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Agenda item 16

**REPORT OF THE FORTIETH MEETING OF THE SCIENTIFIC GROUP OF THE LONDON
CONVENTION AND THE ELEVENTH MEETING OF THE SCIENTIFIC GROUP OF THE
LONDON PROTOCOL**

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1 INTRODUCTION – ADOPTION OF THE AGENDA

1.1 The fortieth meeting of the Scientific Group of the London Convention and the eleventh meeting of the Scientific Group of the London Protocol were convened at the Headquarters of the International Maritime Organization, London, from 27 to 31 March 2017, chaired by Ms. Linda Porebski (Canada).

1.2 The joint session was attended by delegations from Contracting Parties to the London Convention, Contracting Parties to the London Protocol and observers from intergovernmental and non-governmental organizations in consultative status as listed in document LC/SG 40/INF.1.

Opening of the meetings

1.3 The Chair opened the proceedings by welcoming all participants to the joint session of the Scientific Groups of the London Convention and Protocol.

1.4 Dr. Stefan Micallef, Director, Marine Environment Division, IMO, welcomed all delegates to the joint session, and stressed the importance of the Strategic Plan, adopted in 2016 by the governing bodies, not least in the context of the 2030 Agenda for Sustainable Development. In this context, the Scientific Groups play a crucial role, providing guidance and advice to the governing bodies.

1.5 In response, the Chair emphasized the importance of delegations taking the opportunity of the joint session to share experiences and learn from each other. She also invited all delegations, in particular those who were new to the Groups, to contribute to the deliberations and play an active role in the discussions.

Adoption of the agenda

1.6 The agenda (LC/SG 40/1) was adopted¹ and is shown in annex 1. The Scientific Groups also adopted a timetable for the meetings, as amended (LC/SG 40/1/1, annex 2). This annex includes a list of documents considered under each agenda item.

2 WASTE ASSESSMENT GUIDANCE

Guidance on the development of action lists and action levels for wastes or other matter

2.1 The Scientific Groups recalled that in 2016 the governing bodies endorsed the Scientific Groups' decision to re-establish the intersessional correspondence group on the development of further guidance on the development of action lists and action levels for dredged materials (LC 38/16, paragraphs 4.1 to 4.8 and LC 38/16, paragraph 4.3). These ongoing activities were assigned a high priority.

2.2 The Groups considered document LC/SG 40/2/1 (Chair of the correspondence group), providing an update on the progress made on the development of further guidance for developing action lists and action levels for dredged material. The correspondence group included representatives from Argentina, Australia, Canada, Chile, China, France, Ireland, Italy, Japan, Mexico, the Netherlands, Nigeria, Norway, the Republic of Korea, the United Kingdom, the United States, Vanuatu, Greenpeace International and WODA.

¹ All documents for this joint session can be downloaded from <https://docs.imo.org>.

2.3 The Groups noted that a final draft version of the *Step-by-step guidance on simple approaches to creating and using action lists and action levels for dredged material* had been prepared by the correspondence group, for consideration by the Scientific Groups.

2.4 In the discussion that followed, it was noted that the guidance document was in line with what was expected in the terms of reference, and that only minor revisions would be necessary in order to finalize the document.

Establishment of a working group on the development of further guidance on action lists/action levels

2.5 The Groups established a working group on the development of further guidance on action lists/action levels, under the lead of Commander Enrique Vargas (Chile). The group was instructed to: taking into account document LC/SG 40/2/1 and comments made in plenary, complete the draft guidance for development of action lists and action levels for dredged material, with a view to its finalization at this session and forwarding to the governing bodies for approval.

Outcome of the working group

2.6 The working group met from 27 to 29 March 2017. The following delegations were in attendance: Australia, Canada, Chile, Ireland, the United Kingdom, the United States and South Africa (LC/SG 40/WP.6).

2.7 The Groups noted that the working group had finalized the draft step-by-step guidance, as well as a supplement, containing a cover page and the draft spreadsheet of action lists/levels. The latter document would be finalized in the intersessional period, with a view to its submission to the governing bodies together with the draft step-by-step guidance, for approval.

Action by the Scientific Groups

2.8 Having noted the outcome of the working group, the Scientific Groups approved the report in general (LC/SG 40/WP.6), and in particular:

- .1 approved the draft *Step-by-step guidance on simple approaches to creating and using action lists and action levels for dredged material*, as set out in annex 2; and
- .2 re-established the correspondence group on further guidance on the development of further guidance on action lists/action levels, under the lead of Chile², and instructed it to complete the supplement containing the global set of action lists/levels and submit the complete guidance to the governing bodies for approval; and
- .3 invited delegations to submit their action lists and action levels to the coordinator as soon as possible, for inclusion in the final document.

2.9 The Scientific Groups thanked all those who had contributed to the deliberations of the work of the group, and in particular Commander Enrique Vargas for his leadership.

² The coordinator, Commander Enrique Vargas, can be contacted at: evargasg@directemar.cl and evargas95@hotmail.com

National action levels and their application

2.10 The Groups took note of two information documents related to experiences with national action lists and action levels:

- .1 document LC/SG 40/INF.22 (United States) on *Methods under development for assessing the potential impacts of dredged material placement/disposal in the water column*, informing that the Engineer Research and Development Center (ERDC) is finalizing validation of new testing protocols for determining potential toxicity of open water placement/disposal of dredged material. Water column effects are assessed by testing the acute toxicity of sediment-water slurries (elutriates), using laboratory bioassays. ERDC is exploring development of testing protocols that use marine species for elutriate bioassays which may have greater site-specific relevance to placement/disposal sites and exposure conditions. Specifically, general toxicity methods for marine copepods are being adapted for elutriate bioassays in a manner that provides both ecologically relevant and appropriately sensitive testing. For further information contact: Alan Kennedy (Alan.J.Kennedy@usace.army.mil); and
- .2 document LC/SG 40/INF.29 (Canada), summarizing a new definition of "total PCB" and new analytical method requirements for PCBs proposed for use in Canadian dredged material characterizations. The Canadian Disposal at Sea Regulations state that permit applicants must assess the level of each contaminant on the Canadian Action List, which includes the concentration of total polychlorinated biphenyls (PCBs) in sediment to be disposed of at sea.

Development of further guidance on disposal site selection and marine cumulative effects assessment

2.11 The Chair recalled that in 2016 the Scientific Groups were informed of recent research and national guidance on the issues of: (1) disposal site selection methodologies; and (2) marine cumulative effects assessment. The Groups noted that both issues might warrant some further attention and encouraged Contracting Parties to make submissions on these topics (LC/SG 39/16, paragraphs 7.3 to 7.9).

2.12 The Chair stated that in 2016 the governing bodies instructed the Scientific Groups to: taking into account any submissions on these topics, initiate the development of additional guidance on marine cumulative effects assessment and disposal site selection methodologies to support contracting and prospective Parties (LC 38/16, paragraphs 11.14 and 11.15). This activity was assigned a medium priority, with a target completion date of 2018.

2.13 It was also recalled that submissions had been made to the previous session, through document LC/SG 39/INF.9 (Canada) on site selection, and document LC/SG 39/INF.3 (United Kingdom) on cumulative effects, and that these could also inform the discussions.

2.14 The Groups were informed of recent progress within OSPAR and noted that discussions were ongoing in the Environmental Impacts of Human Activities Committee (EIHA) of OSPAR, although in the context of indicators in general, and not dumping in particular.

2.15 Several delegations stressed the importance of disposal site selection as part of the waste assessment under the London Convention and Protocol, and it was noted that the Groups therefore already had expertise on this topic. On the issue of cumulative effects assessments, it was agreed that there was a need to better understand what aspects would be of relevance within

the context of the waste assessment guidance, and if so, what the scope of such guidance would be.

Establishment of a working group on further guidance on disposal site selection and marine cumulative effects assessment

2.16 In the ensuing discussion, the Groups established a working group on disposal site selection and marine cumulative effects assessment, under the co-lead of Dr. Andrew Birchenough (United Kingdom) and Ms. Suzanne Agius (Canada). The working group was instructed to develop a work plan for the development of additional guidance on marine cumulative effects assessment and disposal site selection methodologies to support contracting and prospective Parties.

Outcome of the working group

2.17 The working group met from 27 to 29 March 2017. The following delegations were in attendance: Australia, Canada, China, Ireland, Japan, the Netherlands, Nigeria, the Republic of Korea, South Africa, the United Kingdom, the United States, ISA, ACOPS, Greenpeace International and IMarEST (LC/SG 40/WP.3).

2.18 The Scientific Groups noted that there was a need to develop guidance on disposal site selection, and that it would be preferable to address marine cumulative effects assessment within this guidance to the extent that it pertained to disposal site selection. However, given the nature of the two topics, it was suggested that two separate correspondence groups be established.

Action by the Scientific Groups

2.19 Having noted the outcome of the working group, the Scientific Groups approved the report in general (LC/SG 40/WP.3), and in particular established two correspondence groups, with terms of reference and work plans, shown in annex 3, as follows:

- .1 a correspondence group on further guidance on disposal site selection, under the co-lead of Ms. Suzanne Agius (Canada) and Dr. Andrew Birchenough (United Kingdom)³; and
- .2 a correspondence group on assessment of marine cumulative effects, under the lead of Dr. Andrew Birchenough (United Kingdom).

2.20 The Scientific Groups thanked all those who had contributed to the deliberations of the working group, and in particular Dr. Birchenough and Ms. Agius for their leadership.

Keep under review all Generic and Specific Guidelines

2.21 The Chair recalled that the Scientific Groups had been invited to continue to gather and review information on the usefulness and accessibility of all guidelines, as well as experience with their practical implementation, on the basis of submissions by Contracting Parties. This ongoing activity was assigned a medium priority. Topics that might be included were:

- .1 the application of biological assessment techniques;

³ The coordinators can be contacted at Suzanne.agius@canada.ca and andrew.birchenough@cefas.co.uk, respectively.

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- .2 alternative waste management options; and
 - .3 disposal management measures (e.g. capping).

2.22 The Groups considered several informative documents. Document LC/SG 40/INF.16 (United States) informs of the annual Preliminary Assessments (PAs) and more extensive Dredged Material Management Plans (DMMPs), conducted by the USACE, which identify and assess alternatives for establishing plans for the future placement of dredged material. A pilot demonstration at the Houston Ship Channel and Gulf Intracoastal Waterway, Texas, serves as a proof of concept. The web-based suite will provide easy access to critical data and allow stakeholder engagement throughout project development and execution. Key elements of the tools include understanding placement area locations and capacities; displaying channel shoaling conditions and predicting potential future shoaling patterns; portraying relevant environmental conditions; and estimating placement options based on historical dredging costs. The pilot demonstration and resulting technologies will aid in facilitating beneficial use of dredged sediments, improve the management of dredging and placement operations, and reduce the cost and time for PA/DMMP development and execution. The final product will be nationally applicable to other USACE Districts seeking to optimally and sustainably manage dredged materials. For further information, contact: Safra Altman, Safra.Altman@usace.army.mil and Linda Lillycrop, Linda.S.Lillycrop@usace.army.mil.

2.23 Document LC/SG 40/INF.17 (United States) notes that the USACE is preparing technical guidelines for evaluating, designing, implementing and monitoring in situ sediment remediation technologies. The guidelines are being prepared for the United States Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation for use by federal and state regulatory agencies, stakeholders and remediation practitioners. The remediation technologies considered include enhanced monitored natural recovery, isolation capping for physical and chemical stability, and in situ treatment, including the use of amendments. Case studies are provided to demonstrate the application of these technologies. For further information please contact: Paul R. Schroeder, Paul.R.Schroeder@usace.army.mil.

2.24 Document LC/SG 40/INF.18 (United States) presents findings from a project undertaken by the USACE Engineering With Nature (EWN) Program and the USACE Buffalo District, on the application of both granular and powdered activated carbon (AC) to dredged material being placed at the Ashtabula open water site in order to control bioaccumulation of PCBs in fish. The objectives are to document the efficacy of in-barge mixing, the coverage of the placement mound with AC-amended dredged material, potential losses of activated carbon during and after placement, design dosage protocols, as well as bioaccumulation reduction. Bioaccumulation control can expand the range of alternatives available for management and beneficial use of dredged material and provide an achievable path to more sustainable projects by delivering economic, environmental, and social benefits as opposed to the costs of storage in confined disposal facilities. Analysis of carbon distribution, potential losses and bioaccumulation reduction one year after placement have been completed. For further information, please contact: Paul Schroeder, Paul.R.Schroeder@usace.army.mil.

2.25 Document LC/SG 40/INF.24 (United States) informs that on 6 December 2016 the United States issued a general permit to authorize the transport of marine mammal carcasses from the United States and disposal of marine mammal carcasses in ocean waters. The United States issued this general permit to expedite required authorizations for the ocean disposal of marine mammal carcasses that otherwise required the issuance of an emergency ocean dumping permit. The submission provides information on the process and background to this permit. For more information on the United States General Permit for Ocean Disposal of Marine Mammal Carcasses, including a copy of the general permit itself, please see: <https://www.epa.gov/ocean-dumping/ocean-disposal-marine-mammal-carcasses>.

2.26 Document LC/SG 40/INF.3 (Republic of Korea) announces the release and availability of a national report on the experience with the termination of the ocean dumping of sewage sludge in the Republic of Korea, based on the practical implementation of the Specific Guidelines for assessment of sewage sludge. The full report is available at the Korea Environmental Dredging Society (KEDS) website, at <http://www.k-environmentaldredging.or.kr/>. See also paragraphs 8.26 to 8.28 below.

2.27 Document LC/SG 40/INF.9 (Italy) informs of criteria and methodological procedures for characterizing marine and brackish sediments to be dredged, their classification and identification of appropriate management options in the recent Italian legislation.

Developing recommendations on disposal of fibreglass vessels

2.28 The Chair stated that in 2016, the governing bodies, having noted the discussion at the joint session of the Scientific Groups regarding the widespread problem of disposing of fibreglass vessels, particularly those that have been abandoned (LC/SG 39/16, paragraphs 2.26 and 2.28), invited delegations to forward information, best practices and/or guidance, if any, or case studies on the recycling and/or destruction of fibreglass vessels to the next joint session of the Scientific Groups in 2017. The governing bodies instructed the Scientific Groups to propose recommendations regarding whether to prepare advice on the disposal of fibreglass vessels, for consideration at the next joint session of the governing bodies in 2017 (LC 38/16, paragraphs 9.5 to 9.8). This activity was assigned a medium priority with a target completion date of 2018.

2.29 The Groups considered document LC/SG 40/2 (Secretariat), which provided an overview of available information in relation to the issue of disposal of fibreglass vessels, including the linkages with other Conventions, such as the Hong Kong Convention on Ship Recycling, the Nairobi Convention on Wreck Removal, and the Basel Convention. The Groups noted that:

- .1 the disposal of fibreglass vessels seemed to be an issue of direct relevance not only to SIDS, but, due to the scale of the problem also in other countries with large numbers of recreational craft;
- .2 fibreglass was a highly recyclable material, with several second life applications;
- .3 the technology for recycling fibreglass already existed, but the logistics of handling the large amounts of fibreglass hulls from abandoned or derelict vessels posed a significant challenge; and
- .4 a better understanding of the scale of the issue, the options for disposal and recycling, and the potential impacts of fibreglass in the marine environment would be needed if any further guidance were to be developed.

2.30 The Groups considered document LC/SG 40/INF.9 (Canada), providing, in the annex, a consultant's report with an overview of land-based disposal facilities for vessels in Canada including those that were able to deal with fibreglass vessels. In 2015, Transport Canada commissioned a study to undertake an analysis of ship breaking and recycling in Canada attached in the annex. The purpose of the study was to gain a better understanding of the current recycling capacity in Canada. The report provided information on facilities that recycled small and large vessels, related legislation, regional differences, barriers to recycling, and a number of best practices within Canada and internationally.

2.31 The Groups also considered document LC/SG 40/2/3 (Australia), providing information on an Australian experience with a vessel proposed to be placed at sea to create an artificial reef, where a part of the structure contained fibreglass. It was noted that following assessment of the vessel, it had been decided to remove the fibreglass structures before placement of the vessel at sea, due to the uncertainty of the environmental effects.

2.32 In the ensuing discussion, there was strong interest for further investigation of the issue. Several delegations acknowledged the extent of the problem, the gap in regulations, and the need for additional guidance. It was also highlighted that the issue was relevant at both the national and regional levels in several regions.

2.33 The delegation of Norway informed the Groups that they would introduce economic incentives for land-based disposal of fibreglass vessels by July 2017.

2.34 However, it was also noted that the extent of the problem, including the exact nature of the degradation of fibreglass, the fate, transport and impacts in the marine environment, were largely unknown at this point. There were also gaps in the understanding of the regulatory landscape, and that further consultation with other bodies, both within IMO and externally, would be necessary.

2.35 It was suggested that an initial review of the current state of knowledge, similar to the review that was carried out with respect to marine litter in the waste streams under the LC/LP, could greatly assist further discussions.

2.36 The Groups established an informal group to prepare a draft list of proposed next actions to address the issue of disposal of fibreglass vessels.

Action by the Scientific Groups

2.37 Following discussion of the outcome of the informal group, the Groups agreed to forward the following proposed next actions to the governing bodies, for their consideration:

- .1 engage a consultant to:
 - .1 collate information on the scale of the problem associated with the end-of-life management of fibre-reinforced plastic (e.g. fibreglass) vessels, and on alternatives to disposal at sea, taking into account the different types of fibre-reinforced plastic;
 - .2 conduct a review of the literature of relevance to the potential impacts of ocean disposal or placement of fibre-reinforced plastic vessels on the marine environment, including an evaluation of the impacts of the degradation or breaking apart of fibre-reinforced plastic vessels (e.g. microplastic components), taking into account the different types of fibre-reinforced plastic and the influence of different environmental conditions; and
 - .3 identify key knowledge gaps relating to impacts of fibre-reinforced plastic in the marine environment;
- .2 instruct the Secretariat to consult within IMO, and with other relevant treaty bodies, regarding the end-of-life management of fibre-reinforced plastic vessels and provide advice to the Scientific Groups; and

- .3 instruct the Scientific Groups to consider the consultant's report and advice from the Secretariat and evaluate whether there was a need for disposal into the sea of fibre-reinforced plastic vessels or vessels with fibre-reinforced plastic components and, if so, whether such vessels could be disposed of in the sea in a safe and environmentally sound manner; and whether there was a need for guidance.

Revision of the Specific Guidelines for assessment of platforms or other man-made structures at sea

2.38 The Chair stated that in 2016 the governing bodies approved the *Revised Specific Guidelines for assessment of vessels* (LC 38/16, annex 7), thereby replacing the previous guidelines that were adopted in 2000. The revision took into account the entry into force of the London Protocol (2006) and the adoption of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, and its implementation guidelines. It was also expanded to include an appendix detailing a pollution prevention plan.

2.39 The Chair recalled that the *Specific Guidelines for assessment of platforms or other man-made structures at sea* were adopted in 2000, and, given that the two specific guidelines were strongly related, it was appropriate that a review of the *Specific Guidelines for assessment of platforms or other man-made structures at sea* be undertaken to ensure consistency.

2.40 The Groups considered document LC/SG 40/2/2 (Secretariat), providing a background to the possible revision of the *Specific Guidelines for assessment of platforms or other man-made structures at sea*, highlighting recent work at the national, regional and global levels, which would be important to take into account in such a review.

2.41 Several regional agreements that have agreed or prescribed the decommissioning of offshore structures were noted. Under OSPAR, the dumping, and leaving wholly or partly in place, of disused offshore installations is prohibited within the OSPAR maritime area under OSPAR Decision 98/3 (1998) on the Disposal of Disused Offshore Installations. However, following assessment, the competent authority of the relevant Contracting Party may give permission to leave installations or parts of installations in place in the case of specific installations. OSPAR's Offshore Industry Committee will consider cooperation with IMO on the decommissioning guidelines (IMO resolution A.672(16)) and OSPAR's 1998 Decision, with a view to sharing current practices and standardizing guidelines where possible. Further information about OSPAR's work on offshore installations can be found at: <http://www.ospar.org/work-areas/oic/installations>.

2.42 Various governments in the OSPAR maritime area have developed guidance material to assist in the decommissioning of oil and gas installations and pipelines, including the United Kingdom and Norway.

2.43 UNEP MAP, at its thirteenth ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Mediterranean Sea against Pollution, adopted in 2003 the "Guidelines – Dumping of Platforms and other man-made structures at sea" (UNEP(DEC)/MED IG.15/Inf. 13). Further information about offshore installations can be found at: <http://web.unep.org/unepmap/1st-offshore-protocol-working-group-meeting-5>.

2.44 In the United States, oil and gas platforms must be decommissioned (i.e. dismantled and disposed of) at the end of their useful life, according to the terms of the Department of the Interior (DOI) lease by which the platform was authorized. DOI regulations include a disposal option that, under certain circumstances, allows keeping a biologically valuable structure in the

marine environment as an artificial reef through a process called "Rigs-to-Reefs" see <https://www.bsee.gov/subject/decommissioning>.

2.45 In the discussion, the following views were expressed, inter alia:

- .1 the revised guidelines should not encourage dumping, but highlight the difficulties with such practices;
- .2 there was work ongoing within OSPAR to review their guidance, with further discussions taking place intersessionally by correspondence;
- .3 there was a need to strengthen the assessment part of the guidelines, and to include new types of platforms;
- .4 creation of artificial reefs should not be an excuse for disposal;
- .5 in terms of scope, it would be necessary to look at IMO Assembly resolution A.672(16) to determine if these were complementary issues or if there were any gaps;
- .6 there was a lack of technology for addressing biofouling when considering platforms for disposal/recycling; and
- .7 the observer from the IOGP informed the groups that they had data and expertise that might be of interest to the Groups in the revision.

Establishment of a working group on the revision of the Specific Guidelines for assessment of platforms or other man-made structures at sea

2.46 Following extensive discussion, the Groups established a working group on the revision of the *Specific Guidelines for assessment of platforms or other man-made structures at sea*, under the lead of Ms. Karina McLachlan (Australia). The working group was instructed to: taking into account document LC/SG 40/2/2 and comments made in plenary, develop a work plan for the revision of the *Specific Guidelines for assessment of platforms or other man-made structures at sea*.

Outcome of the working group

2.47 The working group met on 28 and 29 March 2017. The following delegations were in attendance: Australia, Canada, Chile, China, Japan, the Marshall Islands, Norway, the Republic of Korea, the United Kingdom, the United States, ACOPS, IOGP, Greenpeace International, and IMarEST (LC/SG 40/WP.4).

2.48 The Groups noted that the revision would benefit from an initial consideration of the changes that were made to the *Revised Specific Guidelines for the assessment of vessels*. This would also allow incorporation of relevant aspects of the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 (such as the Inventory of Hazardous Materials).

Action by the Scientific Groups

2.49 Having noted the outcome of the working group, the Scientific Groups approved the report in general (LC/SG 40/WP.4), and in particular:

- .1 agreed to establish a correspondence group on the revision of the *Specific Guidelines for assessment of platforms or other man-made structures at sea*, with the terms of reference and work plan, under the lead of Norway⁴, with assistance from Canada, as set out in annex 4;
- .2 noted that further advice would need to be obtained from the Secretariat and the governing bodies regarding engaging with MEPC and/or MSC; and
- .3 agreed to recommend a change to the target completion date to 2019.

2.50 The Scientific Groups thanked all those who had contributed to the deliberations of the working group, and in particular Ms. McLachlan for her leadership.

Waste prevention techniques

2.51 The Chair recalled that in 2013, the Scientific Groups had agreed to develop an overview of information regarding waste prevention techniques and sea disposal techniques providing environmental benefits, and invited Parties to submit documents to the Groups, in particular on the methods and extent to which wastes disposed of at sea had been reduced in their jurisdictions. This information could then be placed on the LC/LP website for use by all Parties or prospective Parties (LC/SG 36/16, paragraphs 2.24 to 2.26).

2.52 The Chair also recalled that in 2016 the governing bodies encouraged Contracting Parties to make submissions on experiences with waste prevention techniques to future sessions of the Scientific Groups, in particular on novel techniques that had not previously been discussed by the Groups, as well as the submission of pertinent links to websites containing overviews of information in relation to the application of the waste assessment guidance (LC/SG 38/16, paragraphs 2.34 to 2.36 and LC 38/16, paragraph 4.4.1). The activity had a medium priority with a target completion date of 2017.

2.53 The Groups noted that Science Day, on Thursday afternoon, 30 March 2017 would be held on the topic of "Waste Prevention Audits" (see section 11 below).

Action by the Scientific Groups

2.54 The Scientific Groups noted that no submissions had been received on this topic for this session, and encouraged delegations to continue submitting information on experiences with waste prevention techniques to future sessions of the Scientific Groups, in particular on novel techniques that had not yet previously been discussed by the Groups.

3 MARINE GEOENGINEERING

Keep under review the marine scientific implications of marine geoengineering

3.1 It was recalled that in 2009 the governing bodies agreed that an exploration of marine geoengineering and its possible impacts on the marine environment was regarded as desirable and should be planned in the future. At recent joint sessions, the Scientific Groups have reviewed several submissions on this topic.

3.2 It was also recalled that the governing bodies, in 2015, welcomed the establishment by GESAMP of a working group on marine geoengineering (WG 41), with a view to providing a better understanding of the potential environmental (and social/economic) impacts of different marine

⁴ The coordinator, Ms. Anne-Grethe Kolstad, can be contacted at: anne-grethe.kolstad@miljodir.no

geoengineering approaches on the marine environment, which could also provide advice to the London Protocol Parties in identifying those marine geoengineering techniques that might be considered for listing in the new Annex 4 of the Protocol (LC 38/16, paragraphs 5.6 to 5.10 and LC 38/INF.2).

3.3 The Groups were informed about progress made by the GESAMP working group on marine geoengineering (LC/SG 40/INF.15). It was noted that the working group had progressed to a stage whereby a number of proposed marine geoengineering activities had been eliminated for the time being as they were not mature enough to warrant further investigation. The second meeting of the working group would be held at the World Meteorological Organization Headquarters in Geneva from 26 to 28 April 2017. A report of progress on their work and initial findings would be provided to the governing bodies in October 2017.

3.4 The Groups took note of the following three information documents related to marine geoengineering experiments and the assessment framework developed by the Scientific Groups:

- .1 document LC/SG 40/INF.4 (Republic of Korea), which contains, in the annex, a review article entitled "Ocean-Iron Fertilization Experiments: Past-Present-Future with an introduction to the Korean Iron Fertilization Experiment in the Southern Ocean (KIFES) Project" authored by Joo-Eun Yoon et al. (2016). The article was submitted to the Journal of Bio-geosciences. The five-year project plan (2016-2020) was designed by the Korea Polar Research Institute (KOPRI) in the Republic of Korea. The Scientific Groups noted that while the Project had been suspended the Republic of Korea was invited to provide further information if available;
- .2 document LC/SG 40/INF.25 (China), which contains, in the annex, an article entitled "Research progress in artificial upwelling and its potential environmental effects" authored by Pan Yiwen, Fan Wei, Zhang Dahai, et al. and published by Science China Earth Sciences in February 2016. The publication summarizes the artificial upwelling studies and experiments in the world and investigates the potential environmental effects. The article further introduces the artificial upwelling research conducted by Zhejiang University, including two field scientific experiments in Qiandao Lake and one sea trial in the East China Sea; and
- .3 document LC/SG 40/INF.8 (Greenpeace International) on an *Assessment of ocean fertilization under the London Protocol as an example for broader application to decision-making regarding geoengineering research*. The Groups noted that although the 2013 amendment to the London Protocol to regulate placement of matter for ocean fertilization and other marine geoengineering activities had not yet entered into force, the procedures established under the LC/LP to address these issues, including the assessment framework developed by the Scientific Groups, remained the most comprehensive approach to date to guide decision-making on research activities relating to geoengineering. The Groups also noted a short article, published by the Royal Society of Chemistry in July 2016, which set out the challenges surrounding assessment of geoengineering research proposals and outlined the London Protocol approach as an example that could have application elsewhere. Further information can be obtained at: http://www.rsc.org/images/Bulletin-July-2016_tcm18-248592.pdf

3.5 The Groups were informed about the Carnegie Climate Geoengineering Governance (C2G2) Initiative, which was launched in January 2017. It was noted that the Executive Director had been invited to speak at the GESAMP working group meeting. Further information can be found at: <http://www.c2g2.net/>. The Groups were also informed about a workshop being organized by the Geoengineering Research Governance Project (GRGP) (<http://ucalgary.ca/grgproject/>). The workshop will run from Wednesday 21 June to Friday 23 June 2017 and will take place at the Oxford Martin School, United Kingdom. The purpose of the meeting is to bring together experts in international law, policymakers, civil society actors and academics working on the topic of geoengineering research at a workshop to examine and help develop a draft Code of Conduct relating to geoengineering research. In total, about forty participants are expected at the meeting with representatives from a range of UN agencies/programmes and national policymakers.

3.6 The Chair reiterated that it was important that the Scientific Groups were kept informed of the scientific implications of marine geoengineering proposals as they arose and urged Contracting Parties to present their submissions to the next joint session of the Scientific Groups in 2018.

4 CO₂ SEQUESTRATION IN SUB-SEABED GEOLOGICAL FORMATIONS

4.1 It was recalled that in recent years the Scientific Groups, having noted the low level of submissions under the various sub-items of this agenda item, decided to consider all relevant issues related to CO₂ sequestration in sub-seabed geological formations, collectively, at future sessions (LC/SG 37/16, paragraphs 4.3 to 4.12). The Scientific Groups were invited to consider any information in relation to the CO₂ Sequestration Guidelines, or on the scientific and technical aspects of CO₂ sequestration projects. This is an ongoing item of medium priority.

4.2 The delegation of the United States informed the Groups that on November 30 2016 the United States Department of Energy (DOE) announced that 16 carbon storage projects had been selected to receive more than US\$44 million for cost-shared research and development. The funding is part of DOE's Carbon Storage Assurance Facility Enterprise (CarbonSAFE) initiative, which seeks to help mitigate carbon dioxide emissions. Two of the projects are focused on offshore carbon capture and storage:

- .1 the University of Texas at Austin will perform a commercial-scale initial characterization of a near-offshore storage complex on the inner shelf of the Gulf of Mexico; and
- .2 Columbia University will undertake a project that proposes large-scale permanent storage of CO₂ in deep ocean basalt formations to enable mineral carbonation as a safe and publicly acceptable solution for mitigating anthropogenic emissions. There is no component of this project that includes a physical injection into any sub-seabed geological formation or anywhere else.

These projects are anticipated to be completed by July 31 2018. Additional information on these projects is available on the United States DOE's website at <http://www.energy.gov/fe/articles/doe-selects-projects-assess-offshore-carbon-storage>.

4.3 The delegation of Japan informed the Groups about the first permit application in Japan with respect to CO₂ disposal into a sub-seabed geological formation in Tomakomai, Hokkaido, which was approved in March 2016. The project included the injection of CO₂ waste streams sourced from a land-based facility via a pipeline. Japan highlighted three key points they experienced during the first permitting process, one of which was the philosophy behind judging the transition of monitoring phases, which were based on water sampling and analysis. Further information would be provided to future sessions of the Scientific Groups, as appropriate.

4.4 The observer from Greenpeace International expressed concerns about information received through the Carbon Capture and Storage Association about the Fujian Zhangzhou Power Plant FGD, China, which was designed by Marine Protech Limited (MPT) and which was reported to be disposing of CO₂ directly into the water column.

4.5 The observer from OECD (IEAGHG) informed the Groups that the efficacy and impacts on the marine environment of ocean storage of CO₂ in the water column required more in-depth research and that more information about this project would be needed.

4.6 The delegation of China indicated that, following internal consultations, it would aim to provide further information about this activity to a future session of the Scientific Groups.

4.7 The observer from OECD (IEAGHG) also informed the Groups that a second International Workshop on Offshore CCS was being held on 19-20 June 2017, at Beaumont, Port Arthur, Texas, United States. The contact point for this event was tim.dixon@ieaghg.org. The Groups also noted that an EU project, STEMM-CCS, was underway to develop offshore CO₂ monitoring techniques and systems and comprehensive environmental baseline surveys for the mid-North Sea, building upon the QICS and ECO2 projects, and to be tested around an example of a potential CO₂ storage site in United Kingdom waters (100m water depth). More information can be found at: <http://www.stemm-ccs.eu/>.

4.8 The LP Scientific Group thanked all delegations that had spoken for the information they had shared and agreed that it was important to continue receiving relevant and up-to-date information on all scientific, technical as well as legal, aspects of CO₂ sequestration projects and encouraged Contracting Parties to inform them of relevant developments, if any, through submissions to the next session.

5 REPORTING ON DUMPING ACTIVITIES

Review of dumping reports

5.1 The Chair stated that in 2016 the governing bodies reviewed the implementation of the *Strategy to improve reporting under the London Convention and Protocol*, and instructed the Secretariat to: publish the summary report on permits issued in 2013 in early 2017; and submit a final draft summary report on permits issued in 2014 and a first draft 2015 compilation report to the meeting of the Scientific Groups and to the Correspondence Group on Assessment of Dumping Reports (CGADR), under the lead of Ireland, for review. This is an ongoing item of high priority (LC 38/16, paragraph 7.5).

5.2 The Groups were informed that the final report on permits issued in 2013 had been published in January and circulated as document LC-LP.1/Circ.81.

5.3 The Scientific Groups noted that the Secretariat had prepared a first overview of the number of dumping permits reported in 2015 (LC/SG 40/5) and would update the data as new reports were received. It was noted that in 2015 there had been 87 States registered as Contracting Parties to the London Convention and 46 States registered as Contracting Parties to the London Protocol. The invitation to Parties to report over 2015 had been issued in August 2016 (LC-LP.1/Circ.78, with a deadline of 1 October 2016) and the Secretariat was working towards presenting the first draft report for 2015 to the meeting of the governing bodies in October 2017. Only 19 Contracting Parties had provided a report on their dumping activities for 2015 at the time of publication of the document.

5.4 The Groups also noted that since the issuance of the document Costa Rica had submitted its 2015 report. The delegation of Japan informed the Groups that they were in the process of finalizing their 2015 report for submission to the Secretariat in the near future.

5.5 The delegation of Canada noted that there was an incorrect "force majeure" next to the Canadian entry on document LC/SG 40/5, annex.

5.6 It was stressed that Parties which had not yet provided their annual reports should submit reports to the Secretariat as soon as possible, preferably in the new online GISIS reporting module. In this regard, use could be made of the guidance to enter data on the GISIS reporting module set out in LC-LP.1/Circ.74.

5.7 The Groups were informed about the final draft summary report on dumping permits issued in 2014 (LC/SG 40/5/1). In 2014, there had been 87 States registered as Contracting Parties to the London Convention and 45 States registered as Contracting Parties to the London Protocol. To date, 34 Contracting Parties had provided a report on their dumping activities for that year. Out of the reporting Parties, ten were Parties only to the Convention, and 24 were Parties to the Protocol (either only the Protocol or both the Convention and Protocol). This was equivalent to a reporting rate of 19% for the Convention-only Parties, and 52% for the Protocol Parties, the lowest reporting rate to date.

5.8 The Groups encouraged Parties to submit their reports on permits issued in 2014 by 1 June 2017 to allow the Secretariat to submit the final draft for consideration by the governing bodies in October 2017.

5.9 The Groups considered document LC/SG 40/5/2 (Chair of the CGADR), providing a review of the draft report on permits issued for 2014. In its submission, the CGADR highlighted a lack of compliance in reporting from many countries with the highest number of countries not reporting, to date. This issue was highlighted last year by the UN First World Ocean Assessment, as reported in document LC 38/3. The review also identified some specific questions for clarification regarding some of the dumping activities reported and the materials dumped as well as raising more general questions for the Scientific Groups and for the governing bodies. The Scientific Groups noted the following clarifications for the issues raised in annex 1 of LC/SG 40/5/2:

Country	Specific points
Australia	Confirmed that a permit was issued in 2013. The disposal of 4 buoys took place in 2013, and the "riser turret mooring" in 2014, under category of "vessels, platforms or other man-made structures at sea". It was also noted that the areas indicated for dumping activities were incorrectly specified as all being in the Indian Ocean.
Canada	Confirmed that the nature and origin of inert material disposed of was geological till after debris and other contaminants had been removed.
Marshall Islands	Confirmed that 1,500 tonnes was disposed of, not 1,500,000 tonnes.
Netherlands	No permits were issued in 2014.

New Zealand	In relation to the carbon steel wellhead – Maritime New Zealand confirmed that the wellhead could remain in place until 2023, after which it would be decommissioned.
Norway	Confirmed that the nature and origin of inert material disposed of in 2014 was rocks from tunnelling works.
South Africa	Confirmed that an emergency permit was issued for disposal of coal and aft section of vessel in 2013. 26,000 tonnes of "other" waste was in fact coal.
United Kingdom	2,120 tonnes of "other material" waste was seaweed.
United States	One general permit was issued for ocean disposal of man-made ice piers from its base at McMurdo Sound in Antarctica. This permit was not used in 2014. Four vessels were dumped under the general permit for the transportation and disposal of vessels in 2014. One general permit for the burial at sea of human remains was also issued.

5.10 In the ensuing discussion, various views were expressed regarding ways to increase the rate of reporting. It was recognized that the Compliance Group and the B2C Steering Group were both tasked to develop recommendations on this issue. It was agreed to discuss this issue further under item 6 of the agenda.

5.11 The Groups were informed that due to lack of data available for 2015, the Secretariat had, so far, only forwarded the 2014 final draft summary report on permits to the CGADR for their review. It is envisaged that the CGADR would also forward its report to the next meeting of the Compliance Group in 2017 for consideration, and explicitly consider whether particular issues of individual or systemic non-compliance should be highlighted for their consideration. The delegation of Nigeria informed the Groups that they were in the process of finalizing their 2014 report for submission to the Secretariat in the near future.

5.12 The Groups recalled that the Scientific Groups had been requested by the governing bodies to update the list of technical experts contained in the appendices of *The London Protocol – What it is and how to implement it* with a view to making this list available online (LC 38/16, paragraph 7.18.3). It was noted that no such list existed in the London Protocol Manual, but that the Secretariat had previously requested the names of technical experts, including legal experts, via LC-LP.1/Circ.59 (2013) and reiterated this verbally each year since, and that this roster of experts might serve the intended purpose.

Action by the Scientific Groups

5.13 Following discussion, delegations were invited to submit the names of technical/legal experts, including their CVs, to the Secretariat, by way of email, by 1 June 2017, in order for the Secretariat to provide a report to the next meeting of the governing bodies in October.

Review of reporting requirements

5.14 The Chair recalled that in 2015 the Scientific Groups, having noted the progress made by the London Protocol Compliance Group on the review of the use of the Reporting Format, tasked the CGADR with commenting on the trial use of the revised format (LC/SG 38/16, paragraphs 5.16 to 5.18). This ongoing activity was assigned a medium priority.

5.15 The Scientific Groups reviewed progress with the introduction of the new online reporting system (LC/SG 39/16, paragraphs 5.12 and 5.13), available in the IMO Global Integrated Shipping Information System (GISIS), <http://gisis.imo.org>, and as announced in circular LC-LP.1/Circ.74.

5.16 The Groups noted that the system was functional, and that some six Parties had utilized it to report their 2015 dumping activities. Several delegations pointed to problems with reporting and using the GISIS module. Others suggested that more thought needed to be given to the need for reporting quantities actually dumped, against the requirement to report permitted quantities. The current practice might cause some difficulties in cases where amounts disposed of would only be available long after a permit had been issued (also for example with multi-year permits). Other aspects of the reporting requirements should also be reviewed.

5.17 It was also suggested that a webinar or online video could be developed to guide users in entering data into the GISIS module. It was noted that the Compliance Group had developed a number of PowerPoint slides to explain why reporting was important. National and regional workshops could also be used to educate users about reporting and about the GISIS module.

Action by the Scientific Groups

5.18 Having considered various views regarding the reporting tables, the Scientific Groups agreed that more experience with the current format was needed before a detailed review of the reporting tables could take place.

Collaboration with other international bodies on reporting

5.19 The Chair recalled that Contracting Parties had the choice, under LC article VI(4) and LP article 9.4, to report either directly to IMO on their dumping activities, or through a Secretariat established under a regional agreement. The Scientific Groups were invited to review progress on collaboration with UNEP Regional Seas and other regional organizations concerning reporting of dumping activities. This ongoing activity was assigned a medium priority.

5.20 The Groups were reminded that the Secretariat was continuing its efforts to discuss with several of the regional bodies to improve these aspects, but that to be successful in these efforts, the initiative would have to come from the countries in the regions, through their respective regional bodies, and delegations were encouraged to, if in a position to do so, raise the issue at appropriate regional meetings.

5.21 Several delegations noted the need for a critical review of the usefulness of the reporting and the data collected. There would be value in communicating what the data was used for, and explaining the value of reporting, in order to encourage compliance with the reporting requirements and thereby build a better understanding of the importance of the treaties and their success over the last decades.

5.22 The Groups were also informed of the recent efforts in the Mediterranean region, through a presentation by the Secretariat for the Mediterranean Action Plan (UNEP MAP). It was noted that while the reporting rate was good, several elements of the report, including number of permits or quantities was not always correct or complete. It was noted that 15 States had ratified the 1995 amendment to the dumping protocol to the Barcelona Convention (similar to the London Protocol) and one more ratification was needed to bring the amended protocol into force. The 1976 dumping protocol (London Convention equivalent) was in force for most Mediterranean States.

5.23 It was noted that some Barcelona Convention Parties were not thinking of ratifying or adopting the marine geoengineering amendment to the London Protocol, as it was not yet in force.

Historical dumping records

5.24 The Chair recalled that in 2014 the Scientific Groups, having considered a *Review of historical dumping records for the period 1976 to 2009*, submitted by the Chair, agreed to continue to gather and collate dumping records intersessionally by correspondence (LC/SG 37/16, paragraphs 5.12 to 5.15). In 2016, the Groups considered progress made intersessionally (LC/SG 39/5 and LC/SG 39/16, paragraphs 5.19 to 5.21), and invited the Republic of Korea to continue its work to analyse historical dumping records, with a view to informing ongoing global processes such as the World Ocean Assessment and the 2030 Agenda for Sustainable Development.

5.25 The Groups considered document LC/SG 40/INF.28 (Canada), presenting a brief history of disposal at sea permits in Canada, with a view to providing support to the ongoing review of global dumping records. The document provided a summary of Canadian disposal at sea trends, some of the milestones and key events, as well as trends in reporting. The Scientific Groups expressed their appreciation to Canada for their submission on historical dumping data and encouraged other delegations to submit similar studies to future sessions of the Scientific Groups.

6 TECHNICAL COOPERATION AND ASSISTANCE

Implementation of the Barriers to Compliance (B2C) Project

6.1 The Scientific Groups recalled that in 2016 the governing bodies, having reviewed the implementation of workshops and projects under the B2C Project, approved the intersessional work plan of the B2C Steering Group, under the lead of Ghana⁵, to support ongoing and future technical cooperation and assistance activities and to continue the discussion on possible actions to improve ratifications of the Protocol (LC 38/16, paragraphs 8.36 to 8.37 and annex 4).

6.2 It was recalled also that the governing bodies noted a number of requests for technical assistance for the period 2017-2018, depending on funds available from the Trust Fund and other sources (LC 38/16, paragraphs 8.1 to 8.37 and annex 4).

6.3 The Chair of the B2C Steering Group informed the Scientific Groups of progress made in the intersessional period. The Scientific Groups noted the following information:

- .1 the consultant contracted by Canada to assist the Steering Group with the revision of the draft Guidance on national implementation had recently provided the Group with a second revised draft following the input received in the first round of correspondence. The second draft incorporated a number of recommendations and suggestions by the Steering Group members. The Group, taking advantage of the Scientific Groups meeting, intended to have an informal meeting to progress work on the draft. The Group would continue to work via correspondence to finalize the draft with a view to its adoption at the next meeting of the governing bodies; and

⁵ The Chair of the B2C Steering Group, Mrs. Azara Prempeh can be contacted at: Azara.Prempeh@ghc-uk.org

- .2 to further increase ratifications of the Protocol, the Group had worked with the Chair of the governing bodies to obtain permission to give a presentation on the London Protocol at MEPC 71 (3 to 7 July 2017). The Chair of the B2C Steering Group was continuing to collaborate with the former co-chairs (Canada and Germany) of the correspondence group on increasing ratification of the London Convention and Protocol, which was incorporated into the Steering Group, in preparation for the presentation at MEPC 71, in particular, to develop the draft slides for the presentation to be made by the Chair of the governing bodies, which would highlight the benefit of being a Party to the Protocol, and the work and achievements of the London Convention and Protocol.

6.4 Following discussions, the Scientific Groups welcomed the progress made by the B2C Steering Group, and noted that work would continue in the intersessional period, with a view to reporting to the next joint session of the governing bodies in October 2017. It was also noted that any comments on the various documents under development by the B2C Steering Group and the Compliance Group should be directed to the respective groups.

Technical advice to specific countries, including national and regional workshops

6.5 The Groups recalled that the convening of workshops concerning the London Convention/Protocol was recommended as an option when the *Practical guidance on the preparation of technical cooperation workshops* was discussed at the 27th Consultative Meeting in 2005.

6.6 It was also recalled that national workshops could support the process of a State preparing to join the London Protocol, for instance to gain political momentum at the start of such a process, or as a check nearer the end to see if all the requirements under the Protocol had been fulfilled.

6.7 National workshops have been held in various countries and are regularly reported to the Scientific Groups. Since 1998, Regional workshops have been convened biennially in conjunction with regular meetings of the Scientific Groups, but also as "stand-alone" activities.

6.8 The Scientific Groups considered document LC/SG 40/6 (Secretariat), reporting on four national workshops to promote the LP conducted since the previous joint meetings of the Scientific Groups: in Viet Nam (May 2016), Madagascar (August 2016), Jordan (December 2016) and Mozambique (February 2017).

6.9 The workshop in Viet Nam was held over three days, from 25 to 27 May 2016. This was the first national London Protocol workshop in Viet Nam, and was convened in cooperation with the maritime administration of Viet Nam, Vinamarine. The training was attended by sixty-nine participants. Two resource persons were provided in-kind by the Government of the Republic of Korea, Prof. Gi-Hoon Hong and Dr. Seung-Nam Seo (KIOST).

6.10 The main outcome from the workshop was an agreement that Vinamarine would request further support for developing a national assessment and work plan for the accession to the London Protocol, in particular in relation to setting up and executing a dumping activities programme in line with the London Protocol global standards and guidance. Following this request, a national consultant was recruited to prepare a national assessment in preparation for accession to the London Protocol. A final report of this project is expected by 31 May 2017. A full report on this project is expected to be submitted to the next meeting of the governing bodies in October 2017.

6.11 The national workshop in Madagascar was held over two days, on 11 and 12 August 2016. The training was coordinated in cooperation with the Agence Portuaire, Maritime et Fluviale (APMF) of the Ministry of Transport and Meteorology. One resource person was provided in-kind by the Government of Canada, Dr. François Marchand (Environment and Climate Change Canada). The workshop was attended by twenty-three participants and was conducted partially in English and partially in French.

6.12 The workshop in Jordan was hosted by the Aqaba Special Economic Zone Authority (ASEZA), in cooperation with the Jordan Maritime Commission (JMC) and PERSGA. It was held over three days from 28 to 30 November 2016 and was a follow-up to a successful regional workshop on the London Protocol, held in Jeddah, Saudi Arabia, in May 2015. One resource person was provided in-kind by the Government of the United Kingdom, Dr. Andrew Birchenough (Cefas).

6.13 The workshop in Mozambique was hosted by the maritime administration of Mozambique (INAMAR), at the School of Nautical Sciences in Maputo, on 1 and 2 February 2017. The activity was a follow-up to a successful regional workshop, held in Nairobi, Kenya, in cooperation with the Secretariat for the Nairobi Convention, in 2014. One resource person was provided in-kind by the Government of South Africa, Mr. Ulric van Bloemestein.

6.14 The Scientific Groups noted that a key lesson from these, and previous workshops, was that each national workshop needed to be specifically tailored to a particular audience as it could vary considerably from country to country and from region to region. This called for a review of the strategic approach to delivering workshops, such as supporting fewer countries for a longer period of time to ensure a gradual learning, with a pathway set in motion that steadily moved the recipient country along an ever-increasing level of technical and administrative complexity, up to and including ratification or accession. As a first step, a strong commitment by the recipient country should be agreed and then a national action plan should be approved by the highest organ in the country, thereby guaranteeing a consistent and long-term approach. This approach would also resonate better with the "twinning concept" discussed for a number of years. The format was currently being applied in the case of Viet Nam, which had now established a work plan for the next 18 months leading up to accession.

6.15 In the ensuing discussion, the following suggestions to improve the effectiveness of technical cooperation interventions were made:

- .1 implement screening of the people nominated to attend a workshop, by introducing criteria as necessary, to ensure that the right audience or category of participants are present at workshops tailored to the needs of the recipient countries;
- .2 possible involvement of national or local experts to further support the recipient countries in implementing the LC/LP;
- .3 the possibility of assigning a consultant to a recipient country following a workshop to develop a national action plan to progress ratification, drafting of legislation or implementation as the case may be; and
- .4 greater use of the "twinning concept" to provide continued and progressive assistance to countries following workshops or in lieu of conducting a workshop.

6.16 Noting the usefulness of the proposals made by delegations, the Groups instructed the B2C Steering Group to consider the need for reviewing the strategic approach in delivering workshops, taking into account these suggestions.

6.17 The Groups were informed about events scheduled in the coming year, as listed in annex 5, and it was noted that, drawing on both the LC/LP Trust Fund as well as the IMO Integrated Technical Cooperation Programme (ITCP), workshops were scheduled in Ghana (regional), Sierra Leone (national), Sri Lanka (sub-regional), the Russian Federation (national), Ukraine (national) and Djibouti (national).

6.18 The Scientific Groups encouraged Contracting Parties to keep them informed about bilateral projects relevant to the Groups' work.

Other technical cooperation and outreach activities

Development of communication plans for recent publications

6.19 The Groups recalled that the governing bodies approved the communication plan for the publication *The London Protocol: What it is and how to implement it* (LC 37/16, paragraph 8.37 and annex 4), and in 2016 the governing bodies approved the communication plans for the document on the *Benefits of being a Party to the London Protocol* and the *Low cost, Low technology Assessment and Monitoring Guidelines* (LC 38/16, paragraph 8.36 and annex 6).

6.20 It was noted that the review of the implementation of the communication plans for the publications was already in the terms of reference for the B2C Steering Group, and the B2C Steering Group was therefore invited to report back, as and when appropriate.

Improvement and update of the London Convention and Protocol website

6.21 The Chair stated that in 2016 the governing bodies were informed that the London Convention/Protocol website remained under continuous updating and development, and noted a list of recommendations to improve the website, as provided by the Compliance Group in its report to the Meeting of Contracting Parties (LC 38/WP.2, annex 3). The governing bodies instructed the Secretariat to continue improving the website, in particular addressing the recommendations by the Compliance Group.

6.22 The Secretariat informed the Groups of recent changes and revisions made on the website, and that further updates would be made, as needed.

Establishment of a Graduate School of LP Engineering Master of Project Administration

6.23 The Groups considered document LC/SG 40/INF.31 (Republic of Korea) providing information on the admission timelines for a graduate school of LP Engineering Master of Project Administration (LPEM). The Groups noted that the Korea Institute of Ocean Science and Technology (KIOST) was planning to start opening the LPEM in March 2018 by admitting students from the Asia-Pacific countries. Further information was also provided through a lunchtime presentation on the topic.

6.24 The Groups noted the progress made towards the establishment of the LPEM, as well as the timelines and criteria for admission. Further information regarding the LPEM can be provided by Dr. Yeon S. Chang (yeonschang@kiost.ac.kr) and Dr. Chang Soo Chung (cschung@kiost.ac.kr).

Strengthening the roster of experts

6.25 The Groups recalled the request by the governing bodies to update the list of technical experts contained in the appendices of *The London Protocol – What it is and how to implement it*, with a view to making this list available online (LC 38/16, paragraph 7.18.3). It was however also recalled that the Secretariat had requested names of technical experts, including legal experts, via LC-LP.1/Circ.59 (2013) and that this roster of experts would serve the intended purpose.

6.26 The Groups, therefore, encouraged delegations to submit the names of such technical/legal experts, including their CVs, to the Secretariat, by way of email, by 1 June, in order for the Secretariat to provide a report to the next meeting of the governing bodies in October 2017.

Re-establishment of the Barriers to Compliance Steering Group

6.27 Following the discussion, the Scientific Groups re-established the B2C Steering Group under the lead of Mrs. Azarah Prempeh (Ghana) to:

- .1 review and update the Barriers to Compliance Project plan of activities, in accordance with the comments and decisions made in plenary with regard to requests for assistance or proposed workshops;
- .2 continue its work on the issues listed in the work plan approved by the governing bodies in 2016 (LC 38/16, paragraph 8.36.6);
- .3 discuss the possibilities to consolidate previous suggestions on ways to improve reporting into one action plan to meet the targets on reporting set in the Strategic Plan; and
- .4 based on the suggestion by the Secretariat, discuss the need to revise the technical cooperation approach as outlined in document LC/SG 40/6, with a view to providing advice to the governing bodies.

Outcome of the B2C Steering Group

6.28 The B2C Steering Group met on 30 March. The following delegations were in attendance: Canada, China, Ghana, Japan, the Republic of Korea, South Africa, the United Kingdom, the United States, ACOPS, Greenpeace International and IMarEST.

Action by the Scientific Groups

6.29 Having noted the outcome of the working group, the Scientific Groups:

- .1 approved the report in general (LC/SG 40/WP.5);
- .2 requested the CGADR and the Compliance Group to provide the B2C Steering Group with previous suggestions on ways to improve reporting and tasked the B2C Steering Group with the consolidation of previous suggestions as well as new ideas into one action plan; and
- .3 invited the governing bodies to consider the review of the strategic approach in delivering LC/LP workshops, taking into account suggestions made by the B2C Steering Group as outlined in LC/SG 40/WP.5, paragraphs 8 to 13.

6.30 The Groups thanked the B2C Steering Group for its efforts and progress made in the intersessional period as well as during the joint session.

7 MONITORING AND ASSESSMENT OF THE MARINE ENVIRONMENT

Reports and assessments of monitoring and developing guidance on monitoring and reporting

7.1 The Chair recalled that in 1999 the 21st Consultative Meeting had reconfirmed the importance of monitoring for the purpose of the London Convention in relation to dumping activities and had agreed that aspects related to research and assessment should be addressed by the Scientific Group and those related to compliance by the Consultative Meeting. The Scientific Groups, as in previous years, were invited to review monitoring reports submitted by Contracting Parties related to dumping operations in accordance with LC Article VI(1)(d) and the equivalent LP Article 9.1.3 (LC/SG 39/16, paragraphs 7.1 to 7.9). This ongoing activity is assigned a high priority.

7.2 The Chair stated that in 2016 the governing bodies approved the *Guidelines on low cost, low technology compliance monitoring: assessment of permit compliance for disposal of wastes and other matter at sea* (LC 38/11, annex) and instructed the Secretariat to publish the guidance as soon as practical in all three working languages of IMO, following a final editorial review. This followed the approval, in 2015, of the *Low cost, low technology field monitoring: Assessment of the effects of disposal in marine waters of dredged material or inert inorganic, geological material*. The Scientific Groups were invited to review progress with the publication of these guidance documents.

7.3 It was also stated that the governing bodies encouraged delegations to continue to submit information on field monitoring techniques to the Scientific Groups for consideration at this joint session (LC/SG 39/16, paragraphs 7.9.1; LC 38/16, paragraphs 11.1 to 11.5). The Groups were invited to review any such information submitted.

7.4 The Scientific Groups noted the following two documents submitted by Canada:

- .1 document LC/SG 40/INF.2, which contains the results of a review of several Pacific coast monitoring studies to evaluate the effects of disposal at sea on marine benthos at various disposal locations. The outputs of the review and relevant scientific literature about benthos in the same geographical area were used to generate recommendations about when and how various benthos monitoring techniques should be used in disposal at sea monitoring studies; and
- .2 document LC/SG 40/INF.13 contains, in the annex, Canada's results of monitoring studies conducted in 2010-2011. Canada conducts representative monitoring of sites at which disposal at sea has been permitted each year.

7.5 The Scientific Groups also noted the following two documents submitted by the United Kingdom:

- .1 document LC/SG 40/INF.11 considers the use of Diffusive Gradients in Thin Films (DGT) to investigate metal behaviour in sediments at three disposal sites and demonstrates how use of depth resolving passive samples such as DGT is compatible with routine monitoring of disposal sites and can provide valuable additional information. The study outcomes, in the annex to the document, can help to inform and improve future disposal site impact assessment, and could be complemented with techniques such as Sediment Profile Imagery for improved

biological relevance, spatial coverage and cost-effective monitoring and sampling of dredge material disposal sites. The study, authored by R. Parker et al., was published in *Science of the Total Environment* 575 (2017), pp. 1074-1086; and

- .2 document LC/SG 40/INF.12 contains, in the annex, a study that assesses the impacts of dredged material disposal on both benthic invertebrate assemblage structure and function at a licenced disposal site (North Tyne) off the north-east coast of England. The study, authored by S. G. Bolam et al., was published in the *Marine Pollution Bulletin* 105 (2016) pp. 180–192.

7.6 The delegation of the United States welcomed the information about DGT to investigate metal behaviour in sediments, and noted the emergence of passive sampling with benefits for both remote field monitoring and laboratory work, and suggested that this could be a topic at a future Science Day, given that these technologies offered a powerful tool for monitoring disposal sites.

7.7 The Scientific Groups noted document LC/SG 40/INF.23 (United States), which announced the availability of the 2013 National Ocean Dumping Site Monitoring Assessment Report. In fiscal year 2013, the United States Environment Protection Agency managed 95 designated ocean disposal sites located off the United States Atlantic, Gulf and Pacific coasts, in the Caribbean, and off the coasts of Hawaii and other islands in the Pacific. This report serves as a comprehensive summary of ocean disposal site monitoring surveys conducted in 2013 by the United States Environmental Protection Agency (EPA). This included 13 surveys at 20 ocean disposal sites offshore from Puerto Rico, Virginia, South Carolina, Florida, Texas, Hawaii, and Oregon. The EPA conducts oceanographic surveys to monitor the impacts of regulated dumping at ocean disposal sites. It also conducts site monitoring activities in coordination with the United States Army Corps of Engineers (USACE). The vast majority of United States ocean sites are designated for the disposal of dredged material, an activity for which the USACE has permitting authority. To access the 2013 National Ocean Dumping Site Monitoring Assessment Report and learn more about ocean disposal site monitoring activities in the United States, visit: <https://www.epa.gov/ocean-dumping/ocean-disposal-site-monitoring>.

7.8 The delegation of the United Kingdom informed the Groups that its regular annual monitoring report for 2015 would be made available in the near future and that it could be accessed at: <https://www.gov.uk/government/publications/dredged-material-disposal-site-monitoring-round-coast-of-england>.

7.9 The Scientific Groups thanked Canada, the United Kingdom and the United States for their informative submissions.

7.10 In the ensuing discussion questions were asked about what the minimum requirements for monitoring were, given that extensive monitoring could be very costly and technologically complex. It was noted that the Compliance Group had produced an overview of such requirements (LP-CG 3/7). The Groups also noted that following a review of all monitoring reports received by the Secretariat in the period 1996 to 2009 (LC 32/10; LC/SG 33/7) a report was produced by a consultant that included recommendations on essential monitoring. Following a decision by the governing bodies the reporting format was extended to include information about monitoring parameters and frequency. This table, currently accessible in the GISIS module (table 5), also allowed Parties to include a link to their monitoring reports. It was noted that few Parties had used this method to report on their monitoring obligations. The groups also noted that following a review of monitoring techniques, it was decided to develop a suite of low cost, low technology monitoring guides specifically designed for countries with capacity and resource constraints.

7.11 The Groups were informed (LC/SG 40/INF.14) that the publication of *Low cost, low technology field monitoring: assessment of the effects of disposal in marine waters of dredged material or inert, inorganic, geological material*, was published in late 2016, I542E (English), with French and Spanish versions to follow in 2017. The *Guidelines on low cost, low technology compliance monitoring: assessment of permit compliance for disposal of wastes and other matter at sea* was currently undergoing an editorial review and would be published in late 2017.

Action by the Scientific Groups

7.12 Following a brief discussion, the Scientific Groups:

- .1 encouraged Contracting Parties to submit monitoring reports to future meetings of the Scientific Groups and/or to include monitoring reports submitted under regional conventions to protect the marine environment; and
- .2 instructed the Secretariat to provide a summary report of the most basic data received during the last few years so that this could be discussed at the next joint session of the Scientific Groups. This information could provide the basis for a discussion about implementing the monitoring guidance(s) so that Parties might learn from the experiences and could implement the suggestions in the future.

Contribution to the global reporting and assessment of the state of the marine environment (UN Regular Process)

7.13 The Chair stated that in 2016, the governing bodies were informed that the First World Ocean Assessment (WOA I) was available to download from the Division of the Ocean and the Law of the Sea (DOALOS) website, and that several chapters of WOA I were of direct relevance to the London Convention/Protocol (LC 38/3). The governing bodies noted that the outcome of WOA I was expected to feed into other global (and regional) mechanisms, such as the 2030 Agenda for Sustainable Development, in particular Sustainable Development Goal 14 (LC 38/16, paragraphs 11.7 to 11.12). The Scientific Groups were invited to provide relevant further comments on the full report, and in particular in relation to the WOA and its second cycle, in order to address the concerns raised in WOA I regarding the low ratification and compliance levels under the LC/LP. This ongoing activity was assigned a low priority.

7.14 The Groups considered document LC/SG 40/7 (Secretariat) about progress made in the implementation of the 2030 Agenda for Sustainable Development and the second cycle of the UN Regular Process. In this regard the Groups noted that the work on historical dumping data, and in particular on trends, might be a useful data set to complete for the purposes of the next cycle of the UN Regular Process. Monitoring reports should also be summarized. One of the key elements would be to obtain a higher response rate to reporting of dumping activities as this tied it together and demonstrated the effectiveness of the Protocol and the Convention.

Action by the Scientific Groups

7.15 Having reviewed the information provided in document LC/SG 40/7 and that London Convention and Protocol Parties were identified for their lack of compliance, the Scientific Groups agreed that it was essential that Parties work harder to increase the level of reporting and the level of reporting of monitoring activities. Non-reporters should be invited to communicate their activities more rigorously, via letters, telephone or other forms of communication. Therefore, the need to engage a dedicated consultant to follow up with non-reporters, or through the Compliance Group, could be considered, and it was noted that the Compliance Group could play an important role in this outreach effort.

8 COASTAL MANAGEMENT ISSUES ASSOCIATED WITH ACTIVITIES TO PREVENT MARINE POLLUTION

Cooperation with UN agencies and other organizations

Riverine and sub-sea disposal of tailings and associated wastes from mining operations

8.1 It was recalled that in 2013, following consideration of a Secretariat-commissioned report on riverine and marine disposal of tailings and associated wastes from mining operations, the governing bodies established a correspondence group to: develop an inventory and understanding of the scope of the LC/LP and other international bodies; gather information on best practices, existing guidance and other issues of marine and riverine disposal of mine tailings around the world; and, jointly with the Secretariat, establish coordination and liaison with GESAMP to explore the need for and possible sources of funding for further work under GESAMP (LC 35/15, paragraphs 8.10 to 8.19).

8.2 It was noted that in 2016 the governing bodies endorsed the Scientific Groups' recommendation to invite GESAMP to commence work addressing the first terms of reference, developed by the Scientific Groups, and proceed when more funds were available. The governing bodies also invited delegations to provide the Secretariat with possible names of experts in relevant fields who, in their own capacity, could be members of the GESAMP working group, and to donate funds or sponsor experts to support the work of the working group (LC/SG 39/16, paragraph 8.5 and LC 38/16, paragraphs 9.1 to 9.22). The governing bodies also re-established the correspondence group on mine tailings to continue its work in accordance with the terms of reference agreed in 2015, under the leadership of Peru, and invited the group to report on the outcomes of its work to the next joint session of the governing bodies in 2017 (LC 38/16, paragraph 9.22). The Scientific Groups were invited to review progress made on this issue which was a high priority activity.

8.3 The Scientific Groups noted that no information had been received from the correspondence group and that it was envisaged that a report would be submitted to the governing bodies for consideration in October 2017.

8.4 The Groups were informed that GESAMP had established a new working group on mine tailings (WG 42) (paragraphs 14 to 16 of document LC/SG 40/14/2, Secretariat). The Groups noted that the group would be led by Dr. Tracy Shimmield, co-director of the Lyell Centre of the British Geological Survey in the United Kingdom, who had a long experience with these issues. The new chair was currently identifying suitable experts and possible options to secure further funds to support the work of this group. A first meeting of the group was expected to take place in the first half of 2017. The Groups also noted that GESAMP had published the *Proceedings of the GESAMP international workshop on the impacts of mine tailings in the marine environment* held from 10 to 12 June 2015, Lima, Peru. The GESAMP Reports & Studies No. 94 can be downloaded from the GESAMP website (www.gesamp.org).

Action by the Scientific Groups

8.5 Following a brief discussion, the Scientific Groups:

- .1 invited the Groups to provide the Secretariat with possible names of experts who, in their own capacity, could be members of the new working group; and
- .2 encouraged delegations to donate funds or sponsor experts to the meeting of the working group.

Deep seabed mining

8.6 It was recalled that in 2014 the governing bodies were informed by a representative from the International Seabed Authority (ISA), on the objectives and workings of the ISA, and noted several reports on deep-sea mining projects (LC 36/16, paragraphs 9.15 to 9.23). The governing bodies instructed the Secretariat to contact LC and LP National Focal Points with a view to collecting information on regulations or best practices in deep seabed mining, for consideration by the Scientific Groups and the governing bodies in (LC 36/16, paragraph 9.24 and LC-LP.1/Circ.69). Additionally in 2016, the governing bodies, having noted that Science Day 2016 was devoted to the topic of Environmental management of deep seabed mining, and other ongoing activities in this field, including the ISA consultations for input to the draft framework for the regulation of exploitation activities, requested the Secretariat, and Contracting Parties as appropriate, to engage with the ISA to ensure that the LC/LP perspectives were captured for input in the draft framework for the regulation of exploitation activities (LC 38/16, paragraphs 9.14 to 9.22). The Scientific Groups were invited to review progress made on this issue. This was a low priority activity with an anticipated target date of 2018.

8.7 The Scientific Groups considered document LC/SG 40/INF.27 (Canada) on *Best management practices for acid rock drainage*. It was noted that the document had been prepared in response to calls for information about best practices on mine tailings and deep seabed mining, and the 2016 Science Day sessions about deep-sea mining projects proposed in the South Pacific. It included a series of guidance documents related to the disposal and management of acid generating rock. It described why disposal of acid generating rock on land was a concern and compiled some of the strategies to deal with this issue through alternatives. Given the buffering capacity of the sea, disposal at sea might often represent the environmentally preferred disposal option for acid generating waste rock, but this determination should only be made following detailed, site specific risk assessments that included characterization of the waste and a study of its interactions with seawater. These studies would enable the evaluation of potential impacts, and provide information about leached materials and their concentrations that was necessary to allow a comparison with other disposal alternatives. It was noted that Canada did not allow the disposal at sea of mine tailings unless those tailings were confined. At present, there were no such facilities in Canadian waters. It was also noted that Canada had not used the Specific Guidelines for the assessment of inert, inorganic geological material on acid rock waste but had used a checklist that screened the material to determine whether it was inert or not. Once contaminated with moisture, the material was classified as not inert.

8.8 The Scientific Groups thanked Canada for their informative document.

8.9 The delegation of Germany informed the Scientific Groups about a recent workshop on the International Seabed Authority's (ISA) Environmental Management Strategy for the Area, which was held in Berlin, Germany from 19 to 24 March 2017. The Berlin workshop was jointly organized by the German Environment Agency (UBA) on behalf of the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Federal Institute for Geosciences and Natural Resources (BGR) on behalf of the Federal Ministry for Economic Affairs and Energy (BMWi) and the Secretariat of the ISA, and supported by the Institute for Advanced Sustainability Studies Potsdam e.V. (IASS).

8.10 The Berlin workshop aimed to assist the ISA in developing a long-term Environmental Management Strategy for the Area and covered governance issues such as overarching principles, regional planning and adaptive management. The outcome of the workshop provided a first structured and interdisciplinary input on the Draft Environmental Regulations taking into account the deliberations by the Legal and Technical Committee in February 2017.

A report on the Berlin workshop would be published as a technical study in June 2017. It was noted that the ISA Legal and Technical Committee would meet in August 2017.

8.11 The Groups were informed that, while there had been a number of informal contacts between the ISA and IMO since the last joint session of the Scientific Groups, the Secretariat had been unable to provide meaningful inputs to ISA processes due to time constraints. In particular, the Secretariat had been unable to attend the Berlin workshop. It was noted that ISA had confirmed that they would sponsor a scientist to participate in the GESAMP working group on mine tailings. ISA also indicated that they would join GESAMP as a full-time sponsoring agency which could open up more channels of cooperation in the future.

8.12 In the ensuing discussion, it was noted that baseline studies were an important element of deep-sea mining and should be completed before any exploitation takes place. Additionally the Groups noted that deep-sea mining was also being conducted, or in a planning phase, in waters within national jurisdictions (within the EEZ) and that this includes sand mining and phosphate mining.

Action by the Scientific Groups

8.13 The Groups, having been reminded of the discussion held at the joint session of the governing bodies of September 2016 regarding cooperation between the ISA and the London Convention and Protocol, and having reviewed the outcomes of the Berlin workshop, agreed that the following non-exhaustive list of issues for which the experience and expertise of, and guidance already developed by, the London Convention and Protocol might be of relevance to the ISA:

- .1 the value of the London Convention and Protocol way of working – transparency, collegiality, inclusivity, pragmatism, data-driven, mainly by Contracting Parties via correspondence or working groups;
- .2 ways of involving international independent substantive experts (conceptually and practically) (including consideration of roster development and management);
- .3 how the Scientific Groups have institutional status in informing the governing bodies, supported and complemented by work via working groups and intersessional correspondence groups;
- .4 experience with how the London Convention and Protocol deals with waste assessment and waste disposal, and, in particular, with inert inorganic geological materials;
- .5 London Protocol Annex 2 and the waste assessment guidances (generic and specific) as examples for use in environmental impact assessment;
- .6 London Convention and Protocol experience with innovative sampling techniques focused on environmental impact;
- .7 using the London Convention and Protocol approach to marine geoengineering, including the Ocean Fertilization Assessment Framework to gauge wider impacts (near field and far field);
- .8 importance of adaptive governance, not just adaptive management, using radioactive waste technical progress as an example, thereby improving incrementally the level of, and confidence in, environmental protection by means of increasingly rigorous environmental regulation;

- .9 experiences with placement, abandonment and disposal of structures (e.g. guidance for disposal of platforms/placement of artificial reefs);
- .10 addressing waste management aspects of Environmental Management Plans at the regional level in particular to deal with cumulative impact assessment;
- .11 work on underwater noise generated by dredging activities; and
- .12 work being conducted by GESAMP on mine tailings, on the instruction of the London Convention and Protocol.

8.14 The Scientific Groups instructed the Secretariat to communicate these issues to the ISA.

Marine litter

8.15 It was recalled that in 2014, the Scientific Groups, having been informed of ongoing efforts under the UNEP-GPA initiated Global Partnership for Marine Litter (GPML), agreed to perform an initial review of marine litter in relation to the various waste streams under the LC/LP, in particular dredged material and sewage sludge (LC/SG 37/16, paragraphs 8.28 to 8.31). As a first step, the Secretariat commissioned a study on the topic, which was published in early 2016.

8.16 It was noted that in 2016 the governing bodies considered the Scientific Groups' discussions in relation to marine litter in the waste streams under the LC/LP, and in particular, the need for guidance that could be developed on this issue with a view to reducing the disposal of microplastics at sea resulting from dredged material and sewage sludge. The governing bodies also noted the outcome of the second United Nations Environment Assembly in relation to plastics as well as several initiatives by Contracting Parties and observers (LC/SG 39/16, paragraph 8.15.3 and LC 38/16, paragraphs 9.23 to 9.27).

8.17 It was further noted that the governing bodies had adopted a recommendation to encourage action to combat marine litter and noted that the issue of plastics might be revisited in the next revision of the waste assessment guidance (LC 38/16, paragraph 9.31 and annex 8). The Scientific Groups were invited to review progress made on this issue, based on information submitted by delegations. This was a medium priority activity, with a target date of 2017.

8.18 The Scientific Groups considered document LC/SG 40/8 (Greenpeace International) on *Microplastics as contaminants in seafood species: relevance to the monitoring and assessment of dredged material and sewage sludge and to the urgency of source control measures*. The Groups noted that the document was in response to the 2016 recommendation of the governing bodies relating to marine plastic litter and microplastics, and the encouragement therein for greater knowledge-sharing. It highlighted Greenpeace International's recent review of the scientific evidence for the presence of microplastics as contaminants in marine species, and the implications for the species impacted and for consumers of seafood. Attention was also drawn to the first results of ongoing studies into microbeads deliberately added as ingredients in consumer products, as one source of such pollution that could be relatively easily addressed. The urgency of assessment of microplastic contamination in wastes eligible to be dumped at sea, and of increased efforts on control of contamination at source, was discussed.

8.19 In the ensuing discussion, the Scientific Groups agreed that Parties should redouble efforts to share knowledge and technical expertise with regard to the analysis of plastics, including microplastics, in dredged material and sewage sludge (in particular), with a view to developing methods to enable routine, reliable monitoring, assessment and reporting of microplastic contaminant levels in such waste streams as soon as possible.

8.20 In this regard the new draft European Commission decision for the EU Marine Strategy Framework Directive obligates Member States to develop microplastic indicators and defines Good Environmental Standards. Many (field and experimental) studies have been carried out and there is definitely a need for further harmonization and standardization. The OSPAR Commission is looking at the possibility of developing a common microplastic indicator, for which more standardised methodologies are needed. Furthermore efforts are being taken by the ISO to develop standardization on this topic.

8.21 The Scientific Groups noted the following two documents submitted by the Republic of Korea:

- .1 document LC/SG 40/INF.5 containing a brief summary of a recent article containing field evidence showing that plastic marine debris and microplastics can be sources of hazardous chemicals to marine organisms. The article, entitled "Styrofoam debris as a source of hazardous additives for marine organisms", was authored by Jang et al. and published in *Environmental Science & Technology* 50 (2016), pp. 4951-4960; and
- .2 document LC/SG 40/INF.6 containing a brief summary of a recent article identifying a problem of microplastic identification using only a conventional microscopic method. The article, entitled "A comparison of microscopic and spectroscopic identification methods for analysis of microplastics in environmental samples", was authored by Song et al. and was published in *Marine Pollution Bulletin* 93 (2015), pp. 202-209.

8.22 The Groups thanked the Republic of Korea for its informative submissions.

8.23 In the ensuing discussion the Groups noted that microplastics found in the London Convention and Protocol regulated waste streams formed a small part of the entire plastic load entering the marine environment, and more emphasis should be placed on source control, especially from land-based sources. This would also assist reducing such material in sediments at some future time.

8.24 The Scientific Groups also noted the work that had recently been published by UNEP, entitled *Marine Plastic Debris and Microplastics: Global lessons and research to inspire action and guide policy change*, and by GESAMP entitled *Sources, Fate and Effects of Microplastics in the Marine Environment: Part 2 of a Global Assessment* which expanded on an earlier study published in 2015. Copies of these reports can be downloaded at: <https://wedocs.unep.org/rest/bitstreams/11700/retrieve> and http://www.gesamp.org/data/gesamp/files/file_element/0c50c023936f7ffd16506be330b43c56/rs93e.pdf, respectively.

8.25 The Scientific Groups encouraged delegations to provide more information on successful and effective methods to reduce microplastics entering the environment through waste streams.

8.26 The Scientific Groups agreed to the suggestion proposed by the delegation of China to change the title of sub-agenda "Marine litter" to "Marine litter and microplastics", considering the increasing attention given to microplastics at the global level, and the initial research on marine litter and microplastics in relation to various waste streams under the LC/LP.

Cooperative measures to assess and increase awareness of environmental effects related to waste originating from chemical munitions dumped at sea

8.27 It was recalled that in 2014 the Scientific Groups were informed of the recent developments under the United Nations General Assembly (UNGA) in relation to cooperative measures to assess and increase awareness of environmental effects related to waste originating from chemical munitions dumped at sea, which had noted, inter alia, the remit of the London Convention and Protocol on this matter (LC/SG 37/16, paragraphs 14.3 to 14.11). In 2016, the governing bodies decided to await further information from the UNGA before initiating any further actions in relation to this issue (LC 38/16, paragraphs 9.32 to 9.33).

8.28 The Scientific Groups were informed that the UNGA was expected to issue another round of questionnaires on this matter in 2016. However, this had not been released and it was decided not to initiate any work until further developments had occurred.

8.29 The delegation of the United States informed the Groups that ERDC had conducted more than ten years of research on conventional munitions at underwater sites along the coast and that some of the monitoring techniques could be applicable to chemical munitions. Additionally the Groups noted that a recent webinar had been given on this topic and was accessible at: <https://www.serdp-estcp.org/Tools-and-Training/Webinar-Series>.

Sewage Sludge

8.30 The Chair stated that in 2016 the governing bodies endorsed the Scientific Groups' decision to remove the topic of sewage treatment facilities and sewage sludge management from the Groups' agenda, since no documents had been submitted on this issue for several sessions, and invited Contracting Parties to make relevant submissions under other parts of the agenda, as appropriate. The governing bodies also instructed the Secretariat to issue a questionnaire, by way of a circular, to solicit further information on the current practices of dumping of sewage sludge and provide a report of the outcomes to the next session of the governing bodies in 2017 (LC 38/16 paragraph 9.34).

8.31 In reviewing progress on this topic, the Groups were informed that the Secretariat had issued Circular LC-LP.1/Circ.80 in January 2017 inviting Parties to provide information on the disposal of sewage sludge which could assist in the Scientific Groups' work to develop an overview of information on current practices of managing or dumping of sewage sludge, including best practices. The deadline for submissions to the Secretariat was 30 June 2017.

8.32 Delegations were encouraged to provide any further information on this topic to the Secretariat before the 30 June 2017 deadline.

Underwater noise from anthropogenic sources

8.33 It was recalled that in 2013 the Scientific Groups were informed of work being undertaken in relation to underwater noise from anthropogenic sources, and noted that it would be premature to prescribe any action in relation to dredging activities at this stage, and that it would be beneficial to ascertain the full extent and impact of noise emanating from such activities before any action could be considered (LC/SG 36/16, paragraphs 8.35 to 8.40). In 2014, the Scientific Groups noted that MEPC 66 had approved the *Guidelines for the reduction of underwater noise from commercial shipping* (MEPC.1/Circ.833).

8.34 The Groups noted document LC/SG 40/INF.10 (United Kingdom) on *Underwater noise levels in United Kingdom waters*, which contained, in the annex, an article that presented the first coordinated national effort to assess ambient noise for management applications, providing data on baseline noise levels in United Kingdom waters. The article was published in *Nature* and was authored by Merchant, N., et al.

8.35 The groups thanked the United Kingdom for its submission.

8.36 The United States informed the meeting that the ERDC had conducted research on the topic of underwater sound related to dredging and other activities for more than 15 years. ERDC was currently developing a framework for both assessing and managing risks associated with underwater sound in order to provide a means to inform decision-making and operational practice. The United States offered to update the meeting on its progress in this effort at the next joint session of the Scientific Groups.

8.37 The Groups were informed about the second meeting of the Scientific Committee of the International Quiet Ocean Experiment (IQOE) that was held in London on 27 and 28 January 2017. The IQOE is a 10-year international scientific project that will coordinate existing research, observations, and modelling on sound in the ocean and its effects on marine organisms, and will promote new research, observation, and modelling where needed. IQOE is a project of the Scientific Committee on Ocean Research (SCOR) and partnerships on Observations of the Global Oceans (POGO), two of the major non-governmental organizations focused on ocean research and observations. The IQOE Science Committee invites participation of the international scientific community in the project, through seeking endorsement by IQOE of relevant research, monitoring, and modelling activities. The IQOE will provide an international structure for planning and coordination of multinational scientific activities related to sound in the ocean and its effects on marine organisms. In addition, the IQOE will help provide a framework for national and regional projects to (1) coordinate their activities; (2) agree to standards for research, observations, and modelling; and (3) combine data to increase its usefulness. The IQOE has established an endorsement process to help identify relevant national and regional science activities, and to link these activities to international IQOE. Further information is available at www.iqoe.org.

Action by the Scientific Groups

8.38 Noting the emerging nature of this issue, delegations were encouraged to continue sharing information and experiences at future joint sessions.

9 HABITAT MODIFICATION AND ENHANCEMENT

Beneficial use of waste materials and experience with habitat enhancement activities

9.1 The Chair recalled that, in recent years, the Scientific Groups had considered several submissions on beneficial use of dredged material and had devoted Science Day 2003 to scientific and technical aspects of the beneficial use of dredged material. In 2015, the governing bodies, having noted that there was a need for a more in-depth review of these management options from a scientific point of view, including their definitions, long-term benefits and aspects of monitoring, invited submissions from Contracting Parties on these topics to the next joint session of the Scientific Groups (LC 37/16, paragraph 4.6). In 2016, the Scientific Groups considered several useful submissions by Contracting Parties and observers (LC/SG 39/16, paragraphs 9.1 to 9.6).

9.2 The Groups noted document LC/SG 40/INF.7 (Republic of Korea), announcing the release and availability of presentations on new science applications for marine public works, which included engineering with nature for coastal resilience, decision support tools for marine public works, process driven ecological modelling, and remediation technologies for beneficial use of contaminated marine sediments. The KIOST International Seminar (KIS) 2016 was held in the headquarters of KIOST in Ansan, Republic of Korea from 30 November to 2 December 2016 under the themes of New Ocean Observation Initiatives and New Application of (Ocean) Science and Technology to ocean space management. The

latter part of the seminar focused on coastal infrastructure including natural features, a novel decision tool for dredged material management, and habitat assessment, and remediation of contaminated sediment. A number of presentations are available on the KIOST website at: <http://kis.kiost.ac.kr/web/pages/gc91148h.do> .

9.3 The Groups also noted document LC/SG 40/INF.19 (United States), providing an update on the USACE Engineering with Nature (EWN) initiative, which supported more sustainable practices, projects and outcomes by working to intentionally align natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits. A greater understanding of EWN opportunities and applications was illustrated through the commitments of three USACE Districts to serve as EWN "proving grounds" and through collaborative meetings with non-USACE partners and stakeholders. EWN projects focusing on dredged material were provided to highlight the practical and broad application of EWN principles and practices. Many of the projects described were not directly related to ocean dumping or the London Convention, but were useful in assessing alternatives to ocean dumping. Six current projects were highlighted, and it was noted that as of February 2017, a five-year strategic plan (2017-2022) for EWN was being prepared by the EWN Leadership Team. Additional information about EWN research, expertise, activities and technology is available at www.engineeringwithnature.org.

9.4 Further information can be obtained from: Dr. Todd Bridges (Todd.S.Bridges@usace.army.mil), Dr. Jeff King (Jeff.K.King@usace.army.mil) or Mary A. Bryant (Mary.Bryant@usace.army.mil).

9.5 The Groups further considered document LC/SG 40/INF.20 (United States), on the beneficial use of sediment through the construction of nature-based features, building consensus with workshops and development of guidelines. Historically, the construction of nature-based features using dredged sediments has occurred in the United States and around the world. However, there have been challenges with stakeholders prioritizing this beneficial-use practice in lieu of ocean disposal and/or placement of sediment in a confined disposal facility (CDF). In 2016, the USACE continued an industrious campaign to increase interest and acceptance of beneficially using sediments for the purpose of constructing nature-based features. Workshops between the USACE and the NOAA occurred with both agencies focused on the benefits of engineering and ecosystem services that were linked to natural and nature-based features (NNBF). The workshops also provided agency participants an opportunity to identify collaborative NNBF projects to pursue. USACE/NOAA workshops were followed by the assemblage of an international team of experts charged with developing NNBF Guidelines that provided practitioners and interested stakeholders with practical material needed to inform the conceptualization, planning, design, engineering, construction, and maintenance of NNBF that were used to support resilience and flood risk reduction for coasts, bays, and estuaries. The Groups noted the efforts thus far and future anticipated outcomes.

9.6 Further information can be obtained from: Dr. Todd Bridges (Todd.S.Bridges@usace.army.mil), Dr. Jeff King (Jeff.K.King@usace.army.mil) or Mary A. Bryant (Mary.Bryant@usace.army.mil).

9.7 The Groups also considered document LC/SG 40/INF.21 (United States), which informed of the Avalon New Jersey dredged material thin layer placement project. In October 2012, Hurricane Sandy impacted the east coast of the United States, including the coastline of the state of New Jersey, leading to critical shoals impeding navigation in channels managed by the USACE. Immediately following the storm, USACE Philadelphia District took action to restore the navigability of the area channels, while seeking opportunities to assist with shoreline and ecosystem recovery. USACE Philadelphia District partnered with New Jersey Department of Environmental Protection, The Nature Conservancy, and Green Trust

Alliance, a non-profit comprised of Green Vest, LLC, and Princeton Hydro, LLC to implement a wetland thin layer placement project on a salt marsh in the west of Avalon, New Jersey. Additional support for research and monitoring was also provided by USACE North Atlantic Division, other USACE districts, and the USACE Engineer Research and Development Center, and other stakeholders and resource agencies.

9.8 Further information can be obtained from: Candice Piercy (Candice.D.Piercy@usace.army.mil), Tim Welp (Timothy.L.Welp@usace.army.mil) or Monica A. Chasten (Monica.A.Chasten@usace.army.mil).

9.9 The Groups noted document LC/SG 40/INF.26 (Canada) on the use of sand by-passing for beach nourishment in Atlantic Canada. It was noted that there were a number of disposal sites on Canada's Atlantic Coast that were associated with small craft harbours whose basins and approach channels required periodic dredging to maintain their navigability. Fifteen of these disposal sites were situated in the province of New Brunswick within a littoral drift system where sediments moved parallel to the coastline, and where sand by-passing could be used to prevent erosion and maintain the sediment budget. In the past, each permit associated with these sites had required its own consultations with public stakeholders and aboriginal organizations. The content of a proposed site management plan that would treat these sites as a group with similar attributes, was presented, resulting in streamlined permit assessments and consultations, and ensuring that these sites were consistently managed in the most appropriate fashion.

9.10 Finally, the Groups noted document LC/SG 40/INF.32 (Republic of Korea and Philippines), describing activities to conserve coastal environment and living resources in the Province of Guimaras, the Philippines, through consultation with, and the participation of, local communities. Actions included the establishment of marine protected area management plans, management boards of stakeholders and guarding facilities, publication of illustrated guide books of marine life for community appreciation, performance of mangrove planting, coastal clean-ups and training on participatory coastal habitat management and information sharing. The project activities were designed through discussion among stakeholders, including provincial officials, municipal officials and local communities, and were supported by the Expo 2012 Yeosu Korea Foundation as a legacy of the exposition, which had the theme of "The Living Ocean and Coast".

9.11 Delegations were invited to continue presenting their case studies on beneficial use of waste materials and on experiences with habitat enhancement activities at the next session of the Scientific Groups.

10 MATTERS RELATED TO RADIOACTIVE WASTES

25-year scientific review of all radioactive wastes and other radioactive matter

10.1 The Chair stated that in 2016 the governing bodies approved the literature review performed in support of the 25-year scientific study of ocean dumping of radioactive wastes and other radioactive matter (2016 Literature Review), and instructed the Secretariat to publish the 2016 Literature Review, on the London Convention and Protocol website, as soon as possible in all three working languages of IMO, following an editorial review. The governing bodies also agreed there was no need to consider commissioning any additional scientific study beyond the scope of this 2016 Literature Review (LC 38/16, paragraph 10.5 and annex 9).

10.2 The Chair invited the Scientific Groups to review progress made to publish the literature review and also invited them to consider reports submitted by Contracting Parties or the Secretariat on this topic.

10.3 The Scientific Groups were informed that the 25-year Scientific Review was available to download from the LC/LP website. Furthermore, it was announced that it might be possible to produce printed copies if Parties considered this important, and if so, it could be done in cooperation with IAEA. This decision would be for the governing bodies.

10.4 The observer from Greenpeace International recalled a paper submitted to the eighteenth Consultative Meeting of the London Convention in 1995 (LC 18/INF.17), relating to reports of illegal dumping of radioactive wastes and other hazardous wastes on vessels in the Mediterranean Sea and in other waters. A press report from February 2017, based on documents recently declassified by Italian military intelligence, indicated that more detailed technical information on the locations, nature and scale of those historical operations might now be available for consideration by the London Convention/Protocol and IAEA. Greenpeace International suggested that the Secretariat could contact IAEA in advance of the 2017 meetings of the governing bodies in order to ensure that a substantive discussion on these matters and their significance for inventories and monitoring activities could be facilitated at that session.

11 OUTCOME OF SCIENCE DAY: "WASTE PREVENTION AUDITS"

11.1 The two Vice-Chairs (Commander Enrique Vargas, Chile, and Dr. Andrew Birchenough, United Kingdom), presented a brief summary of the Science Day session on "Waste Prevention Audits" that had been held on Thursday, 30 March 2017. The Scientific Groups were offered the following presentations:

- .1 "EPA Trash Free Waters Program: a strategic approach to reduce trash in aquatic systems", by Ms. Betsy Valente (United States Environmental Protection Agency (EPA));
- .2 "Cefas Marine Litter Activities", by Mr. Thomas Maes (United Kingdom, Cefas);
- .3 "Sources of microplastics (Styrofoam buoy)", by Dr. Gi Hoon-Hong (Republic of Korea, KIOST);
- .4 "Sediment management and source control, the Port of Rotterdam case", Tiedo Vellinga, (CEDA, Port of Rotterdam);
- .5 "The application of Waste Prevention Audits in South Africa", by Mr. Ulric van Bloemestein and Ms. Nokuzola Sukwana (South African Department of Environmental Affairs); and
- .6 "Waste Prevention Audits for Wood Waste", by Ms. Suzanne Agius (Environment and Climate Change Canada).

11.2 The Scientific Groups were informed that the first three presentations had focused on source control, monitoring and analysis of marine litter, debris and microplastics. The delegate from the United States described how the EPA had developed a strategic approach to reduce trash in aquatic systems through the Trash Free Waters Program. The delegate from the United Kingdom gave an overview of marine litter monitoring activities, outlined approaches being employed to control microplastics and introduced a new microplastic detection method

based on fluorescent staining. The delegate from the Republic of Korea informed the Scientific Groups of the issue of marine litter and microplastics pollution resulting from the weathering of expanded polystyrene (EPS) buoys used in aquaculture activities and outlined strategies for reducing marine pollution, which included coating buoys with polymer films and banning hazardous chemicals from the manufacturing process. The final three presentations were focused on waste prevention audits and control strategies employed by National and Port Authorities. The delegate from WODA informed the Groups of the sediment contamination issues that the Port of Rotterdam faced, how the contamination sources in the River Rhine were identified and how over the last 30 years the port's sediment management and source control programme had been successful in significantly reducing contaminant levels in the sediments passing through the port. The delegates from South Africa gave an overview of the structure and the role of designated authority for issuing dumping permits and described the waste prevention audit procedure for dredged materials. Finally, the delegate from Canada highlighted their experience in waste prevention audits for wood waste resulting from the wood processing industry on Canada's west coast.

11.3 A discussion followed which highlighted the importance of waste prevention audit within the process of assessing wastes and reducing marine pollution. There was concern raised over the issue of microplastics and how they could be addressed in future through the LC/LP.

Planning of Science Day 2018

11.4 The Scientific Groups noted the interest in discussing the following possible topics for Science Day in 2018:

- .1 practical applications of action lists/levels (United States);
- .2 a selection of general classes of compounds, e.g. fire-retardants or pharmaceutical residues in waste materials (United States);
- .3 reducing wastes or other matter directly arising from, or related to, the exploration, exploitation and associated offshore processing of seabed mineral resources (Greenpeace International);
- .4 plastics in the marine environment (Republic of Korea);
- .5 impacts of net pen aquaculture operations on the marine environment (several delegations);
- .6 a revisit of themes discussed at earlier Science Days (e.g. bioassays);
- .7 noise from dredging operations (Secretariat);
- .8 passive sampling (United States);
- .9 community-based management (Chair);
- .10 practical application of low technology guidance (South Africa); and
- .11 beneficial use of sediments (United States).

11.5 The Scientific Groups, having noted that the venue for the next meeting of the Scientific Groups had not been decided, recommended that the topic for Science Day 2018 be chosen from the above list and confirmed at the next session of the governing bodies in October 2017.

11.6 Noting that Science Day had been conducted in different ways in the last few years, depending on the topic as well as the location of the joint session, the Groups considered whether formal sessions, with invited speakers and proceedings, or the informal "pencils down" approach, was the most effective. Some delegations noted that a recording, by video or audio, shared online, together with presentations, could be a valuable tool for outreach purposes.

11.7 In the ensuing discussion, the Groups agreed that both the formal and informal approach could be useful depending on whether the session was held at IMO or abroad.

12 GUIDELINES, MANUALS, BIBLIOGRAPHIES AND INFORMATION EXCHANGE

12.1 The Groups considered document LC/SG 40/INF.14 (Secretariat), providing a progress report on LC/LP publications, and noted a number of important publications in recent years, including:

- .1 *Waste Assessment Guidelines under the London Convention and Protocol*, published in 2014, IMO IA531E (English), IA531F (French), and IA531S (Spanish);
- .2 *The London Protocol – What it is and how to implement it*, published in 2014, IMO I533E (English), IMO I533F (French) IMO I533S (Spanish); and
- .3 *Guidelines on low cost, low technology assessment of dredged material*, published in 2015, IMO I540E (English), I540F (French), and I540S (Spanish);
- .4 *Low cost, low technology field monitoring: assessment of the effects of disposal in marine waters of dredged material or inert, inorganic, geological material*, published in 2016, I542E (English), with French and Spanish to follow;
- .5 *London Convention and London Protocol: 2016 edition*, which contains the legal texts, a list of resolutions, the prospective amendments, terms of reference for subsidiary bodies, and the rules of procedure for the Meetings, was published in 2016 in English (I532E). The French version was published in late February 2017, with the Spanish version to follow; and
- .6 *Carbon dioxide sequestration in sub-seabed geological formations under the London Protocol, 2016 edition*, was published in 2016 in English (I546E).

12.2 The Groups were also informed that the publication on *Low cost, low technology compliance monitoring: assessment of permit compliance for disposal of waste and other matter at sea*, was expected to be published in the second or third quarter of 2017 (English).

12.3 The Groups noted that since the issuance of the above-mentioned publications, some guidance documents had been revised and others were in the process of being updated, for example the *Specific Guidelines for the assessment of vessels*, and that it therefore might be pertinent to eventually update some of the publications to incorporate the new information.

12.4 The delegation of China informed the Scientific Groups that, following the publication of the Chinese version of *The London Protocol: What it is and how to implement it* in 2016, China planned to publish a translated version of *Waste assessment guidelines under the London Convention and Protocol, 2014 Edition* (Chinese version) in order to provide more technical support to management and assessment of dumping of wastes in China.

12.5 The delegation of Canada suggested that the "How to seek assistance guidance", be updated with the latest publications.

13 REVIEW OF THE JOINT WORK PROGRAMME

13.1 It was recalled that in 2016 the governing bodies had endorsed the Joint Work Programme of the Scientific Groups for 2017-2019, as amended (LC 38/16, paragraphs 13.4 and 13.6.3, annex 10), which was subsequently circulated as part of the Joint Work Programme for the London Convention and Protocol for the period 2017-2019 issued as LC-LP.1/Circ.79.

13.2 In light of the progress made on various issues during the current session, the Scientific Groups amended the table format of its Joint Work Programme of the Scientific Groups (LC/SG 40/WP.2) covering the remaining period of 2017-2019 and approved it, as amended and as set out in annex 6, while noting that the highest priority should be given at the next session of the Scientific Groups to the following issues:

- .1 Waste Assessment Guidance;
- .2 Review and improvement of reporting:
 - .1 Review of dumping reports;
 - .2 Review of the reporting requirements; and
 - .3 Database development and GISIS;
- .3 Marine geoengineering;
- .4 Carbon capture and storage;
- .5 Technical cooperation and assistance:
 - .1 Outreach related to publications;
 - .2 Barriers to Compliance project;
 - .3 Regional, national workshops and projects/twinning;
 - .4 Outreach; and
 - .5 LC-LP website;
- .6 Coastal management and prevention of marine pollution:
 - .1 Discharge of tailings and associated wastes from mining operations;
 - .2 Marine litter and microplastics (LC/LP-relevant issues only);

- .3 Risks of industrial wastes kept in storage near the coast;
- .4 Chemical munitions dumped at sea;
- .5 Deep seabed mining; and
- .7 Monitoring and assessment of the marine environment.

Supporting the implementation of the Strategic Plan for the London Convention and Protocol

13.3 It was recalled that in 2016 the governing bodies adopted the Strategic Plan for the London Protocol and London Convention and decided to establish an intersessional correspondence group, under the lead of the two Vice-Chairs of the governing bodies, to develop recommendations on how to operationalize and implement the Strategic Plan, such as the establishment of periodic reviews of the Plan (LC 38/16, paragraphs 3.1 to 3.3.15 and annex 2). The Scientific Groups were invited to support the implementation of the Strategic Plan, and to provide advice, as appropriate, to the governing bodies for consideration at their next session in 2017. This ongoing activity was assigned a high priority.

13.4 The Scientific Groups were informed about recommendations on how to operationalize and implement the Strategic Plan for the London Protocol and London Convention (LC/SG 40/13), which had been developed by the correspondence group.

13.5 Following a brief discussion, the Scientific Groups established a working group, under the lead of Mrs. Azara Prempeh (Ghana) and Ms. Betsy Valente (United States). Taking into account comments and decisions made in plenary, the working group developing recommendations on the Scientific Groups' input on how to operationalize and implement the Strategic Plan for the London Protocol and London Convention was instructed to provide input, as requested in paragraph 8 of document LC/SG 40/13.

Outcome of the working group

13.6 The working group met on 28 and 29 March 2017. The following delegations were in attendance: Angola, Canada, Chile, China, Germany, Japan, the Marshall Islands, the Netherlands, the Republic of Korea, the United Kingdom, and the United States, and observers from Greenpeace International, IMarEST, IOGP, and WWF (LC/SG 40/WP.7).

13.7 The Scientific Groups noted that the working group had reviewed the Joint Work Programme of the Scientific Groups (2017-2019) and identified how this joint work programme aligned with one or more of the four strategic directions in the Strategic Plan for the London Protocol and London Convention. Consequently, a new column with the strategic directions for each work item was added to the Joint Work Programme, as amended, in annex 6.

13.8 The working group also briefly discussed potential gaps in the Joint Work Programme of the Scientific Groups and suggested an additional item for the work programme and two more general ideas to better align the Scientific Groups' activities with one or more of the four strategic directions as listed below:

- .1 add an item to the agenda of the Scientific Groups Meetings to address emerging issues or rename the existing "Coastal Management and Prevention of Marine Pollution" agenda item to incorporate this issue. It was noted that "Boundary issues and emerging matters of concern" was a work item on the Joint Work Programme under item 3;

- .2 explore ways to identify and consider emerging issues for discussion by the Scientific Groups, including in situations in which a timely reaction is required; and
- .3 make use of Science Day to implement the strategic directions in the Strategic Plan. For example, Science Day could be used as an outreach mechanism.

Dates for the next joint session of the Scientific Groups

13.9 The Groups were informed that an official invitation by the Government of Chile to host the joint session of the Scientific Groups in 2018 had been received. The invitation also included an offer to host a regional workshop on the London Protocol prior to the joint session.

13.10 Following a brief discussion, it was recommended that the forty-first session of the LC Scientific Group would be held concurrently with the twelfth session of the LP Scientific Group, most likely in Chile in the period March to May 2018, with the exact dates and venue to be confirmed by the governing bodies.

13.11 The Scientific Groups thanked the delegation of Chile for their kind offer.

14 ANY OTHER BUSINESS

Progress report on activities under GESAMP

14.1 The Scientific Groups were informed of activities under GESAMP (LC/SG 40/14/2, Secretariat), and noted the following:

- .1 GESAMP held its forty-third session, hosted by UN Environment, in Nairobi, Kenya, from 14 to 17 November 2016. The full report of the session will be published on the GESAMP website (www.gesamp.org) in due course. At this annual session, GESAMP organized a side event on environmental aspects of sand mining. The forty-fourth session of GESAMP will be held from 4 to 7 September 2017, hosted by the World Meteorological Organization (WMO) in Geneva, Switzerland;
- .2 the working group on "Sources, fate and effects of microplastics in the marine environment", which was established in 2011, recently published its second report: *Sources, fate and effects of microplastics in the marine environment: part two of a global assessment*. The Group is currently reviewing its terms of reference for a possible third phase;
- .3 as part of GESAMP's role in the identification of new and emerging issues, GESAMP discussed emerging pollutants in wastewater effluents, disinfection by-products, the impact of residues of chronic oil spills, the arrival of pelagic Sargassum, as well as environmental aspects of sand mining; and
- .4 with regard to the issue of mine tailings, GESAMP agreed to establish Working Group 42 on the environmental impacts of wastes from mining operations disposed of at sea (see paragraphs 8.4 to 8.5 above).

Other matters

14.2 The Scientific Groups considered documents LC/SG 40/14 (Chile) and LC/SG 40/14/1 (Chile) on the lessons learned from an event that occurred in 2016 in the Los Lagos Region, Chile, triggered by the mass mortality of fish that affected the salmon industry, caused by a

Chattonella sp. harmful algal bloom (HAB), and which meant it was necessary to authorize the dumping of 4,655 tonnes of fish waste under article 8.2 of the London Protocol in respect of emergency cases. The Scientific Groups noted that there were 1,420 marine aquaculture concessions in the Los Lagos, Aysen, and Magallanes Regions and three species: Pacific salmon, Rainbow trout and Atlantic salmon, being the main farmed species. In 2016, aquaculture reached an export value of around US\$4,000 million.

14.3 As a result of the emergency, Chile, through its environmental authorities, formed a Public-Private Roundtable that, along with carrying out actions to seek answers regarding the HAB event affecting the aquaculture activity and its possible relation with the dumping of fish waste, conducted an analysis of the lessons learned from the emergency and coordinated measures to strengthen the response to future emergencies related to mass fish mortality. Under the framework of the Public-Private Roundtable, the Office of the Under-Secretary for Fisheries and Aquaculture (SUBPESCA), the National Fisheries and Aquaculture Service (SERNAPESCA), the Superintendence for the Environment (SMA), and the Maritime Authority (AAMM) have been developing an action plan that addresses the regulation, management, and control of these events, as well as initiatives to improve the environmental performance of this activity. Progress was also made on developing an early warning system to expedite actions related to the rapid disposal of dead fish by the owners of farming centres, in order to secure the protection of aquatic resources, their environment and human health.

14.4 A Red Tide Scientific Commission was also convened by the Ministry of Economy through the Chilean Academy of Science as a response to the event. The Groups took note of the main measures taken by the relevant public bodies, as well as the future work plan. The full report of the Scientific Commission is available in Spanish at the website of the Office of the Under-Secretary for Fisheries and Aquaculture, at: http://www.subpesca.cl/institucional/602/articles-95146_documento.pdf. The Groups also noted the information provided by Dr. Leonardo Guzman (Chile) on Alexandrium catenella and Paralytic Shellfish Poison during the last 45 years in Southern Chile (39°S-55°S).

14.5 In the ensuing discussion, the delegation of Chile confirmed that there were no plans to increase aquaculture activities in southern Chile. It was noted that, while HAB outbreaks could reoccur, measures taken by the Roundtable, such as early notification and more efficient logistical arrangements for disposal of affected fish on land, would result in a reduced need to dispose of dead fish at sea.

14.6 The Scientific Groups thanked the delegation of Chile for providing this extensive overview of the experiences with the emergency.

15 ELECTION OF OFFICERS FOR BOTH SCIENTIFIC GROUPS

15.1 The LC Scientific Group unanimously re-elected Ms. Linda Porebski (Canada) as the Chair, Commander Enrique Vargas (Chile) as the First Vice-Chair and Dr. Andrew Birchenough (United Kingdom) as the Second Vice-Chair, respectively, for the intersessional period and for the forty-first session of the LC Scientific Group.

15.2 The LP Scientific Group also unanimously re-elected the same officers as Chair and First and Second Vice-Chair, respectively, for the intersessional period and for the twelfth session of the LP Scientific Group.

16 CONSIDERATION AND ADOPTION OF THE REPORT

16.1 The joint report of the fortieth meeting of the Scientific Group under the London Convention and the eleventh meeting of the Scientific Group under the London Protocol was adopted on the final day of the session, Friday, 31 March 2017.

ANNEX 1

1 ADOPTION OF THE AGENDA

LC/SG 40/1 Secretariat: Provisional Agenda

LC/SG 40/1/1 Secretariat: Adoption of the Agenda

2 WASTE ASSESSMENT GUIDANCE

LC/SG 40/2 Secretariat: Developing recommendation on disposal of fibreglass vessels: Available background information

LC/SG 40/2/1 Chair of the Correspondence Group: Report of the Correspondence Group concerned with the development of further guidance for developing action lists and action levels for dredged material

LC/SG 40/2/2 Secretariat: Revision of the Specific Guidelines for assessment of platforms or other man-made structures at sea
LC/SG 40/2/3 Australia: Experience with a vessel that included a fibreglass structure

LC/SG 40/INF.3 Republic of Korea: Experience with practical implementation of the Specific Guidelines for assessment of sewage sludge: Barriers to compliance with the termination of the ocean dumping of sewage sludge in the Republic of Korea

LC/SG 40/INF.9 Canada: Survey of vessel recycling and disposal in Canada

LC/SG 40/INF.16 United States: Enterprise databases, tools, and methods to support Houston Ship Channel and Gulf Intracoastal Waterway Pilot

LC/SG 40/INF.17 United States: Technical guidelines for in situ sediment remediation

LC/SG 40/INF.18 United States: Dredged material bioaccumulation control-Activated carbon application at Ashtabula Open Water Placement Site

LC/SG 40/INF.22 United States: Methods under development for assessing the potential impacts of dredged material placement/disposal in the water column

LC/SG 40/INF.24 United States: Permit for Ocean Disposal of Marine Mammal Carcasses

LC/SG 40/INF.29 Canada: Assessing total PCB concentrations in marine sediments proposed for disposal

LC/SG 40/INF.30	Italy: Recent Italian legislation on dredging sediment classification and management
LC/SG 40/WP.3	Report of the working group on further guidance on marine cumulative effects assessment and disposal site selection
LC/SG 40/WP.4	Report of the working group on the revision of the Specific Guidelines for assessment of platforms or other man-made structures at sea
LC/SG 40/WP.6	Report of the working group on the development of further guidance on action lists and action levels for dredged material

3 MARINE GEOENGINEERING

LC/SG 40/INF.4	Republic of Korea: Introduction to Korean Iron Fertilization Experiment in the Southern Ocean Project
LC/SG 40/INF.8	Greenpeace International: Assessment of ocean fertilization under the London Protocol as an example for broader application to decision-making regarding geoengineering research
LC/SG 40/INF.15	Secretariat: Progress made by the GESAMP working group on marine geoengineering
LC/SG 40/INF.25	China: Research progress in artificial upwelling and its potential environmental effects

4 CO₂ SEQUESTRATION IN SUB-SEABED GEOLOGICAL FORMATIONS

No documents

5 REPORTING ON DUMPING ACTIVITIES

LC/SG 40/5	Secretariat: Preliminary overview of the number of dumping permits reported in 2015
LC/SG 40/5/1	Secretariat: Final draft summary report on dumping permits issued in 2014
LC/SG 40/5/2	Chair of the Correspondence Group: Review of 2014 dumping reports
LC/SG 40/INF.28	Canada: History of the Canadian Disposal at Sea Program

6 TECHNICAL COOPERATION AND ASSISTANCE

LC/SG 40/6	Secretariat: Report on the recent national workshops conducted in Viet Nam, Madagascar, Jordan and Mozambique
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LC/SG 40/INF.31 Republic of Korea: Admission schedule for a graduate school of London Protocol Engineering Master of Project Administration (LPEM)

LC/SG 40/WP.5 Report of the B2C Steering Group

7 MONITORING AND ASSESSMENT OF THE MARINE ENVIRONMENT

LC/SG 40/7 Secretariat: Update on the implementation of the 2030 Agenda for Sustainable Development and the second cycle of the UN Regular Process

LC/SG 40/INF.2 Canada: Choosing between benthic monitoring methods

LC/SG 40/INF.11 United Kingdom: The application of Diffusive Gradients in Thin Films (DGT) for improved understanding of metal behaviour at marine disposal sites

LC/SG 40/INF.12 United Kingdom: Application of biological traits to further our understanding of the impacts of dredged material disposal on benthic assemblages

LC/SG 40/INF.13 Canada: Compendium of disposal site monitoring in Canada in 2010-2011

LC/SG 40/INF.23 United States: National Ocean Dumping Site Monitoring Assessment Report for 2013

8 COASTAL MANAGEMENT ISSUES ASSOCIATED WITH ACTIVITIES TO PREVENT MARINE POLLUTION

LC/SG 40/8 Greenpeace International: Microplastics as contaminants in seafood species: relevance to the monitoring and assessment of dredged material and sewage sludge and to the urgency of source control measures

LC/SG 40/INF.5 Republic of Korea: Styrofoam debris as a source of hazardous additives for marine organisms

LC/SG 40/INF.6 Republic of Korea: A comparison of microscopic and spectroscopic identification methods for analysis of microplastics in environmental samples

LC/SG 40/INF.10 United Kingdom: Underwater noise levels in United Kingdom waters

LC/SG 40/INF.27 Canada: Best management practices for acid rock drainage

9 HABITAT MODIFICATION AND ENHANCEMENT

- LC/SG 40/INF.7 Republic of Korea and United States: New science applications for marine public works
- LC/SG 40/INF.19 United States: Engineering with Nature (EWN) update: Recent actions of note
- LC/SG 30/INF.20 United States: Approaching beneficial use of sediment through the construction of nature-based features: building consensus with workshops and development of guidelines
- LC/SG 40/INF.21 United States: Avalon New Jersey dredged material thin layer placement project
- LC/SG 40/INF.26 Canada: Use of sand by-passing for beach nourishment in Atlantic Canada
- LC/SG 40/INF.32 Republic of Korea and Philippines: Implementation of a community-based management framework for coastal sustainability

10 MATTERS RELATED TO RADIOACTIVE WASTES

No documents

11 OUTCOME OF SCIENCE DAY: "Waste prevention audits"

No documents

12 GUIDELINES, MANUALS, BIBLIOGRAPHIES AND INFORMATION EXCHANGE

- LC/SG 40/INF.14 Secretariat: Progress report on LC/LP publications

13 REVIEW OF THE JOINT WORK PROGRAMME

- LC/SG 40/13 Co-Chairs of the Correspondence Group: Status update of the correspondence group developing recommendations on how to operationalize and implement the Strategic Plan for the London Protocol and London Convention
- LC/SG 40/WP.2 Draft Joint Work Programme of the Scientific Groups (2017 – 2019)
- LC/SG 40/WP.7 Report of the working group on the implementation of the Strategic Plan

14 ANY OTHER BUSINESS

- LC/SG 40/14 Chile: Experience in implementing article 8.2 of the London Protocol in respect of emergency cases
- LC/SG 40/14/1 Chile: Experience in implementing article 8.2 of the London Protocol in respect of emergency cases – lessons learned

LC/SG 40/14/2 Secretariat: Progress report on activities under GESAMP

15 ELECTION OF OFFICERS FOR BOTH SCIENTIFIC GROUPS

No documents

16 CONSIDERATION AND ADOPTION OF THE REPORT

LC/SG 40/16 Report of the Fortieth Meeting of the Scientific Group of the
London Convention and the Eleventh Meeting of the
Scientific Group of the London Protocol

LC/SG 40/WP.1 Draft Report of the Fortieth Meeting of the Scientific
Group of the London Convention and the Eleventh
Meeting of the Scientific Group of the London Protocol

ANNEX 2

**Step-by-step guidance on simple approaches to creating and using action lists and
action levels for dredged material**

DRAFT

March 2017

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1.0 Purpose

This document is intended as a starting place for countries without action lists and/or action levels so that they can minimize environmental impacts from dumping at sea. It is intended that, with time, the assessment process will be ramped up to produce a system that is more stringent and more locally relevant. It is not intended as a way for countries with more sophisticated assessment methodology to reduce their effort.

Recent research has shown that it is more effective to identify and assess contaminants of concern using rudimentary benchmarks (or action levels), than to wait until "perfect" benchmarks for specific contaminants have been derived (Apitz and Agius, 2013). A jurisdiction that has developed a national action list and action levels will be in a better position to make sound permit decisions and to be in compliance with the requirements of the London Protocol and Convention.

Note that there is no "perfect" approach to setting and applying ALs/ALs. All methods have pros and cons, however, it is reasonable for a country with no ALs/ALs to start with the simplest approach relying on data or benchmarks from other jurisdictions, and to proceed to more region-specific approaches as data and expertise become available. Although these levels may not be regionally specific, they may be used as interim measures until sufficient information or expertise is generated to develop region specific benchmarks.

This document is aimed at countries that are in the early stages of implementing the London Protocol, that have limited technical resources and regulatory processes in place, and that do not currently have action lists or levels. It serves as a simple and easy to use complement to 2009 *Guidance for development of action lists and action levels for dredged material* by providing applied examples. While not a comprehensive guide, the document is considered fit for the purpose of enabling more robust and transparent assessments of dredged material. Additional information about assessing the risks that may be posed by the disposal of dredged material can be found in the *Guidelines on Low Cost, Low Technology Assessment of Dredged Material* (2015).

2.0 Explanations of major terms

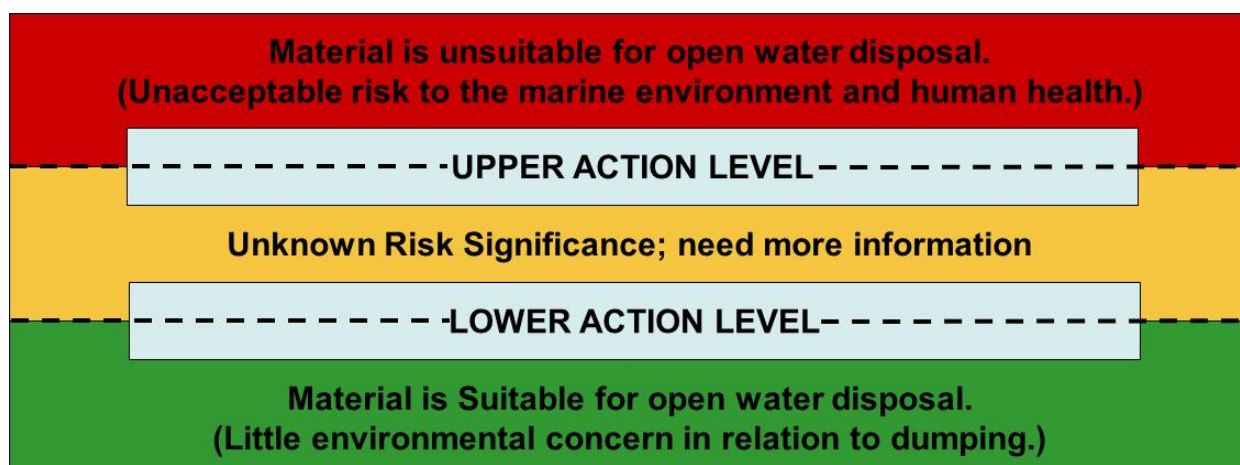
An *Action list* is a set of chemicals of concern that can be used for screening dredged material for its potential effects on human health and the marine environment.

Action levels are thresholds used in the decision making process that determine whether sediments can be disposed of at sea. At a minimum, countries must set at least Upper Levels and may also choose to set Lower Levels.

Upper Levels are used to identify material not suitable for open water dumping at sea¹ and should be set to avoid acute or chronic effects on human health or on marine organisms. Below the lower level, there should be little concern for disposal at sea. Figure 1 shows how action levels function in a simple decision making process.

¹ If it has been acceptable for disposal at sea through management techniques or processes, material above the upper action levels may be considered suitable for dumping at sea if it is no longer above the upper action level.

Figure 1 shows how action levels function in a simple decision making process.



2.1 Acronyms

ERM – Effects Range Median

PAH – Polycyclic Aromatic Hydrocarbons

PCB – Polychlorinated Biphenyl

PEL – Probable Effects Level

TBT – Tributyltin

3.0 Steps in the Process

1. Identify contaminants of local concern
2. Derive an Action list
3. Set benchmarks (action levels) for contaminants of concern
4. Sampling and analyses (waste characterisation)
5. Making a decision using the benchmarks
6. Dealing with difficulties making decisions

3.1 Identifying contaminants of local concern

Local activities, both current and historic, can act as sources of contaminants. Table 2 outlines the most common industry activities, while a more complete list can be found in Appendix A. It is not necessary to evaluate all of these contaminants in all situations. Instead, the goal is to consider the site characteristics and influences that result in concern about a particular contaminant or classes of contaminants, and to focus efforts on characterizing the risk posed by those contaminants.

Local current or historic activity	Associated potential contaminants
Agriculture	Pesticides, herbicides, nutrients
Shipping	Anti-foulants & biocides e.g. TBT, copper, hydrocarbons
Urban runoff	Trace metals, oils, PAH, sewage, flame retardants
Oil refining	Hydrocarbons, PAH, dioxins, furans, ammonia
Mining	Trace metals, cyanides,
Heavy industry	Trace metals, PCBs, oil-based contaminants, PAH
Accidental spillages, floods etc	Can remobilise contaminants in sediment

3.2 Deriving an action list

Most countries include trace metals on their action lists, and analyse these trace metals for all samples. In addition, other categories of chemicals, such as those listed below may be selected on a site or project specific basis.

The action list should include contaminants of local concern based on site characteristics², previously identified by a review of current and historic activities that may have influenced a particular load-site. Priority should be given to toxic, persistent and bioaccumulative substances from anthropogenic sources.

Consideration should also be given to sensitivities in the vicinity of the dumpsite, and chemicals which may be of particular importance to them.

The categories of chemicals most relevant to dredged material and dumping at sea are:

- Trace metals
- PCB & pesticides
- Organotins (TBT & DBT) and other biocides
- PAH

3.3 Setting simple benchmarks (or action levels)

Upper Action Levels provide decision points above which dredged material may not be disposed at sea, except in cases where control measures can be taken to manage the risks at acceptable levels. Lower Action Levels are the levels below which dredged material would be expected to produce little or no adverse effect in the marine environment, and can therefore be subject to open water disposal.

² The following site characteristics may be relevant for determining the contaminants of concern at a particular load site: site configuration (e.g. outfalls, currents, depth, etc.); current land use; site history (e.g. previous dredging/clean-up history, legacy contamination, etc.); sediment characteristics (e.g. very coarse or very fine material, noting that contaminants are most frequently associated with finer sediments).

The simplest approach to setting benchmarks (action levels) uses just an upper benchmark. There are many ways of setting action levels and no method is perfect. The simpler and more easily achievable methods are explored below.

1 "Borrowing" chemistry benchmarks set by another country is the simplest route. If possible, benchmarks should be "borrowed" from countries with similar coastal geology and sensitivities. Although these levels may not be regionally specific, they may be used as interim measures until sufficient information or expertise is generated to develop region specific benchmarks. When "borrowing" chemistry benchmarks, it is essential to use only numbers derived for the same purpose (i.e. not to use upper action level benchmarks from another country as lower action levels). Where possible, "borrowed" benchmarks should be selected to protect what you are interested in protecting (e.g. benchmarks developed to protect organisms that live in sediments (benthos) should not be assumed to protect human health).

It is also possible to use well-established eco-toxicological standards from other countries e.g. ERM or PEL (refs). Although again not locally relevant, these values are used as upper action levels in some countries.

2 Using a consensus approach, that is, taking an average of all available benchmarks for a particular parameter (e.g. for lead). While this method does not allow locally relevant values to be set, all upper action levels have a common purpose and thus there is some logic to averaging these values. When using this approach, only benchmarks used for the same decision making purpose should be averaged together; benchmarks used as upper action levels should not be averaged with benchmarks used as lower action levels. In addition, benchmarks should only be averaged when they are comparable (e.g. set on the same grain size, expressed in the same units, for the same chemical species etc.).

3 An example of how a consensus approach upper action level is calculated is shown below in table x. The values below are used as upper action levels for cadmium. Although derived by different methods, using different assumptions, these numbers are all used for the same purpose and so are considered appropriate to use in this way.

Country	Upper action level (ppm)
Australia	10
Belgium	7
Finland	2.5
Germany	4.5
Ireland	4.2
United Kingdom	4
Geometric mean	4.9

4 Using a reference approach, that is, by comparing to background conditions in the locality. Background concentrations can be set as lower action levels, as it is assumed that sediment at background concentration is unlikely to cause adverse impact. Upper levels can be set using a factor of the background concentration, e.g. three times background.

3.4 Characterization of the material to be dredged

Sampling guidance is available in the *Guidelines on Low Cost, Low Technology Assessment of Dredged Material* (2015).

Information on physical parameters e.g. grain size and quantity, should always be provided, however it may not always be necessary to carry out chemical or ecotoxicological testing.

Circumstances exempting chemical analysis include³:

- The material consists primarily of coarse material,
- The material has been previously undisturbed,
- The material is remote from sources of contamination,
- Assessment of existing information indicates that the material not been influenced by current or historic pollution sources, and
- Recently⁴ collected sampling data that is representative of the site is already available.

If none of the above criteria are met, then sampling should be carried out according to guidelines from London Protocol and Convention (refs). Samples should be stored refrigerated and in the dark prior to analysis. If the facility or expertise for analysis does not exist in a country, then samples can be sent elsewhere for analysis.

3.5 Making decisions

There are a many possible approaches to making decisions about the suitability of material for dumping at sea. These can involve both lower and upper action levels, and a variety of rules on which to base decisions. Generally, simpler approaches are easier to implement and use, but can lack flexibility, local relevance, and the greater confidence that tends to be associated with more complex approaches.

Using only Upper Action Levels

The least complex decision-making frameworks use just an upper action level. Making decisions can be as simple as a pass/fail based on a single upper benchmark, or much more complex such as combining multiple lines of evidence in a weight-of-evidence approach.

Details of the more easily executed decision-making rules are explored below.

1. Simple Pass/Fail rule, using only an upper action level

³ Dredged Material WAG states:

"Dredged material may be exempted from full chemical and biological characterization if there is strong evidence (e.g. historical data, lack of contaminant sources) that the material is not contaminated and it meets one or more of the criteria listed below:

- .1 dredged material is excavated from a site that is spatially removed from existing and historical sources of appreciable pollution, so as to provide reasonable assurance that the dredged material has not been contaminated, or*
- .2 dredged material is composed predominantly of sand, gravel and/or rock, or*
- .3 dredged material is composed of previously undisturbed geological materials."*

⁴ For example, collected in the past three years.

A simple pass/fail rule offers the advantage of enabling clear, transparent and repeatable decisions that can be implemented with relatively little training and experience by a permitting authority.

Example 1. Single characteristic pass/fail decision making approach (if any one upper action level is exceeded, the material is not suitable for open water disposal at sea).

Dredged material characteristic	Upper benchmark (upper action level)	Sediment testing average results	Decision
Contaminant A	340 mg kg ⁻¹	207 mg kg ⁻¹	Dredged material is assessed to be not suitable for disposal at sea based on result from contaminant B ⁵
Contaminant B	220 mg kg ⁻¹	299 mg kg ⁻¹	
Contaminant C	410 mg kg ⁻¹	97 mg kg ⁻¹	
Contaminant D	4.0 mg kg ⁻¹	1.3 mg kg ⁻¹	
Contaminant E	110 mg kg ⁻¹	36 mg kg ⁻¹	
Simple Lethality ⁶	30% survival	40% survival	

2. *Fail on a number of parameters and/or magnitude of exceedance*

A country may allow multiple action levels to be exceeded, but not beyond a specified magnitude (e.g. not more than 1.5 times the benchmark). This method may provide some more leeway than the previous example, while maintaining an absolute limit on extent of contamination.

Example 2. Multiple fail and magnitude of exceedance decision making approach (if two or more action levels are exceeded or any one exceedance is more than 1.5 times its benchmark, the material is deemed unsuitable for open water disposal at sea)

Dredged material characteristic	Upper benchmark (action level)	Sediment testing average results	Decision
Contaminant A	340 mg kg ⁻¹	207 mg kg ⁻¹	Dredged material is assessed to be unsuitable for disposal at sea as two benchmarks are exceeded and the concentration of contaminant D exceeds the benchmark by more than 1.5 times
Contaminant B	220 mg kg ⁻¹	299 mg kg ⁻¹	
Contaminant C	410 mg kg ⁻¹	97 mg kg ⁻¹	
Contaminant D	4.0 mg kg ⁻¹	6.8 mg kg ⁻¹	
Contaminant E	110 mg kg ⁻¹	36 mg kg ⁻¹	
Simple lethality	30% survival	70% survival	

⁵ If it has been acceptable for disposal at sea through management techniques or processes, material above the upper action levels may be considered suitable for dumping at sea if it is no longer above the upper action level.

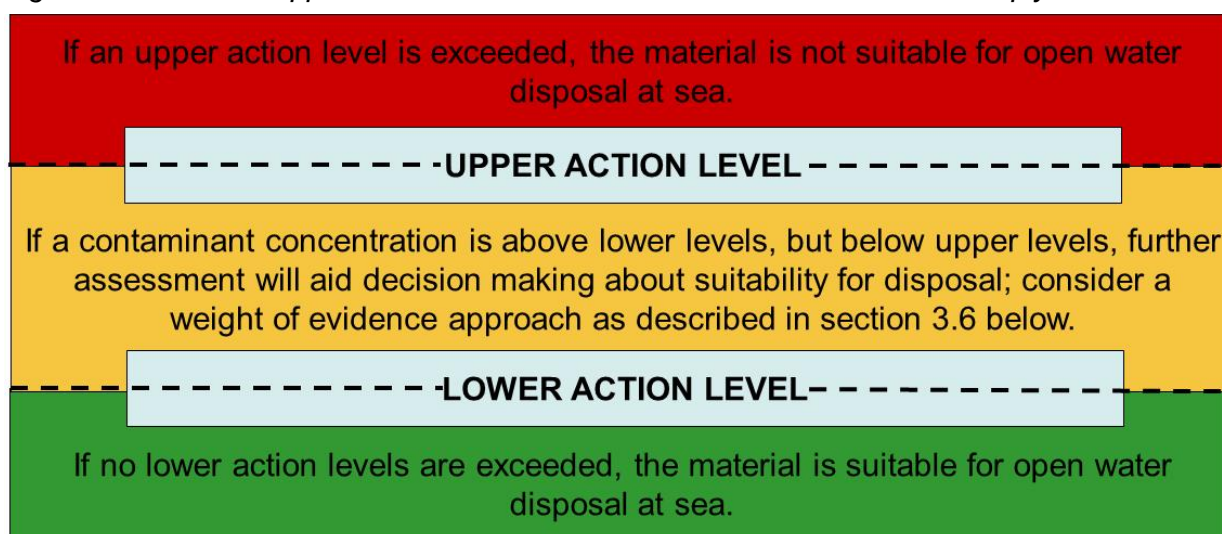
⁶ See section 6 of the *Low Cost Low Tech Field Monitoring Guidance for Dredged Material (2016)* for examples of easy toxicity tests that are straightforward to interpret.

A "weight of evidence" approach for interpreting action levels, as described in IMO, 2009, can also be considered to interpret sediment testing results against action levels. For example, when one or more chemical action levels are exceeded, other tests, such as bioassays, can be used to inform management decisions.

Using a Combination of Lower and Upper Action Levels

More complex decision-making frameworks use a combination of lower and upper action levels. The simplest example of a combined lower and upper action level framework relies on pass/fail rules as follows:

Figure 2 shows how upper and lower action levels can be combined most simply.



Using a "tiered" approach that combines upper and lower action levels can help to quickly identify dredged materials that are or are not suitable for disposal at sea, leaving resources available to conduct more detailed assessments of dredged materials that are more difficult to classify.

3.6 Dealing with difficulties in decision-making

On occasion, results of sediment chemistry or toxicity testing may not be so clear-cut. In these cases, further assessment may be required before a decision on disposal can be made.

In these cases, it is prudent to take other existing information (or evidence) into account in seeking a solution. This process is referred to as using a "weight of evidence" approach. Examples of additional information for assessment include:

- Quantity of material, e.g. is quantity <10 000 m³?
- Is dredged material composed mainly of fine or of coarse material?
- Can elevated concentrations be explained by other factors e.g. local geology
- Is sediment toxic to marine organisms⁷?

⁷ See section 6 of *the Low Cost Low Tech Field Monitoring Guidance for Dredged Material (2016)* for examples of easy toxicity tests that are straightforward to interpret.

- State of benthic community at load-site or dumpsite?
- Are there particular sensitivities in the vicinity of the dumpsite (e.g. protected areas, harvesting of commercial species, fish spawning beds, nursery grounds, leisure use, etc.)?
- Can risk to marine environment be reduced by management techniques e.g. disposal method and or timing?

Alternatively, a decision could be made to seek an option other than sea disposal. For example, where the costs associated with additional assessment are expected to be larger than the cost of the least expensive alternative to disposal at sea, the additional assessment may not be justified.

4.0 How to fit action lists and levels in legislation?

When a country has established its action list and levels, there are two general approaches it can follow to incorporate these into its regulatory regime.

1. Action lists and/or action levels can be reflected directly in domestic law⁸. An advantage of this approach is that it can establish a minimum list of chemical parameters for assessment in all chemical characterizations. Under this approach, it makes sense to construct domestic law to provide flexibility by enabling the evaluation of additional, unlisted chemicals of local concern on a site specific basis.

The major disadvantage of this approach is that revisions to the minimum action list or to the established action levels may be difficult to change or update because changes require amending domestic law.

2. Action lists and/or levels can be published in a guidance or technical document (not included directly in domestic law).

Rather than refer to the actual lists or levels, domestic law would refer to the most up to date guidance/technical document, and require it to be used in dredged material assessments. The document itself would set out a minimum list of parameters to be included, while also allowing discretionary site specific additions. This approach allows greater flexibility for changes and amendments as it requires just the technical document to be revised, rather than the law, thus action lists and levels are relatively easy to update as more information becomes available.

5.0 Review and revision of action lists and levels

Countries employing any of the methods suggested in this document should review the system and revise as necessary according to their scientific, technical and economic capabilities, and based on information gathered in the first five years of operation. Countries may then wish to add to the basic assessment methodology by including more or different steps, including ecotoxicology procedures. The LC/LP Guidance on *Guidance for the Development of Action Lists and Action Levels for Dredged Material* (2009) and the *Revised Specific Guidelines for Assessment of Dredged Material* (2013) provide all the necessary guidance to implementing the more complex assessment methodology.

⁸ For the purposes of this document, domestic law encompasses laws and/or the regulations or other legally binding instruments used to implement them.

6.0 References and background reading (to be completed)

Apitz, S.E. and S. Agius. (2013) *Anatomy of a Decision: potential regulatory outcomes from changes to chemistry protocols in the Canadian Disposal at Sea Program*. Mar Pollut Bull. Apr 15;69(1-2):76-90. doi: 10.1016/j.marpolbul.2013.01.008. Epub 2013 Feb 21.

Government of South Africa (2008). ACT NO. 24 OF 2008. *Draft National Action list for the Screening of Dredged Material Proposed for Marine Disposal in Terms of Section 73 of the national Environmental Management Integrated Coastal Management Act, 2008*. South Africa can be contacted for further technical information.

Guidance for the Development of Action Lists and Action Levels for Dredged Material, IMO, 2009, ISBN 978-92-801-1504-8, IMO publication sales number I538M

Revised Specific Guidelines for Assessment of Dredged Material (2013) *Guidelines for the Sampling and Analysis of Dredged Material Intended for Sea Disposal*, IMO 2005, ISBN 92-801-4192-9, IMO publication sales number I537E

The Low Technology Low Cost Field Monitoring Assessment of the Effects of Disposal in Marine Waters of Dredged Material or Inert, Inorganic, Geological Material

ERL/ERM (Long???)

PEL (Schwartz ???)

OSPAR Guidelines for management of dredged material

6.0 Appendix A – Contaminants associated with Various Industries

Source	Additional Metals	Specific PAHs	Additional Chlorinated Hydrocarbons	Other additional organic parameters	Other additional inorganic parameters
Facilities (as listed on DaS Permit Application)					
Oil Refineries			Dioxins Furans (PCDDs, PCDFs)	Oil and grease	Ammonia
Mills					
<i>i.e. Pulp and paper</i>			Dioxins Furans (PCDDs, PCDFs)	Oil and grease	
<i>i.e. Coal or lignite</i>			Dioxins Furans (PCDDs, PCDFs)		
<i>i.e. Iron and steel</i>	Iron				Cyanide
Mines					
<i>i.e. Metal mines</i>	Nickel Iron Specific metals related to type of mine				Cyanide
Sewage outfalls (i.e. Wastewater Treatment Plant Effluent, combined sewer overflows)	Nickel	Benzo(a)pyrene Pyrene		Oil and grease Triclosan PBDEs Pharmaceuticals Personal care products	Ammonia Phosphorus BOD
Storm Drains/Pipes (i.e. Stormwater outfalls/Automobile traffic/Urban, Commercial, Residential areas)	Nickel	Benzo(a)pyrene Pyrene Fluoranthene		Oil and grease Pesticides	Nutrients
Shipping docks (i.e. Boat Maintenance/ Boat Repair/ Shipyards/ Marinas/Ports/Ferry Terminals)	Copper	Naphthalene Pyrene Benzo(a)pyrene Benzoanthracene Fluoranthene		Tributyltin Oil and grease Other anti-foulants	
Other sources of pollution and contamination					
Agriculture				Pesticides	Ammonia Phosphorus Nutrients BOD
Aquaculture				Antibiotics and other pharmaceuticals (i.e., oxytetracycline) Pesticides (i.e. DDE)	Nutrients
Metal Finishing/Metallurgical processes	Additional metals specific to plant			PBDEs	Cyanide Ammonia
Biological debris (i.e. fish waste, algae, organic matter)					BOD DO

6.0 Appendix B – Examples of Action Levels

**Supplement to the Step-by-step guidance on simple approaches to creating and using
action lists and action levels for dredged material, first edition**

DRAFT

March 2017

This supplement provides examples of lower and upper action levels used by London Protocol and Convention Parties. These numbers may be "borrowed" or used to derive "consensus values" as described in the *Step-by-step guidance on simple approaches to creating and using action lists and action levels for dredged material* and should not be used without consulting the primary guidance. Although these levels may not be regionally specific, they may be used as interim measures until sufficient information or expertise is generated to develop region specific benchmarks.

UPPER ACTION LEVELS (Note: example of format only. To be completed by correspondence group)

Contracting Party	Action levels	Antimony mg kg-1	Arsenic mg kg-1	Cadmium mg kg-1	Chromium mg kg-1	Copper mg kg-1	Lead mg kg-1	Mercury mg kg-1	Nickel mg kg-1	Zinc mg kg-1	Silver mg kg-1	TBT mg kg-1	DBT mg kg-1	Sum TBT & DBT mg kg-1	DDT ug kg-1	DDD	DDE	DDT+DDE+DDD	Dioxins & Furans	Chlordane	Dieldrin	Endrin	Lindane	γ-HCH (Lindane) ug kg-1	HCB ug kg-1	PCB (total) ug kg-1	PCB (individual congeners of ICES 7) ug kg-1	ICES 7 ug kg-1	PAH (Σ19) ug kg-1	PAH (Σ16) ug kg-1	Mineral Oil	Oil g kg-1	Contact Information	Notes						
Australia	UAL	25	70	10	370	270	220	1	52	410	3.7	70 µg Sn/kg dry weight, 1% TOC		46	20	27			6	270 e/620	120e/220	1								50,000 (45,000)										
Belgium	UAL		100 ppm	7ppm	220ppm	100	350	1.5	280	500		7 ppb													2µg/goc		180 µg/goc		2500	36 mg/go										
Canada	UAL			0.6				0.75																	100			2500												
Denmark	UAL		60	2.5	270	90	200	1	60	500		30														200														
Finland	UAL		60	2.5	270	90	200	1	60	500		200ppb						0.03	500ppb							1				1500										
France	UAL		50	2.4	180	90	200	0.8	74	552		4																												
Germany	UAL		120	4.5	360	90	270	2.1	210	900		300		3	6	3											40		5.5											
Hong Kong, China	UAL		42	4	160	110	110	1	40	270	2	0.15													180															
Ireland	UAL	NA	70	4.2	370	110	218	0.7	60	410	NA	0.5	0.5	0.5	No UAL but assessed case by case				NA	NA	NA	NA	NA	1	1	NA	180	1260	NA	assessed on case	NA	NA								
Italy																																								
Japan																																								
New Zealand																																								
Norway																																								
Portugal																																								
Qatar																																								
Republic of Korea																																								
Spain																																								
Sweden																																								
The Netherlands																																								
United Kingdom																																								

LOWER ACTION LEVELS (Note: example of format only. To be completed by correspondence group)

Contracting Party	Action levels	Antimony mg/kg-1	Arsenic mg/kg-1	Cadmium mg/kg-1	Chromium mg/kg-1	Copper mg/kg-1	Lead mg/kg-1	Mercury mg/kg-1	Nickel mg/kg-1	Zinc mg/kg-1	Silver mg/kg-1	TBT mg/kg-1	DHT mg/kg-1	Sum TBT & DHT mg/kg-1	DDT ug/kg-1	DDD	DDE	DDT+DDE+DD	Dioxins & Furans	Chlordane	Dieldrin	Endrin	Lindane	∑-HCH (lindane) mg/kg-1	PCB ug/kg-1	PCB (total) ug/kg-1	PCB Individual congeners of ICES 7) ug/kg-1	ICES 7) ug/kg-1	PAH (∑ 9) ug/kg-1	PAH (∑ 16) ug/kg-1	Mineral Oil	Oil g/kg-1	Contact Information	Notes				
Australia	LAL																																					
Belgium	LAL		20 ppm	2.5 ppm	50ppm	20	70	0.3	70	160		3 ppb													2 µg/goc			70 µg/goc			14 mg/goc							
Canada	LAL																																					
Denmark	LAL		20	0.4	50	20	40	0.25	30	130		3															20											
Finland	LAL		15	0.5	65	50	40	0.1	45	170		3ppb						0.01	20ppb						0.5						500							
France	LAL		25	1.2	90	45	100	0.4	37	276		1																										
Germany	LAL		40	1.5	120	30	90	0.7	70	300		20			1	2	1										13			1.8								
Hong Kong, China	LAL		12	1.5	80	65	75	0.5		200	1															23												
Ireland	LAL	NA	9	0.7	120	40	60	0.2	21	160	NA	0.1	0.1	0.1	No LAL but assessed case by case				NA	NA	NA	NA	NA	0.3	0.3	NA	1	7	NA	4000				Fractions analysed - metals <2mm, organics <63um				
Italy																																						
Japan																																						
New Zealand																																						
Norway																																						
Portugal																																						
Qatar																																						
Republic of Korea																																						
Spain																																						
Sweden																																						
The Netherlands																																						
United Kingdom																																						

ANNEX 3

TERMS OF REFERENCE AND WORK PLANS FOR CORRESPONDENCE GROUPS ON DISPOSAL SITE SELECTION AND ASSESSMENT OF MARINE CUMULATIVE EFFECTS

Terms of reference relating to disposal site selection guidance

1 Taking into consideration the comments and decisions made both in plenary and the working group on further guidance on disposal site selection and marine cumulative effects assessment, the correspondence group, under the coordination of Canada and United Kingdom¹, is instructed to:

- .1 examine relevant existing guidance and experience, such as described in document LC/SG 39/INF.9 (Canada) on *Experience implementing new Canadian disposal site selection guidance*, and others (e.g. from the United Kingdom and the United States) as available, with a view to drafting site selection guidance that will:
 - .1 address London Protocol waste streams (not only dredged material), and refer to existing site selection guidance for carbon dioxide streams;
 - .2 be relevant to both smaller and larger disposal activities, and to both ongoing and one-off disposal operations;
 - .3 clarify how this guidance would relate to other guidance already in place;
 - .4 consider how cumulative effects assessments could be addressed in disposal site selection processes; and
 - .5 include case studies demonstrating the approach set out in the guidance.
- .2 develop a draft guidance for review and comment by the correspondence group.
- .3 provide a progress report to the next meeting of the Scientific Groups in 2018, with a view to providing a final draft version of the guidance to the meeting of the Scientific Groups in 2019.

¹ The coordinators, Ms. Suzanne Agius (Canada) and Dr. Andrew Birchenough (United Kingdom), can be contacted at Suzanne.agius@canada.ca and andrew.birchenough@cefas.co.uk, respectively.

Work plan and timeline

ToR item no.	Activity	Deadline	Coordinator(s)/ Remarks
1.1	Share with the correspondence group existing guidance from Canada, South Africa, the United Kingdom and the United States, and request that group members share any other guidance they deem relevant, particularly national guidance	30 May 2017	Canada, South Africa, United Kingdom, United States, and others
1.2	Develop a draft outline for disposal site selection guidance based on existing guidance shared, including the role of cumulative effects as it pertains to disposal site selection and send it to the correspondence group for comment	15 August 2017	Canada, United Kingdom
	Submit comments on the draft outline	15 September 2017	Correspondence group
	Address comments on the draft outline, and produce a final version of the outline of the guidance document	6 October 2017	Canada, United Kingdom
	Assign drafting work for each section of the outline to members of the correspondence group	Informally at meeting of governing bodies if possible* or through correspondence by 31 October 2017	Canada and United Kingdom, in consultation with correspondence group
	Submit completed drafting assignments to coordinators of correspondence group	31 December 2017	Correspondence group
	Compile drafts of each section into a first complete draft of the guidance		Canada, United Kingdom
1.3	Prepare a correspondence group progress report and submit to the next Scientific Groups meeting		Canada, United Kingdom
	Develop a work plan to complete the development of this guidance, with a view to submitting a final version for consideration by the Scientific Groups in 2019	During meeting of the Scientific Groups in 2018*	Correspondence group

* Notes:

- 1 Check deadlines for presenting documents to the next meeting of the Scientific Groups.
- 2 An informal meeting of the Correspondence Group may be arranged during the meeting of the governing bodies in 2017.

Terms of reference relating to assessment of marine cumulative effects

2 Taking into consideration the comments and decisions made both in plenary and the working group on further guidance on marine cumulative effects assessment and disposal site selection, the correspondence group, under the lead of the United Kingdom², is instructed to:

- .1 hold further discussions on cumulative effects assessment and how this topic may be further addressed by the Scientific Groups;
- .2 review and share relevant information from e.g. DFO Canada, ISA, OSPAR, UNECE Espoo Convention; and
- .3 consider how the Parties to the London Protocol may benefit from existing and developing cumulative effects frameworks, with a view to making a recommendation about how cumulative effects should be addressed, e.g. new guidance, additions to existing guidance and the scope of any further work to be done.

Work plan and timeline

ToR item no.	Activity	Deadline	Coordinator(s)/Remarks
2.1	Provide background materials on cumulative effects to coordinator of correspondence group.	30 April 2017 and ongoing	Correspondence group
2.2	Compile and share relevant background materials with correspondence group.	31 May 2017 and ongoing	United Kingdom
2.3	Draft potential recommendations for next steps and share with correspondence group.	1 November 2017	United Kingdom
	Provide comments on draft potential recommendations to coordinator of correspondence group.	10 January 2018	Correspondence group
	Address comments and prepare a report for submission to, and discussion at the next meeting of the Scientific Groups.	Short document deadline of LC/SG 41* (2018) if possible	United Kingdom

* Note:

Check deadlines for submitting documents to the next meeting of the Scientific Groups.

² The coordinator, Dr. Andrew Birchenough (United Kingdom), can be contracted at andrew.birchenough@cefas.co.uk

ANNEX 4

TERMS OF REFERENCE AND WORK PLAN FOR THE REVISION OF THE SPECIFIC GUIDELINES FOR THE ASSESSMENT OF PLATFORMS OR OTHER MAN-MADE STRUCTURES AT SEA

Terms of reference

1 Taking into consideration the comments and decisions made in plenary, the correspondence group the lead of Norway¹ is instructed to:

- .1 gather information to determine what changes should be made to the *Specific Guidelines for the assessment of platforms or other man-made structures at sea*, taking into account document LC/SG 40/2/2, and the revised *Specific Guidelines for the assessment of vessels*;
- .2 provide an interim report to the governing bodies in 2017;
- .3 based on the information gathered, and any further feedback from the governing bodies, revise the *Specific Guidelines for the assessment of platforms or other man-made structures at sea*; and
- .4 provide a report to the Scientific Groups in 2018, and the governing bodies in 2018.

Work plan

ToR number	Activity	Time frame	Remarks
1	<p>Gather information to determine what changes to the Specific Guidelines are required, with assistance from the Secretariat, including:</p> <ol style="list-style-type: none"> a. what aspects from the revised <i>Specific Guidelines for the assessment of vessels</i> should be incorporated into the <i>Specific Guidelines for platforms or other man-made structures at sea</i>; b. information from OSPAR, UNEP MAP and other regional agreements or institutions, United Kingdom, Norway and United States (as per references in document LC/SG 40/2/2); c. information on permits that have been granted for "platforms or other man-made structures at sea", and experiences in using the current version of the Guidelines; d. what needs to be included under "other man-made structures at sea" and what guidance might be needed; and 	7 July 2017	Correspondence group, with assistance from Secretariat

¹ The coordinator, Ms. Anne-Grethe Kolstad, can be contacted at: anne-grethe.kolstad@miljodir.no

ToR number	Activity	Time frame	Remarks
	e. any other published material on dumping or abandonment of platforms or other man-made structures at sea.		
2	Prepare a progress report to the 2017 meeting of the governing bodies, including a discussion on whether there is a need to revise the Guidelines based on the information gathered at step 1.	Due 4 August 2017	Coordinator
3	Following any advice from the governing bodies, prepare a first draft of the revised Specific Guidelines for consideration by the correspondence group.	17 November 2017	Coordinator, and drafters
	Correspondence Group to comment on the first draft of the revised Specific Guidelines.	15 December 2017	Correspondence group
4	Submit a revised draft of the Specific Guidelines to the 2018 Scientific Groups meeting.	Early 2018	Coordinator
	Following any advice from the 2018 Scientific Groups meeting, prepare a second draft of the revised Specific Guidelines for consideration by the correspondence group.	Within one month following Scientific Groups meeting	Coordinator, and drafters
	Correspondence group to comment on the second draft of the revised Specific Guidelines.	Allow one month to receive comments	Correspondence group
	Prepare a report to the 2018 Meeting of Parties.	Mid 2018	Coordinator

ANNEX 5

Ongoing and planned workshops and projects 2017-2018

B2C workshops/activities	Host country or organization	Planned delivery date	Estimated cost (USD)
Activities implemented or under preparation			
National Workshop: Ratification and Implementation of the LP	Mozambique	February 2017	Implemented
Regional workshop: Ratification and Implementation of the LP	Ghana	May 2017	TBD/back to back with AFS and Biofouling. IMO funded
National Workshop: Ratification and Implementation of the LP	Sierra Leone	TBD	20,000
Sub-regional/National Workshop: Ratification/Implementation of the LP	Sri Lanka	TBD	20,000
National Workshop: Ratification and Implementation of the LP	Russian Federation	TBD	Funding approved by IMO ITCP
National Workshop: Ratification and Implementation of the LP	Ukraine	TBD	Funding approved by IMO ITCP
National Workshop: Ratification and Implementation of the LP	Djibouti	TBD	Funding approved by IMO ITCP
National Workshop: Ratification and Implementation of the LP	Fiji	TBD	20,000
National Workshop: Ratification and Implementation of the LP	Angola	Dec 2017/Jan 2018	20,000
Regional workshop: Ratification and Implementation of the LP	South East Pacific/CPPS	May (2017)	40,000
Regional workshop: Ratification and Implementation of the LP in the Baltic Sea Region	HELCOM	TBD (2017)	10,000
National Workshop: Implementation of the LP	Philippines	TBD	20,000
Total Estimated Costs for Projects and B2C Workshops, excluding TBD values and confirmed IMO funded activities (2017-2018)			\$150,000

ANNEX 6

JOINT WORK PROGRAMME OF THE SCIENTIFIC GROUPS (2017-2019)

SD	Description	2017	2018	2019	Target completion date
SD 2, SD 3	<p>WASTE ASSESSMENT GUIDANCE</p> <ul style="list-style-type: none"> - Review of the Specific Guidance for platforms and other man-made structures at sea - Development of recommendations regarding fibreglass vessels - Guidance on disposal site selection and marine cumulative effects assessment - Overview of waste prevention techniques - Review of and experience with practical implementation of the WAGs 	M	H	L	2019
		M	H	L	2018
		M	H	M	2018
		M	L	L	2017
		M	M	M	ONGOING
SD 2	<p>MONITORING AND ASSESSMENT</p> <ul style="list-style-type: none"> - Assess field monitoring reports 	H	H	H	ONGOING
SD 2	<ul style="list-style-type: none"> - Research results, new techniques, strategies, etc. 	M	M	M	ONGOING
SD 3	<ul style="list-style-type: none"> - Contribution to the United Nations Regular Process (World Ocean Assessment) 	L	L	L	OINGOING
SD 2, SD 4	<p>CO₂ SEQUESTRATION</p> <ul style="list-style-type: none"> - Experience with practical implementation of the CO₂ Sequestration Guidelines and with CO₂ sequestration technologies and their application 	M	M	M	ONGOING
SD 2, SD 4	<p>MARINE GEOENGINEERING</p> <ul style="list-style-type: none"> - Keep under review the marine environmental implications of marine geoengineering 	L	L	L	ONGOING
SD 1, SD 2, SD 4*	<p>TECHNICAL COOPERATION AND ASSISTANCE</p> <ul style="list-style-type: none"> - "Barriers to Compliance" Project – review of the Implementation Plan 	M	M	M	ONGOING
	<ul style="list-style-type: none"> - Regional and national workshops and evaluation of feedback questionnaires 	M	M	M	ONGOING
	<ul style="list-style-type: none"> - Technical advice to specific countries, including "twinning" and lead-country arrangements 	M	M	M	ONGOING

	- Implementation of a communication strategy for London Protocol Manual	L	L	L	ONGOING
	- Improvement/update of the LC/LP website	M	M	M	ONGOING
SD 2, SD 4	HABITAT MODIFICATION/ENHANCEMENT				
	- Beneficial use of waste or other materials	M	M	M	ONGOING
	- Experience with habitat enhancement	M	M	M	ONGOING
SD 2	REVIEW AND IMPROVEMENT OF REPORTING				
	- Review of dumping reports	H	H	H	ONGOING
	- Review of reporting requirements	M	M	M	ONGOING
	- Assess trial of new format	H	M	L	2018
	- Implementation of the online reporting module for GISIS (building on work of the review of reporting requirements)	M	L		2018
	- Collaboration with other international bodies	M	M	M	ONGOING
	- Collaboration with the LP Compliance Group	M	M	M	ONGOING
SD 2	MATTERS RELATED TO RADIOACTIVE WASTES				ONGOING
SD 2, SD 3, SD 4	COASTAL MANAGEMENT AND PREVENTION OF MARINE POLLUTION				
	- Cooperation with other United Nations agencies and industry organizations, as appropriate, with regard to:				
	1. Discharge of tailings and associated wastes into coastal and oceanic waters from mining operations	H	M	L	2019
	2. Marine litter and microplastics (LC/LP-relevant issues only)	M	M	M	2019
	3. Chemical munitions dumped at sea	M	M	L	2018
	4. Deep seabed mining	L	L	L	2018
	- Underwater noise from anthropogenic sources (LC/LP-related issues only)	L	L	L	ONGOING
SD 2, SD 3	GUIDELINES, MANUALS, BIBLIOGRAPHIES AND INFORMATION EXCHANGE	M	M	M	ONGOING

SD 2, SD 3, SD 4	SCIENCE/TECHNICAL FOCUSED DAY	SESSION: ISSUE-	M	M	M	ONGOING
	REVIEW OF WORK PROGRAMME					
	- Review Scientific Groups' Work Programme		M	M	M	ANNUAL
	- Support the implementation of the Strategic Plan		H	M	M	ONGOING

Legend:

H high-priority item
M medium-priority item
L low-priority item

SD Strategic Direction (as per the 2016 Strategic Plan)

* Relates to work of the Scientific Groups only