

Status of leatherback turtles in Australia

by Colin Limpus

1. The legal protection status for leatherback turtles

In Australia, wildlife management is the responsibility of both the Federal and State and Territory Governments, each with their respective management agencies and associated legislation (Table 1).

Leatherback turtles are protected species nationally as a vulnerable, migratory, marine species. They are also listed as protected species with each State and Territory with varying levels of concern – from vulnerable to critically endangered, depending on the State (Table 1).

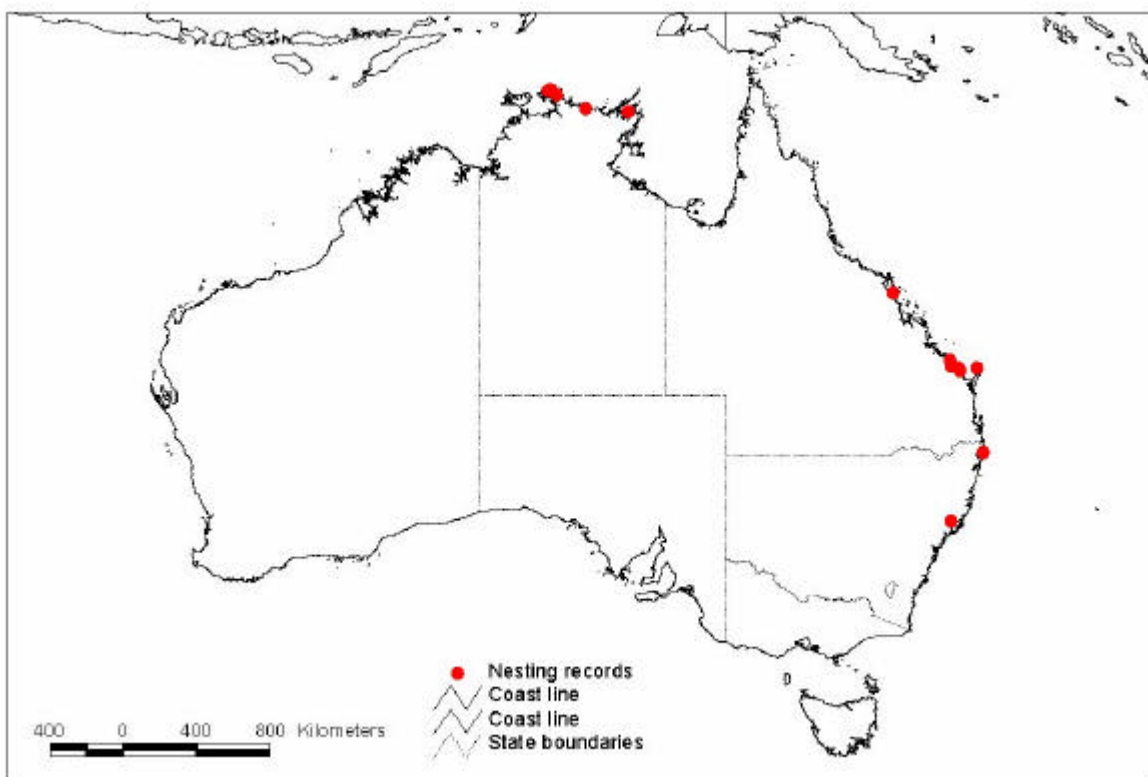


Figure 1. Distribution of confirmed *Dermochelys coriacea* nesting records in Australia.

Table 1. Summary of the legally defined conservation status of *Dermochelys coriacea* for Australia and the Federal and State-Territory agencies responsible for the administration of this legislation.

International obligations	Status	Legal basis	Management Agency
Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Appendix I & II	Australia is a signatory state.	Department of the Environment & Heritage, John Gorton Building, King Edward Terrace Parkes ACT 2600, GPO Box 787, Canberra ACT 2601
Convention on International Trade in Endangered Species (CITES)	Appendix 1	Australia is a signatory state.	
Legislation			
Australia including Aust'n Territories	Vulnerable Migratory species Marine species	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>	Department of the Environment & Heritage (see above)
Tasmania	Vulnerable	<i>Threatened Species Protection Act 1995</i>	Tasmanian Parks and Wildlife Service, GPO Box 1751, Hobart, TAS 7001, Australia.
Victoria	Critically endangered	<i>Advisory list of Threatened Vertebrate Fauna in Victoria 2003</i>	Environment Protection Authority Victoria, GPO Box 439QQ, Melbourne, Victoria, 3001, Australia.
New South Wales	Vulnerable	<i>Threatened Species Conservation Act 1995</i>	NSW Department of Environment and Conservation Incorporating Environment Protection Agency, PO Box A290, Sydney South, NSW 1232, Australia.
Queensland	Endangered	<i>Nature Conservation Act 1992</i>	Environmental Protection Agency, Queensland Parks and Wildlife Service, PO Box 15155, City East, QLD 4002, Australia.
Northern Territory	Vulnerable	<i>Territory Parks and Wildlife Conservation Act 2000</i>	Environment Protection Agency Northern Territory, Office of Environment and Heritage, GPO Box 1680 Level 2, Darwin, NT 0801, Australia.
Western Australia	Rare or likely to become extinct	<i>Wildlife Conservation Act 1950</i>	Department of Conservation and Land Management, Government of Western Australia, Locked Bag 104, Bentley Delivery Centre, WA 6983, Australia.
South Australia	Vulnerable	<i>National Parks and Wildlife Act 1972</i>	Environment Protection Authority South Australia, GPO Box 2607, Adelaide, SA 5001, Australia.

2. Nesting populations

2.1 Overview

There is no historical evidence of a large nesting population of leatherback turtles in Australia. Nesting by the species here was first reported in 1974 (Limpus 1974). Nesting has been reported for low numbers of turtles annually from two areas of Australia (Figure 1).

- Eastern Australia: While there have been isolated reports of leatherback turtle nesting from Mackay in Central eastern Queensland south to Newcastle in central New South Wales, most nesting occurs on about 40km of coastline on the Wreck Rock and Rules Beaches in south Queensland (Limpus and McLachlan 1994). When “discovered” in the 1970s during systematic studies of other marine turtle species, about three female leatherback turtles nested annually in south Queensland. Of course people had been familiar with leatherback turtles visiting these beaches for decades before. Nesting numbers have declined. No leatherback nesting has been recorded in eastern Australia since 1996.
- Northern Arnhem Land: While there have been isolated reports of leatherback turtles from many beaches across northern Arnhem Land and the adjacent islands since the 1970s, most reports of their nesting have been from the Coburg Peninsula (Limpus and McLachlan 1994). There is no reliable estimate of the size of this presumably small nesting population but nesting here continues to be recorded (Rod Kennett pers. comm.).

There have been no confirmed records of leatherback turtle nesting in Western Australia.

2.2 Genetic studies on nesting populations

No population genetics studies for leatherback turtles from Australia have been reported.

2.3) Seasonality of leatherback turtle nesting

Nesting in southeast Queensland occurs during December-February.

leatherback turtle tracks were recorded during December to January at Danger Point near Coburg Peninsula in the Northern Territory (Rod Kennett pers. comm.).

2.4) Biological parameters

Biological data from the nesting turtles are only available from eastern Australia and has been summarised by Limpus and McLachlan (1994) and Limpus et al. (1984) for Queensland and Tarvey (1993) for New South Wales (see Table 2).

Table 2. Summary of the biological data for leatherback turtles in Australia

Category of data	Average & Standard deviation	Range	Sample size
Size of nesting females	CCL = 162 ± 6.8	150.5-174.5	11
Number of eggs per clutch	Qld: 86.1 ± 15.7 NSW: 97.7	64-121 94-104	16 3
Clutches per season	-	Up to 4	
Re-nesting interval (days)	9.17 ± 0.75	9-11	6
Number of years between breeding seasons (years)	Not recorded		
Size of eggs (cm)	5.33 ± 0.11	5.11-5.63	130
Size of hatchlings (cm)	Qld: 5.88 ± 0.29 NSW: 6.10	5.14-6.52 5.73-6.53	39 39
Incubation success (%)	Qld: $15.3 \pm 17.6\%$ NSW: 40.3	0-39 0-78	7 3

2.5) Pivotal temperature studies

There have been no studies of hatchling sex ratio reported and the pivotal temperature for the population has not been defined.

2.6) Migration records

There are no reports of migration from the Australian rookeries.

2.7) Protection of nesting beaches

Eastern Australia: None of the main nesting area occurs within a protected area. The adjacent inter-nesting habitat occurs within the Great Barrier Reef Marine Park.

Northern Territory: None of the nesting sites are within designated protected areas, however they are in some of the most remote parts of coastal Australia; so they are pristine in nature and not likely to suffer any major degradation.

It is not known whether any state agencies are planning to protect any of the leatherback turtle nesting sites.

2.8) Use of hatcheries to protect leatherback turtle nests

Hatcheries are not used

2.9) Threats to leatherback turtles (foraging and nesting)

Limpus (in press) has reviewed the impacts of human impacts on leatherback turtles in Australia. This review is summarised in Table 3.

2.10) Impacts of coastal development and/or sand mining on leatherback turtle nesting

None

2.11) Major threats to leatherback turtles

Entanglement in float lines used in lobster and crab fisheries.

2.12) Activities underway to improve the conservation of nesting populations of marine turtles

Annual fox baiting is conducted along Wreck Rock beaches to reduce predation of turtle eggs.

2.13) Other biological studies conducted on leatherback turtles

The embryology of leatherback turtles has been described (Miller 1985).

3. Foraging populations

3.1) Overview

Leatherback turtles are most frequently encountered in the waters of southern Australia (Tasmania, Victoria, South Australia and Western Australia) and along the mid-eastern Australian Coast (SE Queensland) (Figure 2). Inshore movements to feed on jellyfish in shallow coastal waters during mid-year have been recorded from northwestern Queensland.

There has been only one tag recovery reported from an Australian foraging area: A female tagged while nesting in Java, Indonesia was recaptured from north-western Western Australia.

In eastern Australia, the bycatch of leatherback turtles that are entangled as they swim past the drumline hooks set within the Queensland Shark Control Program are released alive. These data provide an index of the occurrence of leatherback turtles in those waters. The most comprehensive dataset for this leatherback turtle bycatch was recorded at Point Lookout, south Queensland from 1984 to the present (Figure 3). These data are consistent with a decline of leatherback turtles in south Queensland waters in recent decades.

3.2) Seasonality of leatherback turtles occurring in coastal or offshore waters

leatherback turtles can be found foraging year round in Australian waters.

3.3) Size range of leatherback turtles foraging in Australian waters

leatherbacks in Australian waters range in size from small immature turtles, CCL =30.5cm, up to large adults (Prince 2004).

Table 3. Review of threats to leatherback turtles in Australia (foraging and nesting)

Threats at this site/area	Current occurrence	Historical records
Exploitation of nesting fem.	Nil known	Rare; traditional use only
Egg collection	Nil known	Rare; traditional use only
Coastal development	Nil	Nil
Artificial lighting	Nil	Nil
Coastal erosion	Nil	Nil
Trawl Fisheries: combined State and Federally managed trawl fisheries	Rare; Negligible mortality (Robins and Mayer 1998)	Rarely caught, most released alive. <1 death per decade during 1970s-1990s.
Longline Fisheries: Australian East Coast and West Coast Tuna and Billfish Longline Fisheries	Catch and mortality is being quantified; ~60% of total turtle catch may be leatherbacks and mortality is believed to be low (Robins et al. 2002).	-
Gillnet Fisheries	No known occurrence in recent years	Taiwanese drift net fishing, 1985-1986, off Arnhem Land: catch & mortality not quantified Northern Australian barramundi gillnet fishery: low catch rate, <1 leatherback death per year. Tuna drift net fisheries in southern Australia: unquantified effort, catch and mortality; probably appreciable
Lobster fisheries: Tasmania, Victoria, South Australia and southern Western Australia	Turtles are entangled in the floatlines to the traps. Catch and mortality are not quantified; Many captures occur annually; estimated 75% of leatherbacks are released alive (Bone 1998).	No data
Crab fisheries: southern Queensland	0.14deaths/yr during 1990-2003	No data
Vehicles	Nil	Nil
Sand mining	Nil	Nil
Unregulated hatcheries	Not applicable	Not applicable
Natural threats/predation	Nil	Fox predation of eggs on south Queensland beaches; possibly common during 1970-1980s.
Boat strike: Queensland	0.07deaths/yr during 1990-2003	No data
Accidental deaths in Qld shark Control Program	0.25deaths/yr during 1996-2003.	Catch and mortality unquantified in the early years of this program that commenced in 1960s.
Ingestion of marine debris	0.07deaths/yr during 1990-2003	No data

3.4) Information on the diet of leatherback turtles

leatherback turtles in Australian waters have been recorded feeding on large planktonic animals including jellyfish such as *Catostylus* spp. (Bone 1998, Cogger 1992, Limpus 1984, Limpus & McLachlan 1979) and *Pyrosoma* spp. (Prince 2004). Over the continental shelf they will feed at all levels of the water column from the surface to the bottom (Limpus 1984).

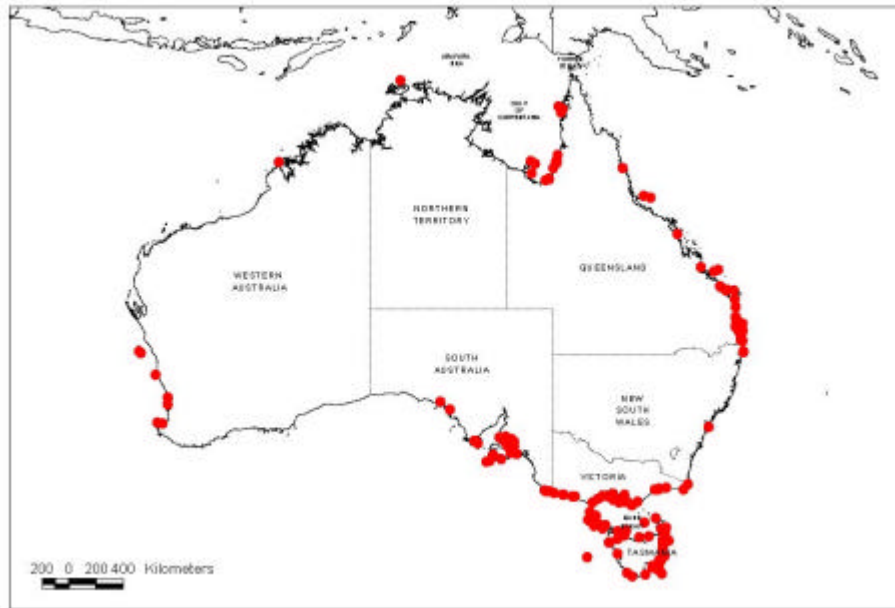
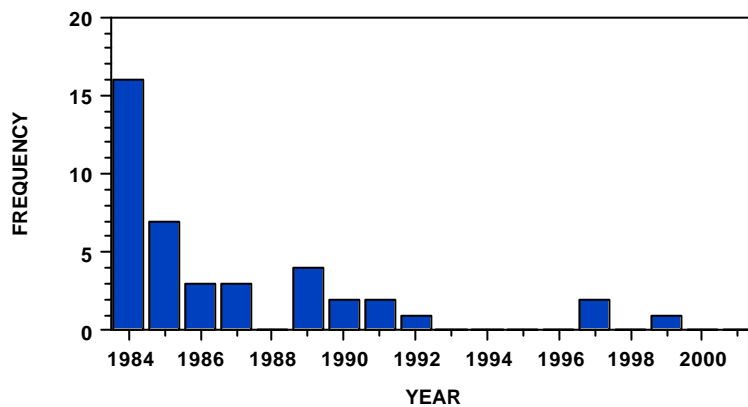


Figure 2. Distribution of foraging area records for *Dermochelys coriacea* in Australia (From Limpus (in press)). There are additional records from southern Western Australia not included in this figure.



1984 data from July-December only

Figure 3. Declining annual capture of *Dermochelys coriacea* on Queensland Shark Control drum-lines at Point Lookout as an index of abundance of the species in south Queensland waters. Data set supplied by Queensland Shark Control Program and commences with the employment of the current contractor in 1984. The fishing effort has been constant with 24 drum-lines deployed in approximately the same locations in each year. The turtles were tangled, not hooked, and almost all were released alive.

3.5) Other biological studies conducted on leatherback turtles in the foraging areas

High levels of arsenic compounds were recorded in a leatherback from the Western Australian coast (Edmonds et al. 1994).

3.6) and 3.6 Threats to leatherback turtles

See section 2.9 and Figures 2 and 3.

3.8) Other activities being undertaken to improve the conservation of leatherback turtle foraging populations

Large TED openings are used in prawn trawl fisheries in northern and eastern Australia.

Training in dehooking, handling and resuscitation of turtles is provided to crews and observers on tuna and swordfish longline boats.

4. References

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