



Marine litter

in the

Black Sea Region



The Commission on the Protection of
the Black Sea
Against Pollution

2007

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PREFACE

The human race is constantly consuming more goods and hence producing more waste. Unfortunately, this increasing amount of waste produced is not being efficiently collected, disposed of or processed properly. Due to the increased population in coastal areas; a very significant amount of litter finds its way to the seashore and marine environments. The problem is even greater in developing countries, where main targets are to increase economic growth and production where issues related to protecting the environment are a minor 'priority'.

The Black Sea, with its densely populated coastal strip, is a "developing" region, especially considering its ever-increasing importance in energy extraction and transport, tourism, and fisheries. Marine litter, either originating from the vessels or from the shores or rivers, is a "visible" pollution problem along the coasts of the Black Sea, in the sea itself and on the bottom of the sea. Marine litter is also a transboundary problem in this enclosed sea basin which displays a very dynamic current system, enabling transportation of any matter from a given location in the Black sea to almost any coastal area. A great portion of the Marine Litter in our region is of non bio-degradable nature, therefore, it is not an aesthetic problem simply, but it often seriously damages the living organisms and might threaten the biodiversity of the Black sea.

This is the most extensive publications written on Marine Litter of the Black Sea. This report evaluates existing data, policies, activities, and institutional arrangements concerning the Marine Litter in the Black Sea region and proposes several actions to deal with the problem. One of the main suggestions is the inclusion of major appropriate actions into the revised Strategic Action Plan, to be adopted in 2008.

Developing the necessary policy documents and strategic plans could be achieved relatively smoothly; however, educating the polluters proves the major challenge in dealing with the Marine Litter problem. Indeed, responsible citizenship could easily decimate this kind of pollution in a relatively short time.

Many people contributed to this report, i.e. authors, data and other information providers, staff of the Permanent Secretariat. The members of the Black Sea Commission supported strongly the preparation of this report, whilst UNEP-RSP provided the necessary funding. Thanks to all contributors for their efforts towards a "noticeably" cleaner Black Sea.

Dr Ahmet Erkan KIDEYS

Executive Director of the Permanent Secretariat

The Commission on the Protection of the Black Sea Against Pollution

Istanbul, December 2007

Dedicated to the memory of
Prof Dr Erdoğan Okuş
(1 June 1962 - 9 April 2006),
one of the contributors of this
report,
who lost his life during a
research cruise in the Black
Sea



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Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment.

Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores.

Marine Litter: An Analytical Overview (UNEP, 2005)

EXECUTIVE SUMMARY

In parallel to its urbanised life style, human is producing increasingly more litter. The Black Sea does not constitute an exception from global negative tendency towards a total coating of the hydrosphere with man-made debris. However, this problem is not properly addressed and managed yet on the regional and national levels. Bearing in mind that marine litter (ML) is a priority for both the Black Sea Commission (BSC) and the UNEP Regional Seas Programme, the latter organization provided support to the BSC Secretariat for the development of Regional Activity on ML in the Black Sea within the framework of the Strategic Action Plan on Rehabilitation and Protection of the Black Sea (BS SAP).

This report includes several sections and a summary for each section could be summarized as the following.

Methodology and expertise. In 2005, it was agreed between above competent bodies that the BSC Secretariat undertakes a series of actions aimed to address and restrain the ML problem. Those actions should provide among others the preparation of a basic Review Document on ML in the Black Sea region. It was decided that the document should include: the data on ML in the marine and coastal environment; the analysis of existing institutional arrangements, legal and administrative instruments, programmes and initiatives; the identification of gaps in the knowledge and needs in the coverage of ML management; and specific proposals and recommendations for changes for the better.

It was stated also that the regional Review Document should be based on appropriate national ML reports arranged in compliance with some standard questionnaire. Thus, the BSC Secretariat has designated one regional and six national consultants on ML (one specialist from each Black Sea country) and asked them to collect, analyze and present available information. The questionnaire was prepared in early 2006 and national ML reports were completed by the mid summer 2006. The first draft of the regional Review Document/Report under the title "Marine Litter in the Black Sea Region: A Review of the Problem" was considered, commented and then adopted by participants of the Special Session on ML within the 15th Meeting of the BSC Advisory Group on Pollution Monitoring and Assessment (Istanbul, 9-10 October 2006). Results of that session were supported by the 15th Regular Meeting of the BSC (Istanbul, 20-21 November 2006). The second draft, improved in accordance with comments by the national consultants and recommendations of the ML session, was submitted to the BSC Secretariat in December 2006 and then, in January 2007, to the UNEP Regional Seas Coordinating Office.

This is the third version of the Review Document on ML in the Black Sea Region. The structure and text of the report were strengthened owing to advices kindly provided by UNEP experts. The report consists of eight sections and supplemented with nine annexes.

The Black Sea environment in view of ML problem Geographical scope of the ML problem extends over the entire catchment area of the Black Sea drainage basin and includes the Black Sea proper; two satellite seas (the Sea of Azov and Marmara Sea); two straits connecting the Black Sea with the satellite seas (the Strait of Kerch and Istanbul Strait - otherwise known as Bosphorus); all rivers (along with their tributaries), flowing into the above maritime areas; coastal territories bordering to these maritime areas; and all land drained by the rivers and their confluents. Air masses shifting over the region add to the problem of ML accumulation and dissemination.

The pronounced horizontal stratification of the Black Sea water column, caused by hydrophysical and hydrochemical factors (gradients of temperature, salinity, oxygen and permanent anoxic layers with H₂S) suggests different density of water mass on the margins and within all these strata. Thus, it could be supposed that the distribution of ML is also stratified in the sea in accordance with density (or flotation ability) of different ML items. The most dense ML objects sink and accumulate on the sea bottom, while the least dense ones drift on the sea surface and in time, sooner or later, become washed ashore. The third group of ML items (probably, vastly numerous

in its absolute number) is suspended in the water column between the surface and bottom. The hypothesis of ML stratification consists in selective horizontal accumulation of certain suspended ML items following the thermocline, halocline and transitional layer between the oxygenated and anoxic waters.

Total population in the Black Sea catchment area exceeds 160-170 million, and daily activities of all these people in some way or other affect the Black Sea environment and, presumably, contribute to ML problem which is originated almost completely (but not only) from the problem of solid waste pollution. The ML problem is closely linked to major problems of public health, conservation of the environment, and sustainable development in the Black Sea region. ML originates from various land- and sea-based sources as a result of manifold human activities and, evidently, causes multivectorial negative impact on the population, wild life, abiotic nature and some sectors of economy. Floating ML and ML items suspended in the water are transported by currents and winds throughout the sea and, thereby, cause transboundary dissemination of solid wastes and basin-wide enlargement of the problem.

Besides, widespread distribution of illegal, unreported and unregulated (IUU) fishing in the Black and Azov Seas can be considered as a peculiar source of ML. That is true indeed regarding countless illegal nets and nets which were discarded or abandoned causing the so-called “ghost fishing”. High concentrations of fixed and floating IUU fishing gear in some areas result in the reduction of habitat space, formation of obstacles on migration ways and enhancement of incidental mortality (by-catch) of cetaceans, fishes and crustaceans. Although no special research on the abandoned nets has been conducted in the Black Sea region, the problem of “ghost fishing”, undoubtedly, exists at least in the shelf area.

National consultants on ML presented basic reference data regarding maritime areas and seashores of the Black Sea riparian states. This information could be useful for recognizing possible spread of ML in each country and, therefore, for planning ML research, monitoring and cleanup activities.

Legal and administrative instruments Black Sea ML is a matter of regulation to some extent (but so far always incompletely) by a series of legal acts aimed to harmonize various human activities on the international, regional and national levels. However, up to now there is no any juridical instrument dedicated specifically to the management of ML problem for the marine and coastal environment in the Black Sea. Moreover, the concept of ML problem and “marine litter” itself, as a law-term in its proper definition (UNEP, 2005), are not accepted and even well-known in the Black Sea community.

The Black Sea states are the parties to several conventions and international agreements which are relevant to the management and mitigation of ML problem. The report contains information on these treaties including the Convention on the Protection of the Black Sea Against Pollution (the Bucharest Convention), the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), the Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention), the Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal (the Basel Convention), and some other instruments which have indirect relation to the control of ML problem. The Bucharest Convention, MARPOL 73/78 and the Basel Convention are ratified by all six Black Sea states.

National consultants on ML indicated that the ML problem is regulated partially in their countries by a number of instruments concerned with various fields of public administration, social life and different human activities. Chronological lists of such legal and administrative instruments presented in the report consist of over 140 titles of heterogeneous documents which were adopted by the governments mainly during the last decade. The detailed comparative analysis of these instruments should be undertaken in the future, and appropriate recommendations on the harmonization and improvement of national legislation should appear as a result. Nevertheless, it seems pertinent to underline the most important points reflecting present situation:

- All six Black Sea states are in transition process of developing and updating their national instruments aimed at combatting marine pollution including ML/ solid waste component. Actual rate of this process and concrete instruments developed are quite different in different countries.
- However, general trends of this process regarding the ML problem are common in all Black Sea states: (a) to prohibit any deliberate discharge of potential ML at sea and on the shore; (b) to improve solid waste collection, processing, storage, disposal and recycling facilities; and (c) to enhance governmental control of activities mentioned in (a) and (b).
- National policies in the Black Sea states are aimed at waste minimization, reuse, recycling and recovery of landfills. The major legislative and regulatory tools for waste management are adequately developed in the Black Sea countries, and include basic laws and regulations. Bulgaria and Romania, which were accepted to the EU in January 2007, transpose relevant EU directives and standards into their national legislation.
- One of the main management problems affecting most Black Sea countries consists in imperfect ability to apply the existing laws and regulations. Being declared once, they should be implemented in a proper way but sometimes they do not work or work inadequately.

Institutional arrangements. This section of the report begins with basic information about intergovernmental organizations involved in ML issues on the global, European and Black Sea regional level (alphabetically): BSC, CIESM, EU, FAO, GESAMP, IMO, IOC, UNEP and WHO.

A wide variety of governmental organizations, NGOs and business establishments are concerned about marine and coastal pollution in the Black Sea states at the national and local level. Most of those entities, represented by ministerial and municipal structures and services, marine and sanitary inspectorates, research institutions and universities, port administrations, various agencies, companies and enterprises, and non-governmental organizations (NGOs), are involved (or can be involved) in the activities addressing and combatting ML problem. Six separate sub-sections of the report are dedicated to national features of the institutional arrangements in each Black Sea country. The list of organizations and specialists related to the ML management, research, monitoring, cleanup operations, and public education in the region is annexed to the report.

Programmes and initiatives. So far, there was no Black Sea regional strategy, action plan or basin-wide programme that was specifically directed to address and solve the ML problem. However, during the period from 1996–2007 there were several international and Black Sea regional programmes and projects which were partly or marginally concerned in ML. The BS SAP (1996, amended in 2002) seems to be the most appropriate framework that could be supplemented with specific ML items of the regional significance. This document, being a basis for cooperative actions on the conservation and improvement of the Black Sea environment, already includes a series of cognate paragraphs relating to the reduction of pollution from land based sources, vessels and dumping, to the waste management, and to the assessment and monitoring of marine pollution.

The 15th Regular Meeting of the BSC (Istanbul, 20-22 November 2006) considered the achieved progress in implementation of the Black Sea Regional Activity on Marine Litter and approved the BSC Workplan for the year 2006/2007. Among other things, this workplan includes Paragraph 12 “Updating of the BS SAP”, with the final aim to adopt the new version of this strategic document at the Ministerial Meeting 2008. It was decided by the BSC members to use this opportunity and introduce specific ML actions into newly amended BS SAP.

National consultants on ML presented their comments regarding the priority of Black Sea ML problem and relevant strategic approaches in their countries. Most experts confirm that this problem constitutes a priority issue on the national level. However, up to now there is no any national strategy, action plan or programme specifically devoted to ML problem in any Black Sea

state. At the same time, some strategic documents of national significance (*e.g.*, environmental strategies for the coastal zone and waters, waste management programmes, *etc.*) are concerned with the ML problem at least in part. Besides, several ML-related projects were implemented during the last decade by the environmental NGOs on voluntary basis.

Scientific information on ML During the last decade, some governmental and private institutions and NGOs in Bulgaria, Russia, Turkey and Ukraine conducted ML research using different approaches and methods. However, national bibliographies on ML in the Black Sea region are still scant. There are very few peer reviewed scientific publications on this topic and most of those papers concern the solid waste management mainly.

Aerial ML surveys have been carried out in the Azov Sea, Kerch Strait and north-eastern shelf area of the Black Sea. Relative intensity of ML pollution in the Kerch Strait turned out to be almost as high as in the southern Azov Sea and twice as high as in the Black Sea waters off the northern Caucasus and eastern Crimea. The results of aerial surveys suggested that major quantity of ML comes to the Russian Black Sea in late spring and early summer. It was supposed that the level of ML pollution depends mainly on the level of river run-off in this area. Just river and rain torrents (which wash down the land-based solid waste) are considered as a principal source/supplier of ML in the territorial waters of Russia.

Important data on permanent sources of ML have been published by Turkish specialists. Solid waste management is one of the main environmental problems in the Black Sea region (Celik, 2002). It is reported that at the southern coast of the Black Sea, substantial amount of municipal and industrial solid wastes, sometimes mixed with hospital and hazardous wastes, are still dumped on the nearest lowlands and river valleys or directly on the seashore or even at sea. Such practice is widespread also in Georgia. Most uncontrolled coastal landfills and dumping sites are not protected from waves and, thus, serve as stationary sources of unknown (but certainly large) quantities of ML. The continuing accumulation of solid wastes on the coast may cause a growth of ML in the marine environment due to spontaneous removal of the wastes from the dumps into the sea by erosive factors such as waves, rains and winds. At the same time, the sea currents and winds play a role of ML dissemination factors contributing to the transport of floating litter. Thus, the land-based solid wastes continue to constitute major source of ML for the Black Sea as a whole. Therefore, ML is a significant region-wide transboundary problem.

Vessel-based line transect surveys have been carried out to study levels of ML pollution in Ukrainian part of the Kerch Strait and within the entire 12-miles-wide territorial waters of Ukraine in the Black Sea. As a result, quantitative values of floating plastic ML (general density, absolute amount and aggregate mass) were estimated. For instance, general density of floating plastic was estimated as 6.6 and 65.7 pieces/ km^2 in the Ukrainian Black Sea and Kerch Strait, correspondingly.

Greater numerical predominance of plastic ML (80–98%) has been determined in comparison with glass ML (2–20%) on the wild (unmanageable) beaches of Crimea, Ukraine, during different seasons. The density of beachfront pollution by polymeric garbage varied from 333 to 6,250 kg/km^2 , while the density of glass ML fluctuated between 222 and 1,455 kg/km^2 .

A series of diving surveys for ML has been realized in different sites within the boundaries of Istanbul city. Most pieces of the litter recorded were manufactured from glass (31%), plastic (25%) and metal (21%). A tendency of ML accumulation on the bottom of certain areas was observed. Solid wastes covered up the ground and local communities of benthic organisms. The abandoned fishing nets were found (and removed). Some representatives of the marine fauna (including cephalopods and crustaceans) were recorded to be by-caught in the “ghost” fishing gear. The concentration of ML collected in different places of the Turkish Black Sea coast varied from 58 to 1,395 kg per linear kilometer of the coastline.

This section of the report presents also expert views on ML pollution provided by the national consultants. According to interview data, most visitors of Bulgarian beaches (up to 90%) appreciated local climatic conditions but did not like rubbish on the coast. The opinion of holiday-makers was that ML strongly (or very strongly) affects quality of a beach.

Gaps and needs in coverage of ML management According to expert valuation by national consultants on ML, at least seven actions or groups of actions deserve high prioritization on the national level: correction of waste management policy; improvement of legal and administrative instruments; development of sustainable ML management; development of ML monitoring methodology; national assessment of ML pollution; preparation of proposals to prevent and reduce ML; and preparation of awareness and educational tools.

Meantime, the Special Session on ML of the 15th Meeting of the BSC Advisory Group on Pollution Monitoring and Assessment (Istanbul, 9-10 October 2006) agreed that the major gaps and needs in coverage of ML management on the regional level consist of the following eight items:

- (a) underdevelopment of waste management policy and, particularly, its incompleteness and low efficiency in respect of ML issues;
- (b) imperfection and disbalance of legal and administrative instruments developed for solid waste and ML management;
- (c) lack of common ML monitoring and assessment approach based on the standardized methodologies and assessment criteria;
- (d) deficiency of practical measures to prevent and reduce ML pollution;
- (e) technological lag in respect to contemporary methods and devices for collection, processing, recycling and disposal of solid wastes and ML;
- (f) insufficiency of public awareness/education regarding ML problem;
- (g) low level of involvement of general public and private sector in combatting ML pollution;
- (h) gaps in professional knowledge on ML issues among managers and authorities involved in the protection of the Black Sea against pollution.

Proposals for changes, conclusions and recommendations National ML consultants made helpful suggestions and formulated some project proposals aimed to address and slacken the ML problem in their countries. Participants of the Special Session on ML (Istanbul, October 2006) proposed a list of high priority actions to be included in the Regional ML Action Plan. The both sets of commended activities are summarized in Section 7 of the report, while Section 8 contains final conclusions and recommendations. Taking into account suggestions, a “Draft Strategic Action Plan for the Management and Abatement of Marine Litter in the Black Sea Region (BS-ML-SAP)” has been drafted as presented in Annex 9.

INTRODUCTION

The overloading of oceans and seas with floating marine litter (ML) and its growing accumulation on the coasts is one of major environmental problems world-wide (UNEP, 2005). It is generally recognized that ML superfluity exerts negative influence on marine and coastal ecosystems, health status of seaside population and normal development of sea-oriented economics including tourist industry, fishery and shipping.

The Black Sea does not constitute an exception from global tendency towards a total coating of the hydrosphere with man-made debris. However, this problem is not properly addressed so far on the regional and national scale, and even actual levels of ML pollution are not adequately evaluated and monitored in the riparian countries. In view of existing gaps in the knowledge, certain national and international effort should be applied to gain necessary basic information.

The Governing Council decision 22/2 IIIA on the UNEP Regional Seas Programme, calls for the utilization of the Regional Seas conventions and Action Plans as a platform for the regional implementation of multilateral environmental agreements and global programmes and initiatives. In the resolution on "Oceans and the law of the sea" (A/59/L.22 adopted as resolution 59/25), in paragraph 92, it is recommended that Consultative Process during its deliberations on the report of the Secretary General, should organize its discussions around, among others, marine debris. The 8th special session of the UNEP Governing Council/Global Ministerial Environment Forum, held in Jeju, Republic of Korea, from 29 to 31 March 2004, at its 6th plenary meeting on 31 March, adopted the decision SS.VIII/4 on Waste management, on the basis of drafts approved and submitted by the Committee of the Whole.

The problem of marine litter was recognized by the UN General Assembly, which in its Resolution A/60/L.22 - Oceans and the Law of the Sea - of 29 November 2005 in articles 65-70 calls for national, regional and global actions to address the problem of marine litter. This GA resolution notes the lack of information and data on marine debris, encourages States to develop partnerships with industry and civil society, urges States to integrate the issue of marine debris within national environmental strategies, and encourages States to cooperate regionally and subregionally to develop and implement joint prevention and recovery programmes for marine debris. In response to the GA call, UNEP (GPA and the Regional Seas Programme), through its Global Marine Litter Initiative took an active lead in addressing the challenge, among others, by assisting 11 Regional Seas around the world in organizing and implementing regional activities on marine litter (Baltic Sea, Black Sea, Caspian Sea, East Asian Seas, Eastern Africa, Mediterranean Sea, Northwest Pacific, Red Sea and Gulf of Aden, South Asian Seas, South East Pacific, and Wider Caribbean).

Within the above mentioned context, and within the context of UNEP's support to the Black Sea Commission (BSC), bearing in mind that ML is a priority activity for both the BSC and for UNEP's Regional Seas Programme, UNEP has provided support to the BSC Secretariat for the development of Regional Activity on ML in the Black Sea within the framework of the Strategic Action Plan on Rehabilitation and Protection of the Black Sea (BS SAP).

The objective of this activity is to assist in the environmental protection and sustainable management and development of the Black Sea region through the development of a Regional Activity on ML within the framework of BS SAP. A draft amendment to the BS SAP to include this Regional Activity on ML will be developed under the Memorandum of Understanding signed between the BSC Secretariat and the UNEP's Regional Seas Coordinating Office in 2005. In particular, this document envisages that such amendment be approved by the Contracting Parties to the Convention on the Protection of the Black Sea Against Pollution (*i.e.*, by Bulgaria, Georgia, Romania, Russian Federation, Turkey and Ukraine).

It is expected that the BS SAP, signed in 1996, based on the Transboundary Diagnostic Analysis carried out by the Black Sea Environmental Programme will be substantially updated in 2008 when the next meeting of the Contracting Parties to the Convention on the Protection of the Black

Sea Against Pollution is to take place. The amendment proposal on ML, worked out in compliance with the current Memorandum of Understanding should be incorporated with the new draft Strategic Action Plan and after that submitted to the BSC for approval and then for consultations at the country level. After the successful national negotiation procedures, the Ministers of Environment of the six coastal states are expected to sign the new Strategic Action Plan at the meeting in 2008 and thus the provisions of the Regional Activity on ML document (as presented in Annex 9) may obtain some legal status in the Black Sea region.

Under the terms of the Memorandum of Understanding, the BSC Secretariat, in consultation with the UNEP Regional Seas Coordinating Office, shall undertake a series of actions regarding the addressing ML problem in the Black Sea region.

This report depends on Activity A of the Memorandum: Preparation of a Review Document on ML in the Black Sea Region, on both the national and regional levels, which will include, among others: collection and review of existing institutional arrangements; data and information on ML in the marine and coastal environment; legal and administrative instruments; programmes and initiatives; identification of gaps and needs in coverage of marine litter management; proposals for changes and recommendations.

Such Review document should be based on national reports based on standard questionnaires and their compilation and other available documents and information, such as relevant scientific papers and other sources and literature. A questionnaire (a template of National Report on the state of ML problem in the Black Sea region) has been prepared by the Regional Consultant on ML and filled in by the National Consultants. The questionnaire is enclosed to this report as Annex 1.

1. THE BLACK SEA ENVIRONMENT IN VIEW OF MARINE LITTER PROBLEM

Geographical scope of ML problem, existing in the Black Sea region, extends over the entire catchment area of the Black Sea drainage basin and includes the Black Sea proper; two satellite seas (the Sea of Azov and Marmara Sea); two straits connecting the Black Sea with the satellite seas (the Strait of Kerch and Istanbul Strait); all rivers (along with their tributaries), flowing into the above maritime areas; coastal territories bordering to these maritime areas; and all lands drained by the rivers and their confluents. In other words, the geographical scope includes those parts of Europe and Asia from which ML can arrive in or depart from the Black Sea region directly or by dint of water masses involved in the hydrologic regime of the basin. Air masses shifting over the region add to the problem of ML accumulation and dissemination.

Geographical and hydrological peculiarities of the Black Sea and contiguous water bodies have been reviewed repeatedly by many authors (e.g., Vylkanov *et al.*, 1983; Zaitsev and Mamaev, 1997; Birkun, 2002 b; Zaitsev, 2006). Despite some factual contradictions, their general attitude on the features of these maritime areas may be summarized as follows.

1.1. PHYSICAL GEOGRAPHY

The Black Sea is one of the most isolated inland seas in the world (Fig. 1.1). It is situated between southeastern Europe and Asia Minor and has a surface area of 420,000-436,000 km^2 and a volume of 537,000-555,000 km^3 of water. The average depth is between 1,240 and 1,315 m , though it reaches a maximum of 2,212 m . From east to west the sea measures 1,175 km , and the widest distance from north to south is over 610 km . The total length of the coastline is about 4,020-4,340 km . The seafloor is represented by the shelf, continental slope and deep-sea depression. The shelf is significantly wide (up to 200-250 km) in the northwestern part of the sea, with a depth varying from 0-160 m . In other coastal areas the shelf strip has a similar depth, but considerably less width, from 0.5-50 km . Thus, only about one quarter (24-27%) of the sea area has a depth of less than 200 m .

The shelf is slightly inclined offshore; its relief is composed of underwater valleys, canyons and terraces. The continental slope is tight and steep, descending in some places at an angle of 20-30°. Pelitic muds cover the slope and the deep-sea depression, whereas bottom pebbles, gravel, sand, silt and rocks are common for shelf area. There are few small islands in the Black Sea; the biggest one and the most distant from the mainland is the Zmeiny isle (0.18 km^2) located 35 km off shore. The Crimean peninsula (27,000 km^2) protrudes into the sea from the north.

At the northeastern corner, the Black Sea is connected to the Sea of Azov by the Strait of Kerch, which is 41 km long, 4-15 km wide and up to 18 m deep at its south entrance. Shallow Taman Gulf penetrates deep inland in the central section of the eastern strait's shore represented by the Taman peninsula of the Caucasus. The opposite coast of the strait is formed by the Kerch peninsula which is a constituent part of the Crimea. Sandy Tuzla island at the mouth of Taman Gulf cuts the Kerch Strait across almost in half and into north (Azov Sea) and south (Black Sea) portions.

The Sea of Azov is about 340 km long and 135 km wide with a surface area of 37,000-39,000 km^2 and a volume of only 320 km^3 . It is the world's shallowest sea with a maximum depth of 13-14 m in places. The Azov's seafloor, covered by silt and sand, has a generally flat relief. The sea is trapezoid in shape, forming at the northeast the Gulf of Taganrog, a 140- km -long creek with a depth of 0-7 m . The Arabat Spit, a 112- km -long sand bar, borders the sea at the west. A series of sandy spits is situated on the north coast of the sea. Along the shoreline of both the Black and Azov Seas, mainly on their north and west coasts and in the estuaries of rivers, there are many salty and brackish lakes and lagoons (limans), which are permanently or occasionally connected with the sea through canals and scours perforating the spits.



Fig. 1.1. Black Sea drainage basin and a list of twenty two Basin's countries – potential contributors to Black Sea ML pollution via their river run-off (after Zaitsev and Mamaev, 1997).

In the southwest, the Black Sea is connected to the Sea of Marmara (and thus the Çanakkale Strait -otherwise known as Dardanelles Strait- and the Mediterranean) by the Istanbul Strait which is over 30 km long, 750-3,700 m wide and 37-124 m deep in the midstream. The Sea of Marmara is about 280 km long and nearly 80 km wide. It has a surface area of 11,000-12,000 km² and an average depth of 494 m, reaching a maximum of 1,355 m in the centre. The sea contains several islands forming two groups. The largest island is Marmara (129 km²) located in front of the entrance to the Çanakkale Strait.

Over 300 rivers flow into the Black and Azov Seas including the second, third and fourth major European rivers, namely the Danube, Dnieper and Don. Some rivers (Danube, Don, Kuban, Kızılırmak and Yeşilırmak) form deltas before their confluence with the sea. The Danube delta (approx 5,920 km²) is the largest wetland in the region.

According to different estimations, the total catchment area of the Black Sea drainage basin comes to 1,875,000-2,500,000 km² covering partially or entirely the territories of 22 countries (see Fig. 1.1).

1.2. HYDROLOGY

The estimated annual volume of river discharge entering the Black Sea fluctuates from 294 to 480 km³. Vast quantities of silt, nutrients, organic matter and unknown amount of ML are brought down by rivers (in particular, the Danube expels up to 52 million tonnes of sediments per year). The annual volume of atmospheric precipitations in the Black Sea area (119-300 km³) is usually lower than the volume of river inflow. The annual level of the evaporation in the Black Sea has been calculated between 232 and 484 km³. Besides this, the general water balance also depends on the intensity of water exchange through the Kerch Strait and Istanbul Strait.

There are two counter currents in the Kerch Strait: the surface current flowing from the Azov Sea to the Black Sea (22-95 km³ of water per year), and the lower one moving in the reverse direction (29-70 km³ per year). The outflow of Black Sea water through the Istanbul Strait (the surface current of 227-612 km³ per year) is approximately twice as large as the inflow from the Sea of Marmara (the lower current of 123-312 km³ per year). The horizontal circulation of Black Sea superficial waters could be roughly described as the two major ring streams rotating counterclockwise in the western and eastern parts of the basin with a velocity from 8-18 cm per second (Fig. 1.2). The smaller counterclockwise currents are also peculiar to the northwestern shelf area as well as to the Azov and Marmara Seas. The vertical circulation in the Black Sea is

extremely slow – it takes hundreds of years for the waters at the surface to be replaced by near-bottom waters from the deep-sea depression. Daily tidal oscillations in the Black Sea do not exceed several centimetres. Severe storms accompanied by waves up to 5-6 *m* high occur most often in winter season.

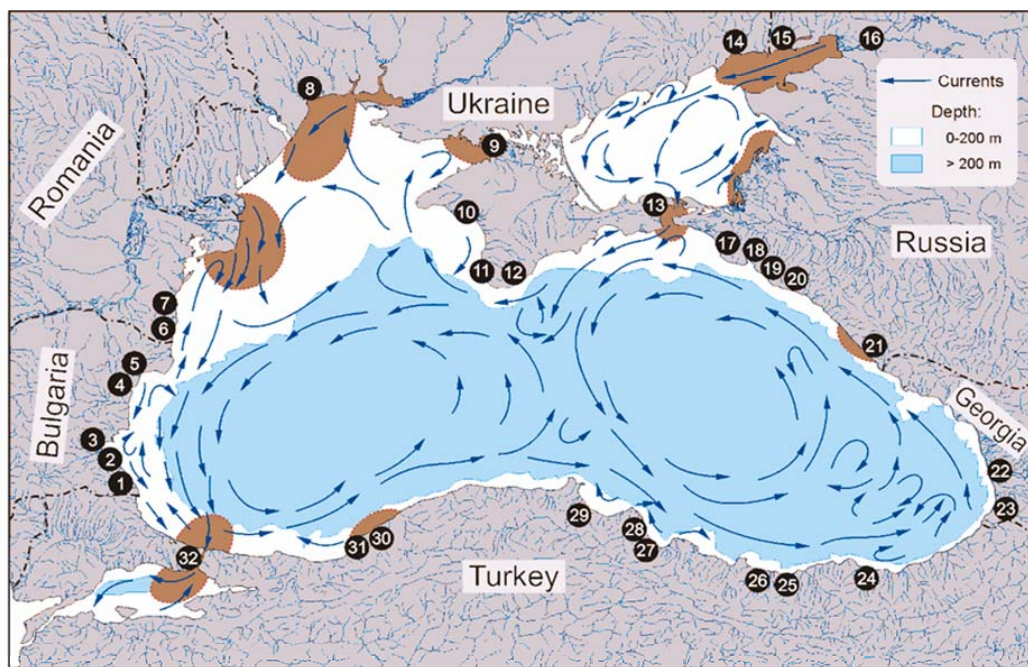


Fig. 1.2. Basic scheme of superficial sea currents and main land-based sources and hot spots of marine pollution in the Black Sea region:

1	Tsarevo	9	Krasnoperekopsk	17	Anapa	25	Giresun
2	Sozopol	10	Evpatoria	18	Novorossiysk	26	Ordu
3	Bourgas	11	Sevastopol	19	Gelendzhik	27	Samsun
4	Varna	12	Yalta	20	Dzhoubga	28	Bafra
5	Balchik	13	Kerch	21	Sochi	29	Gerze
6	Mangalia	14	Mariupol	22	Poti	30	Zonguldak
7	Constantza and Mamaia	15	Taganrog	23	Batumi	31	Eregli
8	Odessa and Ilyichevsk	16	Rostov-na-Donu	24	Trabzon	32	Istanbul

Taken from: Birkun (2002 b) based on Vylkanov *et al.* (1983), Black Sea Transboundary Diagnostic Analysis (1997), Bilyavsky *et al.* (1998), Kerestecioğlu *et al.* (1998) and Mee and Topping, (1999).

As a result of huge inflow from rivers, the mean salinity of the Black Sea (18‰) is less than a half that of the Mediterranean. It rises up to 21-27‰ at a depth below 300 *m*, however it falls seasonally and even as low as 2-8‰ in some spots of the northwestern area. The presence of a halocline at a depth of 100-200 *m* is a distinctive hydrological feature of the Black Sea. Azov's waters are lower in salinity (11.7‰ on average), being almost fresh (1-8‰) in the Gulf of Taganrog. At the same time, the waters in the Marmara Sea are more saline than in the Black Sea, averaging 22‰ at the surface with a gradual increase of salinity closer to the bottom and towards the Çanakkale Strait.

The range of water temperatures at the surface of the Black Sea extends from -1.2°C in winter to +31°C in summer with the mean annual level varying from 12°C in the northwest to 16°C in the southeast of the basin. The thermocline (7.2-8.6°C) is situated at a depth between 50 and 150 *m*. The waters below 500 *m* have a constant temperature of about 9°C. During frosty winters the

shallow waters with low salinity become coated with ice. That is more or less typical for the northwestern coastal area and for the Sea of Azov.

The Black Sea is stratified into the superficial layer of oxygenated waters and the deeper column of anoxic waters saturated by high concentrations (0.2-9.6 *mg/l*) of dissolved hydrogen sulphide (H_2S). A transitional interlayer between those strata lies at a depth between 100 and 250 *m* with some topographic, seasonal and annual fluctuations. Thus, about 87-90% of the Black Sea water volume forms a "dead" zone unfit for aerobic life and inhabited almost exclusively by specific anaerobic bacteria. Consequently, only the upper 10-13% of the water mass represents the most suitable conditions for most marine organisms and, therefore, sustains the biodiversity.

The pronounced horizontal stratification of the Black Sea water column, caused by hydrophysical and hydrochemical factors (gradients of temperature, salinity, oxygenation and saturation with H_2S) suggests different density of water mass on the margins and within all these strata. Thus, it could be supposed that the distribution of ML is also stratified in the sea in accordance with density (or flotation ability) of different ML items. It is generally understood that the most dense ML objects sink and accumulate on the sea bottom, while the the least dense ones drift on the sea surface and in time, sooner or later, become washed ashore. The third group of ML items (probably, vastly numerous in its absolute number) is suspended in the water column between the surface and bottom. The hypothesis of ML stratification consists in selective horizontal accumulation of certain suspended ML items following the thermocline, halocline and transitional layer between the oxygenated and anoxic waters.

1.3. SOCIAL ECOLOGY AND ANTHROPOGENIC THREATS

The Black Sea is bordered by six riparian countries – by Ukraine to the north, Russia to the northeast, Georgia to the east, Turkey to the south, and Bulgaria and Romania to the west (see Fig. 1.2). The Sea of Azov and the Kerch Strait are surrounded by Ukraine and Russia. The Sea of Marmara, Istanbul Strait and Çanakkale Strait (i.e. Dardanelles) represent the inland waters of Turkey known as the Turkish Straits System.

Most coastal territories are densely populated and even overpopulated especially during touristic season (summer). According to different estimates, based on the national census statistics, permanent human population distributed along the Black Sea shores came to 16-20 millions in the 1990s, and an extra 4-12 million per year were represented by tourists (Zaitsev and Mamaev, 1997; Bilyavsky *et al.*, 1998; Kerestecioğlu *et al.*, 1998). However, these figures do not include people inhabiting the coasts of the Azov and Marmara Seas, as well as the citizens of Istanbul, the largest Black Sea urban agglomeration situated on both the European and Asian sides of the Istanbul Strait and containing the resident population of around 14 million (Berkun *et al.*, 2005) and a great number of migrants and visitors. At the end of the 20th century, total population in the Black Sea catchment area was about 160-171 millions, and the living activities of all these people in some way or other affected the Black Sea environment (Mee, 1992; Readman *et al.*, 1999) and, presumably, contributed to ML problem.

The Black Sea and contiguous waters are used for shipping, fishing (along with a limited amount of aquaculture), mineral exploitation, tourism, recreation, military exercises and for liquid and solid waste disposal. In addition, the seabed and the catchment area are under permanent pressure from other human activities, including urban development, industry, hydro- and nuclear energetics, agriculture and land-improvement. Three principal groups of anthropogenic threats to the Black Sea environment could be listed as follows;

- various kinds of pollution;
- physical modification of the seabed, coasts and rivers; and
- irretrievable direct take of natural wealth including the (over)exploitation of mineral and living resources.

Human-associated contamination of the oxygenated water layer is considered as a primary threat and the greatest environmental problem for the Black Sea region (Mee, 1992; BS SAP, 1996; Black Sea Transboundary Diagnostic Analysis, 1997; Mee and Topping, 1999). The main sources of chronic seawater pollution are represented by focal land-based outfalls, river run-off, coastal nonpoint (diffuse) sources, atmospheric fall-out, intentional and accidental inputs from vessels (Table 1.1). According to Mee (1992), the threat to the Black Sea from land-based sources is potentially greater than in any other sea of the world (see Fig. 1.2). Many coastal municipalities and industries discharge their wastes directly to the sea with inadequate or no treatment. Nevertheless, the rivers of the basin are responsible for most of the pollution (Tuncer *et al.*, 1998). They are strongly contaminated with industrial and mining wastes (Readman *et al.*, 1999) and transfer a huge amount of nutrients that originate primarily from agriculture (Zaitsev and Mamaev, 1997; Mee *et al.*, 2005). The impacts of the diffuse coastal, airborne and vessel-sourced pollution are the least investigated, but believed to be significant. Irrespective of sources, anthropogenic pollution of the Black Sea is subdivided into: (a) contamination related to various chemical substances (nutrients, crude oil and petroleum products, persistent synthetic pollutants and trace elements); (b) radioactive contamination; (c) pollution by solid wastes; and (d) biological pollution including microbial contamination and introduction of alien species of marine organisms (see Table 1.1). The ML problem is originated almost completely from the problem of solid waste pollution.

Table 1.1. Types and sources of pollution in the Black Sea

Types of pollution	Sources of pollution				
	Stationary land-based outfalls ^a	River run-off ^b	Coastal diffuse sources ^c	Atmospheric fall-out ^d	Ships and marine platforms ^e
Contamination with chemicals:					
• nutrients and organic matter	+	+	+	+	+
• oil and petroleum products	+	+	+	+	+
• persistent organic pollutants	+	+	+	+	+
• trace elements	+	+	+	+	+
Radioactive contamination		+		+	
Marine litter (solid waste) pollution	+	+	+	?	+
Biological pollution:					
• microbial/faecal contamination	+	+	+		+
• introduction of exotic species					+

^a – industrial liquid wastes and insufficiently treated or untreated sewage from coastal cities and settlements;

^b – inputs from the agriculture, industry, mining and municipal sewage from the whole Black Sea drainage area;

^c – inputs from the agriculture, animal husbandry and unmanaged tourism mainly through the run-off from land (coastal pluvial effluents and ground waters);

^d – inputs from various sources of air pollution (smokes, fumes, dust, exhaust gases) no matter where in the world;

^e – dumping of solid waste, explosives and dredged matter; discharge of untreated sewage and ballast waters; oil spills; lost fishing nets; introduction of alien marine organisms owing to the biofouling.

It is generally acknowledged that the Black Sea and its coasts are subjected to high levels of solid wastes pollution (Mee and Topping, 1999), although very few special studies of its extensiveness, sources and patterns have yet been made (see Section 5). Marine dumping had been known for all Black Sea coastal states for years although the specifically highlighted by some authors for Turkey and Georgia. (Mee and Topping, 1999; Yıldırım *et al.*, 2004; Berkun *et al.*, 2005). In spite of prohibition for dumping wastes in the sea currently existing in the Black Sea coastal states (except for dredged spoils) the illegal dumping still takes place. Due to specific features of very

narrow strips of Georgian and Turkish coasts the problems of washing down of landfills content into the sea certainly are most severely expressed. The sites of explosive objects disposal are mapped off the Crimea (Ukraine) and in the Gulf of Taganrog (Russia). Navigation charts reflect also the distribution of sunken vessels and other scrap metal over the shelf area.

Floating ML and uncontrolled fishing nets represent particular threat to marine mammals (Zaitsev, 1998) which sometimes ingest inedible things and may get themselves entangled. A number of foreign bodies have been collected from stomachs of Black Sea common dolphins (*Delphinus delphis*): coal slag, pieces of wood and paper, bird feathers, cherry stones, and even a bunch of roses (Kleinenberg, 1956).

Widespread distribution of illegal, unreported and unregulated (IUU) fishing in the Black and Azov Seas can be considered as a peculiar source of ML pollution. That is true indeed regarding countless illegal nets and nets which were discarded or abandoned causing the so-called “ghost fishing”. High concentrations of fixed and floating IUU fishing gear in coastal and shelf areas result in the reduction of habitat space, formation of obstacles on migration ways and enhancement of incidental mortality (by-catch) of cetaceans, fishes and crustaceans. Although no special research on the abandoned nets has been conducted in the Black Sea region, the problem of “ghost fishing”, undoubtedly, exists at least in the northwestern Black Sea shelf area. In particular, a total of 194 dead dolphins and harbour porpoises (*Phocoena phocoena*) along with 18,424 turbot (*Psetta maeotica*), 143 sturgeons (*Acipenser* spp.), 401 spiny dogfishes (*Squalus acanthias*) and 1,359 rays (*Raja clavata* and *Dasyatis pastinaca*) were found entangled in 6,416 bottom-set gillnets approximately 640 km long which were arrested in spring 1991 in the Ukrainian waters (Birkun, 2002 a). In April 2002, 35 bycaught harbour porpoises were recorded in the abandoned illegal gill- and trammel nets (30.2 km) in the exclusive economic zone of Romania (Radu *et al.*, 2003). Some additional information on the “ghost fishing” in the Istanbul Strait is presented in Section 5.1.1, E of this report.

1.4. MARINE AND SEASHORE AREAS OF THE BLACK SEA STATES

National Consultants on ML problem presented basic reference data regarding maritime areas and seashores of the Black Sea riparian states (Table 1.2). This information is necessary for recognizing possible spread of ML in each country and, therefore, for planning ML research, monitoring and cleanup activities at the national level. Appropriate maps and schemes can be found in Annex 2.

The National Consultants summarized also available information on the coasts which are difficult of access for the purposes of ML monitoring and cleanup operations:

Bulgaria: There are certain areas (which are high and rocky; around 50 km in total) that are difficult of access or not accessible from the beach. They are: the coast in Kaliakra, Balgarevo and Kavarna, rocky coast south of Kranevo, some areas near villages Shkorpilovci, Byala and Obzor, part of Cape Emine, coast between resort complex “Elenite” and St. Vlas; between Sozopol and Rezovska river the slopes of Strandzha Mountain form a number of small rocky capes.

Georgia: There are no municipal infrastructure and any service relevant to ML or solid waste management along the seashore between Poti and Gali (50 km; 1,8 km²), however, this section of the coast could be accessible for the most part if relevant service is established.

Romania: Inaccessible sections of the seacoast are present in the Danube delta.

Russia: Cliffy and abrupt sites, sometimes impassable, are common on the Russian Black Sea coast, particularly, round the Abrau peninsula, between capes Panagia and Zhelezny Rog, Cape Doob and Golubaya bay, Gelendzhik bay and Dzhoubga settlement as well as in the outskirts of Tuapse city (e.g., capes Guavga and Kadosh). Overall length of these difficult sections of the coast comes to 120 km. Steep coasts, which are difficult of access, are present also in the Azov

Sea and Kerch Strait areas. They include lengthy sections of the northern and southern coasts of the Gulf of Taganrog (over 130 *km*); seashore between Dolgaya and Kamyshevatskaya spits (25 *km*) and between the latter one and Yasenskaya spit (20 *km*); some sections of the northern and southern coasts of the Taman peninsula (between Peresyp and Ilyich settlements – about 33 *km*, and between capes Tuzla and Panagia – 8 *km*). Moreover, hard-to-reach marshy coasts are peculiar to the Azov Sea and Kerch Strait area: the entire seaside of the Don delta (about 20 *km*); some plots of seashore of the Kuban delta (40 *km*); the eastern and southern coasts of Choushka spit along with other swamped sites around Taman Gulf and Dinskoy bay (25 *km*).

Turkey: There are coastal areas which are difficult of access (mainly the indented coastline with vertical rocky shores in places) between the Bulgarian border and Igneada (e.g., Igneada Longoz located 15 *km* south from Bulgaria); between Bartın and Amasra and to the east of Amasra; in the neighborhood of Cide and Doğanyurt; between Catalzeytin and Ayancik; and between Gerze and Alacam.

Ukraine: Sizeable lengths of the seacoast of the Danube delta, Dnieper-and-Boug liman, Tendrovsky, Yagorlytsky, Karkinitsky and Dzarylgachsky bays, lake Sivash, and coastal wetlands of the northern Azov Sea are difficult of access because of reedy and waterlogged shoreline in places. Besides, impassable and almost impassable sites (precipices, rocky chaoses and screes) are situated in some places round Crimea (e.g., along the Tarkhankut peninsula, capes Fiolent, Aya, Sarych, Ayudag, Meganom, Kazantip, mountains Karadag and Opuk).

Table 1.2. Characteristics of Black Sea maritime and seashore areas of the riparian countries

	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine
Maritime areas, <i>km</i>²						
internal waters	1,474	42.7 ^a	58 ^b	80 ^c	–	5,640 ^d
territorial sea	6,506	1,204	5,270	7,800 ^e	30,189.6	24,000 ^e
exclusive economic zone	25,699	5,875	≈12,000	≈40,000 ^e	172,991.3	91,000 ^e
shelf area (0–200 m deep)	10,886	n.d.	n.d.	3,800	19,360.4	48,600
Depth range, <i>m</i>						
internal waters	0–55	0–11	n.d.	0–10 ^f	–	n.d.
territorial sea	17–85	0–295	0–20	0–1,500 ^e	0–1,987	n.d.
exclusive economic zone	40–130	200–1,900	20–100	200–2,200	up to 2,267	n.d.
Coasts						
coastline in total, <i>km</i>	378	316.7	244	400 ^g	1,446.2	1,802 ^h
seashore area in total, <i>km</i>²	6,429	11.2	≈750	70 ^g	n.d.	n.d.

^a – Batumi, Poti and Supsa areas;

^b – Danube delta;

^c – Besides, Russian internal waters in the Kerch Strait and Azov Sea come to 5,370 *km*²;

^d – Besides, Ukrainian internal waters in the Kerch Strait and Azov Sea come to some thousands *km*²;

^e – The delimitation of exclusive economic zones between Russia and Ukraine in the Black Sea is expected in the future. This also concerns territorial waters of both countries in the Azov Sea and Kerch Strait (these areas and relevant depths are not included in the table);

^f – A depth of Russian internal waters in the Kerch Strait and Azov Sea does not exceed 5 and 6 *m*, respectively;

^g – In addition, Russian coastline and seashore area in the Kerch Strait and Azov Sea come to 460 *km* and 75 *km*²;

^h – This figure concerns the Black Sea coast only but not the Ukrainian coasts in the Kerch Strait and Azov Sea;

n.d. – no data were presented by the National Consultants.

2. LEGAL AND ADMINISTRATIVE INSTRUMENTS

ML is part of the broader problem of solid waste management which is closely linked to major problems of public health, conservation of the environment, and sustainable development in the Black Sea region. ML originates from various land- and sea-based sources as a result of manifold human activities and, evidently, causes multivectorial negative impact on the population, wild life, abiotic nature and some sectors of economy. Floating ML and ML items suspended in the water are transported by currents and winds throughout the sea and, thereby, cause transboundary dissemination of solid wastes and basin-wide enlargement of the problem.

Therefore, Black Sea ML is a matter of regulation to some extent (but so far always incompletely) by a series of legal acts aimed to harmonize relevant activities on the international, regional and national levels. However, up till now there is no any jural instrument dedicated specifically to the management of ML problem in the Black Sea marine and coastal environment. Moreover, the concept of ML problem and “marine litter” itself, as a law-term in its proper definition (UNEP, 2005; see Introduction), are not accepted nor it is well-known yet in the Black Sea community.

2.1. INTERNATIONAL AND REGIONAL LEGAL INSTRUMENTS

A list of international and regional instruments which are relevant (directly or indirectly) to and can be used for the prevention and mitigation of the Black Sea ML problem is presented in Table 2.1.

The Convention on the Protection of the Black Sea Against Pollution (the Bucharest Convention, 1992) is predestined to prevent, reduce and control any kind of pollution within the territorial sea and exclusive economic zone of all Black Sea states, with peculiar emphasis on such kinds of pollution as:

- pollution by hazardous substances and matter (Article VI);
- pollution from land-based sources (Article VII and the Protocol on the Protection of the Black Sea Marine Environment Against Pollution from Land-based Sources);
- pollution from vessels (Article VIII);
- pollution caused by emergency situations (Article IX and the Protocol on Cooperation in Combating Pollution of the Black Sea by Oil and Other Harmful Substances in Emergency Situations);
- pollution by dumping (Article X and the Protocol on the Protection of the Black Sea Marine Environment Against Pollution by Dumping);
- pollution from activities on the continental shelf (Article XI);
- pollution from or through the atmosphere (Article XII); and
- pollution by hazardous wastes in transboundary movement (Article XIV).

Most above articles and protocols are applicable to restrain the ML problem. Three lists of hazardous substances and matter, which are annexed to the Convention and to the Protocols on the Pollution from Land-based Sources and by Dumping, include “persistent synthetic materials which may float, sink or remain in suspension” or, in other words, –those materials which constitute plastic ML.

In accordance with the Protocol on the Pollution from Land-based Sources, the Black Sea states should prevent, reduce and control pollution caused by discharges from any sources on their territories such as rivers, canals, coastal establishments, other artificial structures, outfalls or run-off, etc. Each Black Sea state should also carry out “monitoring activities in order to assess the

levels of pollution, its sources and ecological effects along its coasts”, in particular, with regard to the hazardous substances and matter (e.g., persistent synthetic materials).

Table 2.1. Participation of Black Sea states in the conventions and international agreements which are relevant to the management and mitigation of ML problem

Title of convention or agreement	Date of entering into force					
	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine*
Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention)	15.01.94	12.01.94	29.09.92	12.08.93	06.03.94	14.02.94
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	19.05.05	08.02.95	18.03.93	03.11.83	10.10.90	25.01.94
Annex V to MARPOL 73/78 (optional annex covering garbage; the Black Sea is designated as a Special Area with regard to this annex)	19.05.05	08.02.95	30.08.01	31.12.88	31.12.88	17.10.89
Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention)	24.02.06	no	no	29.01.76	no	06.03.76
Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)	16.05.96	18.08.99	26.01.91	01.05.95	22.06.94	01.07.99
United Nations Convention on Biological Diversity (CBD)	16.07.96	31.08.94	02.08.94	29.12.93	14.02.97	01.07.99
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	01.05.91	no	25.03.93	no	01.09.84	29.10.96
Convention on the Conservation of Migratory Species of Wild Animals (CMS, Bonn Convention)	01.11.99	01.01.00	26.01.98	no	no	19.03.99
Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	01.06.01	01.01.00	30.05.00	no	no	09.07.03

* Dates of ratification of the international treaties.

The Protocol on the Pollution by Dumping prohibits dumping in the Black Sea of wastes or other matter which contain the hazardous substances. At the same time, “dumping in the Black Sea of all other wastes or matter requires a prior general permit from the competent national authorities.” Such permits may be issued after consideration of (a) characteristics and composition of the matter intended for dumping, (b) characteristics of the proposed dumping site and disposal method, and (c) possible negative effects of the dumping and practical availability of alternative disposal methods. The Commission on the Protection of the Black Sea Against Pollution (BSC) should be informed by the contracting parties about such national permits as well as about all casual dumping events forced by emergency situations.

In some way, the ML problem can be managed also through the Black Sea Biodiversity and Landscape Conservation Protocol to the Bucharest Convention (Sofia, 2002). In accordance with

this protocol (Article 11, §4), the Black Sea states should “co-operate in developing and harmonising their laws, regulations and procedures relating to liability, assessment of and compensation for damage caused by human activities and/or pollution of the marine environment of the Black Sea, in order to ensure the highest degree of deterrence and protection for the biological and landscape diversity of the Black Sea as a whole”. The scope of this protocol embraces maritime and coastal areas of the Black Sea and the Sea of Azov.

Regarding the pollution from vessels, the Bucharest Convention (Article VIII) demands from the contracting parties the observance of generally accepted international rules and standards.

The International Convention for the Prevention of Pollution from Ships (London, 1973 and 1978 [protocol]; MARPOL 73/78) is the basic convention aimed at combatting pollution from the shipping. This instrument regulates quantities of various wastes that vessels may discharge into the sea. The Regulations for the Prevention of Pollution by Garbage from Ships (Annex V to the Convention) has a special relation to the ML problem because any garbage or solid waste thrown out overboard can be considered as ML. This annex specifies distances from land and methods by which different types of garbage may be disposed from all kinds of vessels and fixed or floating platforms. The disposal/dumping of any plastics (including but not limited to synthetic ropes, synthetic fishing gear and plastic garbage bags) is completely prohibited. The disposal of dunnage, lining and packing materials (other than plastics) is prohibited if the distance from the nearest land is less than 25 nautical miles. The disposal of food wastes and all other non-plastic garbage (including paper, rags, glass, metal, bottles, crockery and similar refuse) is prohibited if the distance from the nearest land is less than 12 nautical miles.

According to Regulation 5 of Annex V, the Black Sea is defined as a Special Area¹ with much stricter requirements on the disposal of garbage than in many other maritime areas of the world. Any discharges of garbage (except food waste) are prohibited here. However, the garbage discharge requirements for a region that has been designated as a Special Area (e.g., the Black Sea area) will not enter into force until adequate garbage reception facilities are provided by all riparian countries in their ports and harbours.

Following MARPOL 73/78 and its amendments, vessels of 400 gross tons and above, or ships certified to carry more than 15 persons should develop a garbage management plan including;

- description of the collection, processing, storage and disposal procedures of each type of waste produced by the ship (including hazardous and medical wastes);
- a list of waste management techniques and equipment that are in use on the ship;
- provisions for the discharge and record of garbage (e.g., garbage record book);
- designation of a person responsible for carrying out the plan.

The Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention, 1972) is destined to control the pollution by wastes and dredged spoils which are loaded on ships for the intentional purpose of dumping them at sea. In contrast to MARPOL 73/78, this Convention does not address wastes that have been produced during the normal operation of ships. Annex 1 to the Convention lists wastes and other matter that must not be dumped (dumping them is prohibited), including such potential ML items as “persistent plastics and other persistent synthetic materials, for example, netting and ropes, which may float or may remain in suspension in the sea”. It is recognized by the contracting parties that plastic materials and other materials that may cause problems of entanglement and ingestion by marine organisms constitute an environmental hazard (UNEP, 2005).

Article 45 of the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (BS SAP, 1996) envisages that the Black Sea states will consider amending the Protocol on the

¹ “Special area” means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by garbage is required (MARPOL 73/78, Annex V, Regulation 1(3)).

Pollution by Dumping to the Bucharest Convention in accordance with the London Convention. The Commission on the Protection of the Black Sea Against Pollution confirmed this intention in 2002 and adopted some actions required (BSC, 2002):

- promoting ratification of the London Convention by the Black Sea states, and
- relevant amending the Protocol on Dumping to the Bucharest Convention before the next Ministerial Meeting in 2007.

The Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (the Basel Convention, 1989) deals with problems of transboundary movements and environmentally sound management of hazardous wastes and other wastes. Annex 1 to the Convention lists 45 categories of wastes to be controlled, including, for instance, “Y1: Clinical wastes from medical care in hospitals, medical centers and clinics”. Annex 2 defines two categories of wastes requiring special consideration: “Y46: Wastes collected from households” and “Y47: Residues arising from the incineration of household wastes”. It is very likely that hazardous ML from land-based sources falls under the scope of the Convention mainly (but not only) under the categories of wastes requiring special consideration (wastes of household origin). Plastic wastes should be considered as a “Basel” wastes if they possess any hazardous characteristics as identified in Annex III of the Convention (e.g., explosive, flammable, ecotoxic, etc.) or contain Annex I material to an extent causing them to exhibit an Annex III characteristic. Such potentially hazardous wastes are classified in Annex IX, List B of the Convention (e.g., “B1115: Waste metal cables coated or insulated with plastics”; “B1180: Waste photographic film containing silver”; a long list of “B3010: Solid plastic waste”).

A number of Technical Guidelines for the Environmentally Sound Management of hazardous and other wastes, adopted by the parties to the Basel Convention, would be relevant to the ML problem (UNEP, 2005), such as:

- Technical Guidelines on Wastes Collected from Households;
- Technical Guidelines on Specially Engineered Landfill; and
- Technical Guidelines for the Identification and Environmentally Sound Management of Plastic Waste and for their Disposal.

In 1999, the Basel Declaration on Environmentally Sound Management was signed by the parties. This document is intended to improve implementation of the Convention in fields of the prevention, minimization, recycling, recovery and disposal of hazardous and other wastes, particularly, by means of the enhancement of institutional and technical capabilities, especially in developing countries and countries with economies in transition. The Strategic Plan for the Implementation of the Basel Convention was adopted at the 6th Conference of the Parties (2002).

Some other international instruments have indirect relation to the control of ML problem.

The Convention on Biological Diversity (CBD; Rio de Janeiro, 1992) concerns the protection, management and sustainable use of the biodiversity in general, and its subsidiary programme called “Jakarta Mandate on Marine and Coastal Biodiversity” (1995; work program – 1998, updated in 2004) is concentrated on relevant issues in the marine and coastal environment, including some ML-related aspects such as (UNEP, 2005): the smothering of the seabed; effects of entanglement and ingestion of litter on fish, marine mammals and seabirds; dissemination of alien species (ML as a vector for transport of invasive species). **The Convention on the Conservation of European Wildlife and Natural Habitats** (the Bern Convention, 1979) is an instrument in the field of nature conservation, which covers the whole of the natural heritage of the European continent. Its aims are to conserve wild flora and fauna and their natural habitats and to promote European co-operation in that field. The Convention is a fundamental treaty at European level for biological diversity; it co-ordinates the action of European states in adopting common standards and policies for the sustainable use of biodiversity. The parties of the Convention should include all appropriate measures in their planning and development policies and pollution control, with obvious attention to the ML issues among other environmental problems. In 2004,

the Strasbourg Declaration on the role of the Bern Convention in the preservation of biological diversity was adopted. **The Convention on the Conservation of Migratory Species of Wild Animals** (CMS or the Bonn Convention, 1979) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is an **intergovernmental treaty**, concluded under the aegis of the UNEP, concerned with the conservation of wildlife and habitats on a global scale. Migratory species which can be threatened with extinction are listed in **Appendix I** of the Convention. Two species of Black Sea animals – the Mediterranean monk seal (*Monachus monachus*) and sturgeon (*Acipenser sturio*) – are inserted into CMS Appendix I. The parties that are range states of these species should endeavour;

- a) to conserve and, where feasible and appropriate, restore those habitats of the species which are of importance in removing the species from danger of extinction;
- b) to prevent, remove, compensate for or minimize, as appropriate, the adverse effects of activities or obstacles that seriously impede or prevent the migration of the species; and
- c) to the extent feasible and appropriate, to prevent, reduce or control factors that are endangering or are likely to further endanger the species, including strictly controlling the introduction of, or controlling or eliminating, already introduced exotic species.

Migratory species that need or would significantly benefit from international co-operation are listed in **Appendix II** of the Convention. All three species/populations of Black Sea cetaceans – the harbour porpoise (*Phocoena phocoena*), short-beaked common dolphin (*Delphinus delphis*) and common bottlenose dolphin (*Tursiops truncatus*) – along with the Mediterranean monk seal (*M. monachus*) and six species of sturgeons (*Huso huso*, *Acipenser gueldenstaedtii*, *A. nudiiventris*, *A. ruthenus* [Danube population], *A. stellatus* and *A. sturio*) are listed in CMS **Appendix II**. The Convention encourages the range states to conclude regional agreements for the protection of such species. In this respect, CMS acts as a framework convention. Following this option, **the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area** (ACCOBAMS; Monaco, 1996) has been concluded under the auspices of CMS, and most Black Sea countries (except Russia and Turkey) are at present the parties of the Agreement. Significantly, that membership is also open to non-coastal states outside the Agreement area ("third countries") whose vessels are engaged in activities that may affect Black Sea and Mediterranean cetaceans. ACCOBAMS aims to reduce threats to all cetaceans in these waters and to promote closer cooperation amongst the parties with a view to conserving all cetacean species present in the area. The Conservation Plan (Annex 2 of the Agreement) includes a series of measures linked to ML problem in the Black Sea region. For example, the parties should:

- introduce or amend regulations with a view to preventing fishing gear from being discarded or left adrift at sea;
- regulate the discharge at sea of, and adopt within the framework of other appropriate legal instruments stricter standards for, pollutants believed to have adverse effects on cetaceans;
- collect and analyse data on direct and indirect interactions between humans and cetaceans in relation to inter alia fishing, industrial and touristic activities, and land-based and maritime pollution; and take appropriate remedial measures and develop guidelines and/or codes of conduct to regulate or manage such activities.

In accordance with basic norms of international law, national legislation of the parties to above multilateral conventions/agreements should be brought to conformity with these instruments.

2.2. NATIONAL LEGAL AND ADMINISTRATIVE INSTRUMENTS

National consultants on ML indicated that the ML problem is addressed to some extent in their countries by a number of instruments concerned with various fields of public administration, social life and different human activities (Table 2.2).

Table 2.2. Presence of ML-related items in national legal and administrative instruments regulating different human activities

National instruments concerning:	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine
• protection of the environment	yes	yes	yes	Yes	yes	yes
• public health	yes	yes	yes	Yes	yes	yes
• coastal and urban development	yes	yes	yes	Yes	yes	yes
• marine and riverine traffic	yes	yes	yes	Yes	yes	yes
• fishery and aquaculture	yes	no	yes	Yes	yes	yes
• tourism and recreation	yes	yes	yes	Yes	yes	yes
• offshore gas and oil exploitation	no	yes	no	Yes	yes	yes
• agriculture and farming	no	yes	no	No	yes	yes
• industry (various branches)	yes	yes	no	No	yes	yes
• protection of state boundaries	yes	no	yes	No	yes	yes
• military (defence) activities	no	yes	yes	Yes	yes	yes
• criminal and administrative offences	yes	yes	yes	Yes	yes	yes

Most national legislative acts, dealing with ML issues, and relevant documents generated by central governments are listed in Table 2.3.

Table 2.3. National legal acts and central government documents relevant to the management of ML problem

Country	Title of legal act	Date of entering into force
Bulgaria	Water Act	28.01.2000
	Territorial Development Act	31.03.2001
	Law on fishing and aquacultures	2001
	Law on Biological Diversity	09.08.2002
	Environmental Protection Act	25.09.2002
	Waste Management Act	30.09.2003
	Act on Sea Areas, Inner Water Ways and Ports (last amendment on 26.05.2006)	23.03.2004
	Law on Human Health	01.01.2005
	Merchant Shipping Code	27.12.2005
Georgia	Code of Administrative Offences (with subsequent amendments)	15.12.1984
	Law on the Environmental Protection	10.12.1996
	Maritime Code	15.05.1997
	Law on Water	17.10.1997
	Law on Public Health	10.12.1997

Country	Title of legal act	Date of entering into force
	Law on the Maritime Areas	24.12.1998
	Sanitary Code	08.05.2003
	Law on Wastes (drafted but not adopted yet)	–
Romania	Water Law (#107/1996; amended on 30.06.04, #310/2004)	08.10.1996
	Ordinance of urgency on wastes system/policy (#78/2000)	22.06.2000
	Law on the approval of the Ordinance of urgency on wastes system/policy (#426/2001)	25.07.2001
	Law on the approval of financing contract for the Project on the Environment and Infrastructure in the Port of Constanta (#517/2001)	24.10.2001
	Ordinance of urgency on the integrated management of costal zone (#202/2002)	28.12.2002
	Law on the approval of the Ordinance of urgency on the integrated management of costal zone (#280/2003)	26.06.2003
	Government decision on the control of bringing in Romania the non-hazardous wastes for their import, active improvement and transit (#228/2004)	04.03.2004
	Government decision on the approval of the Regulations for organization and operation of the National Committee of Costal Zone (#1015/2004)	08.07.2004
	Government decision on the establishment of the environmental assessment procedure for plans and programmes (#1076/2004)	05.08.2004
	Government decision on the approval of National strategy and National plan for waste management (#1470/2004)	18.10.2004
Russia	Government decision regarding the landfill waste disposal (#349/2005)	10.06.2005
	Ordinance of urgency on the integrated prevention and pollution control (#152/2005)	10.11.2005
	Ordinance of urgency on the environmental protection (#195/2005)	30.01.2006
	Water Code	16.11.1995
	Law on the Continental Shelf of the Russian Federation	30.11.1995
Turkey	Law on the Waste Production and Consumption	24.06.1998
	Law on the Sanitary and Epidemiological Welfare of the Population	30.03.1999
	Law on the Protection of the Environment	10.01.2002
	Law of the Harbour	20.04.1925
	Law of the Public Hygiene	06.05.1930
	Law of the Turkish Coast Guard Command	13.07.1982
	Law on the Organization, Duties and Authority of the Gendarmerie	10.03.1983
	Law on the Environment (amended in 2006)	11.08.1983
	Law of the Coast (amended in 1992)	17.04.1990
	Decree Law on establishment/functions of the Ministry of Environment	09.08.1991
	Decree Law on establishment/functions of the Undersecretariat for Maritime Affairs	19.08.1993
	Decree Law on Organization/Functions of the Ministry of Environment and Forestry	08.05.2003
	Law of the Metropolitan Municipality	10.07.2004
	Turkish Criminal Code	26.09.2004
Ukraine	Law on the Response and Coverage of Damages in Emergency Situations caused by Pollution of the Marine Environment by Oil and Other Harmful Substances	11.03.2005
	Law of the Municipality	03.07.2005
	Code of Administrative Offences (#8074-10; with subsequent amendments)	07.12.1984
	Law on the Protection of the Environment (#1268-XII)	26.06.1991
	Principle Legislation on Public Health	1992

Country	Title of legal act	Date of entering into force
	Law on the assurance of sanitary and epidemiological wellbeing of the population	24.02.1994
	Code of Trading Navigation (#277/94)	09.12.1994
	Water Code (amended in 2000)	06.06.1995
	Resolution of the Cabinet of Ministers "On the adoption of rates for the estimation of compensation and harmfulness caused by pollution from ships and other floating facilities in territorial and internal marine waters of Ukraine" (#484d)	03.07.1995
	Resolution of the Cabinet of Ministers "An order for the estimation of compensation and harmfulness caused by contamination from ships and other floating facilities in territorial and internal marine waters of Ukraine" (#116)	26.10.1995
	Law on Waste (#187/98; amended in 2001)	05.03.1998
	Resolution of the Cabinet of Ministers on the "Rules for the protection of surface waters from the pollution by waste waters" (#431; amended in 2002)	1999
	Law on the adoption of the National Programme for the Protection and Recovery of the Environment of the Azov and Black Seas (#2333-III)	22.03.2001
	Resolution of the Cabinet of Ministers on the "Rules for the protection of internal marine waters and territorial sea from pollution and littering" (#269)	31.03.2001

The subordinate administrative documents relevant to ML items are presented in Table 2.4.

Table 2.4. Administrative instruments regulating ML problem on subordinate (ministerial, province, district, municipal, harbor, etc.) levels

Country	Title of document	Date of entering into force
Bulgaria	Decree #87 on the Ratification of the Convention on Environmental Impact Assessment in Transboundary Context	23.03.1995
	Guidelines for the development of waste management programs (Protocol #4)	02.04.1998
	Rules obligatory for the region under the jurisdiction of "Marine Administration" Executive Agency (Varna and Bourgas)	1998
	Regulation on the requirements for treatment and transportation of industrial and hazardous waste (adopted by Decree of the Council of Ministers #53/1999)	1999
	Plan for monitoring of objects on the territory of Port of Varna Ltd.	1999
	Regulation on the procedure and manner for establishment of networks and on the operation of the National Water Monitoring System	21.11.2000
	Plan for monitoring of objects on the territory of Port of Bourgas Ltd.	2000
	Regulation on the quality of coastal marine waters	25.01.2001
	Regulation on the requirements for operational suitability of all, except navy ports, for qualification of the workforce and for issuing certificates for operational suitability which comprises requirements concerning adequacy of port reception facilities and waste reception and handling plans	19.06.2001
	Regulation for the activity, organization of work and staff of the Basin Directorates	29.01.2002
	Regulation on the quality of bathing water	25.02.2002
	Regulation on the terms and conditions for carrying out environmental impact assessment	18.03.2003
	Regulation #2 on the terms and conditions for carrying out environmental assessment on national, regional and district development plans and programmes, on urban development plans and their amendments	18.03.2003 (repealed)
	Regulation on the procedure for determination of sanctions for deterioration or pollution of the environment above the limits	06.09.2003
	Ordinance on the waste classification	25.05.2004

Country	Title of document	Date of entering into force
	Regulation for the activity, organization and staff of the Regional Environmental Inspectorates	27.07.2004
	Ordinance on the conditions and requirements for construction and operation of incineration-plants and co-incineration plants	07.09.2004
	Ordinance on the requirements for sites determined for placing of waste treatment facilities	17.09.2004
	Ordinance on the conditions and requirements for construction and operation of landfills and other facilities and installations for waste disposal and recovery	24.09.2004
	Ordinance on the order and the formats on which information for waste activities is provided, as for the order for keeping public register of the issued permits, registration documents and of the closed facilities and operations	26.10.2004
	Order of the Minister of Environment and Waters for approval of guidelines for the development of plans for adjusting the existing landfills in accordance to regulations (#ПД-1242)	24.11.2004
	Regulation on the conditions, procedure and methods for environmental assessment of plans and programs	2004
	Regulation on the delivery and reception of ship generated waste and cargo residues	01.01.2005
	Establishment rules of the "Marine Administration" Executive Agency	12.05.2005
	Statute for structure and activity of Regional Inspectorates for Protection and Control of Public Health	2005
	Order of the Minister of Environment and Waters for new guidelines for the development of municipal programs for waste management (#ПД-167)	24.03.2006
	Regulation concerning the rules and standards for territory-organizing planning of the Black Sea coast	
	Order #272 on the categorisation of water sources and water receiving bodies	
	National Waste Management Program for 2003-2007	
	National Environmental Strategy and National Action Plan for 2005-2014	
	National Strategy for Water Sector Management to 2015	
	National Programme for Priority Construction of Urban WWTPs	
	National Program for Ports Development	
	Mandatory Rules for the region under the jurisdiction of the Bulgarian Marine Administration	
	Port Waste Management Programs (all ports have such program)	
	Municipal Waste Management Programs (all municipalities have such program)	
	Contracts for the concession of beaches along the Black Sea coast	
Georgia	Decree of the Ministry of Public Health (#36/n)	24.02.2003
	All coastal municipal services and ports act according to sanitary guidelines developed locally on basis of relevant national legal and administrative instruments	
Romania	Government decision #349/2005 regarding the incineration of waste	14.02.2002
	Government decision on the establishment of the frame procedure for environmental impact assessment and on the approval of the list of public or private projects subjected to that procedure (#918/2002)	17.09.2002
	RMTCT order of on the installations for shipyard reception of waste generated on the ships and residual stuff (#779/2002)	29.11.2002
	Government decision on the designation of public authorities in charge of the control and monitoring of the waste import, export and transit activities (#1357/2002)	10.12.2002
	RMEWM order for the approval of the procedure of environmental impact assessment and issuing of the environmental agreement (#860/2002)	31.01.2003

Country	Title of document	Date of entering into force
	RMEWM order on the approval of the methodological guidelines applicable to the frame procedure of environmental impact assessment (#863/2003)	31.01.2003
	RMEWM order for the approval of the procedure of issuing the integrated environmental authorisation (#818/2003)	13.11.2003
	RMEWM order on the approval of the general technical guide for the appliance of the procedure of issuing the integrated environmental authorisation (#36/2004)	19.01.2004
	RMTCT order on the approval of methodological norms regarding authorisation and classification of tourist activities in the costal zone (#455/2004)	18.03.2004
	Order of RMEWM (#2/2004), RMTCT (#211/2004) and RMEC (#118/2004) for the approval of waste shipping control and regulation procedure on Romanian territory	15.04.2004
	Order of RMEWM (#38-SMI/2004), RMTCT (#1044/2004) and RMPH (#671/2004) on the approval of the Code of conduct/policy for recreation activities in the costal zone	15.06.2004
	RMEWM order for the approval of the procedure for authorising activities with the significant environmental impact (#876/2004)	11.01.2005
	RMEWM order on the approval of technical norms for waste incineration (#756/2004)	26.02.2005
	RMEWM order on the approval of technical norms for waste disposal (landfill) (#757/2004)	26.02.2005
	RMEWM order regarding the setting-up of criteria and preliminary procedures of waste acceptance for disposal and the National list of the accepted waste in each class of waste disposal sites (#95/2005)	08.03.2005
	RMEWM order regarding the issuing of environmental permit (note) for ceasing waste disposal activities, i.e. landfill and incineration (#1274/2005)	28.12.2005
Russia	Order of the Committee for Environment Protection on the Federal Catalogue of Waste Classification (#527)	27.11.1997
	Law of Krasnodar Krai [Territories] on Waste Production and Consumption (#245-KZ)	13.03.2000
	Law of Krasnodar Krai [Territories] on Sanitary and Epidemiological Welfare of the Population in Krasnodar Krai" (#497-KZ)	26.06.2002
	Law of Krasnodar Krai [Territory] on Natural Healing Resources, Health-improving Areas and Health Resorts in Krasnodar Krai" (#585-KZ)	03.03.2003
Turkey	Regulations of Rize harbour	04.12.1980
	Regulations on fixing penalties to ships and vessels and procedures to let them off a penalty	03.11.1987
	Regulations on the control of solid waste	14.03.1991
	Regulations on the control of medical waste	22.07.2005
	Regulations on the control of hazardous waste	14.03.2005
	Regulations of Istanbul harbour	06.09.1996
	Regulations of Trabzon harbour	12.08.1999
	Regulations on environmental impact assessment	16.12.2003
	Regulations of ship dismantling	08.03.2004
	Regulations on waste purchase service from the vessels	11.03.2004
	Regulations on waste control of excavations soil, construction and debris wastes	18.03.2004
	Regulations on packaging and packaging waste control	30.07.2004
	Regulations on the control of used batteries and accumulators	31.08.2004
	Regulations on reception of waste from the ships and waste control	26.12.2004
	Regulations on the control of water pollution	31.12.2004
	Regulations on urban wastewater treatment	08.01.2006
	Regulations on bathing waters	09.01.2006

Country	Title of document	Date of entering into force
Ukraine	UMPH order on the approval of the State sanitary rules and norms on coastal marine water protection against pollution in the places of population water use (#631-88)	06.07.1988
	UMPH order on the approval of the State sanitary rules and norms on surface water protection against pollution (#4630-88)	01.01.1989
	UMPH order on the approval of the State sanitary rules and norms on waste water, oil-contained and ballast water and litter discharge from vessels (#199-97)	09.07.1997
	UMTC Rules of Registration of Operations with Harmful Substances on Ships, Marine Installations and Ports (# 452/5643)	10.04.2001
	Regulations on Ports of Ukraine	

The detailed comparative analysis of above national instruments (which are numerous and heterogeneous indeed) and verification of their conformity with respective international and regional legal acts represent special tasks overstepping capabilities of this report. Certainly, this analytical work should be done in the future, and appropriate recommendations on the harmonization and improvement of national legislation should appear as a result. Nevertheless, it seems pertinent to underline at least five important points reflecting present situation;

- 1) all six Black Sea states are in transition process of developing and updating their national instruments aimed at combatting marine pollution including ML (or solid waste) component;
- 2) actual rate of this process and concrete instruments developed are quite different in different countries;
- 3) however, general trends of this process regarding the ML problem are common in all Black Sea states: (a) to prohibit any deliberate discharge of potential ML at sea and on the shore-strip; (b) to improve solid waste collection, processing, storage, disposal and recycling facilities; and (c) to enhance governmental control of activities mentioned in (a) and (b);
- 4) national policies in the Black Sea states are aimed at waste minimization, reuse, recycling and recovery of landfills. The major legislative and regulatory tools for waste management are adequately developed in the Black Sea countries, and include basic laws and regulations. The new EU member countries Bulgaria and Romania and candidate country Turkey (The EU Commission started to prepare an Accession Partnership for Turkey, which was declared on March 8th, 2001) transpose relevant EU directives and standards in their national legislation;
- 5) one of the main management problems affecting most Black Sea countries consists in imperfect ability to apply the existing laws and regulations. Being declared once, they should be implemented by proper way but sometimes they do not work so far or work inadequately.

3. EXISTING INSTITUTIONAL ARRANGEMENTS

3.1. INTERGOVERNMENTAL ORGANIZATIONS

The Commission on the Protection of the Black Sea Against Pollution (the Black Sea Commission or BSC) and its Permanent Secretariat consolidate the regional activities on ML and other types of marine pollution on base of the implementation of the Bucharest Convention and its Protocols (see Section 2.1), and the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (see Section 4).

There are seven BSC Advisory Groups which provide their expertise and information support to the Commission and Secretariat on following items: (a) pollution monitoring and assessment; (b) control of pollution from land based sources; (c) development of common methodologies for integrated coastal zone management; (d) environmental safety aspects of shipping; (e) conservation of biological diversity; (f) environmental aspects of the management of fisheries and other marine living resources; and (g) information and data exchange. The advisory groups (a), (b), (c) and (d) seem to be the most pertinent to the addressing ML problem, although the other advisory groups are concerned about ML sources, effects and management too. In addition, two *ad hoc* working groups have been set up for the promotion of the European Water Framework Directive (#2000/60/EC) and for the implementation of the Memorandum of Understanding between the BSC and Danube Commission (the Danube/Black Sea Joint Technical Working Group).

Within the institutional framework co-ordinated by the BSC, seven Black Sea Regional Activity Centres (RAC) have been established on base of existing national organizations. Four of them may be especially helpful for the development of the regional ML activities:

- RAC on Pollution Monitoring and Assessment (Ukrainian Scientific Center of Ecology of the Sea, Odessa, Ukraine);
- RAC on Control of Pollution from Land Based Sources (Ministry of Environment and Forestry, Provincial Directorate of Istanbul, Turkey)
- RAC on Development of Common Methodologies for Integrated Coastal Zone Management (Department of Natural Resources for Krasnodar Krai / Territory, Krasnodar, the Russian Federation);
- RAC on Environmental and Safety Aspects of Shipping (Marine Environment Pollution and Control Department of the Bulgarian Maritime Administration, Varna Directorate, Varna, Bulgaria).

BSC possesses co-operation links and options for consultative conversation with other intergovernmental organizations involved in marine pollution affairs at the global and regional level, including the United Nations Environment Programme (UNEP), International Maritime Organization (IMO), World Health Organization (WHO), UN Food and Agriculture Organization (FAO), Intergovernmental Oceanographic Commission (IOC) of UNESCO, Mediterranean Science Commission (CIESM), Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), and different institutions of the European Union (EU). The BSC Secretariat has also relations with the secretariats of the CBD, Bern Convention, CMS and ACCOBAMS (see Section 2.1). The Black Sea states can collaborate with all above organizations directly or through the BSC Secretariat.

UNEP. ML is a priority activity for the UNEP's Regional Seas Programme. The Governing Council decision 22/2 IIA on this Programme, calls for the utilization of the regional seas conventions and action plans (including, among them, the Bucharest Convention and the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea) as a platform for the regional implementation of multilateral environmental agreements and global programmes and initiatives. In resolution

59/25 on “Oceans and the law of the sea”, in paragraph 92, it is recommended that consultative process during its deliberations on the report of the Secretary General, should organize its discussions around, among others, marine debris. Besides, the 8th special session of the UNEP Governing Council/Global Ministerial Environment Forum (2004) adopted appropriate decision SS.VIII/4 on Waste Management. Within this context, UNEP provides support to the BSC Secretariat for the development of Regional Activity on Marine Litter in the Black Sea within the framework of the Strategic Action Plan on Rehabilitation and Protection of the Black Sea (the Memorandum of Understanding between the BSC Secretariat and UNEP Regional Seas Coordinating Office was concluded in 2005).

In 1995, the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) has been adopted under the auspices of UNEP. GPA is an action-oriented programme with the goal of addressing the negative effects of land-based activities on the marine and coastal environment, with special emphasis on the inter-linkages between the marine, freshwater and coastal environment. At the 1st Intergovernmental Review Meeting (2001) representatives of 98 governments² expressed their concern that the marine environment is still being degraded to an increasing extent by pollution from different sources. Litter is one of principal pollution categories identified in GPA. It was recommended that states assess problems related to the severity and impacts of contaminants belonging to the principal categories including the ML.

IMO is involved, in particular, in regulatory and technical co-operation activities regarding port reception facilities. IMO maintains the Oil and Litter Information Network and adopted the Guidelines for the implementation of MARPOL 73/78. All Black Sea countries are the members of IMO.

WHO considers the ML problem as important constituent of medical, sanitary and aesthetic issues focused on the safe and salubrious use of the aquatic and coastal environment for public recreation and tourism. WHO published a series of reports on this topic (e.g., WHO, 1990, 1994) and produced appropriate guidelines. The Guide on the Monitoring Bathing Waters (Bartram and Rees, 2000) includes WHO recommendations regarding the methodology of ML surveying on the beaches and at sea (Chapter 12 by A.T. Williams, K. Pond and R. Philipp). The Guidelines for Safe Recreational Water Environments (WHO, 2003) describes possible adverse impacts of the recreational use of coastal and aquatic environments upon the health of users. It also outlines monitoring, control and prevention strategies relating to the hazards associated with these environments. ML issues (including aesthetic parameters, economic consequences, marine debris monitoring and management) are present mainly in Chapter 9 of the Guidelines.

FAO has prepared the Code of Conduct for Responsible Fisheries (adopted in 1995) and technical guidelines for the implementation of the Code. Among other things, the Code includes management objectives and measures related to the ML problem: minimization of waste, discards, catch by lost or abandoned gear, prevention of losses of fishing gear, proper handling and storage of shipboard garbage. 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 Fisheries Industry Department of FAO has a programme on the “Impact of Fishing on the Environment”. FAO and IMO are involved in revising the Code of Safety for Fishing Vessels where the effects of litter could be included as an issue of concern (UNEP, 2005).

IOC. The 6th Session of the IOC Committee for the Global Investigation of Pollution in the Marine Environment (1986) recommended developing methodologies and facilitating efforts to monitor the amounts and types of persistent litter in the seas. Some relevant activities, including several pilot ML surveys and assessments, and the development of solid waste management plans, were realized in 1987-1999 in the Mediterranean and Caribbean regions, and in some places along the coasts of Africa. All Black Sea countries are the member states of IOC. Russia, Turkey and Ukraine are present also in the IOC Executive Council.

² The Black Sea states were represented by Russia and Turkey.

CIESM acts for the communication of scientific information and the development of scientific standards across the Mediterranean and Black Seas. In service to science, the Commission promotes cooperation among marine scientists of various disciplines. In service to society, CIESM draws upon its experts and the current scientific knowledge to deliver impartial and authoritative advice on a variety of issues, focused on the dynamics, processes, biodiversity, pollution and lasting protection of the Mediterranean and Black Sea ecosystems. In addition through its monitoring programs, the Commission keeps a watch at the regional level over sensitive indicators of the ecosystem change. Romania, Turkey and Ukraine are the member states of CIESM.

GESAMP is a multidisciplinary advisory panel consisting of independent experts nominated by a number of the United Nations Agencies (United Nations proper, UNEP, IMO, WHO, FAO, UNESCO-IOC, World Meteorological Organization, and International Atomic Energy Agency) involved in the protection of the marine and coastal environment at the global level. GESAMP addresses litter as one of important sources/categories of the adverse impact of land-based activities on the ocean. The priority actions recommended are as follows: improvement of waste materials recycling; improvement of port reception facilities; development of more degradable packaging materials; and improvement of education and public awareness (GESAMP, 2001).

EU environmental policy aims to achieve sustainability by including environmental protection in EU sectoral policies, preventive measures, the “polluter pays” principle, combatting environmental pollution at source, and shared responsibility. There are approximately 200 EU legal instruments covering a wide range of the environment-oriented fields, including water pollution, management of waste, nature conservation, and relevant European criteria and standards. The EU has adopted the Waste Framework Directive (1975), Directive on Hazardous Waste (1991), Directive on Integrated Pollution Prevention and Control (1996), Directive on the Landfill of Waste (1999), Directive on Port Reception Facilities for Ship-generated Waste and Cargo Residues (2000), Marine Strategy Directive (2005)³ and some other directives which have certain relation to the ML problem. The Sustainable Use of Natural Resources and Waste is one of four priority issues in the EU 6th Environment Action Programme (2001-2010). EU member states must ensure that an environmental impact assessment is carried out before approving certain public and private-sector development projects.

Until recently, there were no EU member states round the Black Sea, however, in 2007 two riparian countries – Bulgaria and Romania – were accepted to the EU, and Turkey has a status of the candidate country embarking on the course of joining the Union. In 2005, Bulgaria and Romania signed the Treaty of Accession to EU, with the objective to make all necessary preparations for their integrating into EU in 2007 or 2008. The negotiations with Turkey whose candidacy application was made in 1987 and accepted in December 2005 continue. The EU Commission started to prepare an Accession Partnership for Turkey, which was declared on March 8th, 2001. On the other hand, the framework regulation designed to furnish the legal basis for the Accession Partnership was adopted by the General Affairs Council on February 26th, 2001. With the adoption of these two documents, an important legal procedure concerning Turkey’s accession strategy was finalized. After the approval of the Accession Partnership by the Council and the adoption of the Framework Regulation, the Turkish Government announced its own National Program for the Adoption of the EU acquis on March 19th, 2001. The National Program was submitted to the EU Commission on March 26th, 2001. Besides, EU has relations (covering the environment protection aspects) with other Black Sea countries. EU is interested in and provides support for institutional, legal and administrative reforms in Ukraine and Georgia. In particular, the Ukraine Country Strategy Paper (2002-2006) and appropriate National Indicative Programme (2004-2006) were adopted by the European Commission in 2001 and 2003, respectively. Environmental issues are included as mandatory ones into the both documents.

³ The European Marine Strategy defines contamination by ML as a general problem for the European seas; principal ML sources are identified as shipping (incl. fishing and commercial shipping) and tourist/recreational activities. According to the opinion of the European Commission (<http://europa.eu/scadplus/leg/en/lvb/e50015.htm>).

3.2. NATIONAL GOVERNMENTAL AND NONGOVERNMENTAL ORGANIZATIONS

A wide variety of governmental organizations, NGOs and business establishments are concerned about marine and coastal pollution in the Black Sea states at the national and local level. Most of these entities, represented by ministerial and municipal structures and services, marine and sanitary inspections, research institutions and universities, port administrations, various agencies, companies and enterprises, and amateur ecological associations, are involved (or can be involved) in the activities addressing and combatting ML problem. The list of national organizations and specialists related to the ML management, research, monitoring, cleanup operations, utilization and public education is presented in Annex 3.

Bulgaria. The Bulgarian Ministry of Environment and Waters (BMEW), Ministry of Transport (BMT) and Ministry of Public Health (BMH) are at the head of ML activities regulated by the government.

BMEW includes two relevant departments responsible for the coordination and planning – the Department of Waste Management and Department of Waters. This ministry acts through such administrative/executive structures as the Bulgarian Black Sea Basin Directorate (BSBD) and Environmental Executive Agency (BEEA). BSBD has functional branches in the coastal cities of Varna and Bourgas. The Regional Environmental Inspectorates situated in the same cities are entrusted with a task of environmental control.

BMT acts through subordinate structures named as the Bulgarian Maritime Administration (BMA) and Bulgarian Port Administration which have their agencies/subdivisions of the same names in Varna and Bourgas.

The Marine Environment Protection and Control Department of the BMA is responsible for:

- control and protection of the Black Sea environment and the Danube River from pollution caused by shipping;
- administrative investigation in cases of marine pollution;
- examination of vessel's documentation related to the protection of the marine environment;
- examination of vessel's construction and equipment aimed to prevent marine pollution;
- control of port reception facilities and waste management plans in Bulgarian harbours and on ships;
- imposing fines and penalties in accordance to the national legislation;
- response to emergency situations accompanied with accidental pollution at sea.

BMH coordinates activities of the Regional Inspectorates for the Protection and Control of Public Health located in Bourgas, Varna and Dobrich. These inspectorates work in tight cooperation with municipalities/administrations of the cities, towns, villages and other populated sites on the Bulgarian coast.

The collected ML and solid wastes are treated in waste incinerators of the Port Varna and Port Bourgas (currently the latter is not in operation) and municipal landfills. There are several enterprises involved in this effort including the collection of ship garbage and port wastes (*e.g.*, Marine Antipollution Enterprise PLC, Port of Bourgas Ltd. and Port of Varna PLC).

Some research institutions of the Bulgarian Academy of Science are interested to participate in ML studies (*e.g.*, the Institute of Oceanology, Central Laboratory of General Ecology, and National Oceanographic Commission).

Bulgarian NGOs involved in ML activities could be listed as follows (alphabetically): the Bulgarian Biodiversity Foundation, Bulgarian National Association on Water Quality (BNAWQ), Center for Environment and Sustainable Development, Greener Bourgas Foundation (GBF), Institute for Ecological Modernization, Mayday Foundation, and 'Sea Friends' Marine Club.

Georgia. Two ministries – the Ministry of Environmental Protection and Natural Resources (GMEPNR) and the Ministry of Public Health (GMPH) – are responsible for the co-ordination of national activities on ML control in Georgia. In this context, for instance, the GMEPNR Department of Water Protection and GMPH Department of Sanitary and Epidemiological Supervision might be appropriate managerial authorities. However, according to expert evaluation by Tamar Gamgebeli (National Consultant on ML, GMEPNR Water Protection Department), at present there is no any governmental structure (or ministerial officer) specifically involved in ML management in Georgia in whole. Besides, there are no institutions involved in ML research and monitoring in this country.

The Adjarian Department of the Environment and Natural Resources along with Adjarian Department of Public Health are responsible for ML affairs in the Autonomous Republic of Adjara. These governmental bodies are not directly involved in ML management, but mainly in solid waste management in the populated localities (cities, towns and villages) and harbours. In Batumi (capital of the Adjara Autonomy) and other riparian cities/towns of Georgia and Adjara, the solid waste management is carried out by local municipalities by means of their sanitary service (inspectors), with assistance from the contracted commercial structures. In the ports of Batumi and Poti, local administrations deal with solid waste reception and disposal also through the contracted firms or derived enterprises (*e.g.*, Batumi Port Ecology Ltd. and Poti Port Office Ltd.). The "Black Sea Eco-Academy" NGO (Batumi) has some experience in public awareness activities against ML and garbage pollution.

No information is available regarding ML institutional arrangements in the Autonomous Republic of Abkhazia.

Romania. Central governmental structures involved in the management of ML affairs are represented by the Romanian Ministry of Environment and Water Management (RMEWM; including its Water Department), Ministry of Transportation (RMTCT), Ministry of Public Health (RmPh) and, to a certain extent, by the Ministry of Economy and Trade (RMEC). Contacts with municipalities (such as the City Administrations of Constantza, Eforie and Mangalia) and other local authorities are arranged with the help of the "Romanian Water" National Administration and the National Environment Protection Agency. These bodies and the RMEWM itself interact also with the subordinate Environment Protection Agencies located in Constantza (responsible for the Black Sea coastal zone) and Tulcea (responsible for the Danube Delta).

The collecting, transporting and final disposal of ML and household waste are developed by local sanitation companies established in the riparian cities and contracted by the municipalities. Port reception facilities (including services for garbage collection from vessels) and the incineration plant for ship-generated waste are dependent on the Constanta Shipyard. All above activities are authorized by the local Environment Protection Agencies and controlled by the Environmental Guard.

Institutions that could be involved in ML studies and monitoring (as a part of appropriate national system) are represented by: the National Research and Development Institute for Environmental Protection (INCDPM-ICIM), National Institute for Marine Research and Development (INCDM), National Institute for Research and Conservation of Danube Delta, and Danube Delta Biosphere Reserve, with advisory assistance from the Romanian Association for Solid Waste Management (ARS).

The environmental public movement in Romania seems to represent the most dynamic and coherent part of the nonprofit sector, at least in terms of activities conducted (regular coastal cleanup campaigns, public awareness and educational projects). Since 1990, environmental NGOs have constantly promoted networking, and some have reached distinguished levels of organizational development. According to the information presented by Alexei Atudorei (National

Consultant on ML, INCDPM–ICIM Environmental Engineering Department), at least eight NGOs are involved in ML-related activities in Romania, including one organization in Constanta (Mare Nostrum), one – in Cluj (Romanian Ornithological Society), one – in Galatsi (Prietenii Pământului) and five – in Bucharest (“UNESCO for Nature” Ecological Club, Black Sea University Foundation, Group of Underwater Research and Speleology, Romanian Association of Environmental Journalists, and Ecological Cooperation Group). Most of these NGOs (except Mare Nostrum) are situated quite far from the seacoast.

Some major stakeholders are involved in anti-ML cooperation. In particular, the shipping industry provided Romania with incineration plant; the tourism industry is involved in collecting and storage of ML generated on the public beaches near hotels, resorts, *etc.*

Russia. The central governmental organs which could be involved in solving the Black/Azov Sea ML problem are as follows:

- the Ministry of Natural Resources of the Russian Federation including the Federal Water Resources Agency;
- the Ministry of Public Health and Social Development of the Russian Federation including the Federal Service on Control in the Sphere of Public Health and Social Development, and the Federal Agency on Public Health and Social Development;
- the Ministry of Transport of the Russian Federation including the Federal Agency on Marine and Riverine Transport;
- the Federal Service on Hydrometeorology and Monitoring of the Environment; and
- the Federal Service on Ecological, Technological and Nuclear Control.

The regional governmental bodies are represented by environmental, health protection and marine transport authorities of two Russian provinces (subjects of the Russian Federation) located at the Black and Azov Sea coasts – the Krasnodar Krai and Rostov oblast. Among these authorities a key role could belong to the Department on Emergency Situations and State Ecological Control; Department of Biological Resources, Ecology and Fish Industry Activities (Krasnodar Krai); and to the Committee for Protection of the Environment and Natural Resources (Rostov oblast). The latter committee includes the Division on Management of the Use and Protection of Water Objects which seems to be the most relevant structure in regard to ML issues in Taganrog Gulf of the Azov Sea.

ML collecting services are developed in Russian harbours of Taganrog, Yeysk (the Azov Sea), Port Kavkaz (the Kerch Strait), Novorossiysk, Gelendzhik, Tuapse and Sochi (the Black Sea). Marine administrations of the seaports possess special vessels and organize regular cleanup operations; they collect ML from ships and the sea surface in harbours and anchorage areas.

On the seashore, the belts of sanitary protection are established along the entire coastline. Annually, just before and during summer holiday season, the administrations of coastal cities, towns and settlements carry out cleanup operations on municipal beaches, whereas the administrations of marine resorts, tourist centres and campsites do the same on the beaches used by their guests (holiday-makers).

No information about Russian NGOs interested in Black Sea ML problem was presented by the National Consultant.

Turkey. In Turkey, the Municipalities are the responsible authorities for the storage, transportation, recycling and disposal of the solid wastes. Outside of their authorization areas, the administrative district within the province has the responsibility.

Municipalities are prohibited to dump solid wastes to river beds and coastal zones, and Provincial Directorates of the Ministry of Environment and Forestry are in control of the issue. General

Directorate of Borders and Maritinal Health of Ministry of Health monitor the water quality. Ministry of Environment and Forestry takes measures to prevent environmental pollution.

According to the Law for Environment No. 2872, Amended Environment Law No. 5491, Law of the Metropolitan Municipality No. 5216 and Law of the Municipality No. 5393 the local district municipalities are responsible for the collection and transportation of all municipality solid wastes to the transfer stations.

According to the Law of the Environment Article 8; 'Waste discharging is forbidden to the receiving environment'. Control and audit, with the authorization of Laws and Regulations, belong to Provincial Directorates of the Ministry of Environment and Forestry. Licence authorization on marine issues such as bilge water and litter is provided by the Ministry of Environment and Forestry, and coastal Municipalities.

According to "Act on Guidelines for Response to Emergencies and Compensation of Losses in Case of Pollution of the Marine Environment from Oil and Other Harmful Substances" the powers, duties and responsibilities regarding drawing up of emergency response plans, implementation of emergency response plans in coastal areas, determination of the type and effects of pollution after the incident are vested in the Ministry of Environment and Forestry and Undersecretariat of Maritime Affairs; the executionary powers, duties and responsibilities regarding public security and police duties are vested in the Turkish Undersecretariat of Maritime Affairs and Coast Guard Command.

According to regulations on the control of solid waste, discharging of solid wastes into the sea, river and other receiving environments, streets, forests etc. are prohibited.

The implementation of the regulation on collecting wastes from ships has started. The infrastructure suitable for the reception of solid wastes has been established in every harbour. According to the Turkish Law of Environment, the audit and punishment of those polluting the marine environment belongs to the Governorships, however fining ships in municipal borders belongs to the authority of Mayors. The procedure for ships outside the borders is carried out by the Coastal Gendarmerie Command.

The Governorships, Metropolitan Municipalities and Municipalities are responsible for the execution of laws and regulations related to municipal and hazardous wastes. The General Directorate of the Bank of Provinces provide expertise to the municipalities for project development and for the implementation of infrastructural activities while dealing with mapping, development of city plans, construction of sewage and solid waste facilities, carrying out geological and geotechnical studies and construction of municipal waste disposal sites.

Permanent services for ML collecting are developed in some places. Coastal cleanup campaigns are organized periodically by environmental NGOs (*e.g.*, TURMEPA in some tens of Turkish coastal sites and STH in Istanbul) together with municipalities.

Several representatives of major stakeholders are involved by NGOs in the partnership on ML issues: shipping companies (some of them make donations), manufacturers of plastics (CEVKO Foundation took part in recycling activities), fisheries, waste managers (*e.g.*, the Turkish National Solid Waste Committee) and general public. Municipalities, local communities and authorities are rendering their assistance with organizing coastal and underwater cleanup campaigns, public meetings and educational actions.

The importance of environment issues in Turkey is taken very seriously due to the work of the Ministries in the Republic of Turkey and growing public awareness.

Ukraine. The central governmental structures managing issues of ML and wastes in Ukraine are represented by:

- the Ministry of Environmental Protection (it includes the Division of the Black and Azov Seas and three State Ecological Inspections, respectively, for the areas of the North-Western Black Sea, Black and Azov Seas round Crimea, and for the rest of the Ukrainian Azov Sea);
- the Ministry of Public Health (it includes the Department of the State Sanitary and Epidemiological Control); and
- the Ministry of Transport and Communication (it includes the Department of Marine and Riverine Tansport).

Besides, there are territorial Departments of the Ministry of Environmental Protection (along with appropriate territorial Ecological Inspections) in all seven seashore provinces of Ukraine including the Autonomous Republic of Crimea, the Odessa, Nikolayev, Kherson, Zaporozhye and Donetsk oblasts, and Sevastopol City/District.

Municipal and private companies provide ML/solid waste collection and transportation services being contracted by the municipal authorities and seaport administrations and supervised by above governmental bodies and their local branches. Municipal landfills are often operated by private companies. Most recycling companies are private. A network of centers for collecting and sorting waste paper, glass and other recyclable materials is growing in Ukraine (Stephanska, 2006).

There are at least three research institutions potentially interested in ML studies and monitoring. They are: the Scientific Centre of Ecology of the Sea (Odessa), Odessa Branch of the Institute of Biology of Southern Seas, and Brema Laboratory (Simferopol). The latter institution has its own experience in organizing and conducting ML surveys along the Crimean coasts, over the Black and Azov Sea waters of Ukraine and Russia, and in the Kerch Strait (see Section 5.1).

Up to date, only a few coastal cleanup operations have been implemented by Ukrainian environmental NGOs (*e.g.*, the Crimean “Ecology and Peace” Association); thus, this public activity is still irregular in most places.

4. PROGRAMMES AND INITIATIVES

4.1. REGIONAL LEVEL

So far, there was no Black Sea regional strategy, action plan or basin-wide programme that was *specifically* directed to address and solve the ML problem. A list of international and regional programmes and projects (1996–2006) which were/are partly or even marginally concerned in Black Sea ML problem is presented as Annex 4.

The Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (BS SAP, 1996, amended in 2002) seems to be the most appropriate instrument that could be supplemented with specific ML items of the regional significance. This document, being a basis for cooperative actions on the conservation and improvement of the Black Sea environment, already includes a series of cognate paragraphs relating to the reduction of pollution from land based sources, vessels and dumping, to the waste management, and to the assessment and monitoring of marine pollution (see Box 4.1 for examples).

Box 4.1. Selected BS SAP articles related to ML problem

Article 39. Black Sea states shall take the necessary steps to enable them to fully exercise their prescriptive and enforcement powers, in accordance with international law, in order to pursue the reduction of illegal discharges by vessels into the Black Sea.

Article 42. A total ban on the disposal of municipal garbage in marine, shoreline and estuarine areas shall be imposed by December 1996. Each Black Sea state shall develop a plan setting out the manner in which comprehensive enforcement of the ban will be attained by December 1999.

Article 43. Illegal dumping operations in the Black Sea are a matter of concern. Black Sea states, individually and jointly, shall take measures to control any dumping activities that may take place.

Article 45. Black Sea states shall consider amending the Protocol on Dumping to the Bucharest Convention, in accordance with the London Convention 1972, including its subsequent amendments.

Article 46. The Black Sea coastal states will co-operate in developing and implementing environmentally sound waste management policies, giving due consideration to waste minimization, recycling and reuse.

Article 53. A “State of Pollution of the Black Sea” report will be prepared and published every five years, beginning in 1996. It will be based on the data collected through the coordinated pollution monitoring and assessment programs.

In 2002, the Black Sea Commission produced a report on the implementation of BS SAP during the period from 1996-2001 (BSC, 2002). This document includes critical overview of the progress in achievement of the posed objectives and formulates additional actions required for the nearest future. In particular, following difficulties and needs were identified in the report:

- there are evident gaps in knowledge related to the assessment of solid waste problems and their management. The creation of international inspectorate to control illegal discharges into the Black Sea is needed. A feasibility study to identify the scope of illegal discharges and to propose measures for their abatement is recommended;
- a total ban on the disposal of municipal garbage in marine, shoreline and estuarine areas has been imposed in all Black Sea coastal states. However, estimates of illegal disposals are not available; existing information gaps do not allow addressing and assessing the problem on the regional scope. The policy, legislative and regulatory measures for solid waste management are not very effective due to; poorly equipped and staffed national authorities; poor economic status of municipalities to whom these tasks are primarily assigned; lack of effective system for collecting and recycling garbage; and ineffective incinerating facilities. Actions required for the coastal zone: (a) to conduct regional feasibility study on the scope of the municipal solid waste problem which includes the socio-economic implications; (b) to develop and implement regional strategy and action plan on the solid waste management; (c) to develop a set of regionally agreed guidelines and manuals for solid waste management; and (d) to promote innovative technologies on solid waste management;

- the maritime authorities of the Black Sea states, in cooperation with the environmental authorities, are responsible for controlling illegal dumping although no country has reported any cases. In the regional context, the problem has not been dealt properly and requires more attention from the BSC. Actions required: (a) to incorporate a monitoring system for litter as a component of the Black Sea Integrated Monitoring and Assessment Program (BSIMAP) and to develop and implement coordinated methodologies and techniques for assessment of litter pollution; (b) to promote know-how and innovative technologies for solid waste management in small municipalities; (c) to raise public awareness and educate populace, including the tourists, on issues of recycling and the reusing of solid wastes; (d) to improve information flow and exchange in order to share the best experiences, innovative technologies and know-how amongst the Black Sea municipalities; (e) to develop regional guidelines for the monitoring of illegal dumping; (f) to train and equip inspection personnel; (g) to promote pilot projects for small municipalities;
- the amending of the Protocol on Dumping to the Bucharest Convention was not on the agenda of the BSC before 2002. Existence of information gaps shows that the strengthening of the information requirements under the Protocol essentially requires the BSC attention and more intense work on the part of the Activity Center on Environmental Safety Aspects of Shipping. The harmonization of penalties and monitoring systems on the regional level needs further improvement. Actions required: (a) to promote ratification of the London Convention to the Contracting parties as appropriate; (b) to revise the Protocol on Dumping and to prepare the necessary amendments by the next Ministerial Meeting in 2007⁴; (c) to conduct necessary training and improve professional education; (d) to prepare and submit a proposal of a regional project for the integrated remote observation system for coastal zones pollution and other hazardous events;
- On the regional level, issues of waste management were not tackled at all in any of the programs or projects. The experience and knowledge on the available technologies, best management practices for household and hazardous wastes, *etc.* were not disseminated and were not shared among the Black Sea states. Regional strategy and feasibility projects in the coastal zone are needed for: (a) preparation of a solid waste inventory (domestic, hazardous and clinical) representing the current situation for Black Sea region, determination of waste characteristics and amount of waste, preparation of a related computer model, and education of the personnel; (b) determination of the appropriate Solid Waste Disposal Model in terms of financial and technical characteristics including waste collection, transportation, recovery and disposal and site selection for the disposal facilities; (c) determination and establishment of the appropriate unified model for the region related with integrated waste management; (d) preparation and development of rehabilitation projects for the existing open dump sites, and assessment of necessary system for the purpose of energy recovery from the existing sites by determination of financial and technical properties; (e) determination of the number, types, properties and costs of the equipment required by the proposed model in framework of the project; (f) preparation and development of application projects for selected facilities; (g) education of the personnel involved in solid waste management and processing;
- in cooperation with IMO and other relevant international organizations, the following regional projects would compliment the national efforts in addressing waste management issues if implemented: (a) to prepare guidelines/manuals for development of the Port Waste Management Plan in line with the IMO and EU requirements and to promote its implementation in all major Black Sea ports; (b) to promote the best environmental practices related to the treatment and disposal of wastes, including ship-generated wastes; (c) to implement ecosystem rehabilitation projects; (d) to prepare guidelines or manuals for operation, maintenance and inspection criteria of disposal areas to guide municipalities in the coastal zone.

⁴ According to recent decision agreed by the Contracting Parties to the Bucharest Convention, the next Ministerial Meeting has been postponed till 2008.

Most of above activities proposed by the BSC in 2002 retain their topicality up to present day. The 15th Regular Meeting of the BSC (Istanbul, 20-22 November 2006) considered the achieved progress in implementation of the Black Sea Regional Activity on Marine Litter (item 8 of the agenda) and approved the BSC Workplan for the year 2006/2007 (item 11). Among other things, this workplan includes Paragraph 12 “Updating of the BS SAP”, with the final aim to adopt the new version of this strategic document at the Ministerial Meeting 2008. It was decided by the BSC members to use this opportunity and introduce specific ML actions into newly amended BS SAP.

4.2. NATIONAL LEVEL

National Consultants on ML were requested to supply their comments regarding the priority of Black Sea ML problem and strategic approaches to this problem in their countries. Results of the interviewing including valuable comments are presented in Table 4.1.

Most experts confirmed that the Black Sea ML problem constitutes a priority issue on the national level, although Bulgarian and Georgian consultants printed “no”. However, comments provided by both A. Nikolova and T. Gamgebeli show that the problem is really important (or even urgent in Georgia) for their states despite the fact that the governments did not address and manage it yet in the proper way. Furthermore, comments by other consultants argue in favour of similar situation in Romania, Russia, Turkey and Ukraine. It seems to be true enough because any national strategy, action plan or programme *specifically* devoted to ML problem are lacking in all six Black Sea countries.

According to Article 81 of the BS SAP, each Black Sea coastal state must prepare a National Black Sea Strategic Action Plan or other corresponding document presenting reasonable actions for the national implementation of the BS SAP.

Bulgaria produced, adopted and partly implemented following strategic tools related to ML and solid waste management issues:

- National Strategy for the Environment and relevant Action Plan for 2000–2006;
- National Environmental Strategy and National Action Plan for 2007–2014;
- National Plan for Economic Development, Sector “Environment” for 2000–2006;
- National Waste Management Program for 2003–2007;
- National Strategy for Water Sector Management (up to 2015);
- ISPA Program for 1999–2000;
- ISPA Strategy for Environment 2003–2006; and
- National Program for priority establishment of waste water treatment plants (since 1999).

The Bulgarian Ministry of Environment and Waters (BMEW) is entrusted with managerial functions on the implementation of above instruments. In its turn, the Bulgarian Ministry of Transport (BMT) is responsible for correct implementation of the:

- Strategy for development of the inland-waterway transport, sea transport and ports until the accession of the Republic of Bulgaria into the European Union (2000–2006);
- National transport strategy (up to 2015); and
- National Programme for Ports Development (2006–2016).

Two more programmes related to the ML problem – the Operational Programme on the Environment and the Sectoral Operational Programme on Transport (2007–2013) – are drafted and, probably, will be adopted by the Bulgarian Government by the end of 2006.

ML-related activities (both the implemented in Bulgaria during last decade and the ongoing) are listed in Table 4.2. Table 4.1. Experts' views on the priority of and national strategic approach to the Black Sea ML problem in the coastal states

Question: Is ML in the marine and coastal environment perceived as a priority issue in your country?

A. Nikolova (Bulgaria) No In fact, litter pollution of the sea and coast is a priority issue for the society. The sociological analysis (carried out by GBF in 2001) showed that the most disturbing factor for Bulgarian beach visitors is beach pollution. More than 90% of the visitors answered that they do not like rubbish on the coast. However, there is no official document on national, regional and local level that addresses adequately litter pollution of the coastal and marine environment.

T. Gamgebeli (Georgia) No. On the one hand, Georgia is aiming at the development of tourism which is considered as one of major priorities of the country. That makes ML problem very actual. On the other hand, there is nothing done on governmental level to study this problem and find its solution. In all available sources it is noted that "the household garbage management system is in a terrible state, garbage collection system is broken down, and garbage, in the best cases, is disposed at landfills not meeting the required standards". This is proved by the fact that the country does not have a Law on Wastes until now, sub-acts on ML have not been developed in coastal zones, and illegal landfills are arranged in cities and other areas very often in coastal zone. There are very few projects implemented on the local level (for example, partial reconstruction of the Batumi landfill).

A. Atudorei (Romania) Yes. ML represents one of the items in the Romanian National Strategic Action Plan for the Black Sea Integrated Control and Survey System of the Environment in Coastal Zone.

Y. Yurenko (Russia) Yes. ML problem caused a start of the Monitoring Marine Pollution Program in the Basin of the Black and Azov Seas (approved by the Head of Russian Government in 2003).

E. Okus (Turkey) Yes. During last five years public opinion, NGOs, ministries and local authorities have contributed to raising attention and taking precautions about the issue along with making new legal arrangements. Waste problem is one of high priority issues in Turkey. Municipalities are prohibited to dump solid wastes to river beds and coastal zone. The execution of the regulation on collecting wastes from ships has started; infrastructures of every harbour has been constructed and collecting of solid wastes has been organized; activities related to liquid wastes are about to be finalized. Various central, provincial and local governmental bodies are involved in the control and management procedures. Social movement against ML pollution has been organized by NGOs in most cities on the Turkish Black Sea coast.

N. Movchan (Ukraine) Yes. No comments.

Question: Could you formulate national strategic approach to the Black Sea ML problem?

A. Nikolova (Bulgaria) Currently ML problem is not addressed by specific strategic document. There is no specific ML strategic approach in Bulgaria setting legislative, institutional and financial framework. The determination of institutional responsibilities for management, control, monitoring and mitigation /cleaning up of ML is needed. Nevertheless, the strategic documents relating to waste management, water protection, port infrastructure development and regional development introduce some strategic principles, such as precautionary principle, polluter pays principle, clean technology /clean production principle which are aimed to prevent ML pollution.

T. Gamgebeli (Georgia) There is no national strategic approach to the ML problem, however the Environmental Performance Review (2003) includes recommendations on solid waste

management: (1) preparation of investment projects envisaged by BS SAP; and (2) preparation of investment project for recycling of municipal and industrial waste.

A. Atudorei (Romania) In accordance with the Bucharest Convention:

- to prevent the pollution by hazardous substances or matter;
- to prevent, reduce and control the pollution from land-based sources;
- to prevent, reduce and control the pollution of the marine environment resulting from emergency situations;
- to prevent, reduce and control the pollution by dumping;
- to prevent, reduce and control the pollution caused by activities on the continental shelf, including the exploration and exploitation of natural resources;
- to prevent, reduce and control the pollution from or through the atmosphere;
- to protect the biodiversity and the marine living resources;
- to prevent the pollution by hazardous wastes in transboundary movement and from illegal traffic;
- to provide framework for scientific and technical cooperation and monitoring activities.

Y. Yurenko (Russia) No comments

E. Okus (Turkey)

1. Planning the installation of landfill sites, recycling facilities and incineration plants in populated areas of the Turkish Black Sea coast;

2. Preventing solid wastes carried by rivers from their reaching the sea (e.g., installing screens in the estuaries to catch a litter);

3. Performing regular cleaning the beaches and controlling these operations;

4. Taking precautionary measures to prevent the pollution from maritime traffic, such as the controlling solid waste from ships through the documents;

5. Finding a long term financial sources for the projects;

6. Decreasing garbage quantity by means of awareness rising on household litter decomposing *in situ*;

7. All Black Sea countries should annually report on activities listed above and present their plans and capacities to the BSC Secretariat.

N. Movchan (Ukraine) For the future:

- development and approval of national legislation concerning operations with ML;
- entering in force of legislative acts concerning ML;
- development and realisation of the system of ML monitoring, collecting and utilization;
- creation of specialized bodies responsible for the collecting and utilization of ML;
- determination of a national service responsible for control, database development and management of activities on ML.

Table 4.2. Implemented and running activities related to ML problem (Bulgaria)

Project name	Years	Executing body	Sponsor
Yearly campaign "Beach watch" for cleaning up of beaches	since 1996 (ongoing)	NGOs, local authorities, BSBD	
Scientific conferences and meetings on Black Sea environmental problems, Black Sea International Conference (Varna)	since 1999 (ongoing)	BNAWQ	Various sources
Capacity building of basin directorates in Bulgaria	2000	BMEW	EU
Waste water treatment plant Obzor–Byala	2000		EU
Establishment of regional landfills – Sozopol	2001–2008	BMEW	EU, ISPA
Bulgarian Vessel Traffic Management and Information System, Phase 1 Vessel Traffic Management and Information System, Phase 2	2002–2004 ongoing	BMT	EU Phare
Waste water treatment plant Meden Rudnik, Bourgas	2003–2007	BMEW	EU, ISPA
Waste regional management (Bourgas, Provadia and Dobrich regions)	2003–2007	BMEW	EU
Integral monitoring of the Bulgarian Black Sea coast between Durankulak and Rezovo	2004	BMEW	EU
Support to the Black Sea Basin Directorate for implementation of requirements of Water Directive in relation to the monitoring system in coastal waters	2005–2006	BMEW / BSBD	EU
Strengthening of the waterborne tasks of the Bulgarian Maritime Administration	2005–2006	BMT / BMA	EU Phare
Establishment of port reception facilities for liquid and solid ship waste	2006–2008	BMT / BMA	Various sources
Waste water treatment plant Varna–Asparuhovo and rehabilitation of urban waste water treatment plan in Varna, II stage		BMEW	EU
Optimisation of national information waste system		BMEW	
Wetlands restoration and pollution reduction project		BMEW	GEF
Environmental educational and awareness raising programs and initiatives	ongoing	NGOs, local authorities, schools, BMEW regional bodies	
International Blue Flag movement	ongoing	resorts, marinas	

Georgia. The National Strategic Action Plan for the Rehabilitation and Protection of the Black Sea has been drafted between 1998 and 2005, however it is not adopted yet by Georgian authorities. This draft document includes some items related to the ML problem. The National Consultant provided two quotations as an illustration:

1. "In accordance with the Georgian legislation and requirements of MARPOL 73/78, by 2005 should be developed: ... rules preventing the pollution of the sea from ships by garbage";
2. "Illegal dumping is very usual in Georgia. Quite a number of city landfills and polygons are located just at the riverbanks or sea shore. Very often industrial wastes are disposed at the

municipal landfills. Georgia does not have a waste management unified policy. Development of National Action Plan is the first attempt to develop such a strategy and the attitude towards the waste management is defined by the following hierarchy: (a) prevention of wastes generation and their reduction at the source; (b) recycling and reuse; (c) energy generation from unused wastes by their burning; (d) their safe disposal at the landfills. Proceeding ... this principle can be used only in long-term perspective.”

According to the information, presented by the National Consultant, during last decade there was no any Georgian programme or project that was fully or partly concerned in the ML problem. Nevertheless, it is known from another source (BSC, 2002) that Georgia adopted the State Standard for Collection of Wastes and realized some other activities in the framework of the World Bank’s Project on the Integrated Management of Coastal Zone. In 1998, the Black Sea Eco-Academy NGO (Batumi) implemented a public awareness project entitled “Make Less Garbage – Info-Bus Campaign” supported by the TACIS Environmental Awareness Programme.

Romania. The National Plan for Waste Management (2000) and the National Strategic Action Plan for Black Sea Integrated Control and Survey System of the Environment in the Coastal Zone (2002) have been adopted in Romania. The Solid Waste Management Plans for coastal municipalities were developed as well on the local level. It is important to mention that the waste management policy is amended currently in Romania in accordance with appropriate EC Directives and other requirements of the European Union. This activity has started in March 2006 by setting up the inter-ministerial working group.

In 2000–2001, the Mare Nostrum NGO (Constanța) in co-operation with its Bulgarian partner (GBF, Bourgas) implemented the “Clean Beaches” project⁵ supported by the REC for CEE. During the same period the Mare Nostrum has implemented two more ML-related projects on the national level.⁶ In 2004, the same NGO along with the Ecumenical Association of the Churches from Romania and the World Council of Churches organized the Workshop on Eco-Ethics and Environmental Education. In summer 2005 and 2006, the Mare Nostrum carried out the “Clean Seaside” public campaign sponsored by the Vodafone- Romania.

Russia. The “Wastes” Federal Programme has been implemented in 1996–2001. It envisaged, in particular, a series of measures/actions for the improvement of solid waste management. The “Ecology and Natural Resources” Federal Programme was adopted for the next 10-year period (2001–2010). This programme includes the “Wastes” sub-program. In 2003–2005, the Hydrometeorological Agency of the Russian Federation (RosHydromet) supported the environmental project entitled as the “Monitoring of the pollution in Russian areas of the Black and Azov Seas” (see Section 5.1.1, B).

Turkey. In May 2004, the Ministry of Environment and Forestry signed a protocol with the Institute of Chemistry and Environment of the Marmara Research Center for the preparation of the National Action Plan related to land based sources of pollutants in the Mediterranean and Aegean Seas, Sea of Marmara and Black Sea. All the land base sources pollutants were determined, and the priorities were defined according to the sectors and areas. After completion of all studies National Action Plan for the prevention of polluting coming from land base sources was prepared and approved.

According to the adopted priorities two priority investment programs were elaborated and started being implemented, including the Anatolia Watershed Rehabilitation Project, which in addition to national funds was supported by GEF and World Bank. The duration of the Project, started in 2005, is 7 years. The aim of the Project is providing a stabilized natural resources management, increasing the income of people living in the Anatolia and Black Sea Regions and decreasing the pollution originating by agricultural activities and transported by Kızılırmak and Yeşilirmak Rivers.

⁵ Full title of the project: “Clean beaches, the first commitment for a sustainable tourism in Romania and Bulgaria Black Sea Coastal Areas”.

⁶ Titles of projects: (a) “Romanian coastwatchers encourage involvement of young citizens and stakeholders in understanding, caring and taking action for the Black Sea environment”; (b) “Raising the awareness of environmental issues in Romania – Keep Romanian beaches clean”.

The project is fully integrated with environmental concern in agricultural practices to make them more sustainable. It includes “storage, management and application of manure” and “ecological sustainable use of natural resources” to reduce the discharge of nutrient load into the Turkish ground and surface waters as well as into the Black Sea. Pilot areas are: Kızılırmak and Yeşilirmak (Tokat, Samsun, Çorum, Amasya) River Basin Area. The Nitrate Directive was translated into Turkish. The main responsible authority is the Ministry of Agriculture and Rural Affairs and Ministry of Environment and Forestry.

Since 2000 all municipalities at the Black Sea coast of Turkey came to the point of constructing adequate landfill sites and recycling facilities for solid waste disposal; plans for solid waste management have been developed and their implementation has started:

- Municipal solid waste Landfills for the cities in Rize-Trabzon area (including 25 towns), Samsun Greater Municipality, cities of Sinop area (including 3 towns) and Adapazarı (including 12 towns) construction of municipal landfills has started in 2005
- the Union of Drinking Water, Solid and Liquid Waste was founded in January 2006 in Giresun. The EIA reports were prepared and the pre-EIA was approved for this city; the construction project has been developed and tender procedure has been completed;
- Ordu finalized the EIA report, and the facility should become operational in 2008;
- in Samsun solid waste is being landfilled regularly and coastal cleaning activities are carried out on a daily basis. Municipalities that are linked to Samsun Metropolitan Municipality collect solid wastes within their boundaries and transport them to Yılanlıdere near Canik, where the wastes are buried under the river bed. In 2007, Samsun Metropolitan Municipality should open new regular disposal site for permanent operation;
- solid wastes of Zonguldak are dumped into the open area just near the sea. However, 15 *ha* of a forest area near Sofular village have been allocated by the Forestry General Directorate in order to construct there new regular storage facility in substitution of the old one. The EIA process was finished in 2006. The construction project started and was expected to be finalized in 2007. It is planned that 32 municipalities will use this facility. The facility will become operational in 2007;
- regular landfill area in Valley of Filyos (Karabük–Bartın–Zonguldak triangle) undergoes the process of EIA;
- feasibility studies and tender documents are prepared for cities of Tokat (Yeşilirmak river basin) and Nevşehir (Kızılırmak river basin). It is expected to start the construction of solid waste facilities there in 2007;
- the World Bank financed the development of a regional solid waste management system with a sanitary landfill in Sürmene; however, for 15 years this proposal has not been advanced because of the legal opposition of the inhabitants in this region (Berkun *et al.*, 2005). A new project for the use of this area as a landfill site has been reconsidered since the legal problems were resolved in 2004;
- some municipalities have purchased new equipment to keep beaches clean.

The above listed efforts suggest that the Turkish government devotes steadfast attention to the development of solid waste management systems in the populated areas of the Black Sea coast. However, it was noted recently (Berkun *et al.*, 2005) that such activities seem to be more difficult to implement in those sites than, for instance, in Istanbul (see Box 4.2).

Box 4.2. Solid waste management in Istanbul
(after Berkun et al., 2005)

9000 tons of municipal solid waste are generated in the city on a daily basis. The present solid waste production per capita is 0.63kg/day. Until 1953, Istanbul's wastes had been dumped at sea. After that, the disposal of solid wastes in open dumps became a common practice, until the publication of the Solid Waste Control Regulation in 1991. Istanbul had five open dumping areas; the Princess Islands' solid wastes were dumped into four dumping areas on the islands themselves. More recently, the Islands' solid wastes have been transported to the mainland. According to the Solid Waste Control Regulation, the local district municipalities are responsible for the collection and transportation of all municipality solid wastes to the transfer stations. The Metropolitan Municipality is responsible only for the collection of solid wastes from the main streets, public parks and then the management of the all solid wastes after they are brought to the transfer stations. The Metropolitan Municipality is also responsible for the construction and operation of the final disposal sites. The Municipality of the Metropolitan City of Istanbul has constructed six transfer stations since 1995. Three of the transfer stations, Halkalı, Baruthane and Yeni Bosna, with 53, 65 and 50 silos, respectively, and a total capacity of 7500 ton/day, are located on the Asian side. The other three transfer stations, Aydınlı, Hekimbaşı and Küçükbakkalköy, having 55, 69 and 45 silos, respectively, and a total capacity of 7500 ton/day, are on the European side. The volume of each silo is 32m³. The distance of the transfer stations from the sanitary landfills is between 38 and 51km. Collected solid wastes are brought by truck to the transfer stations, emptied into the vertical silos, and compacted to reduce the volume by 20% before the silos are carried to the final disposal areas. The Odayeri sanitary landfill has an available area of 14ha and reserved area of 2000ha for future developments. It has the capacity to store 4500 ton of solid waste per day. The area of the other sanitary landfill, Komurcuada, is 6ha, but an additional 50ha is reserved for the future.

Industrial solid wastes are not collected by the Municipality. It is the responsibility of industry itself to collect and transport its own solid waste to disposal sites, and hazardous wastes to the incineration plant located at Kocaeli. Healthcare wastes are collected and transferred to the incineration plant separately by the municipality.

However, recent information reported by the national consultant shows significant progress in the:

According to the Law for the Environment No. 2872, Amended Environment Law No. 5491, Law of the Metropolitan Municipality No. 5216 and Law of the Municipality No. 5393, the local district municipalities are responsible for the collection and transportation of all municipality solid wastes to the transfer stations. The Metropolitan Municipality is responsible for the collection of solid wastes from the main streets, public parks and then for the management of all solid wastes after they are brought to the transfer stations. The Metropolitan Municipality is also responsible for the construction and operation of the final disposal sites. The Municipality of the Metropolitan City of Istanbul has constructed six transfer stations that are Umraniye (Hekimbaşı), Tuzla (Aydınlı), Kadıköy (Küçükbakkalköy), Şişli (Baruthane), Bahçelievler (Yenibosna), Küçükçekmece (Halkalı). The Metropolitan Municipality transports solid wastes from transfer stations to the landfill sites in Kemerburgaz (Odayeri) and Şile (Kömürcüoda). Medical Wastes are collected in separate on a daily basis using 12 special vehicles and transferred to the incineration plant of medical wastes in Kemerburgaz (Odayeri) for incineration. More than 24.000 kg/day medical wastes are collected. Waste batteries are collected also separately at 300 points in Istanbul. In average 1700 kg waste batteries are collected monthly. The Metropolitan Municipality puts waste batteries into the waste battery store in Kemerburgaz (Odayeri) landfill sites.

A series of ML-related projects are carried out in Turkey on volunteer basis with the financial assistance from various sponsoring agencies. Some of them are listed as follows:

- Coastal Cleanup Campaign with Soldiers and Soldier's Families (implemented by the Turkish Naval Forces);
- Cleanup Activity under the Sea (implemented by STH NGO, Istanbul);
- International Coastal Cleanup Campaign (coordinated by TURMEPA NGO, Istanbul);
- Education of Household on Domestic Solid Waste Management (implemented by the Environment and Culture Enterprises, Trabzon);
- Publishing the "Hot News Bulletin" and the "Black Sea Bulletin" (TURÇEK NGO, Istanbul).

Ukraine. The National Concept for the Protection and Recovery of the Environment of the Azov and Black Seas has been adopted by the Cabinet of Ministers of Ukraine in July 1998. Later on, it was followed by the National Programme of the same name (2001-2010) adopted by the Parliament and President of Ukraine in March 2001. This strategic document includes, in particular, following activities:

- development of the control system for preventing the transmission of dangerous substances by marine transport and sea water pollution from vessels; and
- improvement of the municipal and industrial waste operation system in the coastal zone.

Local action plans for solid waste management were developed and incorporated in the environmental programmes/plans prepared on the provincial level.

However, after five years of the implementation of the National Programme, it was resumed by the independent expert (Stephanska, 2006) that Ukraine has not yet developed a self-sufficient national infrastructure for waste management and disposal, although a positive trend in increasing the proportion of recovered or recycled waste is observed. Two of four waste incineration plants are functional in Ukraine, but their equipment does not meet environmental standards, and the resulting ashes and slag are not disposed of properly. Due to the absence of a self-sufficient national infrastructure for waste management and disposal, many regions of Ukraine are experiencing difficulties with processing and disposal of hazardous waste. Most companies have to store hazardous waste on their sites in dangerous amounts. Only few companies' disposal facilities are properly engineered for this purpose. The number of specialized sites for centralized processing of hazardous waste is insufficient.

O. Stephanska (2006) concludes also that “given the heavy reliance in Ukraine on dumping in poorly-controlled sites for solid waste disposal, the greatest practical benefit in terms of reducing threats to human health and the environment would ultimately be achieved by implementing the European Union’s Landfill Directive, although this would be a long term goal”.

There are several pilot landfill management projects in Ukraine. European companies from France, Italy and Spain are exporting waste sorting lines for these projects. In 2004, the U.S. Trade and Development Agency awarded a USD 300,000 grant to the Ukrainian city of Yalta situated on the Black Sea coast of Crimea to fund a feasibility study for developing a modern municipal solid waste management system. The study, completed in 2006, investigated the best available options to replace the old dry-tomb landfill with an integrated waste management system that includes waste minimization, recycling and waste-to-energy conversion. If the project is implemented it will bring modern US technologies to Ukraine.

In 2002 and 2003, the ML surveys have been conducted on the Black Sea coast of Crimea, in the Kerch Strait and over the entire area of the Ukrainian territorial sea (Interdependence..., 2002, 2003; Birkun and Krivokhizhin, 2006). The results of those initiatives supported by the Ukrainian Ministry of Environment and Utrish Dolphinarium Ltd. (Moscow) can be found in Sections 5.1.1 A, C and 5.1.2 A.

The outputs of ML-related projects implemented in the Black Sea countries in 1996–2006 are summarized in Table 4.3.

Table 4.3. Outputs of ML-related projects and other initiatives implemented in Black Sea countries in 1996–2006

(based on the data presented by national consultants on ML and supplemented with relevant information from other sources)

Achieved results	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine
Legal and administrative instruments aimed to manage ML problem are improved	yes	yes	yes	yes	yes	yes
Waste management policy is amended	yes	no	yes	yes	yes	yes
Sustainable integrated management of ML is secured	no	no	no	no	no	no
Methodology to monitor ML pollution is developed (or acquired), including methods which are serviceable to assess:	yes ¹	no	yes ²	yes ³	yes ⁴	yes ⁵
ML quantities	yes	no	n.a.	yes	yes	yes
ML composition	yes	no	n.a.	no	yes	yes
ML distribution patterns	yes	no	n.a.	yes	yes	yes
ML sources	no	no	n.a.	no	yes	no
ML trends	yes	no	n.a.	yes	yes	yes
ML impact on the:						
environment	no	no	n.a.	no	yes	no
biodiversity	no	no	n.a.	no	yes	no
public health	no	no	n.a.	no	yes	no
economics	no	no	n.a.	no	yes	no
Monitoring of ML and its effects is organized and maintained	no	no	no	no	yes	no
Assessment of ML pollution is completed	no	no	no	no	no	no
Proposals to prevent and reduce ML and its adverse effects are prepared	no	no	yes	yes	yes	no
Campaigns and/ or permanent services for ML collecting are developed	yes	no	yes	yes	yes	no
New technologies/ devices for ML collecting and processing are elaborated or purchased	no	no	yes	no	yes	no
Port reception facilities and services for garbage collection from vessels are developed and/or improved	yes	yes	yes	yes	yes	no
Major stakeholders are involved in anti-ML partnership/cooperation, including:	yes ⁶	no	yes	n.a.	yes	no
shipping industry	yes	no	yes	n.a.	yes	no
tourism industry	yes	no	yes	n.a.	n.a.	no
Manufacturers of plastics	yes	no	n.a.	n.a.	yes	no
Fisheries	yes	no	n.a.	n.a.	yes	no
waste managers/services	yes	no	yes	n.a.	yes	no
municipalities, local communities and authorities	yes	no	yes	n.a.	yes	no
NGOs and general public	yes	no	yes	n.a.	yes	no
Training for officers occupied with ML management is organized	yes	no	no	n.a.	no	no

Achieved results	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine
Professional sectorial guidelines for ML management are developed for:	yes	no	yes	n.a.	no	no
tourism	yes	no	n.a.	n.a.	no	no
boating	no	no	n.a.	n.a.	no	no
diving	no	no	n.a.	n.a.	no	no
cruise lines	no	no	n.a.	n.a.	no	no
fisheries	no	no	n.a.	n.a.	no	no
coastal construction	no	no	n.a.	n.a.	no	no
Awareness and educational tools (brochures, posters, TV-clips, etc.) dedicated to ML problems are produced	yes	no	yes	n.a.	yes	no
'Responsible citizenship' guidelines for different sectors and target audiences are developed, in particular, for children and students	yes	no	yes	n.a.	yes ⁷	no
Tourists	yes	no	n.a.	n.a.	no	no
municipal authorities and local communities	yes	no	n.a.	n.a.	no	no
shipping companies	no	no	n.a.	n.a.	no	no
ship and smaller vessels crews	no	no	n.a.	n.a.	no	no
commercial and recreation fishing vessels	no	no	n.a.	n.a.	no	no
other identified target groups	no	no	n.a.	n.a.	yes	no
Mass media awareness-raising campaign fighting against ML is initiated	yes	no	yes	yes	yes	no
Growth of public awareness/ participation in cleanup activities became sound	yes	no	yes	yes	yes	no

n.a. – not available (some National Consultants found difficulties in answering these questions).

¹ – methodology for monitoring beach litter pollution was elaborated and tested on voluntary base for five pilot beaches;

² – methodology to monitor ML pollution is developed in part (not specially for ML) in frames of the National standards "Waste characterization" and ROMECON (household waste characterization);

³ – semi-quantitative method of aerial registration of floating ML;

⁴ – qualitative and quantitative methods including those which are applicable for the coastal and underwater ML surveying;

⁵ – mainly quantitative methods for beaches and maritime areas including the ML surveying based on the line transect methodology;

⁶ – a workshop for initiation of partnership for clean beaches was organised by GBF in 2001 and representatives of all the listed stakeholders expressed their commitment to co-operate;

⁷ – the Hot Guidelines for NGOs and responsible citizenship guidelines for housewives and sports clubs are developed.

5. SCIENTIFIC INFORMATION ON MARINE LITTER IN THE BLACK SEA REGION

This section of the report includes:

- scientific data on ML which are definitely scarce, and
- expert evaluation of some basic characteristics of ML pollution provided by the national consultants on base of their personal experience and understanding of the situation in their countries.

5.1. MARINE LITTER RESEARCH AND MONITORING IN THE MARINE AND COASTAL ENVIRONMENT

As it follows from the national reports, there were no any ML research, monitoring or assessment activities in Georgia and Romania during the last decade (1996–2005) and, obviously, before. At the same time, several institutions in Russia, Turkey and Ukraine have conducted certain ML research using quite different approaches and methods. Results of those studies are summarized below (sections 5.1.1 and 5.1.2).

No special study of ML effects (including environmental impact, public health influences, economic consequences, etc.) has been carried out in the Black Sea region till now.

5.1.1. Data on marine litter in the marine environment

A. The first attempt to estimate approximate level of ML pollution in the Black Sea marine environment has been performed in August 2002 within “Azovka-2002” project implemented by the Brema Laboratory (Simferopol, Ukraine) and Institute of Ecology and Evolution (Moscow, Russia)⁷. The main goal of the project was to collect data on abundance and distribution of Black Sea cetaceans (dolphins and porpoises) by means of aerial surveys. Concomitant information on ML was gained in addition only, thanks to that opportunity. The obtained ML data proved useful to another project implemented at the same time by the Crimean Medical University (Simferopol). Thus, finally, the results were included in scientific report (Interdependence..., 2002) submitted to the Ministry of Public Health of Ukraine. Brief description of that research initiative is presented below.

A series of aerial surveys have been carried out during seven days within the period from 2-17 August 2002 in the Kerch Strait (890 km^2 , 190 km of observation effort along 13 tracklines), the contiguous southern portion of the Azov Sea (7,560 km^2 , 351 km , 6 tracklines), and in adjoining with the strait Black Sea shelf area not more than 200 m deep, located between Cape Chauda in Crimea, Ukraine, and Dagomys on Caucasian coast, Russia (7,960 km^2 , 615 km , 19 tracklines) (Fig. 5.1). The observations were conducted under favourable weather conditions (Beaufort 0-3) by means of three twin-engine high-winged superlight amphibian aircrafts ‘Chernov-22’ (Fig. 5.2) moved along the tracklines at an altitude of 50-200 m with a speed of 100-150 km/hr . Pairs of trained observers provided continual visual scanning of water surface from both boards of the aircraft. They were instructed to draw attention to floating ML represented by plastic bottles and bags, pieces of styrofoam, polyethylene film, etc. Polarizing sunglasses were used as needed.

Just after passing any trackline the observers recorded their cumulative appraisal of ML pollution along the trackline as follows: “0” – ML was not revealed, “1” – few ML items, and “2” – many ML items have been detected. Average ML scores were calculated for each trackline on base of appraisals received from both boards of observation platform, and, finally, mean values of ML

⁷ “Azovka-2002” was supported by the Utrish Dolphinarium Ltd., Moscow.

pollution (VML) were estimated separately for the Kerch Strait and study areas in the Azov and Black Seas:

VML =	$s_1L_1 + s_2L_2 + \dots + s_nL_n$	· 100 km, where
	$n (L_1 + L_2 + \dots + L_n)$	

s – average ML score estimated for each trackline surveyed,

L – length of each trackline surveyed (km),

n – number of surveyed tracklines.

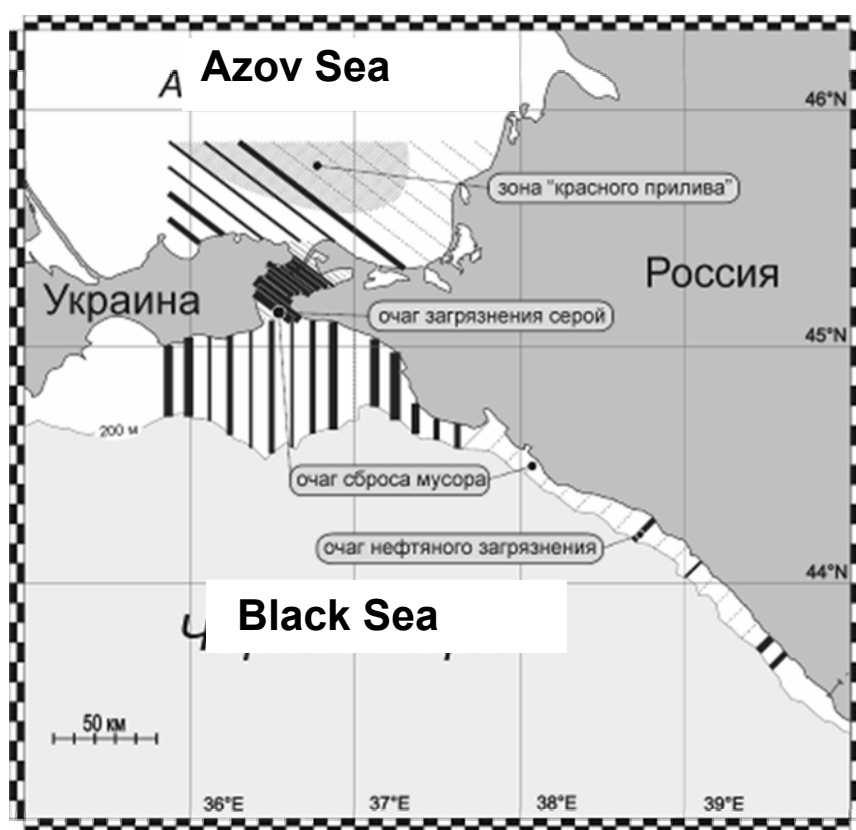


Fig. 5.1. Study areas surveyed in August 2002. Tracklines used for ML surveying are shown as solid lines of different thickness. The thickness of lines corresponds with average ML scores estimated for each trackline: from 0 (the most thin line) to 1,7 (the most thick line).

Moderate number of plastic ML items was detected in the Azov Sea along all tracklines surveyed. As a result, the estimated level of ML pollution in this area appeared the most significant (Table 5.1). In the Kerch Strait numerous ML sightings were concentrated in the central and south-eastern portions – mainly within the anchorage area abundant with large vessels. At the same time, in the northern and south-western parts of the strait ML was not sighted at all (see Fig. 5.1). However, the homogenized valuation of ML pollution in the Kerch Strait turned out to be almost as high as in the Azov Sea and twice as high as in the Black Sea area (see Table 5.1). In spite of this averaged outline of the north-eastern Black Sea as relatively less polluted with ML, there were some tracklines and spots between tracklines (*e.g.*, near Anapa and Gelendzhik and in the vicinity of Feodosia) which possessed large accumulations of ML items.



Fig. 5.2. 'Chernov-22' aeroplanes used for ML syrvying in August 2002 (photo by E. Nazarenko)

Table 5.1. Estimated relative values of ML pollution (aerial survey, August 2002)

Study areas	Observation effort, L (<i>km</i>)	Limits of average ML scores, s	Estimated value of ML pollution (VML)
Azov Sea (southern part; 7,560 <i>km</i> ²)	351	0.5 – 1	12
Kerch Strait (890 <i>km</i> ²)	190	0 – 1.7	10
Black Sea (NE shelf area; 7,960 <i>km</i> ²)	615	0 – 1.7	5

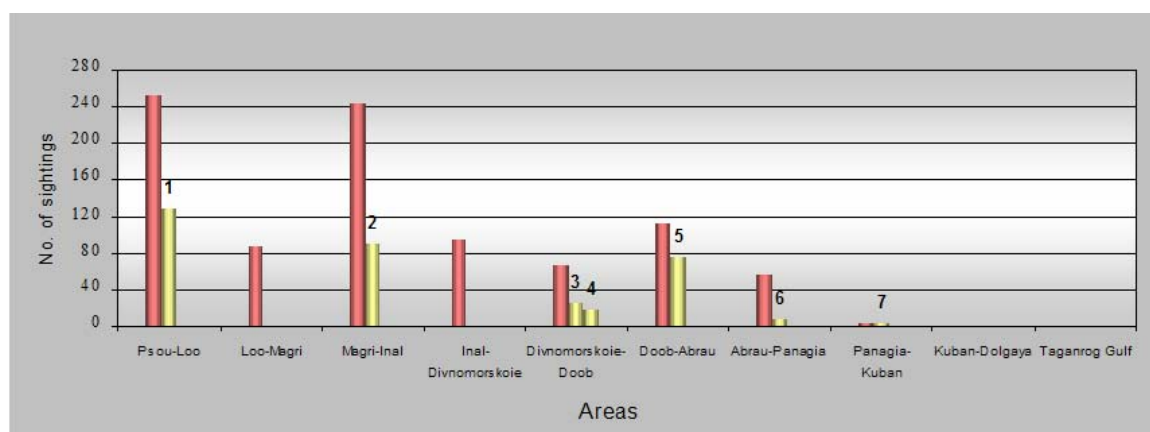
B. Quite different aerial ML surveys have been conducted in the Russian Black and Azov Seas in 2003, 2004 and 2005 by the Centre on Hydrometeorology and Environment Monitoring of the Black and Azov Seas (CHEMBAS, Sochi, Russia)⁸. The methodology and results are described in details in the annual reports of this organization (CHEMBAS, 2004, 2005, 2006). In particular, a total of 150 and 160 days were allocated during warm period (from spring to autumn) for collecting ML data in 2004 and 2005, respectively; 10 specialists were involved in that activity every year. The study area was represented by internal and territorial (12-miles-wide) waters of the Russian Federation including 7,880 *km*² of water surface in the Black Sea and 8,000 *km*² – in the Sea of Azov (maps of the maritime areas under Russian jurisdiction are shown in Annex 2). Visual observations were carried out over the selected plots (strata) of the sea by means of helicopter. Observers recorded total number of solitary ML pieces and ML accumulations floating on the sea surface in each plot/stratum. In addition, they roughly estimated sizes of ML accumulations which varied widely from 1-5 *m*² to more than 100,000 *m*². As a result, the data on geographical distribution, relative density, hot spots, seasonal and daily trends of floating ML were obtained. However, no precise information was collected regarding ML composition. It was indicated only that ML accumulations usually consisted of human-produced ML along with natural ML objects (e.g., wood remainders and leafage).

A total of 918 sightings of floating ML were recorded in 2004, and 949 sightings – in 2005. Typical quantitative distribution of ML sightings between different areas and study plots is shown on the diagram (Fig. 5.3). According to the data presented, the maximum number of ML sightings occurred in the southern part of the Russian Black Sea near Sochi and between Sochi and Tuapse (Psou–Loo, Loo–Magri and Magri–Inal areas). The number of sightings decreased in the northern

⁸ Full title of the project: "Monitoring of the pollution in Russian areas of the Black and Azov Seas".

Black Sea areas up to the southern boundary of the Kerch Strait near Cape Panagia. ML sightings in the Russian Azov Sea were relatively infrequent. Small accumulations of floating litter have been observed in the south-eastern part of this basin and in the Gulf of Taganrog (mainly in its central area along the major navigation route).

Thus, it could be tentatively assumed that the eastern Azov Sea is less polluted with ML than the north-eastern and eastern Black Sea within the territorial borders of Russia during spring, summer and autumn. However, this conclusion may be strongly biased due to different observation effort applied in different areas. In theory, these data should be carefully reconsidered in view of flight time (hours) and flight distance (linear kilometers) allocated for the surveying in each study area and stratum. Factors influencing on ML detectability (speed and altitude fluctuations of the observation platform, different weather conditions, *etc.*) must be taken in consideration too.



■ Research areas in total ■ Study plots/strata within the research areas:

Fig. 5.3. Number of ML sightings recorded in 2005 in different areas of the Russian Black and Azov Seas.

1 Port of Sochi	5 Tsemesskaya bay
2 Port of Tuapse	6 Port of Anapa
3 Gelendzhikskaya bay	7 Anchorage area in the Kerch Strait
4 Anchorage area near Cape Doob	

The results of those aerial surveys suggested that major quantity of ML comes to the Russian Black Sea in late spring and early summer (in May and June), while the least of ML sightings was recorded in autumn (in September and October). It was supposed that the level of ML pollution depends mainly on the level of river run-off in this area. Snowmelt floods and torrential downpours are typical for Russian Caucasus on the verge of spring and summer, and numerous mountain rivers become swollen during this season. It seems very likely that just river and rain torrents along with the washed down land-based garbage and solid waste constitute crucial sources/suppliers of ML pollution in the internal and territorial waters of Russia (Fig. 5.4). Most local rivers are situated in the southern lands of the Krasnodar Territory. That is, probably, one of possible explanations on why so many ML sightings (about 60%) were recorded in the southern coastal zone represented by Sochi–Tuapse area (see Fig. 5.3; Psou–Loo, Loo–Magri and Magri–Inal strata).



Fig. 5.4. Potential ML on the river bank, Russian Caucasus.

(photo by Y. Yurenko)

In the internal Russian waters ML usually was sighted in narrow zone along the coastline, mainly in bays and harbours, with particular trend to accumulation in semi-closed inshore areas, such as Taman Gulf, Tsemesskaya and Gelendzhikskaya bays (see Annex 2). ML also congested in artificial “traps” formed by hydroengineering constructions protruding into the sea, for example, along the 3-*km*-long Tuzla dam built in the Kerch Strait in 2004. In the territorial waters, ML accumulated following the streamline of the eastern Black Sea counter-clockwise current. According to known patterns of the Black Sea superficial circulation (see Fig. 1.2), it could be assumed that floating ML slowly drifts towards North-West along the Russian coast at the distance of 5-25 *km* from the shore. In summertime, complying with daily breeze circulation, ML accumulations were recorded farther from the coastline in the morning than in the evening. During cold season, the dominating intensive north-eastern winds, probably, remove most floating ML from the Russian Black Sea.

C. The vessel-based line transect surveys have been carried out in 2003 for the purpose to estimate cetacean abundance and numerical values of ML pollution in the Ukrainian part of the Kerch Strait (345 *km*²; 109 *km* of observation effort along 13 tracklines; two days in August; Fig. 5.5) and within the entire 12-miles-wide territorial waters of Ukraine in the Black Sea (24,130 *km*²; 1,662 *km* along 57 tracklines; 14 days in September and October; Fig. 5.6). The surveys were designed and performed in frames of two research projects implemented by the Brema Laboratory alone (“MS-2003”)⁹ and together with the Institute of Ecology and Evolution of the Russian Academy of Science (“Afalina-2003”)¹⁰. The ML data were analysed in the Crimean Medical University and submitted to the Ministry of Public Health of Ukraine and BSC Permanent Secretariat (Interdependence..., 2003). Later on the results were presented at the BSC scientific conference (Birkun and Krivokhizhin, 2006).

⁹ “MS-2003” project was supported by the Ukrainian Ministry of Environment, Kiev.

¹⁰ “Afalina-2003” project was supported by the Utrish Dolphinarium Ltd., Moscow.

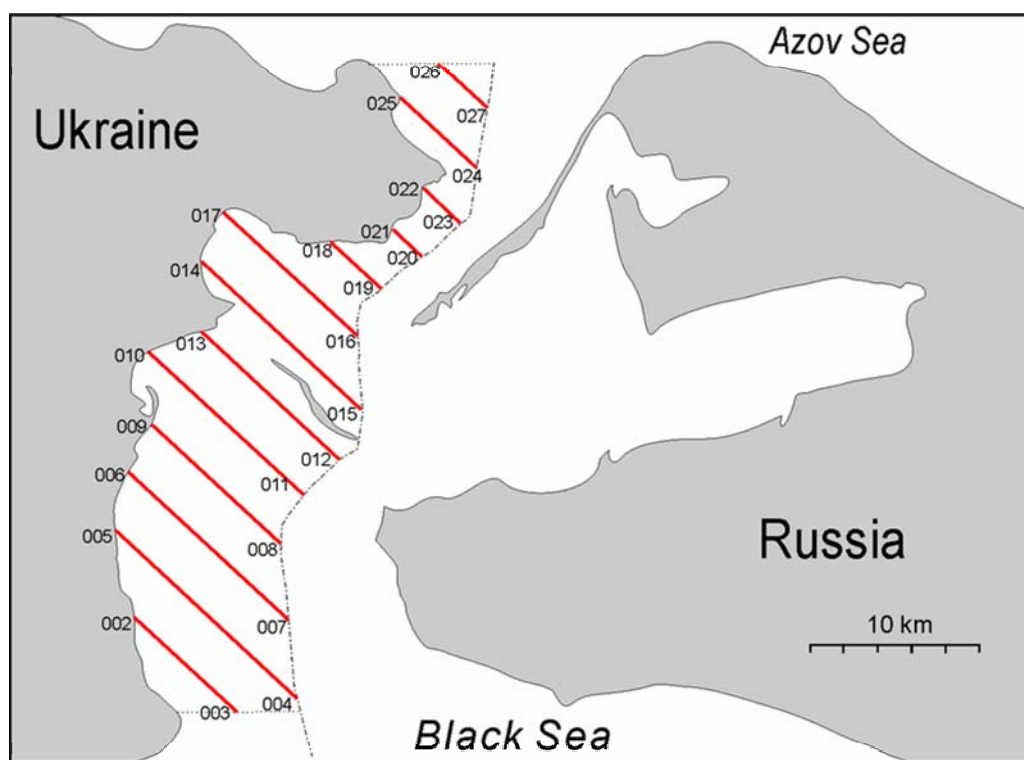


Fig. 5.5. Study area and 13 parallel tracklines used for the vessel-based line transect survey in Ukrainian waters of the Kerch Strait in August 2003.

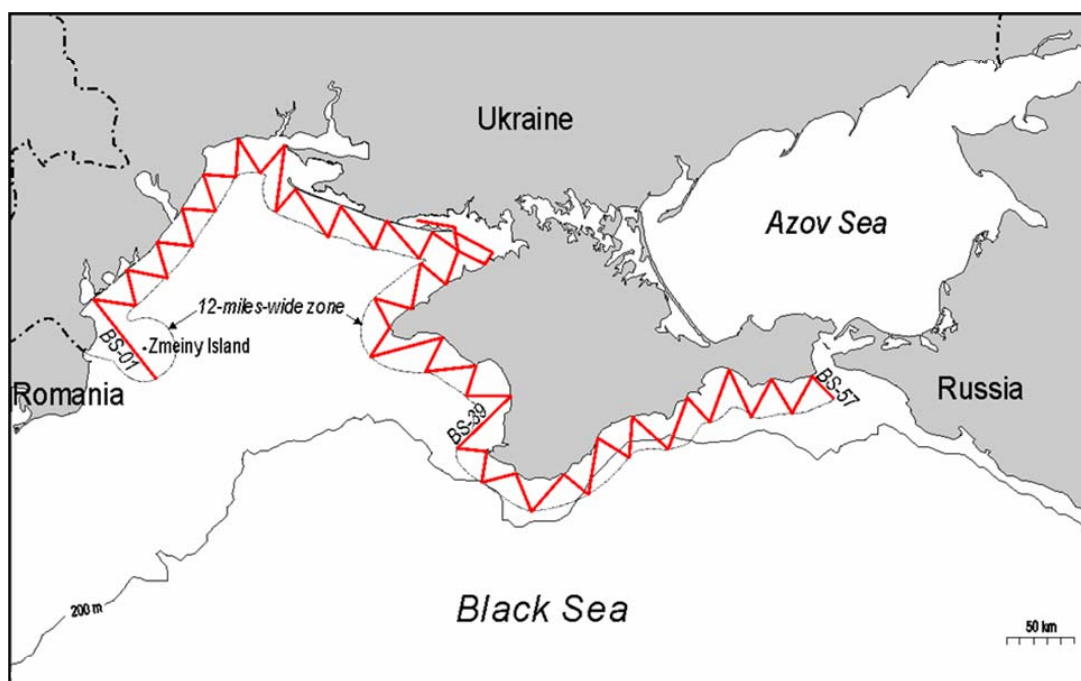


Fig. 5.6. Study area and 57 zigzag tracklines used for the vessel-based line transect survey in Ukrainian territorial waters of the Black Sea in September and October 2003.

The surveys were conducted under the sea state score from 0 to 3 according to Beaufort scale, by means of two observation platforms (a longboat in the strait and cruising yacht in the sea) sailed at a speed of 6–9.4 knots. Changeable pairs of observers, rotated every 30–60 minutes, continuously scanned water surface from both sides of a vessel with the naked eye; a height of observers eyes above sea level varied from 2.6 to 3.4 *m*. Observers were instructed to record all types of polymer debris floating in the Black Sea, but in the Kerch Strait they registered plastic bottles only. Perpendicular distances from the sighted ML objects to vessel's course were estimated. Statistical treatment and analysis of results followed the methodology recommended by Buckland *et al.* (1993). All sightings of ML were pooled to derive specific effective search half-width in two different strata, including the Kerch Strait and Ukrainian territorial waters in the Black Sea. The sets of sightings were truncated at perpendicular distances, partitioned in various but equal intervals and fitted to the models by means of Distance 3.5 program package (The Research Unit for Wildlife Population Assessment, University of St. Andrews, UK).

A total of 479 sightings (591 pieces) of floating plastic ML have been recorded in the Ukrainian Black Sea between the Danube Delta and Zmeiny Island to the west and Kerch Strait to the east (see Fig. 5.6). Most records pertained to coastal waters off the Crimea peninsula between Sevastopol and Feodosia (Fig. 5.7; tracklines from BS41- BS51).

The minimum values (uncorrected for detection bias) of ML pollution with drifting plastics were estimated for territorial waters of Ukraine:

- general density of floating plastic objects – 6.57 pieces/*km*² (CV 18%);
- absolute amount of floating plastic objects – 158,620 pieces (CV 18%).

It was supposed that average mass of one plastic object being either in the sea or on the beach (see Section 5.1.2, A) is equiponderant making up 0.117 *kg*. Therefore, aggregate mass of plastic ML floated upon the entire surface of the Ukrainian Black Sea was estimated at 18,559 *kg*.

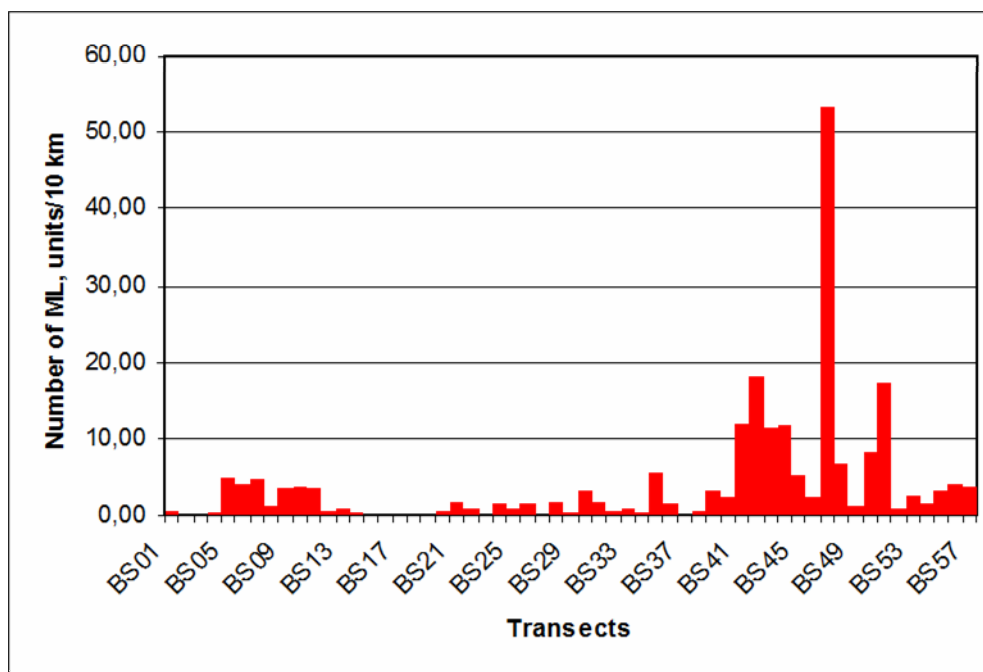


Fig. 5.7. Estimated number of ML items per 10 km on the surveyed tracklines in the Ukrainian Black Sea (vessel-based survey, September–October 2003).

The primary data on ML composition were obtained but not analysed and published yet. However, it was calculated that a share of plastic bottles constituted 5.25% in overall number of ML sightings recorded in the Black Sea area (Fig. 5.8), and their estimated density came to 0.18 bottles/ km^2 (CV 28%), whereas in the Kerch Strait this factor mounted tenfold to 1.84 bottles/ km^2 (CV 45%). Thereupon, it was assumed that the general density of floating plastic ML was also in 10 times higher in the strait than in the sea. Taking into consideration this assumption, the expected general density, absolute amount and aggregate mass of floating plastics were estimated for Ukrainian waters of the Kerch Strait as follows: 65.7 pieces/ km^2 , 22,667 pieces and 2,652 kg, respectively.

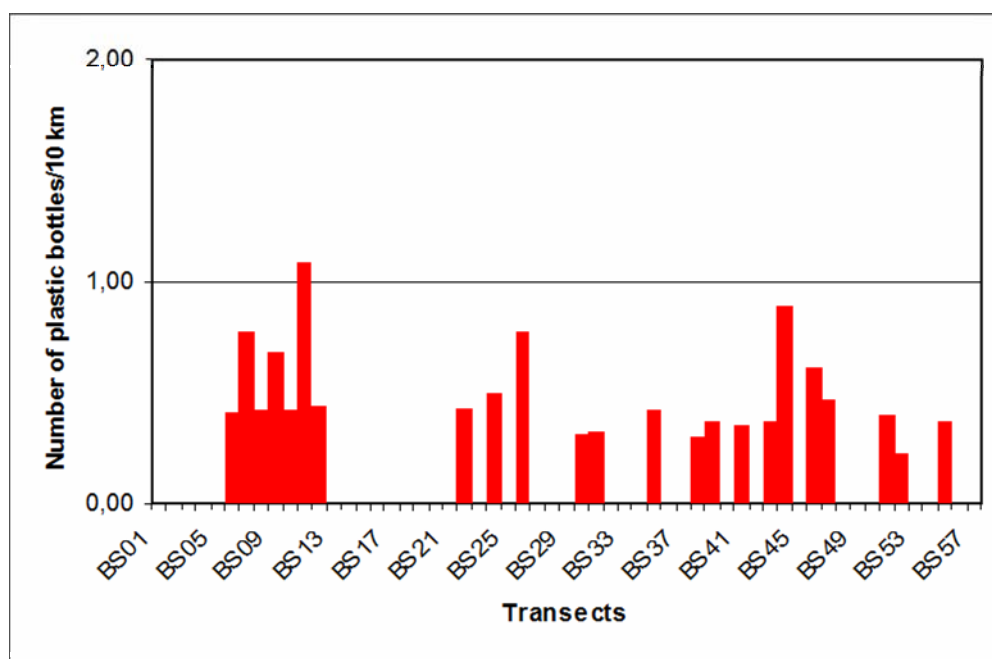


Fig. 5.8. Estimated number of plastic bottles per 10 km on the surveyed tracklines in the Ukrainian Black Sea (vessel-based survey, September–October 2003).

D. Similar cetacean and ML vessel-based surveys have been carried out by the same joint Ukrainian and Russian team (“Afalina-2003” project) in the Russian part of the Kerch Strait (August 2003; 517 km^2 ; 200 km of observation effort along 22 tracklines) and Russian territorial waters of the Black Sea between the strait and Khosta, south of Sochi (October 2003; 7,650 km^2 ; 564 km; 22 tracklines). However, the recorded ML data (in contrast to cetacean data) were not statistically treated, analysed and published, and additional effort and some financial support are needed to complete this piece of research.

E. In 2005, the Underwater Cleaning and Awareness Activity (STH, environmental NGO registered in Istanbul) started underwater inventory of ML in the selected areas within the boundaries of the city (STH, 2005). A series of 11 diving surveys has been realized during one year in the districts of Uskudar (January), Kadıköy (February), Ortaköy (April and June), Büyükdada (April), Sedef Island (June), Heybeliada (July), Gölcük (August), Haliç (September), Harem (November), and Karaköy (December). Although these sites are pertinent to the Istanbul Strait, the gained knowledge could be useful in view of its possible application in the urbanized and harbour areas located round the Black Sea.

The method used by underwater cleanup team was random sampling. A total of 1606 ML pieces under 224 different titles were recorded. After each survey the STH prepared a file including all data obtained (in the form of inventory list), underwater photo and video images, expert judgment concerning suspected sources of ML pollution, and practical recommendations. The inventory

lists (see example in Annex 5) lay the groundwork of a database on the sunken ML recorded in various locations.

The composition of ML items sighted by divers within the water column and on the bottom of study areas is presented on Fig. 5.9. Most pieces on record (77%) were produced from glass, plastic and metal.

Plastic	Glass	Metal	Wooden	Porcelain	Textile	Hybrid*	Paper	Other	Total
403	508	327	24	34	40	218	24	28	1606

* Hybrid: objects formed from more than one material

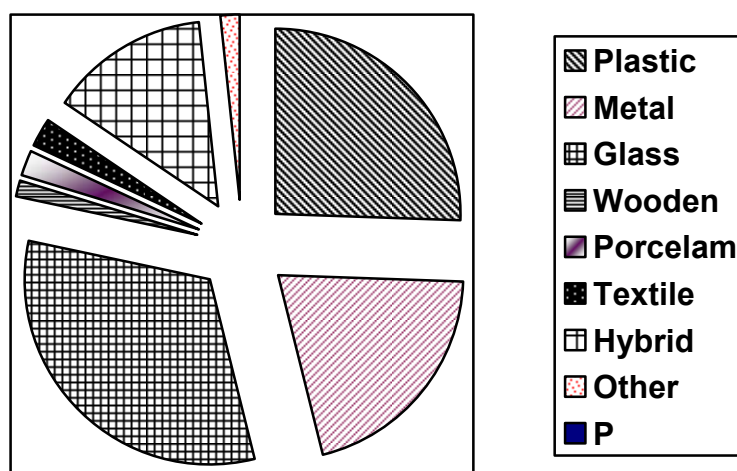


Fig. 5.9. Composition of ML items recorded in the Istanbul Strait by means of underwater investigation (STH, 2005).

A tendency to ML accumulation on the bottom has been ascertained in some places (*e.g.*, in Ortaköy at a depth of 8-13 *m*). Solid wastes cover up the ground along with local communities of benthic organisms (molluscs, *etc.*) there. In Karaköy and the Galata Bridge location, the remains of metal piles and other submerged constructions cause countless fishing lines get caught. Those scraps of fishing tackle, equipped with fishhooks, represent a direct threat to fishes and some other animals. A number of living creatures have been saved from the lines by the divers and much more have been seen dead. The abandoned fishing nets, surrounding the Sedef Island at about 33 *m* level, have been recorded and removed out of the water. The organic and inorganic matter (including solid wastes) filled up the nets hindering normal water circulation, and some representatives of the marine fauna (including cephalopods and crustaceans) were found captured by that useless but still “working” fishing gear (STH, 2005).

5.1.2. Data on marine litter in the coastal environment

A. Some research of ML in the coastal environment was conducted in Ukraine by the Brema Laboratory and Crimean Medical University (Interdependence..., 2003; Birkun and Krivokhizhin, 2006). A total of 12 pedestrian surveys of the stranded cetaceans and washed ashore ML have been carried out on the unorganized (relatively manless) sandy and pebble beaches of the western (outskirts of Shtormovoye), south-western (outskirts of Lyubimovka) and south-eastern (outskirts of Privetnoye) Crimea (Fig. 5.10) during the period from autumn 2002 to summer 2003, including one survey in November, one – in March, three – in April, one – in May, three – in June, and three – in July. The measured area of coastal plots, selected randomly for the ML surveying, varied from 1,200 to 18,165 *m*² depending on the number (from 4 to 16) of voluntary observers/ML pickers

involved in data recording. All pieces of ML found within the bounds of every plot were collected, assorted and weighted (plastic and glass objects were treated separately) and then disposed through the nearest garbage recipient facilities. Specific indices of ML pollution (number and mass of pieces per 1 km^2 of the beach) were estimated and compared between study areas and seasons.

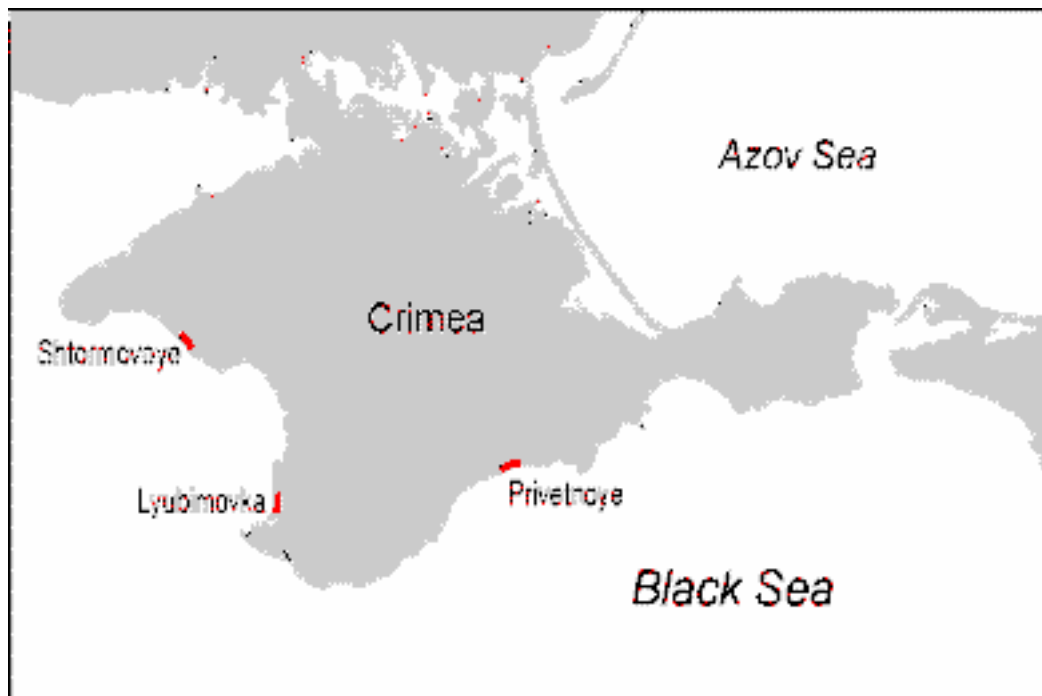


Fig. 5.10. Location of study areas (examined plots of the beach) in the Crimea (pedestrian surveys, November 2002 – July 2003).

Great numerical predominance of plastic ML (80–98% of the recorded pieces) has been determined in different coastal areas and seasons in comparison with glass ML (2–20%) represented mainly by broken and unbroken bottles. The density of pollution by polymeric garbage (including scraps of polyethylene film, plastic bags and bottles, other synthetic ware, *etc.*) varied on the beaches from 2,698 to 55,000 pieces/ km^2 , while the density of glass bottles ashore fluctuated between 280 and 1,455 pieces/ km^2 .

The ML weighting indices varied from 333 to 6,250 kg/km^2 (plastics) and from 222 to 1,455 kg/km^2 (glass). The average mass of one plastic object contaminating the coastal strip came up to 0.117 kg . This value was used for the estimation of aggregate mass of floating plastic ML in the Ukrainian Black Sea and Kerch Strait (see Section 5.1.1, C).

The average overall values of ML quantity on the Crimean unorganized beaches were estimated as follows ($M \pm m$):

- density of plastic objects – $16,348 \pm 5,076$ pieces/ km^2 ;
- mass of plastics objects – $1,910 \pm 612$ kg/km^2 ;
- density of glass objects (bottles only) – 674 ± 107 pieces/ km^2 ;
- mass of glass objects (including bottles) – 552 ± 96 kg/km^2 .

A few examples of ML accumulation on the Crimean beaches are shown on Fig. 5.11.

On 10 May 2003, huge quantity of petroleum tar balls (very specific ML item indeed) were found washed ashore along 30- km -long sandy beach between Cape Evpatoriyskiy and Lake Donuzlav,

western Crimea. The clots were collected and weighted from the area of 1,600 m^2 . The concentration of this contaminant was estimated as high as 11,600 kg per 1 km^2 of the beach. The remote peril of this type of ML consists in the melting of tar balls in the sun, and forming, as a result, timeproof “masout” spots on the beach (Fig. 5.12).

B. Numerous “spontaneous heaps” of ML have been sighted during aerial surveys conducted by CHEMBAS in 2003, 2004 and 2005 (see Section 5.1.1, B) along unpopulated (but visited by unorganized tourists) portions of the Russian Black Sea and Azov Sea coasts. Such ML deposits are known to be present on sandy northeastern coast of the Kerch Strait (Choushka spit), and also in Taman–Anapa (Blagoveshchenskaya and Vityashevskaya spits), Anapa–Novorossiysk (Abrau peninsula), Novorossiysk–Gelendzhik, and Divnomorskoye–Dzhoubga areas. In May 2004 (during snowmelt floods, before tourist season), a total volume of ML on the coast of Sochi area (from Shepsi to Psou) was estimated as much as 12,000 m^3 . Another type of ML accumulations is peculiar to marshy margins of the Azov Sea and Kerch Strait in the Taganrog Gulf, Dinskoy bay and Taman Gulf, *etc.* However, no quantitative information was collected and no analysis was presented regarding composition of ML in those places.

C. Important data on permanent sources of ML have been published recently by Turkish specialists (Çelik, 2002; Yıldırım *et al.*, 2004; Berkun *et al.*, 2005). Solid waste management is one of the main environmental problems in the Black Sea Region. (Çelik, 2002). It was acknowledged that at the Black Sea coast of Turkey municipal and industrial solid wastes, mixed with hospital and hazardous wastes, are often dumped on the nearest lowlands and river valleys or into the sea (Berkun *et al.*, 2005). As mentioned already, the development of an integrated, regional system for solid waste management in the region is more difficult and costly because of the difficult topography of the region (Berkun, *et al.*, 2005).

Environmentally dangerous mode of solid wastes disposal is still realized, in particular, via irregular and uncontrolled landfill sites situated in the immediate proximity to the sea, by some Black Sea coastal states including Turkey. Solid wastes disposal sites continues to constitute major source of ML for the Turkish waters and, probably, for the Black Sea in whole, in spite of the fact that this problem has been highlighted quite many years ago (Berkun, 1991; Tuncer *et al.*, 1998; Mee and Topping, 1998) and dumping any waste such as garbage, debris, construction waste, *etc.* is prohibited on the shore strip according to the Turkish Coastal/Shore Law (1990, amended in 1992). Uncontrolled landfills are urgent as Solid Waste Management, because they are the most traditional (and environmentally dangerous) ways of disposal for many years in the world (Mavropoulos and Kaliampakos, 1999) as well as in Turkey. (Yıldırım *et al.*, 2004).

In this context, Yıldırım *et al.* (2004) presented a case study regarding the municipal solid waste landfill site near Zonguldak city, the southwestern Black Sea coast of Turkey (Fig. 5.13), where the uncontrolled dumping of solid wastes is the actually applied disposal method. The population of the city and its two satellites (Kozlu and Kilimli) has been reported round 136,000 in 2004; the specific solid waste production rate came to 0.64 kg per capita per day (TUGAL, 2002). During over 30 years, the municipal solid wastes (72.4 ton per day at the average) were deposited on the landfill site located in Kozlu suburb, between main coastal roadway and the seashore. The area and bulk volume of the landfill were estimated as 2.5 ha and 75,000 m^3 , respectively. The landfill has a tight physical contact with the shoreline of the Black Sea (Fig. 5.14).

For years there was no wall or any other constructions providing stability for the rubbish heap and preventing rubbish mass transportation into the sea. As a result, the deposited wastes were subjected to waves, and supposedly huge (but really undefined) amount of potential ML items was transported annually into the sea as well as scattered along the coastline. (Yıldırım *et al.*, 2004).

The landfill used causes also other problems including the spreading out of plastics and paper by wind, odours, creating a habitat for insects and rodents, groundwater pollution and producing landfill gases, as the case for similar landfill areas in other parts of the world (Gonullu, 1999, Mavropoulos and Kaliampakos, 1999).



Fig. 5.11. Accumulation of wooden and plastic ML on Black Sea coast of the southern Crimea, Ukraine: the unorganized beach near Rybachye in September 2002
(two left photos) and June 2003 (right photo), photo by A. Birkun, Jr.)

The composition of Zonguldak solid wastes was determined as follows (a total of 2,159 *kg* has been studied by means of manual separation and weighing; Yildirim *et al.*, 2004):

- organic waste 30.7 %
- paper and carton 20.0 %
- plastic 16.1 %
- ash 10.9 %
- glass 6.1 %
- medical (hospital and clinic) waste 6.0 %
- metal 3.8 %
- miscellaneous (tire, wood, bone, leather) 3.8 %
- textile 2.6 %



Fig. 5.12. The beached paper sack with tar balls melting on the heated sand in the vicinity of Shtormovoye (western Crimea, June 2003),
photo by A. Birkun, Jr.

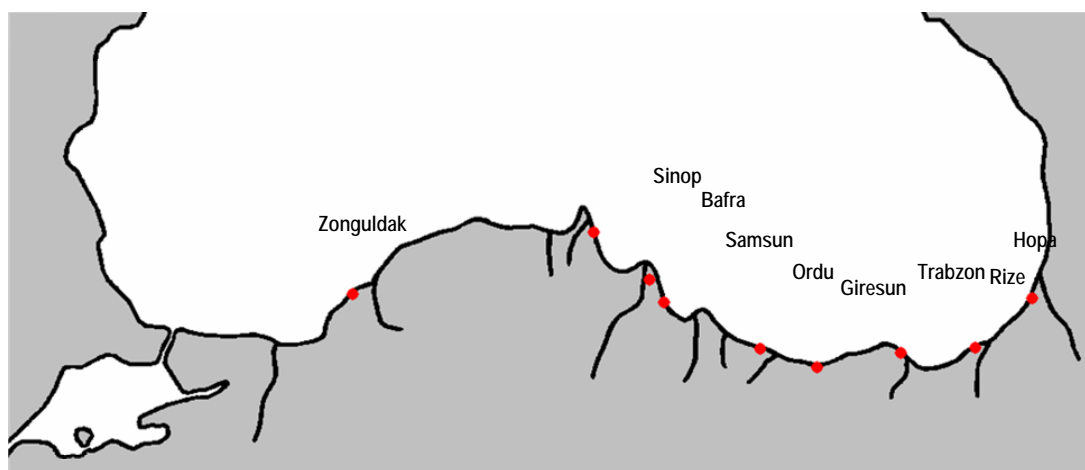


Fig. 5.13. Main towns discharging solid wastes at the Black Sea coast of Turkey
(after Yıldırım et al., 2004; Berkun et al., 2005).

It was concluded that the landfill in Zonguldak province may cause potential threats throughout the Black Sea region because of dissemination of ML and other contaminants by sea currents. It was estimated that the amount of solid wastes will increase in this site during the nearest 15 years

proportionally to population and consumption growth, and, probably, would result in additional 545,000 m^3 of the dumped matter by 2018 (Yıldırım *et al.*, 2004). However, active measures have been undertaken recently by the Municipality with strong support from the government, by constructing a wall as a barrier to avert waste washing from the landfill into the sea as well as regular storage facilities.

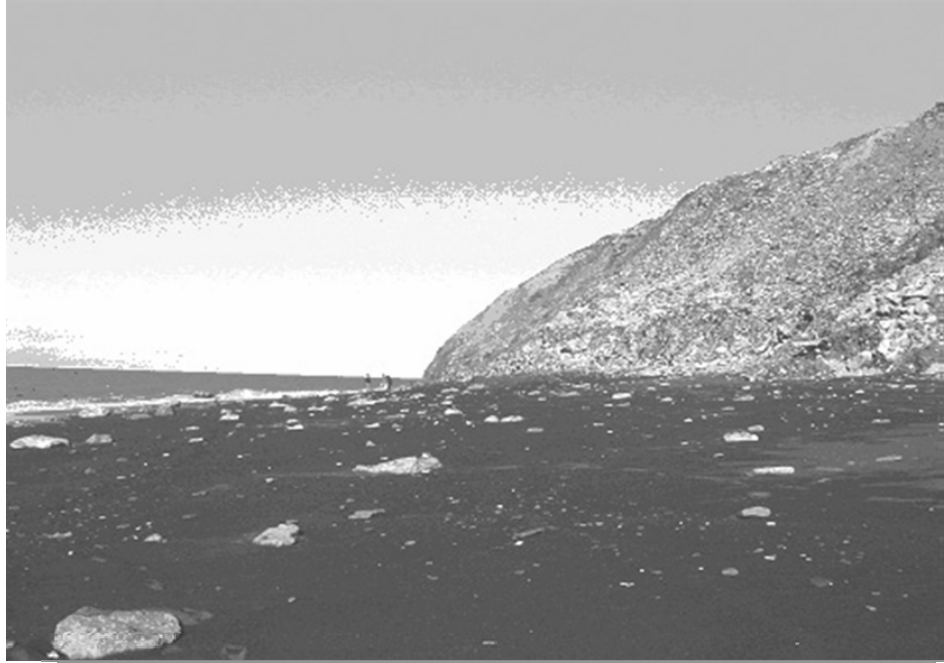


Fig. 5.14 Enormous deposit of ML represented by the landfill near Zonguldak. Human figures on the coast suggest that a height of the waste dump is not less than 20 *m* (upper photo). Waves demolish it shifting ML staff into the sea (lower photo). Both pictures are taken from Yıldırım *et al.* (2004).

In the countries around the Black Sea coast, many cities discharge their solid wastes and wastewaters into the shallow sea waters, mostly without treatment and outfall systems and some cities along the Turkish Black Sea coast are no exception to this rule. (Berkun *et al.*, 2005; see Fig. 5.13). In some areas, municipalities used filling the coastal zone with solid wastes, allegedly, for the purpose to gain some extra “land” expanded towards the sea. As a result, at present some uncontrolled landfills protrude rather far into the sea: water depths along the coastline, shaped by the heaps of solid wastes, run up to 10 *m* in places (Berkun *et al.*, 2005). These sites are not protected from waves and, thus, serve as stationary sources of unknown (but admittedly large) quantities of ML.

Besides, according to available data (Table 5.2) the problem of solid wastes is presently seriously taken under the control of the Turkish Ministry of Environment and Forestry.

Table 5.2. Amount of solid waste by destination, 2004 Data received from web page of the Turkish Statistical Institute (www.turkstat.gov.tr)

Provinces		Solid waste disposed																				
		Total disposal		Metropolitan municipality dumping site		Municipality dumping site		Another municipality's dumping site		Controlled landfill		Composting plant		Burning in an open area		River and lake disposal		Burial		(1) Other (1)		
A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
Artvin	12	35 548	-	-	10	28 900	-	-	-	-	-	-	1	579	-	-	1	1 677	1	4 392	-	-
Giresun	25	87 886	-	-	11	66 393	6	9 786	-	-	-	-	3	1 159	-	-	1	165	4	10 383	-	-
İstanbul	73	4 470 687	-	-	17	148 123	1	732	56	4 156 395	1	151 158	2	1 926	-	-	-	-	3	12 353	-	-
Kastamonu	21	125 881	-	-	17	117 384	-	-	-	-	-	-	1	5 612	2	688	1	2 196	-	-	-	-
Kırklareli	26	123 392	-	-	25	122 870	-	-	-	-	-	-	-	-	-	-	-	-	1	522	-	-
Kocaeli	45	380 446	-	-	11	140 422	3	36 435	30	200 898	-	-	-	-	-	-	-	-	4	2 692	-	-
Ordu	56	158 060	-	-	39	150 099	6	5 152	-	-	-	-	2	586	3	568	3	988	3	667	-	-
Rize	21	89 083	-	-	8	67 792	7	3 376	-	-	-	-	-	-	-	-	4	6 740	2	11 174	-	-
Samsun	47	301 037	15	148 725	17	136 267	7	4 825	-	-	-	-	-	-	2	794	4	9 759	2	667	-	-
Sinop	11	64 979	-	-	7	20 076	-	-	-	-	-	-	-	-	-	-	3	44 876	1	26	-	-
Trabzon	64	168 767	-	-	16	115 463	30	22 763	-	-	-	-	2	302	2	1 419	8	11 940	7	16 881	-	-
Zonguldak	32	322 460	-	-	26	291 453	6	31 007	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bartın	9	37 183	-	-	8	33 949	1	3 234	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Karabük	8	58 544	-	-	8	58 544	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Number of municipalities (Metropolitan municipality means population larger than 750 000; Municipality – population larger than 5000).

Amount of solid waste (tonnes/year) **D.** Since 2002, the Turkish Marine Environment Protection Association (TURMEPA, Istanbul) represents Turkish environmental NGOs in the International Coastal Cleanup Campaign (ICC, 2002). Following this initiative, every year from 5,000 to 6,000 volunteers, organized by TURMEPA and its partners, took part in coastal cleanup operations in the populated areas along the Turkish coasts of the Mediterranean, Aegean, Black Seas and Turkish Straits System. In 2003 and 2004, such operations have been carried out in 27-31 cities and settlements including eight localities at the Black Sea coast: Akçakoca, Ereğli, Giresun, Hopa, Inebolu, Rize, Samsun and Trabzon. The volunteers collected ML items upon selected coastal plots (mainly public beaches) of known length, sorted those items, weighted and recorded them.

According to available statistics, a total of 2009 individuals collected 8,215.4 *kg* of ML along 21.3 *km* of the Black Sea shore in 2003. It constituted 385.7 *kg* per 1 *km* at the average (in comparison with 326.0 *kg/km* for all Turkish sites examined), however, the concentration of collected ML varied in different places within wide range: from 58.4 *kg/km* in Rize to 1,395.1 *kg/km* in Trabzon. The composition of ML (for all sites involved, not only for the Black Sea localities), with regard to its possible sources, was estimated as is shown on Fig. 5.15.

As it follows from this estimation, the shoreline and recreational activities along with smoking-related activities constitute the two major sources of ML contamination of the coast. These activities taken together, allegedly, caused 95.5-96.8% of ML pieces found on the seashore, while the dumping activities were considered responsible for 0.8-1.1% of ML objects only. (Comments from the Regional consultant: Such ratio seems to be very questionable (strongly biased) with its particular reference to the Turkish Black Sea territories because of numerous solid waste dumping sites situated there in direct contact with coastal and marine environment (see Section 5.1.2, C). It seems more likely that at least some or, perhaps, most floating ML items (such as plastic bags, bottles and crockery) were transported by sea currents and winds from the uncontrolled landfills to the localities where they were recorded).

E. In 2001, two environmental NGOs - the Greener Bourgas Foundation (GBF; Bourgas, Bulgaria) and Mare Nostrum (Constanza, Romania) implemented a project entitled as the "Clean Beaches – first commitment for sustainable tourism development" (supported by the Regional Environmental Center for Central and Eastern Europe). The common methodology has been elaborated for ML coastal surveying, and practical guidelines were prepared in the form of a handbook for the assessment of ML pollution on the seashore (Beach Survey Strategy, 2001).

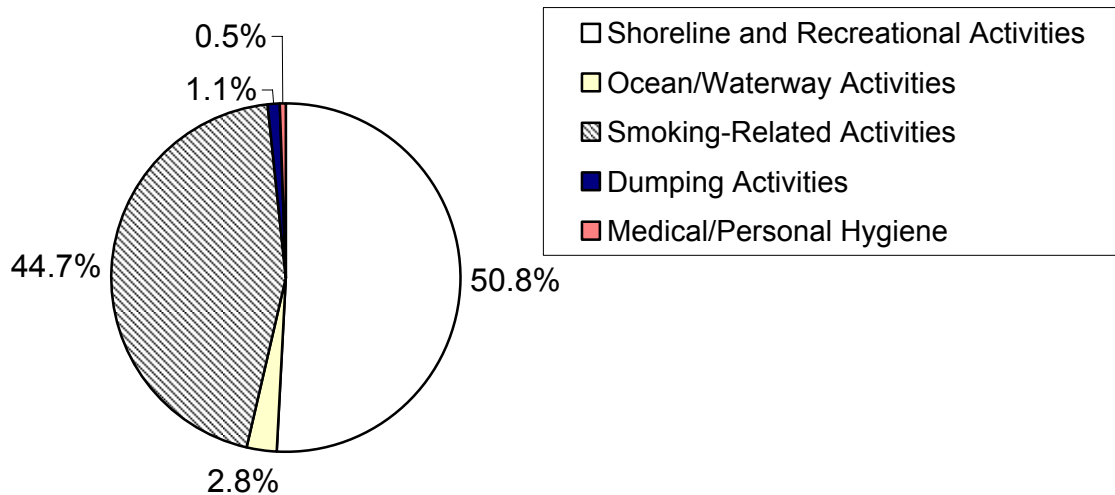
The Bulgarian team monitored five popular beaches in Bourgas, Pomorie and Sozopol during March–July 2001. The volunteers collected, classified and recorded various ML items and prepared a detailed report which is enclosed as Annex 6.

Besides, during the period from 15 June to 15 July, more than 1,500 visitors of the Bulgarian beaches were interviewed on base of preliminary elaborated questionnaire. As a rule, the holiday-makers appreciated climatic conditions of the beaches but most of them (more than 60 or even 90% of the visitors) answered that they do not like rubbish on the beach. The opinion of the beach visitors was that ML strongly (or very strongly) affects quality of the beach.

The recorded numbers of ML items are categorized in compliance with human activities – presumable sources of ML on the seashore (TURMEPA, pers. comm. to E. Okus).

National bibliographies on ML in the Black Sea region are still scant (Annex 7). There are few peer reviewed scientific publications on this topic (all of them are by Turkish authors), and most of these papers concern the solid waste problem mainly.

2003 International Coastal Cleanup - Land -



2004 International Coastal Cleanup - Land -

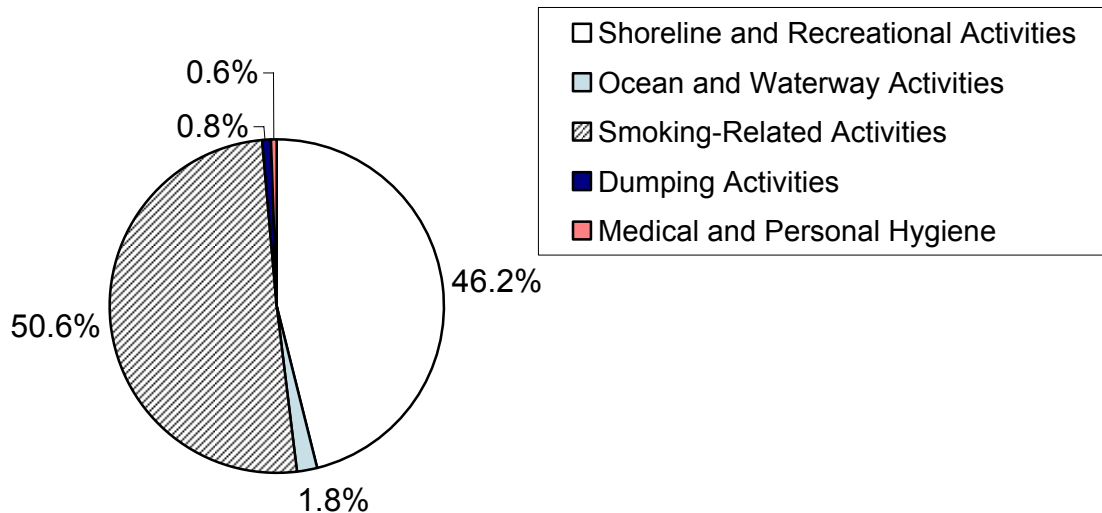


Fig. 5.15. Composition of ML collected in Turkey on the coasts of the Mediterranean, Aegean and Black Seas and Turkish Straits System within the International Coastal Cleanup Campaign in 2003 and 2004.

5.2. EXPERT ASSESSMENT OF MARINE LITTER POLLUTION

National ML consultants were requested to provide expert evaluation (make their own appraisal) regarding the state of ML pollution in their countries. With that end in view, they responded to four questions:

- (a) How do you assess levels of ML pollution last year (in 2005)?
- (b) How do you assess general trend of ML pollution during last decade?
- (c) Can you specify five primary sources of ML and five all-important hot spots?
- (d) Can you specify five principle items (constituents) composing ML?

The answers on these questions are summarized in Tables 5.3–5.9 presented below.

Table 5.3. Experts' views on the level of ML pollution in 2005 in the marine environment

Country	Low	Moderate	Sustainable	High	Very high
Bulgaria		yes			
Georgia		yes			
Romania		yes			
Russia			yes		
Turkey		yes			
Ukraine			yes		

Comment: The medium scores ("Moderate" or "Sustainable") conferred by all national consultants, possibly reflect general uncertainty (a lack of solid scientific data) about actual levels of ML contamination in the marine environment.

Table 5.4. Experts' views on the level of ML pollution in 2005 in the coastal environment

Country	Low	Moderate	Sustainable	High	Very high
Bulgaria			yes		
Georgia		yes			
Romania		yes			
Russia				yes	
Turkey				yes	
Ukraine				yes	

Comment: As it was noted above, there was no ML research activity in Georgia and Romania. That could be a possible reason why these consultants are more straitened in their inferences than their colleagues from other Black Sea countries.

Table 5.5. Experts' evaluation of the general trend of ML pollution during last 10 years (1996-2005) in the marine environment

Country	Decrease	Growth	No significant variation	No comment
Bulgaria			yes	
Georgia			yes	
Romania	yes			
Russia			yes	
Turkey				yes
Ukraine		Yes		

Comment: The continuing accumulation of solid wastes on the uncontrolled landfills may cause a growth of ML in the marine environment due to spontaneous release of the wastes from the dumps into the sea by erosive factors such as waves, rain and wind. At the same time, the sea currents and wind play a role as ML dissemination factors contributing to the transboundary transport of floating wastes.

Table 5.6. Experts' evaluation of the general trend of ML pollution during last 10 years (1996-2005) in the coastal environment

Country	Decrease	Growth	No significant variation	No comment
Bulgaria			yes	
Georgia			yes	
Romania	yes			
Russia		yes		
Turkey	yes			
Ukraine		yes		

Comment: Turkish National Consultant indicates that the data published previously by some Turkish specialists (Yıldırım *et al.*, 2004; Berkun *et al.*, 2005) is quite outdated because in the recent years Turkey undertook a number of very active political steps and investment projects for combating pollution from solid waste disposal and improvement of waste management (see 4.2, pages 45-48).

Table 5.7. Primary sources of ML ranked according to the experts' scores

Source	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine	Total
Municipal garbage/sewages (household waste)	5	5	5	5	3	4	27
Marine transport and ports (shipping waste)	4	3	2	3	5	5	22
Recreation activities in coastal area (litter produced by local population and tourists)	3	4	3	4	1	3	18
River run-off	1	–	–	5	5	–	11
Industry (incl. shipyard works)	1	–	1	–	4	–	6
Fishery (incl. abandoned nets)	1	1	4	–	–	–	6
Coastal construction (incl. house-building)	2	2	–	2	–	–	6
Agriculture	–	–	–	–	2	–	2
Transboundary transfer of floating ML	–	–	–	1	–	–	1

Comment: River run-off and transboundary transfer of floating ML by sea currents were mentioned by some national consultants as the primary sources of ML pollution, although they are not parental (initial) sources, but means of ML transportation mainly. Anyway, ML transfer by sea currents seems to be not less important in the Black Sea region, than ML discharge by rivers.

Table 5.8. ML hot spots indicated by the national consultants

Country	ML hot spots (ranked in order of their importance)
Bulgaria	<ol style="list-style-type: none"> 1. Coastal cities (including seaside resort complexes) 2. Ports 3. Navigation routes 4. Industrial zones along the beaches of Bourgas and Varna 5. Wild beaches and estuaries of the rivers
Georgia	<ol style="list-style-type: none"> 1. Batumi landfill 2. Port of Batumi 3. Port of Poti 4. Kobuleti landfill 5. Mouth of Chorokhi river*
Romania	<ol style="list-style-type: none"> 1. Coastal cities 2. Fishing areas 3. Recreation areas 4. Navigation routes 5. Shipyards in Constantza and Mangalia
Russia	<ol style="list-style-type: none"> 1. River valleys and mouths** 2. Beaches 3. Ports and anchorage areas*** 4. Nearshore bottom of urbanized areas**** 5. Coastal waters between Sochi and Tuapse
Turkey	<ol style="list-style-type: none"> 1. Yeşilırmak delta and basin 2. Samsun area (including Samsun harbour) 3. Kızılırmak delta and basin 4. Industrial areas (Zonguldak and Giresun) 5. Touristic areas (Sinop)
Ukraine	<ol style="list-style-type: none"> 1. Coastal cities (Odessa, Sevastopol, Kerch) 2. Recreation areas in Crimea (Yalta, Sudak, Alushta, Balaklava, etc.) 3. Unorganized beaches of the Crimea peninsula* 4. Sandy spits of the north-western Black Sea and northern Azov Sea* 5. Eastuaries of rivers (Danube, Dnieper, Boug, etc.)*

* Hot spots added by the regional ML consultant in line with his own experience.

** Russian coast of the Black Sea between Divnomorskoe and Psou is the most abundant in mountain rivers.
 *** In particular, harbours of Taganrog, Yeysk and Temryuk in the Azov Sea are burdened with coal debris and scrap-iron.

**** In particular, there are some sunk vessels and abandoned gear within the shelf area between Taman and Anapa.

Table 5.9. Basic groups of ML ingredients ranked according to the experts' scores

Type of ML items	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine	In total
Plastic wares (bottles, bags, etc.)	5	5	5	5	5	5	30
Paper and carton (including various package staff and cigarette stumps)	4	–	4	–	4	4	16
Foodwastes	2	–	–	–	5	2	9
Metal objects (tins and cans, scrap metal)	3	–	–	4	–	–	7
Rubber goods (including old tires)	1	2	–	3	–	–	6
Textile rags	1	–	3	1	–	–	5
Wooden objects	1	4	–	–	–	–	5
Glass (bottles, etc.)	1	–	–	–	–	3	4
Medical wastes	1	–	–	–	3	–	4
Leather (old shoes, etc.)	–	3	–	–	–	–	3
Abandoned fishing and sailing gear	–	1	–	2	–	–	3
Hazardous wastes	–	–	–	–	2	–	2

6. GAPS AND NEEDS IN COVERAGE OF MARINE LITTER MANAGEMENT

The major gaps were already identified in Section 4.2 of the report by means of questioning National Consultants on ML about the outputs of ML-related projects and other relevant activities implemented in their countries in 1996–2006 (see Table 4.3). Besides, based on available knowledge, the National Consultants were requested to set priorities – “primary”, “secondary” and “next to 0” (least important) – in the proposed checklist of 18 actions (or, better, categories of actions) which can promote, in theory, the addressing and mitigation of ML problem. The request was accompanied with common suggestion to add any other activities to the list if necessary. However, most experts (except the Bulgarian one) did not apply to this option, and that is, probably, indicative of the checklist’s completeness. Results of the prioritization provided by the National Consultants are shown in Table 6.1.

According to the summarized scores based on individual estimates by the National Consultants, at least seven (but probably more) high priority actions should be taken into careful consideration. They are: (1) correction of waste management policy; (2) improvement of legal and administrative instruments; (3) development of sustainable ML management; (4) development of ML monitoring methodology; (5) national assessment of ML pollution; (6) preparation of proposals to prevent and reduce ML; and (7) preparation of awareness and educational tools.

6.1. REGIONAL LEVEL

The Special Session on ML was organized by the BSC Permanent Secretariat from 9–10 October 2006 in Istanbul within the 15th Meeting of the BSC Advisory Group on Pollution Monitoring and Assessment. This meeting, with participation of 22 national and regional experts on marine pollution, was conducted following the BSC Work Plan and the Memorandum of Understanding concluded in 2005 between the BSC Permanent Secretariat and the UNEP Regional Seas Coordinating Office in order to develop the Regional Activity on ML in the Black Sea within the framework of the BS SAP. Minutes of the ML Special Session are attached as Annex 8.

The pre-final draft of this report was presented as well as the National ML Reports. Special attention was devoted to the results of expert evaluation of priorities in coverage of ML problem on the national level (see Section 6.1). However, it was noted that the summarized “national” scores do not necessarily reflect the ML priorities on the regional scale. At the same time, participants of the meeting agreed that the major gaps and needs in coverage of ML management on the regional level descend from the national ones, thus, the regional gaps and needs could be summarized as follows:

- (a) underdevelopment of waste management policy and, particularly, its incompleteness and low efficiency in respect of ML issues;
- (b) imperfection and disbalance of legal and administrative instruments developed for solid waste and ML management;
- (c) lack of common ML monitoring and assessment approach based on the standardized methodologies and assessment criteria;
- (d) deficiency of practical measures destined to prevent and reduce ML pollution;
- (e) technological lag in respect of contemporary methods and devices for collection, processing, recycling and disposal of solid wastes and ML;
- (f) insufficiency of public awareness/education regarding ML problem;

- (g) low level of involvement of general public and private sector in combatting ML pollution;
- (h) gaps in professional knowledge on ML issues among managers and authorities involved in the protection of the Black Sea against pollution.

Table 6.1. Identification of priorities by national consultants on ML

(P – primary, S – secondary, U – unimportant, “—” – not assessed)

Actions	Bulgaria	Georgia	Romania	Russia	Turkey	Ukraine
Improvement of legal and administrative instruments	P	P	P	S	P	P
Correction of waste management policy	P	P	P	P	P	P
Development of sustainable ML management	P	P	P	S	P	P
Development of ML monitoring methodology	P	P	P	S	P	P
Organising and maintaining ML monitoring facilities	S	P	S	P	S	P
National assessment of ML pollution	P	P	P	S	P	P
Preparation of proposals to prevent and reduce ML	S	P	P	P	P	P
Development of campaigns/services for ML collecting	S	P	S	U	S	P
Elaboration of ML collecting technologies/devices	S	S	S	U	S	P
Elaboration of ML processing technologies/devices	S	S	S	P	S	P
Development of port reception facilities for garbage	P	P	S	S	S	P
Involvement of stakeholders in anti-ML partnership	P	S	S	S	—	P
Training of officers involved in ML management	S	S	P	U	S	S
Preparation of professional sectorial guidelines	P	S	P	S	S	P
Preparation of awareness and educational tools	P	P	P	P	P	S
Preparation of 'responsible citizenship' guidelines	S	S	P	P	S	S
Initiation of awareness-raising campaign in media	P	S	P	S	P	S
Promotion of public participation in cleanup activities	S	P	P	U	P	S
Research of social and economic costs of ML	P	—	—	—	—	—
Implementation of “polluter pays” principle for ML	P	—	—	—	—	—

7. PROPOSALS FOR CHANGES

7.1. NATIONAL LEVEL

Bulgaria (Atanaska Nikolova)

Approach 1: Direct removal of ML or beach/marine cleanup. This is expensive, laborious and only locally applicable approach.

Approach 2: Policy responses to the marine and coastal pollution. Potentially the most effective activity, via legislation and economic instruments development:

- policy measures to be developed and implemented to aid in preventing, controlling and reducing the ML problem in the marine and coastal areas;
- target specific responsibility groups, such as authorities, business, scientists, NGOs, *etc.*

Approach 3: Public education and awareness raising campaigns directed towards different target groups and aimed to build “responsible” behaviour. This will have long-term effect.

Title of proposal:

Elaboration of Coastal and marine waste management strategy(ies) and action plan(s).

Aim (objectives):

- clear definition and separation of responsibilities, authorities and resources needful for management/control of ML pollution and implementation of cleanup activities;
- development and implementation of innovative policy approaches and practical measures to aid in preventing, controlling and reducing of litter pollution in Black Sea marine and coastal areas. Development of effective legislation and economic instruments, and voluntary incentives for ML prevention and reduction;
- target and involve in specific anti-ML activities the responsibility groups (such as the source industries, environmental NGOs, national and local authorities, research institutions, *etc.*).

Suggested activities:

- detailed analysis of current constraints and opportunities of institutional and legislative/ regulatory framework for the management and the most adequate policy measures to confine the beach littering;
- incorporation of the coastal and marine waste management strategy(ies) in the coastal zone management plans (or other relevant plans and programs);
- partnership for ML prevention: voluntary agreement between representatives of major stakeholders to cooperate for the protection of the marine and coastal environment against ML should be developed; waste management strategies and ICZM plans should include ML items and involve concerned groups including representatives of central and local authorities; source industries, environmental NGOs and research institutions;
- introduction of adequate practical tools for the prevention of ML pollution (re-usable packaging, new materials for erosion control, *etc.*);

- public education and awareness raising campaign should be integral part of the ML strategy.

Potential implementing organisations:

- BMEW (to establish a ML Expert Working group, including representatives of relevant institutions, BMT, BMH, *etc.*), other authorities, research institutes, NGOs, businessmen.
- Preliminarily estimated cost: €50,000.
- *Possible source of funding:* BMEW and international donors.

Georgia (Tamar Gamgebeli)

It would be relevant if waste recycling or waste incinerating plants are constructed in the coastal zone. However, taking into account that this is connected with large investments, this can be considered as a program of long-term perspective.

Since the mentioned measures are very costly (and taking into account that payment ability of the population is very low), the most necessary easy measures should be carried out at the existing landfills. The involvement of private sector directly oriented at coastal ML would be most appropriate.

At the first stage of a pilot project, the ML monitoring should be implemented within the framework of some governmental structure or program in order to obtain reliable information on the levels of ML pollution. In parallel to this, it would be useful if the inventory of ML according to its types (municipal, medical, construction, *etc.*) is carried out.

Also, public awareness and public participation projects, TV programs, booklets, popularisation of garbage bins for society (for teenagers by well known and favourite person with the help of TV advertising rollers) shall be implemented. Educational programs for schools are also very important.

For the addressing ML problem in Georgia, at least one research pilot project should be developed. Such project could be, probably, implemented on any one section of the coast at 10 different sites of 0,5m² each. The project should include quantitative and qualitative evaluation of the level of ML pollution.

Thus, projects that would help to address and solve the ML problem could be as follows:

- 1) Quantitative and qualitative evaluation of ML pollution on the seacoast (\$10,000);
- 2) Improvement of legal and administrative instruments (\$5,000);
- 3) Public awareness raising (\$12,000);
- 4) Installation of garbage incinerators in Georgian Ports of Batumi and Poti (\$300,000);
- 5) Installation of dustbins and refuse bins in the recreational areas (\$100,000);
- 6) Construction of small garbage recycling and incinerating plants for municipal waste services (\$3,500,000).

Implementing organizations might be various: government, NGOs, private sector; as for source of funding international financial institutions will be necessary for financial support of costly projects (like indicated in 4. 5. and 6), where the government could be co-financier. As for cheaper projects the source of financing should be the government.

Romania (Alexei Atudorey)

The National Standard SR 13493/2004 “Waste Characterization – Methodology for Household Waste Characterization – ROMECOM” is implemented in Romania. The standard could be used for the characterization (quantities, composition, humidity, calorific value, *etc.*) of ML collected from the recreational areas. Besides, guidelines for development of the database are included in the standard. It could be suggested that this standard is implemented in all Black Sea countries. This will assure the unified ML research/monitoring, collection and disposal activities in the the region.

Title of proposal:

Implementation of the unified methodology of ML research, monitoring, prevention and decreasing in the Black Sea region.

Aim (objectives):

Implementation of the ML Management/Action Plan in the Black Sea region.

The results obtained will be based on the same methods, same system for processing ML data and will assure accumulation of the standardized ML information in each country for future activities, such as: the development of ML monitoring methodology, preparation of proposals to prevent and reduce ML, elaboration of ML collecting and processing technologies and devices, development of sustainable ML management.

Suggested activities:

- elaboration and implementation of a unified standard for ML characterization;
- elaboration and implementation of a unified system for ML monitoring and development of ML database at the local and national level;
- elaboration and implementation of a unified system for developing technical norms for the prevention and reduction of ML pollution;
- elaboration and implementation of a unified system for developing technical norms for ML collecting and processing technologies and devices;
- elaboration of a unified “handbook” for the implementation of ML Management/Action Plan”.

The activities of the project could be performed as:

Phase 1 preparation of the proposed documents based on the international and national experience; the documents will be elaborated by a working group with members (national experts) from all Black Sea counties;

Phase 2 a “case study” in one city for each country (in cooperation with national and local administration, industrial, social and sanitation companies, research and development institutes, universities, NGOs, *etc.*);

Phase 3 analysis of the results obtained during the “case studies”; the analysis will take into consideration local features of each city (e.g., number of tourists, different industrial activities, level of industrial activities, municipal prognosis for the future five years, *etc.*);

Phase 4 preparation of the National Action/Management Plans on ML in the final form; the Regional Action Plan on ML should be included in the BS SAP;

Phase 5 implementation of the Regional and National Action/Management Plans on ML and monitoring of the results during three years;

Phase 6 analysis of the results after three years and improvement of the Action/Management Plans on ML. This phase may represent a new project.

Potential implementing organization(s):

- national and local administrations in all Black Sea countries;
- industrial, social and sanitation companies performing activities in the coastal zone;
- research and development institutes;
- universities;
- NGOs.

Preliminarily estimated cost:

€ 600,000 in total

or €100,000 for each country (including €10,000 for dissemination of the results).

Possible source of funding:

international donors.

Turkey (Erdogan Okus)

Recommendations:

- all municipalities should separate solid waste collected from beaches, keep records of the amounts and work accordingly;
- all ports must establish a waste reception facilities under the Regulation on Reception of Waste from the Ships and Waste Control;
- All beaches should be encouraged and supported to implement a criteria of Blue Flag by the responsible organizations;
- municipalities should separate domestic solid waste in source by collecting recyclable wastes such as glass, plastic, paper, *etc.* separately;
- research vessels in the Black Sea should be encouraged to do studies on surveying the floating ML¹¹;
- ML that comes into trawl during fish inventory studies should be separated, weighted and calculated as the amount per area (it is especially important in metropolitan cities and areas close to estuaries);
- adverse effects of ML should be evaluated on the international level¹²;
- ML studies at sea, on the coasts and in the estuaries should be carried out in order to assess the levels of ML pollution on the regional scale;
- a common data bank should be established for the data obtained by the monitoring of ML and its effects at sea, on the seashore and in the rivers;

¹¹ The Institute of Marine Science and Management of the Istanbul University is going to start in 2006 some new research activities within the context of "R/V ARAR Black Sea Pollution Monitoring Study".

¹² As an example, in 1988 more than 450 barrels were dumped onto the Black Sea from an Italian flagged ship. Today, 327 of these barrels are kept in Samsun and 127 of them are in Sinop. This example shows the international dimension of ML. The Ministry organized to relegate barrels and IZAYDAS committed as consultancy. The LEMONDIS Company is in Germany committed to dispose of barrels in the Europe.

- stock quarries that have been operated for the coastal highway can be converted into landfill areas.

Other suggestions:

- all residential areas should contain landfill sites;
- all beaches should be viewed and cleaned regularly;
- in order to raise public awareness, educational activities should be increased in schools and informative programs for housewives should be prepared with the support of local TV and newspapers;
- special marine protection areas should be established in the Black Sea and all activities like fishing, sea traffic, tourism, *etc.* should be stopped in these areas;
- waste from ships should be collected in ports regularly and treated properly;
- ML should be prevented in order to protect marine and coastal species and their habitats;
- monitoring systems such as national and regional observatories should be established in order to ensure the pollution control;
- 'Coastal Area Management Plans' should be developed, the appropriate report for Turkey should be reviewed;
- study on the open sea, coast and estuary should be monitored and fixed a pollution condition in the Black Sea Region;
- regional strategies on solid waste, medical waste and hazardous waste should be developed and implemented.

Recommendations and proposals submitted by Turkish environmental NGOs could be summarized as follows:

- to raise public awareness on ML issues (especially among students and children, ship and smaller vessels crews), particularly, by means of education and cleanup campaigns, and exhibitions of ML collected due to the coastal, marine and underwater cleanup operations.

The restoration of uncontrolled landfills is an urgent task for Turkey. In order to rehabilitate such site in Zonguldak and control the pollution raised from it, the following activities have been proposed by Y. Yıldırım *et al.* (2004): that in many aspects coincided with recommendations of national consultant:

- solid waste evacuation to the site should be stopped and a new "landfill site" must be established according to the environmental regulations;
- run off rain water collection and control system should be constructed to control surface run off;
- suitable trees should be planted all over the field to prevent erosion and to improve the aesthetic view;
- a retaining wall should be constructed to provide stability for the rubbish heap and to prevent rubbish mass transportation through the sea¹³;
- a revetment or seawall should be constructed to prevent the retaining wall and landfill from wave effects;
- identification of the composition of solid wastes stored on the landfill (based on properties of materials) should be carried out;

¹³ This wall is already constructed in 2005-2006.

- monitoring of physicochemical and biological processes inside the landfill and main processes affecting waste volume should be developed;
- to investigate the overall behaviour of the landfill (including geophysical research and biogas measurement);
- recreational studies must be carried out in the landfill site.

Title of proposal:

Celebration of the Black Sea Day'06

Aim (objectives):

During the Celebration of the Black Sea Day (BSD) in Turkey to highlight importance of the protection of the Black Sea against ML pollution and to increase public awareness and awareness of decision makers on the Turkish coast on this issue.

The aim of the International BSD activities could be to increase public awareness regarding the Black Sea pollution problems and possible recovery actions concerning ML; to evaluate the latest local and national activities on the management of ML.

Suggested activities:

To celebrate the BSD as a week. The activities will start from Istanbul and spread to Samsun, Zonguldak, Giresun, Trabzon and Artvin areas. The activities will include:

- cleanup campaign,
- press conference,
- panels and receptions,
- TV programmes,
- fishermen seminars,
- preparation of educational materials for students,
- seminar for housewives,
- new slogan and logo for the BSD,
- publishing special bulletin on ML,
- concerts.

Potential implementing organization(s):

NGO's from the Black Sea coast, Regional Directorates of the Ministry of Environment and Forestry, Private companies.

Preliminarily estimated cost: \$15,000

Possible source of funding: UNEP, BSERP, Ministry's budget.

7.2. REGIONAL LEVEL

Participants of the Special Session on ML within the 15th Meeting of the BSC Advisory Group on Pollution Monitoring and Assessment (Istanbul, 9-10 October 2006) were invited to propose their own list of high priority actions to be included in the Regional ML Action Plan. The "brain

storming” approach was applied to complete this work. Finally, the participants agreed that principal actions and activities which should be included in the Action Plan are as follows:

- improvement of national waste management policies (to introduce measures to reduce ML pollution into national waste management policies);
- improvement of legal and administrative instruments for ML as a part of national waste management policies (to introduce necessary amendments related to ML into new LBS protocol of the Bucharest Convention);
- development of the regional and national ML assessment and monitoring schemes using common methodologies and assessment criteria (to develop methodologies for monitoring and assessment of floating, submerged and coastal litter; to organize and maintain ML monitoring facilities);
- developing and implementing measures to prevent and reduce ML pollution (to prepare proposals and relevant implementation programs; to construct and improve port reception facilities for garbage; to close down dumping sites and landfills in the coastal water protection zone as defined in national legislation; to address and mitigate ghost fishing);
- raising public awareness and improvement of public education (to prepare awareness and educational tools; to organize public campaigns; to initiate awareness-raising campaign in media; to prepare 'responsible citizenship' guidelines);
- strengthening public/private partnership in combatting ML pollution;
- implementation of the best available technologies in order to collect, process, recycle and dispose ML;
- improvement of professional skills and knowledge on the management of ML (to prepare professional sectorial guidelines; to organize a training for officers involved in ML management).

Special note on the Black Sea regional ML survey

It could be recommended that the line transect methodology and Distance analysis (Buckland *et al.*, 1993) are applied for further development of ML research and monitoring at sea by means of the vessel-based and aerial surveys conducted over different coastal and offshore areas, preferably on the Black Sea regional scale.

It seems to be reasonable from scientific and economical points, if the first basin-wide ML survey will be carried out simultaneously with the Black Sea cetaceans' basin-wide survey initiated and promoted by the BSC Permanent Secretariat and ACCOBAMS. The project proposal was prepared and submitted to the BSC Secretariat in December 2005. It was supported by several meetings of the international and national experts and by the Scientific Committee of the International Whaling Commission (St. Kitts, May 2006). The 4th Meeting of the ACCOBAMS Scientific Committee (Monaco, November 2006) has endorsed the most recent version of the proposal and provided appropriate recommendation for the Black Sea Commission.

CONCLUSIONS

1. The overloading of the Black Sea marine and coastal environment with ML constitutes one of the most urgent and difficult environmental problems in the region. Geographical scope of this problem, which is focused on the Black Sea proper and its coasts, extends over the entire catchment area of the Black Sea drainage basin. However, so far ML problem is not properly addressed and managed on the regional and national levels. The dissemination of floating and suspended ML by wind and sea currents represents a transboundary threat.
2. The ML problem is originated almost completely from the problem of solid waste pollution. These two problems are closely linked to major problems of public health, conservation of the environment, and sustainable development in the region. ML originates from various land- and sea-based sources as a result of manifold human activities and, evidently, causes multivectorial negative impact on the population, wild life, abiotic nature and some sectors of economy (*e.g.*, the tourism, fishery and marine traffic). At the same time, it seems very likely that the land-based solid wastes constitute the major source of ML in the Black Sea.
3. Widespread IUU fishing can be considered as a peculiar type of ML pollution in the Black Sea region. Illegal fishing nets and nets which were discarded or abandoned cause the so-called “ghost fishing”. Admittedly high concentrations of fixed and floating IUU fishing gear in the shelf area result in the reduction of habitat space, formation of obstacles on migration ways and enhancement of incidental mortality (by-catch) of cetaceans, fishes and crustaceans.
4. Black Sea ML is a matter of regulation to some extent by a series of legal acts aimed to harmonize various human activities on the international, regional and national levels. However, up to now there is no any jural instrument dedicated specifically to the management of ML problem in the Black Sea marine and coastal environment. Neither the concept of ML as a serious problem or indeed as a law term are formally accepted or even well-known in the Black Sea community.
5. The Black Sea states are the parties to several conventions which are relevant to the management and mitigation of ML problem. The Bucharest Convention, MARPOL 73/78 and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal are ratified by all six Black Sea states, whereas the Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention) is ratified by Bulgaria, Russia and Ukraine only.
6. All Black Sea riparian states are in transition process of developing and updating their national instruments aimed at combatting marine pollution including ML/solid waste component. Actual rate of this process and concrete instruments developed are quite different in different countries. However, general trends of this process regarding the ML problem are common: (a) to prohibit any deliberate discharge of potential ML at sea and on the shore; (b) to improve solid waste collection, processing, storage, disposal and recycling facilities; and (c) to enhance governmental control of above mentioned activities.
7. National policies in the Black Sea states are aimed at waste minimization, reuse and recycling, and recovery of landfills. The major legislative and regulatory tools for waste management are adequately developed in the Black Sea countries, and include basic laws and regulations. Bulgaria and Romania, which were accepted to the EU in January 2007, transpose relevant EU directives and standards into their national legislation. One of the main management problems in most Black Sea countries is the failure in full application of the existing laws and regulations.
8. A wide variety of governmental organizations, NGOs and business establishments are concerned about marine and coastal pollution in the Black Sea states at the national and local level. Most of those entities, represented by ministerial and municipal structures and services, marine and sanitary inspectorates, research institutions and universities, port administrations, various agencies, companies and enterprises, and amateur ecological associations, are involved (or can be involved) in the activities addressing and combatting ML problem. The existing

institutional arrangements are in need of improvement, consolidation and harmonization of their activities on the regional and national levels.

9. So far, there is no any Black Sea regional and national strategy, action plan or programme that is specifically devoted to address, restrain and solve the ML problem. However, during the period from 1996–2007 there were several international and Black Sea regional programmes and projects which were partly or marginally concerned in ML. The BS SAP (1996, amended in 2002) seems to be the most appropriate strategic framework that could be supplemented with specific ML items of the regional significance. Some strategic documents of national importance (*e.g.*, environmental strategies for the coastal zone and waters, waste management programmes, *etc.*) are concerned in ML problem at least in part. Besides, several ML-related projects were implemented during the last decade by environmental NGOs on voluntary basis.

10. During the last decade, some governmental and private institutions and NGOs carried out ML research using different approaches and methods. However, national bibliographies on ML in the Black Sea region are still scant; there are very few scientific publications on this topic and most of the papers concern the solid waste management mainly. Several aerial and vessel-based ML surveys have been carried out in the Ukrainian and Russian waters. Turkish specialists performed diving ML surveys in the Istanbul Strait and presented the data concerning uncontrolled dumping sites at the southern coast of the Black Sea. Coastal ML surveys were conducted in some populated (in Bulgaria and Turkey) and unpopulated (in Ukraine) seashore areas. Results of all those studies confirm the importance of ML problem for different Black Sea countries and the region in whole.

11. According to expert valuation by national consultants on ML, at least seven actions or groups of actions deserve high prioritization on the national level: (a) correction of waste management policy; (b) improvement of legal and administrative instruments; (c) development of sustainable ML management; (d) development of ML monitoring methodology; (e) national assessment of ML pollution; (f) preparation of proposals to prevent and reduce ML; and (g) preparation of awareness and educational tools.

12. The Special Session on ML of the 15th Meeting of the BSC Advisory Group on Pollution Monitoring and Assessment (Istanbul, 9-10 October 2006) agreed that the major gaps and needs in coverage of ML management on the regional level consist in following items: (a) underdevelopment of waste management policy and, particularly, its incompleteness and low efficiency in respect of ML issues; (b) imperfection and disbalance of legal and administrative instruments developed for solid waste and ML management; (c) lack of common ML monitoring and assessment approach based on the standardized methodologies and assessment criteria; (d) deficiency of practical measures destined to prevent and reduce ML pollution; (e) technological lag in respect of contemporary methods and devices for collection, processing, recycling and disposal of solid wastes and ML; (f) insufficiency of public awareness/education regarding ML problem; (g) low level of involvement of general public and private sector in combatting ML pollution; and (h) gaps in professional knowledge on ML issues among managers and authorities involved in the protection of the Black Sea against pollution.

RECOMMENDATIONS

National consultants on ML made helpful suggestions and drafted some project proposals aimed to address and alleviate ML problem in their countries. Besides, participants of the Special Session on ML (Istanbul, 9-10 October 2006) proposed a list of high priority actions to be included in the Regional ML Action Plan. Reflecting all available provisions, the aim of this action plan could be formulated as follows: *to consolidate, harmonize and implement necessary environmental policies, strategies and measures destined to develop sustainable integrated management of ML issues in the Black Sea region.*

The objectives of the Regional ML Action Plan could be based on general recommendations of this report, including:

- (1) to improve the waste management policies in order to devote due regional/ intergovernmental and national/governmental attention and outline proper effort and resources for the abatement of marine litter pollution in the region in whole and in every Black Sea riparian state, in particular;
- (2) to reinforce and harmonize existing legal and administrative instruments relevant to the implementation of waste management policies in order to ensure their efficacy under the application with respect to marine litter issues;
- (3) to strengthen intergovernmental institutional arrangements consolidating Black Sea regional activities on marine litter and other types of marine pollution;
- (4) to improve national institutional arrangements regarding the addressing, preventing and combatting the marine litter problem;
- (5) to identify financial sources and allocate essential funds for the implementation of marine litter projects;
- (6) to develop regional and national marine litter monitoring and assessment schemes on base of common research approach, methodology, evaluation criteria and reporting requirements;
- (7) to improve, develop and implement practical measures aimed to prevent and reduce marine litter pollution;
- (8) to gain and implement the best available technologies in order to collect, process, recycle and dispose marine litter;
- (9) to raise public awareness and promote public education on marine litter issues;
- (10) to strengthen public, governmental and private sector partnership in combatting marine litter pollution;
- (11) to improve professional skills and knowledge of responsible authorities involved in the management of marine litter issues;
- (12) to stimulate information exchange on marine litter issues in order to share the best experiences and innovative technologies amongst the Black Sea countries.

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ACRONYMS

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
ARS	Romanian Association for Solid Waste Management
BEEA	Bulgarian Environmental Execution Agency
BMA	Bulgarian Maritime Administration
BMEW	Bulgarian Ministry of Environment and Waters
BMH	Bulgarian Ministry of Public Health
BMT	Bulgarian Ministry of Transport
BNAWQ	Bulgarian National Association on Water Quality
BSBD	[Bulgarian] Black Sea Basin Directorate
BSC	Commission on the Protection of the Black Sea Against Pollution (Black Sea Commission)
BSD	Black Sea Day
CBD	Convention on Biological Diversity
CHEMBAS	[Russian] Centre on Hydrometeorology and Environment Monitoring of the Black and Azov Seas
CIESM	Commission Internationale pour l'Exploration Scientifique de la Mer Mediterranee
CMS	Convention on the Conservation of Migratory Species of Wild Animals
EIA	Environmental Impact Assessment
EU	European Union
FAO	United Nations, Food and Agriculture Organization
GBF	Greener Bourgas Foundation
GEF	Global Environmental Facility
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection
GMEPNR	Ministry of Environmental Protection and Natural Resources of Georgia
GMPh	Ministry of Public Health of Georgia
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
ICC	International Coastal Cleanup campaign
ICZM	Integrated Coastal Zone Management [Programme]
IMO	International Maritime Organization
INCDM	National Institute for Marine Research and Development (Romania)
INCDDPM-ICIM	National Research and Development Institute for Environmental Protection (Romania)
ISPA	[EU] Instrument for Structural Policies for Pre-accession
ISWA	International Solid Waste Association
IUU fishing	Illegal, unreported and unregulated fishing
MARPOL	International Convention for the Prevention of Pollution from Ships
ML	Marine Litter
NATO	North Atlantic Treaty Organisation
NGO	Non-governmental organization
RAC	Regional Activity Centre
REC for CEE	Regional Environmental Center for Central and Eastern Europe
RMEC	Ministry of Economy and Trade of Romania
RMEWM	Ministry of Environment and Water Management of Romania
RmPh	Ministry of Public Health of Romania

ACCOBAMS	Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area
RMTCT	Ministry of Transportation of Romania
STH	[Turkish] Underwater Cleaning and Awareness Activity
TURMEPA	Turkish Marine Environment Protection Association
UMPH	Ministry of Public Health of Ukraine
UMTC	Ministry of Transport and Communication of Ukraine
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VML	Estimated value of marine litter pollution
WHO	World Health Organization

ANNEXES

ANNEX 1

A TEMPLATE OF NATIONAL REPORT ON THE STATE OF MARINE LITTER PROBLEM IN THE BLACK SEA REGION:

(Black Sea country)

by _____

(name of National Consultant)

This questionnaire should be filled in and submitted to the BSC Secretariat,

secretariat@blacksea-commission.org, by 28 February 2006

Background information

Excerpts from the Memorandum of Understanding (MoU) between the Permanent Secretariat of the Commission on the Protection of the Black Sea Against Pollution (BSC Secretariat) and the United Nations Environment Programme (UNEP), 2005

The Governing Council decision 22/2 IIIA on the UNEP Regional Seas Programme, calls for the utilization of the Regional Seas conventions and Action Plans as a platform for the regional implementation of multilateral environmental agreements and global programmes and initiatives. In the resolution on "Oceans and the law of the sea" (A/59/L.22 adopted as resolution 59/25), in paragraph 92, it is recommended that Consultative Process during its deliberations on the report of the Secretary General, should organize its discussions around, among others, marine debris. The eighth special session of the UNEP Governing Council/Global Ministerial Environment Forum, held in Jeju, Republic of Korea, from 29 to 31 March 2004, at its 6th plenary meeting on 31 March, adopted the decision SS.VIII/4 on Waste management, on the basis of drafts approved and submitted by the Committee of the Whole.

Within the above mentioned context, and within the context of UNEP's support to the BSC, bearing in mind that marine litter is a priority activity for both the BSC and for UNEP's Regional Seas Programme, UNEP has provided support to the BSC Secretariat for the development of Regional Activity on Marine Litter in the Black Sea within the framework of the Strategic Action Plan on Rehabilitation and Protection of the Black Sea (BS SAP).

The objective of this activity is to assist in the environmental protection and sustainable management and development of the Black Sea region through the development of a Regional Activity on Marine Litter within the framework of BS SAP. A draft amendment to the BS SAP to include this Regional Activity on Marine Litter will be developed under this MoU and BSC Secretariat will ensure that such amendment be approved by the Contracting Parties to the Convention on the Protection of the Black Sea Against Pollution.

It is expected that the BS SAP, signed in 1996, based on the Transboundary Diagnostic Analysis carried out by the Black Sea Environmental Programme will be substantially updated in the beginning of 2007 when the next regular meeting of the Contracting Parties to the Convention on the Protection of the Black Sea Against Pollution is to take place. The amendment proposal on marine litter, worked out in compliance with the current MoU will be incorporated with the new draft SAP and after that submitted to the BSC for approval and then for consultations at the country level. After the successful national procedures, the Ministers of Environment of the six coastal states will sign the new SAP at the meeting in 2007 (postponed to 2008) and thus the

provisions of the Regional Activity on Marine Litter document will obtain some legal status in the Black Sea region.

Under the terms of this MoU, the BSC Secretariat, in consultation with the UNEP Regional Seas Coordinating Office (RSCO), shall undertake...:

Activity A - Preparation of a Review Document on Marine Litter in the Black Sea Region, on both the national and regional levels, which will include, among others: collection and review of existing institutional arrangements; data and information on marine litter in the marine and coastal environment; legal and administrative instruments; programmes and initiatives; identification of gaps and needs in coverage of marine litter management; proposals for changes and recommendations.

Such Review document should be based on national reports (preferably based on standard questionnaires) and their compilation and other available documents and information, such as relevant scientific papers and other sources and literature.

ABBREVIATIONS

Any abbreviations used in the report should be included in this table

NC	–	National Consultant
ML	–	Marine Litter
	–	

Section 1. GENERAL INFORMATION

1.1. *National Consultant on ML*

(please fill in your personal data)

Family name	
First name	
Address	
Telephone number (with country code)	
Fax number (with country code)	
E-mail	
Host Institution	
Affiliation/position	
NC's experience in ML problem	

1.2. *Geographical scope of ML problem*

(a) maritime and coastal areas under the jurisdiction of your country in the Black Sea region, including the Black Sea proper, Azov Sea and Kerch Strait:

Maritime areas, km ²	
internal waters	
territorial sea	
exclusive economic zone	
shelf zone (0–200 m deep)	
Depth range, from X to Y m	
internal waters	
territorial sea	
exclusive economic zone	

Maritime areas, km ²	
Coasts	
coastline in total, <i>km</i>	
seashore area in total, <i>km²</i>	

(b) please attach a layout/map of the maritime and seashore areas

(c) please provide brief description of the maritime areas and coasts in view of their potential accessibility for ML monitoring and cleanup operations; please evaluate the extent of coastline (km) and seashore area (km²) in places which are difficult of access; please indicate these places on the map (see 1.2,b).

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1.3. National bibliography on ML in the Black Sea region

Please provide references on scientific papers, reports, web sites, other publications concerned with marine litter / debris / garbage (1996–2006). Do not list references on other types of marine pollution and other environmental problems. Translation of titles into English along with original spelling is advisable.

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Section 2. Legal and administrative instruments

2.1. Legal instruments

(a) international environmental legislation (conventions, multi- and bilateral agreements relevant to the mitigation of ML problem; print dates when these instruments have been entered into force in your country)

Title of convention or agreement	dd.mm.yy
Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention)	
International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)	
Annex V to MARPOL 1973/78 (optional annex covering garbage; the Black Sea is designated as a Special Area with regard to this annex)	
Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	
Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention)	
United Nations Convention on Biological Diversity (CBD)	
Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	
Convention on Migratory Species (CMS, Bonn Convention)	
Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	
Please add additional lines for listing more items	

- (b) national environmental legislation (please specify laws, decrees, other legal acts related to regulating ML affairs in your country; print dates when these instruments have been entered into force)

Title of national legal act	dd.mm.yy

2.2. Administrative instruments

- (a) central government documents dealing with ML

(statements, resolutions, ministerial regulations, national standards, guidelines, etc.)

Title of document	dd.mm.yy

- (b) instruments of subordinate (province, district, municipal, harbor, etc.) level (list those documents only which have particular sense for regulation of ML problem)

Title of document	dd.mm.yy

2.3. Presence of ML items in national legal and administrative instruments regulating human activities beyond environmental sphere

(please print YES or NO in appropriate cells of the table)

Presence of ML items in the instruments concerning:	
Public health	
Coastal and urban development	
Marine and riverine traffic	
Fishery and aquaculture	
Tourism and recreation	
Offshore gas and oil exploitation	

Presence of ML items in the instruments concerning:	
Agriculture and farming	
Various branches of industry	
Protection of state boundaries	
Military activities	
Other activities (<i>please specify</i>)	

Please enclose relevant references as an annex to this report.

Section 3. Existing institutional arrangements

Please add to tables 3.1 – 3.5 as many lines as you need

3.1. Governmental structures involved in the management of ML affairs

(ministry, departments, inspectorates/inspections, etc.)

Organization	Person responsible for ML management	Contact information (address, tel., e-mail)

3.2. Institutions involved in ML research and monitoring

Organization	Contact person	Address, tel., e-mail

3.3. Organizations/enterprises involved in ML cleanup and disposal/utilization

Organization	Contact person	Address, tel., e-mail

3.4. Non-governmental organizations involved in ML activities

Organization	Contact person	Address, tel., e-mail

3.5. Experts on ML (other than mentioned in 3.1 – 3.4, if any)

Name of expert	Field of expertise	Address, tel., e-mail

Section 4. strategies, Programmes and initiatives

4.1. Strategies concerning the solution of ML problem in the Black Sea region

4.1.1. Is there specific document arranging national strategy on Black Sea ML in your country?

Please print "YES" or "NO"

If "YES" is printed, please provide reference to this document (title, date of adoption, by whom it was adopted, etc.):

4.1.2. Are there specific national or ministerial action/ management plans aimed to solve/ mitigate Black Sea ML problem in your country?

Please print "YES" or "NO"

If "YES" is printed, please specify correct reference(s):

4.1.3. The Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (BS SAP, 1996) envisages in its paragraph 81 that appropriate National

Action Plan or other corresponding document should be developed by each Black Sea country. In this respect, please specify:

(a) full title of this document, its reference No., date of adoption, by whom it was adopted, stipulated terms of implementation

(b) does this document include specific items concerning ML?

Please print "YES" or "NO"

If "YES" is printed, please provide correct wording of these items (in English):

4.1.4. Could you please formulate national strategic approach to the Black Sea ML problem? (maximum, 100 words, if possible)

4.2. Programmes aimed to address/reduce ML pollution in the Black Sea region

4.2.1. Participation of your country in the international and Black Sea regional programmes (1996–2006) which are/ were fully or partly concerned in ML problem

Programme name	Terms of realization	Implementing agency	Sponsoring agency

4.2.2. National and/ or ministerial programmes (1996–2006) which are/ were fully or partly concerned in ML problem

Programme name	Terms of realization	Implementing agency	Sponsoring agency

4.2.3. Implemented and ongoing activities related to ML problem

Please specify projects, actions, scientific meetings, public campaigns, other activities and initiatives realized within above programmes (4.2.1, 4.2.2) and beyond them in 1996–2006

Project name	Terms of realization	Executing organization	Sponsor

4.2.4. Outputs of ML-related projects and other activities/ initiatives implemented in your country in 1996–2006

Please print YES or NO in appropriate cells of the table; if your answer is YES, please provide references (including web addresses) and comments; besides, if possible, attach factual annexes to this report

Achieved results	YES/NO	References and comments
Legal and administrative instruments aimed to manage ML problem are improved		
Waste management policy is amended		
Sustainable integrated management of ML is secured		
Methodology to monitor ML pollution is developed (or acquired), including methods which are serviceable to assess:		
ML quantities		
ML composition		

Achieved results	YES/NO	References and comments
ML distribution patterns		
ML sources		
ML trends		
ML impact on the:		
environment		
biodiversity		
public health		
economics		
Monitoring of ML and its effects is organized and maintained		
Assessment of ML pollution is completed		
Proposals to prevent and reduce ML and its adverse effects are prepared		
Campaigns and/ or permanent services for ML collecting are developed		
New technologies/ devices for ML collecting and processing are elaborated or purchased		
Port reception facilities and services for garbage collection from vessels are developed and/ or improved		
Major stakeholders are involved in anti-ML partnership/cooperation, including:		
shipping industry		
Tourism industry		
manufacturers of plastics		
fisheries		
waste managers/services		
municipalities, local communities and authorities		
NGOs and general public		
Training for officers occupied with ML management is organized		
Professional sectorial guidelines for ML management are developed for:		
Tourism		
Boating		
diving		
cruise lines		
fisheries		
coastal construction		
Awareness and educational tools (brochures, posters, TV-clips, etc.) dedicated to ML problems are produced		
'Responsible citizenship' guidelines for different sectors and target audiences are developed, in particular, for		
children and students		

Achieved results	YES/NO	References and comments
Tourists		
municipal authorities and local communities		
shipping companies		
ship and smaller vessels crews		
commercial and recreation fishing vessels		
other identified target groups		
Mass media awareness-raising campaign fighting against ML is initiated		
Growth of public awareness/ participation in cleanup activities became sound		
Other substantial results (please specify; add more lines, if necessary)		

Section 5. Marine litter research and monitoring in the marine and coastal environment

5.1. Research/ monitoring/ assessment of ML and its effects in your country

5.1.1. Have any research/ monitoring/ assessment of the state of the marine and coastal environment concerning ML been made in your country in 1996–2005?

Please print YES or NO

If YES, please list references and/or give web addresses if available online:

--

5.1.2. Have any other studies on the effects of ML (ecological effects, public health effects, economic consequences, etc.) undertaken in your country in 1996–2005?

Please print YES or NO

If YES, please list references and/or give web addresses if available online:

--

If you printed NO in 5.1.1 and 5.1.2., please go directly to Section 6.
If you printed YES, please continue your work within Section 5.

5.2. ML parameters and effects which were studied in 1996 – 2005

Please print YES or NO and provide references, if available

ML characteristics	YES/NO	Reference
Quantity/ density		

ML characteristics	YES/NO	Reference
Composition		
Distribution patterns		
Sources		
Trends (spatial/ temporal dynamics)		
Impact on the:		
environment		
biodiversity		
public health		
economics		
Other (please specify)		

5.3. Efforts applied to collect ML data in 2004 and 2005

5.3.1. In the marine environment

	2004	2005
Time allocated for ML research (number of days)		
Geographical scope, including		
Internal maritime areas (area investigated, km ²)		
territorial waters (area investigated, km ²)		
exclusive economic zone (area investigated, km ²)		
Number of people involved in research/ monitoring		

5.3.2. In the coastal environment

	2004	2005
Time allocated for ML research (number of days)		
Geographical scope:		
length of the coastline investigated, km		
area of the seashore investigated, km ²		
Number of people involved in research/ monitoring		

5.4. Available ML data (1996 – 2005)

Please print YES or NO in appropriate cells of the table

ML characteristics	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Internal maritime area										
Quantity/ density										
Composition										
Distribution patterns										
Sources										
Trends (spatial/ temporal dynamics)										
Impact on the:										
environment										

ML characteristics	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
biodiversity										
public health										
economics										
Territorial sea										
Quantity/ density										
Composition										
Distribution patterns										
Sources										
Trends (spatial/ temporal dynamics)										
Impact on the:										
environment										
biodiversity										
public health										
economics										
Exclusive economic zone										
Quantity/ density										
Composition										
Distribution patterns										
Sources										
Trends (spatial/ temporal dynamics)										
Impact on the:										
environment										
biodiversity										
public health										
economics										
Coastal environment										
Quantity/ density										
Composition										
Distribution patterns										
Sources										
Trends (spatial/ temporal dynamics)										
Impact on the:										
environment										
biodiversity										
public health										
economics										

Please provide references and information on where the ML data are accumulated:

5.5. Do ML databases exist in your country?

Please print YES or NO

If YES, please provide contact information: _____

5.6. Estimated levels and effects of ML pollution

Please compile brief review (summary) of available data characterizing intensity, extensiveness, composition, seasonal and yearly dynamics, and adverse effects of ML pollution in your country during the last 10 years (1996–2005), with general emphasis on the most recent results. Arrange your description and conclusions in order of subject headings given in Table 5.4. Section 6. Expert evaluation of the present status of marine litter problem

(please make your own appraisal of the situation in your country)

6.1. Is marine litter/marine debris in the marine and coastal environment perceived as a priority issue in your country?

Please print YES or NO

Comments:

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6.2. Can you suggest methodology (or some methods) of ML research/monitoring implemented in your country for more extensive use in the Black Sea region in whole?

Please print YES or NO

Comments:

--

6.3. Can you suggest other achievements of your country in addressing, management and reducing of ML problem for more extensive use in the Black Sea region in whole?

Please print YES or NO

Comments:

--

6.4. How do you assess levels of ML pollution in 2005?

Please print YES in appropriate cells

	Low	Moderate	Sustainable	High	Very high
in the marine environment					
in the coastal environment					

6.5. How do you assess general trend of ML pollution during last decade?

Please print YES in appropriate cells

	Decrease	Growth	No significant variation	No comment
in the marine environment				
in the coastal environment				

6.6. Five primary sources of ML and five all-important hot spots

Please specify in descending order (first – the most important source and hot spot)

Sources:
Hot spots:

6.7. Five principle items (constituents) composing ML

Please specify in descending order (first – the most important item or group of items)

--

6.8. Identification of priorities in coverage of ML problem

Please print YES in appropriate cells

Actions	Priority		
	Primary	Secondary	Next to 0
Improvement of legal and administrative instruments			
Correction of waste management policy			
Development of sustainable ML management			
Development of ML monitoring methodology			
Organising and maintaining ML monitoring facilities			
National assessment of ML pollution			
Preparation of proposals to prevent and reduce ML			

	Priority		
Development of campaigns/services for ML collecting			
Elaboration of ML collecting technologies/devices			
Elaboration of ML processing technologies/devices			
Development of port reception facilities for garbage			
Involvement of stakeholders in anti-ML partnership			
Training of officers involved in ML management			
Preparation of professional sectorial guidelines			
Preparation of awareness and educational tools			
Preparation of 'responsible citizenship' guidelines			
Initiation of awareness-raising campaign in media			
Promotion of public participation in cleanup activities			
Other actions (please specify)			

6.9. Proposals/ recommendations for changes

Please make your suggestions taking into consideration above list of priorities (6.8). For each initiative please specify:

- Title of proposal
- Aim (objectives)
- Suggested activities
- Potential implementing organization(s)
- Preliminarily estimated cost (Euro)
- Possible source of funding

Section 7. ANNEXES

Please attach to this report any materials (scanned copies of documents, publications, etc.) which can show positive experience of your country in the solution of ML problem.

ANNEX 2

BLACK SEA LIST OF ORGANIZATIONS AND SPECIALISTS RELATED TO ML MANAGEMENT, RESEARCH, MONITORING, CLEANUP OPERATIONS, UTILIZATION AND PUBLIC EDUCATION

Organization	Specialist	Contact information
Black sea region		
Commission on the Protection of the Black Sea Against Pollution (BSC), Permanent Secretariat	Oksana TARASOVA Pollution monitoring and assessment officer (before 2007) Violeta VELIKOVA Pollution monitoring and assessment officer (since 2007)	Dolmabahce Sarayi II, Hareket Kosku 34353 Besiktas / Istanbul, TURKEY Tel.: +90 (212) 2279927; Fax: +90 (212) 2279933 www.blacksea-commission.org violeta.velikova@blacksea-commission.org
Brema Laboratory Black Sea Council on Marine Mammals (BSCMM; NGO)	Alexei BIRKUN, Jr. Deputy director on science, BSCMM Chairman, Regional Consultant on ML	Gagarin str. 9a-18, 95028, Simferopol, UKRAINE Tel.: +380 652 253503 Fax: +380 652 522792 AlexeiBirkun@home.cris.net
Bulgaria		
Ministry of Environment and Waters (including the Department of Waste Management and the Department of Waters)	Chavdar Georgiev Deputy Minister (waste management) Lyubka Kachakova Deputy Minister (waters)	W.Gladston str. 67, 1000, Sofia Tel.: +359 2 9406224, +359 2 9406231 Fax: +359 2 9885913
Executive Environmental Agency	Dimitar Vergiev Executive Director	Tzar Boris III blvd. 136, 1618, Sofia P.O. Box 251 Tel.: +359 2 9559011; Fax: +359 2 9559015; telex: +359 2 23894 ncesd@nfp-bg.eionet.eu.int
Black Sea Basin Directorate – Varna	Ventsislav Nikolov Director Desislava Konsulova Head of the Monitoring, Prognosis and Information Supply Department	Al. Dyakovich str. 33, 9000, Varna Tel.: +359 52 687435 bvarna@bsbd.org
Bulgarian Maritime Administration of the Ministry of Transport	Ventsislav Ivanov Executive Director	Dyakon Ignatiev str. 9, 1000, Sofia Tel.: +359 2 9300910 +359 2 9300920
Varna Maritime Administration	Bogdan Bogdanov Director/Harbourmaster	Primorski blvd. 5, 9000, Varna Tel.: +359 52 684922 +359 52 602378 hm_vn@marad.bg
Bourgas Maritime Administration	Nikolay Apostolov Director/Harbourmaster	Knyaz Alexander Batenber blvd. 3, 8000, Bourgas Tel.: +359 56 844339 +359 56 / 840 064 hm_bs@marad.bg

Organization	Specialist	Contact information
Bulgarian Port Administration of the Ministry of Transport	Peycho Manolov Executive Director	Gen. Gurko str. 5, 1000, Sofia Tel.: +359 2 9409773 +359 2 987 9480 headoffice@port.bg
Varna Port Administration	Rumen Arabadzhiev Director	Slaveykov square 1, 9000, Varna Tel.: +359 52 633261 +359 52 633266
Bourgas Port Administration	Todor Shivachev Director	Knyaz Alexander Batenber blvd. 3, 8000, Bourgas Tel.: +359 56 822344 +359 56 822433
Regional Environmental Inspectorate in Bourgas	Simeon Simeonov Director	Perushtitsa str. 67, 8000, Bourgas Tel.: +359 56 813199 +359 56 813200 riosv@unacs.bg
Regional Environmental Inspectorate in Varna		
Ministry of Public Health		Sveta Nedelia Square 5, 1000, Sofia Tel.: +359 2 9301107 and +359 2 9811830 Fax: +359 2 9811830
Regional Inspectorate for the Protection and Control of Public Health in Bourgas	Svetla Stancheva Director	Aleksandrovska str. 120, Bourgas Floor 5, Room 35 Tel.: + 359 56 816257
Regional Inspectorate for the Protection and Control of Public Health in Varna	Emil Angelov Director	Bregalniza str. 3, Varna Floor 5, Room 501 Tel: + 359 52 632778
Regional Inspectorate for the Protection and Control of Public Health in Dobrich	Svetla Angelova Director	Kiril and Methodiy str. 57, 9300, Dobrich Tel. +359 58 600 614 +359 58 600 692 riokoz-dobrich@link.bg
Central Laboratory of General Ecology, Bulgarian Academy of Science	Nesho Chipev Director	Gagarin str. 2, 1113, Sofia Tel.: +359 2 717195 Fax: +359 2 705498 ecolab@ecolab.bas.bg
Institute of Oceanology	Hristo Dimitrov Slabakov Senior Scientist	First May str. 40, P.O. Box 152, 9000, Varna Tel.: +359 52 370486 +359 52 370484 office@io-bas.bg
National Oceanographic Commission, Bulgarian Academy of Science	Hristo Slabakov Chairman	Parvi Mai str. 40, P.O. Box 152, 9000, Varna
Marine Antipollution Enterprise PLC	M. Staicheva	27 Juli str. 21, 9000, Varna Tel: +359 52 630626
Port of Bourgas Ltd. (collection of ship garbage and port waste)	Argir Boyadzhiev Director	Knyaz Alexander Batenber str. 1, 8000, Bourgas Tel.: +359 56 822222 headoffice@port-burgas.com
Port of Varna PLC (collection of ship garbage and port waste)	Danail Papazov	Slaveykov square 1, 9000, Varna Tel: +359 52 692232 and +359 52 602191 Fax: +359 52 632953 headoffice@port-varna.bg
Bulgarian National Association on Water Quality (NGO)		Hristo Botev blvd. 137, 1000, Sofia Tel.: +359 2 9335049 +359 2 9312288 waterql@ttm.bg

Organization	Specialist	Contact information
Institute for Ecological Modernization (NGO)	Lyudmil Ikonov	II Makariopolski str. 8, 9000 Varna Tel.: +359 52 612858
Bulgarian Biodiversity Foundation (NGO)	Stoyan Michiv	Sredna gora str. 75, 1303, Sofia +359 887 796187
Greener Bourgas Foundation (NGO)	Venelin Todorov	Sheinovo str. 24, 8000, Bourgas Tel.: +359 56 847225
Mayday Foundation (NGO)	Doychin Krashovski	Br. Miladinovo str. 68, 9000 Varna
Black Sea NGO Network	Alexandar Shivarov	Sheinovo str. 12, 9000, Varna Tel.: +359 52 615856 reg_off@blackseanetwork.org
'Sea Friends' Marine Club (NGO)	Darina Ivanova	Odrin str. 18, 9000, Varna Tel.: +359 52 306423 and +359 48 895372 seapeople@abv.bg
Center for Environment and Sustainable Development (NGO)	Ilian Iliev	9000, Varna, P.O. Box 79
Georgia		
Ministry of Environmental Protection and Natural Resources	Tamar Gamgebeli Chief specialist of the Water Protection Department, National Consultant on ML	Guramishvili str. 5a, 0192, Tbilisi Tel.: +995 32 612204 tgamgebeli@yahoo.com
Adjarian Department of Environment and Natural Resources	Irakli Goradze Head of the Department	Rustaveli ave. 6, Batumi Tel.: +995 222 73591 Fax: +995 222 73590 denr_ajara@gol.ge
Adjarian Department of Public Health		Rustaveli str. 6, Batumi
Batumi's Sanitary Inspection		Batumi Municipality, Abashidze ave. 34, Batumi
Poti Port Office Ltd.	David Kukava	Poti port, Poti
Batumi Port Ecology Ltd.	Irakli Papunidze	Batumi port, Batumi
Black Sea Eco-Academy (NGO)	Ekaterine Khvedelidze	Batumi Tel: +995 222 74581; +995 77 423927 bsea@access.sanet.ge
ROMANIA		
Ministry of Environment and Water Management	George Constantin Director of the Water Department	Libertatii Bd. 12, sector 5, Bucharest
"Romanian Water" National Administration	Madalin Mihailovici General Director	Edgar Quinet str. 6, sector 1, Bucharest Tel.: +40 21 3122174 dispecer@rowater.ro
National Environment Protection Agency	Ioan Gherghes General Director	Lacul Morii str. 151, sector 6, Bucharest Tel.: +40 21 4934235 Fax: +40 21 4934237 contact@anpm.ro
Institutul National de Cercetare - Dezvoltare Delta Dunarii	Romulus STIUCA	Strada Babadag 165, Tulcea, 8800, judetul Tulcea Tel.: +40 240 531520 office@indd.tim.ro
Administratia Rezervatiei Biosferei "Delta Dunarii"	Paul CONONOV	Portului str. 34A, 820243-Tulcea Tel.: +40 240 518945 Fax: +40 240 518945 arbdd@ddbra.ro

Organization	Specialist	Contact information
National Research and Development Institute for Environmental Protection	Magdalena CHIRIAC	Independentei Spl. 294, sector 6, Bucharest Tel.: +40 21 3182010 contact@icim.ro
National Research and Development Institute for Environmental Protection	Alexei Atudorei Head of Environmental Engineering Department, National Consultant on ML	Independentei Spl. 294, sector 6, 060031, Bucharest Tel.: +40 21 3182057/ext. 160 +40 21 2201056 (direct) Fax: +40 21 3182001 aatudorei@yahoo.com
National Institute for Marine Research and Development	Simion Nicolaev General Director	Mamaia Bd. 300, Constanta Tel.: +40 241 543288 nicolaev@alpha.rmri.ro
Agentia Pentru Protectia Mediului Constanta	Diana Oprescu	Unirii str. 23, Constanta Tel.: +40 241 546696; 543717 office@mediu-constant.ro www.mediu-constant.ro
Agentia Pentru Protectia Mediului Tulcea	Cedar Bestas	14 Noiembrie str. 5, Tulcea Tel.: +40 240 515505; 514608 office@apmtl.ro www.apmtl.ro
Santierul Naval S.A. Constanta	Doina Munteanu Ing. Sef Departament Calitate & Mediu	Strada Principala, Constanta, 8700, judetul Constanta Tel: +40 241 616970 office@snc.ro www.snc.ro
Constanta City Administration	Radu Mazare Mayor	Tomis Bd. 51, Constanta Tel.: +40 241/488.185 Fax: +40 241/488.101
Eforie City Administration	Ion Ovidiu Brailoiu Mayor	Progresului str. 1, Eforie Tel.: +40 241/748.633 Fax: +40 241/748.979
Mangalia City Administration	Zamfir Iorgus Mayor	Constantei Sos. 13, Mangalia Tel.: +40 241/751.060 Fax: +40 241/755606
Grupul de explorări subacvatice și speologice (GESS NGO)	Florian Baci	Frumoasa str. 31, sect.1, Bucharest Tel./Fax: +40 21 3124051 gess@dial.kappa.ro www.gess.ngo.ro
Mare Nostrum (NGO)	Lucian Ionescu	Constanța , Bdul Mamaia nr. 296 Tel.: +40 241 612422 Fax: +40 241 831099 mare-nostrum@cier.ro www.cier.ro
Societatea Ornitologică Română (NGO)	Dan Hulea	G. Dima str. 49, Cluj Tel/Fax: +40 264 438086 office@sor.ro www.sor.ro
Clubul ecologic UNESCO Pro Natura (NGO)	Peter Lengyel	Calea Plevnei 61, sect. 1, Bucharest Tel.: +40 21 3112644 Fax: +40 21 3151558 pronatura@ccs.ro www.pronatura.ro
Prietenii Pământului (NGO)	Camelia Zamfir	Portului str., Bl. Siret 4-109, Galați Tel/Fax: +40 236 462564 earthfriends@rdslink.ro
Asociația Română a Ziariștilor de Mediu (ARZM NGO)	Alexandru Săvulescu	CP 45-8 Bucharest Tel/Fax: +40 724 864183 arzm@fx.ro

Organization	Specialist	Contact information
Grupul Ecologic de Colaborare (GEC NGO)	Dan Manoleli	Calea Victoriei 120, Bucharest Tel/Fax: +40 213 111932 mdan@fx.ro
Fundația Universitară a Mării Negre (NGO)	Marian Trifu	Primăverii str. 50, sect. 1, Bucharest Tel/Fax: +40 21 2224118 bseau@mc.ro
RUSSIA		
Centre on Hydrometeorology and Environment Monitoring of the Black and Azov Seas (CHEMBAS)	Yuriy Yurenko Head of the Marine Department, National Consultant on ML	Plastunskaya str. 100-84, 354003, Sochi Tel.: +7 8622 319264 Fax: +7 8622 614342 bereg@sochi.ru
North-Caucasian Interregional Administration on Technological and Ecological Supervision	Leonid YARMAK Deputy director	Odesskaya str. 42, 350020, Krasnodar Tel.: +7 861 2672620 Fax: +7 861 2627907 sevkaveconadzor@rambler.ru
Administration on Environment Monitoring, Polar and Marine Operations of RosHydromet	Valeri CHELUKANOV Chief of the Administration	Novovagankovski side-str. 12, 123242, Moscow Tel.: +7 495 2521369 Fax: +7 495 2552004 chel@mecom.ru
Krasnodar region and Republic of Adygeya Administration of the Federal Service on Veterinary and Phytosanitary Supervision	Irina KOZLOVA Deputy director of the Fishing Supervision Department	Lukianenko str. 111, 350012, Krasnodar Tel.: +7 861 2222031 Fax: +7 861 2112574 quadrant@mail.kuban.ru
Special Marine Inspection of the Black and Azov Seas	Alexandr KIM Chief of the Inspection	Rybatskaya str. 1, 353925, Novorossiysk Tel.: +7 861 7713995 Fax: +7 861 7713995 chasmi@istnet.ru
TURKEY		
Ministry of Environment and Forestry	Recep SAHIN Deputy General Director of the DG of Environment Management	Sogutozu Cad. 14/E, Bestepe, Ankara Tel: +90 312 2075000 Fax: +90 312 2075100 rsahin@cevreorman.gov.tr www.cevreorman.gov.tr ; www.deniz.cevreorman.gov.tr
Ministry of Environment and Forestry	Emine ERCAN Chief of Department of the General Directorate for Environmental Management, Waste Management Department	Sogutozu Cad. 14/E, Bestepe, Ankara Tel: +90 312 2075000 Fax: +90 312 2075100
Prime Ministry Undersecretariat for Maritime Affairs	Saniye ONUR Head of department of the General Directorate for Maritime Transport	G.M.K Bulvarı 128, 06100, Maltepe, Ankara Tel: +90 312 2320922-2533 Fax: +90 312 2320922 sadiye.onur@denizcilik.gov.tr www.denizcilik.gov.tr
Ministry of Public Health, General Directorate of Borders and Maritinal Health		Kemankeş C. Karamustafa Paşa Sk. 67, 80030 Karaköy, Istanbul Tel./ Fax: +90 212 2933674 www.hssgm.gov.tr

Organization	Specialist	Contact information
Turkish Coast Guard Command, Black Sea Area Command		Sahil Güvenlik Karadeniz Bölge, Komutanlığı, Samsun Tel: +90 362 4450333-2304 +90 312 4175050 Fax: +90 362 4450251 www.sgk.tsk.mil.tr
Turkish Naval Forces Command, Northern Sea Area Command		Deniz Kuvvetleri Komutanlığı, 06100, Bakanlıklar, Ankara Tel: +90 212 2543150 Fax: +90 312 4173065 www.dzkk.tsk.mil.tr
General Directorate of State Hydraulic Works		İsmet İnönü Bulvarı, 06100, Yucetepe, Ankara Tel: +90 312 4178300 Fax: +90 312 4182498 www.dsi.gov.tr
University of Istanbul, Institute of Marine Science and Management		Müşküle Sok. 1, 34116, Vefa, İstanbul Tel: +90 212 5196788 Fax: +90 212 5268433
Istanbul University, Faculty of Aquatic Sciences	Mustafa KARABATAK Prof. Dr.	Ordu cad. 200, Laleli, İstanbul Tel: +90 212 5190484 Fax: +90 212 5140379
Istanbul Bilgi University, Faculty of Law	Nilufer ORAL Dr.	Kurtuluşderesi cad. 47, Dolapdere, 34440, İstanbul Tel: +90 212 3115000 Fax: +90 212 2976315 noral@bilgi.edu.tr
Marmara University, Faculty of Law	Hakan BAYKAL Prof. Dr.	Tıbbiye cad., 81014, Haydarpaşa, İstanbul Tel: +90 216 3498400 Fax: +90 216 3387710
Turkish National Committee on Solid Wastes	Günay KOCASOY Prof. Dr.	Boğaziçi Üniversitesi Çevre Bilimleri Enstitüsü, 80180, Bebek, İstanbul Tel: +90 212 3594476 Fax: +90 212 2575033 kocasoy@boun.edu.tr www.kakad.boun.edu.tr
Istanbul Technical University, Faculty of Ship Building and Marine Science	Fatma YONSEL Assoc. Prof.	İTÜ Ayazağa Kampüsü Maslak, 34469, İstanbul Tel: +90 212 285 64 64 Fax: +90 212 285 64 54 Gemi.dekanlik@itu.edu.tr
Turkish Industrialists and businessmen Association (TUSIAD), Environment Department	Alper UCOK Manager of Industry, Service and Agriculture Department	Meşrutiyet cad. 74, Tepebaşı, 34420, İstanbul Tel: +90 212 2491929 Fax: +90 212 2517005 aucok@tusiad.org www.tusiad.org
Cekmece Nuclear Education and Resource Center	Gül GÖKTEPE Scientist	P.K. 1, Atatürk Havalimanı, 34149, İstanbul Tel: +90 212 5484050/1221 Fax: +90 212 5482230 gul.goktepe@taek.gov.tr
Ministry of Environment and Forestry, Regional Directorate of İstanbul	Suna GURLER DEDEOGLU Landscape Architect	Mimar Kemalettin sok., Nur han 2, Eminönü, İstanbul Tel: +90 212 5194915/1210 Fax: +90 212 5201360 sgurler@cevreorman.gov.tr ; gurlersuna@yahoo.com
Karadeniz Technical University (KTU), Faculty of Marine Science	Ertuğ DÜZGÜNEŞ Prof. Dr.	61530, Çamburnu, Trabzon Tel: +90 462 7522419 Fax: +90 462 7522158 ertug@ktu.edu.tr www.deniz.ktu.edu.tr

Organization	Specialist	Contact information
Karadeniz Technical University (KTU), Department of Civil Engineering	Mehmet BERKUN Prof. Dr.	61080, Trabzon Tel: +90 (462) 3772657 Fax: +90 (462) 3772606 berkun@ktu.edu.tr http://enformatik.ktu.edu.tr/eakademik/145/index_en.html
	Egemen ARAS Research Assistant	Tel: +90 462 3773547 Fax: +90 462 3772606 egemen@ktu.edu.tr
University of Zonguldak, Karaelmas Department of Environmental Engineering	Yılmaz YILDIRIM Assoc. Prof.	67100, Zonguldak Tel: +90 372 257 40 10/1569 Fax: +90 372 257 40 23 yildirim@karaelmas.edu.tr
University of Zonguldak, Karaelmas Department of Civil Engineering	Ömer Faruk ÇAPAR Assoc. Prof.	67100, Zonguldak Tel: + 90 372 257 40 10/1542 Fax: + 90 372 257 40 23 ofcapar@karaelmas.edu.tr
Karadeniz Technical University, Department of Chemistry	Dr. Sefa KOCABAŞ Environment Engineer	67100, Zonguldak Tel: +90 372 2574010/1388 Fax: +90 372 2574023 sefakocabas@gmail.com
Marmara Research Center, Chemistry and Environment Institute (TUBITAK)	Gülşen AVAZ Researcher	Gebze Yerleşkesi, Marmara Araştırma Merkezi, İzmit Tel: +90 262 6412300 Fax: +90 262 6412309 gulsen.avaz@mam.gov.tr www.mam.gov.tr
Middle East Technical University (METU), Institute of Marine Science	Ferit BINGEL Prof.	P.O.Box 28, 33731, Erdemli-Mersin Tel: +90 324 5213434 Fax: +90 324 5212327 admin@ims.metu.edu.tr www.ims.metu.edu.tr
Coastal Zone Management Turkish National Committee Middle East Technical University, Department of Civil Engineering	Erdal OZHAN Prof. Dr.	İnönü Bulvarı, 06531, Ankara Tel: +90 312 2102401 Fax: +90 312 2101262 civil@ce.metu.edu.tr ; ozhan@metu.edu.tr
Turkish Environmental and Woodlands Protection Society (TURCEK; NGO) University of Istanbul, Faculty of Letters, Department of Geography	Barbaros GONENCGİL Assoc. Prof., Physical Geography and Environmental Science	Mühürdarbaşı sok. 6/3, Kadıköy, İstanbul Tel: +90 216 3380017 +90 212 4555700/15722 Fax: +90 216 3304155 +90 212 5514371 barbaros@istanbul.edu.tr www.turcek.org.tr
Turkish Marine Environment Protection Association (TURMEPA; NGO)	Eşref CERRAHOĞLU President of the Board Yasemin CAGATAY Expert	DenizTemiz Derneği Nakkaşatepe, Aziz Bey Sok. 26, 34674, Kuzguncuk, İstanbul Tel: +90 216 3102901; 3417777 Fax: +90 216 3432177 turmepa@ku.edu.tr www.turmepa.org.tr
Underwater Cleaning and Awareness Activity (STH; NGO)	Hakan TIRYAKI President	Fuatpaşa cad., Defne Apt. 32 D.7, Fenerbahçe, İstanbul Tel: +90 216 3688672 Fax: +90 216 3688672 irtibat@sualtitemizlikhareketi.org

Organization	Specialist	Contact information
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ANNEX 3

INTERNATIONAL AND REGIONAL PROGRAMMES AND PROJECTS RELEVANT TO THE BLACK SEA ML PROBLEM (1993–2006)

Programme or project name	Years	Sponsoring agency
Black Sea Environmental Programme (BSEP)	1993–1996	GEF
Marine Meteorological and Oceanographic Services for the Black Sea (BLACKMARS)	1997	NATO
The Black Sea Ecosystem Processes, Prediction and Operational Data Management	1998–2002	NATO
Clean Beaches, the First Commitment for Sustainable Tourism in Romanian and Bulgarian Black Sea Coastal Areas (Bulgarian and Romanian project)	2000–2001	REC for CEE
Strategic Partnership for Nutrient Reduction in the Danube River and Black Sea	2001–2007	World Bank / GEF
International Coastal Cleanup (ICC) Campaign	2002–2006	Ocean Conservancy, Alcan, Bosch, Migros, British Petroleum (Turkey)
Afalina-2003 (Ukrainian and Russian project)	2003	Utrish Dolphinarium Ltd. (Russia)
Regional Danube Project, Phase 2	2003–2006	GEF / UNDP
Black Sea Ecosystems Recovery Project (BSERP)	2004–2007	GEF / UNDP
Film Competition “If there was no sea?”	2006	REC (Turkey)
World Environment Day (5 June)	annually,	Various sources
International Black Sea Action Day (31 October)	1997–2006	Various sources

ANNEX 4

EXAMPLE OF THE INVENTORY LIST OF UNDERWATER ML SURVEY BY STH, ISTANBUL



Fig. A5-1 Inventory list of underwater ML survey by STH Istanbul

20 February 2005 – Kadikoy, Istanbul

Location: Wharf square – front of the Conservatoire

Inventory of Collected Material

MATERIAL	unit	MATERIAL	unit
Beverage can	12	Speaker	1
Glass bottle	51	Auto tyre	3
Glass jar	3	Hubcap	1
Tea cup	2	Battery	12
Tea spoon	3	Marble	1
Dessert spoon	1	Lighter	1
Plastic bottle	1	Shoe (left)	2
Oil drum (5lt)	1	Crutch	1
Padlock	5	Garbage can	1
Umbrella	2	Jaw of an animal	1
Digital watch	1	Walkman earphone	1
Digital clock	1	Various profile pipe	3
Glasses	1	Jaw of a sheep	1
Intr. To civil law	1	Canned food box	1
Camera	1	Paint brush (roll)	2
Mobile phone	3	Health insurance card	1
Mobile phone battery	3	Panel radiator	1
Pencil	1	Handle of a beach umbrella	2
Student pass	8	Hawser	1
Telephone card	2	Iron pipe	1

MATERIAL	unit	MATERIAL	unit
Various plastic material	2	Insect remover pump	1
Credit card (bonuscard)	1	Broom	1
Plate	2	Pullover	1
Part of a gun bullets are filled in (empty)/gun charger	1	Tea plate	7
Monthly provisions expense report	1	Arabic amulet etc.	2
Shoe polish lid	2	Paint brush tip	1
Belt clip	2	Adhesive	2
Concrete drill	1	Cigar box	1
Auto inner tyre	1	Crenel	1
Handle of an umbrella	1	Iron railing (1mx2m)	1
Washbasin pipe	1	Parquet	1

Analyses

When the 20 Feb, Kadikoy activity inventory lists are examined, besides the fall of some materials, solid waste pollution caused directly by the local residents, can be seen. This situation gives some hints about the lack of awareness and sensitivity of these people. The number of the garbage cans is fair enough. And this supports the anxiety about the insensitivity and unawareness.

Especially existence of lots of transportation passcards all gathered in a certain point, indicates the lack of environmental awareness of one or more IETT personnel. At this point, the related institution should not be accused of the lack of their personnels' awareness, just the opposite, the institution should be informed about the situation.

Some materials like oil drum, panel radiator, wastebasket which are not probably fallen accidentally or thrown by people passing by, show that all these take place because of the lack of sensitivity and awareness of the marine vehicles.

Suggestions

STH, by the help of the existing data, is ready for collaboration about the improvement of the awareness project for the local residents. Our suggestion is, to start a periodical campaign along the shore with the participation of the voluntary students. During the campaign period the region between the seabus wharf and the New Kadikoy Wharf will be watched carefully and communication with those who throw trash into the sea will be provided. The content, the communication and awareness methods can also be discussed.

The presentation of the education program prepared under the visual & scientific data to the students of the primary education by the help of discussions will be a highly effective awareness method.

Another suggestion that we think will be effective, is an outdoor exhibition of the visual materials that we have provided from the Kadikoy activity at the shore between the two wharfs and the wharves themselves.

ANNEX 5

GBF REPORT ON COASTAL LITTER MONITORING

REPORT ON COASTAL LITTER MONITORING

Pilot beaches:

Burgas, Pomorie and Sozopol

Prepared by:

Greener Burgas Foundation, Bulgaria

Within the Project “Clean Beaches – first commitment for sustainable tourism development”,
financed by Regional Environmental Center for Central and Eastern Europe

2001, Burgas, Bulgaria

BOURGAS

Characteristics of the North Beach Bourgas

Location

The North beach is situated on the east of Bourgas, including the coastal zone next to the Park of the town. The length is about 1.5 km from the bridge to the restaurant “Palm Beach”, which was recently destroyed.

The coastal zone continues to the north (but is not safeguarded by the beach guards and there are no toilet facilities, bathing cabins and plumbing installation in this part of the beach.) On the north the beach bounded by the other safeguarded zone-Central beach. The west border is the park zone of the town with build up infrastructure. The access to the beach is along its length. The beach was given to the concessionaire for 10 years. On the territory of the beach there is no waste dumping sites, and discharges of industrial wastewater. The cleanness of the region is affected by the proximity of the Port of Bourgas. There is a draining channel in the middle of the beach. It is determined that in this channel are included waste waters with domestic character, which make worse the water quality and make them risky in their passing through the sand and pouring out into the sea water.

Organization of the coastal line

There are the following zones: zone for heliotherapy, bathing zone, zone for water sports, children zone and some temporary places of resort for entertainment and consumption.

There are new commercial objects, build up directly to the sand. Their constructing is consistent with change and compliment of Ordinance 2. Several places of entertainment were destroyed because of their illegal construction, and their residues are still there.

Exploitation

Cleaning

In the beginning of the season was made basic cleaning and leveling of the beach, but this was done not entirely.

Toilets

There is no sewage along the coastal zone. Therefore the toilets are with pits. Essential oversights are unguarded shafts, which may cause accidents and insects, which may cause infections.

Bathing cabins

Along the coastal zone there are 5 bathing cabins. The sand inside is covered with litter and faeces, which make the cabins unusable. The number of bathing cabins is insufficient to satisfy the need of visitors. Their structures give opportunities for their using like toilets and make them hazardous because of the impossibility for cleaning up. We consider that there are no bathing cabins, which are harmless and don't cause infections.

Water supply

The coastal zone has water supply. There are 5 places with 3 showers per place. The wastewater absorbs in the sand near to the showers. There are no new shower platforms and possibility for heating the water. So, the existing showers are extremely insufficient and inappropriate for using from children. There are only 2 fountains in the beach, which don't work. One of them is like wastebasket. The lack of the fountains for drinking water is intolerable, because there is a water supply system. The borders of the safeguarded beach on north and south are marked only in Bulgarian language.

Informational signs

There are no informative signs about the water and air temperature, the motion of the wind, indication about medical center and etc. The signs are insufficient and many of them are not in the right places.

Cleaning of the beach

Along the coastal zone there are wastebaskets situated at 30 m intervals. The emptying of these baskets and the cleaning of the sand is doing manually. The machine cleaning is not effective and is doing rarely (the existing machines are old and ineffective). Because of this the deeper sand is dirty with cigarette ends, metal caps, plastic wastes, parts of toys, pits, etc. The waste collected is dumped in the town landfill. The lack of specialized vehicles (closed) creates continuously conditions for additional pollution of the region- the beach, the park and the road.

Lifeguards

In intervals of 100 m. are situated 9 lifeguard posts. They have ropes, life saving ball, signal flag, life saving boats-4, life saving equipment. The water zone is marked with buoys in appropriate colour. For each post there are least 2-life guards, according to the requirements. The main oversights are insufficient signals, the lack of boards in foreign languages and the old posts, which need painting and repair.

Results of the litter monitoring

Investigated coast was 500m zone starting from former "Palm Beach" discotheque to the lifeguard post 9.

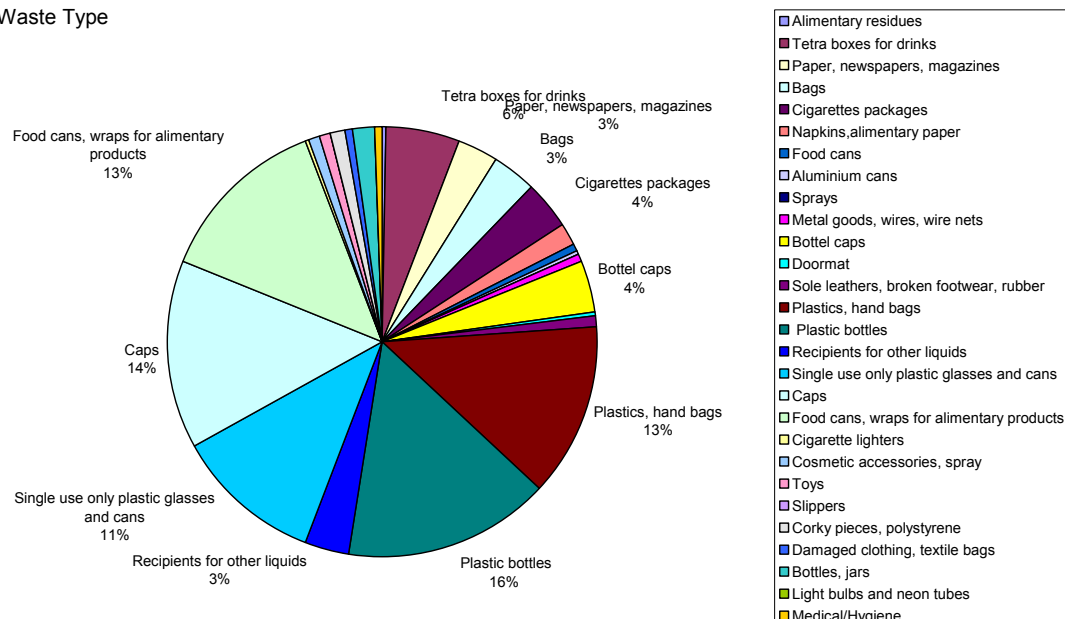
The monitoring of the litter pollution on the Bourgas beach started in March 2001. Out of touristic season, the survey was made once per month. During June and July (till 14 July in order to be able to process the data) we made measurements of the litter pollution twice per month.

Types of litter

Beach litter consists of various slowly degradable solid waste items from a large number of different sources. The main types of litter found on the beach are:

- Plastics (fragments, sheets, bags, caps, containers);
- Polystyrene (cups, packaging);
- Paper and cardboard;
- Rubber (gloves, tires);
- Metal (drink cans, aerosol containers, wires)
- Wood (construction timbers)
- Sanitary
- Textile (clothing, textile bags);
- Glass (jars, bottles, light bulbs)

Waste Type



The analysis of the survey data shows that the prevailing types of beach pollution are plastics (more than 70%).

Main sources

The conclusion of observations made is that the main source of pollution is beach visitors.

Important sources of beach litter are ships and fishermen boats. Part of the beach litter is transported by the air (especially during the windy days) from the waste containers of the places of entertainment situated next to the beach.

On the other hand, restaurants, cafes, shops and beach discotheques are important indirect source of litter, too. The analysis shows that around 80% of the litter accumulated on the beach is plastic bottles and caps, boxes for drinks, single use plastic glasses and cans, cigarettes packages etc.

How much

During the 6 surveys from 500 m long beach area the volunteers collected 1087 litter items.

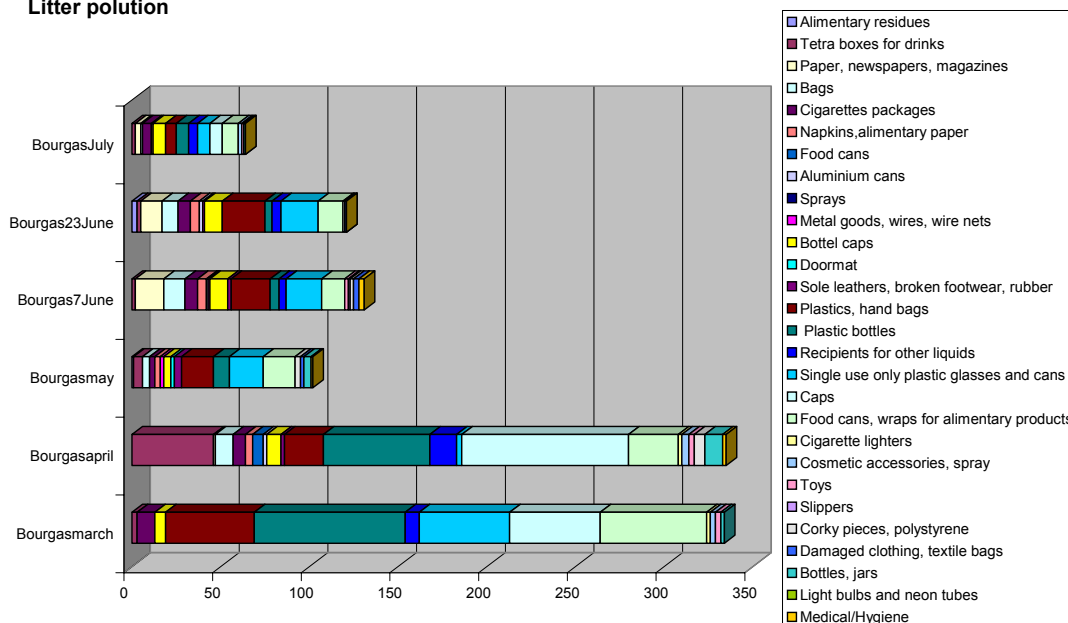
The analysis of the monitoring data shows that during the out-of-touristic season and touristic season the most litter collected are plastic bottles (170), plastic bags (142), food cans (142) and bottle caps (152).

Tendency

Considering the favorite climatic conditions in Bulgaria, already in May people start to use the beaches for sunbathing. The official opening of the beach is based on the report of the regional commission for beaches, proving that the beach provides all necessary facilities (such as lifeguard, medical posts, toilets, baskets, beach cleaning, showers and drinking water) and can be considered as safe and suitable for use.

The results of the beach survey show clearly that during the out-of-touristic period, when the beaches are not cleaned regularly, despite the small number of visitors, the litter pollution is significant. During the active period the concessionaires have the interest to clean up the beaches, but there are no effective instruments to make them to maintain the beaches during non-touristic period. It is visible that in May (when the climatic conditions are already suitable for sunbathing) the litter pollution is decreasing significantly, because the beach is cleaned regularly by the concessionaires.

Litter pollution

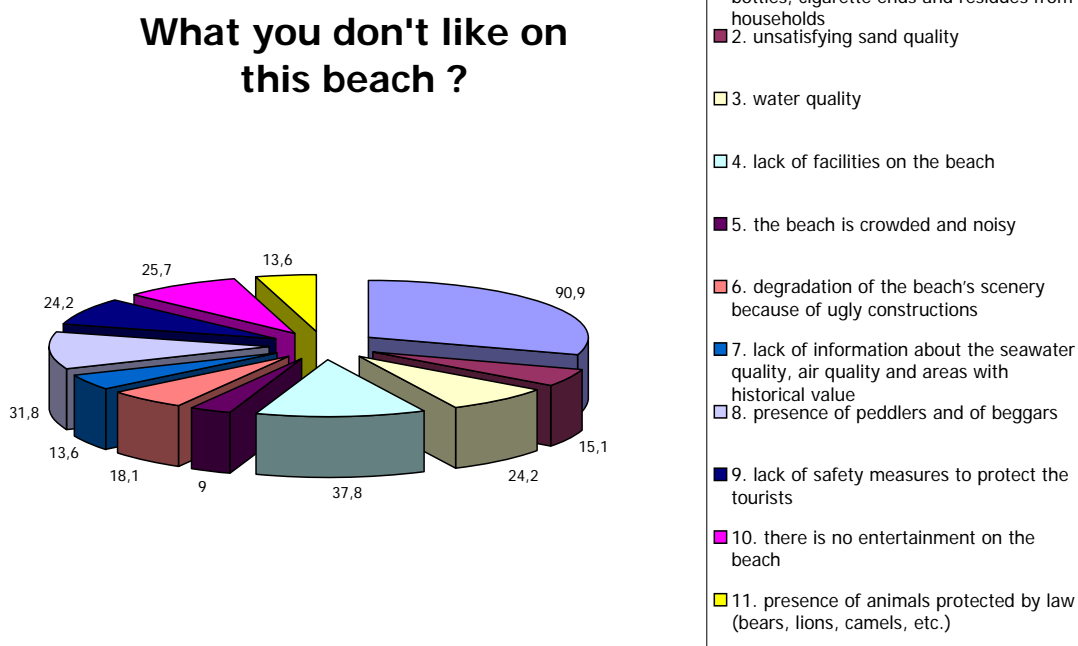


Sociological investigation

During the period 15 June – 15 July more than 500 visitors of the Bourgas beach were interviewed on the base of preliminarily elaborated questionnaire.

The analysis of the results shows that people appreciate climatic conditions of the beaches (the beach is exposed to the sunlight all day long – around 36%) and the smooth slope of the seacoast (around 40%).

What you don't like on this beach ?



But the most disturbing factor is beach pollution – more than 90% of the visitors answered that they do not like the rubbish on the beach (see figure).

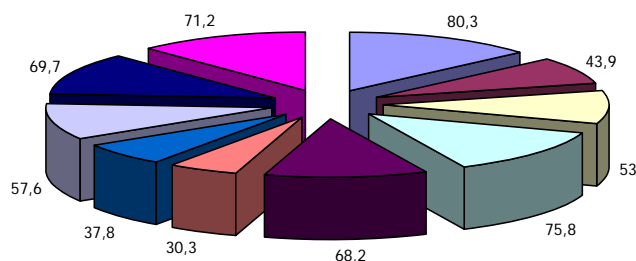
*the total is more than 100% because most of the people select more than one answer

Furthermore, the opinion of most beach visitors is that the garbage (boxes, plastic bags, paper, PET-bottles, food related items trash, dirt) could affect strongly (to very strongly) the quality of the beach.

What can be done?

The beach visitors consider the daily cleaning of the bathing area (removing of rubbish, algae, etc.) as the most important measure for improvement of the beach quality. On the second place is provision of sufficient number (and acceptable quality) of toilets, showers, garbage containers on the beach. Significant part of the visitors (71%) stressed the need to be forbidden and controlled discharges of the dirty ship's waters. It is especially important for protection of Bourgas beaches, because here is located the biggest port of Bulgaria.

Modifications for improving the bathing quality of the beach



- 1. Daily cleaning of the bathing area (removing rocks, algae, rubbish, metallic objects, pipes)
- 2. Separating the bathing area from the one for nautical sports (skijets, boats, hydrobicycles)
- 3. Decrease of the quantity of used water that is thrown into the seawater and their discharge far from the bathing area
- 4. A large number of toilets, showers, garbage cans on the beach
- 5. Presence of lifeguards and of first aid points available for the hole season
- 6. Informing the tourists about the seawater quality
- 7. Warning signs for the swimmers
- 8. Access forbidden for animals in the seawater
- 9. Forbidding the discharge of dirty waters from pools and hotels
- 10. Forbidding the discharge of dirty waters coming from the ships

POMORIE

In Pomorie resort the seaside is low, sandy with entirely open sea-line to the East and West and it is preserved to the North by Stara Planina. The total area of the coastal zone is 278 000m². It may supply 24 000 bath places in the urban zone observing the European norm for 8m² per person. The sand consists of ferro- oxide and salts, dark colour and temperature of about 60°C, suitable for warm sun bathing. The structure of coastal zone, the great number of coastal fortifications and mud-banks permit heating of the water to 20-28°C, which make the water appropriate for children and elderly. The life saving services are provided in accordance with the Bulgarian legislation. They are well equipped technically and personnel according the existing requirements for these activities, including medical services. The words like “ far from the beach and the sea” are not existing because they are a part from the life-town environment that gives it extreme attractivity.

The breakwaters out of swimming zones lead out the cold streams of the way. Shallow and level seaside bottom with slight stop without reefs and cold sea streams is safety for diving.

The resort Pomorie disposes of over 60 000 beds category 1, 2 and 3 stars, in family pensions(hotels), hotels with all the facilities for a quiet family recreation, a lot of establishments for quick eating, indoor swimming pool. Comfortable transport junctions connect Pomorie with other towns and resorts. The airport is only 8 km away.

Characteristic of the Beaches

Pomorie seashore is divided officially on 12 beaches based on the existing beach supporting facilities (breakwaters). (see the map attached). For the local people the seashore is divided on 3 beaches: Central (beach 4-8) ; Eastern (beach 1-3) and South (beach 9-12). This division was used by our volunteers during the beach survey.

For the need of this project we selected the most famous and preferred by the tourists sand beaches to be monitored regularly.

Central Beach (4 and 5 from the map):

Total area	52 316 m ² ;
Sand beach	40 853 m ² ,
including clear active sand area	20 621 m ² ;
areas occupied with objects of infrastructure-	4 116 m ² ;
other-	16 116 m ²
Sand dune-	11 463 m ² ;
Rocky coast-	0 m ²
Length of the coast	688 m; (the whole area was included in the survey)
Average width of the beach-	76 m;
Maximum width of the beach-	165 m;
Minimum width of the beach-	23 m;
Splash zone is	between 1-5 m.

Borders of the selected 500 m for the Litter Survey:

North: Sanatorium of the Ministry of Healthcare
South: Water roll-slide
Within the observed beach area (maximum 100 m from the limit of the beach) there are:
Restaurants (3) , alimentary shops (4) , discotheque (1) , post office (1).
The access to the beach is free. There is no fence.
The beach is provided with baskets, toilets, lifeguard, umbrellas, and showers.
Operated by the Municipality of Pomorie (no interest from private operators).

Eastern Beach

Total area	64 663 m ² ;
Sand beach-	47 667 m ² ,
including clear active sand area-	23 444 m ² ;
areas occupied with objects of infrastructure-	19 304 m ² ;
other-	4 919 m ²
Sand dune-	15 694 m ² ;
Rocky coast-	1 302 m ²
Length of the coast-	2 446 m;
(500 were included in the survey)	
Average width of the beach-	26 m;
Maximum width of the beach-	74 m;
Minimum width of the beach-	24 m;
Splash zone is	between 1-5 m.

Borders of the selected 500 m for the Litter Survey:

North: Water pump station

South: Medical post Within the observed beach area (maximum 100 m from the limit of the beach) there are: Restaurants (5) , alimentary shops (4) , discotheques (2) , hotels (2). The access to the beach is free. There is no fence. The beach is provided with baskets, toilets, lifeguard, umbrellas, showers, and information desks. Operated by the private concessionaires. Awarded with Blue Flag.

South Beach

- Total area- 43 882 m²;
- Sand beach- 43 784 m²,
- including clear active sand area- 22 654m²;
- areas occupied with objects of infrastructure- 4 383 m²;
- other- 16 747m²
- Sand dune- 98 m²;
- Length of the coast- 905 m; (500 m were monitored regularly)
- Average width of the beach- 41 m;
- Maximum width of the beach- 58 m;
- Minimum width of the beach- 35 m;
- Splash zone is between 1-5 m.
- Borders of the selected 500 m for the Litter Survey:

North: fishermen breakwater

South: water canal. Within the observed beach area (maximum 100 m from the limit of the beach) there are: Restaurants (2), alimentary shops (6) , stands with misc. products (10). The access to the beach is free. There is no fence. The beach is provided with baskets, toilets, lifeguard. Operated by the Municipality of Pomorie (up to now private interests for taking under concession).



Map of Pomorie

Results of the Litter Monitoring of the Beaches in Pomorie

The monitoring of the litter pollution on the Pomorie beaches started in March 2001. Out of touristic season, the survey was made once per month. During June and July (till 14 July in order to be able to process the data) we made weekly measurements of the litter pollution.

Types of litter

Beach litter consist of various slowly degradable solid waste items from a large number of different sources. The main types of litter found on the beach are:

- Plastics (fragments, sheets, bags, caps, containers);

- Polystyrene (cups, packaging);
- Paper and cardboard;
- Rubber (gloves, tires);
- Metal (drink cans, aerosol containers, wires)
- Wood (construction timers)
- Sanitary
- Textile (clothing, textile bags);
- Glass (jars, bottles, light bulbs)

The analysis of the survey data shows that the prevailing types of beach pollution are paper (24%) and plastics (42%).

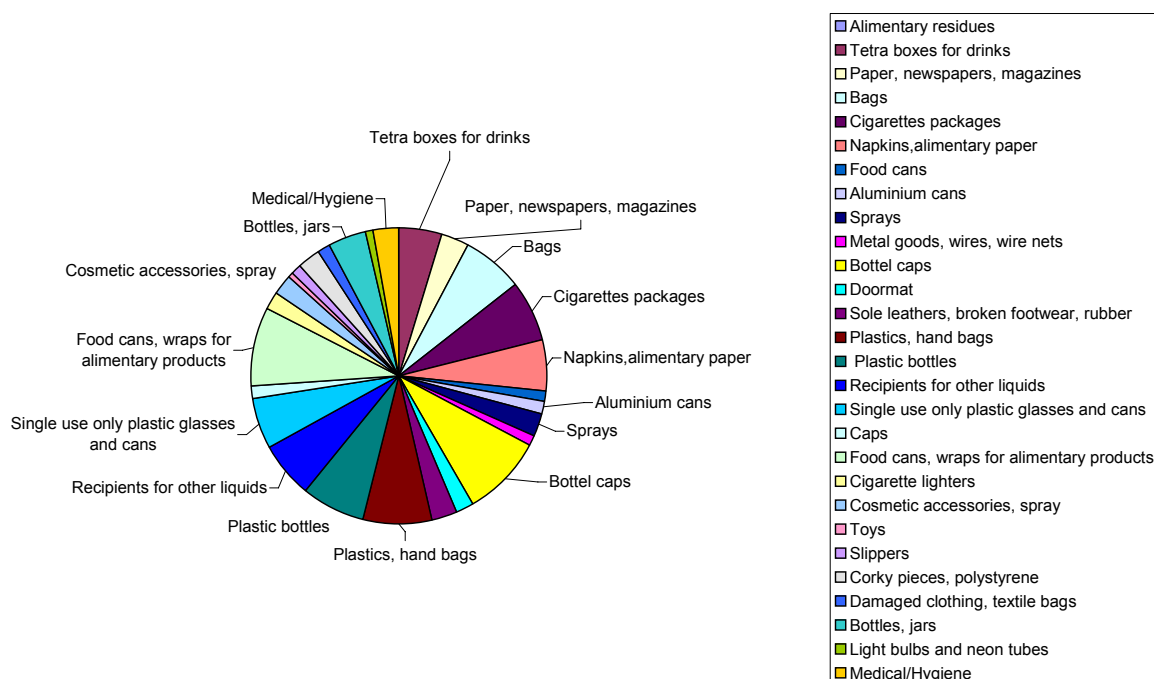
Main sources

The conclusion of observations made is that the main source of pollution are the beach visitors.

Still important sources of beach litter are fishermen boats. Part of the beach litter is transported by the air (especially during the windy days) from the streets and waste containers of the places of entertainment situated next to the beach. Irregular street cleaning and waste collection in Pomorie is precondition for pollution of the beach.

On the other hand, restaurants, cafes, shops and beach discotheques are important indirect source of litter, too. The analysis shows that around 70% of the litter accumulated on the beach are plastic bottles and caps, boxes for drinks, single use plastic glasses and cans, cigarettes packages etc.

Chart :Type of litter pollution



How much

During the 9 surveys of the 3 beaches made the volunteers collected 3409 litter items.

The analysis of the monitoring data shows that during the out-of-touristic season and touristic season the most often find litter are bottle caps (303), wraps for alimentary products (295), plastic bags (249) and plastic bottles (241).

Tendency

Considering the favorite climatic conditions in Bulgaria, already in May people start to use the beaches for sunbathing. June can be considered as a touristic period, nevertheless that the officially the beaches in Pomorie were opened on 15 June with the Mayor's order. The official opening is based on the report of the regional commission for beaches, proving that the beach provides all necessary facilities (such as lifeguard, medical posts, toilets, baskets, beach cleaning, showers and drinking water) and can be considered as safe and suitable for use.

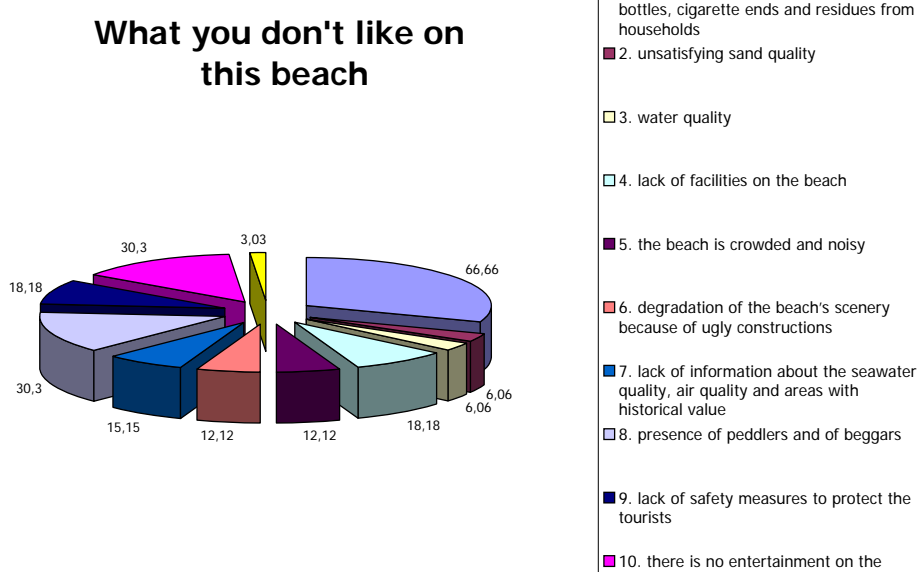
The results of the beach survey show clearly that during the out-of-touristic period, when the beaches are not cleaned regularly, nevertheless the less number of visitors, the litter pollution is significant.

Very indicative is comparison of the beach pollution on 2 June and 16 June – before and after the official start of the season, when the operators start officially to provide services on the beaches.

Sociological investigation

During the period 15 June – 15 July more than 500 visitors of the Central, Eastern and South Pomorie beaches were interviewed by the preliminary elaborated questionnaire.

The analysis of the results shows that people appreciate climatic conditions of the beaches (the beach is exposed to the sunlight all day long – around 50%). But the most disturbing factor is beach pollution – more then 60% of the visitors answered that they do not like the rubbish on the beach. (see figure)

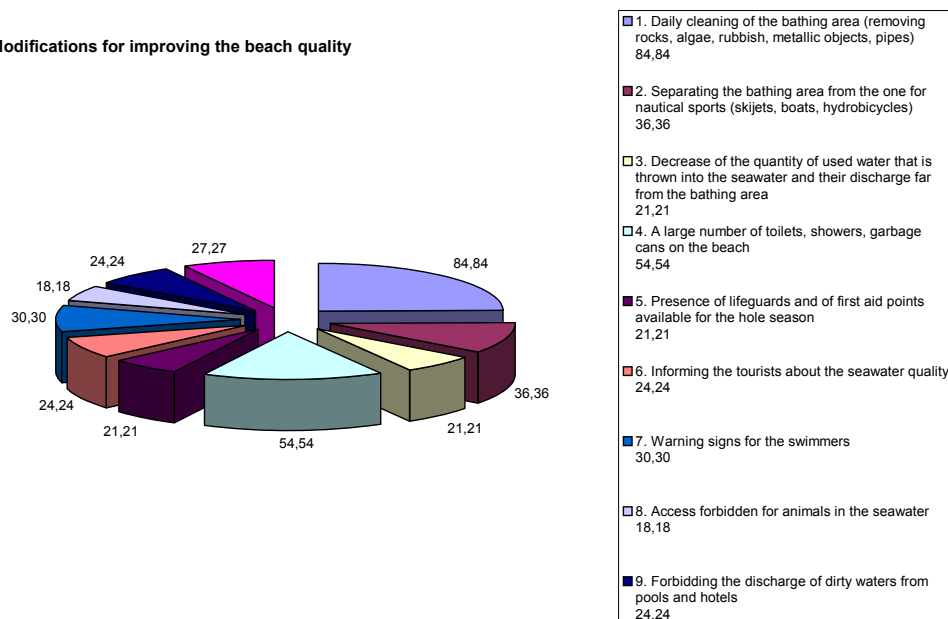


Furthermore, the opinion of most beach visitors is that the garbage (boxes, plastic bags, paper, PET-bottles, food related items trash, dirt) could affect strongly (to very strongly) the quality of the beach.

What can be done?

The beach visitors consider the daily cleaning of the bathing area (removing of rubbish, algae, etc.) as the most important measure for improvement of the beach quality. On the second place is provision of sufficient number (and acceptable quality) of toilets, showers, garbage containers on the beach.

Modifications for improving the beach quality



SOZOPOL

Characteristics of the Sozopol Beaches

Sozopol seashore is divided on 2 beaches (see the map attached). For the need of this project we selected the most famous and preferred by the tourists sand beaches to be monitored regularly.

The “**Harmanite**” beach is situated in the south and central part of the bay, lying between Cap “Harmanite” and Cap “Kolokita”. It looks northeast. The sand is thin and average-sized, quartz-carbonated (content of carbonates of 58%). It has a low content of heavy metals. It feeds mainly by the broken shells. Dunes with height of 4-8 ms are situated in the rear south part of the beach. The beach has a shoreline of 812 m and average width of 75 m.

The whole area is 51,715 m². and the area of the dunes behind is 14,280 m².

Borders of the selected 500 m for the Litter Survey:

North: Transformer

South: Café-bar “Odisey”

Within the observed beach area (maximum 100 m from the limit of the beach) there are: Restaurants (5), alimentary shops (7), discotheque (2), family hotels (4). The access to the beach is free. There is no fence. The beach is provided with baskets, toilets, lifeguard, umbrellas and lounge chairs, and showers. Operated by a private operator.

A **“Central” beach** is situated in front of the town, in small arc-like bay, northeast of cap “Harmanite”. It is facing northeast. The sand is thin and average-sized. It feeds from the depth of the sea. The beach has a shoreline of 502 m and average width of 37 m. The whole area is 18,022 m². The whole beach was monitored by the volunteers. Within the observed beach area (maximum 100 m from the limit of the beach) there are: Restaurants (2), alimentary shops (3), family hotels (1). The access to the beach is free. The beach has a fence. The beach is provided with baskets, toilets, lifeguard, umbrellas and lounge chairs, and showers. The beach is operated by a private operator. The sewage waters are collected through sewage network of the town and through the main collectors flows into the east part of the Bay of Sozopol in front of the port, away from the beach “Central” and “Harmany”, which are used for recreation purposes.

Analyses of the seawater quality and the air quality in Sozopol are in compliance with the national standards. The municipal company “Sozopol” performs waste collecting and transporting of the household and industrial waste. The wastes are disposed in the landfill of Ravadinovo village.

The efforts of the municipality management are directed towards the maintaining of the ecological balance in the municipality in the future, which is connected with the communal and sanitary hygiene and rational organization on the territory in order to reach the steady development.

Results of the Litter Monitoring of the Beaches in Sozopol

The monitoring of the litter pollution on the Sozopol beaches started in March 2001. Out of touristic season, the survey was made once per month. During June and July (till 14 July in order to be able to process the data) we made measurements of the litter pollution twice per month.

Types of litter

Beach litter consist of various slowly degradable solid waste items from a large number of different sources. The main types of litter found on the beach are:

- Plastics (fragments, sheets, bags, caps, containers);
- Polystyrene (cups, packaging);
- Paper and cardboard;
- Rubber (gloves, tires);
- Metal (drink cans, aerosol containers, wires)
- Wood (construction timbers)
- Sanitary
- Textile (clothing, textile bags);
- Glass (jars, bottles, light bulbs)

The pollution on the beaches is highly varied. Alimentary residues like aluminum cans, recipients for liquids, wraps for sweets, bottle caps, plastic bottles are predominant. Should be mentioned the oil pollution found on the Central beach in April. Significant accumulation of constructional waste was found in April, too.

The analysis of the survey data shows that the prevailing type of beach pollution is plastic (40%).

Main sources

The conclusion of observations made is that the main source of pollution are the beach visitors.

Still important sources of beach litter are fishermen boats. Part of the beach litter is transported by the air (especially during the windy days) from the streets and waste containers of the places of entertainment situated next to the beach.

On the other hand, restaurants, cafes, shops and beach discotheques are important indirect source of litter, too. The analysis shows that around 70% of the litter accumulated on the beach

are plastic bottles and caps, boxes for drinks, single use plastic glasses and cans, cigarettes packages etc.

How much

During the 6 surveys of the 2 beaches made the volunteers collected 6710 litter items.

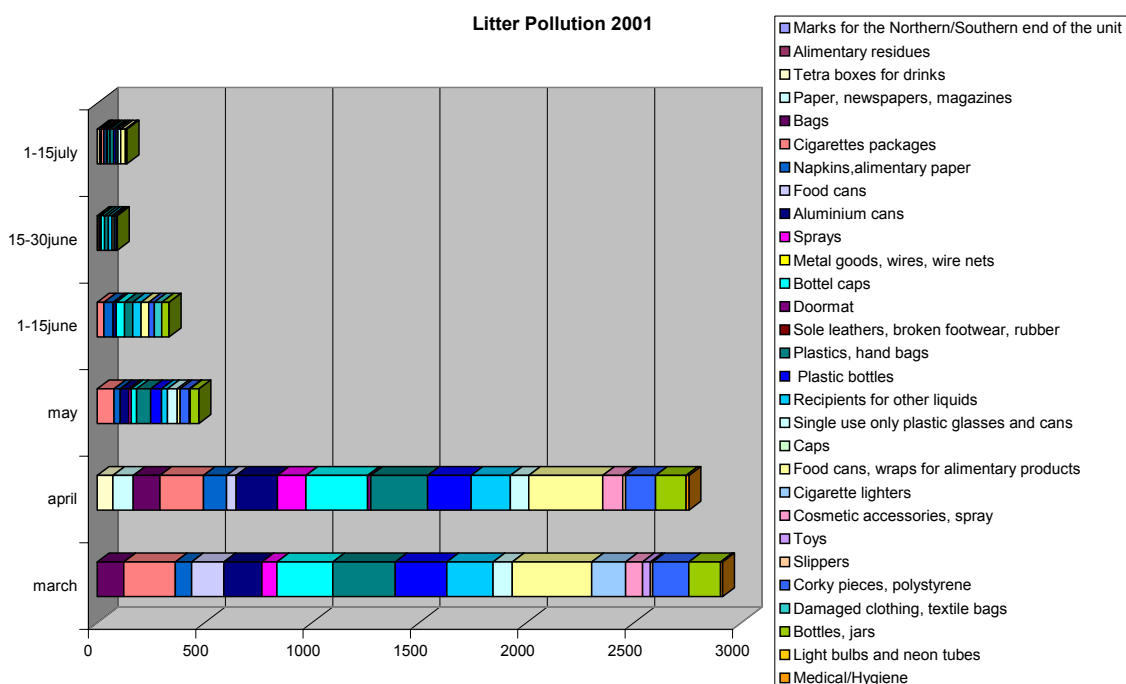
The analysis of the monitoring data shows that during the out-of-touristic season and touristic season the most often find litter are bottle caps (637), wraps for alimentary products (795), plastic bags (692); cigarette packages (575) and plastic bottles (506).

Tendency

Considering the favorite climatic conditions in Bulgaria, already in May people start to use the beaches for sunbathing. June can be considered as a touristic period, nevertheless that the officially the beaches in Sozopol were opened on 15 June with the Mayor's order. The official opening is based on the report of the regional commission for beaches, proving that the beach provides all necessary facilities (such as lifeguard, medical posts, toilets, baskets, beach cleaning, showers and drinking water) and can be considered as safe and suitable for use.

The results of the beach survey show clearly that during the out-of-touristic period, when the beaches are not cleaned regularly, nevertheless the less number of visitors, the litter pollution is significant.

Both beaches of Sozopol are operated by private concessionaires, whose properties are the places of entertainment around the beach. The beach operators provide survives as umbrellas, lounge chairs, sport facilities etc. They have very strong economic interest to attract the visitors. Unfortunately not with high environmental awareness, but with this strong economic interest we can explain the timely and thorough cleaning of the beaches in the beginning of May. Very indicative is comparison of the beach pollution in April and May.

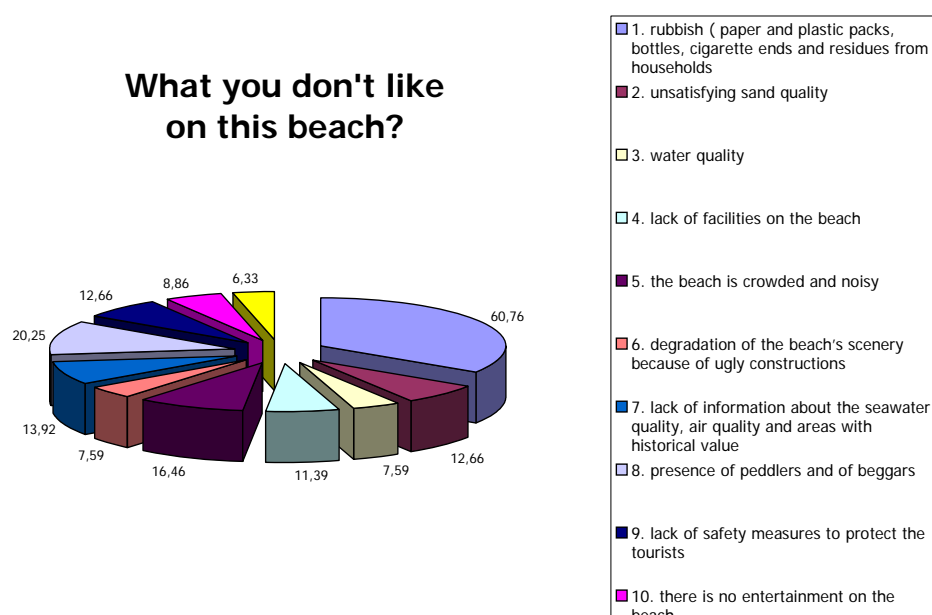


Sociological investigation

During the period 15 June – 15 July more than 500 visitors of the Central and South Sozopol beaches were interviewed on the base of the preliminary elaborated questionnaire.

The analysis of the results shows that people appreciate climatic conditions of the beaches (around 50%). But the most disturbing factor is beach pollution – more then 60% of the visitors answered that they do not like the rubbish on the beach. (see figure)

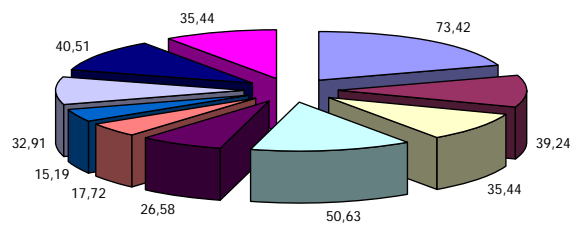
Furthermore, the opinion of most beach visitors is that the garbage (boxes, plastic bags, paper, PET-bottles, food related items trash, dirt) could affect strongly (to very strongly) the quality of the beach.



What can be done?

The beach visitors consider the daily cleaning of the bathing area (removing of rubbish, algae, etc.) as the most important measure for improvement of the beach quality. On the second place is provision of sufficient number (and acceptable quality) of toilets, showers, garbage containers on the beach.

Modifications for improving the bathing quality

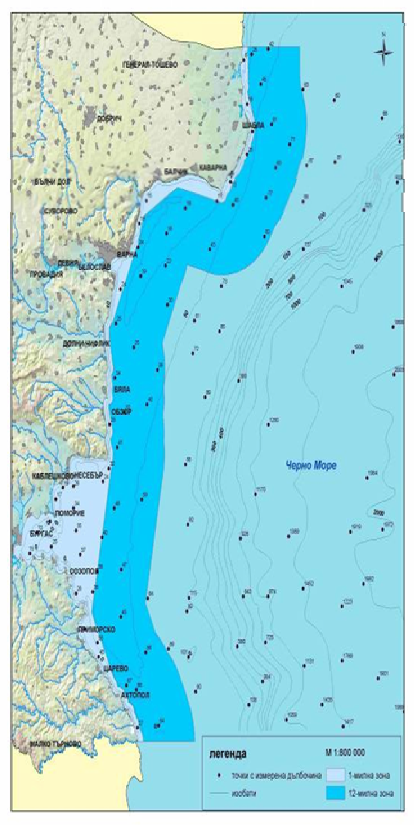


- 1. Daily cleaning of the bathing area (removing rocks, algae, rubbish, metallic objects, pipes)
- 2. Separating the bathing area from the one for nautical sports (skijets, boats, hydrobicycles)
- 3. Decrease of the quantity of used water that is thrown into the seawater and their discharge far from the bathing area
- 4. A large number of toilets, showers, garbage cans on the beach
- 5. Presence of lifeguards and of first aid points available for the hole season
- 6. Informing the tourists about the seawater quality
- 7. Warning signs for the swimmers
- 8. Access forbidden for animals in the seawater
- 9. Forbidding the discharge of dirty waters from pools and hotels
- 10. Forbidding the discharge of dirty waters coming from the ships

ANNEX 6

MAPS OF MARITIME AND SEASHORE AREAS UNDER THE JURISDICTION OF BLACK SEA STATES

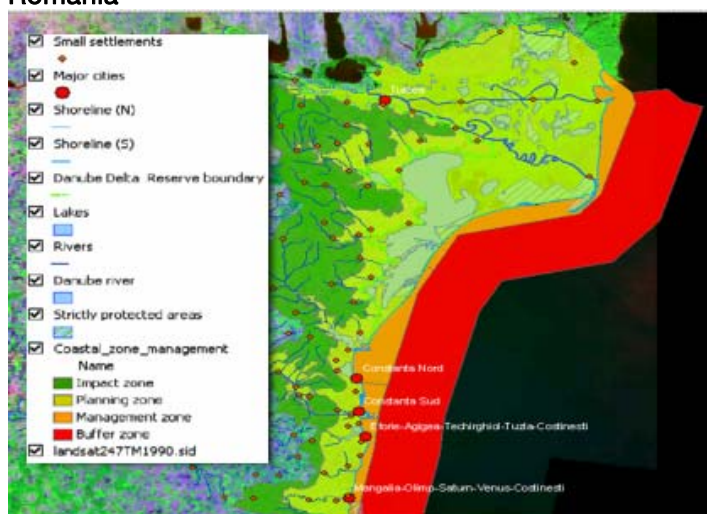
Bulgaria



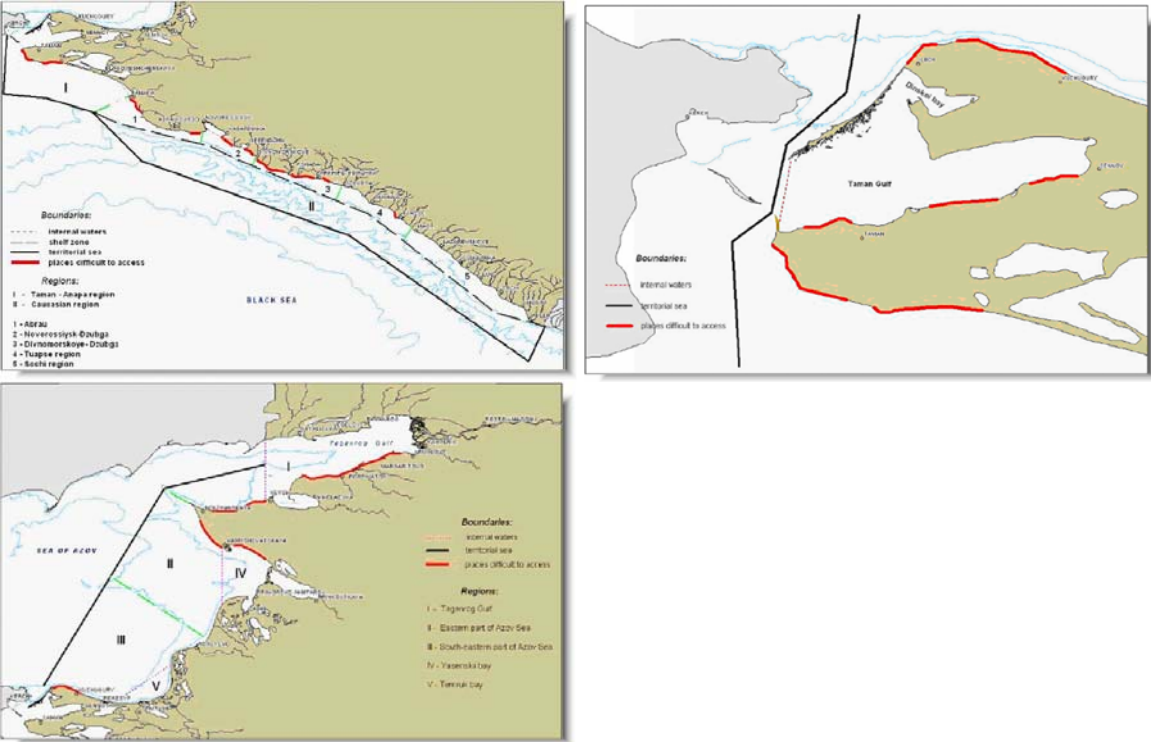
Georgia



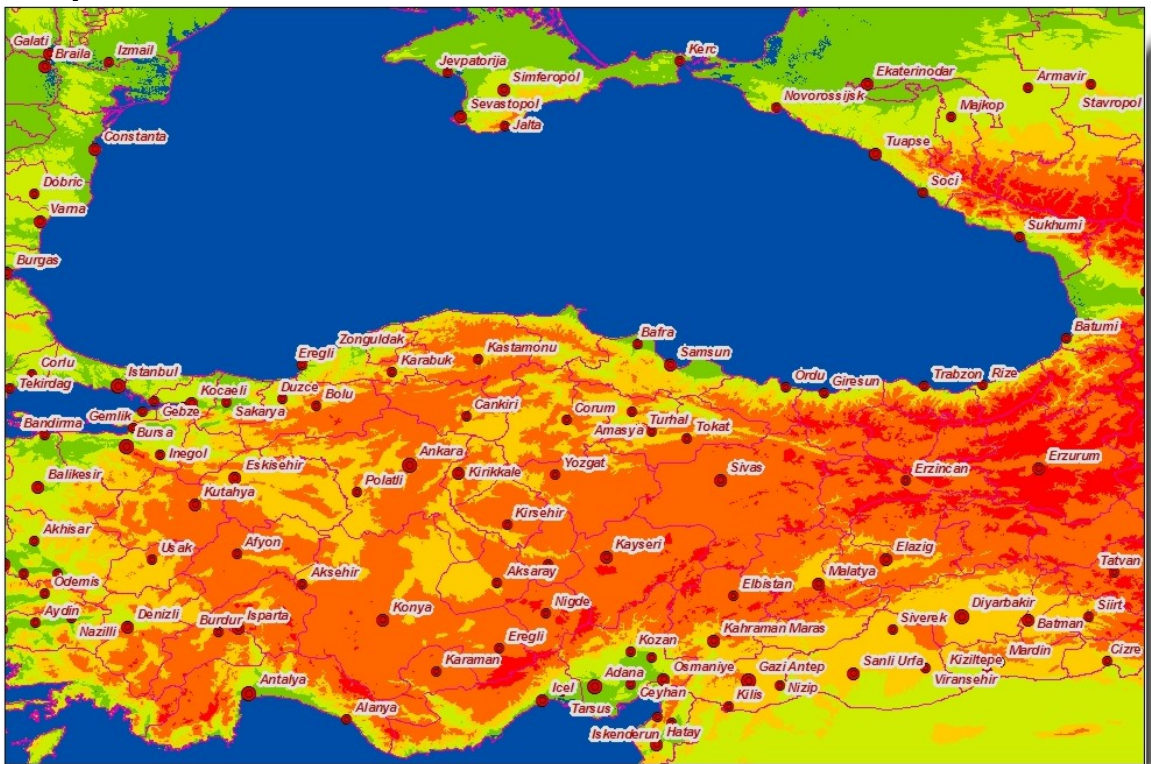
Romania



Russia

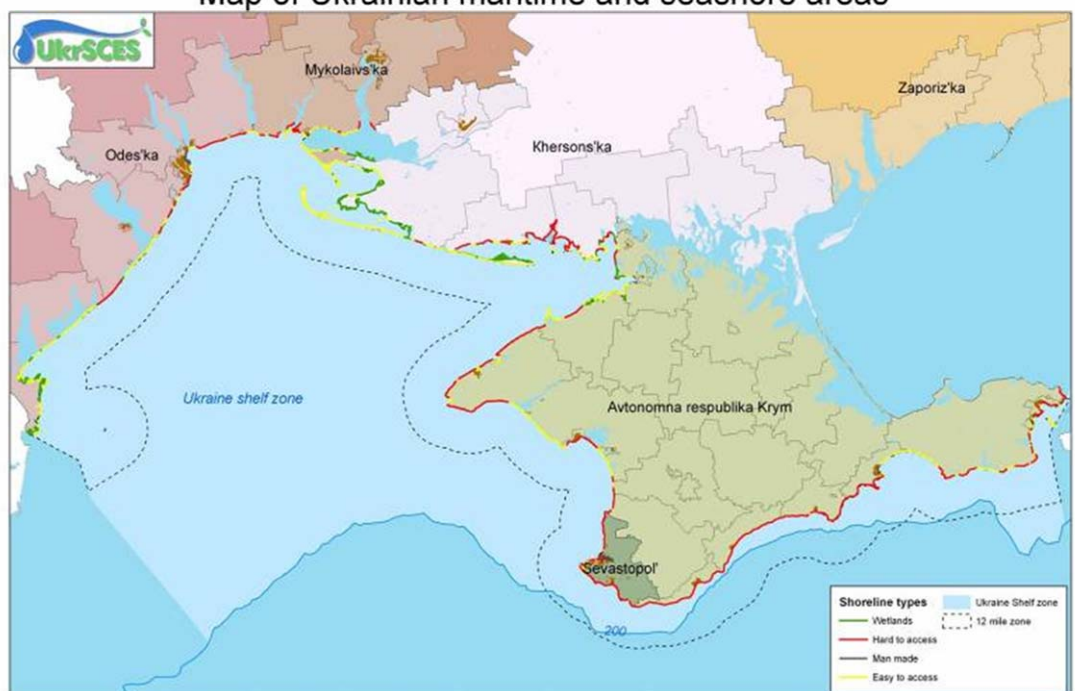


Turkey



Ukraine

Map of Ukrainian maritime and seashore areas



ANNEX 7

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ANNEX 8

MINUTES OF THE SPECIAL SESSION ON MARINE LITTER DURING THE 15TH MEETING OF THE ADVISORY GROUP ON POLLUTION MONITORING AND ASSESSMENT

Istanbul, Turkey, 9-10 October 2006

The Special Session on Marine Litter (ML) was organized by the BSC Permanent Secretariat on 9-10 October 2006 in Taşlik Hotel, Istanbul, within the 15th Meeting of the BSC/AG PMA. This meeting was conducted following the BSC Work Plan and the Memorandum of Understanding (MoU; Activity C) concluded in 2005 between the BSC Permanent Secretariat and the UNEP Regional Seas Coordinating Office in order to develop the Regional Activity on ML in the Black Sea within the framework of the Strategic Action Plan on Rehabilitation and Protection of the Black Sea (BS SAP).

The Special Session was chaired by Dr. Oksana Tarasova, PMA Officer of the BSC Permanent Secretariat. Dr. Alexei Birkun agreed to act as rapporteur and provide the minutes.

Participants:

- **Hermanni Backer**, HELCOM Secretariat, Helsinki, Finland;
- **Alexei Birkun, Jr.**, Regional Consultant on ML, Brema Laboratory, Simferopol, Ukraine;
- **Nugzar Buachidze**, Pollution Monitoring Centre, Georgia;
- **Yasemin Cagatay**, Turkish Marine Environment Protection Association (TURMEPA; NGO), Turkey;
- **Gul Goktepe**, Turkish Environmental and Woodlands Protection Society (TURCEK; NGO), Turkey;
- **Suna Gurler**, National Consultant on ML, Provincial Directorate of Istanbul of the Ministry of Environment and Forestry, Istanbul, Turkey;
- **Kalinka Kamenova**, Black Sea Water Basin Directorate, Varna, Bulgaria;
- **Tulay Kirimhan**, DG of Environmental Management, Marine and Coastal Management of the Ministry of Environment and Forestry, Turkey;
- **Sefa Kocabas**, Environmental Protection Association of Zonguldak (NGO), Turkey ;
- **Viktor Komorin**, Ukrainian Scientific Center of Ecology of Seas, Odessa, Ukraine;
- **Samuel Kotis**, officer of the US Embassy in Budapest;
- **Velcho Kuyumdjiev**, Bulgaria;
- **Radu Mihnea**, Chairman of AG PMA, National Institute for Marine Research and Development, Constanta, Romania;
- **Natalia Movchan**, National Consultant on ML, Ecological Committee of the Parliament of Ukraine, Kiev, Ukraine;
- **Yuriy Nabyvanets**, Ukrainian Research Hydrometeorological Institute, Ukraine;
- **Atanaska Nikolova**, National Consultant on ML, Black Sea Water Basin Directorate, Bourgas, Bulgaria;
- **Atanas Palazov**, Institute of Oceanology, Varna, Bulgaria;
- **Alev Pirci**, DG of Environmental Management, Marine and Coastal Management of the Ministry of Environment and Forestry, Turkey;
- **Oksana Tarasova**, Permanent Secretariat of the Black Sea Commission, Istanbul
- **Vano Tsiklauri**, WWF Caucasus Programme, Georgia;
- **Nino Tskhadadze**, Department of the Black Sea Convention, Ministry of Environmental Protection and Natural Resources, Tbilisi, Georgia;
- **Evgeniy Yakushev**, Laboratory of Marine Chemistry, Southern Branch of the Shirshov Institute of Oceanology, Gelendzik, Russia.

The meeting was attended by National Consultants on ML from Bulgaria (Atanaska Nikolova), Turkey (Suna Gurler) and Ukraine (Natalia Movchan), whereas the National Consultants from Georgia (Tamar Gamgebeli), Romania (Alexei Atudorei) and Russia (Yuriy Yurenko) were not able to participate due to different reasons.

Opening and introductory remarks

The Special Session was opened by the chair. She reminded the participants about the contents of the MoU regarding the Regional Activity on ML in the Black Sea and underlined that the main purposes of the meeting are:

- (a) to assess national and regional situation regarding ML problem in the Black Sea and discuss appropriate national and regional reports based on the questionnaire adopted by the BSC Secretariat;
- (b) to develop and prioritize strategies which could serve as a baseline for the Black Sea Action Plan on ML.

The agenda was adopted as proposed originally with the exception of presentations of the Romanian and Russian ML reports owing to the absence of relevant national consultants. It was agreed by the participants that Vano Tsiklauri will present the Georgian national report on base of materials prepared in advance by Tamar Gamgebeli; and the Romanian and Russian ML data will be considered within the presentation of the Black Sea regional report.

An introductory presentation of UNEP/GPA¹⁵ and UNEP/RS¹⁶ activities on ML was made by the chair. In particular, it was noted that:

- the total input of ML into the oceans and seas worldwide is estimated at 6.4 million tonnes per year and round 8 million items every day;
- the large share of ML (90-95%) is represented by plastics which are long-lived and active for decades, can travel huge distances with marine currents and winds, cause a threat to marine life and humans directly and indirectly, entail economic losses to coastal communities, tourism, fishermen, seafaring, *etc.*;
- light plastics are distributed in the water column being transported horizontally and vertically; most such polymer items (90%) float on or close to the water surface; heavier components are distributed at all depths, 70% ends up on the seabed (15% on the beaches, 15% floating);
- sea-based sources of ML are represented by various vessels, fish farming, ghost fishing, offshore oil and gas platforms, whereas the main land-based sources are: landfills located on the seacoast or along the coasts of rivers, direct discharge of untreated sewage into the sea and touristic/recreational activities at the seashore;
- worldwide inputs of ML are increasing, despite international, regional and national efforts;
- causative factors of this negative trend: a lack of international legal instruments, deficiencies in implementation and enforcement of existing regulations and standards, lack of awareness among main stakeholders and general public;
- UNEP/GPA and UNEP/RS recognize ML as an important marine pollution category to be addressed;

¹⁵ Global Programme of Action for the Protection of the Marine Environment from Land-based Activities.

¹⁶ Regional Seas Programme.

- The ML objectives of these international bodies are: (a) to establish controlled and environmentally sound facilities for receiving, collecting, handling and disposing of litter from coastal area communities; and (b) to reduce significantly the amount of litter reaching the marine and coastal environment by the prevention or reduction of the generation of solid waste and improvements in its management, including collection and recycling of litter.

Presentation of ML reports and discussion

The floor was given by turns to Nikolova, Gurler, Movchan and Tsiklauri. They presented, correspondingly, National Reports on ML prepared in Bulgaria, Turkey, Ukraine and Georgia.

After that, the floor was given to Birkun, who presented the draft Regional Report on ML (or, according to the MoU terminology, the Review Document on ML in the Black Sea Region)¹⁷ based on the data and expert views provided by the National Consultants and supplemented with other available information taken from scientific publications, reports, media, *etc.*

The talks/PowerPoint presentations were arranged in accordance with standard ML Questionnaire prepared by the Regional Consultant and adopted and distributed by the BSC Secretariat in early 2006 as a template for National Report on the State of ML Problem.

The consultants presented their summaries concerning following basic items:

- geographical scope of the problem;
- legal and administrative instruments;
- existing institutional arrangements;
- strategies, programmes and initiatives;
- ML research and monitoring in the marine and coastal environment;
- expert evaluation of the present state of ML problem; and
- proposals and recommendations for changes.

Each talk was accompanied with questions and remarks by the participants. The presentations were followed with open discussion.

It was noted, in particular, that all six Black Sea countries (including Rumania and Russia which were not represented by their National Consultants at the meeting but submitted the reports) are concerned about Black Sea ML problem and its growth within the national boundaries (including coastal areas, internal waters and territorial sea), exclusive economic zones and in the region in whole. However, the problem is not addressed yet up to par in the national politics and legislations, thus, currently available legal instruments (national, regional and international) seem to be not enough to solve, stabilize or even noticeably restrain it.

It was noted also that numerous governmental establishments (which are basically but not only dependent on the Ministries of Environment, Ministries of Public Health and Departments of Marine Transport) as well as many research institutions, universities, NGOs, municipal and harbor services, state-run and private enterprises assumed certain responsibilities and obligations (or possess potential capabilities) to deal with the ML problem. However, by far not all and, probably, few of them demonstrate real effort in this matter. No special (anti-) ML strategies, action plans or programmes exist in the riparian states including reasonable research and monitoring programmes which might be developed and funded by the governments.

At the same time, it was underlined that some cognate (closely related to ML problem) activities are in progress. Most of these relate to the problem of adequate receiving, collecting, handling and disposing/recycling of solid wastes (obvious primary origin of ML) produced by coastal area communities, industries and various vessels. In spite of general positive trend towards the

¹⁷ Birkun A., Jr., Atudorei A., Gamgebeli T., Gurler S., Movchan N., Nikolova A., Okus E., Yurenko Y. 2006. Marine Litter in the Black Sea Region: A Review of the Problem. Report to the Permanent Secretariat of the Commission on the Protection of the Black Sea Against Pollution.

mitigation of this problem in the region, some “hot spots” were identified by the meeting including the uncontrolled landfill sites situated in the immediate proximity to the sea or on the river banks. It was concluded that additional efforts should be applied by the states to eliminate such permanent and, undoubtedly, severe sources of ML pollution.

Among other important items and basic activities discussed there were:

- port reception facilities for garbage (are lacking in many small harbors);
- lack of contemporary incineration and recycling factories for solid waste;
- ghost fishing (is not addressed yet on the national and regional level);
- need in common (regional) ML monitoring methodology and database;
- necessity of initial and periodical assessments of ML pollution;
- need in development of communities services for ML/solid waste collecting;
- expediency of professional sectorial and 'responsible citizenship' guidelines on ML.

It was recognized that floating ML and mainly drift plastics represent transboundary threat for the Black Sea environment and this problem could be properly addressed (the data on distribution and absolute numbers of floating litter will be obtained) by means of a basin-wide line transect survey that would resemble the vessel-based surveys conducted in the Ukrainian and Russian territorial sea in September-October 2003. ML survey may be designed and carried out as a parallel (low cost) activity in frames of the Black Sea cetacean survey promoted by the BSC Secretariat in cooperation with ACCOBAMS and preliminarily planned for summer 2007. Positive experience gained in recent years due to initiative studies of ML pollution in Bulgaria, Russia, Turkey and Ukraine should be taken into account when the common methodology of ML monitoring and assessment is elaborated.

NGOs and ML issues

Crucial role of environmental NGOs in raising public awareness and education campaigns on ML problem was emphasized repeatedly by the consultants and other participants of the meeting. Some examples of relevant voluntary activities (clean-up operations on the beaches, publishing and dissemination of posters, leaflets, *etc.*) are known in Bulgaria, Georgia, Romania and Ukraine. Meantime, the most extensive public movement against ML pollution seems to be developed in Turkey (according to the National Report, at least 16 NGOs and their branches are involved in ML initiatives in different cities of the Turkish Black Sea coast).

The floor was given to responsible representatives of three Turkish NGOs – to Yasemin Cagatay from the Marine Environment Protection Association (TURMEPA), Sefa Kocabas from the Environmental Protection Association of Zonguldak and Gul Goktepe from the Turkish Environmental and Woodlands Protection Society (TURCEK). They presented activities of their organizations including participation in the International Coastal Cleanup Campaign (TURMEPA, 2002-2006), public educational efforts (TURCEK) and Environmental Protection Association of Zonguldak, active since 1992, that presented long-term exertion to eliminate solid waste problem in Zonguldak and studies to improve public awareness.

The meeting appreciated efforts of these NGOs and noted that their experience can be useful for application on the regional level.

Then the participants discussed possibilities to organize regular (annual) regional clean-up campagne under the auspices of the BSC Secretariat. The Black Sea Day in September and 22 April (the date when the Bucharest Convention was signed) were proposed by the chair as probable opportune days for this action. Cagatay and Nikolova agreed to prepare a concept of the Black Sea clean-up campaign.

Hermanni Backer proposed his assistance regarding available information on ML activities in the Baltic Sea region.

Black Sea Action Plan on ML

Birkun presented results of expert evaluation of priorities in coverage of ML problem on the national level. According to the summarized scores based on individual estimates by the National Consultants, at least seven (but probably more) high priority actions should be taken into account in the Black Sea Regional Action Plan/Strategy on Marine Litter (see Annex). Nevertheless, it was noted that the summarized “national” scores do not necessarily reflect the ML priorities on regional scale.

The participants were then invited to propose their own list of high priority actions to be included in the ML action plan. The “brain storming” approach was applied to complete this work. Finally, the participants agreed that principal actions and activities which should be included in the action plan are as follows:

- improvement of national waste management policies (to introduce measures to reduce ML pollution into national waste management policies);
- improvement of legal and administrative instruments for ML as a part of national waste management policies (to introduce necessary amendments related to ML into new LBS protocol of the Bucharest Convention);
- development of the regional and national ML assessment and monitoring schemes using common methodologies and assessment criteria (to develop methodologies for monitoring and assessment of floating, submerged and coastal litter; to organize and maintain ML monitoring facilities);
- developing and implementing measures to prevent and reduce ML pollution (to prepare proposals and relevant implementation programs; to construct and improve port reception facilities for garbage; to close down dumping sites and landfills in the coastal water protection zone as defined in national legislation; to address and mitigate ghost fishing);
- raising public awareness and improvement of public education (to prepare awareness and educational tools; to organize public campaigns; to initiate awareness-raising campaign in media; to prepare 'responsible citizenship' guidelines);
- strengthening public/private partnership in combatting ML pollution;
- implementation of the best available technologies in order to collect, process, recycle and dispose ML;
- improvement of professional skills and knowledge on the management of ML (to prepare professional sectorial guidelines; to organize a training for officers involved in ML management).

In conclusion the chair thanked all participants for their contribution to this meeting and closed the session.

Annex

Expert evaluation of priorities in coverage of ML problem on the national level

Potential actions	Bulgaria A.Nikolova	Georgia T.Gamgebeli	Romania A.Atudorei	Russia Y.Yurenko	Turkey E.Okus	Ukraine N.Movchan	Total score
Correction of waste management policy	3	3	3	3	3	3	18
Improvement of legal and administrative instruments	3	3	3	2	3	3	17
Development of sustainable ML management	3	3	3	2	3	3	17
Development of ML monitoring methodology	3	3	3	2	3	3	17
National assessment of ML pollution	3	3	3	2	3	3	17
Preparation of proposals to prevent and reduce ML	2	3	3	3	3	3	17
Preparation of awareness and educational tools	3	3	3	3	3	2	17
Organising and maintaining ML monitoring facilities	2	3	2	3	2	3	15
Development of port reception facilities for garbage	3	3	2	2	2	3	15
Involvement of stakeholders in anti-ML partnership	3	2	2	2	3	3	15
Preparation of professional sectorial guidelines	3	2	3	2	2	3	15
Initiation of awareness-raising campaign in media	3	2	3	2	3	2	15
Elaboration of ML processing technologies/devices	2	2	2	3	2	3	14
Preparation of 'responsible citizenship' guidelines	2	2	3	3	2	2	14
Promotion of public participation in cleanup activities	2	3	3	1	3	2	14
Development of campaigns/services for ML collecting	2	3	2	1	2	3	13
Elaboration of ML collecting technologies/devices	2	2	2	1	2	3	12
Training of officers involved in ML management	2	2	3	1	2	2	12
Research of social and economic costs of ML	3	no data	no data	no data	no data	no data	no data
Implementation of "polluter pays principle" for ML	3	no data	no data	no data	no data	no data	no data

Primary – 3 Secondary – 2 Next to “0” – 1 Maximum overall score = 18 (3 x 6 experts)

ANNEX 9

DRAFT STRATEGIC ACTION PLAN FOR THE MANAGEMENT AND ABATEMENT OF MARINE LITTER IN THE BLACK SEA REGION (BS-ML-SAP) ¹⁸

Contents

Preamble

- 1 Aim and Objectives
- 2 Definitions
- 3 Geographical Scope
- 4 General Principles and Tools
- 5 Actions
 - 5.1 Consolidation of Environmental Policy, Legislation and Administrative Instruments
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 - 5.3 Research, Monitoring and Assessment
 - 5.4 Practical Activities Aimed to Prevent and Reduce Marine Litter Pollution
 - 5.5 Public Awareness, Education and Information Exchange
- 6 Implementation Framework
- 7 Reporting

Recognizing that the overloading of oceans and seas with floating marine litter and its growing accumulation on the coasts is one of the major environmental problems world-wide and within the Black Sea region, in particular;

Recognizing also that marine litter superfluity in the basin of semi-closed Black Sea exerts a negative impact on marine and coastal ecosystems, the overall health status of seaside populations and development of the maritime economics including the tourist industry, fisheries and shipping;

Recalling that the state of the environment of the Black Sea and adjacent waters continues to be a matter of concern due to the ongoing degradation of their ecosystems and the unsustainable use of their natural resources;

Being aware that the marine litter issues are so far not properly addressed or managed on a regional or national scale, and even actual levels of marine litter pollution are not adequately evaluated nor monitored by the Black Sea riparian countries;

Being Contracting Parties to the *Convention on the Protection of the Black Sea against Pollution* (signed in Bucharest, Romania, on 21 April 1992) and to the protocols of this Convention including: the *Protocol on the Protection of the Black Sea Marine Environment Against Pollution from Land-based Sources*; the *Protocol on the Cooperation in Combating Pollution of the Black Sea by Oil and Other Harmful Substances in Emergency Situations*; the *Protocol on the Protection of the Black Sea Marine Environment Against Pollution by Dumping*; and the *Protocol on the Black Sea Biodiversity and Landscape Conservation*;

Bearing in mind that all of the Black Sea countries have signed and ratified the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78; London, 1973 and 1978), the Convention on the Trans-boundary Movements of Hazardous Wastes and Their Disposal (Basel Convention; Basel, 1989), the Convention on Biological Diversity (CBD; Rio de Janeiro, 1992), and European Environment Ministries adopted the Protocol on Strategic Environmental Assessment, as well as the Environment Strategy for Countries of Eastern Europe, Caucasus and Central Asia (Kiev, 2003);

¹⁸ This document has been prepared by the regional consultant, Dr A. Birkun, upon the request of the Permanent Secretariat of the Black Sea Commission, to provide basis for regional policy development in the Black Sea region in long term and as a guidance in the SAP update process in short-term.

Also being Contracting Parties to Annex V of MARPOL 73/78, the *Regulations for the Prevention of Pollution by Garbage from Ships*, which is a document designating the Black Sea as a potential *Special area* with regard to restriction of solid waste / marine litter pollution originated from vessels;

Recalling that the *Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (London Convention; London, 1972) is designed to control the pollution by wastes and dredged spoils which are loaded on ships for the intentional purpose of dumping them at sea, and that this Convention is not ratified yet by some Black Sea states;

Recalling further the *Strategic Action Plan for the Rehabilitation and Protection of the Black Sea* that was adopted in Istanbul, Turkey, in October 1996 (amended in 2002), with particular reference to its Articles 39, 42, 43, 45, 46 and 53 relating to the reduction of pollution from vessels, land based sources and dumping, to the waste management, and to the reporting of results of marine pollution monitoring and assessment;

Recalling also that the UNEP Governing Council decision 22/2 IIIA on the Regional Seas Programme calls for the utilization of the regional seas conventions and action plans as a platform for the regional implementation of multilateral environmental agreements and global programmes and initiatives; and that the addressing, management and abatement of marine litter are priority activities for both the Black Sea Commission (BSC) and the UNEP Regional Seas Programme¹⁹;

Convinced that special activities should be applied to overcome the marine litter problem in the Black Sea region, and those activities arranged in this particular document (BS-ML-SAP) should be incorporated later on into the framework of new edition of the *Strategic Action Plan for the Rehabilitation and Protection of the Black Sea* (2008);

Aware that the production and implementation of the BS-ML-SAP can and should facilitate the obligations of the Contracting Parties with respect to other multi-lateral environmental agreements to which they may also be Contracting Parties

the Governments of:

Bulgaria
Georgia
Romania
the Russian Federation
Turkey, and
Ukraine

Agree on the following aim, objectives, definitions, geographical scope, general principles, tools and actions:

1 Aim and Objectives

Considering above provisions, the aim of the BS-ML-SAP is to consolidate, harmonize and implement necessary environmental policies, strategies and measures to develop sustainable integrated management of marine litter issues in the Black Sea region.

The objectives of the BS-ML-SAP are as follows:

- (1) to improve the waste management policies in order to devote due regional/ intergovernmental and national/governmental attention and outline proper effort and resources for the abatement of marine litter pollution in the Black Sea in general and in every Black Sea coastal state, in particular;

¹⁹ The *Memorandum of Understanding regarding the Regional Activity on Marine Litter in the Black Sea* was concluded in 2005 between the Permanent Secretariat of the Black Sea Commission and the UNEP Regional Seas Coordinating Office.

- (2) to reinforce and harmonize existing legal and administrative instruments relevant to the implementation of waste management policies in order to ensure their efficacy under the application with respect to marine litter issues;
- (3) to strengthen intergovernmental institutional arrangements consolidating Black Sea regional activities on marine litter and other types of marine pollution;
- (4) to improve national institutional mechanisms with respect to the addressing, preventing and combating the marine litter problem;
- (5) to identify financial sources and allocate essential funds for the implementation of marine litter projects;
- (6) to develop regional and national marine litter monitoring and assessment schemes based upon a common research approach in methodology, evaluation criteria and reporting requirements;
- (7) to improve, develop and implement practical measures aimed to prevent and/or reduce marine litter pollution;
- (8) to gain and implement the best available technologies in order to collect, process, recycle and dispose marine litter;
- (9) to raise public awareness and promote public education on marine litter issues;
- (10) to strengthen public, governmental, and private sector partnership in combating marine litter pollution;
- (11) to improve the professional skills and knowledge of responsible authorities involved in the management of marine litter issues;
- (12) to stimulate information exchange on marine litter issues in order to share the best experiences and innovative technologies amongst the Black Sea countries.

2 Definitions

Ecosystem approach is the comprehensive integrated management of human activities based on best available scientific knowledge about the ecosystem and its dynamics, in order to identify and take action on influences which are critical to the health of the marine ecosystems, thereby achieving sustainable use of ecosystem goods and services and maintenance of ecosystem integrity. This description clearly places humans as part of natural ecosystems, and stresses that human activities in these ecosystems must be managed such that they are sustainable in the long term, not compromising ecosystem components that contribute to its structural and functional integrity.²⁰

Ghost fishing is the accidental capture of aquatic organisms by fishing gear (usually gill nets, or traps, pots, *etc.*) that has been lost or discarded into the sea and which continues to entangle or trap aquatic animals.²¹

Integrated coastal zone management (ICZM) is a development management process realised at the state level with participation of all stakeholders, aimed at optimal balance among economic development, environment protection and social benefits. It is implemented by establishing the organizational legal framework and procedures, required for the provision of an optimal combination (integration) of development plans in coastal zones with the problems of environmental protection and resources conservation (including the social aspect).

²⁰ The definition has been adopted by the Intermediate Ministerial Meeting (Bergen Declaration, March 2002) and the Køge Stakeholders meeting (December 2002).

²¹ The definition was taken from <www.oceansatlas.org/world_fisheries_and_aquaculture/html/glos/terms/>.

Marine litter is any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores.²²

'Polluter pays' principle: any polluter should bear the cost of measures to reduce pollution according to the extent of either the damage done to society or the exceeding of an acceptable level (standard) of pollution.²³

Precautionary principle: where there are threats of serious or irreversible damage to the environment, lack of full scientific certainty should not be used as a reason for postponing cost-effective measures to prevent environmental degradation.⁶

Solid waste is non hazardous solid or semi solid materials which result from residential, institutional, commercial, office, industrial, construction, or demolition activities, and that are discarded as garbage, refuse, or other waste, provided that 'solid waste' does not include material that is intended or collected for the purpose of recycling.²⁴

Special area means a sea area where for recognized technical reasons in relation to its oceanographical and ecological condition and to the particular character of its traffic the adoption of special mandatory methods for the prevention of sea pollution by garbage is required. Any discharges of garbage (except food waste) are prohibited in a special area. However, the garbage discharge requirements for a region that has been designated as a special area (*e.g.*, the Black Sea area) will not enter into force until adequate garbage reception facilities are provided by all riparian countries in their ports and harbours.²⁵

3 Geographical Scope

- (1) Geographical scope of marine litter problem, existing in the Black Sea region, extends over the entire catchment area of the Black Sea drainage basin and includes the Black Sea proper; two neighbouring seas (the Sea of Azov and the Marmara Sea); two straits connecting the Black Sea with these seas (the Strait of Kerch and Istanbul Strait); all rivers (along with their tributaries, estuaries and banks) flowing into the mentioned water bodies; coastal territories bordering to these maritime areas; and all lands drained by the rivers and their confluents. Thus, the geographical scope of marine litter origin includes those parts of Europe and Asia from which marine litter arrive in and depart from the Black Sea region directly or by dint of water masses involved in the hydrological regime of the basin. To this end it is expected that the Contracting Parties will agree on the geographical scope if it does go beyond the one established in the Convention and will elaborate a mechanism for dealing with pollution coming from the marine litter pollution sources not included in the geographical scope of the BS-ML-SAP.
- (2) The BS-ML-SAP area should be delineated and agreed by the Contracting Parties during two years since the BS-ML-SAP and/or newly amended Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (along with marine litter articles incorporated in it) come into force. Within the interim period, the Black Sea Commission shall prepare a map of the BS-ML-SAP area consistent with (a) national legislation; (b) boundaries of maritime and coastal areas under the jurisdiction of the Black Sea states (including their coastal water protection zones, internal waters, territorial sea and exclusive economic zones) and (c) natural and man-made features of the coastline and the seabed.

²² Marine Litter: An Analytical Overview (UNEP, 2005).

²³ These principals were adopted by the the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992).

²⁴ Glossary of Environmental Terminology <<http://www.eco-tec-inc.com/glossary.html>>

²⁵ Regulation 1(3) of Annex V to MARPOL 73/78.

4 General Principles and Tools

- (1) The BS-ML-SAP shall be implemented as an integrated mechanism for Black Sea cooperation in the field of management and abatement of marine litter pollution in order to achieve the BS-ML-SAP objectives and objectives stated in the Convention on the Protection of the Black Sea Against Pollution and its Protocols.
- (2) The Contracting Parties to the above Convention shall incorporate the provisions of the BS-ML-SAP into their national strategies, plans and/or programs for the protection and rehabilitation of the Black Sea and the sustainable use of marine and coastal resources paying due attention to national, sectoral and intersectoral interaction.
- (3) The Contracting Parties shall endeavour to apply the ecosystem approach to any human activities that may contribute to marine litter pollution in the region and, thus, irreversibly damage, compromise or otherwise affect the Black Sea marine and coastal environment.
- (4) The implementation of the BS-ML-SAP shall be closely coordinated with respective global and European legal instruments and initiatives covering a wide range of the environment-oriented fields, including management of waste, water pollution, nature conservation, and relevant European criteria and standards; it should also be consistent with already existing national obligations of the Contracting Parties.
- (5) The implementation of the BS-ML-SAP shall be based on fundamental environmental principles and tools including the precautionary, 'polluter pays', clean technology/clean production principles and tools of the integrated coastal zone management, combating the pollution at source, and shared responsibility.

5 Actions

The actions presented below are grouped into five sections in accordance with general directions of the proposed activities:

Consolidation of environmental policy, legislation and administrative instruments (Objectives 1 and 2);

Organizational and institutional arrangements (Objectives 3, 4 and 5);

Research, monitoring and assessment (Objective 6);

Practical activities aimed to prevent and reduce marine litter pollution (Objectives 7 and 8);

Public awareness, education and information exchange (Objectives 9, 10, 11 and 12).

5.1 Consolidation of Environmental Policy, Legislation and Administrative Instruments

Objective 1: to improve the waste management policies in order to devote due regional/intergovernmental and national/governmental attention and outline proper effort and resources for the abatement of marine litter pollution in the region as a whole and in every Black Sea riparian state, in particular.

5.1.1: to introduce specific issues, aimed to address, prevent, control and reduce marine litter pollution, into the Black Sea regional and national environmental policies concerned with waste/solid waste management and the integrated coastal zone management:

- (a) to amend the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea by means of the addition of marine litter items in the articles concerned with the prevention, reduction and control of the pollution from land-based sources, vessels, emergency situations, dumping, other activities at sea and on the seacoast, by hazardous wastes in transboundary movement;
- (b) to amend national waste strategies and national coastal zone management plans (or other relevant plans and programs) with the aim of marine litter minimization, and/or to develop and adopt national action plans specially dedicated to address and mitigate the marine litter problem.

Objective 2: to reinforce and harmonize existing legal and administrative instruments relevant to the implementation of waste management policies in order to ensure their efficacy with respect to marine litter issues.

5.1.2: introduce amendments related to marine litter into existing and draft protocols of the Convention on the Protection of the Black Sea Against Pollution, including:

- (a) Protocol on the Protection of the Black Sea Marine Environment Against Pollution from Land-based Sources;
- (b) Protocol on the Cooperation in Combating Pollution of the Black Sea by Oil and Other Harmful Substances in Emergency Situations;
- (c) Protocol on the Protection of the Black Sea Marine Environment Against Pollution by Dumping;
- (d) Black Sea Biodiversity and Landscape Conservation Protocol; and
- (e) Draft Legally Binding Document for Fisheries and Conservation of Living Resources of the Black Sea.

5.1.3: promote implementation by all Black Sea states of the principles of the Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (the London Convention, 1972)

5.1.4: carry out the detailed comparative analysis of national policies relevant to the marine litter problem and to conduct the verification of their correspondence with respective international and regional legal acts; to prepare appropriate recommendations on the harmonization and improvement of national legislation.

5.1.5: ensure conformity of national legislative acts and administrative policies of the Black Sea states with international and regional instruments concerned with the marine litter problem and solid waste management:

- (a) develop and/or update national legal acts aimed at combating marine pollution including the marine litter and solid waste components. In particular, these national acts should:
 - prohibit any deliberate discharge/dumping of potential marine litter at sea, into rivers or, on the seashore and riverbanks;
 - improve solid waste collection, processing, storage, disposal and recycling facilities; and
 - enhance governmental control of the above activities.

The transposition of relevant EU directives and standards (including the Landfill Directive, *etc.*) in the national legislations could be recommended not only for EU member states but for all Black Sea countries;

- (b) in view of intersectoral cooperation and coordination, harmonize appropriate administrative instruments issued at national, provincial and local levels by different authorities responsible for:
- protection of the environment,
 - public health,
 - coastal and urban development,
 - integrated management of coastal zone,
 - marine and riverine traffic,
 - fishery and aquaculture,
 - tourism and recreation,
 - offshore gas and oil exploration,
 - various industries and agriculture,
 - protection of state boundaries,
 - military (defence) activities,
 - criminal and administrative offences.

5.2 Organizational and Institutional Arrangements

Objective 3: to strengthen intergovernmental institutional arrangements consolidating Black Sea regional activities regarding marine litter and other types of marine pollution.

5.2.1: introduce marine litter issues as a matter of regular supervision and special discussions into the workplans and practice of operation of the Black Sea Commission, BSC Permanent Secretariat, and BSC Advisory Groups (AG) including the AG on Pollution Monitoring and Assessment, AG on Control of Pollution from Land Based Sources, AG on Development of Common Methodologies for Integrated Coastal Zone Management, AG on Environmental Safety Aspects of Shipping, AG on Conservation of Biological Diversity, AG on Environmental Aspects of the Management of Fisheries and Other Marine Living Resources, and AG on Information and Data Exchange. It could be helpful also if two *ad hoc* BSC working groups (Working Group for the Promotion of the European Water Framework Directive and the Danube/Black Sea Joint Technical Working Group) are involved in marine litter activities.

5.2.2: stimulate marine litter activities within the institutional network coordinated by the Black Sea Commission

5.2.3: maintain and reinforce cooperation links, options for consultative conversation, regulatory and technical cooperation and coordination activities of the Black Sea Commission and the Black Sea coastal states with other intergovernmental organizations involved in marine pollution / marine litter issues at the global, European and regional level, including the United Nations Environment Program (UNEP, including the UNEP's Regional Seas Program and the UNEP's Global Program of Action for the Protection of the Marine Environment from Land-based Activities), International Maritime Organization (IMO), World Health Organization (WHO), UN Food and Agriculture Organization (FAO), Intergovernmental Oceanographic Commission (IOC) of UNESCO, Mediterranean Science Commission (CIESM), Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP), and appropriate institutions of the European Union (EU). The continued development of cooperation between BSC Permanent Secretariat and secretariats of the CBD, Bern Convention²⁶, CMS²⁷ and ACCOBAMS²⁸ is also expedient.

²⁶ Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979).

²⁷ Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979).

²⁸ Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (Monaco, 1996).

Objective 4: to improve national institutional arrangements regarding addressing, preventing and combatting the marine litter problem.

5.2.4: inventory and evaluate operational abilities of governmental and non-governmental entities (ministerial and municipal structures and services, marine and sanitary inspections, research institutions and universities, port administrations, environmental and transport agencies, waste management companies, recycling companies and enterprises, NGOs, *etc.*) concerned about marine litter pollution and involved in appropriate activities;

5.2.5: determine institutional responsibilities [and establish specified national bodies] for the management, control, monitoring and elimination of marine litter at sea (including internal and territorial waters) and in the coastal zone (including the populated and unpopulated areas);

5.2.6: ensure tight cooperation between the key central (*e.g.*, ministry of environment, ministry of public health and ministry of transport) and provincial/municipal authorities involved in marine litter issues.

5.2.7: develop or amend local solid waste management strategies/plans and ICZM plans which should anticipate marine litter issues and involve all stakeholders concerned;

Objective 5: to identify financial sources and allocate essential funds for the implementation of marine litter projects.

5.2.8: the Contracting Parties shall provide proper financing of the measures and actions aimed at the marine litter issues at a national level and ensure that the programs and projects identified as of Black Sea regional importance are properly incorporated within the national budgets.

5.3 Research, Monitoring and Assessment

Objective 6: to develop regional and national marine litter monitoring and assessment schemes on the basis of a common research approach, methodology, evaluation criteria and reporting requirements.

5.3.1: study spatial and temporal patterns of marine litter distribution, accumulation and shifting on the sea surface, within the water column, over the seabed and along the seashore with regard to hydrological, hydrochemical and hydrometeorological peculiarities including the pronounced horizontal stratification of the Black Sea, presence of stable and transient sea currents, seasonal fluctuations of predominant and local winds, *etc.*

- (a) obtain data on geographical and temporal distribution, including density, absolute numbers, composition, 'hot spots' (vast accumulations) and movement and transboundary transport of visible floating litter by means of surveys based commonly agreed methodologies, *e.g.* polygonal and line transect methodologies²⁹;
- (b) obtain data on geographical and temporal distribution of submerged marine litter by means of diving surveys particularly (but not exclusively) in the urbanized and harbour areas around the Black Sea.
- (c) study the distribution, quantity and composition of marine litter within the water column in offshore and inshore maritime areas.
- (f) study the distribution, quantity and composition of marine litter washed ashore on the seacoast in different areas of the Black Sea states.

5.3.2: carry out a comprehensive study and mapping of the main sources of marine litter pollution in the BS-ML-SAP area

²⁹ The marine litter survey could be designed and carried out as a parallel (low cost) activity within the framework of the Black Sea Cetacean line transect survey promoted by the BSC Permanent Secretariat and ACCOBAMS.

5.3.3: study and address, at regional and national levels, the issue of ghost fishing caused by the fixed and floating nets, having been discarded, abandoned or lost, and by the uncontrolled fishing nets pertinent to illegal, unreported and unregulated fisheries.

5.3.4: study the adverse effects of marine litter on the environment, biodiversity, public health, economics and social life in the Black Sea countries and the region as a whole.

5.3.5: develop and implement on a continual basis the common methodologies, unified standards, guidelines and reporting format for the monitoring and assessment of floating, submerged and coastal litter, its sources and effects. The recommendations provided by international bodies³⁰ should be taken into consideration as important mainframe documents.

5.3.6: incorporate the monitoring and assessment modules devoted to marine litter as obligatory components into the Black Sea Integrated Monitoring and Assessment Program (BSIMAP)

5.3.7: conduct further periodical assessments annually (national level) and biennially (regional level) analyzing the results of marine litter monitoring effort.

5.3.8: ensure that marine litter issues are included in the environmental impact assessment schemes and procedures carried out before approving any development project that may affect the marine and coastal environment.

5.3.9: develop and maintain national and regional marine litter databases accumulating primary information obtained due to the monitoring of marine litter and its impact.

5.4 Practical Activities Aimed to Prevent and Reduce Marine Litter Pollution

Objective 7: to improve, develop and implement practical measures aimed to prevent and reduce marine litter pollution.

5.4.1: improve or develop municipal and industrial infrastructures for solid waste management in the coastal zone in order to prevent and reduce marine litter pollution originated from focal land-based sources:

- (a) close down all dumping sites and landfills situated in the immediate proximity to the sea (within the coastal water protection zone) and on the river banks as defined in the national legislations. Any evacuation of wastes to such sites should be completely prohibited and stopped – this is a matter of particular urgency;
- (b) develop rehabilitation projects for the closing down dumping sites and landfills located in the coastal zone and on the river banks
- (c) replace former poorly controlled landfills and uncontrolled dumping sites by the installation of new regular storage facilities for solid wastes (*e.g.*, sanitary landfill sites) situated beyond the coastal water protection zone and river banks and constructed as consistent with contemporary safety requirements and environmental regulations; to ensure safe disposal of solid wastes at these new landfill sites.

5.4.2: develop and improve port reception facilities for garbage collection from vessels³¹:

- (a) infrastructures suitable for the reception of solid waste should be established at all Black Sea ports and harbours and, thus, a basic requirement will be attained in order to introduce the garbage discharge rules designated for *special areas* (see section 2. Definitions);

³⁰ For instance, the WHO guidelines (Guide on the Monitoring Bathing Waters, 2000; Guidelines for Safe Recreational Water Environments, 2003) and recommendations by UNEP (in preparation, 2007).

³¹ In compliance with Annex V of MARPOL 73/78 (the Regulations for the Prevention of Pollution by Garbage from Ships).

- (b) undertake precautionary measures for preventing marine litter pollution from maritime traffic: the generation, gathering and disposal of solid wastes by vessels should be controlled by port authorities via regular mandatory examination of appropriate onboard documentation.

5.4.3: improve or develop permanent services for marine litter collection and removal along the entire coastline of the BS-ML-SAP area including the populated and unpopulated sections of the shore:

- (a) improve municipal and other authorities capability for marine litter/solid waste collection within the boundaries of their jurisdiction including the seacoast and inshore waters;
- (b) impel the tenants of beaches and local authorities to achieve the criteria of the Blue Flag Program³²
- (c) appoint responsible bodies, define management schemes and allocate resources needful for implementing regular cleanup operations in the unpopulated areas

5.4.4: elaborate and implement measures serviceable to mitigate ghost fishing.

Objective 8: to gain and implement the best available technologies in order to collect, process, recycle and dispose of marine litter.

5.4.5: promote general application in the BS-ML-SAP area of the integrated waste management systems which include modern technologies of solid waste minimization, recycling and waste-to-energy conversion:

- (a) conduct feasibility studies in order to determine the number, types, properties and costs of the constructions and equipment required for each country;
- (b) prepare and implement investment projects in order to engineer, construct and install new solid waste recycling facilities and incineration plants which should be properly equipped in accordance with the environmental standards.

5.4.6: promote activities aimed to develop and introduce on a larger scale the re-usable packaging, quickly degrading wrapping materials and other practical tools instrumental sufficient for the prevention and abatement of marine litter pollution.

5.4.7: elaborate and implement the unified [regional] system of technical norms for the prevention and reduction of marine litter pollution as well as for marine litter collection and processing technologies and devices.

5.4.8: elaborate upon and implement measures aimed to prevent litter carried by rivers from deposition at sea

5.5 Public Awareness, Education and Information Exchange

Objective 9: to raise public awareness and promote public education on marine litter issues.

5.5.1: organize the Black Sea regional and national public education and awareness raising campaigns directed towards different target groups and aimed to create 'responsible' behaviour:

- (a) prepare, produce and disseminate the awareness and educational tools (brochures, posters, leaflets, TV-clips, CDs, *etc.*) dedicated to the marine litter problem at a national, regional and global level;

³² The Blue Flag Programme for beaches and marinas is implemented by the Foundation for Environmental Education (FEE). It strives to promote sustainable development in the coastal areas through high water quality standards, safety standards, environmental management standards and environmental education.

- (b) initiate and promote awareness-raising publications in the mass media (radio and TV broadcasts, newspapers and environmental bulletins) expanding the experience of Black Sea NGOs already involved in such activities;
- (c) prepare and distribute 'responsible citizenship' guidelines on marine litter issues for NGOs, children and students, tourists (including yachtsmen), shipping companies (including their managers, ship crews and passengers), fishermen, soldiers and military seamen, police staff and municipal authorities;
- (d) organize public exhibitions of marine litter collected due to the coastal, marine and underwater cleanup operations.

Objective 10: to strengthen public, governmental and private sector partnership in combating marine litter pollution.

5.5.2: raise public participation in marine litter abatement activities by means of involving more people in cleanup campaigns on a voluntary basis:

- (a) promote coastal and marine cleanup campaigns already organized and periodically implemented by environmental NGOs at the international, national and local levels (*e.g.*, the International Coastal Cleanup which is the largest volunteer event of its kind in the world³³);
- (b) organize an annual Black Sea regional cleanup campaign under the auspices of the Black Sea Commission.
- (c) use the annual celebration of the Black Sea Day, 31 October³⁴, as an additional opportunity to highlight the importance of protection of the Black Sea against marine litter pollution and to increase public awareness and awareness of the private sector and decision makers on this issue.

5.5.3: involve major stakeholders in anti-marine litter cooperation, including the shipping industry, tourism industry, manufacturers of plastics, fisheries, waste managers/services, municipalities, local communities and authorities, NGOs and general public:

- (a) develop the partnership for marine litter prevention and reduction by means of voluntary agreement or statement signed by representatives of major stakeholders in order to cooperate for the protection of the marine and coastal environment against marine litter;
- (b) organize national and regional meetings/workshops of different stakeholders for the initiation of multilateral partnerships campaigning for clean beaches and waters.

Objective 11: to improve professional skills and knowledge of responsible stakeholders involved in the management of marine litter issues.

5.5.4: prepare, adopt and implement a set of [regionally agreed] professional sectorial guidelines:

- (a) on marine litter management for tourism, cruise liners, boating, fishery and coastal construction.
- (b) for the development and efficient operation of solid waste reception facilities in major and minor Black Sea ports;
- (c) for the operation, maintenance and control of solid waste disposal areas and other key constituents of the integrated waste management systems developed in the coastal provinces and municipalities.

³³ This world-wide campaign is organized annually in mid September since 1986 by the Ocean Conservancy and numerous NGO partners.

³⁴ The date when the Strategic Action Plan for the Rehabilitation and Protection of the Black Sea was signed in 1996.

5.5.5: organize and conduct a training course on marine litter issues for officers occupied with municipal and port waste management, wild nature conservation and fish protection (on ghost fishing).

Objective 12: to stimulate information exchange on marine litter issues in order to share the best experiences and innovative technologies amongst the Black Sea countries.

5.5.6: use the Biannual Scientific Conference of the Black Sea Commission as a platform for regular information exchange (including specific symposia and round tables) on the state of the marine litter problem.

5.5.7: prepare and publish a handbook or manual aimed to address the marine litter problem in the Black Sea region and provide a methodological framework for the implementation of this BS-ML-SAP.

6 Implementation Framework

- (1) The BS-ML-SAP shall be implemented by the Contracting Parties within the mutually agreed timeframe for achieving its objectives. The timeframe for operational actions shall be introduced annually based on the yearly reporting of the Contracting Parties and based on the annual work plan of the Black Sea Commission.
- (2) The Commission on the Protection of the Black Sea Against Pollution through its Permanent Secretariat shall coordinate regionally relevant activities as far as possible to ensure joint programs and projects.
- (3) Before the BS-ML-SAP comes into force, the corresponding activities shall be conducted in accordance with provisions of the Strategic Action Plan for Rehabilitation and Protection of the Black Sea 1996, amended 2002.
- (4) The BS-ML-SAP shall become an integral part of the new, updated Strategic Action Plan for Rehabilitation and Protection of the Black Sea to be prepared in 2007 and approved by the Ministerial Conference of the Contracting Parties in 2008.

7 Reporting

- (1) The implementation of the BS-ML-SAP shall be monitored through the regular reporting of the Contracting Parties to the Black Sea Commission along with its annual and five yearly reports.
- (2) The reporting requirements should be stipulated by the Permanent Secretariat and approved by the Commission at one of its meetings before the end of 2008.