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

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PLANNING OF GESAMP ACTIVITIES:
GLOBAL TRENDS IN POLLUTION OF COASTAL ECOSYSTEMS

Report by the IAEA Technical Secretary on behalf of the Chair of Working Group 39 (WG 39)

1 The goal 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, WG 39 looks at the establishment of trends in global pollution in coastal environments.

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 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 MSExcel to organize the information extracted from the collected documents. The database and the document collection management was made through the file-sharing website Dropbox. WG members engaged to the intersessional work on the compilation of documents and population of the database. In the 38th session of GESAMP (2011) a report of the WG 39 inception meeting was submitted and it was noted that financial support was needed to continue working with the tasks included in the ToRs. In the 39th session of GESAMP (2012) it was stressed that the WG did not have a meeting since its first meeting in 2011, due to other priorities at the IAEA in relation to the Fukushima accident in March 2011, and thus progress had not been achieved. During the GESAMP 40th session (2013), it was reported that 304 scientific papers had been compiled and recorded in the WG 39 bibliographic database (see annex 1). A pilot web platform was presented and developed at no cost 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 again noted that financial support was needed for data preparation for trend analysis of the contaminants, especially for the digitization of core profile figures from the papers contained in the data base.

3 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 explained in detail, 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. WG 39 members worked in 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 with the designed methodology, the existing tools and available data would warrant a high quality and high impact product. The WG 39 members stressed again that financial support was needed to continue with WG 39 tasks. At the end of the meeting, the main results were presented to IAEA-EL Director and IAEA-EL staff recognized the quality and relevance of the work done and further emphasized the IAEA interest and commitment to the objectives of WG 39. The Director mentioned that IAEA would look for funding in order to continue the work of WG 39, notably the digitization of all data and gathering of information for the final report.

4 A report of the second meeting of WG39 was submitted to the 41st session of GESAMP (2014). It was reported that all data analysis results would be carefully described and interpreted in a detailed report and submitted for review by the GESAMP members before publication. The meeting stressed again that, in order to continue with WG 39 activities, it was necessary to complete the digitization of core profile figures from the papers in the bibliographic database. It was agreed that the supporting agencies would look for appropriate funding with the aim to implement the pending WG 39 activities (e.g. digitization of paper graphs, maps production, third meeting of the WG 39 to review the final report) during the intersessional period. However, the timeline for completion of the work depended on the availability of funds.

5 During the 42nd session of GESAMP (2015) the participants were informed that, during the third quarter of 2015, IAEA and the Executive Committee of GESAMP had agreed to provide the needed funds to support the pending work of WG 39. UNINMAR-UNAM had committed to provide the final report of the digitization within one year, upon receipt of the resources (in June 2015).

6 During the 43rd session of GESAMP (2016) the participants were informed that UNINMAR-UNAM had completed the digitization and capture of the available literature within the current total of 66 LMEs (328 articles from 50 LMEs; 16 LMEs do not have available publications), the digitization of graphs and the compilation a total of 58,006 geo-chrono-referenced data. The information for each time series (Table 1, below) includes the metadata corresponding to the bibliographic source, sampling location (coordinates and depth), contaminant (family, subfamily and contaminant type) and the contaminant concentrations versus age provided by sediment dating. The information is available at UNINMAR where it can be visualized and analyzed by the members of GESAMP WG 39 (http://www.icmyl.unam.mx/uninmar/mapa.jsf#zoom=2&lat=21.70167&lon=0&layers=B00TT).

7 During the 44th session of GESAMP (2017) participants were informed that over 1,000 papers that were initially screened, 327 were included in the final database with data from 49 LMEs. Details were provided on the mathematical normalization of the data and the trend analysis by linear regression. A synthesis of global and LME data was presented for various contaminants and for time periods reflecting pre-heavy industry, rapid heavy industry development, and the modern era of industrial regulation. A timeline was presented for completing the activities of WG39. This included finalizing data analysis by December 2017 and finalizing the working group report by August 2018. This report will include a global summary as well as more detailed reports for 5-6 targeted Large Marine Ecosystems.

8 GESAMP expressed its appreciation and noted the value of the working group's activities, however, there was concern that completing the final report by August 2018 is too ambitious. The working group was instead requested to complete the final draft report by August 2018, for review first by GESAMP members, followed by external reviews in the latter half of 2018. The working group should note in the final report that all of the data was collected from peer reviewed published papers and that no direct monitoring was conducted. It should also avoid including information which implies that the risks are associated with contaminant levels and focus instead on reporting on trends.

9 The draft of the final report was completed in June 2018, in advance of the GESAMP recommendation during the 44th session of GESAMP. The document contains an executive summary, seven chapters (introduction, methodology, results, case studies, global assessment, summary and conclusions and recommendations), a glossary, acknowledgements and the references included in the data base, organized by LME. The case studies correspond to California Current (LME03), South Brazil Shelf (LME15), Canadian Eastern Arctic-West Greenland (LME18), Baltic Sea (LME23) and East China Sea (LME47).

10 The draft of the final report was reviewed by six external and internal (GESAMP) experts and comments were communicated with the GESAMP office. During the 46th session of GESAMP in September 2018 the Chair of WG 39 presented the report and comments from reviewers were discussed. As a result, some changes to the draft of the final report were necessary. The WG 39 chair, Dr. Ruiz Fernandez, submitted the final version of the report to the GESAMP office in April 2019. The final version was reviewed again by members of GESAMP and GESAMP ExCom and the content was accepted. Currently, the report is undergoing an editorial revision and will then be published by the IAEA as an official GESAMP report.

11 There is no intervention required during the 47th GESAMP meeting in 2019.