

Appendix 2.

Draft Annotated Outline

Proposal to SCAR for the study of the Marine Living Resources of the Southern Ocean

1. Introduction: Background and general objectives

1.1 Historical background

This will briefly review what is ~~presumably~~ known about the Southern Ocean resources, and their approximate magnitude, nature and distribution. Past and current research will be described. The events and recommendations (from SCAR, IOC, the Antarctic Treaty powers) leading to the establishment of the group, and its terms of reference will be outlined.

1.2 The objectives and justification of the research programme

The long-term objectives of the programme - provision of scientific advice on which the rational use and conservation of the resources can be based - will be set out, together with the intermediate objectives needed to reach the long-term target, and the specific role of the programme in fulfilling this target. The costs of the ~~project~~ ^{programme} will be compared, in very general terms, with the benefits that ~~would~~ ^{might} be obtained if the long-term objective were reached.

2. Suggested research programmes

This section ^{will} outlines the individual lines of research which need to be pursued, and then brought together to provide a comprehensive picture of the complete marine ecosystem, ^{so as to} ~~and thus~~ form the scientific basis for the rational utilization of that system. Emphasis will be placed, for each group of animals, on those aspects of the biology and population dynamics that need to be ~~classified~~ ^{assessed} before an adequate assessment of their potential yield can be made.

2.1 Population dynamics and ecology of krill

Significant unknown elements are the biomass (and the best techniques for estimating biomass); population parameters (particularly life-span); population structure (particularly the degree to which krill in different areas form independent stocks or sub-populations); and consumption by the major predators (whales, seals, birds, squid etc.).

productivity

seasonal and year to year variations of these, and their dependence on environmental factors.

2.2 Population dynamics and ecology of marine mammals

These are being reviewed by a working group of ACMRR, and a report from this group, including research proposals will be available ^{early} in ~~mid~~ 1976.

2.3 Population dynamics and ecology of fishes, squids and other living resources ~~components of the ecosystem~~

lobsters
sea weeds

With some exceptions, less is known of these resources than of krill ^{and} the same general research programme will be needed, with special emphasis, ^{particularly} ~~at least~~ for squid, on developing suitable sampling and surveying techniques.

2.4 Trophodynamics and modelling of the Antarctic marine ecosystem

birds

The ^{studies} ^{above} on individual stocks or groups of stocks need to be combined, together with relevant other studies on the environment, to provide ^{an understanding} ~~a study~~ of the complete ecosystem. ^{Account} ~~Account~~ ^{physical & biological} ~~possible effects of~~

Account will
be taken
of effects
of fishing
h.o. on
the
ecosystem

2.5 Pollutants in the Antarctic marine ecosystem

Studies on pollutants in the relatively unpolluted Antarctic could be particularly significant in providing a baseline for ^{and for} comparison with other areas ^{and} ^{monitoring future changes}.

3. Practical implementation of the programme

The programme will cover all aspects of biological research (^{see} work ^{by} ^{from} special ships, ships of opportunity, experimental and other work ashore etc.) relevant to the long-term objectives. Special attention will be paid to encouraging and facilitating full participation by scientists ^{from} in all parts of the world including those ^{from} in non-member ^{not party to} countries ^{of} the Antarctic Treaty. ~~Standardize sampling eqpt. & techniques for comparison.~~

To produce
compatible
results
sampling
techniques
will in
general be
standardized.

3.1 A proposal for a coordinated multiship programme

The vast area of the Southern Ocean, and the differences ^{due to location} between different parts of the area, and the great seasonal changes ^{require} ~~mean~~ that studies of the resources must be carried out with at least a certain minimum intensity of sampling in space and time if valid conclusions are to be reached. For many studies the coordinated work of several vessels ^{will} ~~may~~ be needed to reach this minimum level. In the first operational stage these studies ^{should} ~~may~~ be concentrated in a suitable area e.g. the Scotia Sea. This survey will be the largest element of the whole programme.

3.2 Supporting ship-based programmes

Many ships which can work in the Antarctic wholly or partly on biological research will not, for logistic and other reasons, be able to take part in the main survey. Their activities need to be coordinated to produce the

greatest ^{contribution to} ~~benefits~~ for the long-term objectives. This will require determination of the priority observations and the best type of gear, as well as the stimulation of biological observation from oceanographic, supply and other ships (especially from any vessels carrying out commercial or semi-commercial fishing).

3.3 Supporting shore-based programmes

The sea work will need to be supplemented and ^{to the research ships} ~~complemented~~ by a range of shore activities. These include ~~direct~~ ^{and subantarctic} logistic support; observations from Antarctic/shore stations, particularly to provide continuous base-line data; experimental work, ^{both} either in the Antarctic ^{and} elsewhere; and theoretical studies including modelling.

3.4 Remote sensing

This offers the best chances of ^{scanning} surveying large areas ~~quickly~~. Consideration needs to be given to the platform (^{aeroplanes} aircraft, helicopter, or satellite), and the ~~types of observation~~ ^{techniques} (e.g. bioluminescence, ^{observations} colour photography) ^{infra red imagery}.

3.5 Data reporting and handling

Arrangements will be needed to ensure that ^{biological material and} data are collected ^{and exchanged and sorted} in the detail and timeliness desired, from all the relevant sources (ships participating in the intensive survey, other research ships, commercial fishing vessels etc.). Different arrangements may be needed for different types of data ^{and material} (e.g. observations of the physical environment; plankton samples; catch statistics etc.).

3.6 Time-table and financial implications

This will bring together the individual proposals into a single programme, and examine the ^{manpower, facilities & funds to enable} resources ^{required} for national and international institutions ~~if they are~~ to carry out the work proposed.

4. Coordination and cooperation between international bodies

Many bodies have interests in the Southern Ocean, differing according to their structure (within the U.N. system; other inter-governmental bodies; and non-governmental organizations) and their prime responsibilities (scientific research; resource utilization etc). They need to cooperate and coordinate their activities to avoid duplication and conflict, and improve their general effectiveness. ^{ways of achieving this will} be proposed.

and analysis of samples
is done

and other characteristics

5. Provision of scientific advice

The ship borne and land-based research will provide information on the magnitude, ~~and~~ *and* distribution of the resources. This information must then be used to provide advice to governments so that ~~the correct~~ *rational* decisions on the management of the resource can be made.

5.1 Examination of management strategies

Within the constraints set by the biological situation, many management policies may be possible. The consequences of different measures need to be ~~examined~~ *scientifically evaluated* so that governments can ~~choose the most effective one.~~ *make appropriate choices*

5.2 Arrangements for providing advice

Many different ~~elements~~ *agencies* within governments, and within various international bodies are concerned with management. These have scientific, economic, legal or administrative responsibilities. Arrangements are needed to ensure the ~~smooth~~ *effective* flow of advice from the scientists to those taking the ~~actual~~ *formulation* decisions on management. *and*