Australian Marine Science Institutions and Information Sources

Denis Abbott
Marine Laboratories Librarian
Commonwealth Scientific and Industrial Research Organisation
GPO Box 1538 Hobart, Tasmania 7001
Australia

ABSTRACT

Following the declaration of the Australian Fishing Zone in 1979, the Australian government accepted responsibility for a significant expansion in marine science. Funding for research, equipment and facilities increased accordingly. Australia's national marine science institutions, their main research activities, and their libraries are described. This information serves as background for a description of bibliographic data bases, non-bibliographic sources, and published sources of marine science information.

Thank you for the invitation and opportunity to talk to you about marine science information in Australia. As far as I can tell, this is the first time an Australian librarian has attended an IAMSLIC Conference. Perhaps it is appropriate that it coincides with the year of Australia's Bicentennial Celebration, 200 years of European settlement.

The declaration in 1979 of the Australian Fishing Zone created the second largest of these zones in the world. It embraces an area of ocean almost as large as the Australian land mass, approximately 7 million square km. The United States zone is marginally larger at 7.8 million square km. Responsibility for such a large area drew attention to the limited knowledge and effort in marine science research. You could say the government was embarrassed into action.

Government attention was focused through a series of reports recommending that it accept responsibility for a significant expansion of marine science. By the mid-1980's much had been achieved in response to these reports. A lack of ocean-going research vessels had largely been rectified by chartering RIG Seismic for the Bureau of Mineral Resources and building the RV Franklin for the Division of Oceanography of the Commonwealth Scientific and Industrial Research Organisation (CSIRO). This division had been accorded funding priority within CSIRO and together with the Division of Fisheries, was transferred from Sydney to the new Marine Laboratories complex in Hobart. The Australian Marine Sciences & Technologies Advisory Council (AMSTAC), which was responsible for advising the government on all aspects of marine science, disbursed approximately $3 million per annum on marine research in the years between 1981 and 1986. According to one calculation, net federal spending on research, environmental monitoring, management, and coordination of all forms of marine science and technology rose by 51% between 1981/82 and 1985/86.

Unfortunately, there are now signs of a financial decline in government support with the abolition of the marine science grants scheme, a static budget at the Australian Institute of Marine Science for the last five years, and the removal of marine science as a CSIRO research priority. It also appears that AMSTAC has been allowed to lapse amidst a reorganization of federal government departments.
The reports I have mentioned concentrated on the physical sciences as the area of greatest shortcomings. With a clear economic, benefit fisheries research had long been established. The Australian Fisheries Service discharges the Australian government's fisheries management responsibilities with its biological research undertaken by the CSIRO Division of Fisheries and other marine science institutions. Each state and the Northern Territory has a fisheries department that, with the support of a research section, manages the fisheries in its coastal waters. The work of the federal and state fisheries bodies is coordinated by the Australian Fisheries Council, and much of the research is funded through the Fishing Industry Research Trust Account. This is a matching fund whereby the Australian government pays an equal amount to that collected as a levy from the fishing industry by the state fisheries authorities.

The following discussion of national marine science institutions and their libraries and information sources will be confined to those that are working exclusively in marine science. A large proportion of the nation's marine science research is conducted in universities, and much of the taxonomic research is done by state museums of natural history, but this paper is too short to discuss their contribution.

The Australian Institute of Marine Science (AIMS) and the Great Barrier Reef Marine Park Authority (GBRMPA), which are based in or near Townsville in Queensland, concentrate on tropical marine science, in particular coral reef research. In the initial years of the MST grants scheme, reef research received the greatest proportion of available funds. The investment seems vindicated for a perception has developed in recent years that a good proportion of the significant, innovative work on coral reefs is being conducted in Australia.

Although the act establishing the Australian Institute of Marine Science in 1972/3 gave it "... freedom to carry out research in the marine sciences without qualification as to type or location," its work has been confined to the coastal and continental shelf regions of tropical Australia. AIMS regards this a self-imposed restriction, taking into account the work of other institutions, particularly the Bureau of Mineral Resources and CSIRO, which have the advantage of ocean going research vessels.

AIMS has four major programs: coastal processes and resources, reef studies, environmental studies, and marine systems analysis. Within these programs, particular emphasis has been placed on long-term studies of mangrove forests and studies on the crown of thorns starfish, which has damaged large areas of reef. Work has also been based on the discovery that massive corals contain within their skeletons historical data about past climate and weather. Remote sensing systems have been established in collaboration with GBRMPA and James Cook University, and a system developed by CSIRO called MicroBRIAN has used satellite imagery to map the Reef.

The library at AIMS was built rapidly after the site was occupied in 1976. It had to become self-reliant quickly because the laboratories are 50 km from Townsville. Fortunately, it has always been well-funded, and the current director accords the library a high priority. External use of the collection has been limited because until 1986 its holdings were not on the Australian Bibliographic Network. AIMS is responsible for the overall management of the Australian Marine Research in Progress data base, and the librarian is the Institute's representative on the Management Advisory Board.

The Great Barrier Reef is not one single reef but a series of reefs and reef complexes stretching for 2300 km and covering an area encompassed in a marine park of about 350,000 square km. This is an area larger than the land mass of the United Kingdom. A convenient reference for more information on the Reef is the special issue of Oceanus Vol. 29(2), Summer 1986.

The GBRMPA was established as an Australian government body in 1975. It has responsibility for recommending areas to be included in the marine park, carrying out or arranging for research, preparing zoning plans, and formulating education and management plans. The zoning concept was adopted to resolve any potential conflicts resulting from different uses of the Reef.

A major boost to the GBRMPA's education program has been the building of Great Barrier Reef Wonderland in Townsville, a tourist attraction of international status. Its main facility is an aquarium accommodating a functioning coral reef system with a walk-through viewing tunnel.
In practice, most of the research for GBRMPA is conducted by universities, government bodies or private consultants. A dominant area of research consuming more than half the available funds is the crown of thorns starfish.

From the outset the library developed not so much from a collection building effort, but as an information service making full use of local resources. The librarian would spend time each week scanning new publications in the James Cook University Library gleaning material relevant to GBRMPA staff. This approach undoubtedly paved the way for the development of the REEF data base.

Audio-visual materials figure more prominently than in other libraries for there are substantial collections of colour slides, maps and aerial photographs.

The only organization that encompasses all Australian waters in its work is the CSIRO Marine laboratories and, in the case of the Division of Oceanography, it goes beyond Australian waters. However, interest in geographic areas beyond Australian waters is restricted by the Division’s mission statement to matters of relevance to the Australian region. The Division’s primary goal is the advancement of scientific knowledge and understanding of the physics and chemistry of the seas and oceans of the Australian region.

The Division of Oceanography’s current research interests in physical oceanography include Australia’s major current systems (the East Australian Current and the Leeuwin); participation in the TOGA program study of El Niño; and an assessment of wave power using wave-riding buoys moored in the boisterous seas off Tasmania’s west coast. Two of the current chemical oceanography projects are the determination concentrations of essential fatty acids in micro-algae used in mariculture and the refinement of techniques for identifying and analysing low concentrations of trace metals and organic compounds in seawater.

The Division of Fisheries was established in 1937, and in the ensuing 50 years it has conducted research at one time or another on most of Australia’s fisheries. Some fisheries, such as the highly lucrative prawn fishery in the Gulf of Carpentaria, developed as the result of exploratory work done by the Division.

Since the declaration of the Australian Fishing Zone in 1979, the Division has received additional funds to conduct the biological research required by the Australian Fisheries Service. During this time the chartered 53m stern trawler Seela has been used for research cruises studying the tropical demersal fishery off the North West Shelf, and exploratory fishing in the Great Australian Bight and in the southeast temperate trawl fishery. This work forms part of the Fisheries Resources section, but the Division has six other sections, two of which are based in regional laboratories. The Marmion Laboratories near Perth, Western Australia, work on coastal ecology and the western rock lobster, while research at the Cleveland Laboratories, Brisbane, Queensland, is devoted to the penaeid prawn (shrimp) fishery in the Gulf of Carpentaria.

At the main laboratories in Hobart, the Algal Physiology and Ecology Section maintains an algal culture collection and supplies starter collections and advice to mariculture farms. It has recently started work on toxic dinoflagellates that have occurred in Tasmanian waters. The Biological Oceanography Section studies biological processes relating to planktonic organisms and communities in Australian waters. It is currently exploring the use of Side-Looking Airborne RADAR (SLAR) for fish spotting and provides images to the fishing industry from NOAA satellites via the Division of Oceanography’s remote sensing unit. The Fish Population Dynamics and Stock Assessment Section seeks to develop mathematical models of stock assessment, chiefly for the valuable Southern bluefin tuna. The Seafood Technology Section carries out research in support of advice to industry on ways to improve the quality of fish and fishery products. The Marine Laboratories Library has been operating for 50 years, a long time in Australian special libraries. Throughout this period the Library has been one of the main beneficiaries of CSIRO’s extensive publications exchange program. Nearly two-thirds of its current serial titles come on exchange; many are unique holdings, and with long backsets the collection has grown to be the country’s main marine science library. CSIRO libraries have been assiduous in reporting holdings to union lists; in fact, CSIRO published the Australian list of scientific serials until 1976 when the Australian Bibliographic Network began to assume this role. Consequently the library is used extensively by other libraries supporting work in marine science.
The Victorian Institute of Marine Science is one state body that deserves mention amongst these national institutions. Constituted to promote marine science and technology through research, information, and education, it operates in a unique way. Possessing few facilities of its own, it contracts or collaborates with other organizations to conduct research and information projects. Using this approach it has made a contribution at the national level.

**Bibilographic Sources of Information**

Most Australian marine science research is published in international publications or in Australian journals that are indexed by international indexing and abstracting services. There are, therefore, few purely national sources in marine science. Those same data bases that you are used to searching, namely, *Aquatic Sciences and Fisheries Abstracts (ASFA)*, *BIOSIS, Oceanic Abstracts*, and *Zoological Record*, are also the first choice in Australian marine science libraries.

Because the literature on the Great Barrier Reef was widely dispersed and existing indexes provided inadequate coverage of the reef, Jean Dartnell, the foundation librarian at GBRMPA, developed a data base called REEF.\(^8\) Started in 1982 it covers all disciplines, all forms of material and all levels of materials, whether scholarly or popular, that relate to the reef. As well as material published from 1982 onwards, older material has been added in batches, the indexing done under contract. The indexing vocabulary for REEF is mostly drawn from the ASFA thesaurus, and searches on latitude and longitude are possible using formatted fields. An annual paper copy version is published that is kept up to date with a quarterly current awareness service. At the end of 1987, the data base held 10,000 records, and although REEF was developed in conjunction with CSIRO, it was made available for on-line searching in 1985 on AUSINET, a system provided by a private company. Since then CSIRO has established AUSTRAUS on CSIRONET, using IBM STAIRS as its command language. AUSTRALIS now has 22 science and technology data bases, including the Australian Bibliography of Agriculture (ABOA) and Australian Marine Research in Progress (AMRIP). Because of this emphasis on science, GBRMPA has chosen to transfer REEF to AUSTRALIS.

ABOA, although small by comparison with international data bases, is one of the largest files in Australia. It is a cooperative data base built largely from the contributions of departments of agriculture. Since the federal and most state government fisheries' authorities are units of these departments, their publications are indexed for ABOA, thus forming a significant segment of fisheries' material on the data base. The format of ABOA is the same as AGRIS and Australia's contribution to AGRIS is stripped from ABOA.

Librarians from fisheries authorities, CSIRO Marine Laboratories, AIMS and one of the natural history museums met in 1986 to form a cooperative network whereby charges would not be made for interlibrary loans, and serials, duplicates and accessions lists would be exchanged. The other purpose of the meeting was to consider whether a separate marine science data base could be established or, as was preferred, the coverage of ABOA should be extended. However, little progress has been made in extending ABOA mainly because the librarians find it difficult to spare time for indexing whilst running their libraries. The format of AGRIS also makes occasional indexing time consuming and the compulsory use of the CAB thesaurus and commodity codes which have little provisions for marine science, discourages increased indexing effort.

Australia has no centre for gathering material for ASFA contributions; all indexing of Australian publications is done by FAO in Rome.

**Non-Bibliographic Sources of Information**

Work began in 1981 on AMRP, as a computer-based register of marine research. It was funded by a Marine Science & Technology Grant and operated by the Victorian Institute of Marine Science, assisted by GBRMPA, the Department of Science and Technology, and developed by CSIRO.
The AMRIP data base was not available for on-line searching until 1987 when AUSTRALIS was established, but it was used to produce a papter copy directory. The first edition, published in 1982, had 579 projects listed; now with a fourth edition due out this year there are 1,964 research projects on the data base.

AMRIP is not a data base that gets frequent use but it provides "...a basis for more effective cooperation and coordination between researchers and the users of research in industry and government." The data base also readily reveals those areas of research that are being neglected. The introduction to all three editions of the AMRIP Directory have noted the "...dearth of projects with an engineering and technological basis..." Perhaps it is not surprising then that in June this year the Minister for Science announced a Review of Marine Science and Technology that requires an assessment of the industrial and commercial opportunities that are likely to arise in Australian and international maritime industries to the year 2000.

In 1983/84 AMSTAC recommended to the government that Federal government departments and agencies be asked to compile inventories of their existing marine data holdings and that a directory of these inventories be published. Although AMSTAC thought that most agencies could accommodate the task within existing budgets, the inventories were not compiled. At a seminar organized by the Victorian Institute of Marine Science this year, it was proposed that the AMRIP data base form an inventory function for marine science data. The proposal has yet to be considered by the Management Advisory Board of AMRIP, but the Board will no doubt seek assurances on continued updating by contributing agencies.

The Australian Oceanographic Data Centre (AODC) was formed in 1964 as part of the Royal Australian Navy Hydrographic Service to provide a range of Information to the defense and civilian communities. The centre transmits Australian XBT data supplied by the Navy and CSIRO under the International Oceanographic Data Exchange to the United States National Oceanographic Data Center.

The AODC responds to individual requests for information, but also distributes standard products such as weekly Western Tasman Ocean Analysis Charts prepared by the Navy's Weather Centre at Nowra, New South Wales and GOSSTCOMP charts obtained from NOAA, giving weekly global SST values.

AODC's ability to fulfill its role as a national centre has been severely hampered by failure at acceptance tests of the data processing software that a commercial house had worked on for two years. That was at the end of 1986, and the Centre expected a replacement system could take another two years to develop.

In contrast, the Tidal Laboratory at the Flinders Institute for Atmospheric and Marine Sciences, South Australia, has developed sophisticated software to maintain a national data base for sea level data. The data base contains sea level time series for the Australasian region; tidal harmonic constants for tidal predictions; storm surges; time series on non-tidal residuals; and mean and abnormal sea levels.

Times and heights of high and low water are annually predicted for 55 ports and supplied to the RAN Hydrographic Office which publishes the annual Australian Tide Tables.

Sources of Published Information

The Australian Journal of Marine and Freshwater Research, which is published by CSIRO on behalf of the Australian Academy of Sciences, is the main outlet for scientific papers on marine science within Australia, although the majority of papers are published in overseas journals. Taxonomic papers occasionally appear in the records or memoirs of state museums of natural history and the papers and proceedings of Royal Societies in each state, or the Linnean Society of New South Wales. CSIRO, AIMS, GBRMPA, and most of the state fisheries' authorities publish technical report series as does the Institute of Ocean Sciences at Sydney University. The Institute also publishes Marine Studies, a useful monthly newsletter covering events throughout the country. A similar function is served at greater length by the quarterly Bulletin of the Australian Marine Sciences Association. It also publishes abstracts of the papers presented at its annual conference.
The Australian Centre for Maritime Studies is a private, independent, non-profit association whose objectives include the dissemination of information on maritime affairs. It publishes *Maritime Studies*, a bimonthly journal on marine policy, and a series, *Occasional Papers in Maritime Affairs*.

I thought that a talk to an international audience on Australian marine science information sources would be incomprehensible without some background information, but the attempt to provide information on the main marine science institutions in Australia in a short paper can only be superficial. It would have also been quite short because most papers on Australian work are published in overseas journals. I invite you to use the following references as a beginning for additional information on Australian marine science.

**NOTES**


9. Management Advisory Board. iii.

Bibliography


