12 MANAGEMENT MEASURES

12.1 The Commercial Line Fishery

12.1.1 Responsibility for Management

Management of the Commercial `Reef Line Fishery' is the responsibility of the Queensland State Government. The fishery is managed by the Queensland Fish Management Authority (established under the Fishing Industry Organisation and Marketing (FIOM) Act of 1982 - See Section 6). The current legislation comes under the FIOM Act 1982-89 and the Fisheries Act of 1989 (Gwynne 1990).

Discussions regarding jurisdiction over the fishery were held between the Commonwealth and Queensland State Governments in the various rounds of the Offshore Constitutional Settlement (OCS). On June 1 1987, the Commonwealth and Queensland State Governments agreed that under the OCS the Demersal Reef Fishery would be managed by the state.

The spatial boundaries under this agreement were amended under OCS on the 31 August 1988. A further found of OCS negotiations in May 1989 identified clearly that the state was responsible for managing the reef demersal stocks.

The other legislation which clearly affects management of the Reef Line Fishery is the Commonwealth's Great Barrier Reef Marine Act of 1975. This Act established the Great Barrier Reef Marine Park (GBRMP) and the GBRMP Authority. GBRMPA is responsible for the control, care and development of the Marine Park. Its main strategy of management is zoning of the GBR reefs. This zoning has the following objectives:

i. the conservation of the Great Barrier Reef;

ii. the regulation of use of the Marine Park so as to protect the Great Barrier Reef while allowing the reasonable use of the Great Barrier Reef region;

iii. the regulation of activities that exploit the resources of the Great Barrier Reef Region so as to minimise the effect of those activities on the Great Barrier Reef;

iv. the reservation of some areas of the Great Barrier Reef for its appreciation and enjoyment by the public;

v. the preservation of some areas of the Great Barrier Reef in its natural state undisturbed by man except for the purpose of scientific research.

The framework for the management of the Marine Park by GBRMPA has been provided by the GBRMPA Zoning plans. These Zoning regulations and their role in fisheries management are discussed later in this Section. Clearly the management by QFMA of the Reef Line Fishery within the Great Barrier Reef Marine Park exists within a framework of spatial closures to fishing setup by GBRMPA. A `Memorandum of Understanding' was signed by GBRMPA, QFMA and the Division of Fisheries and Wetland Management of the Queensland Department of Primary Industries (QDPI) in 1988. Within this memorandum of understanding GBRMPA recognises the responsibility of QFMA and QDPI to manage the reef fisheries. It is generally acknowledged by both State and Commonwealth representatives that in the case of any conflict of interest the Commonwealth Act would override the State Act. Such conflicts of interest have not arisen with respect to the Reef Line Fishery and the policy of both Commonwealth and State organisations has generally been one of consultation. Such consultation is likely to

increase with the recent establishment of the `Effects of Fishing Program' set up by GBRMPA on the advice of the Advisory Committee on Research into the Effects of Fishing in the Great Barrier Reef Region. This program, beginning in 1991, will involve extensive consultation and co-operation between a wide variety of State and Commonwealth management and research institutions, aimed at investigating effects of fishing in the GBR region.

12.1.2 Management Measures

12.1.2.1 Controls on Fishing Effort

A freeze on commercial fishing licences in Queensland has existed since 1979 (Qld Fisherman, April 1991, p. 11). This has had the general effect of an overall reduction in the number of commercial fishermen in Queensland. However, the vast majority of fishermen in Queensland have a line-fishery endorsement (1963 line-fishery endorsements in 1989) despite the majority of the reef line catch being taken by about 100 commercial fisherman (see Section 6). Theoretically at least, great potential exists for many commercial fishermen to shift into the reef line-fishery in the future. Furthermore, a fair amount of latent effort exists amongst the 69 vessels with Line-Only endorsements. These Primary vessels have access to 4 Tender vessels per endorsement, permitting operation of 276 tender vessels. Currently (1989) these Primary endorsements operate only 153 tender vessels (Gwynne 1990).

In 1986 the Reef Line Fishing Advisory Committee of the Queensland Commercial Fishermens' Organisation (QCFO) proposed the introduction of an interim management plan for the reef line fishery based on limited-entry licensing for line fishing and trolling operations conducted in a defined area of the Great Barrier Reef (Qld Fisherman July 1986, p. 19). Many of the supporters of this proposal were reef line fishermen based in Mackay. This proposal was rejected by the QCFO State Line Committee (see Qld Fisherman August 1991 Supplement on Line Review). The recent review of the Reef Line Fishery (Gwynne 1990) has also proposed that a commercial Reef Line Fishery (RLF) endorsement be established. It proposes that those Primary vessels which contribute the majority of the commercial reef line catch (about 100) be endorsed to utilise up to 4 tender vessels (except those currently licensed to use more than 4 tenders). It recommends steps be taken (over a 5 year period) to limit all RLF endorsed vessels to no more than 4 tender vessels. The recommendation stops short of attempting to reduce the number of line fishery endorsements, opting to simply prevent an increase in effort in the fishery by proposing that all other Primary vessels holding a line fishery entitlement be authorised to operate in the fishery using only one tender vessel (ie. the current situation) (Gwynne 1990). The recommendation of Gwynne regarding an RLF has again been rejected by QCFO (Qld. Fisherman, August 1991 Supplement in Line Review). The only QCFO Branch (of which there are 13) to support a `separate endorsement' was the Mackay Branch. QCFO rejected the proposal based largely on its objection to the use of `performance criteria' and `historical involvement' in selection of RLF endorsements. However, QCFO did recommend that a total freeze on tender vessels for use in the Line Fishery be implemented immediately, until at least the outcome of the Reef Line Fishery Review (Qld Fisherman, August 1991 Supplement on Line Review).

12.1.2.2 Gear Restrictions

Descriptions of fishing gear used in the fishery were given in Section 9. The fishery for demersal reef fish is a line fishery. Legislation provides for the use of up to 6 hooks (maximum of 1 hook in Marine National Park `A' Zone) on a hand line or rod. Most commercial operators use only one hook per line (Gwynne 1990).

A multiple-hook fishery has been proposed recently in waters > 100 fathoms off the Queensland Coast by the QFMA. (Qld Fisherman, May 1991, p. 19). The apparatus proposed are drop lines (maximum 6), trot lines and bottom-set longlines (maximum 300 hooks per line).

It will be a condition of permit that coral trout, emperor and snapper will not be allowed on board at the same time as the multiple-hook apparatus. However, a similar and directly adjacent multiple-hook fishery has been proposed recently by the Australian Fisheries Service (AFS) in which there appear to be no restrictions in taking coral trout, emperor or snapper.

12.1.2.3 Restrictions on Catch

No restrictions on catch such as catch quotas or individual transferable quotas exist for the commercial Reef Line Fishery. Restrictions on catch in the form of minimum legal sizes do exist e.g. Coral Trout, 35cm TL; Sweetlip Emperor, 30cm TL; Red Emperor, 35cm TL. Gwynne (1990) gives a list of all legal minimum and maximum sizes of fish allowed to be captured in Queensland waters (see his Appendix 2). The current minimum legal sizes have been a source of concern, particularly with market pressure for `pan-sized' reef fish. The demand for coral trout below its minimum legal size of 35 cm TL has apparently been substantial in some areas. A recommendation of the recent review of the Reef Line Fishery (Gwynne 1990) was that the minimum size limit on coral trout be reviewed immediately, and that further research be conducted to determine if a greater length would be more appropriate (see Sections 5 and 11). This was supported by the QCFO (Qld Fisherman, August 1991, Supplement on Line Review). Beinssen (1989a) suggested that the legal minimum size of coral trout be raised to 45cm TL in Capricornia. A QFMA Working Group has been formed recently to review all minimum legal sizes of fish in Queensland. The recommendations of this Working Group have now been made (as of October 1991) and these recommendations are being reviewed by the QFMA Board. If approved by QFMA the recommendations will then pass to the Minister for Primary Industries for approval. The legal minimum sizes of both coral trout and sweetlip emperor are likely to increase, perhaps as early as 1992.

12.1.2.4 The Recent Review of the Reef Line Fishery

The main recommendations of this review (Gwynne 1990) regarding the commercial reef line fishery were the establishment of a Reef Line Fishery (RLF) endorsement, a limit of 4 tenders per RLF endorsement and 1 tender per line-fishing endorsement, a review of the legal minimum size of coral trout, extra emphasis on enforcement (ie. an additional Boating and Fisheries Patrol office be established at Innisfail and a mobile task force of the Boating and Fisheries Patrol be established), and that the Reef Line Fishery be reviewed again in two years (from 1990). Other recommendations regarding the commercial reef line fishery related to amendments to FIOM to provide for sales of product by Master Fishermen only where that product is taken by the use of a licensed commercial fishing vessel endorsed appropriately, consideration be given to greater account of prior fishing experience in applications for Master Fisherman's Licences and a recommendation to maintain the current boat replacement policy should an RLF be accepted. Comments on the Reef Line Fishery Review are currently being assessed by QFMA. A detailed response to all of these recommendations has been provided by the QCFO (Qld Fisherman, August 1991, Supplement on Line Review).

Closures of reefs to commercial fishing under the GBRMPA zoning plans are dealt with later in this Section.

12.2 The Recreational Line Fishery

12.2.1 Responsibility for Management

Responsibility for the management of the recreational line fishery on the GBR falls under similar arrangements to those described for the commercial line fishery. The QFMA (and QDPI) are responsible for managing the fishery within the framework set by the GBRMPA zoning scheme.

Line Fishery). The GBR Marine Park and GBRMPA were established under the Commonwealth Great Barrier Reef Marine Park Act 1975. The major management strategy of GBRMPA has been its Zoning Plans. The first zoning plan came into operation in July 1981 in the Capricornia Section of the Marine Park. Table 18 summarises information relevant to zoning of the GBR Marine Park and relevant to the reef line fishery on the GBR.

The zones and the type of fishing they permit are as follows:

General Use `A' Zone (Light Blue on Zoning Maps): permits trolling, line fishing (maximum 6 hooks per line), spear fishing, limited collecting, oyster gathering, crabbing, bait gathering, bait netting, commercial netting and trawling. A range of other activities are permissible with written permission from GBRMPA (e.g. traditional fishing and hunting).

**General Use `B' Zone** (Dark Blue on Zoning Maps): as for General Use `A' Zone but trawling not allowed.

**Marine National Park `A' Zone** (Yellow on Zoning Maps): as for General Use `B' Zone except spear fishing, commercial netting and limited collected not allowed. Also, line fishing allowed only with no more than one hook per line.

Marine National Park `B' Zone (Green on Zoning Maps): no fishing of any kind allowed.

Scientific Research Zone (Orange on Zoning Maps): no fishing of any kind allowed.

Preservation Zone (Pink on Zoning Maps): no fishing of any kind allowed.

In addition, certain provisions relating to `Designated Areas' exist. The two of relevance to fishing are the `Replenishment Areas' where fishing is not permitted, other than trolling for pelagic species during the period May 1 to January 31 of any year and `Seasonal Closure Areas' where fishing is not permitted in certain seasons.

In the recent review of the Cairns Zoning Plan (October 1989) the zones have been renamed. They will now be called General Use Zone (= old General Use `A' Zone), General Use (No Trawling) Zone (= old General Use `B' Zone), Marine Park Recreation Zone (= old Marine Park `A' Zone) and Marine National Park Zone (= old Marine Park `B' Zone). Scientific Research Zones and Preservation Zones will be retained as in previous zoning plans. A new zone (No Structures Subzone) will be introduced, free from fixed structures and permanently moored facilities (other than approved moorings and markers). Replenishment Areas and Seasonal Closure Areas will be retained as for previous zoning plans.

Zoning Plans have been formulated and put into action in the various Sections of the Marine Park (see Table 18). These Zoning Plans were intended to have a duration of 5 years. At present the only revisions of existing zoning have occurred for the Capricornia Section in 1987-88 (which involved a review of the initial Capricornia Section and its incorporation into the Mackay/Capricorn Section) and the Cairns Section (October 1989 to present).

The general strategy with respect to line fishing has been to implement zoning on an individual reef scale. The **approximate** number of reefs per marine park section and the **approximate** numbers closed to line fishing per section are given in Table 18. These figures are approximate because they were calculated by eye from the existing zoning maps. The total number of coral reefs in the Marine Park shown in Table 18 (1,471) is considerably less than that on the

GBRMPA computer records (> 2,900, S. Hillman pers. comm). This is due mainly to the criteria used in counting reefs. Coral reefs that were _1 km maximum dimension only were counted and shoals, patches and banks were not included in counts. The reason for the exclusion of small reefs and shoals, patches and banks was that such `reefs' are likely to be too small to attract separate zoning in their own right in most situations. Their exclusion in counts in no way diminishes their potentially great biological significance as `stepping stones' in potential movements of adult reef fish between reefs.

The percentage of reefs actually closed to line fishing in the Marine Park is 23.3% (342 out of 1471 - See Table 18). This figure is affected greatly by the existence of the green `cross-shelf transect' in the Far Northern Section. There are 94 `green' reefs and 4 `pink' reefs in this transect. If these are omitted, the percentage of reefs closed to line fishing in the whole park is 16.6%. The percentage of closed reefs varies from section to section, being lowest in the Mackay/Capricorn Section (14.9%) and highest in the Far Northern Section (32.0% - but only 9.9% excluding the `cross-shelf transect') (Table 18). The percentage of the area of the marine park actually closed to fishing is considerably smaller, and in approximately 2 to 5% (2% in the Mackay/Capricorn section, for example).

The maximum duration of closures to line fishing in each section as of late 1991 are Capricornia - 10 years (17 years for certain sites on Heron Island), Cairns Section - 8 years, Far Northern Section - 6 years, Central Section - 4 years and Mackay/Capricorn Section - 3 years (Table 18).

12.4 Fisheries Management and Spatial Closures to Fishing

The use of long-term (> 1 year) spatial closures to fishing is a relatively common management strategy in the conservation of reefs. The first marine protected area in modern times was apparently established in the 1930s in Florida (Plan Development Term = PDT 1990). Since that time marine parks aimed at reef conservation have been established all over the world (see reviews by Kenchington 1988; UNEP/IUCN 1988; Dartnall 1989; PDT 1990). It has long been recognised that establishment of marine parks (areas closed to fishing) affect existing reef fisheries. These effects have been viewed as both negative (most often as a reduction in the stock available for exploitation and a concentration of fishing effort on the areas remaining open to fishing) and positive. Any positive benefits of marine parks depend on the nature and degree of interchange of fish between areas closed and open to fishing. The most commonly cited potential benefit is a build-up of fish biomass in closed areas and a subsequent dispersal of larvae from closed to open areas. Given the length of larval life and extent of potential larval dispersal (Doherty and Williams 1988), such interchange could occur over considerable geographic areas. The greater the area over which fish are dispersed, the greater any positive effect will be diluted and any benefits will be influenced strongly by year to year variations in survivorship of larvae in the planktonic phase. Another potential positive benefit on reef fisheries is movement of adult fish between closed and open areas. Benefits to reef fisheries can potentially be gained by emigration of adults from unfished to fished areas (e.g. Alcala and Russ 1990) or, given high fishing mortality in the fished areas, by random fluxes across boundaries between open and closed area (Beverton and Holt 1957).

Despite the potential effects of marine parks on existing fisheries, the establishment of long-term spatial closures has not been used commonly as part of management strategies for reef fisheries. The recent proposal for establishment of Marine Fishery Reserves on 20% of the continental shelf in the US Southern Atlantic (PDT 1990) to conserve and manage stocks of reef fishes is one of the first reef fishery management plans to have long-term spatial closures as a central theme of the plan. In contrast, the zoning plans of the Great Barrier Reef Marine Park were not set up explicitly to manage the GBR reef fishery. Nevertheless, any advantages and