

INTRODUCTION

In the development of an effective conservation programme for wetlands, one of the first steps is the compilation of an inventory of the most important wetland sites. Such wetland inventories already exist for much of the world, *e.g.* Europe, Africa, South and East Asia and the Neotropical Realm. *A Directory of Wetlands in Oceania* seeks to continue this global coverage by providing a comprehensive review of existing knowledge of the most important wetlands in the island nations and territories of the Pacific Ocean.

When first launched at the Fourth South Pacific Conference on Nature Conservation and Protected Areas in Vanuatu in 1989, the Oceania Wetland Inventory Project was restricted to the small island nations and territories of the Pacific from the Republic of Palau and the Solomon Islands in the west to the Hawaiian Islands and Chile's oceanic territories in the east. The wetlands of Papua New Guinea had already been described in *A Directory of Asian Wetlands*, published by IUCN-The World Conservation Union in 1989, and, with their continental affinities, were somewhat outside the scope of the Oceania Directory. However, a considerable amount of work has been carried out on the wetlands of Papua New Guinea since the *Directory of Asian Wetlands* was published, and so it was thought appropriate to include a short chapter on Papua New Guinea in the present volume.

As the Oceania wetland inventory was getting under way, increasing interest was being expressed in comparable inventories in Australia and New Zealand. Following a series of informal discussions between wetland conservationists in Australia and New Zealand and the sponsors of the Oceania wetland inventory in early 1990, it was agreed that the Australian and New Zealand inventories should follow the Oceania inventory closely in approach and objectives so that the three together would constitute a comprehensive inventory of important wetlands throughout the entire Australasian/Pacific region. Initially it was anticipated that the New Zealand inventory would be included *as a* chapter in the Oceania volume, while the Australian inventory would be published simultaneously *as a* companion volume.

Work began on the New Zealand inventory in late 1990 with the Department of Conservation coordinating the compilation of information through its regional Conservancy Offices. As the work progressed, it became increasingly apparent that the inventory would be far too bulky for publication in the same volume as the rest of Oceania, and thus the New Zealand inventory now appears as a separate, companion volume. The Australian inventory project was launched in August 1991 at a special technical workshop convened by the Australian National Parks and Wildlife Service (ANPWS) and the Bureau of Rural Resources. State and Territory agencies throughout Australia participated in the project, with the ANPWS providing overall coordination and compiling the final report for publication.

A Directory of Wetlands in Oceania follows a format similar to that of earlier wetland directories; thus the greater part of the Directory consists of a series of national reports. Each begins with an introduction which summarizes the general situation of the wetlands and provides information on the institutional and legal base for wetland conservation and research. Then follows a series of accounts of those wetlands which are known or thought to be of greatest importance from the point of view of nature conservation. The site descriptions include basic information on size and location, physical features, ecological features, ownership, degree of protection, land use, threats and conservation values.

The term "wetland" is used in the sense defined in the text of the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention). Thus, wetlands are "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres". Coral reefs and other exclusively marine systems are, however, generally excluded from this definition, and have not been considered in this Directory except in so far as they form an integral part of a site

containing more typical wetland habitats. The principal reef systems of the Central and Western Pacific have recently been described in volume three of *Coral Reefs of the World*, published jointly by UNEP and IUCN in 1988.

Most country reports include an outline map (or maps) showing the location of the sites described in the Directory. For reasons of space, it has not been possible to include detailed maps of each site. However, the many individual site maps which have been provided by contributors are on file at IWRB headquarters in the United Kingdom, and constitute an important reference source.

Methodology

The compilation of *A Directory of Wetlands in Oceania* has involved the collection of data through three main channels:

- national networks of contacts, each with a "national coordinator" responsible for the compilation of data in his or her country and preparation of a national report.
- direct contact with individuals or institutions with expertise on particular sites or species.
- a review of the recent literature.

In many cases, compilation of a national inventory was coordinated by a single individual (national coordinator) or institution in the country or territory concerned, and a comprehensive report was submitted. However, in several countries it proved impossible to coordinate the collection of information through a single person or institution, and material was received from several independent sources. In the case of Nauru, Niue, the Pitcairn Islands, Tuvalu and Wallis and Futuna, no local contact could be established, and the material presented in the Directory is based entirely on expatriate sources and the literature. Emphasis was given throughout to obtaining recent information from individuals currently working on wetlands, and little attention was given to the older literature.

Site Descriptions

Contributors were requested to submit their information on standard wetland data sheets of a type used in similar wetland inventories in the Palearctic Region, Neotropical Region and Asia. These data sheets are very similar in design to the information sheet currently being used by the Ramsar Bureau in the presentation of information on sites listed under the Ramsar Convention. Information presented on the completed data sheets has been reproduced in this Directory in a slightly modified form, and in many cases with additional information from other sources.

The following data categories have been employed in the site accounts:

Title: The name of the wetland with a reference number used in the accompanying map.

Location: The geographical coordinates (Greenwich) and general location of the site.

Area: The area of the wetland habitat in hectares. In the case of some rivers and coastal zones, only the approximate length of the site is known.

Altitude: The altitude of the wetland in metres above sea level.

Overview: A brief description of the wetland, summarizing the principal physical and ecological features and highlighting the main conservation values.

Physical features: A brief description of the principal physical features of the site, including information on hydrology, soil type and chemistry, water quality, depth, fluctuations and permanence, *as well as* a note on climatic conditions.

Ecological features: A brief description of the main habitats and vegetation types present, with information on the dominant plant communities and species present.

Land tenure: Details of the ownership of the wetland and the ownership of surrounding areas.

Conservation measures taken: Details of any protected areas established at or around the wetland, and any other conservation measures taken at the site.

Conservation measures proposed: Details of any proposals for the conservation of the wetland.

Land use: Details of the principal forms of land use and human activities at the wetland and in surrounding areas.

Possible changes in land use: Any information available on proposed changes in land use and development plans which might affect the ecological character of the wetland.

Disturbances and threats: Details of existing and possible future threats to the wetland and its wildlife.

Hydrological and biophysical values: Information on the principal hydrological and biophysical values of the wetland.

Social and cultural values: Information on the principal social and cultural values of the wetland.

Noteworthy fauna: The importance of the wetland for wildlife including aquatic mammals, waterbirds, aquatic reptiles, amphibians, fishes and invertebrates.

Noteworthy flora: Information on any plant species or communities for which the wetland is particularly important.

Scientific research and facilities: Information on major research activities at the wetland and any existing facilities for research.

Conservation education: Information on any existing programmes and facilities for conservation education and training.

Recreation and tourism: Information on the present and potential use of the wetland for recreation and tourism.

Management authority and jurisdiction: Details of the authority responsible for the conservation and management of the wetland, and the authority or authorities with territorial and functional jurisdiction over the wetland.

References: Abbreviated references to published literature and unpublished reports relevant to the site. The references are given in full at the end of each national section.

Reasons for inclusion: An indication of those features for which the site is considered to be internationally important, with a numerical reference to the criterion or criteria which justify the inclusion of the site in the Directory. The criteria used in the selection process are those developed for the identification of wetlands of international importance for designation

under Article 2 of the Ramsar Convention. These criteria, as adopted by the Fourth Conference of the Contracting Parties in Montreux, Switzerland, in June 1990, are as follows:

(1.) Criteria for representative or unique wetlands.

A wetland should be considered internationally important if:

- (a) it is a particularly good representative example of a natural or near-natural wetland, characteristic of the appropriate biogeographical region;
- or (b) it is a particularly good representative example of a natural or near-natural wetland, common to more than one biogeographical region;
- or (c) it is a particularly good representative example of a wetland which plays a substantial hydrological, biological or ecological role in the natural functioning of a major river basin or coastal system, especially where it is located in a trans-border position;
- or (d) it is an example of a specific type of wetland, rare or unusual in the appropriate biogeographical region.

(2.) General criteria based on plants or animals.

A wetland should be considered internationally important if:

- (a) it supports an appreciable assemblage of rare, vulnerable or endangered species or subspecies of plant or animal, or an appreciable number of individuals of any one or more of these species;
- or (b) it is of special value for maintaining the genetic and ecological diversity of a region because of the quality and peculiarities of its flora and fauna;
- or (c) it is of special value as the habitat of plants or animals at a critical stage of their biological cycle;
- or (d) it is of special value for one or more endemic plant or animal species or communities.

(3.) Specific criteria based on waterfowl.

A wetland should be considered internationally important if:

- (a) it regularly supports 20,000 waterfowl;
- or (b) it regularly supports substantial numbers of individuals from particular groups of waterfowl, indicative of wetland values, productivity or diversity;
- or (c) where data on populations are available, it regularly supports 1% of the individuals in a population of one species or subspecies of waterfowl.

A wetland is suitable for inclusion in the Ramsar Convention "List of Wetlands of International Importance" and hence in this Directory if it meets any one of the criteria set out above.

For proper application of the Ramsar criteria, it is essential that a considerable body of information be available on the site in question. For many wetlands in Oceania, the information is so scanty that no objective evaluation of the importance of the site can be made. If all such sites were to be ignored, the Directory would become little more than an inventory of wetlands which have been well studied and well documented, and would lose its value as a basis for the identification of priorities in future wetland surveys and research. In those cases where very little information is available, the selection of sites for inclusion in the Directory has been based almost entirely on the judgement of the contributors.

Source: Names of individuals and institutions providing information on the site.

Some headings, such as "Conservation measures proposed", "Possible changes in land use", "Scientific research and facilities", "Conservation education", "Recreation and tourism" and "References", have been omitted when no relevant information was available to the compiler.

Comprehensiveness

For all countries except Hawaii, it has been possible to provide at least a preliminary inventory of important wetlands on the basis of information received from contributors and the literature. Hawaii was exceptional in that information on the many hundreds of wetlands in the State was compiled as an electronic database and thus in a form unsuitable for publication in this Directory. Furthermore, at the time of going to press, the Hawaiian Islands Wetland Database was still incomplete, lacking information on some 70-80 wetlands including some of the State's largest and most important sites. It is to be hoped that a summary of the data in this important wetland database can be published separately at a later date.

The comprehensiveness of the other country reports varies greatly. In the U.S. Territories and former U.S. Trust Territories, a considerable amount of attention has been given to wetlands, and in some cases, notably American Samoa, Guam and the Northern Mariana Islands, most wetland habitats have now been documented in great detail. In these countries and territories, the chapter in this Directory is thought to be very comprehensive; all sites of international importance have been included, along with a number of sites which are probably of only local or national importance. The inclusion of these latter sites is at least partly justified by the rapid rate at which wetlands are disappearing throughout the region as a whole and consequent rate at which the remaining undisturbed wetlands are increasing in importance.

In most other countries and territories in Oceania, little attention has been given to wetlands, and the wetland inventories remain at a very preliminary stage. In some cases, *e.g.* the Marshall Islands, Nauru, Niue, Tokelau, Tuvalu, the U.S. Unincorporated Territories and Wallis and Futuna, there appear to be few, if any, significant wetlands other than reef systems. However, in other cases it seems that although many important wetlands do exist, only a few have attracted the attention of researchers and conservationists and little information is available on the remainder. This is particularly the case in the Cook Islands, Fiji, French Polynesia, New Caledonia, the Solomon Islands and Tonga. Most of the larger wetlands and other sites of great international importance are now known and have been included in this Directory, but there doubtless remain many smaller wetlands which will in time be found to possess special qualities which justify their designation as wetlands of international importance.

One of the primary objectives of the Directory is to provide the stimulus and basis for the completion of detailed national wetland inventories which should include not only more information on the sites which meet international criteria, but also details of sites of only national or even local importance. In most of the present and former U.S. Territories, work on such national inventories was initiated many years ago, while in Fiji, Vanuatu and Western Samoa, some wetland inventory work has been carried out within the last few years. Only summaries of these national inventories have been incorporated here. Most of the other contributions provide excellent skeletons upon which comprehensive national inventories can be based. More field work needs to be carried out at many of the internationally important sites, and additional sites of national rather than international importance should be considered. Only when detailed national inventories are available for all the countries of the region will it be possible to compile the definitive directory of wetlands of international importance in Oceania.

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