

EXECUTIVE SUMMARY

- Australia has international responsibilities for the management of dugongs in the Great Barrier Reef Region. One of the World Heritage values of the Region is that it "provides major feeding grounds for large populations of the endangered species *Dugong dugon*". In addition, the dugong has high biodiversity value as the only species in the Family Dugongidae and one of only four species in the Order Sirenia, all of which are listed as vulnerable to extinction by the World Conservation Union.
- Aerial surveys for dugongs have been conducted over an area of some 39,000 km² in the inshore waters of the Great Barrier Reef Marine Park (GBRMP) south of Cape Bedford in 1986/87, 1992 and 1994. Survey specific correction factors have been used to correct for perception bias (the proportion of animals visible in the transect which are missed by observers) and to standardise for availability bias (the proportion of animals that are invisible due to water turbidity).
- These surveys indicate that the number of dugongs in the region has declined by approximately 50% over the past eight years from an estimated 3479 ± s.e. 459 in 1986/87 to 1682 ± s.e. 236 in 1994. Over a large section of the region, this decline is over 80%. This change does not appear to be due to emigration out of the region. It is most likely to be due to unsustainable dugong mortality within the region. Dugongs have a life-span of more than 70 years and bear only one calf at a time at intervals of three years or more. Population models indicate that a dugong population reproducing optimally will increase at only about 5% per year. Thus dugong populations can sustain only a very low level of anthropogenic mortality (1-2% of females).
- Dugongs in this region are threatened by habitat loss, traditional hunting and incidental mortality in commercial gill-nets and in shark nets set for bather protection. These impacts are unquantified and their relative importance probably varies in different parts of the region.
- We believe that unless these problems are addressed as a matter of urgency, dugong numbers will continue to decline in this region with a consequent reduction in its World Heritage values.

RECOMMENDATIONS

Overall Approach

- That the management of dugongs in the southern Great Barrier Reef be directed at reducing all threatening processes so that their mortality does not exceed sustainable levels. Threatening processes include habitat loss, mortality from fishing, shark meshing and Indigenous hunting. This approach corresponds with that advocated by the "Turtle and Dugong Conservation Strategy for the Great Barrier Reef Marine Park" (Ellis 1994) and the draft of "A Management Program for the Conservation and Management of the Dugong (*Dugong dugon*) in Queensland" (Queensland Department of Environment and Heritage 1994) being produced under the Nature Conservation Act 1992 (Queensland). Further, management needs to recognise that focussing on these problems in the context of dugong conservation alone may lead to an increase in the threatening processes affecting populations of other threatened species, particularly green turtles.

Marine Park Management

- That the Great Barrier Reef Marine Park Authority, the Queensland Department of Environment and Heritage and the Queensland Fish Management Authority collectively review the management regimes in the Central and Mackay-Capricorn Sections of the Great Barrier Reef Marine Park, adjacent State Marine Parks and Fisheries Habitat Areas with a view to assessing their capacity to protect dugongs and their habitats particularly in key areas such as the Hinchinbrook Island area and Cleveland, Upstart, and Shoalwater Bays.

Indigenous Management

- That Councils of Elders similar to those established between Mackay and Dunk Island be established in other centres where there are significant numbers of Indigenous people who wish to hunt dugongs and turtles. These Councils should be informed of the decline in dugong numbers throughout the southern Great Barrier Reef and encouraged to minimise traditional hunting in this region in a culturally acceptable manner which involves the entire local Indigenous community. Also, discussions should be held with the traditional owners of key dugong areas, such as the Hinchinbrook Island area, Cleveland Bay, Upstart Bay, and Shoalwater Bay, in order to facilitate these areas being listed as critical areas under the Nature Conservation Act 1992 (Queensland).
- That the Councils of Elders be offered assistance to develop a culturally appropriate education program to further encourage their people to take responsibility for managing their dugong harvest.
- That research results be relayed back to Indigenous communities.

Fishery interactions

- That fishery logbook data be used to identify areas where gill-netting occurs and dugongs are relatively abundant. In these areas, consultations should be held with the relevant Management Advisory Committees and Zonal Advisory Committees to negotiate management arrangements appropriate for each area. These arrangements may include:
 - (a) the use of fishing gear and fishing practices which reduce the dugong take, such as has been instituted in Hervey Bay,
 - (b) zonal closure in areas which cannot be patrolled effectively by managers because of their remoteness.
- That the Tropical Finfish Management Advisory Committee give consideration to management measures to protect dugongs in developing the management plan for gill-netting such as:
 - (a) reducing latent effort through a buy-back scheme or restricting gill-netting endorsements to fishers "who could demonstrate a significant commercial level of involvement over a three year period" (The Recreational Fishing Consultative Committee 1993, p. 18).
 - (b) introducing area restrictions on individual gill-netting endorsements,
 - (c) reducing the use of illegal gill-nets by tagging commercial gill-nets with individual identifiers,
 - (d) introducing an amnesty period for the surrender of illegal gill-nets,
 - (e) closing areas where dugongs occur and where gill-netting has not occurred in the last three years.
- That an appropriate education program be put in place to inform commercial fishers on aspects of dugong conservation biology and management and on methods to minimise dugong take. This should take the form of workshops on dugong conservation biology and fishing methods run by the Queensland Commercial Fishers Organisation, the Fisheries Industry Training Council, James Cook University and the Queensland Department of Primary Industry. These workshops could include the following:
 - (a) scientific advice on aspects of the biology of dugongs,
 - (b) instruction on how to remove struggling dugongs from nets by experienced gillnetters,
 - (c) local information on dugongs from experienced fishers.

Attendance at workshops could be compulsory for re-endorsements of gill-netting licences.

- That mechanisms be developed to enable commercial fishers to donate accidentally drowned dugongs to local Indigenous groups.
- That the cost and logistics of an experiment to evaluate the potential of acoustic alarms to reduce entanglement of dugongs in gillnets be investigated as a desk top study which should also address the logistics of introducing such alarms if they were found to be effective.

Shark-meshing for bather protection

- That the Queensland government, through consultation with local Focus Groups, organise for all shark meshing nets remaining in the waters of the Great Barrier Reef Region to be replaced with drumlines, and that an appropriate education program be established to advise the public on ways to avoid contact with dangerous sharks.

Research

- That culturally appropriate research programs be established to collect and/or collate data on the take of dugongs by commercial gill-netting, the Queensland Shark Meshing Program and Indigenous hunters. These data should include (for each fishery):
 - (a) number and fate of animals caught,
 - (b) data and circumstances of catch,
 - (c) size and sex of animals caught,
 - (d) total fishing effort.
- That detailed studies of dugong movements and habitat use in key regions such as Shoalwater Bay be conducted to determine the appropriateness of netting closures by:
 - (a) satellite tracking individual dugongs, and
 - (b) an analysis of dugong sightings from the aerial surveillance flights conducted by Queensland Department of Environment and Heritage and Coastwatch surveillance data.
- That the aerial survey of dugongs, turtles and cetaceans in the inshore waters of the Central and Mackay-Capricorn Sections of the Great Barrier Reef Marine Park be repeated in November 1999.
- That the surveys conducted by Coles and his co-workers in the 1980's (Lee Long et al. 1993) be repeated to determine if there has been any loss of seagrasses at a regional scale.
- That a workshop be held with seagrass workers from CSIRO Division of Fisheries (Cleveland Laboratory), the Queensland Department of Primary Industries Northern Fisheries Centre, James Cook University and the University of Queensland to discuss the development and standardisation of cost-effective techniques to monitor intertidal and subtidal tropical seagrass beds at both local and regional scales.

Distribution of this report

That copies of this report be made available to interested parties including (but not limited to):

- * the Queensland Fish Management Authority,
- * the Chair of the Tropical Finfish Management Advisory Committee,
- * the Queensland Department of Primary Industries,
- * the Queensland Department of Environment and Heritage,
- * the Queensland Department of Family Services,
- * the Queensland Commercial Fishermen's Association,
- * the Australian Nature Conservation Agency, and
- * all Councils of Elders in the Great Barrier Reef region
- * the Co-operative Research Centre for Ecologically Sustainable Development of the Great Barrier Reef.