

REPORT OF SCOR/ACMRR WORKING GROUP 22
ON
MARINE POLLUTION

1. In accordance with Recommendation 6.30 of the 6th Meeting of the IOC Bureau with the Consultative Council, the SCOR/ACMRR Working Group on Marine Pollution met in Paris on 12-14 December, 1966. Present were:

Nominated by SCOR:

D. W. Pritchard, Chairman
O. Kinne

Nominated by ACMRR:

P. Korringa
A. J. Lee

Secretariat:

S. J. Holt, FAO
A. Y. Takenouti, IOC
R. J. Hurley, IOC

N. Popov, nominated by SCOR, was unable to attend.

2. The Working Group concerned itself with the preparation of the terms of reference of the IOC Working Group on Marine Pollution and a draft agenda, with annotations, for its first meeting. In addition, the Working Group drew up recommendations to the IOC Secretariat concerning the preparations for this first meeting.

3. The Working Group's proposals are appended.

Recommendations to IOC Secretariat concerning preparations for the Meeting of the IOC Working Group on Marine Pollution

A. Documents to be made available

1. Draft agenda, annotation, and tabular analysis prepared by SCOR/ACMRR Working Group.
2. Working papers (to be prepared by consultants for the IOC Secretariat) on the following subjects:

- a) oceanographic processes determining the fate of pollutants in the sea (Agenda Item 6). This paper should cover both the physical and biological processes of movement and diffusion, the biological and chemical processes of degradation, the biological and geo-chemical processes of accumulation and removal, and the bio-chemical processes of interaction. Hence preparation may require the joint efforts of at least two authors;
 - b) biological reactions as indicators and criteria of pollution and its effects (Agenda Item 5). This paper should consider organismic reactions suitable to serve as indicators for the assessment of the kind and degree of pollution in a given body of water, as well as the effects of pollutants on i) ecosystems and on ii) parts thereof. Examples under i): changes in species composition; successions; local distributions; rates of turn-over and breeding activities. Examples under ii): lethal doses; rates of reproduction, growth, metabolism, and activity; and intra- and interspecific relationships.
3. Reports on the activities of other international organizations relating to marine pollution, with particular reference to the oceanographic aspects:
- a) specialized Agencies (FAO, IMCO, IAEA)
 - b) inter-governmental bodies (ICES, IPFC, GFCM, EURATOM, OECD)
 - c) non-governmental bodies (IAWPR, SCIBP, IAPO).
4. The analysis by the ACC Sub-Committee on Marine Science and its Applications of the questionnaires it circulated to governments, together with a review of the information which was excluded from the questionnaires because such information had already been submitted to IMCO or IAEA. This analysis should include a detailed list of the pollutants reported in the responses to the questionnaire.
5. A report on marine resource aspects of pollution by ACMRR.
6. A short bibliography of key references.

B. Other preparations and suggestions

1. It is suggested that the meeting of the IOC Working Group on Marine Pollution be held in Paris in June or July 1967 for a period of 4 days.
2. Observers should be invited from those organizations listed in 3b) and 3c) above, as well as representatives from the specialized agencies concerned, SCOR and ACMRR.

DRAFT AGENDA FOR THE IOC WORKING GROUP
ON MARINE POLLUTION

1. Opening of meeting. Election of Officers
 2. Adoption of the Agenda
 3. Terms of reference of the Working Group. Definition of Marine Pollution
 4. Types of Pollution and their effects
 5. Methods for the Measurement and Assay of Marine Pollution
 6. The Fate of Pollutants in the Marine Environment
 7. Proposals for IOC action
 8. Any other business
 9. Closing of meeting
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Annotation to the Proposed Agenda
for the meeting of the
IOC WORKING GROUP ON MARINE POLLUTION

Agenda Item 3.

Under this item the Working Group is invited to consider and amend as necessary the following draft terms and definition prepared by the SCOR/ACMRR Working Group.

- a) Terms of Reference: (Based on IOC Resolution IV-10).

To consider and report to the fifth session of the IOC on the question of how the Commission can further the national and international studies of oceanographic processes relevant to marine pollution, its effect and its control.

- b) The following is proposed as a definition of marine pollution for the purpose of the IOC Working Group:

"Introduction by man of substances into the marine environment resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to maritime activities including fishing, and reduction of amenities."

Deleterious effects on the marine environments may be produced as a result of actions of man other than the introduction of a substance. The construction of a barrier across an estuary might produce deleterious effects elsewhere, and the overfishing of a marine population would be a definite example of such action. The above definition excludes such actions from the term "marine pollution". The shock wave from an explosion also produces deleterious effects, but is not by this definition "marine pollution", though the chemical products released by the explosion may be pollutants.

It should also be noted that acts which in one case might be deleterious and hence be acts of pollution might, in another case, be beneficial, and hence not acts of pollution. For example, the discharge of a heated effluent might in some cases be deleterious while in other cases it might be beneficial, or, at least, not harmful.

The term "harm to living resources" is to be taken in a broad sense, and is intended to include not only harm to commercially important species, but also any disruption of the environment which would tend to destabilize the eco-system.

Agenda Item 4:

Under this item the Working Group is invited to consider and, if necessary, amend and expand the main categories of pollutants given in the appended table, and to identify their effects, according to the four categories referred to in the draft definition and in the heading of the table.

Agenda Item 5:

The Working Group is invited to consider, for each category of pollution, the adequacy of existing methods for its detection and measurement, and for assessment of its effects. It is intended that discussion of methods for assessing the effects of pollution on marine resources should include both field studies and laboratory investigations for improving methods and for establishing criteria of pollution and of its biological effects.

The Working Group should identify the further research required to meet these ends.

Agenda Item 6:

Under this item the Working Group should consider the oceanographic determinants of the fate of pollutants, identifying the physical, chemical (including geochemical and biochemical), and biological processes which lead to changes in distribution (dispersion, accumulation and removal) and modification (degradation) of the various categories of pollutants.

The Working Group should review the status of research on these processes and identify the further research required both in the laboratory and in the field.

Agenda Item 7:

Under this item the Working Group is invited to consider possible IOC action pertinent to Agenda items 5 and 6. Possible types of action might include the following:

- a) To recommend that member states undertake, for the purpose of providing a scientific basis of pollution control, such oceanographic and related research as is required to identify, measure, evaluate and ameliorate effects of marine pollution.
- b) To consider and recommend international co-operative programmes of research required to identify, measure, evaluate and ameliorate the effects of marine pollution.

c) To facilitate the exchange of data and scientific information related to the identification, measurement, evaluation and amelioration of the effects of marine pollution.

d) In co-operation with other organizations concerned, to promote the application of the results of oceanographic research in the formulation and execution of pollution control measures.

In proposing such actions, the Working Group should take account of the related activities of UNESCO, of other agencies of the U. N. Family and of other international organizations.

Annotation to Proposed Agenda of the
IOC WORKING GROUP ON MARINE POLLUTION

This Table lists the Major Categories of Pollution, and, for each type of pollution, the General Categories of Effect most frequently associated with that pollution type are indicated by the crosses in the appropriate column. Where it has been possible to make a judgement, the most important category of effect for the particular type of pollution is further indicated by a parenthesis around the cross.

The final column of this table gives reference numbers to footnotes wherein illustrative examples of the categories of pollution are given.

General Categories of Effect

<u>Major Categories of Pollution</u>		Harm to living resources	Hazards to human health	Hindrance to maritime activities	Reduction of Amenities	Reference to illustrative examples
Domestic sewage (including waste from food processing)	Direct microbial	-	(x)	-	x	1
	Indirect microbial	-	(x)	x	-	2
	Eutrophication and related processes	(x)	x	x	(x)	3
Industrial waste products	Heavy Metals	x	(x)	x	-	4
	Petro-Chemical	-	x	x	-	5
	Oils, etc.	-	-	x	(x)	6
	Pulp and Paper Wastes	(x)	-	-	x	7
	Pesticides	x	(x)	-	-	8
	Detergents	x	-	-	x	9
	Radioactive Materials	-	(x)	x	-	10
	Heat	x	-	x	-	11
	Solid Objects	-	-	x	x	12
	Dredging Spoil	x	-	x	-	13

Footnotes to Table

1. Direct contamination of beaches near discharges of inadequately treated sewage can lead to bacterial and virus infections and non-aesthetic conditions with consequent adverse effects on tourism.
2. Bacterial or virus infection can be caused by eating raw shellfish harvested from areas contaminated by sewage and this also leads to adverse effects on the fishing industry.
3. Discharge of sewage or other organic wastes leads to increases in nutrient salts and changes in their proportions in the sea and so to quantitative and qualitative changes in the phytoplankton which may
 - a) have adverse effects on shellfish;
 - b) if they involve increases in toxic species, lead to poisoning by eating contaminated shellfish;
 - c) lead to non-aesthetic conditions resulting from the mass production, mass mortality and decomposition of marine organisms.
4. Filter-feeding invertebrates and also fish larvae, etc., which are sensitive to changes in the quantities of certain elements normally rare in sea water, take in metals, such as copper, zinc, and mercury, originating from industrial wastes. This causes in various circumstances the death of the organisms, the spoiling of the flavour of shellfish and the poisoning of consumers of the organisms.
5. Wastes from petro-chemical industry cause spoiling of the flavour of marine products and danger to man through the consumption of organisms in which carcinogens have accumulated.
6. Oily substances may clog nets, spoil the flavour of fish and shellfish, kill sea-birds, contaminate beaches. Some methods of treating oil on beaches and on the sea surface involve the use of materials toxic to marine life.
7. Sulphite effluents with high biological oxygen demand cause non-aesthetic conditions, destruction of shellfish beds and hindrance to migrating fishes.
8. Insecticides and residues, such as chlorinated hydrocarbons and organic phosphorus compounds, are persistent and highly toxic to marine arthropods and may accumulate in other organisms with consequent health hazards to predators including birds and man.

9. The SCOR/ACMRR working group is not aware of any specific examples, but, considering that detergents have a high phosphorus content, is of the opinion that the bio-degradation of the short-chain detergents could add to the eutrophication effect of domestic waste.
10. Because of the rigid control exercised over the atomic energy industry since its inception, the Working Group has no examples of adverse effects brought about by the discharge into the sea of radioactive effluents. There exist, however, the potential dangers of nuclear accidents as hazards to health. Of particular concern are the radioactive isotopes of those elements which are normally rare in sea-water and which are readily taken up by marine organisms.
11. Under certain conditions warm water discharges from large electrical power plants can lead to:
 - a) excessive growth of vegetation which interferes with navigation;
 - b) increase in fouling and boring organisms on vessels and structures;
 - c) thermal blocks which interfere with migrations of fish;
 - d) when associated with other types of discharge, increased microbiological activity and thereby oxygen depletion with consequent adverse effects on living marine resources.
12. Floating and sunken solid objects, such as drums, wire, bottles, timber, vehicles, plastic articles and other persistent materials, can:
 - a) interfere with navigation and fishing operations;
 - b) provide a habitat for boring organisms;
 - c) when washed up on shores, reduce amenities;
 - d) adversely affect the benthic habitat.
13. Discharge of clay, silt, etc. from dredging, and also possibly from mining and drilling operations, may
 - a) increase the turbidity of the water with adverse consequences to marine life;
 - b) cover hard bottom with soft layers which impede spawning of fish and settling of shellfish;
 - c) because of high nutrient content of interstitial water, add to the nutrient salt concentration of the sea and hence to the problems associated with eutrophication;
 - d) interfere with navigation and fishing operations.