

REPUBLIC OF THE MARSHALL ISLANDS

INTRODUCTION

Area: 181 sq.km.

Population: 40,600 (1988).

The Republic of the Marshall Islands consists of 29 coral atolls and five coral islands or "table reefs" spread over some 750,000 sq.km of ocean between latitudes 4° and 15° North and longitudes 160° and 173° East in the central Pacific. The islands lie to the east of the Caroline Archipelago and northwest of the Gilbert Islands (Kiribati). All are low-lying, with maximum elevations generally between 1.5 and 6 m, and nowhere exceeding 8 m. The islands form two parallel chains, the Ratak ("sunrise") Islands in the east and the Ralik ("sunset") Islands in the west. While some of the atolls are very small, the archipelago includes Kuwajleen (Kwajalein) which has the largest atoll lagoon in the world (2,173 sq.km). The islets or "ane", of which there are over 1,100, are composed of coral sand and gravel, cobbles and boulders, and consolidated limestone.

The climate is tropical maritime with a mean annual temperature of 27.8°C, the mean monthly temperatures varying by only 2°C. Rainfall increases from north to south, from about 750-1,000 mm in the northernmost atolls to over 4,000 mm on Jalwoj (Jaluit) in the south. In the dry northern atolls, the heaviest rainfall occurs from September to November, whereas in the wet southern atolls it is heavy throughout the year. In the northern Marshals, the Northeast Trades predominate throughout the year; in the south, these predominate from December to April, with east or southeast winds blowing for much of the rest of the year. Typhoons are rare, with only four reported since 1900 (UNEP/IUCN, 1988).

The islands were first settled sometime between 1500 and 1000 BC and first visited by Europeans in the early 16th Century. Following the Second World War, the United States of America took control of the islands under a United Nations Trusteeship. The independent government of the Marshall Islands was established in May 1979, and the islands became an independent state in free association with the U.S.A. in October 1986. Twenty-three of the atolls and four of the islands are inhabited, with over half of the population living on just two, Majro (Majuro, the political and economic centre) and Kuwajleen (a large military base). The economy is based on the production of copra and fishing. Tourism is limited, and the islands are still heavily dependent on foreign aid.

Small remnants of atoll forest and beach forest, mostly comprising pan-Pacific species, occur on some of the uninhabited atolls, but most of the islands have been extensively modified by man, particularly for coconut and breadfruit plantations and as a result of military activities. Bikini and Ane-wetak (Enewetak) were used as atomic test sites by the U.S.A. from 1946 to the 1960s. The 1954 Bravo test, the first and largest thermonuclear explosion by the U.S.A., spread fallout to several of the northern atolls and caused inestimable damage and social disruption to many reef and island communities (UNEP/IUCN, 1988). The full extent of the disruption to the atoll ecosystems has never been properly documented or evaluated. The greatest long-term threat to the ecosystems of the Marshall Islands is that posed by sea-level rise as a result of global warming. Contamination of underground freshwater supplies, loss of land and increased hurricane damage may make the country uninhabitable if worst-case scenarios are realised (Pernetta, 1988).

The Marshall Islands are important for their turtle and seabird populations. The Green Turtle (*Chelonia mydas*) still nests in large numbers on some of the northern atolls, notably Pikaar (Bikar), Bok-ak (Taongi) and Bikini, but the Hawksbill (*Eretmochelys imbricata*) is now uncommon in the islands and

under threat from continued persecution. Many of the islands support large breeding colonies of seabirds, particularly Bok-ak (Taongi), Pikaar (Bikar), Taka, Jemo, Wotho, Ujlan (Ujelang), Ujae and Kuwajleen (Hay, 1985). Bok-ak, with at least 14 breeding species, is one of the most important breeding sites for seabirds in the Pacific. There are only two resident land birds in the Marshall Islands, the Micronesian Pigeon (*Ducula oceanica*) and Purple-crowned Fruit-Dove (*Ptilinopus porphyraceus*), and one of these, the fruit-dove, is now believed to be extinct in the islands. Other native terrestrial fauna include a number of species of skinks and geckoes.

Dahl (1980 and 1986) has given a brief account of the natural ecosystems of the islands, and has reviewed their importance for nature conservation. UNEP/IUCN (1988) provide a general account of the coral reef systems and reef resources, and give further details on Arno, Bikini, Ane-wetak, Kuwajleen and Majro (Majuro) atolls. Thomas *et al.* (1989) describe the natural diversity and conservation values of six of the northern atolls (Bok-ak, Pikaar, Taka, Wotho, Rongerik and Erikub) and one coral island (Jemo).

There are currently no protected areas in the Marshall Islands. Two of the northern atolls, Bok-ak and Pikaar, were designated as reserves by Order of the District Administrator in the 1950s and 1960s, but these designations have not been recognized since independence (IUCN, 1991). Dahl (1986) recommended the reinstatement of these two reserves and establishment of additional protected areas for the conservation of seabirds, natural vegetation and coral reef systems. Thomas *et al.* (1989) confirmed the significance of Bok-ak and Pikaar, and identified several other sites of special conservation value in the northern Marshalls.

Summary of Wetland Situation

There are no natural, permanent freshwater wetlands in the Marshall Islands. Standing fresh water is a rarity, and running water is totally lacking except briefly during heavy rain storms. The only significant fresh water occurs underground in shallow GhybenHerzberg lenses of fresh water floating on salt water in the porous interiors of the atoll islets. These lenses are found on most islets of any real extent except in the dry northern region of the archipelago. Relatively small groundwater fluxes and continuous tidal fluctuations result in a relatively thick zone of mixing between fresh and salt water, and a relatively thin freshwater lens (Olsen, 1984; Thomas *et al.*, 1989).

There are a few very small, mostly brackish, ponds on some of the wet atolls. These have been formed as a result of the closure of a small portion of the lagoon and subsequent dilution with rainwater. One such pond, on Ellep (Lib) Island in the Ralik Chain, contains fresh water (Dahl, 1980). Wherever these wetlands occur, they are important in the local economy for the cultivation of taro. Artificial taro pits occur in the interiors of most of the larger islets in the southern, wet atolls. These pits were created by digging down to below the freshwater table and then filling with a muck consisting of decomposing vegetable matter. They are planted with *Colocasia* and *Cyrtosperma*, the principal and most edible taro genera, as well as sugar cane and a few marsh plants useful as food and medicines (Thomas *et al.*, 1989).

Mangrove vegetation has a very restricted distribution in the Marshall Islands, and only four species are native: *Bruguiera gymnorrhiza*, *Lumnitzera littorea*, *Rhizophora mucronata* and *Sonneratia alba* (Woodroffe, 1987). Poorly developed and impoverished swamps are known on Jalwoj, Arno and Aelonlaplap (Ailinglaplap) atolls in the southern and wettest parts of the archipelago. Further north, mangroves are found mostly inland, in low wet spots termed "mangrove depressions". These depressions are usually rock-bottomed, but many have organic-rich muddy or sandy sediments in them, and some may be connected to the sea by a subterranean connection. *Bruguiera gymnorrhiza* is the principal species, often growing in association with the fern *Acrostichum aureum*; *Lumnitzera littorea* is also occasionally present (Fosberg, 1975). In some cases at least, *e.g.* on Bikini Atoll, these stands of mangroves have probably been planted by the islanders, who had uses for the trees. Stands of *Rhizophora mangle* on Anecwetak Atoll are also thought to have been introduced by man (Woodroffe, 1987).

Small areas of tidal salt marsh are found on some atolls; these comprise strand species, mainly grasses, on the coast and in depressions subject to tidal flooding (Dahl, 1980)

Sea-grasses are very rare in the Marshall Islands, only two stands of *Thalassia hemprichii* being known from shallow water in Ujlan and Aelonlaplap atolls, and one *Cymodocea rotunda* bed in Majro Atoll. This seems to be the eastern limit of *Thalassia* in the Pacific. *Halophila* sea-grass beds have recently been reported from the lagoon side of several islets in Kuwajleen Atoll (Thomas *et al.*, 1989).

The only significant wetlands, other than strictly marine systems (coral reefs, reef flats, sea-grass beds *etc.*), would appear to be as follows:

- A small tidal pond with mangrove-fringed channel in the centre of Majej (Mejit) Island, a low coral island in the Ratak Chain.
- Several small stands of mangroves on Arno Atoll (Ratak Chain).
- Mangroves in small depressions on islets in Aelonlaplap Atoll (Ralik Chain).
- Mangroves in small depressions on islets in Jalwoj Atoll (Ralik Chain).
- A small stand of *Bruguiera gymnorrhiza* in Bikini Atoll (Ralik Chain), probably introduced by man.
- A small stand of *Rhizophora mangle* in Ane-wetak Atoll (Ralik Chain), presumably introduced by man.
- A small freshwater pond in the central depression of Ellep (Lib) Island, a low coral sand island in the Ralik Chain.
- A small, enclosed saline lagoon in one of the two main islands in Namdik (Namorik) Atoll (Ralik Chain).

None of these sites is afforded any special protection. Dahl (1980) recommended the establishment of one or more reserves to protect examples of the mangrove communities, but other authors have paid scant attention to these small wetland areas.

Only one species of waterbird, the Pacific Reef Heron (*Egretta sacra*), is resident in the Marshall Islands, the complete absence of Rallidae reflecting the lack of wetland habitats. The islands are, however, relatively important for migratory shorebirds, with eight species occurring commonly on migration and in winter: Pacific Golden Plover (*Pluvialis fulva*), Wandering Tattler (*Heteroscelus incanus*), Grey-tailed Tattler (*H. brevipes*), Bristle-thighed Curlew (*Numenius tahitiensis*), Whimbrel (*N. phaeopus*), Bar-tailed Godwit (*Limosa lapponica*), Ruddy Turnstone (*Arenaria interpres*) and Sanderling (*Calidris alba*) (Amerson, 1969; Garrett & Schreiber, 1988; Pratt *et al.*, 1987). Pacific Golden Plover and Ruddy Turnstone are the commonest shorebirds, with wintering populations almost certainly numbering in the thousands. The Marshall Islands are of international importance for their substantial wintering population of Bristle-thighed Curlews. The species occurs widely throughout the islands, but appears to be most common in the northern atolls. The birds frequent reefs, beach rocks and sandy shorelines, and are generally widely scattered, seldom congregating in flocks. Thus in May 1986, Garrett and Schreiber (1988) found the species in small numbers on virtually every islet they visited in Bikini Atoll, although in total they observed only about 25 birds.

Situated at the end of the Micronesian chain and relatively close, by Pacific standards, to the continents of Asia and North America, the Marshall Islands have attracted a wide variety of migratory waterfowl as rare stragglers or vagrants. At least one species of heron, nine species of ducks and geese, one crane, thirteen shorebirds, two gulls and three terns have been recorded in the islands as vagrants.

Wetland Research

Apart from some work on the mangrove communities (Fosberg, 1975), little if any research has been carried out on the wetlands of the Marshall Islands. The marine ecosystems have, however, received a considerable amount of attention, with some atolls, notably Arno and Kuwajleen, being the subject of extensive studies. The results of much of this work have been published in the Atoll Research Bulletin. Detailed coastal resource atlases have been prepared for Majro, Arno and Kuwajleen atolls by the U.S. Army Corps of Engineers. A multi-disciplinary expedition to the northern Marshall Islands in September 1988 investigated the natural diversity and conservation values of Bok-ak, Pikaar, Taka, Jemo, Wotho, Rongerik and Erikub, and identified several sites as being specially worthy of protection (Thomas *et al.*, 1989; Thomas and Juvik, 1989). However, none of these dry atolls has any significant wetlands. The birds of the Marshall Islands have been documented by Amerson (1969) and Garrett and Schreiber (1988).

Wetland Area Legislation

Conservation legislation in the Marshall Islands has recently been summarized by Anon (1989) and IUCN (1991). The National Environmental Protection Act (1984), along with the Coastal Conservation Act (1988), charges the Marshall Islands Environmental Protection Authority with responsibility to "preserve and improve the quality of the environment". Amongst other measures, the Act makes provision for the preservation of important historical, cultural and natural aspects of the nation's heritage. A number of Trust Territory regulations, covering such topics as water supply, pesticides and sewage disposal, remain in force but will be revised in due course. There is currently no protected areas legislation, and the two protected areas established prior to independence are no longer recognized.

At international level, the Republic of the Marshall Islands is a party to the Convention for the Protection of the Natural Resources and Environment of the South Pacific (SPREP Convention), and has ratified the Convention on Biological Diversity. However, it is not as yet a party to the Convention on the Conservation of Nature in the South Pacific (Apia Convention) or any of the other international conventions that directly promote the conservation of nature (IUCN, 1991).

Wetland Area Administration

Not applicable.

Organizations involved with Wetlands

(a) Governmental

Ministry of Resources and Development

- Maritime Resources Authority
 - Division of Agriculture
- Environmental Protection Authority

(b) Non-governmental

Alele Museum of the Marshall Islands

WETLANDS

There do not appear to be any non-marine wetlands in the Marshall Islands which might qualify as wetlands of international importance on the basis of the Ramsar Criteria. Several atolls have been identified as being of high conservation value for their rich and diverse reef systems, for their large breeding populations of seabirds and/or turtles, or as good examples of relatively undisturbed atoll ecosystems. These are described in detail by UNEP/IUCN (1988), Thomas *et al.* (1989) and IUCN (1991).

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