

Oceans From a Global Perspective:  
Marine Science Information Transfer  
(ed) C.P. Winn  
IAMS LIC

## FUTURE TRENDS FOR THE INTERNATIONAL OCEANOGRAPHIC INFORMATION EXCHANGE SYSTEM

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### Abstract

International technology transfer in the marine sciences is every bit as complex as it is in industrial research and development, yet institutional support is less than in industry. The orderly treatment of information is essential to this process and needs a new framework for keeping abreast of the information revolution.

The Food and Agricultural Organization of the U.N. (FAO) and the Intergovernmental Oceanographic Commission (IOC) have collaborated for the past ten years in the organization of a modest range of products and services collectively known as AS-FIS (Aquatic Sciences and Fisheries Information System). In fact, these products and services are an *ad hoc* selection which do not yet comprise a full range of information services. Moreover, many countries neither benefit from nor participate in these services. Reduced budgets threaten the subscriptions of some agencies and preclude the purchase of new ones. The challenge is to help the marine science community, including developing countries, keep up with advances in marine information management.

The IOC is conducting a brainstorming workshop within two weeks of this meeting to bring forth new ideas and design new strategies for promoting marine information management. It will strive to design a first draft of an overall development plan for a global marine information management program, the components of which must attract the interest of the local marine science institutions and the support of international funding groups. The workshop would greatly appreciate any considered suggestions of the IAMS LIC meeting.

Thirty years ago the world scientific community joined together in what was at that time a rare example of cooperation, in the International Geophysical Year, during which observance it was decided to establish the first two World Data Centers in Moscow and Washington, to centralize the archiving of data from the IGY experiment. Thus international data exchange has been the forerunner of our information management activities.

It was immediately realized that the accumulation of data in just two centers was not satisfactory for the interests of other nations. The Intergovernmental Oceanographic Commission was convened in 1961, and it chartered the Working Group on International Oceanographic Data Exchange. Without wishing to trace the familiar history of IODE and the international network of oceanographic data centers, it is important to notice how very successful the work of the IODE has been and to learn from this past success. As we consider the field of information management we will refer to the experiences of data exchange in trying to plan for the future. The IOC and its Working Committee on IODE continue to be the prime movers in international marine information management, particularly on behalf of the developing countries.

It was soon recognized that there is an ancillary requirement for processed and analyzed information, in addition to the collection of oceanographic data. This includes information about planned oceanographic activities, published at the beginning of the year and circulated internationally by IOC. Then, information about completed oceanographic activities is available as the Report of Observations/Samples Collected by Oceanographic Programs (ROSCOP). The Marine Environmental Data Inventory (MEDI) System contains technical descriptions of the marine data holdings of national and international data archives in automated-searchable form. Finally, ASFIS is responsible for scientific and technical information on marine and freshwater studies including socio-economic and legal aspects. The Aquatic Sciences and Fisheries Abstracts, as everyone here must know firsthand, covers Biology and Living Resources and Ocean Technology, Policy, and Nonliving Resources. Also published is a Marine Sciences Contents Tables, Freshwater and Aquaculture Contents Tables, the World List of Aquatic Sciences and Fisheries Serials Titles, and directories of experts, institutions and projects.

Among these activities, I would like to report some of the following current conclusions from the most recent meeting of the Marine Information Management (MIM) Group of the IODE Working Committee which met in Moscow last December.

- 1) There is fresh interest in information about data, as reflected in the emergence of new systems such as the NASA Global OnLine Data (GOLD) inventory. MEDI is grappling with the difficulties of updating such data in a centralized inventory, and it may be that a distributed inventory is the only feasible system.
- 2) MEDI seems not to be reaching significant groups of potential users, such as the ASEAN Coastal Resources Management Project, and it was agreed that an evaluation of user needs should guide future development of MEDI. Scant resources available for the development of MEDI suggest a search for some alternative operational design.
- 3) The MIM Group focused on the apparent overlap in coverage between AGRIS and ASFIS and the confusion this causes in some countries. The respective groups at FAO are working on this problem.

- 4) The Group also considered its search for a standard software for microcomputers, including the popular micro-CDS/ISIS from UNESCO. The IOC Secretary is presently determining what steps are necessary to establish micro-CDS/ISIS as an official standard for ASFIS.
- 5) FAO is working on unifying regional files into a single Institutions Register database, under a database management system, within the next year.
- 6) The Group also agreed on the value of a continuously updated International Directory of Marine Scientists and is seeking resources to undertake regular production of it. The problem of a lack of resources haunted our evaluation of all ASFIS products.
- 7) There is a special task team on Training, Education and Mutual Assistance (TEMA), which helped focus the Group's attention on this field. It was emphasized that an important training method is for information specialists from developing countries to visit ASFIS centers in other countries. It also urged the development of university courses for marine information specialists and otherwise to include information management in all marine science curricula.

Finally, the Group considered several ideas for MIM publications, including the following:

- i) an annotated bibliography on marine information management,
- ii) a manual on how to establish and maintain a marine information centre,
- iii) a volume of key papers on MIM.

The Group of Experts recommended to the IODE Working Committee the convening of a consultation by an *ad hoc* group of experts for the purpose of developing a coherent, global strategy for marine information management. IODE accepted this recommendation and this meeting will be held presently, in Paris, from October 12 to 16. I am taking advantage of this opportunity to solicit your full cooperation and consideration during the course of your meeting to generate new ideas, offer some judgment as to their relative priority, and have your secretariat communicate these to IOC headquarters by the week's end. We will be returning to you within a couple of months with the recommendations of this planning session for further comments. Even as we start, however, I wish to be sure that we keep our plans relevant to your needs and in tune with the priorities of the individual centers.

## THE BROADER PERSPECTIVE

If we step back and view the overall situation with the IOC's perspective, we will note that at the international level we are performing the bare minimum of necessities in coordinating activities among countries. In more and more regions, among several more groups of institutions we are now seeing increased cooperation in ways that we have recommended for years:

- common lists of holdings, union lists of catalogs and periodicals;
- work on microcomputers to build up information holdings in a form that permits exchange among centers, and
- increasing experimentation with and impact from electronic mail services.

Thus, we are looking at the situation in individual countries, especially developing countries, and we must gauge the sophistication of the international mechanisms to the abilities of the research and information centers as well as the growth of the technologies. This occasionally places us several steps ahead of the current level of development of the local research centers, in a way which may make it difficult for developing countries to justify program or budget for libraries and information centers. This situation is worsened by the fact that not all libraries and centers are able to increase their budgets to keep abreast of the rising costs and increased variety of subscriptions and stock materials. This is true not just in developing countries.

One of the areas of personal interest for us as a group is the direction of professional development for librarians and information specialists. Personally, I see this career as more dynamic than ever before, and in ways that even the wildest of our imaginations cannot quite perceive. Broadly speaking, I expect the scientists to assume some of the responsibilities for information management for which we were responsible. Specifically, I think the scientists must learn some of the principles of key word assignment and abstract writing. Likewise, searching online is a skill which more and more scientists must look forward to acquiring. This will mean that the information specialists will be teaching the scientists some of their skills, and that the teaching skill is something which will be needed by information specialists more than ever before.

Instead of writing the abstracts and doing the searches - what we might call the mechanical work of the information profession, we want to train others to pick up these tasks, in order to free us to enter what we call "value added information services." Librarians and information specialists ought to be training in the area of performing critical reviews of the literature, analyses of trends in information and data base developments, tracking the trends of the contents, authors, and the technical specifications of data bases and other collections. Finally, as information professionals we may set for

ourselves the goal of speeding up the time lag between conduct of research, publication in the journal articles, and coverage by the databases.

Another problem we have noted is that articles and reports being prepared in some developing countries are citing only references from this same country, and sometimes the same locale within the country. This is a seriously negative mark on the research, and it seems clearly the responsibility of the libraries and information centers to broaden the access of the researchers.

### **MODULAR APPROACH TO PLANNING MARINE INFORMATION MANAGEMENT**

Our international coordination activities need to grow together with infrastructure development at the local level. It may be helpful to consider a modular approach to the interplay between local infrastructure development and international cooperation. The purpose of this is to permit local centers to select priority elements from within an overall strategy without having to take other elements which might duplicate existing facilities. Likewise, certain elements may be attractive to other international cooperative programs which might not be disposed to promote the entire strategy. Our interests overlap with many other dynamic programs, and we must develop a rational division of labor as much as possible.

At the first level, we wish to assure local information centers and libraries an adequate supply of the most important research and reference journals, for example, our own Aquatic Sciences and Fisheries Abstracts-ASFA. This must be complemented by a quotient of training and technical assistance which will assure achievement of a minimum level of technical and managerial capability. The selection of publications and the types of training should be flexible according to specific needs, and some budget should be available for at least two weeks consultancy per year to re-assess these needs.

At a next level, our program should address some technical needs in the fields of computerization and telecommunications. I agree with Dr. Arthur C. Clarke, who has written that the single most important development in technology is the telephone. Even as we move into the computerized age of information management, we have seen how the telephone is an indispensable linkage for computerized as well as voiced information transmission. We are past the point, however, where serious doubts can be entertained any longer regarding the utility or feasibility of microcomputers, even in developing countries. Indeed, the availability of compact discs has so greatly increased the flexibility and portability of databases and their search systems, that dissemination of these technologies is urgent. At this level, an international program might provide equipment, training and budgetary support for operations during a start-up period.

We are a long way from having achieved even these modest levels of development in

most countries, yet I wish to consider one higher level of development. At this level, the information center starts actively producing information products, such as an authoritative union list of periodicals, specialized services to users, input to ASFA, development of a national regional network, and participation in regional training workshops. Additional, especially productive capital equipment, such as a microfiche reader-printer and laser discs would be appropriate acquisitions, whether through direct purchase or international grant.

It is worth mentioning here that these international programs have a special role to play in filling the need for foreign exchange for the acquisition of such equipment. It is incumbent on the local institutions to demonstrate their corresponding commitment of local currency.

I see as a short term goal a level of development where each participating information center is contributing to maintenance of a country profile, including the scheduling of meetings, lists of scientists, Ph.D.s, M.A.s, and institutions. This must be done within a nationwide and regionally compatible system in which the exchange of information is easy, secure, and automated. Finally, the human resources must be able to manipulate these data in significant ways, comparing the literature output to the number of scientists, and preparing descriptive analysis of research trends and technical issues relating to information management. In this direction, I have identified some of the areas which I consider to be strategically significant to global Marine Information Management development:

- 1) increase user satisfaction,
- 2) improve efficient use of systems by intermediaries and end users,
- 3) increase quantity and quality of material entering the system,
- 4) improve regional and international coordination of information flows,
- 5) improve the review and introduction of new technologies,
- 6) improve the planning and evaluation tools used by intermediaries and end users,
- 7) improve infrastructure in developing countries.

In the longer term, we look forward to something we refer to as institutional self-sufficiency. This implies a high degree of productivity, so as to finance the development of the local systems. Yet we realize that in the foreseeable future, especially in developing countries, marine science development will depend heavily on budgetary support from the local government and international funding organizations. It is evident now that those projects which are most likely to succeed are those which are inherently productive and will generate some income in the information marketplace.

Finally, I am looking forward to the operation of regional boards which will review the progress of the national systems and their coordination at the international level, so

that gaps can be filled and mistakes corrected promptly and effectively. Such a utopia may seem far off indeed as we consider and face the reality of subscriptions cancelled by harsh budget reductions. And there is no doubt that the achievement of this reality definitely depends on a commitment by national leadership, including personnel and operating budgets.

The reality is that this commitment will ebb and flow like the ocean's tides, with each achievement threatened by some future retrenchment. Our jobs as effective managers is to achieve the most we can when the time is ripe and to protect these gains when times are lean. I wish you the best of luck in these uncertain times, and I wish to reaffirm my own long-standing commitment and that of my organization to do our utmost to accelerate development in the field of marine information management.

