

Marine turtles of the Great Barrier Reef World Heritage Area

CJ Limpus

Department of Environment, PO Box 541, Brisbane Qld 4002

The Great Barrier Reef World Heritage Area is one of the few remaining strongholds for marine turtles globally with internationally significant populations for four of the six species present. All species are characterised by slow growth to maturity, long distance migration from feeding to breeding sites, high fidelity to traditional breeding sites, non annual breeding, temperature dependent sex determination and low recruitment rates to adult populations.

Chelonia mydas (Green turtle). Conservation status: Australia and Queensland = vulnerable. Most *Chelonia mydas* within the Great Barrier Reef originate from the two independent breeding units of the Great Barrier Reef - one which breeds in the northern Great Barrier Reef (> 30 000 females annually), the other which breeds mostly in the southern Great Barrier Reef (approximately 8000 females annually, mostly within conservation parks). Smaller numbers originate from the breeding units of New Caledonia and north Papua New Guinea. Short term trends in population numbers are masked by large interseasonal fluctuations in nesting numbers caused by a response to El Niño Southern Oscillation effects with a two year lag time. These nesting populations come from areas within a 2600 km radius of the nesting beaches, with more than half of migration tag recaptures occurring in neighbouring countries. The largest sources of anthropogenic mortality is hunting by coastal indigenous peoples, mostly of large females, in northern Australia and neighbouring countries. Total harvest within the migratory range of these turtles appears to be non-sustainable. When additional mortalities in east Australia from boat strike, fishing industry by-catch, ingestion of fishing line, entanglement in line and rope are considered, the conclusion must be that there is a high probability that significant declines in population levels can be expected in the Great Barrier Reef World Heritage Area within the next 25 years. Current management within the migratory range of these stocks is not ensuring sustainability.

Caretta caretta (Loggerhead turtle). Conservation status: Australia and Queensland = endangered. Almost all breeding in the southern Pacific region occurs within the south Great Barrier Reef and adjacent mainland. This stock of approximately 1000 nesting females annually (mostly in conservation parks) does not interbreed with the other Pacific stock that breeds in Japan or with the Western Australian stock. The south Queensland stock draws on feeding populations within a 2600 km migration range. This stock has declined by 50-80% in the number of nesting females annually since the late 1970s. The decline has been attributed primarily to fisheries by-catch mortality with additional mortality from boat strike, ingestion of synthetic debris, entanglement in ropes and traditional hunting in Papua New Guinea. Most anthropogenic mortality occurs within Australia.

Eretmochelys imbricata (Hawksbill turtle). Conservation status: Australia and Queensland = vulnerable. The largest remaining population in the Pacific region breeds in the north Great Barrier Reef, Torres Strait and NE Arnhem Land (several thousand nesting females annually. Great Barrier Reef rookeries are mostly conservation parks). This stock is genetically distinct from other Indo-Pacific stocks. Migration of *Eretmochelys imbricata* resident in the Great Barrier Reef World Heritage Area to breed in the Solomons and from Indonesia to the Great Barrier Reef is documented. It is extensively hunted in neighbouring countries for tortoiseshell and meat. Census data from Milman Island indicates a declining north Great Barrier Reef stock. The large harvests in neighbouring countries are expected to be reducing the size of

resident populations within the Great Barrier Reef World Heritage Area. Limited census and demographic data and almost total lack of quantified mortality data are impeding management.

Natator depressus (Flatback turtle). Conservation status: Queensland = vulnerable. This eastern Australian stock, comprising approximately 1000 nesting females annually, breeds mostly on continental islands of central Queensland (approximately 10% of this Australian endemic species). Most nesting occurs in conservation parks. They migrate from feeding areas from within the Great Barrier Reef World Heritage Area - probably the only stock of any marine turtle globally whose entire population is contained within a single management area.

Anthropogenic impacts appear to be limited to unquantified mortality in the east coast prawn fishery and some harvest and predation by feral pests of eggs. Census data (15 yr) suggest that a population decline may have commenced. No demographic data available except for breeding females.

Dermochelys coriacea (Leatherback turtle). Conservation status: Australia = vulnerable, Queensland = endangered. A rare species within the Great Barrier Reef World Heritage Area, both as resident turtles and breeding females. Population levels will be affected by egg harvests in Papua New Guinea and by open seas gill net and long line fisheries.

Lepidochelys olivacea (Olive ridley turtle). Conservation status: Australia = vulnerable, Queensland = endangered. An uncommon species within the Great Barrier Reef World Heritage Area. The origin of the resident turtles is unknown. Impacted by trawling by-catch mortality. No census data are available.

Table 1 summarises pressure, state and response (DEST 1994) for marine turtles.

Reference

Department of the Environment, Sport and Territories 1994. State of the Environment Reporting: Framework for Australia. Department of the Environment, Sport and Territories, Canberra. 42 pp.

Table 1. Summary of pressure, state and response (DEST 1994) for marine turtles. With all turtle species, the actions need to be directed across the distribution of the management unit. In most cases, this will involve concurrent actions inside and outside the Great Barrier Reef World Heritage Area. For each species, quantification of demographic parameters is required, e.g. survivorship, mortality rates from anthropogenic factors, age/size structures, fecundity, breeding rates. These data are available to only a limited degree for each stock.

Species	Pressure	State	Response
Green	Indigenous hunting inside and outside Australian waters. Disease, boat strike and fishery by-catch are secondary pressures.	Population stability difficult to determine. Populations expected to decline substantially if unsustainable harvest continues.	Liaise with neighbouring countries/states/agencies to reduce mortality to a sustainable level.
Loggerhead	Fishery by-catch. Boat strike, debris ingestion, PNG hunting and fox predation are secondary pressures.	Population has suffered a major decline in the last 15 years, recovery possible if management measures are successful.	Reduce turtle mortality in fishing gear- especially in trawls. Reduce boat strike mortality.
Hawksbill	Harvest in Indonesia, PNG and Solomon Islands. Egg harvest in Torres Strait is secondary pressure.	Data indicate start of population decline. Continued decline likely.	Liaise with neighbouring countries to reduce mortality to a low level.
Flatback	Fishery by-catch, egg loss through harvesting and pig predation.	No apparent decline. Population possibly stable.	Monitor the impact of pig predation and trawl by-catch.
Leatherback	Indonesia and PNG egg harvest.	Population assumed to be declining, leading to eventual extinction.	Liaise with neighbouring countries (Indonesia and PNG) to manage egg harvest at sustainable level.
Olive Ridley	Fishery by-catch.	No data on population. Future unknown.	Identify anthropogenic mortality levels and gather demographic data.