, M. (2002). Tracking down ghost nets, available:  
[http://www.nwstraits.org/Documents/KOMO4\\_Net.pdf](http://www.nwstraits.org/Documents/KOMO4_Net.pdf).

Homfeyr, G.J.G., Bester, M.N., De Maine, M., Kirkman, S.P., Pistorius, P.A. & Makhado, A.B. (2002). Entanglement of pinnipeds at Maron Island, Australian Mammalogy. 24: 141–146.

Linden, O. *et al*, (1990). State of the marine environment in the ROPME Sea Area. UNEP Regional Seas Reports and Studies No. 112 Rev. 1.

Marine Mammal Commission. (1996). “Effects of Pollution on Marine Mammals” Bethesda, Maryland. Marine Mammal Commission Annual Report to Congress.

Mee, J. (1991). Oman’s Living Sea-an illustrated collection of articles from the ‘Our Living Sea’ newspaper column. Sponsored by the Omani-American Joint Commission for Economic and Technical Co-operation.

MRMEWE-Oman. (2003). State of the Marine Environment-2003. Marine Pollution and Coastal Zone Management Section/Ministry of Regional Municipalities, Environment and Water Resources (MRMEWR). Muscat, Sultanate of Oman, 96pp.

Page, B. *et al*. (2003). A summary of Australian sea lion and New Zealand fur seal entanglements in marine debris pre- and post-implementation of Australian Government fishery bycatch policies. The Australian Marine Sciences Association Annual Conference 2003, Brisbane, Queensland, 9-11 July 2003.

Piatt, J. F. and Nettleship, D.N. (1987). Incidental catch of marine birds and mammals in fishing nets off Newfoundland, Canada. Marine Pollution Bulletin. 18: 344-349.

Ross, J. (1987). Sea Turtle Management Plan for the Sultanate of Oman. Report to Ministry of Agriculture and Fisheries and Omani American Joint Commission. 13pp.

Schrey, E., Vauk, G.J.M., (1987). Records of entangled gannets (*Sula bassana*) at Helgoland, German Bight. Marine Pollution Bulletin 18, 350–352.

SOMER (2003). State of the Marine Environment Report. ROPME/GC-11/003. Regional Organisation for the Protection of the Marine Environment, Kuwait, 217 pp.

Stewart, B. S. and P. K. Yochem. (1987). Entanglement of pinnipeds in synthetic debris and fishing net and line fragments at San Nicolas and San Miguel Islands, California, Marine Pollution Bulletin 18:336-339.

UNEP and GPA, (2005, in press). Feasibility Study on Sustainable Management of Marine Litter.

USEPA (1992 b) Importance of coastal Watersheds

Volgenau, L., S.D. Kraus, and J. Lien. (1995). The impact of entanglements on two substocks of the western North Atlantic humpback whale, *Megaptera novaeangliae*. Can. J. Zool. 73: 1689-1698.