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**REPORT OF
THE FIRST COBSEA MARINE LITTER WORKSHOP**

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OPENING AND INTRODUCTION OF THE WORKSHOP

1. Dr. Srisuda Jarayabhand, Coordinator, United Nations Environment Programme (UNEP) East Asian Seas Regional Coordinating Unit (EAS/RCU) introduced His Excellency Arief Yuwono, Executive Secretary of the Ministry of Environment of Indonesia to deliver the opening remarks of the First COBSEA Marine Litter Workshop.
2. In his opening remarks, His Excellency Arief Yuwono emphasized the importance in dealing with the global and local effects of marine litter. Mr. Yuwono further introduced some of the efforts undertaken by Indonesia and emphasized the importance of all stakeholders working together in order to address marine litter. He extended Indonesia's support to the global and marine litter initiative and thanked UNEP and COBSEA for bringing the COBSEA member countries together to discuss a regional action plan on marine litter.
3. The representatives from the COBSEA member countries, regional organizations and UNEP were invited to introduce themselves. The provisional list of participants is attached as Annex 1 to this report.
4. Dr. Srisuda Jarayabhand, Coordinator, UNEP EAS/RCU, introduced the main objectives of the workshop and explained that it had been organized in order to present the draft regional review on marine litter to the COBSEA member countries and to discuss the draft framework document of a "Regional Action Plan on Marine Litter". The Programme of Work, the draft "Regional Review: Marine Litter in the Seas of East Asia" and the draft framework document "Regional Action Plan on Marine Litter for the Seas of East Asia" are attached as Annex 2, 3 and 4 to this report.

PRESENTATIONS

UNEP Regional Seas Programme

5. Dr. Ellik Adler, Coordinator, UNEP Regional Seas Programme, introduced UNEP's global initiative on marine litter. The presentation is attached as Annex 5 to this report.
6. In his presentation, Dr. Adler described marine litter as a transboundary and multi-disciplinary problem strongly affecting the general public and emphasized its significant economic impacts. He further described the main activities of UNEP's global initiative on marine litter and the eleven regional activities (including the COBSEA initiative) that had been developed and sponsored under this programme. Mr. Adler also noted the United Nations General Assembly Resolution on Marine Litter (UN GA Resolution A/60/L.22) that encourages states to cooperate regionally and sub-regionally to develop and implement joint prevention and recovery programmes for marine litter.
7. Dr. Adler also introduced the planned activities under UNEP's global initiative on marine litter and urged COBSEA not to start the development of regional monitoring guidelines as part of their activities on marine litter, but to instead utilize the harmonized global monitoring guidelines that are currently under development by UNEP Regional Seas in collaboration with UNESCO International Oceanographic Commission (IOC). Mr. Adler also informed an "Expert Meeting" would be organized in connection to this activity, bringing together experts from various regions in the world.

UNEP East Asian Seas Regional Coordinating Unit (EAS/RCU)

8. Dr. Srisuda Jarayabhand introduced the main objectives and activities of the first phase of the COBSEA marine litter initiative including:
 - A review of the status and management of marine litter in the East Asian Seas region;
 - The organization of this First COBSEA Marine Litter Workshop; and
 - The development of a regional action plan on marine litter.

9. Dr. Jarayabhand explained that the activities had been initiated through the nomination of national marine litter focal points in all COBSEA member countries (with the exception of Singapore). In addition, a regional consultant and national consultants had been identified to undertake national surveys on marine litter, to conduct the regional review on marine litter and to assist the COBSEA member countries in developing a draft regional action plan on marine litter.

10. Furthermore, Dr. Jarayabhand extended her appreciation to the UNEP Regional Seas Programme for the support provided to the COBSEA marine litter initiative, to the COBSEA member governments for their important inputs to the activities, and to Mr. Steve Raaymakers for providing his technical expertise as the COBSEA regional consultant on marine litter.

COBSEA Regional Consultant on Marine Litter

11. Mr. Steve Raaymakers, Director, EcoStrategic Consultants, introduced the draft Review Document on Marine Litter in the East Asian Seas region, emphasizing that the review document is still in draft format and requesting additional input from the country representatives. The presentation is attached as Annex 6 to this report.

12. Mr. Raaymakers introduced the main objectives of the review as the identification of existing knowledge/information, instruments/regulations and barriers/gaps in the East Asian Seas region regarding marine litter and marine litter management. Mr. Raaymakers noted that a limited number of scientific studies regarding marine litter have been undertaken in East Asia compared to other regions. Apart from the exceptions of Republic of Korea and Australia, very little information is available regarding marine litter among the COBSEA member countries. Mr. Raaymakers also presented the many national actions that are being undertaken in the region, but listed the main barriers and gaps for reducing marine litter as low awareness, competing national development priorities, lack of data and use of marine litter trajectory models, poor implementation of existing instruments that relate to marine litter and the lack of involvement of private sector and regional fishery bodies. Furthermore, Mr. Raaymakers emphasized the need for a regional strategy and action plan on marine litter in the seas of East Asia.

13. Mr. Adler from the Regional Seas Programme recommended that this analysis should serve as the bases for the development of a regional action plan in the East Asian Seas region.

The Department of Environment and Water Resources, Australia

14. Dr. Ilse Kiessling, Assistant Director, Marine and Biodiversity Division Liaison, Department of Environment and Water Resources, Australia, was invited to present "Marine Litter: Australian responses to a national and regional problem". The presentation is attached to this report as Annex 7 to this report.

15. Dr. Kiessling's presentation highlighted the importance that Australia is placing on the marine litter issue. Her presentation included information on the development of an Australian marine litter strategy (Threat Abatement Plan), various community initiatives and some of the initiatives undertaken by the industry sector in Australia. Ms. Kiessling also mentioned that only a small portion of the discarded fishing nets found on northern Australian shores originate from Australian vessels while the largest proportion comes from beyond national jurisdiction.

16. Dr. Kiessling also introduced the aims of the Asia Pacific Economic Cooperation (APEC) study "Understanding the economic benefits and costs of controlling marine debris" being undertaken through the APEC Marine Resources Conservation Working Group. Australia is overseeing the project and Indonesia and Chile are co-sponsoring economies. Dr. Kiessling explained that the objective of the study is to compile existing data on the direct and indirect impacts of marine litter in the APEC region, and to analyse the costs of marine litter. The study aims to identify targeted economic incentives and disincentives for preventing marine litter.

17. After the presentation, Ms. Sitti Hamdiyah, Official, Office of the Lead Shepherd of the APEC Marine Resources Conservation Working Group, emphasized the potential of COBSEA and APEC collaborating in implementing the areas of the APEC Bali Plan of Action that relate to GPA and marine litter, especially considering that nine out of ten COBSEA member countries are also members of APEC.

Ministry of Environment, Cambodia

18. Mr. Koch Savath, Ministry of Environment, Cambodia presented "Marine Litter in Cambodia". The presentation is attached as Annex 8 to this report.

19. Mr. Savath's presentation included information on the authorities responsible for different aspects of marine litter management in Cambodia and some of the marine litter related project activities. Mr. Savath informed that there is very limited information available regarding the marine litter problem and that very little research and surveys have been conducted in Cambodia. Mr. Savath also informed that even though Cambodia has not participated in any International Coastal Cleanup (ICC) campaigns, there are several local cleanup activities undertaken in Cambodia.

South China Institute of Environmental Sciences, P.R. China

20. Mr. Huang Zhengguang from the South China Institute of Environmental Sciences (SCIES) presented "Marine Litter in China". The presentation is attached as Annex 9 to this report.

21. Mr. Huang's presentation included an overview of the information available on the marine litter problem in China. Mr. Huang further stated that there is no formal marine litter monitoring programme in China and that the available data and information is still limited and scarce. It seems however that the majority of marine litter originates from land-based sources rather than sea-based sources. Mr. Huang's presentation also included information on lead agencies in China regarding marine litter, existing laws and regulations and the main gaps and national needs for action.

Ministry of Environment, Indonesia

22. Ms. Wahyu Indraningsih, Assistant Deputy Minister, Marine and Coastal Degradation Control, Ministry of Environment, Indonesia presented "Marine Litter in Indonesia". The presentation is attached as Annex 10 to this report.

23. In her presentation, Ms. Indraningsih informed on some of the main marine litter related policies in Indonesia including the work related to the Master Plan on River Water Classification. She also informed on some of the main marine litter related activities on public awareness, Reduce, Reuse and Recycle (3R)-principles, public private partnerships on waste management, and clean up programmes and the EcoPort Programme implemented by the Ministry of Transportation in Indonesia. Ms. Indraningsih emphasized the importance of community empowerment, improved solid waste management through enhanced public-private partnerships, the replication of 3R activities on a wider scale, enhancement of monitoring and information system on marine litter and enhanced public awareness for future marine litter management initiatives.

Ministry of Natural Resources and Environment, Malaysia

24. Mr. Hashim bin Daud, Director, Water and Marine Division, Department of Environment, Ministry of Natural Resources and Environment, Malaysia presented information on marine litter management in Malaysia. A summary of his presentation is attached as Annex 11 to this report.

25. In his presentation, Mr. Daud informed the workshop that marine litter management is still very limited in Malaysia and mentioned that there is a need to assess the extent of the marine litter problem and for Malaysia to initiate actions to properly address the marine litter issue.

Maritime and Ocean Engineering Research Institution, R.O. Korea

26. Dr. Rho-Taek Jung, Senior Researcher, Korea Ocean Research and Development Institute, Maritime and Ocean Engineering Research Institute (KORDI/MOERI), Republic of (R.O.) Korea, presented the "National Implementation of the Korean Policy on Marine Litter Issue". The presentation is attached as Annex 12 to this report.

27. In his presentation, Dr. Jung explained the history of marine litter management in R.O. Korea and how the approach is gradually changing from the end-of-pipe approach to the front-of-pipe approach. He further introduced some of the main active government agencies and NGOs and their substantive efforts in managing marine litter in Korea. Dr. Jung explained that Korea has had an integrated management system for marine litter since 1999, and introduced the main activities in the 'National Research and Development Project on Marine Litter'. He further introduced some of the technical inventions used in Korea to address the marine litter issue such as marine litter containment booms and marine debris recovery ships. He also described Korea's buy-back programme where the government pays fishermen to collect discarded fishing gear.

28. The workshop participants discussed the relation between R.O. Korea's buy-back programme and the polluter-pays-principle, but noted the success achieved by this approach and congratulated Korea on its successful programme.

Department of Environment and Natural Resources, Philippines

29. Ms. Maricris T. Laciste, Science Research Specialist, Research Development Division, Environmental Management Bureau, Department of Environmental and Natural Resources, the Philippines presented "Marine Litter - the Philippine Experience". The presentation is attached as Annex 13 to this report.

30. In her presentation, Ms. Laciste summarized the state of the marine litter problem in the Philippines, existing institutional arrangements, initiatives and programmes, barriers and gaps and national needs of action. She reported on some of the outcomes from the monitoring undertaken during International Coastal Cleanup Campaigns in the Philippines and explained that the reason the Philippines is so successful in International Coastal Cleanup campaigns is because the Environmental Management Bureau and its district offices are responsible for organizing the campaigns. She also noted some barriers and gaps including the lack of lead agency, sustained funding and support and systematic data gathering or research efforts.

Department of Marine and Coastal Resources, Thailand

31. Dr. Pinsak Suraswadi, Acting Director of Marine Resource Conservation and Restoration Division, Department of Marine and Coastal Resources, Thailand presented "Thailand's Experiences of Marine Litter Management". The presentation is attached as Annex 14 to this report.

32. In his presentation, Dr. Suraswadi highlighted the economic importance of Thailand's coastal and marine resources and mentioned some of the problems experienced by marine litter in Thailand. Dr. Suraswadi summarized some of actions undertaken by Thailand in order to increase awareness, clean-up marine litter and increasing the efficiency of recycling. Dr. Suraswadi also mentioned that there are currently very little analyses of the sources of the marine litter in Thailand and that there is a general lack of understanding regarding the transboundary nature of marine litter.

Vietnam Environment Protection Agency, Vietnam

33. Mr. Le Dai Thang, Official, Integrated Coastal Zone Marine and River Basin Management Division, Vietnam Environmental Protection Agency presented the "Vietnam National Survey on Marine Litter". The presentation is attached as Annex 15 to this report.

34. In his presentation, Mr. Thang mentioned that there is very limited data and information available

on marine litter in Vietnam and that the only surveys that have been undertaken with connection to marine litter have focused primarily on shipping/navigation and oil/gas. However, Mr. Thang also informed on Vietnam's involvement in both ICC and Clean Up the World and its participation in several marine litter-related international conventions. The lack of specific laws and regulations, inadequate or non-existent waste treatment systems at seaports and the lack of awareness on marine litter were identified as some of the main barriers and gaps for effective marine litter management. Mr. Thang also emphasized the need for marine litter monitoring in Vietnam.

Northwest Pacific Action Plan (NOWPAP)

35. Dr. Jeong Sook Park, Scientific Affairs Officer, Northwest Pacific Action Plan (NOWPAP) Regional Coordinating Unit (RCU), and Dr. Takafumi Yoshida from NOWPAP Special Monitoring and Coastal Environmental Assessment Regional Activity Center (CEARAC) were invited to present the "NOWPAP Marine Litter Activity". The presentations are attached as Annexes 16 and 17 to this report.

36. Dr. Park presented the background of the NOWPAP Marine Litter Activity (MALITA), which was initiated in 2005 through the collection and review of existing data and information on marine litter. She also informed on the current activities including the organization of marine litter workshops and meetings, the development of marine litter monitoring guidelines and sectoral guidelines and the development of a NOWPAP Regional Action Plan on Marine Litter. She also mentioned the NOWPAP ICC events to be held this year in Rizhao, China (in June), in Busan, Korea (in September) and in Vladivostok, Russia (in October). She invited the COBSEA secretariat and the COBSEA members to participate in these events, if appropriate.

37. Dr. Yoshida presented on the efforts made by NOWPAP to understand the marine litter distribution in the NOWPAP region through monitoring surveys implemented by the Northwest Pacific Region Environmental Cooperation Center (NPEC).

38. After the presentation, Dr. Adler commented that NOWPAP and its marine litter activities provide an excellent example to COBSEA. He also suggested that it could be beneficial to explore the possibilities of COBSEA and NOWPAP co-organizing future marine litter events to cover the entire coastline of the East Asian and Northwest Pacific Seas.

39. Regarding marine litter monitoring guidelines, Dr. Adler mentioned the development of global marine litter monitoring guidelines that is being undertaken by UNEP Regional Seas in collaboration with UNESCO IOC.

Keep Australia Beautiful National Association

40. Mr. Richard Olesinski, Australia Tidy Towns Program Judge, Keep Australia Beautiful National Association, was invited to present "Sustainable Seas: Reducing Marine Litter through a Clean Ports Award Program. Lessons from Down Under: The Experience of Australian Award-based Litter Reduction Programs". The presentation is attached as Annex 18 to this report.

41. In his presentation, Mr. Olesinski explained the experiences with the Australian Tidy Towns programme and how it has evolved over the past 30 years while highlighting the importance of community ownership to ensure the success of any environmental award programme. Mr. Olesinski also emphasized the benefits of an incentive approach rather than a penalty approach to address marine litter and proposed criteria for a potential Clean Ports Award Program for the East Asian Seas region.

42. After the presentation, Mr. Raaymakers requested clarification regarding the reward offered to the winner of the Tidy Towns programme and Mr. Olesinski clarified that there is no monetary reward, only a title and the recognition.

43. Mr. Daud wondered how such a programme is funded and mentioned the difficulties in funding and involving communities in such community-based initiatives in most Asian countries because of the poverty issues. Mr. Olesinski clarified that the programme was primarily funded by private sector donations.

44. Mr. Adler asked if it would be possible for a programme like Tidy Towns to expand its activities to other countries in the East Asian Seas region. Mr. Olesinski answered that he would certainly introduce the idea to the Keep Australia Beautiful National Association. Mr. Olesinski also mentioned the possibility of other relevant programmes expanding its activities to other countries in the East Asian Seas region, for example the Australian Clean Marine programme.

INTRODUCTION TO THE DRAFT FRAMEWORK DOCUMENT “REGIONAL ACTION PLAN ON MARINE LITTER FOR THE EAST ASIAN SEAS REGION”

45. Mr. Raaymakers introduced the draft framework document “Regional Action Plan on Marine Litter for the East Asian Seas region” and explained that this document only provided a suggested structure and examples of the potential content of a regional action plan on marine litter. Mr Raaymakers emphasized that fewer actions may result in a more achievable outcome in the first instance. Mr. Raaymakers explained that the detailed content of the regional action plan would be discussed in detail by three breakout groups during the afternoon. The presentation is attached as Annex 19 to this report.

46. The workshop participants were divided into the following three groups:

- Group 1: Objectives, institutional arrangements, funding and sustainability.
- Group 2: Knowledge, awareness and clean-up
- Group 3: Marine litter prevention

FIELD TRIP

47. The Ministry of Environment of Indonesia invited the workshop participants to visit two sites in northern Jakarta in order to showcase some examples of marine litter management in Indonesia. The following sites were visited:

- Waste reception facilities in Tanjung Priok Port; hosted by Indonesia Port Corporation II, Branch of Jakarta
- Household waste management in Warakas Subdistrict, North Jakarta; hosted by Unilever and Keluهران (Village) Warakas.

PRESENTATION OF OUTCOMES FROM THE BREAK-OUT SESSIONS

Group 1: Objectives, institutional arrangements, funding and sustainability

48. Ms. Zulhasni, Ministry of Environment of Indonesia, was invited to present the outcomes from Group 1’s discussions, attached as Annex 20 to this report.

49. Group 1 had discussed chapters 2, 3 and 6 of the draft framework document for a Regional Action Plan on Marine Litter (RAP-MALI). Group 1 had suggested the name “COBSEA Regional Action Plan on Marine Litter (RAP-MALI)” instead of the proposed “RAP-MALI for the Seas of East Asia”. The risk of narrowing the potential for partnerships with a name implicating such COBSEA ownership was discussed. However, in order to follow the example of the NOWPAP RAP-MALI and to increase COBSEA’s ownership of the action plan the workshop participants decided on the name “COBSEA RAP-MALI”. It was also decided that the need of regional collaboration and partnership would be emphasized in the goal of the action plan.

50. The representative from Australia informed that Australia would not be able to comment on any institutional arrangements at this point since no time had been available for national consultations on the draft framework RAP-MALI prior to the workshop.

Group 2: Knowledge, awareness and clean-up

51. Ms. Maricris T. Laciste from the Department of Environmental and Natural Resources, the Philippines was invited to present the outcomes of Group 2's discussions, attached as Annex 21 to this report.

52. Group 2 had discussed sub-chapters 4.1, 4.2, 4.4 and 4.5 of the draft framework document for a RAP-MALI. After some discussion regarding Group 2's proposed re-organization of Chapter 4, the workshop participants agreed that the sub-chapter 4.4: "Marine litter removal and cleanup" was important and should remain as a separate sub-chapter in the COBSEA RAP-MALI. It was agreed that the proposed removal of sub-chapter 4.4 would be disregarded. There was also some discussion regarding the Group 2's suggestion to include good practise examples in the COBSEA RAP-MALI. It was agreed that short references could be made to such examples, but that such information would be more appropriately included in the regional review document.

Group 3: Marine litter prevention

53. Mr. Hashim bin Daud from the Ministry of Natural Resources and Environment of Malaysia was invited to present the outcomes of Group 3's discussions, attached as Annex 22 to this report.

54. Group 3 had discussed sub-chapter 4.3 of the draft framework document for a RAP-MALI. After some discussion regarding the proposed regional perspective of the RAP-MALI, the workshop participants emphasized the importance of national implementation of the proposed actions in order to ensure a sustainable action plan. It was recommended that only a realistic amount of responsibility would be put on the COBSEA Secretariat considering its limited funding and staffing. It was further emphasized that the COBSEA Secretariat can only initiate activities, while actual implementation at national level is the responsibility of the COBSEA member countries.

55. There was also some discussion regarding Group 3's suggestions on the section on sea-based sources of marine litter and the relevance to conduct a regional review of port waste reception facilities. The workshop participants agreed that Group 3's proposal to remove the review would be disregarded considering the importance of port reception facilities in order to minimize marine litter originating from sea-based sources.

WRAP-UP AND CLOSURE OF WORKSHOP

56. The workshop participants agreed on the following process for finalizing the COBSEA Regional Action Plan on Marine Litter:

- The COBSEA regional consultant on marine litter would consolidate the outcomes and recommendations from the break-out discussions in a second draft COBSEA RAP-MALI;
- The workshop participants would be given two weeks to provide their input to the draft regional review on marine litter;
- The second draft COBSEA RAP-MALI would be circulated to the COBSEA member countries together with the report from the First COBSEA Marine Litter Workshop and the finalized regional review on marine litter;
- The COBSEA National Focal Points (NFPs) would be given one month to provide their comments on the second draft COBSEA RAP-MALI.
- The COBSEA Secretariat would incorporate the comments made by the COBSEA member countries into a third draft COBSEA RAP-MALI.
- The third draft COBSEA RAP-MALI would be tabled to the COBSEA member countries at the 19th Meeting of COBSEA or, if deemed necessary, presented to a second technical marine litter workshop in connection to the 19th Meeting of COBSEA.

57. In addition, Dr. Jarayabhand proposed that Thailand would be a suitable location for a planned "Experts Meeting" for the development of global monitoring guidelines on marine litter. She proposed that COBSEA would assist UNEP Regional Seas in organizing this meeting, provided there would be no financial implications for COBSEA. Dr. Adler expressed his appreciation for this offer. It was agreed that COBSEA would host the meeting.

58. Dr. Jarayabhand thanked all the workshop participants for their important inputs to the discussions, the Regional Seas for its support to the COBSEA marine litter activity, the COBSEA member countries and the regional consultant for making this workshop possible and the Ministry of Environment of Indonesia for their excellent support and assistance in organizing this First COBSEA Marine Litter Workshop.

59. Dr. Jarayabhand declared the workshop closed

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ANNEX 2

THE PROGRAMME OF WORK

Day 1	Tuesday 8th of May 2007
8.00-8.30	Registration
8.30-8.40	Opening Statement Mr. Rachmat Witoelar, the Minister of Environment, the Republic of Indonesia
8.40-8.45	Introduction of the Workshop Participants
	<i>Presentations</i>
8.45-9.10	“UNEP’s Global Initiative on Marine Litter” Mr. Ellik Adler, UNEP Regional Seas Programme
9.10-9.20	“Introduction to the Marine Litter initiative in the East Asian Seas region” Dr. Srisuda Jarayabhand, UNEP EAS/RCU
9.20-9.40	“Draft review document on Marine Litter in the East Asian Seas region” Mr. Steve Raaymakers, EcoStrategic Consultants
9.40-10.00	“Marine Litter: Australian responses to a national and regional problem” Dr. Ilse Kiessling, Department of the Environment and Water Resources, Australia
10.00-10.10	“Marine Litter in Cambodia” Mr. Koch Savath, Ministry of Environment, Cambodia
10.10-10.30	Coffee break
10.30-10.40	“Marine Litter in China” Mr. Huang Zhengguang, South China Institute of Environmental Sciences (SCIENS), People’s Republic of China
10.40-10.50	“Marine Litter in Indonesia” Ms. Wahyu Indraningsih, Ministry of Environment, Indonesia
10.50-11.00	“Marine Litter Management in Malaysia” Mr. Hashim bin Daud, Ministry of Natural Resources and Environment, Malaysia
11.00-11.10	"National Implementation of the Korean Policy on Marine Litter Issue" Dr. Rho-Taek Jung, Maritime and Ocean Engineering Research Institution (MOERI), R.O. Korea
11.10-11.20	Country presentation – Ms. Maricris T. Laciste, Environmental Management Bureau, the Philippines
11.20-11.30	“Thailand’s Experiences of Marine Litter Management” Dr. Pinsak Suraswadi, Department of Marine and Coastal Resources, Thailand

11.30-11.40	“Vietnam National Survey on Marine Litter” Mr. Le Dai Thang, Vietnam Environment Protection Agency (VEPA), Vietnam
11.40-12.00	Discussion
12.00-13.00	Lunch break
13.00-13.20	“NOWPAP Marine Litter Activity” Dr. Jeung Sook Park, NorthWest Pacific Action Plan (NOWPAP) Regional Coordinating Unit; and Dr. Takafumi Yoshida, NOWPAP Special Monitoring and Coastal Environmental Assessment Regional Activity Centre (CEARAC)
13.20-13.40	“Sustainable Seas – Reducing Marine Litter through a Clean Ports Award Program. Lessons from Down Under – The Experience of Australian Award-based Litter Reduction Programs” Mr. Richard Olesinski, Keep Australia Beautiful National Association
13.40-14.00	Discussion
	<i>Recommendations on the draft Framework Document “Regional Action Plan on Marine Litter for the East Asian Seas region”</i>
14.00-14.15	Presentation of the draft framework document “Regional Action Plan on Marine Litter for the East Asian Seas region” Mr. Steve Raaymakers, EcoStrategic Consultants
14.15-14.30	Instruction for break-out discussion
14.30-14.50	Coffee break
15.00-17.00	Break out discussion
Day 2	Wednesday 9th of May 2007
8.00-13.00	Field trip: Solid waste management in Cakung, North Jakarta; and Local Community Participation on Household Waste Management in Warakas sub-district, North Jakarta (Lunch will be arranged on the way back to the workshop venue)
13.00-14.00	Presentation of the outcomes from break-out discussions
14.00-14.40	Discussion
14.40-15.00	Coffee break
15.00-16.30	Desk-top scenario exercise Facilitator: Mr. Steve Raaymakers, EcoStrategic Consultants
16.30-17.00	Wrap-up and closure of workshop

ANNEX 3

Regional Review: Marine Litter in the Seas of East Asia

Steve Raaymakers
EcoStrategic Consultants
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NOTE

This Draft 2 of the Regional Review is provided to participants at the 1st COBSEA Regional Workshop on Marine Litter in Jakarta 8-9 May 2007 as supporting background material and for review and comment

Workshop participants are invited to provide the Regional Consultant with any comments, corrections and additional information for inclusion in the final document - which will be produced after the workshop

Acknowledgements

This review was funded by the United Nations Environment Programme (UNEP) Regional Seas Programme (RSP) and managed by the UNEP East Asian Seas Regional Coordinating Unit (EAS/RCU), which acts as the Secretariat for the Coordinating Body for the Seas of East Asia (COBSEA). The efforts of Elik Adler, the Coordinator of the UNEP RSP, and of Srisuda Jarayabhand and Birgitta Liss of the EAS/RCU, in facilitating this review, are gratefully acknowledged.

The review was undertaken by Steve Raaymakers of EcoStrategic Consultants, supported by National Consultants (NCs) in each COBSEA member country as follows.

Australia:	Ilse Kiessling
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China:	Huang Zhengguang
Indonesia:	Nat Budiawan
Malaysia:	Nizam Basiron
Philippines:	Ella Deocadiz
Singapore:	No input received
South Korea:	Won-Tae Shin
Thailand:	Sakanan Plathong
Vietnam:	Le Dai Thang

LIST OF ACRONYMS USED

APEC	Asia Pacific Economic Cooperation
APFIC	Asia Pacific Fisheries Commission
ASEAN	Association of South East Asian Nations
CCAMLR	Convention for the Conservation of Antarctic Marine Living Resources
COBSEA	Coordinating Body for the Seas of East Asia
CUTW	Clean Up the World
DPRK	Democratic Peoples' Republic of Korea (North Korea)
DTIE	Division of Technology, Industry and Economics (of UNEP)
EAS/RCU	East Asian Seas Regional Coordinating Unit (of UNEP)
FAO	Food and Agriculture Organization (of the UN)
GEF	Global Environment Facility
GIS	Geographic Information System
GPA	Global Programme of Action on the Protection of the Marine Environment from Land-based Activities (of UNEP)
ICC	International Coastal Cleanup
IGR	Inter-Governmental Review (of GPA)
IMO	International Maritime Organization (of the UN)
IOC	Inter-Governmental Oceanographic Commission (of UNESCO)
IUU	Illegal, Unregulated and Unreported (fishing)
JICA	Japan International Cooperation Agency
KAB	Keep Australia Beautiful
LAFG	Lost and Abandoned Fishing Gear
LME	Large Marine Ecosystem
MARPOL	International Convention for the Prevention of Pollution from Ships
MRC	Marine Resources Conservation working group (of APEC)
NSWMC	National Solid Waste Management Commission (of the Philippines)
NC	National Consultant
NGO	Non Governmental Organization
NOAA	National Oceanic and Atmospheric Administration (of the USA)
NOWPAP	North West Pacific Action Plan
NPA	National Plan of Action (of GPA)
PADI	Professional Association of Diving Instructors
PEMSEA	GEF/UNDP/IMO Regional Programme on Partnerships for Environmental Management in the Seas of East Asia
PRC	Peoples' Republic of Korea
RAP	Regional Action Plan
RCU	Regional Coordinating Unit (of PEMSEA)
ROK	Republic of Korea (South Korea)
RSO	Regional Seas Organization
RSP	Regional Seas Programme (of UNEP)
SDS-SEA	Sustainable Development Strategy for the Seas of East Asia
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICPLOS	United Nations Informal Consultative Process on the Law of the Sea
USA	United States of America
WSSD	World Summit on Sustainable Development

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Figure 2: Shipping densities as represented by real ship position reports and major ports in East Asia

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Figure 5: Surface winds in the Pacific

Figure 6: Monitoring sites under the South Korean National Marine Debris Monitoring Program

Table 1: Summary of existing knowledge and data on marine litter in each COBSEA member country, as reported in National Survey responses

Table 2: National-level programmes and initiatives to address marine litter in the COBSEA member countries, as reported in National Survey responses

Table 3: National-level barriers, gaps and needs in relation to marine litter in the COBSEA member countries, as reported in National Survey responses

1. INTRODUCTION AND BACKGROUND

1.1. *The Issue*

Marine litter, also known as marine debris and marine garbage, is one of the major threats to the World's oceans. Marine litter enters the seas from both land-based sources and from ships and other vessels at sea, and comprises a wide range of materials, including persistent plastics and a variety of other problematic pollutants.

Marine litter causes a wide range of ecological, environmental and socio-economic impacts, including ingestion by and entanglement of marine life, fouling of coastlines and interference with navigation. There have been cases of major shipping accidents, resulting in loss of human life, from the entanglement of vessel propellers and rudders in marine debris. Johnson (2000) reports that in 1992, Japan estimated that its fishing industry spent **US\$4.1 billion** in vessel repairs for damage caused by marine debris. Serious public health issues are also associated with hazardous materials, medical wastes, syringes, glass and other sharp and/or dangerous debris washed-up on beaches.

Global data on marine litter continues to show increasing levels of garbage washing up on coastlines and accumulating at sea. In 1997, the U.S. Academy of Sciences estimated the total input of marine litter into the oceans, worldwide, at approximately 6.4 million tonnes per year, nearly 5.6 million tonnes of which was estimated to come from merchant shipping. It is estimated that there is over 46,000 pieces of plastic floating on every square mile of ocean today. It has been suggested by some researchers that an estimated three times more garbage (much of it plastic), is being thrown into the ocean each year than the amount of fish taken out (www.gpa.unep.org).

Of particular concern are mass concentrations of marine debris in high seas 'sink' areas, such as the equatorial convergence zone. In some such areas, 'rafts' of assorted debris, including various plastics, ropes, fishing nets, cargo-associated wastes such as dunnage, pallets, wires and plastic covers; drums and shipping containers along with accumulated slicks of various oils, often extend for many kilometres. Marine litter is also a compounding factor in the dispersal of invasive alien species across the oceans.

Marine litter is also found on the seabed. It could be that as much as 70 per cent of the entire input of marine litter sinks to the bottom and is found on the seabed, both in shallow coastal areas and in much deeper parts of the oceans (www.gpa.unep.org).

A serious element in the broader issue of marine litter is the problem of Lost and Abandoned Fishing Gear (LAFG). Raaymakers (2007) reports that LAFG, including nets, lines, traps and floats, that are either accidentally lost or intentionally abandoned by fishing vessels at sea (or by fishers working from the shore), is increasingly becoming a major world-wide marine pollution concern. The impacts of LAFG are similar to those of marine litter in general and include:

- navigational hazards and threats to human life and property when vessels entangle LAFG;
- 'ghost-fishing' when LAFG continues to function as designed, catching target commercial species without economic benefit but with economic (and ecological) loss;
- the entanglement of non-target species, including sea-turtles, marine mammals and sea-birds, many of which may be of conservation concern and/or legally protected species;
- the accumulation of communities of fouling organisms on LAFG that then acts as an

agent for the introduction of foreign species to new areas;

- beaching of LAFG which can cause amenity impacts, preventing or hampering use of beaches and foreshores for tourism, recreation and other uses; and
- economic impacts - including from the four other impact types listed above, and from the response to these impacts – which can be costly (e.g. emergency response to entangled vessels, LAFG recovery and clean-up campaigns, scientific research and monitoring).

1.2 The Seas of East Asia

The East Asian region (Figure 1) embraces the most populous region in the world. It is home to almost 1.8 billion people, 60% of whom are concentrated in coastal areas. In the past decade, the region has been the centre of considerable economic growth, bringing about increasing urbanization. Around 300 million people in the region are now living in coastal urban areas (PEMSEA 2002).



Figure 1: East Asia showing the COBSEA member countries
(non-COBSEA members Brunei, Japan and North Korea are not labelled)

The region embraces five large marine ecosystems (LMEs) or sub regional seas (the Yellow Sea, South China Sea, East China Sea, Sulu-Celebes Sea and the Indonesia Seas). It includes two archipelagic countries (Indonesia and Philippines) and contains the greatest number of islands of all the regions in the world (PEMSEA 2002).

Around 30% of the world's coral reefs, one-third of the world's mangroves as well as many other important critical habitats are found in the region. The region comprises the world's richest marine biodiversity and produces about 41% of the total fish catch of the world (PEMSEA 2002).

The region also has one of the World's highest concentrations of shipping and fishing vessel activity (Figure 2), and with a high rate of ongoing economic development, most major industrial ports in the

region are undergoing significant expansion, and many new ports are being developed.

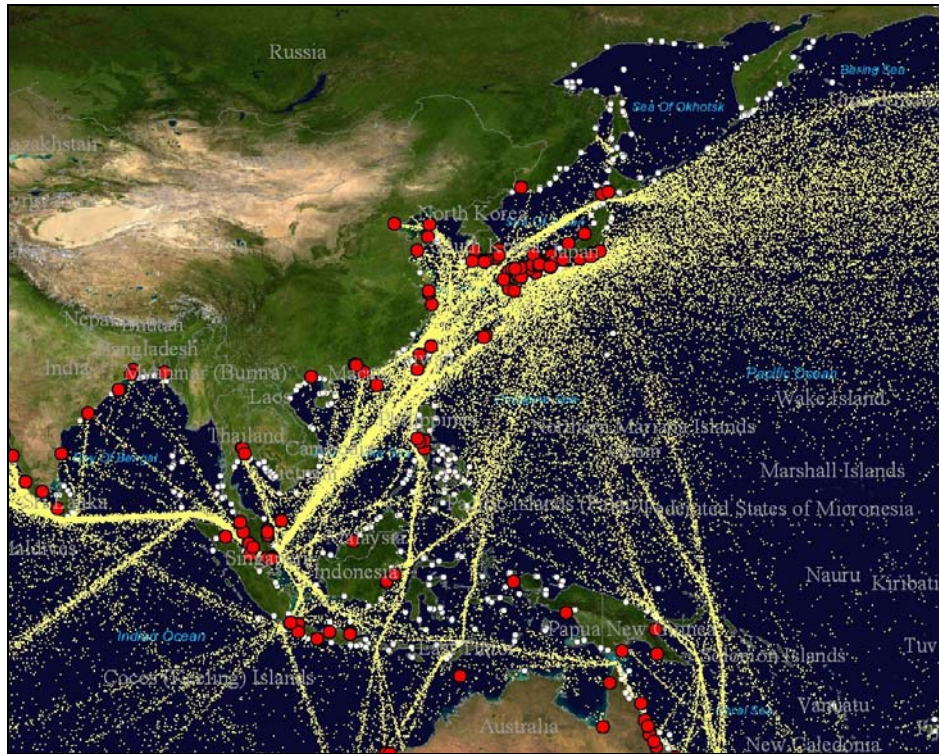


Figure 2: Shipping densities as represented by real ship position reports and major ports (red dots) in East Asia

While many countries in the region are party to various international environmental and marine-related Conventions and other legal instruments, like most parts of the World national implementation of such is poor, due to a number of factors including capacity and cultural barriers.

These factors combined with others dictate that the marine litter situation in the East Asian Seas is as severe as, if not worse than any part of the World. The massive industrial and urban development under-way in the coastal zones of the region, combined with an exponential and sustained growth in shipping activity serving their rapidly expanding economies, and the current lack of effective marine litter prevention and control measures in many East Asian countries, make marine litter a major marine pollution problem in the Seas of East Asia.

1.3 The Response

The widespread nature of marine litter, its transboundary nature, and the difficulties in identifying marine litter sources have made effective laws and regulatory systems difficult to draft and even harder to enforce.

The International Maritime Organization (IMO) has acted to try and address pollution from ship-based sources, through the *International Convention for the Prevention of Pollution from Ships* (MARPOL 73/78). Annex V of MARPOL deals specifically with the disposal of garbage from vessels, and includes a total ban on the disposal of plastics from vessels anywhere in the World's seas and oceans. It also places a legal requirement on port States to provide adequate facilities in ports to receive garbage from vessels.

The United Nations Environment Programme (UNEP) - *Global Programme of Action for the Protection of the Marine Environment from Land-based Activities* (GPA), inter alia aims to reduce the amount of litter reaching the marine environment by prevention or reduction of the generation of solid waste, and to establish environmentally sound facilities for receiving, collecting, handling and disposing of litter. The Basel Convention also addresses this issue, inter-alia, through programmes on plastic waste.

However, control and reduction of marine litter has not been covered by any single global convention, initiative or programme, and the increasing severity of the problem indicates that the various existing but un-coordinated initiatives, are not currently effective.

In response to increasing concerns about the marine litter problem, in 2005 the 6th meeting of the *United Nations Open-ended Informal Consultative Process on Oceans and Law of the Sea* (UNICPLOS) was requested by the UN General Assembly to discuss, amongst other issues, the problem of marine litter. Draft General Assembly Resolutions were prepared and later adopted by the General Assembly on 29 November 2005 as Resolution A/60/L.22 - Oceans and the Law of the Sea - as follows:

“...*The General Assembly,*

65. *Notes* the lack of information and data on marine debris and encourages relevant national and international organizations to undertake further studies on the extent and nature of the problem, also encourages States to develop partnerships with industry and civil society to raise awareness of the extent of the impact of marine debris on the health and productivity of the marine environment and consequent economic loss;
66. *Urges* States to integrate the issue of marine debris within national strategies dealing with waste management in the coastal zone, ports and maritime industries, including recycling, reuse, reduction and disposal, and to encourage the development of appropriate economic incentives to address this issue, including the development of cost recovery systems that provide an incentive to use port reception facilities and discourage ships from discharging marine debris at sea, and encourages States to cooperate regionally and sub-regionally to develop and implement joint prevention and recovery programmes for marine debris;
67. *Invites* the International Maritime Organization, in consultation with relevant organizations and bodies, to review Annex V to the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto, and to assess its effectiveness in addressing sea-based sources of marine debris;
68. *Welcomes* the continued work of the International Maritime Organization relating to port waste reception facilities, and notes the work done to identify problem areas and develop an action plan addressing the inadequacy of such facilities;
69. *Calls upon* States to take all appropriate measures to control, reduce and minimize, to the fullest extent possible, marine pollution from land-based sources as part of their national sustainable development strategies and programmes, in an integrated and inclusive manner, and to advance the implementation of the Global programme of Action for the Protection of the Marine Environment from Land-based Activities and the Montreal Declaration on the Protection of the Marine Environment from Land-based activities; [and]
70. *Welcomes* the convening of the Second Intergovernmental Review Meeting of the Global Programme of Action in Beijing from 16 to 20 October 2006 as an opportunity to discuss marine debris in relation to the source categories of the Global Programme of Action, and urges broad high-level participation.”

This resolution by the UN General Assembly serves to bring the issue of marine litter to the centre of

global attention and concern.

In a related move, UNEP commenced a global initiative on marine litter several years ago, called the *Marine Litter Partnership*, and this was presented at the 2nd Intergovernmental Review Meeting (IGR II) of the UNEP-GPA held in Beijing, China, 16th October 2006. Under this initiative UNEP is working with a number of UN Organizations (IMO, FAO, IOC, Basel Convention, UNEP-DTIE, UNEP-GPA, UNEP -Regional Seas); non UN organizations; individual Regional Seas Conventions, Secretariats and Organizations; national Governments and NGOs.

One of the main activities of this initiative is the provision of financial support by UNEP to several Regional Seas Organizations (RSOs) to develop *Regional Strategies and Action Plans on Marine Litter*. These regions are the Black Sea, Caspian Sea, East Africa, East Asian Seas, Mediterranean Sea, North-West Pacific, Red Sea and Gulf of Aden, South Asian Seas; South East Pacific and the Wider Caribbean. The development of these regional strategies and action plans is now well under way in all of these regions, and **this review** is part of this initiative for the East Asian Seas.

This review has been developed by Steve Raaymakers of EcoStrategic Consultants, on contract to UNEP through the UNEP East Asian Seas Regional Coordinating Unit (EAS/RCU). It covers the following 10 countries, which are members of the Coordinating Body of the Seas of East Asia (COBSEA):

- Australia
- Cambodia
- China (PRC)
- Indonesia
- Malaysia
- Philippines
- Singapore
- South Korea (ROK)
- Thailand
- Vietnam

The consultancy includes the following elements:

1. Development, distribution, collection and analysis of a *National Survey* sent to all COBSEA member countries.
2. Preparation of a *Regional Review of Marine Litter in the Seas of East Asia (this document)*, based on the National Survey returns.
3. Preparation of a draft *Regional Action Plan on Marine Litter for the Seas of East Asia*.
4. Consideration and further development of this Review Document and the Draft Regional Action Plan at a *Regional Workshop*.
5. Finalisation of the *Regional Action Plan on Marine Litter for the Seas of East Asia*.

2. OBJECTIVES OF THE REGIONAL REVIEW

The objectives of this review are to establish the current state-of-play, in the Seas of East Asia, at both the regional and national levels, with regard to:

- Existing knowledge and data on the marine litter problem
- Existing instruments, programmes and initiatives on marine litter
- Existing gaps and needs in relation to the prevention, control and management of marine litter

and to make recommendations and proposals for change.

3. REVIEW METHODS

As required by the consultancy Terms of Reference issued by UNEP, this review was undertaken as a desk-top literature study only.

The Regional Consultant (the consultant) prepared a standard National Survey which was distributed to National Consultants (NCs) in the 10 COBSEA member countries in September 2006, for completion and return to the consultant by 20 October 2006. Responses were received from all ten countries except Singapore, and the last National Survey response was received by the consultant on 26 April 2007.

This represents a survey return rate of more than 90% - an extremely positive result for such surveys. The use of appointed NCs to coordinate survey responses would have been a major factor in this extremely high success rate.

Despite the extremely high rate of survey returns, it should be noted that budgetary constraints on each country to undertake this task were extremely tight (a tiny US\$500 per country from UNEP), and time was also limited. National Survey responses should therefore not be considered as being fully comprehensive. Responses of 'no data or information' to some survey questions may not necessarily be correct.

The consultant also sought information from other relevant bodies and through his own professional network of contacts in various national governments, marine science institutions and international environmental Non Government Organizations (NGOs).

The consultant also undertook an international literature search and obtained all relevant publications that were identified. A full list of references collected is provided under References.

Overall a significant amount of information was collected, which increased the amount of time required for the document review component of the consultancy. Each reference collected was reviewed systematically against the sections that make up the structure of this report, and the information gleaned from this process was used to develop the report.

4. REVIEW FINDINGS

4.1 Existing knowledge and data on marine litter

At the global level, scientific data and information on the problem of marine litter is highly geographically patchy, however, there are many studies that show alarming quantities of debris accumulating in ocean convergence zones and washing ashore to impact on coastal resources. Relatively good data is available from a few concentrated geographical areas where intensive studies have been conducted, such as near the Hawaiian Islands, the seas of North East Asia and the North

Pacific generally. Some limited studies are available from other areas such as around Australia and in European seas, and many other regions have very little to absolutely no data on the marine litter issue at all (e.g. seas around Africa, South Asia and South America).

Perhaps the best data available is on marine litter that washes ashore. Globally, an extremely large number of countries have coastal clean-up and monitoring programs. Some of these are nationally coordinated, government-led initiatives such as in Japan (Uchida 2006) and Korea (Cho 2006), and others are focussed on specific areas and run by NGOs and/or community groups, such as the WWF/Aboriginal community marine debris programme in Northern Australia (Kiesling 2003) and the *Save the North Sea* project initiated by NGOs in Sweden and now active in all North Sea States (www.savethenorthsea.com). Others are undertaken under the auspices of international Conventions and multi-lateral organizations, such as the beached-debris monitoring undertaken in Antarctica under the *Convention for the Conservation of Antarctic Marine Living Resources* (CCAMLR) (refer section 4.1 and www.ccamlr.org/pu/e/sc/deb/intro.htm).

Perhaps the most well established programme covering the largest number of sites globally is the community-implemented *International Coastal Cleanup* (ICC) run by the US-based Ocean Conservancy, which on one day each year mobilizes thousands of volunteers in over 70 countries world-wide to undertake coastal clean ups, and record and submit data using standard formats. During the 2005 ICC, 450,000 volunteers removed 8.2 million pounds of debris from 18,000 miles of coasts, spanning 74 different nations around the World (ICC).

The situation relating to existing knowledge and data on marine litter in East Asia, both at the regional and national levels, is summarised below.

4.1.1 Ocean circulation, movement and accumulation of Marine Litter

Brainard et al (2000) report that marine debris found accumulating on many coastlines of the world often does not originate from local sources, but from sources further a-field, often even across the other side of a vast ocean. In developing actions and measures to address marine litter, it is important for scientists, regulators and industry to have an understanding of ocean circulation patterns. General charts of broad-scale ocean circulation patterns can be obtained from general navigation and oceanographic texts (e.g. Figure 3).

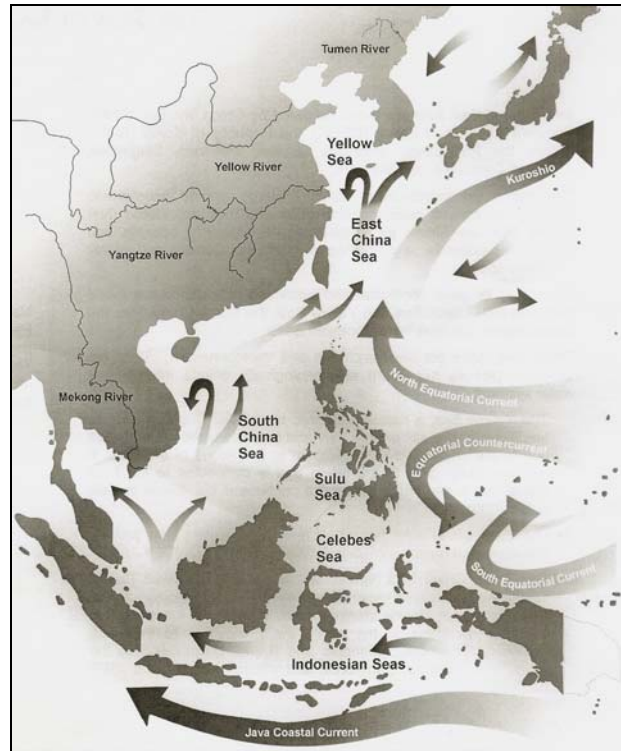


Figure 3: The major currents of the East Asian Seas

Over the long term the mean of these generic patterns are probably indicative. However, over shorter time periods and at larger scales, which are of more relevance to the assessment and management of marine litter, the real situation is far more complex, highly variable and seasonally dynamic. In reality, marine litter will not follow generic, mean ocean circulation patterns, but will be driven by rather more complex patterns resulting from a combination of wind-driven currents, wave-driven currents and thermohaline or density-driven currents (Brainard et al 2000).

In recent years significant advances have been made in the mapping and modelling of complex ocean circulation patterns, at various scales, and incorporating the different elements that drive these patterns. The outputs of such models are often presented as colour-rich graphics and animations, based on satellite imagery and remote sensing, that can greatly assist scientists and managers in interpreting the results. Today an array of satellite sensors can be used by oceanographers to measure various aspects of the world's oceans, including for parameters such as surface winds (e.g. QuickSCAT), sea surface height and computed geostrophic currents (e.g. TOPEX/Poseidon), sea surface temperature (e.g. GOERS) and chlorophyll as indicated by ocean colour (e.g. SeaWiFS). When combined with numerical modelling, supported by in-field oceanographic data collection and physical tracking to verify the models, these systems provide very powerful tools to assist in the assessment and management of marine litter. Two examples from the Pacific, adjacent to East Asia, are presented in Figures 4 and 5.

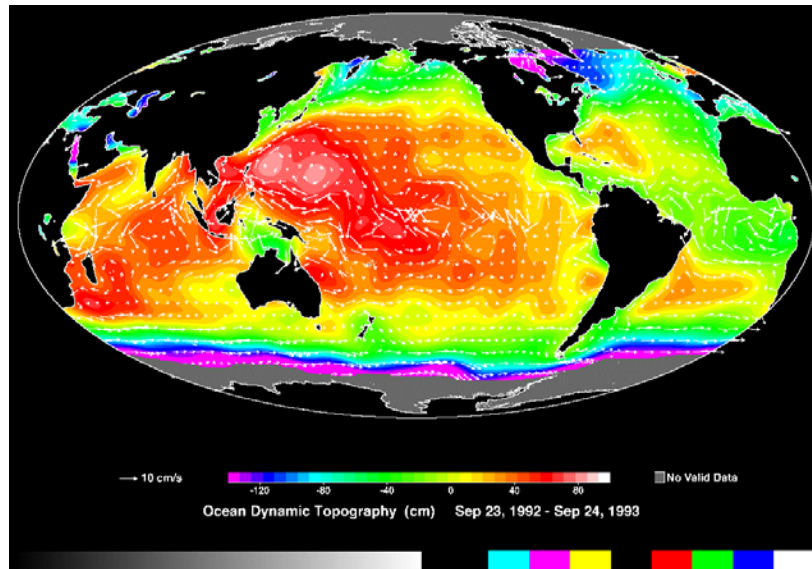


Figure 4: Ocean topography from TOPEX/Poseidon mission. Provides a global view of ocean topography (with tides and waves smoothed out). Ocean currents are calculated from the topography. [This map](#) uses colour to show ocean topography and arrows to show the speed and direction of ocean currents (source: TOPEX/Poseidon)

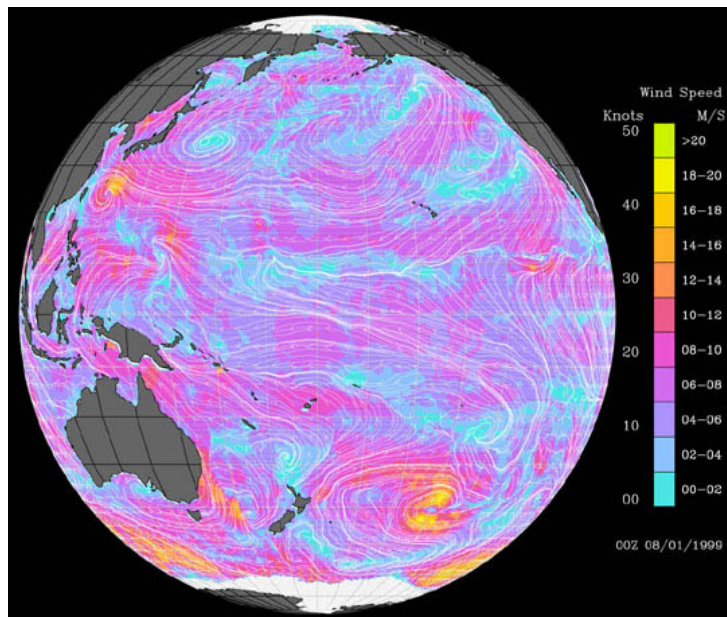


Figure 5: Surface winds in the Pacific - important drivers of ocean currents and marine litter (source: QuickSCAT)

There are many examples where oceanographic tracking and modelling have been used in the assessment and management of marine litter. For example Kubota (1994) tracked virtual marine debris in the North Pacific using a simple numerical model over five years, which indicated the accumulation of debris from the whole north Pacific in the northern Hawaiian Islands. The results of this predictive modelling have been verified by real-life sightings in this area, including the current NOAA Marine Debris Programme - which is undertaking significant work in collaboration with many others to address LAFG in the Northern Hawaiian Islands, including further use of ocean circulation models (Donohue 2004).

Work by various parties has shown that (logically) marine litter tends to accumulate (and often reside for extended periods of time) in ocean convergence zones, and move away from ocean divergence zones. Mass concentrations of marine debris in high seas 'sink' areas, such as the equatorial convergence zone, are of particular concern. In some such areas, 'rafts' of assorted debris, including various plastics, ropes, fishing nets, cargo-associated wastes such as dunnage, pallets, wires and plastic covers; drums and shipping containers along with accumulated slicks of various oils, often extend for many kilometres (pers. obs. 1989, 1998 & 2000). Such zones have been modelled and mapped by various researchers and the results of such work are vital to improving the monitoring and management of marine litter.

In order to be effective in addressing marine litter, oceanographic models need to be developed and applied at much larger scales than the global examples depicted in the figures above, including at the regional, national and local scales. It is well beyond the scope of this desk-top review to provide detailed information on ocean-circulation patterns and existing maps and models for the East Asian Seas. It is recommended that any regional strategy and action plan to address marine litter that is developed by UNEP / COBSEA and their partners should include a component to develop and run marine litter trajectory models for each sub-regional sea in East Asia.

4.1.2 Regional knowledge and data

In undertaking this review, the Consultant has not been able to identify any data or references on the sources, causes, quantities and distribution of marine litter at the regional level in the Seas of East Asia. As stated above, relatively good data is available for only two countries within the region - South Korea (a COBSEA member) and Japan (a non - COBSEA member). In Australia some data is available from various uncoordinated survey and monitoring efforts, undertaken at various geographical scales by different parties. These are reviewed in Appendix 1.

As a component of the broader marine litter problem, LAFG is likely to be major concern in East Asia, due to extremely large size of the fishing industry and lack of effective regulation of the industry in the region, including an extremely high level of Illegal, Unregulated and Unreported (IUU) fishing in the region.

The ICC collects potentially useful data (on beached marine debris generally), but this is not yet organized into a database which allows identification of hot spots, trends over time and other parameters that managers would find useful. In 2006 the ICC included eight of the 10 COBSEA member countries, as follows:

- Australia
- Indonesia
- Malaysia
- Philippines
- Singapore
- South Korea (ROK)
- Thailand
- Vietnam

The COBSEA member countries Cambodia and China have not been involved in the ICC to date, although China is planning to join in 2007. Within the region the ICC was also active in 2006 in Hong Kong (China), Japan and Taiwan (which are not members of COBSEA). The 2006 ICC Coordinators for East Asian countries are listed in Appendix 2.

Presentation of ICC data does not give a clear picture per country nor of trends over time. It should also be noted that the ICC is primarily a community clean-up activity, with data collection being a

different parties, providing a reasonable but still patchy picture of the marine litter situation in that country. In most of the other countries, the ICC provides some limited data on the current situation at the restricted number of sites where ICC activities are conducted on one day each year. Cambodia has not participated in the ICC to date, and China is joining in 2007. In Thailand some data is derived from targeted clean-ups at high profile tourist areas and dive sites. In Jakarta Bay, Indonesia, island surveys repeated since the 1980's show significant increases in marine litter over time (Willoughby, 1986a, 1986b), (Willoughby et al, 1997), (Uneputtu & Evans 1997). Overall, the current state of knowledge about the extent of the marine litter problem is extremely poor in the East Asian region, and significant further work is required to address this major gap.

Table 1: Summary of existing knowledge and data on marine litter in each COBSEA member country, as reported in the section 2 of National Survey responses

	<i>Australia</i>	<i>Cambodia</i>	<i>P.R China</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>R.O. Korea</i>	<i>Thailand</i>	<i>Vietnam</i>
Existing surveys and monitoring:	Ad-hoc in disparate locales at different scales by various parties using different methods. ICC	None reported	No program to date. Will join ICC 2007	Repeat surveys in Jakarta Bay - significant 20 yr increases. ICC	ICC	ICC	National Marine Debris Monitoring Program in place since 1999. ICC	Regular clean-ups at resort areas and dive sites. ICC	ICC
Source differentiation :	Surveys near cities indicate up to 80% from land-based sources. In remote areas most from sea-based sources	Not identified	Not identified	Not identified	Not identified	1997 JICA study indicates 15% of daily solid waste production in Manila disposed to water-bodies	Land-based sources appear to be the major contributor, although sea-based sources high relative to other countries	Not identified	Not identified
Accumulation zones:	No national survey to date but ad-hoc studies indicate accumulations at urban centres and certain remote coasts	Not identified	Not identified	Not identified	Not identified	Not identified	Not identified	Not identified	Not identified
Ecological and environmental impacts:	A number of studies confirm the range of impacts caused by marine litter, esp. on marine turtles, seabirds and similar wildlife.	No specific data reported	No specific data reported	No specific data reported	No specific data reported	No specific data reported	Measured reductions in fisheries believed to be linked to ghost fishing by LAFG.	LAFG identified as marine litter type causing worst impacts	No specific data reported
Socio-economic impacts:	Australia supporting APEC study with Indonesia and Chile in 2007	No specific studies reported.	No specific studies reported.	Indonesia supporting APEC study with Australia and Chile in 2007	No specific studies reported.	No specific studies reported.	No specific studies reported.	No specific studies. High value tourism industry affected.	No specific studies reported.
Lost and Abandoned Fishing Gear:	Major problem along northern coastline. Special monitoring and clean-up program with Aboriginal communities	No specific work reported	No specific work reported	No specific work reported	Anecdotal reports of LAFG from Fisheries patrol vessels	No specific work reported	High priority issue with unique waste fishing gear 'buy-back' programme.	No specific work reported	No specific work reported

4.2 Existing instruments, programmes and initiatives

4.2.1 Regional instruments, programmes and initiatives

There are currently no regional legal instruments such as multi-lateral treaties addressing marine litter or even marine environmental management generally for the Seas of East Asia. In fact the region is one of the few regional seas in the world where coastal States have not concluded a formal regional seas treaty, convention or other legal instruments.

There have been and are several regional and sub-regional technical cooperation programmes and other initiatives that address various aspects of coastal and marine environmental management and protection in the region, and some of the major initiatives are summarised below.

PEMSEA

Perhaps the most notable regional initiative on coastal and marine environmental management in East Asia to date is the GEF/UNDP/IMO Regional Programme on *Partnerships for Environmental Management of the Seas of East Asia* (PEMSEA – www.pemsea.org).

This initiative commenced in January 1994 as the GEF/UNDP/IMO *Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas*, and ran for five years until December 1998. The programme was coordinated by a Regional Coordination Unit (RCU) in Manila, Philippines, and involved Brunai Darussalam, Cambodia, China (PRC), Indonesia, Malaysia, North Korea (DPRK), Philippines, Singapore, South Korea (ROK), Thailand and Vietnam (all COBSEA members except Brunai Darussalam and DPRK).

The programme provided institutional strengthening and capacity building to these countries to prevent and manage marine pollution and to implement IMO and other international marine pollution Conventions. Demonstration sites were established at several coastal cities in the region, including at Batangas Bay in the Philippines, where measures to reduce and manage marine litter and other forms of marine pollution were implemented.

In 2000 a second phase to the programme was funded by GEF, and renamed PEMSEA. The PEMSEA programme expanded the number of Demonstration Sites and broadened its focus to cover a wider range of integrated coastal zone management issues. Marine litter was never a major focus for PEMSEA, although it is a major issue in the region.

A major achievement of PEMSEA was the adoption by 12 coastal States (the above 11 plus Japan) of the *Putrajaya Declaration of Regional Cooperation for the Sustainable Development of the Seas of East Asia*, at the inaugural East Asian Seas Congress in Putrajaya, Malaysia on 12 December 2003.

The Declaration provides for the cooperative regional implementation of the *World Summit on Sustainable Development* (WSSD) requirements for coasts and oceans in East Asia, through the *Sustainable Development Strategy for the Seas of East Asia* (SDS-SEA), including *inter alia* implementation of IMO Conventions on sea-based sources of marine pollution and the UNEP GPA (*Global Programme of Action for the Protection of the Sea from Land-based Activities*), both of which are important mechanisms for addressing marine litter.

Implementation of the SDS-SEA is now commencing with major GEF, World Bank and other funding, and the PEMSEA office in Manila continues to act as the regional coordinating unit.

The *Putrajaya Declaration* and SDS-SEA identified both land-based and sea-based sources of marine pollution, implicitly including marine litter, as high priority issues for the region, and provide for regionally coordinated actions to address marine pollution.

It is strongly recommended that UNEP EAS/RCU should attempt to coordinate closely with PEMSEA / SDS-SEA in developing and implementing the Regional Strategy and Action Plan in Marine Litter, including ensuring that an appropriate share of SDS-SEA resources and funding are allocated to addressing marine litter, including to support implementation of the Regional Strategy and Action Plan on Marine Litter.

Other GEF Projects

In addition to PEMSEA / SDS-SEA, GEF has also been supporting two sub-regional projects on coastal and marine environmental management in the COBSEA area - for the East China Sea Large Marine Ecosystem (LME) and the South China Sea LME. There are also current GEF proposals for new projects in the Arafura and Timor Seas and the Sulu-Suluwesi Seas, both also within the COBSEA area. In addition, the GEF Yellow Sea LME project is being implemented, which lies within the area covered by the North West Pacific Action Plan (NOWPAP), COBSEA's neighbouring RSO immediately to the north.

None of these sub-regional projects had or have explicit activities to address marine litter - they are working on broader coastal and marine biodiversity and fisheries management issues.

It is strongly recommended that UNEP EAS/RCU should seek to coordinate closely with the activities of these sub-regional GEF projects where practicable, in developing and implementing the Regional Strategy and Action Plan in Marine Litter, including ensuring coordination of marine litter activities through the broader PEMSEA / SDS-SEA framework.

APEC

Asia-Pacific Economic Cooperation (APEC), comprising all of the Pacific-Rim economies, through its Marine Resources Conservation (MRC) working group, has developed a project entitled *Understanding the economic benefits and costs of controlling marine debris in the APEC region*.

The aim of the project is to develop an accurate assessment of the economic benefits and costs of controlling marine debris in the APEC region as a basis for determining relevant incentives and other measures for preventing it and mitigating its impacts.

The project will involve the collation and analysis of existing data on the direct and indirect impacts of debris on communities, governments, and specific industry groups (fishing, shipping and transport, tourism, insurance), and the design of an economic model of the expected (market and non-market) costs of marine debris on selected economic values and industries.

Project recommendations and an outreach program will be developed with the aim of assisting governments, industry and communities to better understand the economic implications of marine debris, and thereby adopt incentives and other measures to limit its incidence as well as effectively target resources to mitigate its impacts.

While the APEC region comprises the entire Pacific Rim, it includes the East Asian Seas countries and the outputs of the study will be of significant benefit to the development and implementation of the Regional Strategy and Action Plan on Marine Litter for the Seas of East Asia.

It is strongly recommended that UNEP EAS/RCU should seek to coordinate closely with APEC in developing and implementing the Regional Strategy and Action Plan in Marine Litter. The APEC initiative is co-sponsored by Australia, Chile and Indonesia. As two of these countries are COBSEA members, such coordination should, at least theoretically, be relatively easy.

The APEC marine litter study was scheduled to commence in January 2007 and end in October 2007.

Adjacent Regions

Immediately to the north of the COBSEA region is the Regional Sea known as the North West Pacific, which is covered by the UNEP North West Pacific Action Plan (NOWPAP). The NOWPAP member countries are China, Japan, the Russian Federation and South Korea, two of which are also members of COBSEA - China and South Korea.

NOWPAP has a highly developed programme on marine litter. In particular, Japan and South Korea are amongst the most advanced countries in the world in addressing marine litter, and have a lot to offer the other East Asian countries. While not a COBSEA member; Japan has strong economic and political ties with East Asia and should be invited to join COBSEA's Regional Strategy and Action Plan on Marine Litter.

In addition to economic, political and technical linkages, the COBSEA and NOWPAP regions are linked oceanographically, and both regions undoubtedly receive marine litter from sources in the other region, including by ocean currents and from vessels from countries in the adjacent region.

Fisheries surveillance statistics from countries like Australia and Indonesia indicate that a major source of marine litter, including LAFG in the COBSEA region, is highly likely to be fishing vessels from countries in the NOWPAP region, including IUU fishing vessels.

Both COBSEA and NOWPAP stand to benefit substantially from working closely together on the development and implementation of their respective regional action plans on marine litter. Recognizing that transboundary problems like marine litter require transboundary solutions, it is strongly recommended that every effort be made by all parties concerned, towards maximum coordination, cooperation and integration of the COBSEA and NOWPAP marine litter activities.

4.2.2 National instruments, programmes & initiatives

Instruments, programmes and initiatives to address marine litter at the national level in the COBSEA Coastal States have been drawn from the National Survey responses and are presented in Table 2.

The COBSEA member country with the most advanced programme to address marine litter is clearly South Korea (ROK), which has had a *National Integrated Management Strategy for Marine Litter* (NIMSML) in place since 1999, funded and managed by the Ministry of Maritime Affairs and Fisheries (MOMAF). This programme is fully comprehensive including, *inter alia* clear designation of a Lead Agency (MOMAF), clear structures and procedures for the involvement of all other relevant government agencies, local governments, NGOs, research institutions, the private sector and the community, a variety of funding mechanisms, a national awareness campaign, nationally coordinated marine litter survey and monitoring programme, linked to physical clean-ups; integration with the broader national solid waste management effort, a concerted technological research and development programme, and a major effort to address the problem of LAFG, including an innovative scheme where fishermen are paid to return waste fishing gear to port.

No other COBSEA member country begins to approach the level of sophistication and national

coordination exhibited by South Korea in addressing marine litter, and it is strongly recommended that the rest of the region should endeavour to learn as much as possible from the South Korean experience.

Overall, in all countries governmental responsibilities for marine litter issues tend to be shared by different government agencies, with environment ministries generally taking the lead for land-based sources and maritime administrations taking responsibility for sea-based sources. Local (e.g. municipal) governments tend to be responsible for general waste management matters in all countries. Of all the countries only Indonesia has a national task force to coordinate marine litter issues amongst the various government agencies - the *National Action on Coastal and Marine Cleanup* (Gerakan Bersih Pantai Laut) - although this is reported to not be functioning very well.

Cambodia has a *National Coastal Steering Committee* and Vietnam has a *National Oil Pollution Response Committee*, which could be used as structures or models for inter-ministerial coordination on marine litter issues as well, and the Philippines has a National Solid Waste Management Commission (NSWMC) and a Multi-Sectoral Task Force on Maritime Development, both of which could be used as national forums for the coordination of marine litter activities.

All countries reported that they do not have national legislation specifically addressing marine litter (except those that have implemented Annex v of MARPOL through national legislation - which addresses vessel-sources specifically). All countries reported that marine litter, especially from land-based sources, is addressed through a variety of environmental and natural resource management laws and regulations.

All countries except Indonesia and Thailand are parties to MARPOL, including Annex V which deals with garbage from vessels. Vietnam is only party to Annexes I and II of MARPOL, not Annex V. The national implementation of MARPOL Annex V in those countries that are party could also do with further development.

All countries except the Philippines report that waste reception facilities are provided in ports - although even in Australia these are absent or inadequate in some ports. All countries except the Philippines report that port waste reception facilities are provided on a fee for service basis. Such an approach can be a barrier to the use of such facilities - as vessel operators do not wish to pay such fees, and instead opt to dispose of garbage at sea - at no cost.

An alternative model that has been shown to be effective, including at some ports in Australia - is a "no special fee" approach. This requires that all vessels using a port pay a standard environmental fee, which is used to fund the provision and operation of waste reception facilities, regardless of whether or not the vessels use the reception facilities. The result is that vessels are then more likely to use the facilities - as they are paying for them anyway, and make no cost savings by dumping illegally at sea.

All countries except Thailand and Vietnam reported being signatories to the UNEP - GPA and having developed National Plans of Action (NPAs) for land-based sources of marine pollution - including marine litter. Actual implementation of GPA NPA activities appears to be very low in all countries.

All countries reported being parties to the Basel Convention and having national legislation of procedures to implement the Convention.

All countries except Cambodia and China reported having active NGO involvement in marine litter activities, particularly coastal cleanups and surveys at the local level. All countries except Australia, China and Cambodia are involved in the ICC and all countries except China and Cambodia are involved in Clean Up The World (CUTW) and PADI Project AWARE.

Most countries reported that they do not have economic instruments in place to address marine litter, although in Australia some ports charge a generic environmental fee which helps cover costs of waste reception facilities (see “no special fee” above), some States have charge schemes for plastic shopping bags and/or deposit pay-back for return of bottles and cans and Australia has fines for marine litter, as do some other countries including China.

The Philippines reported having a range of policies and government codes that provide for economic incentives and instruments to address solid waste management - including National Government grants and awards for Local Governments.

All countries except Cambodia reported having the elements of national integrated waste management systems, with Australia, Malaysia and South Korea having the best developed systems, and China, Indonesia, Thailand and Vietnam needing significant further development of their systems. The Philippines has a well developed national integrated waste management system on paper, but is facing significant implementation challenges. Generally, countries reported that the management of marine litter is not integrated into their national waste management systems.

Table 2: National-level programmes and initiatives to address marine litter in the COBSEA member countries, as reported in the National Survey responses

COBSEA member country	Lead Agency	Inter-ministerial Task Force	Policy and Laws	Party to MARPOL Annex V	Port Waste Reception Facilities	UNEP GPA	Party to Basel	NGO activities	Understanding & awareness	Integrated Waste Management (IWM)	Economic instruments	Coastal Clean-up and monitoring
<i>Australia:</i>	Department of the Environment and Water Resources. Australian Maritime Safety Authority (AMSA) for ship-based sources	No	<i>Threat Abatement Plan</i> for marine debris under the <i>Environment Protection & Biodiversity Conservation Act</i> Various State policies and laws (details in National Survey).	Yes. Implemented nationally through <i>Protection of the Sea (Prevention of Pollution from Ships) Act</i> and by legislation in each State.	Provided in most ports but not always adequate. Responsibility is at State / local port level. AMSA maintains directory of such facilities.	Signatory to GPA and has prepared National Plan of Action (NPA)	Yes. Implemented nationally through <i>Hazardous Waste (Regulation of Exports and Imports) Act</i>	Yes. At various levels in different areas. Includes action by seafood industry groups (details in National Survey).	Good understanding and awareness about marine litter. Various awareness programmes undertaken at different levels by may different groups. Tend to be ad hoc.	Well developed. Includes waste reduction measures by the packaging and plastics industries (details in National Survey).	Some ports charge a generic environmental fee which helps cover costs of waste reception facilities, others charge per use of facilities. Some States have charge schemes for plastic shopping bags and/or deposit pay-back for return of bottles and cans. Australia has fines for marine litter.	CUTW. PADI Project AWARE. KAB. Various programmes at different levels. Tend to be ad hoc.
<i>Cambodia:</i>	Not specifically for marine litter	National Coastal Steering Committee (Not specifically for marine litter)	Not specifically for marine litter. General environmental and marine resources laws (details in National Survey).	Yes but not yet fully implemented nationally.	None. Private contractors have collected wastes from ports on occasion.	Signatory to GPA and has prepared NPA.	Yes. National study on waste batteries underway.	No NGO activities specifically on marine litter were reported.	Very low level of awareness and no awareness programmes on marine litter.	Not developed.	None reported.	CUTW activities just commencing.

Table 2 continued

COBSEA member country	Lead Agency	Inter-ministerial Task Force	Policy and Laws	Party to MARPOL Annex V	Port Waste Reception Facilities	UNEP GPA	Party to Basel	NGO activities	Understanding & awareness	Integrated Waste Management (IWM)	Economic instruments	Coastal Clean-up and monitoring
<i>China:</i>	State Environment Protection Administration (SEPA) Maritime Safety Administration (MSA) for ship-based sources and ports.	None	Not specifically for marine litter. General environmental and marine resources laws (details in National Survey).	Annex V of MARPOL came into force in China in Feb 89. National Guidance on implementation issued by MSA.	Required in all ports in China by law that implements Annex V of MARPOL. However not provided in all ports and costs for use discourage full use.	Signatory to GPA and NPA being prepared. Will include land-based sources of marine litter.	Yes. Implemented nationally by <i>Provisional Regulations on Environment Protection for Waste Import</i>	None reported.	Very low level of awareness and no awareness programmes on marine litter.	The <i>Blue Bohai Sea</i> Program is a sub-national integrated waste management system in China. The program includes waste management by ports and harbours before 2010 without exceptions.	All ships entering ports are required to pay waste management fees for reception and disposal of wastes. China has fines for marine litter.	Has not yet joined ICC or CUTW. Local volunteers in Dalian, Yantai, Qingdao, Shanghai, Ningbo, Xiamen, Shenzhen and Haikou have organized coastal cleanups in past years.
<i>Indonesia:</i>	Ministry of Marine Affairs and Fisheries. Ministry of Environment.	National Action on Coastal and Marine Clean Up (Gerakan Bersih Pantai Laut). Poorly coordinated.	Not specifically for marine litter. General environmental and marine resources laws (details in National Survey).	No.	At some ports only, mainly ocean fisheries ports. Not all adequate.	Signatory to GPA and has prepared NPA.	Yes. Agreement signed between Indonesia and Basel Secretariat for training centre.	Yes. At various levels in various provinces. (details in National Survey).	Low level of awareness. Awareness programmes are starting, esp. by NGOs and through coastal clean-ups at local levels. Tend to be ad-hoc.	IWM systems do operate at municipal / provincial level but port waste facilities not integrated with these.	None reported for Indonesia.	ICC. CUTW. PADI Project AWARE. Implemented at various local level sites.

Table 2 continued

COBSEA member country	Lead Agency	Inter-ministerial Task Force	Policy and Laws	Party to MARPOL Annex V	Port Waste Reception Facilities	UNEP GPA	Party to Basel	NGO activities	Understanding & awareness	Integrated Waste Management (IWM)	Economic instruments	Coastal Clean-up and monitoring
<i>Malaysia:</i>	None yet but the Dept. of Environment has been appointed focal point for this project	None. Ministry of Housing & Local Govt has completed pilot study of solid waste on Tioman Is and will replicate for other islands in 2007	None specific to marine litter but general local government bylaws on sanitation and disposal of solid wastes	Yes Jan 97 National Legislation via an amendment to the <i>Merchant Shipping Ordinance</i> , 1952; and Part V-by laws 29(1)(f), Laws of Malaysia. <i>Act 488 on Port Authority.</i>	15 ports have waste reception facilities for garbage.	Endorsed the GPA in 1995 No specific activities related to GPA on marine litter	Yes. The <i>Customs Act 1967</i> has been amended to include provisions of the Basel Convention	WWF Malaysia organises beach clean-ups at the Ma' Daerah Turtle Sanctuary prior to start of nesting season.	Articles form the internet and press show a high degree of awareness. NGO activities are contributing to awareness, inc. WWF and PADI Project AWARE	Waste management in Malaysia is fully privatised to the <i>Alam Flora</i> consortium at municipal level, regulated by local governments Waste management at ports by private contractors appointed by port authorities. Wastes collected deposited at municipal landfills.	None reported	ICC CUTW (06 only) WWF Ma' Daerah Turtle Sanctuary. Dive groups conduct regular beach clean-ups under the PADI Project AWARE

Table 2 continued

<i>COBSEA member country</i>	<i>Lead Agency</i>	<i>Inter-ministerial Task Force</i>	<i>Policy and Laws</i>	<i>Party to MARPOL Annex V</i>	<i>Port Waste Reception Facilities</i>	<i>UNEP GPA</i>	<i>Party to Basel</i>	<i>NGO activities</i>	<i>Understanding & awareness</i>	<i>Integrated Waste Management (IWM)</i>	<i>Economic instruments</i>	<i>Coastal Clean-up and monitoring</i>
<i>Philippines:</i>	Department of Environment and Natural Resources (DENR) Department of Transport and Communications (DoTC) for ship-based sources	None specific to marine litter but the Multi-Sectoral Task Force on Maritime Development could provide a forum.	None specific to marine litter but Section 42 of the Philippine Environment Code (P.D. No. 1152) relates to waste management Marine Pollution Degree of 1976 deals with marine pollution	Yes. Implemented by Marine Pollution Degree of 1976	No data reported	Is a signatory	Is a party and has national licencing system	The NGOs HARIBON and PADI are active on marine litter issues in Philippines	No data on level of understanding and awareness reported	National Solid Waste Management Commission (NSWMC) under Office of President DENR has Ecological Solid Waste Management Act (RA 900) Local Govt Code places responsibilities on local Govts for waste management	A large number of economic schemes provided for in National waste management policy and Local Govt Code – not fully implemented	ICC PADI Project AWARE
<i>Thailand:</i>	Marine Department, Ministry of Transportation. Pollution Control Department, Ministry of Natural Resources and Environment. Department of Industrial Works	Not for marine litter but there is National task force for oil pollution which may provide a suitable structure	Not specifically for marine litter. General environmental and marine resources laws (details in National Survey).	No	Most fishing ports reported to provide reception facilities For major ports waste companies registered with the Marine Department. Fees vary	No information reported	Yes. Implemented nationally through <i>Hazardous Substance Act</i> BE 2535 (1992).	Coastal clean-ups at famous tourist destination e.g. Pattaya and Phuket. Considerable works done after 2004 tsunami.	Low but increasing rapidly. Organized and well structured Govt. training and awareness programmes on waste management. Many NGO awareness activities.	Poorly developed	Pollution Control Department and Department of Fisheries have plan for waste treatment for fishing ports, not implemented yet.	ICC PADI Project AWARE Various NGO and dive industry activities

Table 2 continued

COBSEA member country	Lead Agency	Inter-ministerial Task Force	Policy and Laws	Party to MARPOL Annex V	Port Waste Reception Facilities	UNEP GPA	Party to Basel	NGO activities	Understanding & awareness	Integrated Waste Management (IWM)	Economic instruments	Coastal Clean-up and monitoring
Singapore:	No survey return											
S Korea:	Ministry of Maritime Affairs and Fisheries (MOMAF)	Yes. Marine Alliance of Nongovt organizations, Governmental sector and research Organization. (MANGO)	Yes. National Integrated Management Strategy for Marine Litter (NIMSML) Marine Pollution Prevention Act (ship-sourced) Wastes Control Act (general waste management)	Yes. Ratified in 1996. Implemented nationally by Marine Pollution Prevention Act	Required by law.	Yes. NPA developed and submitted to UNEP in 2007	Yes. Implemented nationally through Act on the Control of Transboundary Movements of Hazardous Wastes and their Disposals	Highly developed, inc. formal partnerships with Govt and research community to address marine litter through MANGO	Formal, nationally coordinated awareness campaign, inc. TV advertising	Highly developed and linked to marine litter activities	Innovative programme to address LAFG through buy-back of waste fishing gear returned to port by fishermen	Formal, nationally coordinated programme. ICC
Vietnam:	Vietnam Environment Protection Agency (VEPA)	No	Not specifically for marine litter. General environmental and marine resources laws (details in National Survey).	Only Annexes I & II (Not V which deals with garbage)	Provided at most ports as a commercial service. Disposal of waste after collection is a problem	Not signatory but has completed a <i>National Report on land-based sources of marine pollution</i> with GPA support.	Yes. Implemented nationally through Decision No 12/2006/QD-BTNMT, 2006	MCD is NGO undertaking some activities that are relevant to the marine litter (e.g. ICC, CUTW).	Very low level of awareness, inc. at senior policy levels, and no awareness programmes on marine litter	System includes personnel, regulations, equipment. Efficiency is limited. Marine litter not managed within this system. Some ships/ports waste transported to land dumps.		ICC CUTW

4.3 Identified barriers, gaps and needs

4.3.1 Regional barriers, gaps and needs

In undertaking this Regional Review the consultant has identified a number of barriers, gaps and needs at the regional level in relation to the prevention and control of marine litter in the Seas of East Asia. Many of these stem from and are related to the national-level barriers, gaps and needs which are presented in section 3.3.2 and so are only summarised here.

The major regional barriers and gaps are:

- A generally very low level of awareness of the problem at all levels, including at decision maker level - which translates into very low political will to address the problem.
- A major push for economic development in the region, often with scant regard for environmental consequences, and a cultural perspective that does not recognize the values of the oceans and the impacts of human activities on it.
- A broad range of competing, national development priorities, including law and order, food security, public health, education and socio-economic development; that often push environmental issues, especially marine environmental issues, down the government funding list in terms of order of priority.
- Lack of regional data on the nature and extent of the problem.
- Lack of a regional multi-lateral legal instrument on marine environmental protection, such as a convention or treaty.
- Lack of a regional strategy and action plan on marine litter, which recognizes the trans-boundary nature of the problem and the need for regional cooperation and coordination, and lack of a regional coordination mechanism.
- Lack of priority given to marine litter by existing regional programmes such as PEMSEA, SDS-SEA and the sub-regional GEF LME projects.
- Lack of involvement of the private sector (e.g. shipping, ports, fisheries, costal tourism, packaging, plastics and waste management industries) in addressing the issue.

The major regional needs are:

- Development and implementation of a regional strategy and action plan on marine litter, which recognizes the trans-boundary nature of the problem and the need for regional cooperation and coordination (as will be developed under this consultancy).
- Close coordination with PEMSEA / SDS-SEA in developing and implementing the Regional Strategy and Action Plan in Marine Litter, including ensuring that an appropriate share of SDS-SEA resources and funding are allocated to addressing marine litter, including to support implementation of the Regional Strategy and Action Plan.
- Close coordination with APEC and ASEAN on marine litter issues.
- Development and operation of a central, regional database to which national administrations

report annual statistics on the sources, causes, quantities and distribution of marine litter in their respective jurisdictions. The database could present outputs graphically on map-based Geographic Information System (GIS) – providing visual representation of the geographical spread of the problem. This would provide a powerful monitoring tool for assessing the true regional extent of the problem, including regional hot spots, as well as trends over time and the effectiveness or otherwise of management and control responses.

- Development and operation of marine litter trajectory models for each sub-regional sea in East Asia.
- Close coordination with neighbouring regions - especially NOWPAP which has highly a developed programme on marine litter.

4.3.2 National barriers, gaps and needs

National level barriers, gaps and needs in the COBSEA member countries have been drawn from the National Survey responses and are presented in Table 3. Many of these are similar to those presented in section 3.3.1, but also include the following additional barriers and gaps:

- Lack of coordination between government agencies.
- Cost of using port reception facilities based on fee for service approach (discouraging vessel operators from using them).
- For Australia and Indonesia, vast and complex geography and many remote areas.
- No structured, nationally coordinated strategy and action plans on marine litter - activities tend to be ad-hoc in all countries.
- Very poor implementation of UNEP GPA NPAs.
- For Indonesia, Thailand and Vietnam, not parties to Annex V of MARPOL.
- Lack of relevant laws and regulations, and/or poor enforcement of existing laws and regulations.
- Lack of or inefficiencies with broader national waste management systems.
- No marine litter trajectory models.

The major national needs are:

- Designation of clear national lead Agencies for coordinating marine litter issues
- Formation of National Task Forces on marine litter, including all relevant government bodies as well as port, shipping, fisheries, coastal tourism, packaging, plastics and other industries.
- Development and implementation of National Strategies and Action Plans for marine litter – which *inter alia*:
 - Implement the Regional Strategy and Action Plan nationally
 - Provide for concerted and sustained awareness campaigns targeting political-level

decision makers, port, shipping, fisheries and coastal tourism industries and coastal communities.

- Provide for more effective implementation at the national level of:
 - the elements of the GPA NPAs that address land-based sources of marine litter,
 - MARPOL Annex V to address sea-based sources of marine litter, and
 - the FAO Code of Practice for Responsible Fisheries to address the problem of LAFG.
- Adopt a “no special fee” approach to port waste reception facilities in all countries in the region.
- Establish national coordinated marine litter surveys and monitoring.
- Provide for technical training and capacity building of relevant personnel from government, academia, coastal communities, NGOs and relevant industries.
- Further develop broader national integrated waste management arrangements and ensure management of marine litter is integrated into these arrangements.

Table 3: National-level barriers, gaps and needs in relation to marine litter in the COBSEA member countries, as reported in the National Survey responses

	<i>Australia</i>	<i>Cambodia</i>	<i>China (PRC)</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Singapore</i>	<i>South Korea (ROK)</i>	<i>Vietnam</i>
<i>Barriers</i>	<p>Lack of coordination between Federal, State and local levels</p> <p>Lack of data on the extent and nature of the problem</p> <p>Cost of using port waste reception facilities based on fee for service approach</p> <p>Vast coastline with many remote areas</p>	<p>Very low level of awareness, inc. at decision-maker level (very ,low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Competing socio-economic development priorities</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>	<p>Very low level of awareness, inc. at decision-maker level (very ,low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Competing socio-economic development priorities</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>	<p>Very low level of awareness, inc. at decision-maker level (very low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Competing socio-economic development priorities</p> <p>Extremely vast and complex geography, including tens of thousand of islands</p> <p>Lack of coordination between National, Provisional and local levels</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>	<p>Low to medium level of awareness, inc. at decision-maker level, (but low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>	<p>No data on level of awareness</p> <p>Lack of data on the extent and nature of the problem</p> <p>Vast and complex geography, including many islands</p>	<p>Low level of awareness, inc. at decision-maker level, (low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Competing socio-economic development priorities</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>	<p>No Survey Response</p>	<p>No major barriers – marine litter is well established as a high priority issue in S Korea.</p>	<p>Very low level of awareness, inc. at decision-maker level (very ,low political will)</p> <p>Lack of data on the extent and nature of the problem</p> <p>Competing socio-economic development priorities</p> <p>Cost of using port waste reception facilities based on fee for service approach</p>

Table 3 continued

	<i>Australia</i>	<i>Cambodia</i>	<i>China (PRC)</i>	<i>Indonesia</i>	<i>Malaysia</i>	<i>Philippines</i>	<i>Thailand</i>	<i>Singapore</i>	<i>South Korea (ROK)</i>	<i>Vietnam</i>
<i>Gaps</i>	<p>No structured, nationally coordinated, strategic approach to marine litter</p> <p>Efforts to implement GPA NAP largely superficial</p> <p>Lack of enforcement of relevant laws and regs</p> <p>No marine litter trajectory models</p>	<p>No designated Lead Agency</p> <p>Lack of broader national and local integrated waste management system</p> <p>Lack of relevant laws and regulations</p> <p>Lack of technical capacity</p> <p>No marine litter trajectory models</p> <p>No national funding for marine litter</p>	<p>Lack of enforcement of relevant laws and regs</p> <p>No marine litter trajectory models</p>	<p>Confusion of roles and responsibilities between Govt agencies</p> <p>Inefficiencies of broader national and local integrated waste management system</p> <p>Not a party to MARPOL</p> <p>Lack of enforcement of relevant laws and regs</p> <p>No national funding for marine litter</p>	<p>Lack of enforcement of relevant laws and regs</p> <p>No marine litter trajectory models</p> <p>No national funding for marine litter</p>	<p>Confusion of roles and responsibilities between Govt agencies</p> <p>Inefficiencies of broader national and local integrated waste management system</p> <p>Lack of enforcement of relevant laws and regs</p> <p>No marine litter trajectory models</p> <p>No national funding for marine litter</p>	<p>Inefficiencies of broader national and local integrated waste management system</p> <p>Not a party to MARPOL</p> <p>Lack of enforcement of relevant laws and regs</p> <p>No marine litter trajectory models</p> <p>No national funding for marine litter</p>	<p>No Survey Response</p>	<p>No major gaps</p> <p>Spread of national marine litter monitoring sites could be more representative - some large stretches of coastline without sites (see Fig A.1.1.).</p>	<p>Lack of broader national and local integrated waste management system</p> <p>Not a party to Annex V of MARPOL</p> <p>Lack of relevant laws and regulations</p> <p>Lack of technical capacity</p> <p>No marine litter trajectory models</p> <p>No national funding for marine litter</p>

<p>Needs</p>	<p>Greater coordination between Federal, State and local levels</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Develop marine litter trajectory models</p>	<p>Designate Lead Agency</p> <p>Concerted awareness campaign at all levels</p> <p>Develop broader national and local integrated waste management system</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p> <p>Join ICC</p>	<p>Concerted awareness campaign at all levels</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p> <p>Join ICC</p>	<p>Designate clear Lead Agency</p> <p>Accede to MARPOL</p> <p>Concerted awareness campaign at all levels</p> <p>Improve efficiencies of broader national and local integrated waste management system</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p>	<p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Develop marine litter trajectory models</p>	<p>National situation assessment</p> <p>Clearer designation of Govt. roles and responsibilities</p> <p>Concerted awareness campaign at all levels</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Establish physical infrastructure for waste management</p>	<p>Accede to MARPOL</p> <p>Concerted awareness campaign at all levels</p> <p>Improve efficiencies of broader national and local integrated waste management system</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p>	<p>No Survey Response</p>	<p>Ongoing commitment to funding if the existing national programme is to continue.</p>	<p>Accede to Annex V of MARPOL</p> <p>Concerted awareness campaign at all levels</p> <p>Develop broader national and local integrated waste management system</p> <p>National coordinated marine litter survey and monitoring programme</p> <p>Adopt 'No special fee' approach to port waste reception facilities</p> <p>Technical training</p> <p>Develop marine litter trajectory models</p>
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5. CONCLUSIONS & RECOMMENDATIONS

The following conclusions can be made from this Regional Review:

- Marine litter, also known as marine debris and marine garbage, from both land and sea-based sources, is one of the major threats to the World's oceans.
- The problem of marine litter is particularly severe in the Seas of East Asia, due in part to the massive industrial and urban development under-way in the coastal zones of the region, combined with an exponential and sustained growth in shipping activity serving their rapidly expanding economies, the current lack of effective marine litter prevention and control measures in many East Asian countries, and major cultural and awareness barriers that impede political will to address the problem.
- As a component of the broader marine litter problem, LAFG is likely to be major concern in East Asia, due to extremely large size of the fishing industry and lack of effective regulation of the industry in the region, including an extremely high level of Illegal, Unregulated and Unreported (IUU) fishing in the region.
- Very little is known about the extent and nature of the problem in East Asia, including source differentiation, zones of accumulation and degree of ecological, environmental and socioeconomic impacts.
- All countries in the region face significant barriers to the effective prevention and control of marine litter as outlined in section 3.3.

The following recommendations are made from this Regional Review:

- The COBSEA member countries consider, review, further develop, finalise, adopt and implement the draft Framework for a Regional Strategy and Action Plan on Marine Litter in the Seas of East Asia, which is produced as a separate output of this consultancy.
- As a sub-set of the Regional Strategy and Action Plan, each country develops and implements a National Strategy and Action Plan on marine litter, which addresses the elements outlined in section 3.3.2.
- All countries in the region should join ICC, CUTW and PADI Project AWARE.
- A central, regional database should be established to which national administrations report annual statistics on the sources, causes, quantities and distribution of marine litter in their respective jurisdictions. The database could present outputs graphically on map-based Geographic Information System (GIS) – providing visual representation of the geographical spread of the problem. This would provide a powerful monitoring tool for assessing the true regional extent of the problem, including regional hot spots, as well as trends over time and the effectiveness or otherwise of management and control responses. Such a regional database could possibly be housed and maintained by the UNEP EAS/RCU, with appropriate support from COBSEA member governments.
- Marine litter trajectory models should be developed for each sub-regional sea in East Asia.
- Close coordination and sharing of lessons should be undertaken with neighbouring regions – especially NOWPAP which has highly a developed programme on marine litter. Japan should be invited to join the Regional Strategy and Action Plan in Marine Litter for the Seas of East Asia, as it has a lot to offer the other East Asian countries. Brunei Darusalaam should also be invited to join.

- Close coordination should be undertaken with PEMSEA / SDS-SEA in developing and implementing the Regional Strategy and Action Plan in Marine Litter, including ensuring that an appropriate share of SDS-SEA resources and funding are allocated to addressing marine litter, including to support implementation of the Regional Strategy and Action Plan.
- Close coordination should also be undertaken with APEC and ASEAN on marine litter issues.
- Close coordination and joint activities should be undertaken with the Asia-Pacific Fishery Commission (APFIC), FAO, IMO and APEC Fisheries Working Group to address LAFG in the region.

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APPENDIX 1: SUMMARY OF RESPONSES TO NATIONAL SURVEY SECTION 2 - STATE OF THE PROBLEM

Countries are listed in alphabetical order. The full survey returns are held by EcoStrategic Consultants (www.eco-strategic.com) and the EAS/RCU (www.cobsea.org).

Australia

(text provided by Ilse Kiessling, Australian NC)

Existing surveys and monitoring in Australia

A number of land-based coastal marine litter surveys have been undertaken around the Australian coastline. Most of these surveys tend to be ad-hoc, though an increasing number of longer-term monitoring programs are becoming established. These surveys and monitoring programmes provide a picture of the extent of the marine litter problem along parts of the Australian coastline. However, due to inconsistencies in survey monitoring approaches and an absence of data on litter floating in the sea or present on the seabed, it is difficult to compare across regions or determine the magnitude of the marine litter issue on a national scale. As a consequence existing data almost certainly under-represent the actual quantity of marine litter in Australia's marine and coastal environments.

Plastics are found in all locations where litter has been reported around Australia. Some of the most abundant types of litter surveyed include cigarette butts, snack bags and confectionary wrappers, and plastic bottles and containers (Wace 1995, 1994, KAB 1996, Whiting 1998, White 2004, KAB 2006). While many materials in marine litter are persistent (such as glass, metals, foam, and even timber and cloth), plastic is of primary concern as it tends to be the most abundant litter type (by number and weight) found on beaches and in sediments, and it tends to have some of the most obvious and pervasive impacts on marine species.

The composition of land-based litter varies widely between survey locations and specific catchment conditions. Not surprisingly general food packaging and urban litter tends to be reported in areas closest to population centres, and derelict recreational and commercial fishing gear is reported in the greatest densities near popular fishing locations. Commercial fishing litter (notably derelict fishing nets from foreign sources) also comprises the greatest proportion of litter by weight reported along a number of northern Australian beaches (Kiessling 2003).

However studies have shown that the composition and source of litter may also change throughout the year. For example, one study has shown that the source of coastal litter during wet periods is polluted stormwater, but that during dry weather, the largest source of litter was from fishers who appeared to be responsible for plastic bags, cans and tangled fishing lines left in and near the water (Jackson 1995).

For details on selected marine litter surveys and monitoring programs around Australia, please see Table 1 (in Appendix 2). More recent surveys and additional information, please contact the Australian National Consultant.

Source differentiation in Australia

The origins of litter on Australian beaches are influenced by a number of factors. These include proximity to urban centres, population of surrounding areas, and vicinity of marine-based activities. Conclusive identification of the origins of litter is often very difficult as many items may be used either by people on land or on vessels at sea, and equally derelict fishing nets and other items from marine based activities may enter the marine environment through poor waste management practices on land. In general however, marine litter may be classified as originating from either

land-based sources or activities at sea. Given the durability of many types of litter and the distances it can travel, significant proportions of litter along parts of the Australian coastline also originate from land and marine sources beyond Australia's jurisdiction.

Around Australia, coastal surveys near cities have shown that around 75-80% of shoreline litter is from land-based sources, and that this typically consists of cigarette butts, food packaging, plastic shopping bags, and metal bottle tops and can pull-rings that have reached beaches via streams and drains (O'Callaghan 1993, Gregory and Ryan 1994, Wace 1994, 1995; Haynes 1997, Edyvane et al. 2004, Clean Up Australia 2006, KAB 2006).

Debris from land-based sources may enter the marine environment via wind, streams, and drains from streets and municipal land fills as well as direct littering of beaches. Urban stormwater discharged from stormwater rains is also a major pathway for marine litter in Australia (Cunningham and Wilson 2003). In Australian coastal cities many stormwater drains discharge directly into the ocean and many thousands more street drains provide opportunities for litter to enter waterways that ultimately end at the coastline. Landfills may also be a major source of litter in the marine environment, although it is not clear to what extent.

In areas remote from population centres marine-sourced litter makes up the greatest proportion of waste recorded. Along parts of the northern Australian coastline for example, between 80 – 99% of litter recorded is likely to originate from marine sources (Sloan et al. 1998, Whiting 1998, Kiessling 2003), and on Australia's sub-Antarctic islands 100% of litter recorded is from marine based activities (Slip and Burton 1991).

On remote Australian coasts Lost and Abandoned Fishing Gear from both domestic and foreign commercial fisheries tends to be one of the most significant items of litter recorded both in terms of its quantities as well as the impacts it is having on marine species (Kiessling 2003, Roeger et al. 2004). Recreational fishers tend to produce relatively small amounts of waste per person and per vessel in comparison to commercial vessels, in part due to the short duration of voyages (National Research Council 1995).

However, studies in parts of Australia have found a positive correlation between litter on beaches and numbers of recreational boats (Widmer 2002). The types of litter most frequently reported as associated with recreational boats are plastic bags, aluminium cans and glass bottles (Widmer 2002), though recreational fishers are also responsible for the loss or disposal of lines, lures, and nets (Whiting 1998, Thompson 2000, Kiessling and Hamilton 2001, 2003).

A large number of cargo ships operate in Australian waters including Australian and foreign flagged vessels in domestic or international trade. Evidence suggests that cargo ships are likely to be responsible for a proportion of waste in Australia's marine environment. For example, a number of plastic livestock syringes and associated glass antibiotic bottles used to dispense medication to cattle on livestock carriers have been found during surveys on Christmas Island (Environment Australia 2001a) and Arnhem Land (Alderman et al. 1999, Kiessling and Hamilton 2001, 2003), and livestock feedbags such as those used in the live cattle trade have also been reported to wash ashore in northern Australia (Leitch 1997). One of these feedbags (originally containing 'Lucerne Cubes' manufactured in Australia) was responsible for the entanglement of a hawksbill turtle in northeast Arnhem Land (Leitch, 1997).

Other sources of marine based litter potentially include recreational leisure boats, coastal barges, surveillance vessels, offshore oil platforms, rigs and supply vessels, passenger cruise ships, and research vessels. Considerable amounts of waste are likely to be generated by most if not all of these vessel types, though all are required to conform with national, state/territory and international waste management regulatory requirements aimed at prevention of pollution of the sea from ship-sourced waste.

Marine litter is not only a domestic issue for Australia, but is also an international issue both in

terms of its sources and impacts. For example, the majority of derelict fishing nets washing ashore on Australia's northern coasts originates from fishing activities beyond Australia's jurisdiction, while only a small proportion has been identified as originating from Australia's prawn trawling fleet (Kiessling 2003, White 2004).

A significant proportion of litter other than derelict fishing nets in Australian waters is also believed to have international origins. Glass bottles thought to be from Japanese longline and purse seine tuna fisheries have been found on cays in the Coral Sea (Smith 1992, Wace 1995). Thick rubber and plastic sheeting from which the soles of handmade thongs have been cut and their residual 'blanks' that are believed to originate from Indonesia have washed ashore in parts of northern Australia, including the beaches at Cocos-Keeling Island (Wace 1995). Numerous other items such as fishing net floats, sorting baskets, crates, buckets, hand reels, light globes, ropes and gloves which may also be directly attributed to fishing and general shipping activities are also found in large quantities (Sloan et al. 1998, Whiting 1998, Kiessling 2003).

Accumulation zones in Australia

No comprehensive assessment of marine litter around Australia's coastal environments has ever been undertaken, and as such it is difficult to determine exactly where litter is accumulating at the highest rates. However, a review of published papers on marine litter surveys around Australia suggests that high concentrations of litter accumulate on parts of the coastlines of every Australian state.

Specific areas where litter has been reported at comparatively high densities include coasts adjacent to all urban centres as well as more remote areas of the north western Cape York coastline, the northeast Arnhem Land coastline (Roelofs et al. 2005, White 2004), Groote Eylandt (Sloan et al. 1998, Kiessling 2003, White 2004), the far north Great Barrier Reef region (Haynes 1997), parts of the Western Australian coastline (Cary et al. 1987, Edwards et al. 1992, RAOU 1996) parts of the south Australian coastline including Anxious Bay (Edyvane 2004, Eglinton et al. 2005), and southwest Tasmania (Slater 1991, Sustainable Development Advisory Council 1996, Pryor 1999).

Anecdotal evidence suggests that for more remote areas, marine litter 'hotspots' areas tend to be exposed sandy shorelines, and that while some beached litter may wash back out to sea during storms, that litter accumulation rates generally tend to increase after storms.

Ecological and environmental impacts in Australia

Records of entangled wildlife and wildlife that has ingested litter within Australian waters tend to be limited to land-based observations, and in many instances wildlife found adversely affected by marine litter is not recorded at all. However, information that is available suggests that disturbingly high numbers of Australia's marine wildlife are being harmed and killed by litter while at sea, or as a result of their injuries on shore.

Marine species may become tangled in litter when they feed on organisms attached or associated with it, or if they accidentally swim into unseen litter floating at sea. Plastic bands or net fragments entangled around young animals' necks may restrict their ability to feed properly, and eventually result in their strangulation and death as they grow. Lost and Abandoned Fishing Gear, ropes, and other types of litter tangled around the bodies, flippers, tails or flukes of marine wildlife may lead to infections, restricted mobility, protracted amputation of limbs, and eventual death through drowning, starvation or smothering. Entanglement of marine species in litter may also have economic implications for commercial species.

A monitoring programme run by rangers from the Dhimurru Land Management Aboriginal Corporation in Arnhem Land (Northern Territory) since 1996 has recorded more than 300 hawksbill, olive ridley, flatback and green turtles stranded along a short stretch of coastline (Roeger et al.

2005). Of these, most (33%) were hawksbill, and were found entangled in derelict trawl and drift nets of foreign origin, fishing line and plastic waste. Approximately 55% of turtles recorded have been found alive, but it is currently unclear how many of these stranded turtles that are alive when found subsequently perish due to injuries sustained by their entanglement in or ingestion of litter (eg. Chatto 1995).

Most stranded turtles found during the Arnhem Land monitoring programme are observed between May and June each year. This period correlates with onshore southeast trade winds when marine litter accumulation is generally recorded to be higher than during other times of the year. The high number of stranded turtles found onshore during the period of southeast trade winds may provide some indication of the number of turtles that may be entangled in nets during other times of the year but never wash ashore and are therefore never recorded.

A marine wildlife stranding and mortality database maintained by the Queensland Environmental Protection Agency/Parks and Wildlife Service highlights that significant numbers of marine turtles are ingesting and becoming entangled in marine litter in Queensland waters (Greenland et al. 2004). During 2001/2002 for example, a total of sixteen hawksbill, loggerhead, and green turtles were found with longline hooks, other fishing hooks, fishing line, and plastic bags embedded in their flesh or trailing from their mouths. Thirteen of these animals were dead when found (Greenland et al. 2004).

A total of eighty-one turtles (hawksbill, loggerhead, green, flatback, and olive ridley) were found during the same period entangled in rope, fishing line, plastic bags, derelict fishing nets, crabpots and floats (Greenland et al. 2004). This database relies on public reports and ad hoc sightings of stranded wildlife (rather than dedicated surveys) and in most instances it is unknown which records relate to Lost and Abandoned Fishing Gear, or gear that is in the control of fishers. Nevertheless, the numbers of animals recorded as entangled in or that have ingested litter are likely to be far less than actual numbers of turtles affected by marine litter across the Queensland coast (Miller et al. 1994). For example, extrapolation from counts of beach-washed nets and their entrapped turtles on the beaches of the north-western Cape York Peninsula suggest that several hundred marine turtles of at least four species are killed annually in derelict nets along the Queensland Gulf of Carpentaria coast (Limpus and Miller 2002).

Other than turtles, many other protected species such as whales, dugong, and sawfish have been recorded entangled in fishing litter along other areas of the coastline, though little other than anecdotal reports of these strandings exist.

Waterborne litter such as balloons, plastic bags and confectionery wrappers may be ingested by vertebrate marine wildlife when it is confused with prey species. Debris such as fishing line, plastic pieces and ropes may also be ingested when wildlife targets prey that is attached to or associated with these items. Ingested litter may starve animals by preventing further ingestion, but it can also reduce absorption of nutrients, result in internal wounds and ulceration, and cause animals to become more buoyant thereby inhibiting diving (Beck and Barros 1991, Bjorndal, et al. 1994, Sloan et al. 1998, EPA/QPWS 2000). Research has also demonstrated that there is a strong potential for biological uptake of heavy metals and/or other toxic substances through ingestion of suspended 'microplastics'. It is unknown how many animals may be harmed through ingestion of and/or uptake of toxic substances associated with microplastics in Australian waters.

Socio-economic impacts in Australia

Beyond the ecological impacts of marine litter on marine wildlife, marine litter may also have social, economic, and aesthetic impacts on marine habitats and environments, coastal communities, governments and industry as well as become a health risk, vector for invasive aquatic organisms and navigational hazard at sea (Kiesling 2003).

The aesthetic impact of marine litter on coastal environments in Australia is obvious and

compelling. While the true social and economic costs of marine litter in Australia are unknown, marine litter is likely to have significant economic implications for industries such as tourism, shipping and fishing due to a mix of aesthetic impacts, navigational, health and safety hazards, pollution of commercial fish catch, and gear maintenance costs and downtime. The social and cultural impact of marine litter on Indigenous people and communities across northern Australia in particular, is also considerable.

Reports suggest that the navigational hazard posed by marine litter in northern Australian waters is significant and increasing. For example litter, especially derelict fishing nets, has entangled rudders and propellers of marine vessels, and smaller items have been reported to clog cooling water intakes, causing engine failure (Nash 1992, Haynes 1997, Pooley 2000). Most incidents involving marine litter, however, remain poorly documented.

Debris can also be a hazard to divers and beachgoers in Australia. Children playing on remote beaches on Cape York, for example, have been cut badly by broken glass from large numbers of light globes and fluorescent tubes washed ashore there. Hundreds of often full, rusty gas cylinders pose a significant explosive threat to beachgoers, and potentially hazardous substances (eg sump oil, detergents, fuels) regularly wash ashore in containers such as 44 gallon drums (Alderman et al., 1999).

The high cost of clean up operations for polluted beaches is prohibitive for many remote coastal communities (Nash 1992, Faris and Hart 1995, Wace 1995, Willoughby et al. 1997, Sloan et al. 1998), and the tonnes of fishing gear found washed ashore in some areas has resulted in public antagonism towards the fishing industry as a whole (Sloan et al. 1998).

Australia, Indonesia and Chile and recently submitted a project proposal to the APEC Marine Resource Conservation Working Group (MRCWG) entitled Understanding the economic benefits and costs of controlling marine debris in the APEC region. Funding for this project was recently approved by the MRCWG and it will be undertaken during 2007. The aim of the project is to develop an accurate assessment of the economic benefits and costs of controlling marine litter in the APEC region as a basis for determining relevant incentives and other measures for preventing it and mitigating its impacts.

Lost and Abandoned Fishing Gear (LAFG) in Australia

Lost and Abandoned Fishing Gear from both domestic and foreign commercial fisheries tends to be one of the most significant items of litter recorded both in terms of its quantities as well as the impacts it is having on marine species (Kiesling 2003, Roeger et al. 2004).

Preliminary analysis of derelict fishing nets found in the Gulf of Carpentaria suggest that foreign fishing nets of Asian use and manufacture are likely to comprise the greatest proportion (around 80%) of all nets washing ashore on beaches there. Nets used by Asian fisheries found on northern Australian coastlines tend to be of larger mesh size, and of much greater area and weight than Australian prawn trawl nets (Sloan et al. 1998, Kiesling and Hamilton 2001, 2003, Whiting 2004). Foreign nets are also causing some of the greatest harm to marine animals, especially turtles (Kiesling 2003, Roeger 2004).

Monofilament line that has been lost and discarded by recreational fishers is also of concern as it presents an entanglement threat to marine wildlife such as sea turtles. For example, recreational fishing line was responsible for the death of a green turtle at Magnetic Island in Queensland during 2000 (Thompson 2000).

WWF Australia, Dhimurru Land Management Aboriginal Corporation and the Northern Territory Fisheries agency have developed a guide for the standardised identification and reporting of Lost and Abandoned Fishing Gear. Completed in 2001, 'The Net Kit' includes photographs of over 180

net types, with specifications of mesh size, twine size, colour, net use and probable country of manufacturing origin.

See also information detailed under ecological and environmental impacts above.

Cambodia

(text adapted from Pak Sokharavuth, Cambodia NC)

Existing surveys and monitoring in Cambodia

No survey and monitoring programmes specifically addressing marine litter were reported for Cambodia. Several studies have been undertaken looking at general solid waste management issues in various coastal cities, towns, villages and industries, including:

- *Integrated Coastal Management Project (ICM): 2000-2006 and 2007-2012* for Sihanoukville Authority covering one village Sangkat No. 4, Kan Mittapheap.
- *Environmental Management of the Coastal Zone-Cambodia (EMCZ): 2002-2007* for Ministry of Environment/Coastal Coordination Unit, covering Sihanoukville City, Koh Khyong and Boeng Kayak Villages. Data collected on market wastes, household wastes, fishing wastes, hospital waste and industrial waste, finding the above mentioned areas in bad condition with poor waste management practices.
- *NIDO: 2004-2008* Department Industry Mines and Energy Sihanoukville Municipality, covering garment factories and fishery processing factories. Data collected on solid waste and oil waste from all types of industry and processing factories.
- *Participatory Management Coastal Resources (PMCR/IDRC): PMCR/Solid Waste:2002-2007* Ministry of Environment covering the coast and islands in Peam Krosob Wildlife Sanctuary in Koh Kong Province. Data collected on household solid waste.
- *Port's Waste Management:* Sihanoukville Municipality / Port Institution covering the collection of waste from ships in the port and waste generated in the port. Data has been published at www.pas.gov.kh.

Source differentiation in Cambodia

There is no data reported on marine litter source differentiation for Cambodia.

Accumulation zones in Cambodia

There is no data reported on ocean circulation patterns and accumulation zones for marine litter for Cambodia.

Ecological and environmental impacts in Cambodia

There is no research in Cambodia concerning ecological and environmental impacts of marine litter. There is a general statement in the State of the Coastal Environment and Socio-economic Report 2005, regarding impacts on biological and marine habitats in relation to the pressures of exploitation on forestry, fisheries, water pollution, solid wastes and land use.

Socio-economic impacts in Cambodia

There is some information on socio-economic impacts on coastal and marine resources in

Cambodia, but not specifically relating to marine litter. The 2005 State of the Coastal Environment and Socio-economic Report cites the relationship between socio-economic impacts and the solid waste problem due to the lack of management of marine activities and industries, especially impacts of improper management of solid and liquid wastes in fishing villages and coastal communities.

Lost and Abandoned Fishing Gear (LAFG) in Cambodia

There is no data reported on LAFG for Cambodia.

China (PRC)

(text adapted from Huang Zhengguang, China NC)

Existing surveys and monitoring in China

There are only informal reports presented in NOWPAP Marine Litter Workshop, November 14th 2005, Toyama, Japan and the 1st NOWPAP Workshop on Marine Litter, June 8th, 2006, Incheon, Republic of Korea by Dr. Linlin Hu.

Only some reports and maps on marine litter are found in local media. No other references, studies, reports, maps or graphs about marine litter in China can be found. Some coastal cleanup activities have been carried out by local volunteers in Dalian, Yantai and Qingdao on the Yellow Sea coastline, Shanghai and Xiamen on the East China Sea, and Shenzhen and Haikou on the South China Sea. There are no marine litter activities/programmes/projects conducted and proposed before the end of 2006, at national and provincial levels in China.

Source differentiation in China

No data on source differentiation was reported for China, although the NC states that "it is obvious that in China most marine litter comes from land-based sources, much more than sea-based ones."

Accumulation zones in China

No information was reported for ocean circulation patterns and accumulation zones for marine litter in China

Ecological and environmental impacts in China

No information was reported on the ecological and environmental impacts of marine litter in China.

Socio-economic impacts in China

No information was reported on the socio-economic impacts of marine litter in China.

Lost and Abandoned Fishing Gear (LAFG) in China

No information was reported on LAFG in China, however studies in other countries in the Pacific have indicated that Chinese (and other) vessels may be major contributors to LAFG in the region.

Indonesia

(text adapted from Nat Budiawan – Indonesian NC)

Existing surveys and monitoring in Indonesia

A number of marine litter survey and monitoring programmes have been carried out in Indonesia, as follows:

- *Bersih Pantai (Coastal Clean-Up) 2005*; undertaken by the Faculty of Fisheries and Marine Sciences, Diponegoro University, Semarang, Central Java. This clean-up covered Semarang and Jepara Provinces in Central Java and was undertaken in July 2005. It assessed the amount of organic and inorganic waste accumulated in coastal areas of Semarang and Jepara. The data is unpublished and is held by the Faculty of Fisheries and Marine Sciences, Diponegoro University.
- *Beach Litter Survey at Thousand Islands (Kepulauan Seribu), Jakarta*; undertaken by Willoughby (National Resources Institute, Kent, UK), in 1985 and covering 24 islands of the Thousand Islands, Jakarta. The survey classified types of litter and seven types were recognized (plastic bags; footwear; polystyrene blocks of more than 10 cm diameter; plastics/glass bottles; metals can and containers; ropes and pieces of fishing net, and light bulbs). The data is published - Willoughby, N.G. (1986a) (1986b).
- *Beach Litter Survey at Thousand Islands (Kepulauan Seribu), Jakarta*; undertaken by Uneputty (Pattimura University, Ambon, Indonesia) and Evans (University of Newcastle-upon-Tyne, UK) in 1994. The survey covered 19 Islands at Thousand Islands, Jakarta and assessed each litter accumulation. The main findings were that litter has accumulated on shores of unmanaged islands in the Pulau Seribu Archipelago. Shores of most of the islands surveyed were severely polluted with beach litter. The main source of litter was assessed to be the city of Jakarta. Types of litter recognized included plastic bags; footwear; polystyrene blocks; plastics/glass bottles; metals can and containers; ropes and pieces of fishing net, and light bulbs). Severe pollution has evidently spread to more distant parts of the archipelago. Islands beyond about 20 km from the mainland were largely free of litter (in 1985), but those up to 45 km of it were severely polluted by 1994. Data is published - Uneputty & Evans (1997).
- *Domestic Waste and TBT pollution in Coastal Areas of Ambon Island, Indonesia*; undertaken by Evans, Dawson, Frid, Gill and Porter (University of Newcastle upon Tyne, UK) and Pattisina (Pattimura University, Ambon, Indonesia) at 56 sites on Ambon Island, Eastern Indonesia in 1995. Main findings were that coastal areas of the island of Ambon were polluted by domestic waste. There was severe beach litter pollution and contamination of inshore waters. Data is published – Evans et al. (1995).
- *Beach Litter Survey at Thousand Islands (Kepulauan Seribu), Jakarta, Indonesia*; undertaken by Willoughby (National Resources Institute, Kent, UK), Sangkoyo (Planology Department, Indonesian Institute of Technology and Lakaseru (WWF, Indonesia) in 1997. The main findings were that strandline litter levels on the shorelines of 23 of the Thousand Islands, Jakarta Bay, comprised nearly 34,000 items of litter belonging to 11 categories. Litter levels have almost doubled on islands close to inshore, and are more than five times higher on the offshore islands, since a similar survey in 1985. Polystyrene blocks, plastic bags and discarded footwear made up 80% of the items counted. Jakarta is still considered to be the source of most of the litter, though litter which is self-generated by tourist activities is more important than before. Social developments in Indonesian lifestyles have resulted in the appearance of litter items not seen in the 1985 survey. Plastic bags probably carpet the bottom of inshore Jakarta Bay. Data is published - Willoughby et al (1997).

Source differentiation in Indonesia

The sources of marine litter in Indonesia come from both land-based sources and ship based

sources, and apart from the studies referenced above, no additional data on source differentiation was reported in the National Survey response.

Several published papers and articles from local newspapers mention that domestic waste is the main source of litter at marine and coastal areas in Indonesia (Unepetty and Evans 1997 and Willoughby et al. 1997 and several local newspapers (Harian KOMPAS, Harian Sinar Harapan, Majalah TEMPO and Majalah GATRA, Jurnal Celebes, 2003 – 2006)

Accumulation zones in Indonesia

No information was reported as being available on accumulation zones for marine litter in Indonesia.

Ecological and environmental impacts in Indonesia

No information was reported as being available on the ecological and environmental impacts of marine litter in Indonesia.

Socio-economic impacts in Indonesia

Nash (1992) investigated two beaches close to Jayapura, Irian Jaya province, for types and amounts of waste. The source of litter is a municipal dumpsite on the coastline in a nearby bay. In that bay lives a small community of traditional fishermen. These fisher folk mainly use gill nets, hook and line, or gather shellfish and molluscs by hand. The respondents described impacts such as propeller entanglements, fouling of gill nets and hooks, damage to the fishing gear, and injuries. These problems were viewed by some as serious enough to cause modifications to their fishing behaviour (sometimes against their best economic interest) such as avoidance of some fishing areas, and use of different types of gear. Plastic bags are the most common type of debris reported by the fishermen. More than half of gill net fishing expeditions had debris fouling the nets.

Lost and Abandoned Fishing Gear (LAFG) in Indonesia

No information was reported as being available on the problem of LAFG in Indonesia.

Malaysia

(text adapted from Nizam Basiron, Malaysian NC)

Existing surveys and monitoring in Malaysia

No marine litter survey and monitoring programmes were reported for Malaysia.

Source differentiation in Malaysia

No information was reported as being available on source differentiation for marine litter in Malaysia.

Accumulation zones in Malaysia

No information was reported as being available on accumulation zones for marine litter in Malaysia.

Ecological and environmental impacts in Malaysia

There have been newspaper articles in Malaysia on turtles entangling in LAFG and choking on plastic.

Socio-economic impacts in Malaysia

No information was reported as being available on the socio-economic impacts of marine litter in Malaysia.

Lost and Abandoned Fishing Gear (LAFG) in Malaysia

There is anecdotal information on LAFG in Malaysia collected by Department of Fisheries vessels while on patrol. However no records are kept. As stated above here have been newspaper articles in Malaysia on turtles entangling in LAFG and choking on plastic.

Philippines

(text adapted from Ella Deocadiz, Philippines NC)

Existing surveys and monitoring in the Philippines

The National Survey response does not identify any existing survey and monitoring activities in the Philippines. However the Philippines is a participant in the International Coastal Cleanup (ICC), which does provide some survey and monitoring data. Since 1994, the Philippine ICC effort was spearheaded by the International Marine-life Alliance with major support from the Department of Environment and Natural Resources (DENR). Reports have stated that through this effort, the Philippines consistently placed second only to the United States in terms of areas covered and volunteers generated. It was noted that the DENR, through its field offices, has been instrumental in recruiting these volunteers nationwide.

It is also understood that marine litter survey and monitoring was carried out at the Batangas Bay demonstration site in the late 1990s under the GEF/UNDP/IMO Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas.

Source differentiation in the Philippines

A study by the Japan International Cooperation Agency (JICA) on Metro Manila solid waste management was conducted in 1997. The study was able to determine the volume of solid wastes being disposed to waterbodies (mainly rivers), which represents approximately 15% of the daily waste generation of approximately 5,000 metric tons.

Accumulation zones in the Philippines

There are anecdotal reports of marine litter accumulations in water bodies in the vicinity of urban centers but there are no systematic data gathering activities in the Philippines.

Ecological and environmental impacts in the Philippines

No information was reported as being available on the ecological and environmental impacts of marine litter in the Philippines.

Socio-economic impacts in the Philippines

No information was reported as being available on the socio-economic impacts of marine litter in the Philippines.

Lost and Abandoned Fishing Gear (LAFG) in the Philippines

No information was reported as being available on LAFG in the Philippines.

South Korea (ROK)

(text adapted from Won-Tae Shin, South Korea NC)

Existing surveys and monitoring in South Korea

The South Korean Government is one of the few governments in the world to have designated marine litter as a major national marine environmental protection priority, along with marine sediment contamination, harmful algae blooms (red tides), beach damage, marine ecosystem disturbance and maritime accidents. A *National Integrated Management Strategy for Marine Litter* (NIMSML) has been implemented in South Korea since 1999, funded and managed by the Ministry of Maritime Affairs and Fisheries (MOMAF).

Prior to funding by MOMAF marine litter surveys and monitoring in South Korea were limited to local NGO and citizens' activities on special days such as 'Earth Day' and 'Environment Day', and were undertaken on ad-hoc basis in limited areas (as is still the case in most countries that have marine litter activities). Since commencement of the NIMSML in 1999, the *Marine Alliance among Nongovernmental organizations, Governmental sector and research Organizations* (MANGO) was established. Utilising the resources and expertise of the three sectors (NGO, government and research), MANGO has supported a *National Marine Debris Monitoring Program* (MDMP) in South Korea, with more than 23 local NGOs monitoring 20 coastal sites regularly since 2000. The types, weight and numbers of marine debris are identified and measured according to the guidelines of the International Coastal Cleanup (ICC). The actual monitoring is undertaken by community members / citizens, and includes actual clean-up as well, and so has a major community outreach and awareness-raising benefit.

Korea trialed underwater monitoring using SCUBA divers in 2002, as much marine litter is deposited in the coastal waters. An underwater monitoring manual was developed in 2003, and since 2004, the national monitoring programme has expanded to include underwater, island and sea-surface marine litter, comprising 31 beach sites, six SCUBA sites and four remote islands, as depicted in Figure 6 of the main report.

Source differentiation in South Korea

The National Survey response reports that land-based sources of marine litter are the largest, but compared to other countries, sea-based sources are also significant because of dense activity in the coastal waters of South Korea.

Accumulation zones in South Korea

Despite the existence of a National Marine Debris Monitoring Program the National Survey response did not report any results identifying recognized accumulation zones in South Korea.

Ecological and environmental impacts in South Korea

The National Survey response reported that there is very little quantitative data on the ecological and environmental impacts of marine litter in South Korea. It was found that litter destroys the habitat and spawning grounds of fisheries resources, and that lost and abandoned fishing gear resulted in ghost fishing which eventually leads to the reduction of fish resources, although it is difficult to differentiate this cause from other possible causes such as over-fishing and non-litter forms of pollution. Marine litter at the seaside also significantly affects coastal amenity in South Korea. Impacts of marine litter on seabirds is partially presented South Korean data, and as there are few marine mammals on Korean coasts, the damage on them is rarely reported.

Socio-economic impacts in South Korea

No information was reported as being available on the socio-economic impacts of marine litter in the South Korea.

Lost and Abandoned Fishing Gear (LAFG) in South Korea

LAFG is identified as a major issue in South Korea, including impacts on vessels and cases where lives have been lost at sea due to vessel entanglement in LAFG. Addressing LAFG forms a major part of the National strategy, including a programme where MOMAF purchases waste fishing gear returned to port by fishermen, which is deemed to be highly effective and serves as a possible model for other countries and regions.

Singapore

Singapore did not return a National Survey.

Thailand

(text adapted from Sakanan Plathong, Thai NC)

Existing surveys and monitoring in Thailand

In Thailand the Office of Marine Conservation and Rehabilitation, Department of Marine and Coastal Resources, Ministry of Natural Resources and Environment, undertakes an Underwater Garbage Collection Contest each year at coral reef and beach areas used as major tourism resources along the Thai coastline.

Fishing net constituted the highest proportions being about 54 percent and the total weight. The other types of garbage are aluminium cans, tires, batteries, wood, plastics and foam.

Most data from these clean-ups are contained in unpublished reports to the Department of Marine and Coastal Resources. Some data has been published in Thai (Upanol & Thongtham, 1998).

Source differentiation in Thailand

Apart from the garbage collection contest referenced above, no information was reported as being available on source differentiation for marine litter in Thailand.

Accumulation zones in Thailand

No information was reported as being available on accumulation zones for marine litter in Thailand.

Ecological and environmental impacts in Thailand

There are no studies that have comprehensively investigated the impacts of marine litter in Thai waters, although a small number of isolated studies provide an indication as to the nature of the problem. Lost and Abandoned Fishing Gear has been identified as the type of marine debris most hazardous to marine species. Lost fishing gear and gear scraps have been shown to entangle coral reef, marine turtles and manta rays. In Thai waters, reports of entangled and stranded marine wildlife are almost entirely limited to land-based observations over a small area of coastline. However it is suggested that disturbingly high numbers of marine species are being harmed and killed by debris while at sea, or as a result of their injuries on shore.

Some species of marine turtles are thought to mistake plastic bags and other plastic items for prey,

especially hawksbills, eat encrusting organisms that grow on floating plastics and nets, and are likely to become ensnared when attempting to feed.

There are also directly threaten to coral reef ecosystems through the abrading and scouring of coral substrates as Lost and Abandoned Fishing Gear snags on coral reef. There are many volunteer campaigns to remove fishing nets form the coral reefs.

Socio-economic impacts in Thailand

Coastal and marine tourism is a major component of the Thai economy and the aesthetic impact of marine debris on coastal environments is obvious and compelling. Indeed, the aesthetic degradation from marine litter that is evident on many beaches in Thailand may be more compelling to the general public and policy makers than detailed analyses of animal mortality or other biological/ecological impacts. While the true social and economic costs of marine litter in Thailand are unknown, marine littee is likely to have significant economic implications for industries such as tourism, shipping and fishing due to a mix of aesthetic impacts, navigational, safety and health hazards, and gear maintenance costs and downtime. The social and cultural impact of marine litter on local people and coastal communities is also likely to be considerable.

Anecdotal reports suggest that the navigational hazard posed by marine floating debris in Thai's waters is significant and increasing, although incidents remain poorly documented. Debris, especially derelict fishing nets, has been reported entangling rudders and propellers of marine vessels, and smaller items have been reported to clog cooling water intakes, causing engine failure. However, many incidents are undocumented.

Debris can be a hazard to divers and beachgoers. Children playing on remote beaches have been cut badly by broken glass from large numbers of light globes and fluorescent tubes washed ashore.

The high cost of clean-up operations for polluted beaches is prohibitive for many remote coastal communities and the tonnes of fishing gear found washed ashore in some areas has resulted in public antagonism towards the fishing industry as a whole.

Lost and Abandoned Fishing Gear (LAFG) in Thailand

Refer sections above.

Vietnam

(text adapted from Le Dai Thang, Vietnam NC)

Existing surveys and monitoring in Vietnam

No existing marine litter survey and monitoring programmes were reported for Vietnam.

Source differentiation in Vietnam

No information was reported as being available on source differentiation of marine litter in Vietnam.

Accumulation zones in Vietnam

No information was reported as being available on accumulation zones for marine litter in Vietnam.

Ecological and environmental impacts in Vietnam

No information was reported as being available on the ecological and environmental impacts of marine litter in Vietnam.

Socio-economic impacts in Vietnam

No information was reported as being available on the socio-economic impacts of marine litter in Vietnam.

Lost and Abandoned Fishing Gear (LAFG) in Vietnam

No information was reported as being available on LAFG in Vietnam.

APPENDIX 2: INFORMATION SOURCES AND CONTACTS

[to be completed in final report]

UNEP Regional Seas Programme:

Contact person: Dr Elik Adler
Position: Senior Programme Officer / Coordinator Regional Seas Programme
Location: UNEP, Nairobi, Kenya
Email: Elik.Adler@unep.org
Web site: www.unep.org/

UNEP East Asian Seas Regional Coordinating Unit (EAS/RCU):

Contact person: Dr Srisuda Jarayabhand
Position: Coordinator
Location: UNEP, Bangkok, Thailand
Email: jarayabhand@un.org
Web site: www.cobsea.com

Contact person: Birgitta Liss
Position: Junior Professional Officer
Location: UNEP, Bangkok, Thailand
Email: liss@un.org
Web site: www.cobsea.com

UNEP GPA:

Contact person:
Position:
Location:
Email:
Web site:

Regional Consultant:

Contact person: Steve Raaymakers
Organization: EcoStrategic Consultants
Position: Consultant
Location: Cairns, Australia
Email: steve@eco-strategic.com
Web site: www.eco-strategic.com

National Consultants on Marine Litter:

Country	Person	Organisation	Location	Email
Australia:	Dr Ilse Kiessling	Department of the Environment & Water Resources	Darwin, NT	ilse.kiessling@environment.gov.au
Cambodia:	Pak Sokharavuth	Department of Environmental Pollution Control, Ministry of Environment	Phnom Penh	sokharavuth@online.com.kh
China (PRC):	Huang Zhengguang	South China Institute of Environmental Science	Guangzhou, Guangdong Province	georgehuang@scies.com.cn
Indonesia:	Nat Budiawan	Center for Environmental Safety and Risk Assessment, Faculty of Mathematics and Natural Sciences, University of Indonesia	Depok, Jakarta	drbud@ui.edu , dr.budiawan@gmail.com
Malaysia:	Nizam Basiron	Maritime Institute of Malaysia	Kuala Lumpur	nizam@mima.gov.my
Philippines:	Ella Deocadiz	Ministry of Environment and Natural Resources	Manila	gellamini@yahoo.com
Singapore:	N. Sivasothi	Raffles Museum of Biodiversity Research, National Univ. of Singapore	Singapore	sivasothi@nus.edu.sg
South Korea:	Won-Tae Shin	Ministry of Maritime Affairs and Fisheries	Soul	wtsin@momaf.go.kr
Thailand:	Sakanan Plathong	Centre for Biodiversity of Peninsular Thailand, Faculty of Science, Prince of Songkla University	Songkla, Peninsular Thailand	sakanan2004@yahoo.com
Vietnam:	Le Dai Thong	Vietnam Environment Protection Agency	Hanoi	ldthang@nea.gov.vn ; ldtthang@gmail.com

NB. In addition to the National Consultants' details above, each National Survey response contains contact details for stakeholders from various sectors involved in marine litter activities in each country. The National Survey responses are held by UNEP EAS/RCU.

National ICC Coordinators in each COBSEA member country

Country	Person	Organisation	Location	Email
Australia:				
Cambodia:				
China (PRC):				
Indonesia:				
Malaysia:				
Philippines:				
Singapore:				
South Korea:				
Thailand:				
Vietnam:				

National ICC Coordinators in non-COBSEA members

Country	Person	Organisation	Location	Email
Brunei Dar-es-sallam:				
Japan:				
Taiwan:				

ANNEX 4
DRAFT FRAMEWORK DOCUMENT –
REGIONAL ACTION PLAN ON MARINE LITTER (RAP-MALI) FOR THE SEAS OF EAST ASIA

About this Documents:

This Document has been produced by a consultant on contract to the UNEP EAS/RCU, and is intended to provide a **Draft Framework** for a Regional Action Plan on Marine Litter (RAP-MALI) for the Seas of East Asia.

As a Draft Framework only, the document contains a Table of Contents, major Section headings and bullet points under each Section - suggesting possible elements that might be included in each Section.

The Draft Framework Document will be reviewed and further developed by break-out groups at the 1st COBSEA workshop on Marine Litter in Jakarta 8-9 May 2007.

Workshop participants will be asked to consider different aspects of the Draft Framework Document, including the dot-points under each Section, and to make recommendations for its completion.

The consultant will use the recommendations of the workshop to fill-out and complete the RAP-MALI, which will be submitted to COBSEA for consideration.

The Draft Framework Document should be considered in conjunction with the “sister document” also produced by this consultancy - entitled *Raaymakers, 2007. Regional Review of Marine Litter in the Seas of East Asia, Report to the UNEP EAS/RCU.*

The Regional Review provides significant background material which should be used by the workshops participants when developing the Draft Framework Document.

1. Introduction and background

Taking into account the global concern and the United Nations General Assembly Resolution on Marine Litter (UN GA Resolution A/60/L.22), the UNEP Regional Seas Programme has initiated a global programme on marine litter including addressing the problem at the regional level, through assistance to several Regional Seas Organizations (RSOs), including the Coordinating Body for the Seas of East Asia (COBSEA). For this purpose, in November 2006, UNEP prepared *Guidelines for the Development and Implementation of Regional Strategies for addressing Marine Litter*. According to these guidelines, three phases are suggested in order to incorporate the marine litter issue into the Programmes of Work of individual RSOs:

- Phase I - Assessment of the regional situation through a Regional Review;
- Phase II - Preparation of a Regional Action Plan in Marine Litter (RAP-MALI); and
- Phase III - Integration of the RAP into the Programme of Work.

With financial support from UNEP Regional Seas, COBSEA commenced its marine litter activity in late 2006 and in general accordance with the UNEP Guidelines, the COBSEA approach is being undertaken as follows:

Phase I: Assessment of the regional situation

For this task COBSEA contracted National Consultants in each COBSEA member country and a Regional Consultant to complete National Surveys on marine litter and prepare a Regional Review respectively. The resulting draft Regional Review report has been submitted to COBSEA and forms a "sister document" to the RAP-MALI, which should be used as valuable background information in developing the RAP-MALI for the East Asian Seas.

Phase II: Preparation of the Regional Action Plan

For this task the Regional Consultant has produced this Draft Framework Document, which is to be used by the Regional Workshop as the basis for further developing the RAP-MALI. The Regional Consultant will use the outputs of the workshop to finalise the RAP-MALI.

Phase III: Integration of the RAP-MALI into the Programme of Work of COBSEA and implementation at the national and regional level.

In order to achieve this integration and implementation the RAP-MALI will need to be approved and adopted by COBSEA and resources secured for its implementation.

2. Aim and objectives

[Workshop break-out groups to propose possible aims and objectives for the RAP-MALI]

Examples include:

“The Aim of the RAP-MALI for the Seas of East Asia is to maintain, protect and improve the quality of coastal and marine resources and environments of East Asia through addressing the issue of marine litter.

The Objectives of the RAP-MALI are to:

- Prevent marine litter on the coasts and in the seas of East Asia.
- Reduce marine litter Prevent marine litter on the coasts and in the seas of East Asia.
- Monitor marine litter sources, distribution, quantities and trends on the coasts and in the seas of East Asia.”

please review, comment, make suggestions]

3. Institutional arrangements

[Workshop break-out groups to propose possible institutional arrangements for managing implementation of the RAP-MALI, both regional and nationally]

Examples include:

- EAS/RCU to act as central, regional coordinating body
- COBSEA IGM to act as overall decision-making / approving body for RAP activities
- Establish Regional Task Force on marine litter, including private sector representation, to provide expert technical advice to COBSEA IGM and guide implementation of the RAP-MALI.
- Formally designate Lead Agency for marine litter in each country.
- Establish inter-ministerial, cross-sectoral National Task Force on marine litter in each country, including private sector representation.
- Develop National Action Plan (NAP) to guide implementation of the RAP in each country.

Please review, comment, make suggestions]

4. Actions and activities

[this section will describe the actions and activities that are to be carried out under the RAP-MALI in order to achieve its aims and objectives. Actions and activities are grouped into the components 4.1 to 4.5 below. Please review, comment, and make suggestions]

4.1 Knowledge & understanding

(Section could include activities related to research, surveys, monitoring and information management)

[Examples of regional actions and activities include:

- Encourage ALL COBSEA member countries to join the International Coastal Clean-up (ICC) and to spread ICC activities to additional sites in each country.
- Develop a standardised marine litter survey and monitoring methodology for the region and promulgate to all countries (standardisation is vital for data quality control and inter-comparability).
- In addition to ICC (which is more focussed on clean-up than survey and monitoring), support countries to implement regular marine litter survey and monitoring programmes at selected high-priority sites, using the standardised regional survey and monitoring methodology.
- Establish a central regional database on marine litter at EAS/RCU. Could be based on the NOWPAP database managed by POMRAC.
- Undertake marine litter trajectory modelling in each sub-regional sea of the COBSEA region, to identify sources and accumulation zones for marine litter.

Please review, comment, and make suggestions]

4.2 Communication, awareness and education

[Examples of regional actions and activities include:

- As per ICC above (ICC is as much a communication and awareness activity as it is clean-up activity).
- Undertake a major regional awareness campaign using mass media (TV, radio and newspaper).
- Undertake targeted awareness campaigns at the national level, aimed at high priority marine litter sources (e.g. fishing industry, shipping industry, municipal councils).

Please review, comment, and make suggestions]

4.3 Marine litter prevention

4.3.1 Land-based sources

[Examples of regional actions and activities include:

- Assist countries to develop legislative and institutional basis for the development of sound,

generic, integrated waste management systems for major municipal areas and coastal towns and villages.

- Assist countries to develop and to achieve greater on-ground implementation of GPA National Plans of Action (NPAs).
- Assist municipal councils in each country to implement Stormwater Quality Improvement Devices (SQIDS) and similar physical traps/interceptors in city and town stormwater systems.
- Develop and implement Award-Based Incentive Schemes for coastal villages, towns and cities and also ports (Green/Clean Ports Award), using models such as Australian “Tidy Towns” scheme.

Please review, comment, and make suggestions]

4.3.2 Sea-based sources

[Examples of regional actions and activities include:

- Ensure all countries in the region are party to MARPOL Annex V and have implementing national legislation.
- Undertake a Regional Review of Port Waste Reception Facilities and publish a Regional Directory of such, similar to that published by Australia and New Zealand.
- Adopt a regional approach to port waste reception facilities based on a “No Special Fees” cost recovery basis.
- Target awareness campaigns at shipping and fishing industries.
- Develop and implement Award-Based Incentive Schemes for ports that provide reception facilities etc (Green/Clean Ports Award), using models such as Australian “Tidy Towns” scheme.

Please review, comment, and make suggestions]

4.3.3 Lost & abandoned fishing gear (LAFG)

[Examples of regional actions and activities include:

- As per sea-based sources; plus
- Assist countries to develop national legislation that requires all fishing gear to be identified/marked
- Assist regional fishing industry to better implement / comply with the FAO Code of Conduct on Responsible Fisheries, esp. components relating to LAFG.

Please review, comment, and make suggestions]

4.4 Marine litter removal and clean-up

[Examples of regional actions and activities include:

- Encourage ALL COBSEA member countries to join the International Coastal Clean-up (ICC) and to spread ICC activities to additional sites in each country.

- Encourage entities with particular interest in or responsibility for certain coastal areas, such as tourist resorts and port authorities, to undertake regular clean-ups of their areas.

Please review, comment, and make suggestions]

4.5 Information Management

[Examples of regional actions and activities include:

- Develop and maintain a central, regional database to which national administrations report annual statistics on the sources, causes, quantities and distribution of marine litter in their respective jurisdictions. The database could present outputs graphically on map-based Geographic Information System (GIS) – providing visual representation of the geographical spread of the problem. This would provide a powerful monitoring tool for assessing the true regional extent of the problem, including regional hot spots, as well as trends over time and the effectiveness or otherwise of management and control responses.
- Such a regional database could possibly be housed and maintained by the UNEP EAS/RCU, with appropriate support from COBSEA member governments.

Please review, comment, and make suggestions]

5. Workplan

This section would include a Workplan table along the following lines:

COBSEA RAP-MALI Workplan

Component	Activity	Timeline	Responsibility	Budget
<i>Knowledge & understanding</i>	ICC in all countries: Develop/promulgate standard survey and monitoring methods: Marine litter trajectory models each sub-regional sea etc	Annual 6 months 2 years	[pl suggest]	In country sponsorship & voluntary US\$10K US\$50K per sub-region
<i>Communication and awareness</i>	Major regional awareness campaign: Targeted national campaigns: etc	1 st year then annual Annual		US\$50K US\$20K per country
<i>Marine litter prevention etc</i>				
<i>Etc as per sec. 4 above</i>				

Please review, comment, and make suggestions]

6. Funding and sustainability

[this section would outline how the RAP will be funded and sustained. Examples include:

- Establish a Regional Marine Litter Action Fund, managed by COBSEA and contributed to by member govts and industry (e.g. ports, shipping, fisheries, tourism, plastics, packaging and waste management industries).
- Link with other major, well-funded programmes in the region to ensure they contribute to RAP activities (e.g. APEC, ASEAN, PEMSEA/SDS-SEA and other GEF LME projects).
- Bilateral donors that are non-COBSEA members (e.g. Canada, Japan, NZ, EU, Sweden).
- Incorporating user pays and polluter pays concepts into all aspects of waste management practices in each country.
- Adopting other economic instruments such as bottle/can deposit return refund schemes.

Please review, comment, and make suggestions]

7. References

[any relevant references will be added to final RAP]

8. Appendices

[any relevant appendices will be added to final RAP – please make suggestions]

ANNEX 22

Group 1: Objectives, Institutional Arrangements, Funding and Sustainability

Facilitator:

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Aim and Objectives

The aim of the COBSEA RAP-MALI is to improve the quality of the marine and coastal environment of East Asian Seas by addressing the issue of marine litter through Regional Collaboration and partnerships.

Objectives:

- Prevent and reduce litter in the marine and coastal environment of East Asian Seas
- Mitigate environmental and socioeconomic impacts of marine litter in the East Asian Seas.
- Monitor and assess the type, sources, distribution, quantities and trends of marine litter in order to provide science-based information for policy making and management planning.

Institutional Arrangement

- Establish a regional working group of marine litter national focal points and experts to provide advice to the COBSEA meeting and guide the implementation of the COBSEA RAP MALI. The group will discuss and advice COBSEA on its modality of work.
- Within the framework of COBSEA, cooperate with other global and regional organizations/programmes including civil society, private sector and other relevant stakeholders.

Funding and Sustainability

- Allocate budget for the implementation of the RAP MALI from COBSEA Trust Fund and seek financial and in-kind support from other sources such as:
 - COBSEA members
 - Other bilateral donors
 - Multi-lateral donors
 - Relevant private sector industries
 - NGOs
- The implementation of COBSEA RAP MALI at the national level will be carried out by individual member state.
- With a view towards longer-term sustainability, COBSEA and its members will endeavour to include user-pays, polluter-pays and other economic instruments in all marine litter activities, as and where appropriate and possible.

ANNEX 23

Group 2: Knowledge, Awareness and Clean Up

Facilitator

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Group participants

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Overview

Group 2 was tasked to look at sections 4.1; 4.2; 4.4; and 4.5. Throughout the process, the group considered the priority, language, feasibility and whether COBSEA is the appropriate forum to pursue the action.

Group 2 is comfortable with the proposed framework, however through analysing every action, we are suggesting the removal of two sub headings, deleting duplicating actions and we have suggested additional actions to be included. We also suggest that the actions should be numbered. We had difficulties in identifying the priority of the actions as the priorities change for different countries based on their needs, capacity etc. As such we have just identified “collective” high priority actions.

As such, the group has made the following general suggestions for the consultant to consider:

Section 4.1 Knowledge and understanding

Suggest teasing out the introduction/context a little bit more. The term “knowledge and understanding” may not be the right language to describe the actions for all member countries.

Action one:

Encourage ALL COBSEA member countries to join the International Coastal Clean-up (ICC) and to spread ICC activities to additional sites in each country.

Suggestions:

- Change the focus to international clean up activities (including ICC, Addition of Clean Up the World) etc.
- Include the following “which do not have national clean up activities in place” and to add “consider” as the first word.
- Change last point to each country to “member” countries.

Revised action:

Encourage ALL COBSEA member countries which do not have national clean up activities in place to consider joining international clean up activities (including the International Coastal Clean-up (ICC), Clean up the World etc) and to spread ICC activities to additional sites in each country.

Delivery through: national actions

Priority: high

Action two:

Develop a standardised marine litter survey and monitoring methodology for the region and promulgate to all countries (standardisation is vital for data quality control and inter-comparability).

Suggestions:

- Replace monitoring with something along the lines of “COBSEA members will take direction from UNEP on the monitoring [on completion of UNEP funded study].

Revised action:

COBSEA members will take direction from UNEP on standardised marine litter survey and monitoring methodology for the region and promulgate to all member countries.

Delivery through: regional action firstly, then national actions

Priority: not determined

Action three:

In addition to ICC (which is more focussed on clean-up than survey and monitoring), support countries to implement regular marine litter survey and monitoring programmes at selected high-priority sites, using the standardised regional survey and monitoring methodology.

Suggestions:

- Replace support with encourage. And finish sentence at high priority sites.
- Replace with “encourage member countries to implement regular marine litter survey and monitoring programmes at high priority selected sites in addition to international clean up activities (including ICC, Addition of clean up the world).

Revised action:

Encourage member countries to implement regular marine litter survey and monitoring programmes at selected high-priority sites in addition to ICC (which is more focussed on clean-up than survey and monitoring), using the standardised UNEP-IOC survey and monitoring methodology.

Delivery through: national actions

Priority: not determined

Action four:

Establish a central regional database on marine litter at EAS/RCU. Could be based on the NOWPAP database managed by POMRAC.

Suggestions:

- Addition of “consider the merits of establishing”, needs to link to the East Asian Seas Knowledgebase, needs to also include a reference to the database design to follow an agreed format.

Revised action:

Consider the merits of establishing a central regional database on marine litter at EAS/RCU and the role that the East Asian Seas Knowledgebase and other existing databases could play.

Delivery through: COBSEA action
Priority: High

Action five:

Undertake marine litter trajectory modelling in each sub-regional sea of the COBSEA region, to identify sources and accumulation zones for marine litter.

Suggestions:

- Change to “consider to undertake”.
- Also include the identification of opportunities through other programs (national, regional etc).
- Also remove “in each sub-regional sea of the COBSEA” and replace with “in the COBSEA region”.

Revised action:

Consider to undertake marine litter trajectory modelling in the COBSEA region, to identify sources and accumulation zones for marine litter.

Delivery through: could be national action, or COBSEA or collective regional project
Priority: High

Section 4.2 Communication, awareness, education

Suggest teasing out the introduction/context a little bit more.
Suggest replacing education with capacity building in this title (this incorporates awards/incentives/training/education)

Action one:

As per ICC above (ICC is as much a communication and awareness activity as it is clean-up activity).

Suggestions:

- Consultant will need to reword so that this is an action.
- Change the focus to international clean up activities (including ICC, Addition of clean up the world) etc
- Include a caveat for members “which do not have national clean up activities in place”.

Delivery through: national actions
Priority: not determined

Action two:

Undertake a major regional awareness campaign using mass media (TV, radio and newspaper).

Suggestions:

- Change wording to “consider” undertaking.....
- Need to note that mass media may be costly and unobtainable.
- Suggest “consider the development of a regional communication strategy to promote awareness for all relevant audiences (government, industry, local gov, community) to meet community needs”

Revised Action:

Consider developing a regional communication strategy to promote awareness for all relevant audiences (government, industry, local gov, community) to meet community needs.

Delivery through: COBSEA activity
Priority: high

Action three:

Undertake targeted awareness campaigns at the national level, aimed at high priority marine litter sources (e.g. fishing industry, shipping industry, municipal councils).

Suggestions:

- Add “consider” at the start.
- Targeted campaigns need to go from “grass roots to national”.
- Remove the reference to industry in the brackets, so it will just be fishing, shipping.
- Include port authorities in the example.

Revised action:

Consider undertaking targeted awareness campaigns at local to national levels, aimed at high priority marine litter sources (e.g. fishing, shipping, municipal councils, port authorities).

Delivery through: national actions and COBSEA driven actions
Priority: not determined

Add a new point around “technical professional development/training/capacity building to support officials and researches to address marine debris”. *Priority: high*

Add a new point around “encouraging community stewardship”, though we note this is linked to the actions within prevention.

Section 4.4 Marine Litter and clean-up

Action one:

Encourage ALL COBSEA member countries to join the International Coastal Clean-up (ICC) and to spread ICC activities to additional sites in each country.

Suggestions:

- This action should be removed as it duplicates Action 1 in 4.1.

Priority: not determined

Action two:

Encourage entities with particular interest in or responsibility for certain coastal areas, such as tourist resorts and port authorities, to undertake regular clean-ups of their areas.

Suggestions:

- Suggest moving to Section 4.2 and removing this sub-heading
- Addition of dive sites.

Revised action:

Encourage entities with particular interest in or responsibility for certain coastal areas, such as dive sites, tourist resorts and port authorities, to undertake regular clean-ups of their areas.

Delivery through: national actions

Priority: not determined

Section 4.5 Information Management

Action one and two:

Develop and maintain a central, regional database to which national administrations report annual statistics on the sources, causes, quantities and distribution of marine litter in their respective jurisdictions. The database could present outputs graphically on map-based Geographic Information System (GIS) – providing visual representation of the geographical spread of the problem. This would provide a powerful monitoring tool for assessing the true regional extent of the problem, including regional hot spots, as well as trends over time and the effectiveness or otherwise of management and control responses.

Such a regional database could possibly be housed and maintained by the UNEP EAS/RCU, with appropriate support from COBSEA member governments.

Suggestions:

- Add consider at the front of the sentence.
- Recommend moving this to section 4.1.
- Make consistent with section 4.1 point four.
- Remove the support aspect,, this can go in another section.

Revised action:

Consider developing and maintaining a central, regional database to which national administrations report annual statistics on the sources, causes, quantities and distribution of marine litter in their respective jurisdictions. The database could present outputs graphically on map-based Geographic Information System (GIS) – providing visual representation of the geographical spread of the problem. This would provide a powerful monitoring tool for assessing the true regional extent of the problem, including regional hot spots, as well as trends over time and the effectiveness or otherwise of management and control responses.

Delivery through: COBSEA actions firstly, then national actions to populate the database

Priority: high

Views on other aspects of the document:

Suggest Section 2 - aim and objectives: Recommend including awareness explicitly as an objective

Need to include marine debris reporting in the State of the Marine Environment Reporting.

Good practice examples worthy of noting (but not exhaustive) include:

Thailand NGO activities for clean up

South Korea public awareness and education program

Indonesia ecoport program

Suggest the consultant consider these in the report

The group also suggests that the consultant number the actions.

ANNEX 24

Group 3: Marine Litter Prevention

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General observations:

- COBSEA member countries are at very different stages, with varying (often very limited) information available on marine litter
- In many countries, the first important task may be to get marine litter recognized as a national issue of importance (role for COBSEA to play)
- Focus the RAP-MALI on activities that can be initiated by COBSEA - regional perspective
- Activities should be worded in a more general 'guideline' style
- Language should reflect COBSEA's role in encouraging and promoting initiatives among countries rather than 'ensuring'.

COBSEA

- Important role in facilitating information sharing, coordinating and promoting activities among COBSEA members, and to increase awareness among governments and general public in the region
- COBSEA's expertise is in environment: Need to coordinate activities with other technical organizations such as IMO and FAO

Section 4.3: Marine Litter Prevention

- Agree with structure
- But section 4.3 should be merged with section 4.2: Communication, awareness and education
- Generally ok with the suggestions made under each section, but with some comments...

4.3.1 LAND-BASED SOURCES

- Include recommendation for COBSEA to coordinate activities with the GPA
- Include the promotion of 3R-initiatives as an example of integrated waste mgmt
- Outlined actions should be more general and open up for more alternatives, both engineering and non-engineering options (ex. Facilitate information sharing and assist countries in the application of appropriate technical measures, such as SQIDS)

- Implement award-based incentive schemes such as Tidy Towns in connection with national waste management initiatives (bring point 1 and 4 together)

4.3.2 SEA-BASED SOURCES

- Include recommendation for COBSEA to coordinate port- or shipping related activities with IMO and fishing related activities with FAO and APFIC
- Remove the Regional review of port waste reception facilities: may be beyond COBSEA's ability at this point
- COBSEA to propose/encourage (not adopt) 'No special fees' port waste reception facilities
- Could include actions to encourage development and implementation of certain industry codes of conduct to prevent marine litter

4.3.3 LOST AND ABANDONED FISHING GEAR

- Include recommendation to coordinate with FAO and APFIC
- Many countries already have legislation to identify/mark fishing gear, but need support in strengthening implementation
- Add recommendation to encourage countries to establish a national register of fishing gear (especially net types) used by the domestic fishing fleet
- Focus FAO Code of Conduct related activities only on LAFG