GESAMP
Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection

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Agenda item 4

PLANNING OF GESAMP ACTIVITIES: ESTABLISHMENT OF TRENDS IN GLOBAL POLLUTION IN COASTAL ENVIRONMENTS

Report of the Chairperson of Working Group 39

1 The purpose of WG 39 is to contribute to the reduction of stress in coastal ecosystems by providing stakeholders, scientists and society with an objective and global assessment of pollution trends during the last century in sensitive coastal ecosystems. At the request of IAEA, the WG 39 looks at the establishment of trends in global pollution in coastal environments. The lead agency for WG 39 is IAEA (contact point Dr. M. Angelidis), co-sponsored by UNIDO (contact point Mr. Christian Susan).

2 The Working Group (WG) met for the first time back-to-back with the International Symposium on Isotopes in Hydrology, Marine Ecosystems, and Climate Change Studies in Monaco at the beginning of April 2011. Terms of Reference (ToR) were provided and members agreed on the working methodology and distribution of tasks among them. The agreed main activity was to conduct a literature survey on temporal trends of pollution of coastal ecosystems following a list of priority substances, and to classify the information according to the geographical definitions of the Large Marine Ecosystems (LMEs). A bibliographic database was designed in Microsoft Excel to organize the information extracted from the collected documents. The database and the document collection management was made through the file-sharing website DropBox. The WG members engaged to intersessional work on the compilation of documents and population of the database. A report of the WG 39 inception meeting was submitted to the 38th session of GESAMP, held in May 2011, where it was noted that financial support was needed to continue working with the tasks included in the ToRs.

3 During the 40th session of GESAMP it was reported that WG 39 had compiled 304 scientific papers and the bibliographic records had been introduced in the WG 39 database. A pilot web platform was presented, developed by UNINMAR at the Institute of Marine Sciences and Limnology, National Autonomous University of Mexico (ICML-UNAM), with the aim to host and manage the information contained in the WG 39 database. It was noted that financial support was needed for further development of the web platform, and for the preparation of the data for the pollution trend analysis (specially, the digitalization of core profile figures from the papers in the data base).

4 The second meeting of WG 39 was held at the Environment Laboratories of the International Atomic Energy Agency (IAEA) in Monaco in May, 2014. An improved version of the web-based analysis tool was presented, which has the capability to assess the pollution trends in the temporal series obtained from the literature. The analysis routine was carefully explained, step by step, so WG 39 members were able to perform trend analysis in their

assigned LMEs. As a pilot study, the relevant figures of LME 03 California Current were digitized by UNAM, at no cost to the leading organizations.

5 WG 39 members worked with the quantification of temporal trends from selected papers, pollutants were grouped, statistical tests were performed, a preliminary LME dataset was integrated, pollutant concentrations were compared to the NOAA-SQUIRT benchmarks to evaluate potential risk of harmful effects to the coastal resources and a preliminary report on LME 03 California Current was produced. The WG 39 working methodology was revised according to the experience gained by all WG 39 members during i) the literature search and review (Task 1) and ii) the pilot pollution trend analysis performed in session 2 of this meeting. During the meeting, WG 39 members delineated and agreed on future work and task assignment. After the examination of the pilot study, members agreed that the methodology designed, the existing tools and available data will warrant a high quality and high impact product. The WG 39 members stressed that support was needed to continue with the WG 39 tasks.

6 At the end of the meeting, the main results were presented to IAEA-EL Director Mr. D. Osborn and IAEA-EL staff Ms. I. Osvath. Mr. Osborn recognized the quality and relevance of the work done and further emphasized the IAEA interest and commitment to the objectives of WG 39. He mentioned that IAEA would look for funding in order to continue the work of WG 39, notably the digitation of all data and gathering of information for the final report.

7 A report of the second meeting of WG 39 was submitted to the 42nd session of GESAMP. It was explained that all information obtained from the data analysis will be carefully described and interpreted in the detailed report for each LME and submitted for review by the GESAMP members before publication.

8 During the third quarter of 2015, IAEA and the GESAMP Office provided funds to support the digitization work of WG 39. Currently UNINMAR-UNAM has completed the analysis of the available literature within the current total of 66 LMEs (328 articles from 50 LMEs; 16 LMEs do not have any study or report available), the digitization of the graphs (871 sediment cores) and the compilation a total of 58,006 geo-chrono-referenced data. The information available for each sediment core (Table 1), includes the metadata corresponding to the bibliographic source, sampling location and contaminant (family and contaminant type) and the contaminant concentrations in relationship with the sediment dating. The information is now available in the UNINMAR-UNAM database for data analysis and preparation of the final report by the members of WG 39.

Table 1. Information available from the literature analysis and graph digitization by LME[1]

Large Marine Ecosystem	***ARTICLES***	***LOCATION***	***TIME SERIES***	***ANALYTE NUMBER***	***DATA NUMBER***	***FAMILIES***
01 East Bearing Sea	1	2	2	1	24	1
02 Gulf of Alaska	1	2	2	1	25	1
03 California Current	12	33	134	50	2696	2
04 Gulf of California	10	16	49	15	1216	4
05 Gulf of Mexico	7	26	55	17	1006	3
06 Southeast U.S. Continental Shelf	1	1	4	4	30	1
07 Northeast U.S. Continental Shelf	8	21	56	22	750	5
10 Insular Pacific Hawaiian	2	4	24	12	879	2
11 Pacific Central-American Coastal	4	4	14	13	281	4
12 Caribbean Sea	5	14	37	16	543	5
13 Humboldt Current	5	33	36	4	454	4
14 Patagonian Shelf	2	3	11	8	234	3
15 South Brazil	22	46	139	45	2324	6
16 East Brazil Shelf	2	8	20	6	134	3
17 North Brazil Shelf	3	7	10	3	141	2
18 West Greenland Shelf	8	35	71	24	979	4
19 East Greenland Shelf	3	10	19	3	123	2
20 Barents Sea	11	27	40	11	510	4
21 Norwegian Sea	4	16	33	11	255	3
22 North Sea	6	14	48	31	533	3
23 Baltic Sea	38	98	590	237	8291	5
24 Celtic - Biscay Shelf	4	6	36	19	653	3
25 Iberian Coastal	11	56	230	20	3698	4
26 Mediterranean Sea	31	116	412	56	5970	6
27 Canary Current	4	6	35	10	464	4
28 Guinea Current	2	6	34	6	123	1
29 Benguela Current	2	2	4	4	64	3
32 Arabian Sea	6	20	73	10	2163	4
33 Red Sea	1	1	4	4	64	1
34 Bay of Bengal	3	22	94	10	1218	3
35 Gulf of Thailand	3	7	37	16	1107	4
36 South China Sea	30	68	351	92	10428	6
38 Indonesia Sea	3	3	13	7	218	1
40 Norheast Australian Shelf	7	3	26	7	411	2
41 East-Central Australian Shelf	1	3	15	5	91	2
42 Southeast Australian Shelf	2	2	11	7	217	1
43 Southwest Australian Shelf	2	2	3	2	24	1
44 West-Central Australian Shelf	2	4	11	4	84	3
46 New Zealand Shelf	3	8	18	8	205	3
47 East China Sea	7	10	23	17	653	4
48 Yellow Sea	12	18	67	22	1981	3
49 Kuroshio Current	11	35	201	92	3161	6
50 Sea of Japan East Sea	7	9	135	99	1747	5

Large Marine Ecosystem	***ARTICLES***	***LOCATION***	***TIME SERIES***	***ANALYTE NUMBER***	***DATA NUMBER***	***FAMILIES***
54 Chukchi Sea	5	14	29	10	515	3
55 Beaufort Sea	1	3	6	2	90	1
58 Kara Sea	1	1	1	1	15	1
60 Faroe Plateau	2	2	5	5	66	3
61 Antarctic	4	9	33	17	446	4
62 Black Sea	4	5	13	10	519	2
66 Canadian High Arctic	2	10	19	3	183	2

[1]LMEs not listed do not have any study report available