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**IMO/FAO/UNESCO–IOC/WMO/WHO/IAEA/UN/UNEP
Joint Group of Experts on the Scientific Aspects
of Marine Environmental Protection (GESAMP)**

Report of the twenty-fifth session of GESAMP

Rome, 24-28 April 1995

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No. 56

**IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP
Joint Group of Experts on the
Scientific Aspects of Marine Environmental Protection
- GESAMP -**

REPORT OF THE TWENTY-FIFTH SESSION

Rome, 24-28 April 1995

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1995

NOTES

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1 INTRODUCTION

1.1 The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) held its Twenty-fifth Session at the Headquarters of the Food and Agriculture Organization of the United Nations, in Rome, Italy, under the Chairmanship of Mr O. Osibanjo. Ms H.Yap was Vice-Chairman of the Group.

Opening of the Session

1.2 Mr W. Krone, Assistant Director-General a.i. of the Fisheries Department of FAO, welcomed the Group to the Session on behalf of the Director-General of FAO, Mr Jacques Diouf. In referring to the important contributions GESAMP had made during the preparatory process for the Rio Summit and to the role GESAMP could possibly play in the implementation of programmes of the Global Environment Facility (GEF) and other activities aiming at the implementation of Agenda 21, he welcomed that GESAMP had moved from an advisory body dealing strictly with marine pollution problems to a group dealing also with scientific aspects of marine environmental management. Mr Krone expressed his hope that GESAMP, after having convened for the twenty-fifth time, will continue to play its important role for many more years.

1.3 The Chairman thanked Mr Krone on behalf of the participants for his good wishes for the success of the meeting and declared the Session open.

1.4 The Group then rose in silence to pay respect to the late Mr R. Lloyd, former member of GESAMP, who had passed away during the last intersessional period.

Adoption of the Agenda

1.5 The agenda for this Session as adopted by the Group is reproduced in Annex I. The list of documents considered at the Session is given in Annex II. Participants of the Session are listed in Annex III.

2 REPORT OF THE ADMINISTRATIVE SECRETARY

2.1 The Administrative Secretary of GESAMP informed the Group on the IMO activities related to the mandate of GESAMP. Particular reference was made to the amendment process embracing major international conventions, e.g., London Convention 72 (Amendment Group, 24-28 April 1995), MARPOL 73/78 (regulations for the prevention of air pollution from ships), SOLAS 74, etc.

2.2 In his statement, the Administrative Secretary touched upon such important items of the agenda as 'Future work programme' and 'Integrated coastal management'. In relation to the latter, he briefed the Group on the developments under two major technical cooperation projects financed by GEF and implemented by IMO:

- Programme for the Prevention and Management of Marine Pollution in the East Asian Seas, and
- Wider Caribbean Initiative for Ship-generated Wastes.

3 EVALUATION OF HAZARDS OF HARMFUL SUBSTANCES CARRIED BY SHIPS

3.1 Mr P. Wells, Chairman of the Working Group on Evaluation of Hazards of Harmful Substances Carried by Ships, informed GESAMP that the Thirtieth Session of the Working Group had been held during the intersessional period (27 February-3 March 1995). The main achievements at that session were a consideration of hazard profiles of chemicals, a preliminary review of GESAMP hazard evaluation rationale and parameters linked to the harmonization process for the classification of toxic chemicals requested by UNCED's Agenda 21 chapter 19, and a consideration of an IMO/GESAMP review panel to examine the classification criteria used by the Working Group. Mr Wells noted with deep regret the passing away of Ms Thea Adema, a valued member of the Working Group, and expressed his great appreciation for her contributions to the Working Group since its formation.

3.2 Mr Wells described briefly the work of the Working Group. White spirits were reinstated in the composite listing. The IMO Sub-Committee on Bulk Chemicals (BCH) had informed the Group about regrouping pollution categories and considering cleaning agents and the need for tests of biodegradability. The Marine Environment Protection Committee (MEPC) of IMO recommended that a panel of experts be established to review the current hazard evaluation procedure. The chemical data base was now available on disc for beta-testing. Several background papers had been prepared by the Working Group, preparatory to the revision of GESAMP Reports and Studies No. 35.

3.3 The Working Group's primary task was accomplished: it conducted eight revisions of previous profiles, assessed 15 substances submitted by nine companies, making a number of decisions on specific chemicals, and evaluated 34 substances proposed for inclusion in the IMO Chemical Codes. The Group was informed about ongoing efforts towards a globally applicable harmonized chemical classification and labelling system, and the request made by MEPC to set up a panel to review the GESAMP hazard evaluation scheme. The Working Group also started discussions on how to modify the scheme, adding new parameters and subdividing columns within the current scheme.

3.4 GESAMP was invited to comment on the Working Group's progress, especially on the recommendation to establish an IMO/GESAMP Review Panel on the hazard evaluation criteria. GESAMP members noted that the Working Group was fulfilling its terms of reference and conducting appropriate hazard evaluations, based on the intrinsic properties of chemicals. The Group indicated that the review panel's composition and function was the responsibility of IMO and that it should employ appropriate experts independently, not as GESAMP members. Several members stressed the need for a clear understanding of the distinction between hazard and risk assessment as reflected in GESAMP Reports and Studies No. 45. Accordingly, GESAMP adopted the following statement:

3.5 "Hazards relate to substances and are assessed solely on the basis of physical and chemical properties. Risk is a term that involves a combination of hazard of a substance and exposure of organisms to it. Risk therefore refers to the probability of adverse effects occurring. The relationship between hazard and risk is illustrated by Figure 3 of GESAMP Reports and Studies No. 45. It should be noted, however, that, as reflected in the footnote to this figure, there are no generally accepted definitions of the terms 'hazard' and 'risk' but, because distinction is essential, GESAMP has adopted the usage described above."

3.6 The Group endorsed the report of the Thirtieth Session of the Working Group, and, in particular, approved the hazard profiles that had been reviewed or established during the intersessional period.

3.7 A summary of the report of the Thirtieth Session of the Working Group, including its terms of reference and its members is presented in Annex IV.

4 ENVIRONMENTAL IMPACTS OF COASTAL AQUACULTURE

4.1 The FAO Technical Secretary of GESAMP Working Group 31 briefly described the background for the preparation of document GESAMP XXV/4, entitled "Monitoring of ecological effects of coastal aquaculture waste". He recalled that the first draft of this document, prepared by the Working Group during a meeting held 17-21 January 1994, had been presented and discussed at the Twenty-fourth Session of GESAMP (March 1994). Following the recommendations by that session, the report was reviewed and amended during a second meeting of the Working Group in Victoria, Canada (19-23 September 1994), to include all comments and suggestions received from experts, who had reviewed the first draft, as well as from GESAMP members. A summary of this report is given in Annex V.

4.2 The Chairman of the Working Group, Mr R. Gowen, introduced the second draft of the report, which provides an assessment of monitoring the effects of aquaculture waste. He emphasized the importance of viewing monitoring as part of the mechanism for managing aquaculture development, and the use of Environmental Impact Assessment (EIA) as a means of defining the potential effects of aquaculture waste and in the design of appropriate monitoring programmes.

4.3 Mr Gowen drew the attention of the Group to a chapter on "The use of models in environmental impact assessment" which is new to the report. The section discusses the use of models and presents details of models which have been used to predict the effects of aquaculture waste. He informed the Group that the section on "General principles of monitoring" has been modified in the light of comments made at the Twenty-fourth Session of GESAMP and comments received by invited experts.

4.4 Mr Gowen reiterated the difficulty in designing specific standardized monitoring programmes. To illustrate how monitoring programmes can be designed, the report details the variables which are commonly used in monitoring the effects of aquaculture waste, and presents five scenarios. Scenarios 1 and 3 are examples where the expectation is for a low level of impact with a corresponding low level of monitoring. Scenarios 2 and 4 attempt to show how modelling can be used to predict the effect of aquaculture waste and aid in developing a monitoring programme. Scenario 5 is an example of how evaluation of impact is used to limit development.

4.5 The final section of the report identifies key issues which need to be resolved if programmes to monitor effects of aquaculture waste are to be successfully implemented.

4.6 In the ensuing discussion, the Group provided numerous technical and editorial comments and suggestions on the report. Main discussion points focused on the use of impact prediction models, the utility of power analysis in statistical determination of required monitoring effort, the number of spatial and temporal replicates of sampling and

control sites, and on the relevance of pre-operational baseline studies and environmental auditing. It was also emphasized that monitoring should be seen as an integral part of EIA, and that EIA should also address positive and negative economic and social consequences of proposed developments. Where relatively large areas are designated under coastal management programmes for use exclusively by aquaculture, the design of monitoring programmes, in particular sampling strategies, should be adjusted accordingly. Some GESAMP members agreed that greater emphasis should be given to the use of models in predicting the ecological effects of aquaculture wastes.

4.7 It was noted that there are potential ecological and human health effects due to chemicals used by aquaculturists. However, the Chairman of GESAMP explained that this issue will be addressed by the Working Group when it tackles the issue of chemical usage in coastal aquaculture. It was felt that the introduction of this report should contain a section on its specific scope, to provide readers with a clear focus on the subject of this report. The introduction should also emphasize possible benefits of ecological monitoring for aquaculture, and highlight that any environmental assessment and monitoring effort be related to the scale of perceived impact of a given aquaculture operation.

4.8 The Technical Secretary of this Working Group introduced an addendum to section 8: "Perspectives", which contained primary features of ecological monitoring for consideration by farm managers, administrators and scientists when developing aquaculture-specific guidelines. In response, it was suggested to further emphasize the comparatively high costs of monitoring programmes designed to detect small ecological changes in contrast to those which require detection of big impacts.

4.9 In view of the discussion on this report, the Group agreed that the following steps should be completed before a decision on publication is taken:

- GESAMP members will provide their written comments on the report to Mr Gowen by the end of the current Session;
- Mr Gowen will revise the report accordingly, and send the report to all members of GESAMP as well as to all Sponsoring Agencies, and
- the decision on publication as GESAMP Reports and Studies No. 57 will be taken by the Chairman of GESAMP on the basis of the reactions of GESAMP members and Sponsoring Agencies.

4.10 With respect to the terms of reference relating to chemical usage, the Technical Secretary of this Working Group informed the Group of related discussions the Working Group had during its meeting in Victoria. The Working Group agreed to address a number of issues including quantities and types of chemicals used in coastal aquaculture, toxicity to non-target organisms, persistence in aquatic environments, stimulation of drug resistance, residues in non-cultured organisms, residues in aquaculture products, human health risks, on-farm management and regulation of chemical usage. GESAMP Working Group 31 would meet in December 1995 in conjunction with a regional workshop on chemical use in Asian aquaculture in order to benefit from the numerous presentations and discussions at this workshop.

4.11 With regard to the terms of reference relating to the integration of aquaculture into coastal area management schemes it was recommended that the members of the Working Group continue to compile and review relevant information with particular emphasis on related experiences worldwide.

5 OPPORTUNISTIC SETTLERS AND THE PROBLEM OF THE CTENOPHORE *MNEMIOPSIS LEIDYI* IN THE BLACK SEA

5.1 The UNEP Technical Secretary of GESAMP reminded the participants that the Working Group on opportunistic settlers and the problem of the ctenophore *Mnemiopsis leidyi* in the Black Sea had been established by GESAMP at its Twenty-third Session at the request of UNEP. The main task of the Working Group was to advise Black Sea countries and UNEP on possible courses of actions to manage the problem of the massive population explosion of *Mnemiopsis leidyi* in the Black Sea. IMO, FAO and Unesco-IOC had agreed to support activities of the Working Group. Messrs Y. Sorokin and P. Wells were requested to co-chair the Working Group. A first meeting of the Working Group was convened in Geneva from 10 to 14 January 1994.

5.2 The report of the first meeting was considered at the Twenty-fourth Session of GESAMP. It was agreed that the Working Group should continue its work under the following modified terms of reference:

- to assess the occurrence, distribution, reproductive biology and physiological features of the intruder ctenophore, its ability to compete for food with pelagic fish, and control of its population by predators in its natural habitat;
- to assess the probable causes of the ctenophore outbreaks and their connection with other destabilizing factors and developments in the Black Sea region;
- to assess the impact of the ctenophore on pelagic and benthic communities and its consequence for fisheries, and
- to develop a strategy, and to recommend measures, to overcome the ctenophore and similar invasions in other parts of the world, using the Black Sea region as an example.

5.3 Taking into account this instruction, two members of the Working Group were requested by UNEP to formulate possible strategies prior to the second meeting of the Group. They suggested that in order to prevent further damage by *Mnemiopsis leidyi* to the pelagic ecosystem of the Black Sea, and to restore it to a commercially productive state, a strategy based on the biological control of population of *Mnemiopsis leidyi* must be exercised. Their analyses facilitated substantially further deliberations of the Working Group.

5.4 The second meeting of the Working Group was convened in Geneva from 20 to 24 March 1995. The membership of the Working Group was extended by inclusion of several new members from the region to enlarge its expertise in the state of Black Sea ecological system and biology and distribution of *Mnemiopsis leidyi*. As a result much more factual data were used to support suggested strategy. The meeting prepared the final report of the Working Group for consideration and eventual approval by GESAMP.

5.5 The report was presented to this Session by Messrs P. Wells and Y. Sorokin, Co-Chairmen of the Working Group.

5.6 Mr Wells described the approach taken in the report, stating that it covered the topics of distribution and ecology of the comb-jelly, the causes of the outbreak, the alteration of the Black Sea ecosystem, its impact on Black Sea fisheries, the needs for monitoring and modelling, and the choice of appropriate control strategies. The report was improved over previous versions, due to the substantial efforts and contributions of Working Group members.

5.7 Mr Sorokin stated that the invasions by exotic species into coastal areas and inland seas is becoming extremely common and causes a drastic transformation of the ecosystem. It contains a list of recent invasions among which the ctenophore *Mnemiopsis* invasion into the Black Sea and adjacent seas was most pronounced and caused more drastic economical and environmental losses. In detail the report analyses the time scale of this invasion, the spatial distribution of the invading ctenophore in the Black, Azov and Marmara Seas, and gives information regarding long-term fluctuation of its population density (biomass). In the Black Sea, after peaking in 1988-90, the ctenophore population decreased, but it started to rise again in 1994.

5.8 The invasion of *Mnemiopsis* correlates with a drastic alteration of the whole pelagic ecosystem in the basins of the Black Sea area and even affected the benthic fauna. The basic aspects of such alteration and its impact upon the fishery is treated in the report in detail, showing grave losses to the fisheries and economies of the Black Sea countries. The report analyses the causes of this vigorous outbreak of the invader, concluding that it was preconditioned by the recently anthropogenic transformation of the Black Sea ecosystem.

5.9 Mr Wells then continued, describing how the most feasible strategy for eradicating or controlling the introduced species, i.e., the comb-jelly was chosen. The Working Group considered that ecological control by species introduction or enhancement, i.e., biological control, had a realistic chance of success. This control strategy could be deployed by enhancing local fisheries (creating new fishery resources, rehabilitating pelagic fish stocks, and developing alternative mariculture facilities), in particular, by improving the horse mackerel stocks and introducing both vertebrate (fish) and invertebrate (comb-jelly) predators. It was noted that such a recommended biological control programme, including fisheries enhancement, required a cautious approach and the agreement by Black Sea coastal states as to its benign nature. Such a strategy should also be accompanied by appropriate research and monitoring, as described in the report.

5.10 Consideration of the report by GESAMP members resulted in a number of points. These were:

- The problem of invading species is not unique to the Black Sea region, but is a global problem. Not only have invasions occurred naturally over millions of years, they have become common in recent years due to human activities. Such invasions have often led to dramatically altered ecosystems, with severe economic effects.

- The Working Group has recommended that biological control appears to be the most appropriate strategy to combat the introduction of the comb-jelly and contribute to restoring the Black Sea. GESAMP urged caution in implementing introductions of alien species (including biological controls) because of ecological concerns and also in light of general international legal rule.
- At the same time the Group believes that restoration of high water quality in the Black Sea by reduction of nutrient and chemical inputs will also play a major part in re-establishing fish stocks that are natural predators or competitors with the comb-jelly. This re-establishment of fish stocks can be achieved by reducing fishing effort, by fish releases from aquaculture and by restoring habitats.
- The Group believes that there is considerable data available which would allow modelling of the dynamics of the system which will include predator-prey relationships. Such modelling should not preclude remedial actions being undertaken.
- The Group urges that more efforts be devoted to focused monitoring of environmental conditions and the distribution of the comb-jelly.
- The Group recommends that cost-benefit analyses should be carried out on each of the control strategies suggested.

5.11 Suggestions were also made to correct and improve the report by (not in priority): ensuring full editorial corrections, including a change in title to "The Invasion of the Ctenophore *Mnemiopsis leidyi* in the Black Sea"; listing action items as immediate, short- or long-term; expanding the section on monitoring; adding a suitable photograph of *M. leidyi*; ensuring that all feasible control options are discussed; making suitable reference to the Bucharest Convention and its role in controlling pollutants from the Danube River system; omitting misleading statements on cause and effects; mentioning appropriate international law relating to introduced species, especially in ballast water; and including an executive summary in the report.

5.12 The Group agreed that the report should be published after editing as GESAMP Reports and Studies No. 58, incorporating comments provided by GESAMP members at this meeting and reformatting it into standard GESAMP publication style. The Executive Summary is attached to this Report as Annex VI.

6 SEA-SURFACE MICROLAYER

6.1 The WMO Technical Secretary of GESAMP recalled that Working Group 34 on the Sea-Surface Microlayer was established by the Twenty-third Session of GESAMP in April 1993 to prepare a report on current understanding of the physics, chemistry and biology of the sea-surface microlayer with particular reference to its role in global environmental change and as a marine habitat. A draft report prepared at the Working Group meeting in February 1994 had been submitted to the Twenty-fourth Session of GESAMP, which in the course of lengthy and detailed discussion of the draft, made many comments with regard to some assumptions, statements and conclusions in the report, and proposed what additional considerations should be taken into account. The Group had agreed that a core group of Working Group 34 should meet in summer 1994 to complete and revise the

report taking into account the GESAMP comments (as reflected in GESAMP Reports and Studies No. 53) and to present the final report to GESAMP in 1995 for approval. The Core Group met in Norwich, UK, from 21 to 24 August 1994 and the revised report was submitted to the present Session as document GESAMP XXV/6.

6.2 The Chairman of the Working Group, Mr R.A. Duce, noted that the Core Group was confronting a difficult task in balancing the conflicting arguments and viewpoints regarding a number of issues, especially in Chapter 3 on biological effects of chemical changes, and trying to avoid any speculations not based on proved scientific evidence and reliable data. He also noted that GESAMP comments had been taken into account to the extent as deemed appropriate by the Core Group and that additional information (e.g., on TBT in the sea-surface layer) was also added to the report. Finally he expressed hope that the amended report would be agreeable in essence to the GESAMP members and to all the experts involved in the preparation of the report.

6.3 In the subsequent discussion, the Group noted the scientific value of and essential progress in improving the report. At the same time it was noted that the report still required some clarifications and corrections. In particular, the Group was of the opinion that the Executive Summary did not reflect the tasks which were put forward to the Working Group, the present state of knowledge of the sea-surface microlayer and the GESAMP conclusions on this matter. Other comments were related to the following:

- overstatements of the importance of the sea-surface microlayer in Chapter 3 on biological effects of chemicals (sections 3.1 and 3.4);
- clarification of the use of the word "bioavailability" in section 3.7 on effects of chemical contamination;
- clarification with respect to biological effects for dependent vs opportunistic species in the microlayer (in section 3.4);
- phase out of tributyl tin (TBT) use in small boats in restricted coastal regions (section 3.7);
- inconsistencies in the discussions of poly-aromatic hydrocarbons (PAHs) in the section on the effects of chemicals (section 3.7), and
- more emphasis on the role of the microlayer in sea-to-air transport of materials, especially those harmful to human health (section 2.3).

6.4 The Group agreed that an *ad hoc* group be established during the Session to revise the Executive Summary of the report on the sea-surface microlayer. It was also agreed that some minor corrections, including editorial ones, would be given to Mr Duce, the Working Group Chairman by the GESAMP members during the present Session, and that the report will be revised taking the comments and corrections into account. The revised Executive Summary was later considered and adopted by GESAMP (see Annex VII). The Group also agreed that the revised report on the sea-surface microlayer and its role in global change be published as GESAMP Reports and Studies No. 59, and that abstracts of papers presented at the Working Group meeting in 1994 should not appear as an Annex in the final report since they would be published in full in a separate book.

7 INTEGRATED COASTAL MANAGEMENT

7.1 The FAO Technical Secretary of the Task Force on Integrated Coastal Management (ICM) established by GESAMP during its Twenty-fourth Session, in introducing this agenda item, noted that the Task Force has been formed by the Co-Chairmen, Messrs J. Gray and S. Olsen, and had met in Rome, 28 November-2 December 1994. Following this meeting, sections of the proposed report had been drafted. A summary of the report is attached as Annex VIII.

7.2 Mr S. Olsen, in introducing the draft sections, noted that a valuable contribution which GESAMP can make to the continuing debate on the attributes and scope of integrated coastal management is to review experience in selected developing and developed countries in order to identify the characteristics of viable approaches to resolving important coastal issues. He noted that four case studies had been selected which met the following criteria: addressed multiple sectors; had advanced into the implementation phase, and were representative of a range of scientific inputs. It was apparent in retrospect that the work of the Task Force would have been facilitated if a conceptual framework to provide a basis for an analysis of the case studies had been prepared prior to the meeting. The draft made available to GESAMP represented an attempt to provide such a framework. Mr Olsen emphasized that this document was not intended to be reviewed formally, but to provide a basis for reviewing progress to date.

7.3 In the discussion of the draft sections of the report, there were differences of view with regard to the direction which had been taken by the Task Force. Many members expressed concern that the approach did not as yet give sufficient attention to the roles of science. Some members, however, found merit in the draft, noting that it was a basis for identifying the contributions of natural and social scientists to the integrated coastal management process. A number of detailed comments were made with regard to how the text might be improved.

7.4 During the discussions, it became evident that a clear and concise description of the ICM process would be needed as a foundation for any work by GESAMP on scientific contributions to ICM projects.

7.5 GESAMP recommended that for the continuance of the study of integrated coastal management, the Terms of Reference should be better focused. GESAMP appreciates that ICM cannot be successfully implemented without the incorporation of appropriate science. Accordingly, the purpose of this study is to enhance the utilization of science in the protection and management of the coastal area by preparing concise guidance on applications of science to integrated coastal management.

7.6 The revised Terms of Reference of this study are as follows; they should be dealt with consecutively:

- present a concise description of the structure of ICM emphasizing its scope and objectives;
- identify and evaluate the scientific elements (social and natural) required to support the stages of the ICM process drawing on an analysis of ICM case studies, and

- identify factors and approaches that have either facilitated or impeded the incorporation of science into ICM.

8 MATTERS OF CONCERN WITH REGARD TO THE STATUS OF THE MARINE ENVIRONMENT

Matters of Concern

8.1 Since the phasing out of tributyl tin (TBT) as an antifouling agent, companies had turned to copper-based substitutes. These, however, were not particularly effective and now paint manufacturers are incorporating triazine-based herbicides as extra additives. High concentrations of products of these substances have been found at several kilometres from marinas where they are used. These may lead to inhibition of growth in natural phytoplankton and algal communities. The Group requested the Working Group on the Hazards of Harmful Substances Carried by Ships to evaluate all available data and to report on its results to the Twenty-sixth Session of GESAMP.

8.2 Recent open-literature data from freshwater environments show that a range of substances (including DDT, PCB, dioxins, PAH) have oestrogenic effects on fish where male fish develop female organs. The finding is that a wide variety of different chemicals have the same effect even though they are greatly different from natural oestrogens. Concern is also being expressed about the action of these "oestrogenic mimic" chemicals in humans where they have been implicated in falling sperm counts. GESAMP believes that this is a matter of potential concern and urge that research efforts be devoted to the study of potential effects of oestrogenic mimic chemicals in the marine environment.

State of the Marine Environment

8.3 The Sponsoring Agencies asked the Group to consider the feasibility of preparing a "State of the Marine Environment" for the year 2000, advising that if such a project were to be undertaken, it would almost certainly call for a new concept and approach, if only in view of the more limited resources now at their disposal.

8.4 The Group noted with satisfaction, the wide use made of the 1990 "State of the Marine Environment" report (GESAMP Reports and Studies No. 39) by UNCED and other recent policy-making fora, and the continuing emphasis on the fundamental importance of periodic review, assessment, and specification of problems and priorities. This is the basic mission of GESAMP and is laid down in its Terms of Reference.

8.5 The Group emphasized the importance of ensuring that a contemporary and coherent analysis of the state of the marine environment is available to the international community to underpin the development of policies and programmes relating to marine environmental protection and the sustainable use of marine and coastal resources. The Group agreed that while the 1990 "State of the Marine Environment" continued to serve this purpose, it could not be expected to do so beyond the year 2000, and that steps would have to be taken as soon as possible to commence a new assessment.

8.6 The Group also concluded that it was not only necessary, but highly desirable that the next "State of the Marine Environment" should be based on a new concept and be prepared under a new approach. In reaching this conclusion, the Group pointed *inter alia*

to the rapidly growing requirement for more focused, prioritized guidance, more multidisciplinary and integrated approaches, and for assessments which identify trends and are generally more predictive in character.

8.7 Various suggestions were made in respect of the nature and scope of the new assessment, the process for selecting main subjects and areas of focus, the building-blocks (existing, planned and yet to be identified) needed for its preparation and organization of the Group's work. It was the general perception that it would be best to aim at a synthesizing document - not one containing detailed and comprehensive coverage of all marine environmental issues - and to focus particularly on the status of and trends in such main areas as resource exploitation, coastal development, habitat modification and contamination and its effects (i.e., pollution).

8.8 The Group readily acknowledged that the preparatory process would not be the same as that for the 1990 report. While the amount and quality of new data and information that could be assembled was an open question, it was noted that some new, comparable data could be generated through the use of its Guidelines for Marine Environmental Assessments (GESAMP Reports and Studies No. 54). The Group consequently urged the Sponsoring Agencies to ensure that the Guidelines were widely circulated and that their use regionally was actively encouraged.

8.9 It was generally recognized that considerable effort would have to be devoted to involving a variety of organizations and individuals, at global and regional level, in the process. One possible element in the organization of work, it was suggested, would be to identify experts in the regions who will be assigned the task of identifying, collecting and collating documents relevant to conditions and issues in their respective regions and to catalogue information for focused review and synthesis by GESAMP, or a core group thereof, on the basis of topics, themes and criteria specified by GESAMP.

8.10 Subsequent to this discussion, the Sponsoring Agencies informed the Group that they would examine in detail the feasibility of preparing a new assessment, taking into account available financial resources, in order that all the interested bodies could be informed of the result in a timely way, especially the United Nations Commission on Sustainable Development and the governing bodies of the UN system, and plans put in place for GESAMP's consideration at its next session.

9 FUTURE WORK PROGRAMME

Oil in the Marine Environment: New Tanker Designs

9.1 The Administrative Secretary / Acting IMO Technical Secretary introduced document GESAMP XXV/9 containing a modified request from the IMO Marine Environment Protection Committee (MEPC) which originally was submitted to the Twenty-fourth Session of GESAMP for advice on the severity of ecological damage caused by accidental spills from tankers of different new designs. It was emphasized that the primary purpose of asking GESAMP's assistance was to permit IMO to evaluate the equivalency of new designs to the double hull tanker, as well as to make it possible to assess the relative environmental significance of the different outflow characteristics.

9.2 Document GESAMP XXV/9 presents a set of four revised questions accompanied by a more explanatory text. The Group considered the document and found that conditions of hypothetical incidents are still not specified and there were too many uncertainties to produce scientific advice. Responses to these questions will be fundamentally and critically dependent on the physical and biological characteristics of the receiving environment and the specific composition of the oil considered. Accordingly, any answers to these questions would have to be developed in the context of a set of very detailed specifications of all these variables in the form of a range of scenarios. These could not be comprehensive enough to address the global situation that implicitly forms the basis of the questions posed by IMO. In essence, the risk (i.e., the product of frequency of spill occurrence and the associated potential damage) from a single large spill compared with that of several small spills, of equal aggregate volume, for a single specified oil composition, will vary according to the ecological characteristics of the specific environment into which the spill, or spills, take(s) place. This implies that the analysis that might be undertaken by GESAMP would have inherent limitations and would yield projections that would be too specific.

9.3 The Group agreed, however, to assist IMO regarding the main scientific elements of comparisons of tanker design. GESAMP would therefore recommend opening a dialogue with IMO's Marine Environment Protection Committee (MEPC) to define appropriate questions that are both answerable in scientific terms and supportive of the comparison of tanker design features relating to oil spill probability and their associated ecological consequences.

Oil in the Marine Environment: Discharges from Maritime Activities

9.4 The Group briefly considered document GESAMP XXV/9/Add.1 submitted by IMO on arrangements to review the accuracy of estimates of amounts of oil input into the marine environment, specifically from shipping sources. The Group was informed that some of the assessments will be made by correspondence and in addition to this a small task force will address the issue. A meeting of this task force could be organized in conjunction with other IMO activities in August 1995. GESAMP noted the above information.

Proposal for a Working Group on Biodiversity

9.5 During the Twenty-fourth Session of GESAMP held in New York (21-25 March 1994) the UNEP Technical Secretary had informed the participants of the interest of UNEP in establishing a Working Group on marine biodiversity. After a short discussion GESAMP decided to consider this matter at its Twenty-fifth Session and requested the UNEP Technical Secretary to provide a background paper for this purpose.

9.6 The background paper containing:

- draft terms of reference of the Working Group;
- a workplan and time-table;
- suggestions for membership profiles, and
- a draft outline for the eventual report;

was presented to this Session by the UNEP Technical Secretary as document GESAMP XXV/9.2 (summarized in Annex IX).

9.7 The Group considered that establishment of a full scale GESAMP Working Group with the suggested terms of reference is not warranted at this time. The overview of the situation with regards to threats to marine biological diversity and recommendations concerning actions that can be taken to better protect, conserve and manage biological diversity can be prepared by an expert of GESAMP.

9.8 GESAMP accepted Mr J. Gray's offer to prepare a peer-reviewed, 12-15 page document covering the geographical distribution of marine biodiversity, the key regions and/or habitats, the threats to marine biodiversity (including exploitation of living resources) and what strategies need to be adopted to best conserve marine biodiversity. The paper will be presented at the Twenty-sixth Session of GESAMP. This overview would provide the necessary working paper for GESAMP, at its next session, to prioritize its future work on marine biodiversity and, particularly, the integration of biodiversity issues in its work. The Group also noted that the subject would be considered by the Sponsoring Agencies in the context of their study of the feasibility of a new State of the Marine Environment assessment.

Intersessional Activities of Working Groups

9.8 Taking into account the above decisions of the Group, intersessional work will be carried out in the framework shown below:

1. Evaluation of the hazards of harmful substances carried by ships (Working Group 1)

Lead agency: IMO
Co-sponsor: UNEP
Chairman: P. Wells

Two meetings of the Working Group are planned - one from 28 August to 1 September 1995, one in February 1996.

2. Environmental impacts of coastal aquaculture (Working Group 31)

Lead agency: FAO
Co-sponsors: UNEP, Unesco-IOC, WHO
Chairman: R. Gowen

A meeting of the Working Group will be held in December 1995.

3. Input of oil into the marine environment from shipping (Task Force)

Lead agency: IMO
Chairman: P. Wells (first meeting only)

A meeting of four to five experts will be convened in late August 1995. Work will be initiated by correspondence with a view to evaluate available data sources on input of oil from shipping into the marine environment and to consider approaches that might be used to produce reliable input estimates.