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**THE MARINE FISHERIES INFORMATION SERVICE:** Technical and Extension Series envisages the rapid dissemination of information on marine and brackish water fishery resources and allied data available with the National Marine Living Resources Data Centre (NMLRDC) and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

Abbreviation - *Mar. Fish. Infor. Ser. T & E Ser.*, No. 58: 1984

# MULTIDISCIPLINARY MARINE FISHERIES RESOURCES MANAGEMENT\*

World fisheries have been beset by problems such as the over exploitation of resources, a restricted approach to fisheries problems, marine pollution and the establishment of exclusive economic zones. The purpose of this paper is to present a summary of a modern, logical and systematic multidisciplinary approach to fisheries management for administrators, the details of which are available elsewhere (Bakus, in press).

The major objectives of a fisheries resources management programme are to: 1) summarize existing information of fisheries; 2) emphasize data gaps for priority species; 3) assess socioeconomic problems and user conflicts, 4) develop a comprehensive management programme. How these objectives can be reached is accomplished by carrying out a seven phase programme.

Phase I (Initial Contact and Information Gathering) begins by the formation of a working group of experts, comprising at least a programme manager, fishery biologist, fishing industry specialist, economist, sociologist and in some cases a pollution or public health specialist. These individuals compile, with the help of students, preliminary data and information in their respective

**Table 1. Species Information Sheet†**

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| Species:                                |
| Distribution:                           |
| Habitat Preference:                     |
| Abundance:                              |
| Reproduction:                           |
| Production:                             |
| Ecology:                                |
| Feeding Habits:                         |
| Predators:                              |
| Disease:                                |
| Other Related Data: (e. g., physiology) |
| Commercial Harvesting:                  |
| Sport and Recreational Harvesting:      |
| Subsistence-Artisanal Harvesting:       |
| Legal Aspects:                          |
| Alternative Species for Exploitation:   |
| Fishing Regulations:                    |
| Methods of Processing:                  |
| Economics of Processing:                |
| Marketing of Fish:                      |
| Sociology-Anthropology:                 |
| Additional Information:                 |

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†Detailed descriptions are presented in Bakus (in press)

**Table 2. Fisheries Resource Management Programme Methodology**

| Preliminary investigation             | Intensive field study            | Laboratory studies and data analysis | Group analysis          | Results   |
|---------------------------------------|----------------------------------|--------------------------------------|-------------------------|---|
| Initial Contact-Information Gathering | Ecology                          | Ecology                              | Progress Meetings       | Summary of Information on Priority Economic Species   |
| Formation of Working Groups           | Fisheries Biology and Management | Fisheries Biology and Management     | Modelling               | Data Gaps   |
| Information Compilation               | Economics                        | Economics                            | Feedback and Evaluation | Recommended Research Programmes   |
| Information Synthesis                 | Sociology                        | Sociology                            | Decision Analysis       | Alternative Management Plans  |
| General Meetings                      | Pollution and Health             | Pollution and Health                 | ...                     | Preferred Management Plans including Cost-benefits, Tradeoffs & Management Priorities in Rank Order of Importance |

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disciplines from a variety of sources. Phase II (Information Compilation) is a more intensive compilation of published and unpublished materials, including the use of computer searches of the literature if feasible. Information obtained in Phase II is synthesized in Phase III (Information Synthesis). These synthesized data are entered into data sheets, a separate set for each priority species (Table 1). Data gaps are ranked into three categories: essential, important, and minor importance, providing the government and others with suggested priority research programmes.

Phase IV (Preliminary Research) is an attempt to fill serious data gaps prior to the development of alternative management plans. Phase V (Modelling) consists of the development of visual or compartmental models, both general and specific, in order to help the working group understand more clearly the inter-relationships between the various parts of the management framework. Models for stock assessment are also considered at this time. A series of alternative

management scenarios are developed in Phase VI (Management Scenarios) that reflect a variety of interests.

Phase VII (Final Management Plan) incorporates a powerful decision making procedure (multi-attribute utility measurement) to select the best management alternative. This process consists of first rating each attribute (e.g., fishermen's net income) on a scale of 0 to 100 against each alternative management plan, followed by the ranking of the attributes (e.g., fishermen's net income vs. fish stock assessment vs. coliform counts in fish, etc.), to give a final composite score that ranges from 0 (worst) to 100 (best) (Bakus, 1983, *Ocean Mgmt.* 8: 305-316). The management plan with the highest score is recommended along with alternative plans, in rank order of importance. The management plan summarizes all probable costs and benefits, tradeoffs, and recommended major research, development, and management priorities in rank order of importance. This methodology is summarized in Table 2.

