MARINE AND ESTUARINE RESERVES IN AUSTRALIA WITH PARTICULAR REFERENCE TO NEW SOUTH WALES

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CONCEPTS OF MARINE PARKS AND RESERVES

A gradual realization throughout the world that the resources of the oceans and estuaries are becoming more affected by the impacts of man, has highlighted an urgent need for the reservation of representative areas of marine and estuarine ecosystems.

This idea of marine parks and reserves as a logical extension of the terrestrial park concept into the underwater realm, seems, like that of terrestrial national parks, to have flowered originally in the U.S.A. The concept was given impetus by the first World Conference on National Parks held in Seattle in 1962 which "recognized that the oceans and their life are subject to the same dangers of human interference and destruction as the land, and encouraged that the governments of all countries with marine frontiers examine, as a matter of urgency, the possibility of creating marine parks and reserves". (Randall 1971). Further impetus was given to the concept by a special symposium on marine parks held at the Eleventh Pacific Science Congress in Tokyo in 1966 and the International Conference on Marine Parks and Reserves, also held in Tokyo, in 1975.

Two broad options for the effective protection of the marine and estuarine environment were outlined by Talbot and Rooney (1978/1979); these are:

(i) To prevent adverse impacts on selected areas by declaring them to be reserves and by the creation of buffer zones of protection around them. Distance and proper management then become the principal factors in their preservation.

(ii) To establish a co-ordinated system of management and protection, thus enabling areas of impact to be contained while protecting the overall system.

Although some attempt has been made in New South Wales towards the latter goal by the establishment of a Coastal Council, the former is probably a more realistic approach to the problem in the immediate future.

The main objectives in the establishment of marine reserves have been discussed in a number of places (McMichael 1972; Collett and Pollard 1975; I.U.C.N. 1976; Pollard 1977; Rooney *et al.*, 1978; Ottaway *et al.*, 1980), and can be summarised thus:

(i) Preservation of self perpetuating populations of particular species of organisms and their habitats.

(ii) Preservation of samples of natural ecosystems, both common and rare.

(iii) Preservation of areas of particular scientific and aesthetic interest.

(iv) Preservation of areas of the natural environment for the purposes of education and recreation.

MANAGEMENT

Before marine or estuarine reserves can be established, certain conflicts which are characteristic of them need to be

overcome. Marine and estuarine areas usually have been regarded as a 'commons' and are often still seen as zones of unlimited potential for exploitation (Goeden 1975). The exclusion of what may be regarded by some as 'legitimate' activities and the inevitable establishment of regulations are usually not welcomed. However, while many exploitative activities may need to be excluded from a marine reserve if it is to justify its name, certain other less damaging (and many traditional) uses can often be accommodated.

The four major uses, i.e., scientific, educational, conservational and recreational, for which marine and estuarine reserves may be required (Pollard 1980), suggest that different management strategies might often be necessary for different reserves or parts of large reserves.

In large areas designed to cater for all or most of the above listed purposes, e.g., the Capricornia Section of the Great Barrier Reef Marine Park (G.B.R.M.P.A. 1981), a multiple zoning and management plan may often be required. This involves the establishment of different areas of protection within a large buffer area, allowing most traditional uses such as some forms of fishing, to exist alongside other commercial and recreational activities, as well as ensuring the preservation of natural areas for scientific, educational and passive recreational uses. A wider buffer area surrounding these zoned areas reduces the possibility of some major regional impact affecting the more important areas within the park.

Smaller areas are sometimes reserved to ensure the preservation of a particular community type, habitat or species. The management plans devised for these areas may be in response to existing exploitation of a fragile resource, and are generally more restrictive.

MARINE RESERVES IN AUSTRALIA

There are about 40 declared marine or estuarine reserves of one form or another in Australia. Many of these are small and few have had detailed management guidelines developed for them. There have been many more such reserves proposed and there are over 450 existing coastal terrestrial parks and reserves in Australia, many of which could eventually be extended to include marine areas (Rooney *et al.*, 1978). Thus, the potential for the establishment of marine park and reserve systems in Australia is considerable.

Queensland: The first marine park in Australia was established around Green Island on the Great Barrier Reef in 1938, while the Heron Island-Wistari Reef area was declared in 1963 (Pollard 1977). Both of these parks were proclaimed under Fisheries legislation, but will now, presumably, be included in the Cairns and Capricornia Sections, respectively, of the Great Barrier Reef Marine Park (see below).

The establishment of Fisheries Habitat Reserves under Queensland fisheries regulations promulgated in 1968 has provided protection for inshore and estuarine habitat areas deemed to be of importance in providing food and shelter for marine animals. They also protect localities such as recreational fishing areas, commercial hauling grounds and areas considered worthy of conservation for education and scientific study (Olsen 1977). There are at least 23 Fish Habitat Reserves so far gazetted by the Queensland Fisheries Service. Details of some of the regulations existing in these reserves are found in Olsen (1977) and Rooney *et al.* (1978).

Legislative mechanisms for declaring marine reserves also exist under the Forestry Act, but as yet none have been declared.

Great Barrier Reef: The Great Barrier Reef Marine Park (G.B.R.M.P.) Act of 1975 established the G.B.R.M.P. Authority in 1976. This Authority is responsible for making recommendations as to areas that should be declared as parts of the Marine Park, and the uses which may be made of them. To date two sections have been declared; the Capricornia Section (October 1979) and the Cairns Section (November 1981), which together constitute just under 10% of the G.B.R. Region as defined in the Act.

The Authority is also required to prepare a zoning plan for each Section under which, consistent with care and protection of the reef, any reasonable uses can be made of the park. The zoning plan for the Capricornia Section has been drawn up; that for the Cairns Section should be available for public comment later this year.

Victoria: Victoria has only one marine reserve at present, the Harold Holt Marine Reserve, which covers 5 separate areas in and adjacent to Port Phillip Bay. These are Swan Bay, the rock platforms and adjacent reefs at Point Lonsdale and Point Nepean, and the surrounds of Mud Island and Popes Eye, a total of about 3,200 ha. These areas were gazetted in February 1979 and are administered by the Fisheries and Wildlife Division of the Ministry of Conservation. Regulations have been drawn up to control amateur and commercial fishing. Other areas proposed include waters adjacent to Phillip Island and Wilsons Promontory.

South Australia: In 1971, seven Aquatic Reserves were proclaimed under the South Australian Fisheries Act, wherein provision was made for reserves to be set up to protect areas of ecological importance (Connell and Shepherd 1972). The best known of these reserves, at Port Noarlunga, was designed to retain the natural animal and plant communities on these reefs near the Adelaide metropolitan area and of some nearby estuarine mangrove and seagrass communities, as these areas

show the greatest abundance and diversity of marine life in this area (S.A. Department of Agriculture and Fisheries 1976). One additional area, Barker Inlet in the Torrens River, has been proclaimed since 1971 (Anon. 1973). Ottaway *et al.* (1980) discussed these areas and proposed others to be considered for protection, particularly in St Vincent and Spencer Gulfs.

Tasmania: Tasmania at present has no areas that could strictly be termed marine reserves. However, a recent announcement (June 1981) of a joint policy by the National Parks and Wildlife Service and the Tasmanian Fisheries Development Authority for the establishment and management of marine reserves suggests that this is likely to change.

Surveys of potential marine reserve locations (Edgar 1981) have resulted in recommendations for the establishment of five reserves. The most important are a marine extension to the existing Rocky Cape National Park on the north west coast and Maria Island on the east coast.

Western Australia: No marine reserves exist in this state, although the Western Australian Division of the Australian Marine Sciences Association has for many years been pressing for the enactment of appropriate legislation, and has prepared a report entitled "Proposals for Establishment of Marine Reserves in Western Australia", which states the case for the establishment of such reserves, gives a background classification of the typical marine environments of the state, and makes recommendations for the creation of reserves in a number of specific areas (Australian Marine Sciences Association 1972). In 1975 a number of recommendations were also made to the Minister for Conservation and Environment through the W.A. Environmental Protection Authority. These recommendations included the waters of Shark Bay and the Ningaloo Reef Tract (Rooney *et al.*, 1978).

Northern Territory: No marine reserves exist in the Northern Territory, although at least one proposal has been made for an area near the Coburg Peninsula.

New South Wales:

Existing Marine and Estuarine Reserves: In 1971, the New South Wales State Government proclaimed a marine extension of the existing Bouddi State (now National) Park in the area surrounding Maitland Bay, just to the north of Broken Bay (Anon. 1972). The boundaries of this marine section extend from Gerrin Point in the south to Third Point in the north and are shown in Figure 1. The taking of any marine life is prohibited in this area, and its protection is an example of cooperative management between the National Parks and Wildlife Service (N.P.W.S.) and State Fisheries (N.S.W.S.F.).

No other marine National Parks have since been declared in New South Wales under N.P.W.S. legislation. The main reason for this was the advent of the Commonwealth Seas and Submerged Lands Act in 1973, which prevented the States from declaring land below the low tide mark on the coast (see Appendix). In addition, the N.P.W.S. has the legislative capacit to declare marine parks, but has no control over most forms of marine life (i.e., 'fish' – see Appendix) in these areas nor the expertise to assess and manage aquatic habitats. On the other hand, until 1979 N.S.W.S.F. had no legislative power to declare Aquatic Reserves, although they could close areas to fishing and had the necessary laws and expertise to manage fish and their habitats (see Appendix).

This problem was eased with the passing of an amendment to the Fisheries and Oyster Farms Act, which, since 1979 has allowed the establishment of Aquatic Reserves under State Fisheries legislation. In recent years N.S.W.S.F. has been carrying out a programme of investigation into the suitability of areas along the New South Wales coastline as potential sites for marine and estuarine reserves. The objective is to select suitable areas of natural intertidal and subtidal habitat for dedication for scientific, conservational, educational and recreational purposes, and to develop appropriate biological management and conservation strategies for these areas. Approximately 40 potential sites have so far been identified (Pollard 1980).

To date four Aquatic Reserves have been, and another is in the process of being gazetted:

(i) Long Reef Rock Platform, on Sydney's northern beaches. In consequence of the diversity and zonation pattern of its intertidal fauna and flora, this locality has been used as a scientific research and education area by universities, colleges and high schools for almost 50 years. During the past decade, however, this major rock platform has come under increasing pressure from people collecting its invertebrate fauna for food. Its protection as an aquatic reserve, therefore, is aimed at preserving it as a viable scientific research and education area in perpetuity. Its management involves a prohibition on the taking of all marine life from the rock platform itself and to a distance of 100 metres seawards of low water mark, with the exception of the taking of fin fish from these waters by means of line or spear (Fig. 2). Limited collecting for scientific and educational purposes is allowed under permit from N.S.W.S.F.

(ii) Shiprock, in Port Hacking, is an area of particular biological interest which encompasses some 200m of shoreline off Little Turriel Point in the southern suburbs of Sydney. It is probably best described in the words of Clarence Lawler, then Secretary of the Underwater Research Group of New South Wales,

Fig 1. BOUDDI NATIONAL PARK

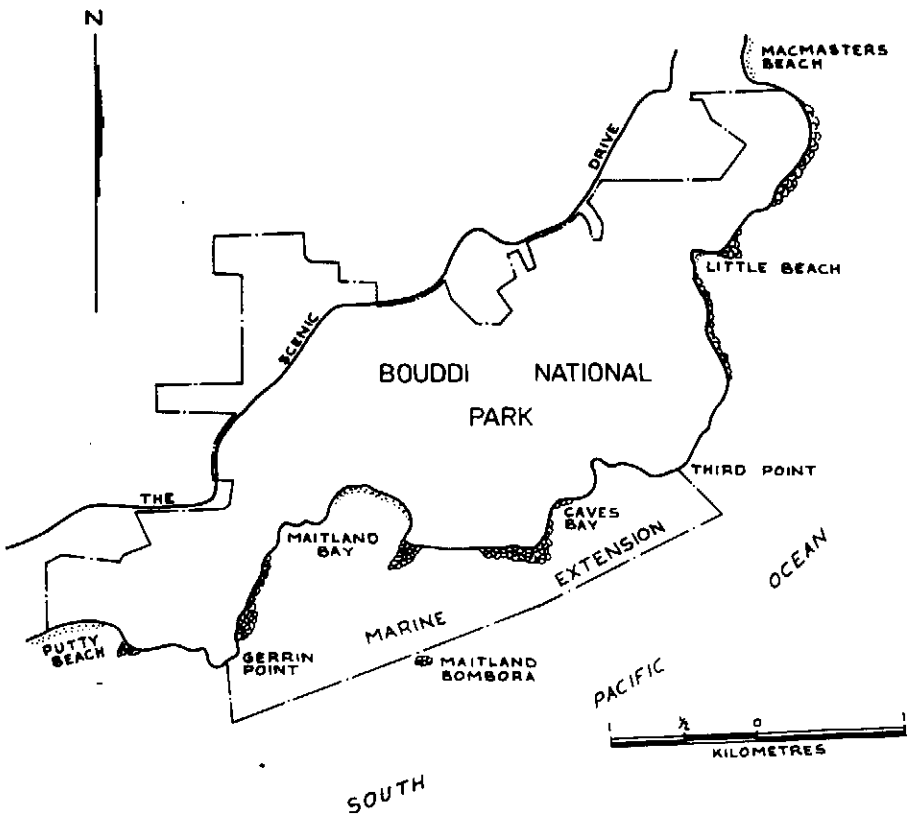


Fig 2. LONG REEF AQUATIC RESERVE

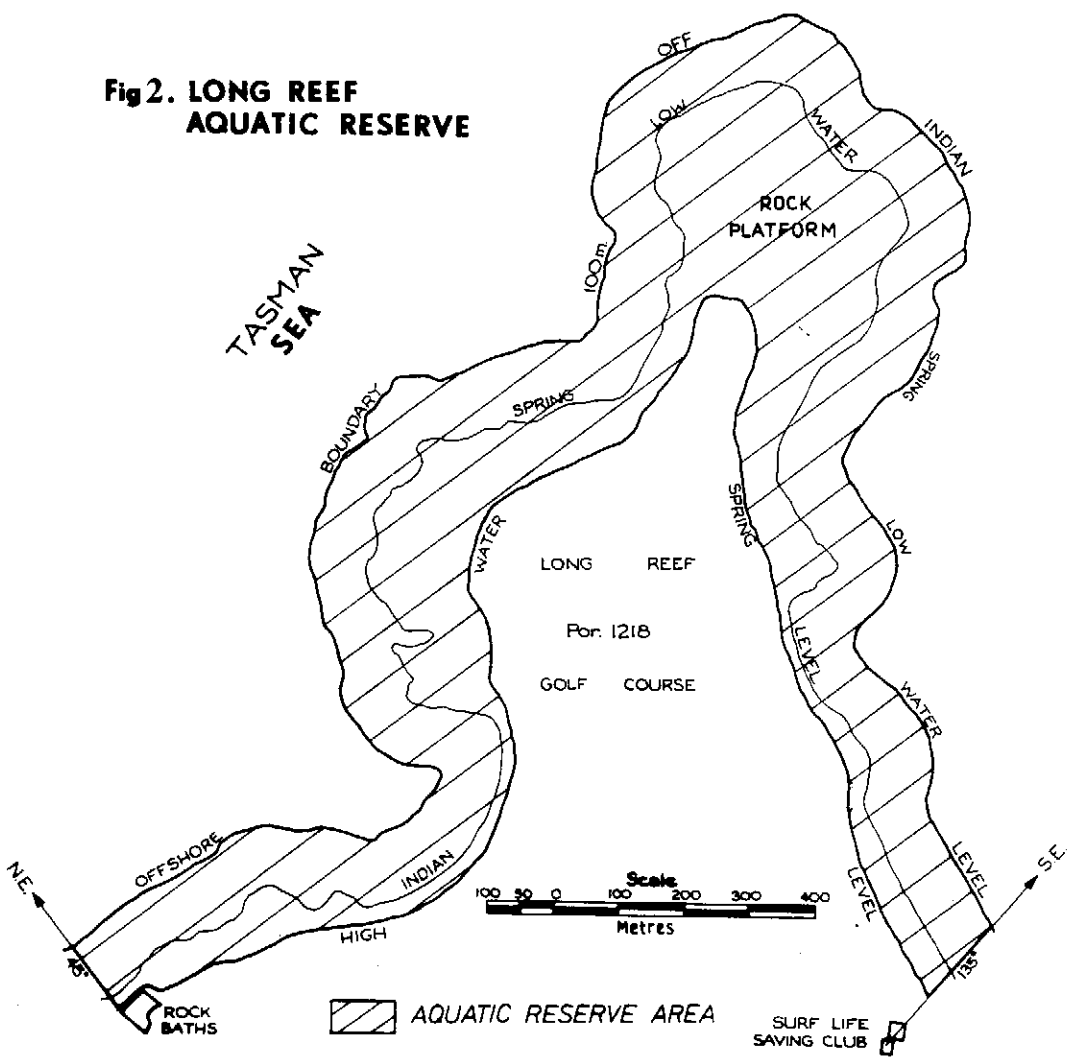
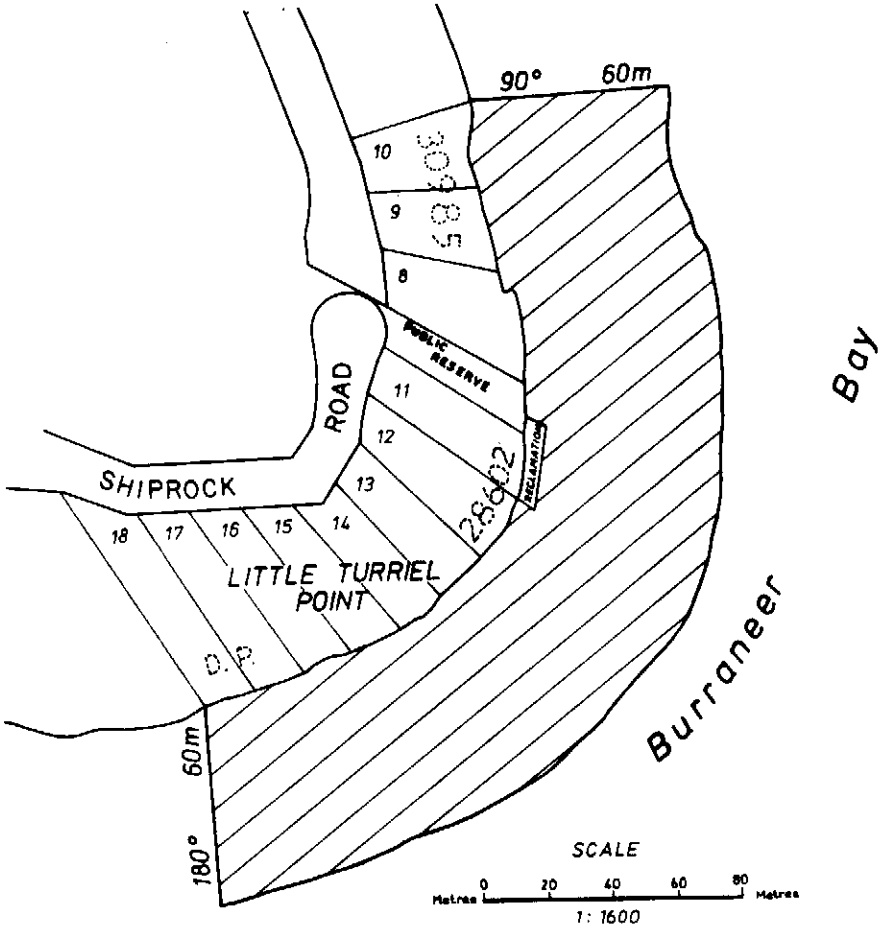
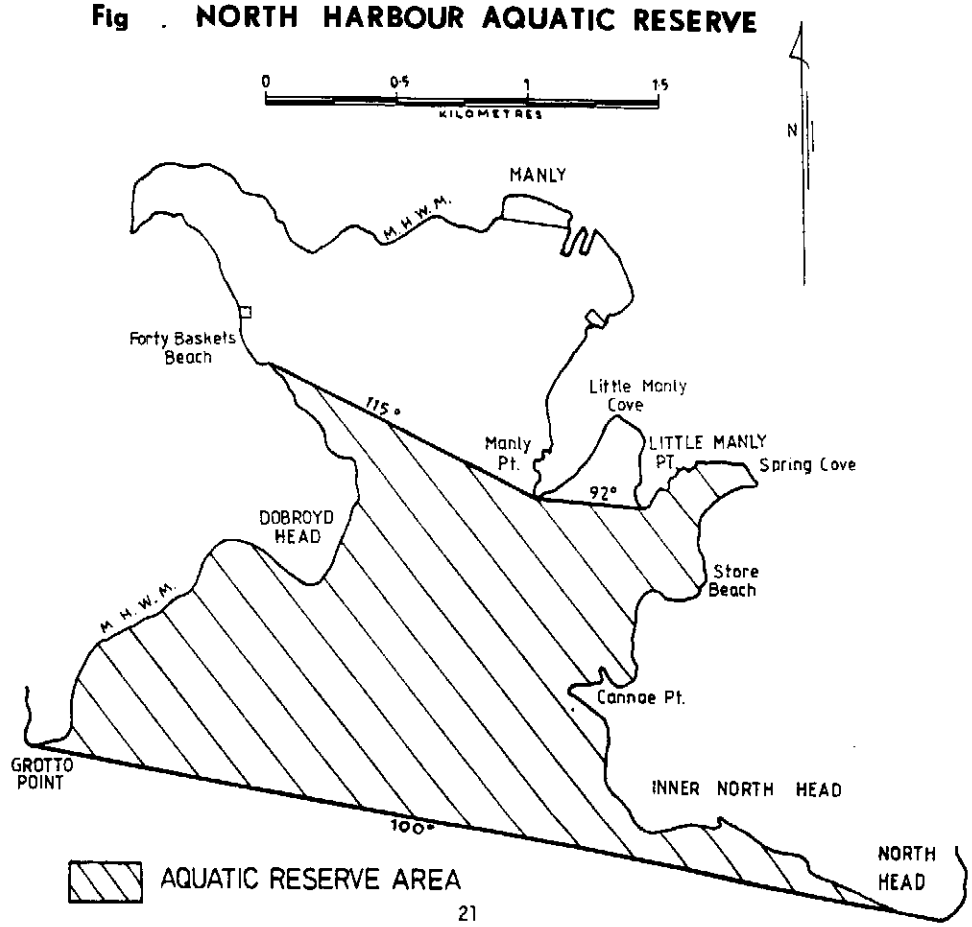


Fig3. SHIPROCK AQUATIC RESERVE



PORT HACKING

Fig . NORTH HARBOUR AQUATIC RESERVE



who prepared a report on the physiography, flora and fauna of the area as the basis for the Underwater Research Group's submission to have Shiprock protected as a marine reserve. Lawler describes it as a "tiny area in Port Hacking, where some unusual features have combined to create an extremely rich and varied fauna surrounded by comparatively sterile sand flats" and "where the combination of a deep submarine cliff, strong currents and unpolluted water have resulted in an extremely rich growth of marine invertebrates with a resulting large population of fishes". He continues: "During the early months of 1965 the author and other members of the Underwater Research Group of New South Wales began diving in this area and were astonished at the profusion of marine fauna that we found in this seemingly ordinary estuarine situation. Never before had we encountered anything like this concentration and variety of animals in which almost every phylum was represented. Species hitherto regarded as rare or uncommon were found in great numbers and all available living space was crowded with masses of invertebrates" (Lawler 1972). The taking of all marine life to a distance of 60 metres from the shore is prohibited in this area (Fig. 3).

(iii) North Sydney Harbour, including the intertidal and subtidal rocky reef areas between North Head and Little Manly Point and between Grotto Point and Forty Baskets Beach, and the waters between. Management of this area includes some restrictions on fishing and the removal of marine life, but most traditional commercial and recreational fishing activities have been allowed to continue (Fig. 4).

(iv) Julian Rocks, Byron Bay. The subtidal area around the Julian Rocks supports a wide variety of corals and has a very diverse fish fauna, comprising a mixture of both warm temperate and tropical species. Management of this area involves a prohibition on the taking of all marine life, except by line fishing, for a distance of 500 metres around the Trig. Station located on the Rocks (Fig. 5).

(v) Bushrangers Bay (Bass Point) in the Shellharbour area, north of Kiama. This small bay is an ideal protected area for beginner scuba and snorkel divers, and it is intended to offer it complete protection against the removal of any marine life, in the same manner as Shiprock (Fig. 6).

The first of the above areas was gazetted in May 1980, the following three in March 1982, and the last is soon to be gazetted as an Aquatic Reserve under the provisions of the Fisheries and Oyster Farms (Amendment) Act 1979.

Although not reserves in their own right, some intertidal and subtidal areas of estuaries have, historically, been included in National Parks (e.g., the South West Arm of Port Hacking in Royal National Park and Cowan Creek in Kuringai-Chase).

Proposed Marine and Estuarine Reserves: Other areas being considered for reservation and for which proposals have been made (Fig. 7) are:

(i) The Solitary Islands, north of Coffs Harbour. The waters adjacent to the coast and around the main offshore islands contain extensive reef building corals (in many cases at the southernmost limit of their distribution on the coast) and a highly diverse mixture of tropical and temperate flora and fauna. Both N.P.W.S. and N.S.W.S.F. have prepared management proposals for this area, and consideration is being given to its eventual declaration as a marine National Park, containing a number of Aquatic Reserves immediately surrounding some of the islands.

(ii) Jervis Bay, south of Nowra. Proposals have been put forward by a number of organisations (Anon. 1975) to have a wide variety of reef, seagrass and mangrove habitats in Jervis Bay declared as marine reserves. At present the southern part of the bay between the Naval College and Bowen Island is managed by the Commonwealth as part of the Jervis Bay Nature Reserve. The other areas proposed are around the Beecroft and Bherwherre Peninsulas and in the eastern sector of the bay proper.

(iii) Lowe Howe Island. This is one proposed reserve area which is worthy of special mention because of its great zoogeographic interest and thus its importance to marine science. This mountainous volcanic island is located in the northern Tasman Sea over 800 kilometres to the east-north-east of Sydney and over 600 kilometres due east of the New South Wales coastline opposite Port Macquarie, at a latitude of 31.5° South. The Island is bounded on the western side by a coral-fringed lagoon approximately six kilometres long and almost two kilometres in width at its widest point. This fringing reef is the southernmost coral reef in the world, and has been described as the South Pacific's counterpart of Bermuda in the North Atlantic. The uniqueness of this southernmost coral reef lies in the fact that, while lying at a latitude of 31.5°S, over 900 kilometres to the south of the southernmost coral reefs of Queensland's Great Barrier Reef, it supports at least 20 genera, and probably well over the 44 species so far recorded, of hematypic or reef-building corals. This apparent biological anomaly is due to the presence of a warm, southward-flowing current and the extremely clear oceanic waters in the Island's vicinity. The Solitary Islands, located only a few kilometres off the mainland coast around 30°S, comprise the only other significant coral habitat in New South Wales, but although they are

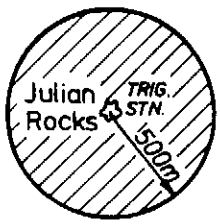


Fig 5.
JULIAN ROCKS AQUATIC RESERVE

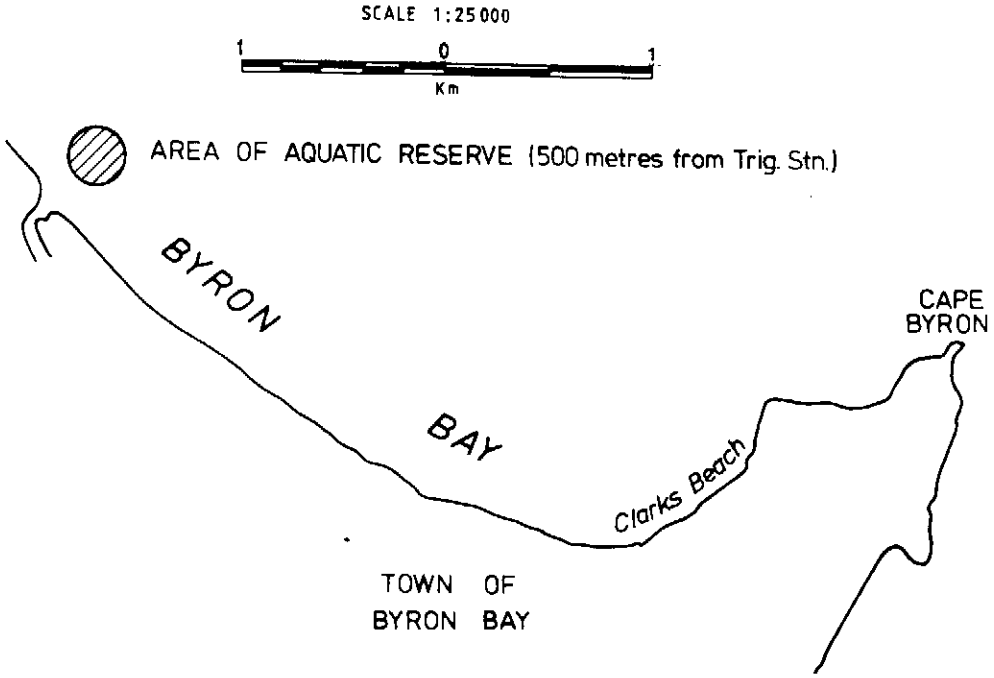
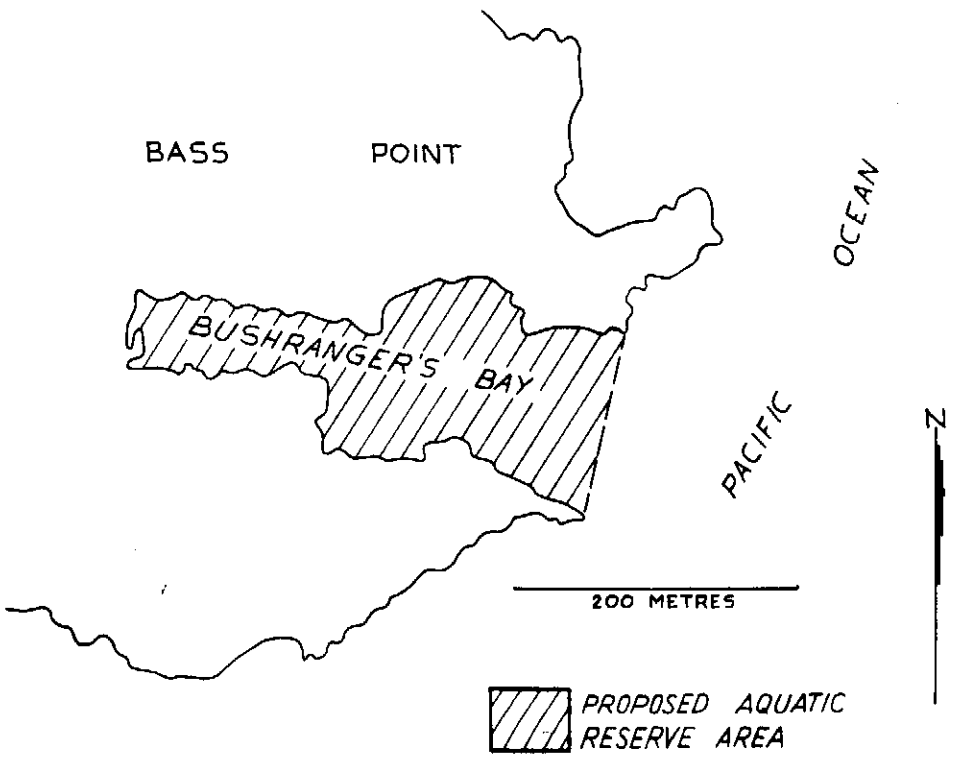


Fig 6.
PROPOSED BUSHRANGER'S BAY AQUATIC RESERVE AT BASS POINT



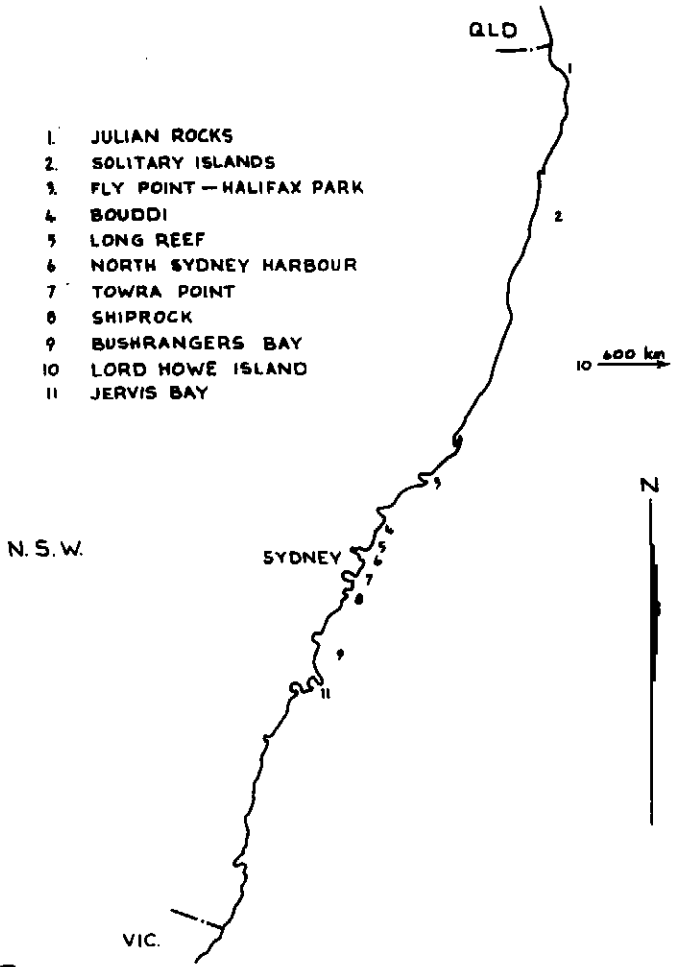


Fig 7.
N. S. W. COASTLINE SHOWING LOCATION OF EXISTING AND PROPOSED AQUATIC RESERVES AND MARINE PARKS

Diver examining black coral in proposed
Marine National Park off North Solitary Island.

located between 130 and 165 kilometres further to the north than Lord Howe Island, they support fewer genera (17) and species (34) of reef-building corals. The growth forms of most of the species found around Lord Howe Island also resemble more closely those forms normally occurring on northern coral reefs than the more stunted forms of the same species found at the Solitary Islands. In addition to the corals themselves, a rich diversity of tropical fishes and other marine fauna normally associated with more northerly coral reefs also occurs in the Lord Howe area. A proposal for an Aquatic Reserve in the lagoon and Neds Beach areas of Lord Howe Island has been put forward by N.S.W.S.F. (Pollard 1981), and is presently being considered by the Lord Howe Island Board.

(iv) Fly Point-Halifax Park, Port Stephens. This area supports a high diversity and abundance of sedentary marine animals, particularly sponges, and is characterised by deep sublittoral cliffs and strong tidal currents, in many ways similar to Shiprock.

Two Nature Reserves which have estuarine components have been announced but have yet to be proclaimed under the National Parks and Wildlife Act:

(i) The Kooragang Island-Fullerton Cove Nature Reserve, on the northern arm of the Hunter River, near Newcastle, will extend down to low water mark on both sides of the river arm, thereby including significant areas of mangroves and saltmarsh. The exact boundaries are still being formulated but will include most of the floor of Fullerton Cove.

(ii) The Towra Point Nature Reserve on the southern side of Botany Bay includes the whole of Weeny Bay, with its extensive mangrove stands. This land is being transferred from the Commonwealth to the State and once this transfer is complete it will be gazetted and management plans drawn up.

The rest of the intertidal and subtidal area around Towra Point, as well as the rocky reef habitats adjacent to the Botany Bay headlands, are also being considered by N.S.W.S.F. for Aquatic Reserves.

As can be seen from the information presented, New South Wales has taken the early steps towards what should eventually become an extensive and comprehensive system of marine and estuarine parks and reserves in that State.

APPENDIX: LEGISLATION RELATING TO MARINE PARKS AND AQUATIC RESERVES IN NEW SOUTH WALES

There are two Acts in New South Wales under which Marine Parks and Aquatic Reserves can be created, and their animal and plant life protected.

(i) National Parks and Wildlife Act, 1974. National Parks and Nature Reserves can be declared over Crown lands and lands vested in some other authorities within the territorial jurisdiction of New South Wales. At present this legislation is restricted to the low water mark along the open coast but includes the area within most bays and inlets. However, an agreement between the States and the Commonwealth will soon extend this area to 3 miles off the coast (Commonwealth of Australia 1980).

In practice, all proposals concerning intertidal and subtidal lands are referred to New South Wales State Fisheries for their concurrence, and those involving submerged Crown lands are referred to other relevant Government Authorities.

Under the National Parks and Wildlife Act, animals are defined as all animals other than 'fish' within the meaning of the Fisheries and Oyster Farms Act. Fauna are more specifically defined as mammals, birds and reptiles. Within National Parks and Nature Reserves all animals are protected, as are fauna. Consequently, marine and freshwater invertebrates and fish are not protected under the N.P.S.W. Act, except in the regulations relating to National Parks (not Nature Reserves) which, at present, prohibit the setting of any trap or net for fish in any water within a National Park. Indirect protection can be provided by habitat protection through regulations and plans of management. Outside National Parks and Nature Reserves all fauna are protected unless otherwise specified, but not all animals.

Within National Parks and Nature Reserves all plants are protected. This presumably includes all forms of marine flora. Particular species can be protected outside these areas by the insertion, by the State Governor, of their names into a Schedule of the Act.

Plans of management are required to be prepared for National Parks. However, where lands submerged by water are included in a management plan, that plan must be referred to the Minister administering the Fisheries and Oyster Farms Act. Before that plan of management can be adopted for any subtidal area, concurrence in writing must be received from that same Minister.

(ii) The Fisheries and Oyster Farms Act, 1935, defines 'fish' to include all marine, estuarine and freshwater animal life excluding whales. There are numerous legal restrictions in force on the taking of fish with reference to species, methods, waters and seasons.

Strict controls over the cutting of all mangroves in New South Wales for any purpose are shortly to be introduced. The cutting of mangroves for the purpose of oyster cultivation is controlled at present. Regulations are in force to control the commercial gathering of seaweed.

Under the Act as amended in 1979 certain Crown lands can be declared Aquatic Reserves and regulations may be made to prohibit the taking of fish and other marine animal life from these reserves and to provide for their management, protection and development.

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