

[1] "*Dermochelys coriacea* — Leatherback Turtle, Leathery Turtle, Luth. Glossary SPRAT Profile For information to assist regulatory considerations, refer to Policy Statements and Guidelines, the Conservation Advice, the Listing Advice and/or the Recovery Plan. EPBC Legal Status and Documents Top EPBC Act Listing Status Listed as Endangered Listed marine Listed migratory - EPBC Act, Bonn Conservation Advice Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Dermochelys coriacea* (Leatherback Turtle). Canberra: Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/1768-conservation-advice.pdf>. In effect under the EPBC Act from 08-Jan-2009. Listing Advice Threatened Species Scientific Committee (TSSC) (2009). Commonwealth Listing Advice on *Dermochelys coriacea*. Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/biodiversity/threatened/species/pubs/1768-listing-advice.pdf>. In effect under the EPBC Act from 08-Jan-2009. Recovery Plan Decision Recovery Plan required, this species had a recovery plan in force at the time the legislation provided for the Minister to decide whether or not to have a recovery plan (19/2/2007). Adopted/Made Recovery Plans Department of the Environment and Energy (2017). Recovery Plan for Marine Turtles in Australia. Australian Government, Canberra. Available from: <http://www.environment.gov.au/marine/publications/recovery-plan-marine-turtles-australia-2017>. In effect under the EPBC Act from 03-Jun-2017. Threat Abatement Plans Department of the Environment and Energy (2017). Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017). Canberra, ACT: Commonwealth of Australia. Available from: <http://www.environment.gov.au/biodiversity/threatened/publications/tap/feral-pig-2017>. In effect under the EPBC Act from 18-Mar-2017. Department of the Environment and Energy (2018). Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans (2018). Canberra, ACT: Commonwealth of Australia. Available from: <http://www.environment.gov.au/biodiversity/threatened/publications/tap/marine-debris-2018>. In effect under the EPBC Act from 21-Jul-2018. Department of the Environment, Water, Heritage and the Arts (DEWHA) (2008). Threat abatement plan for predation by the European red fox. DEWHA, Canberra. Available from: <http://www.environment.gov.au/biodiversity/threatened/publications/tap/predation-european-red-fox>. In effect under the EPBC Act from 01-Oct-2008. Marine Bioregional Plans Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012). Marine bioregional plan for the North Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Available from: <http://www.environment.gov.au/topics/marine/marine-bioregional-plans/north>. In effect under the EPBC Act from 27-Aug-2012. Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012). Marine bioregional plan for the Temperate East Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Available from: <http://www.environment.gov.au/topics/marine/marine-bioregional-plans/temperate-east>. In effect under the EPBC Act from 27-Aug-2012. Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012). Marine bioregional plan for the South-west Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Available from: <http://www.environment.gov.au/topics/marine/marine-bioregional-plans/south-west>. In effect under the EPBC Act from 27-Aug-2012. Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) (2012). Marine bioregional plan for the North-west Marine Region. Prepared under the Environment Protection and Biodiversity Conservation Act 1999. Available from: <http://www.environment.gov.au/topics/marine/marine-bioregional-plans/north-west>. In effect under the EPBC Act from 27-Aug-2012. Other Commonwealth

Documents\Top\Other EPBC Act Plans\South-east marine region profile: A description of the ecosystems, conservation values and uses of the South-east Marine Region (Commonwealth of Australia, 2015) [Information Sheet]. Commonwealth Listing Advice on Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28 degrees South (Threatened Species Scientific Committee (TSSC), 2001) [Listing Advice]. National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds (Department of the Environment and Energy, 2020) [Admin Guideline]. Seagrass - A Vulnerability Assessment for the Great Barrier Reef (Great Barrier Reef Marine Park Authority (GBRMPA), 2011) [Admin Guideline]. Information Sheets\Information Sheet - Harmful marine Debris (Environment Australia, 2003) [Information Sheet]. Federal Register of Legislative Instruments\Marine:Declaration under section 248 of the Environment Protection and Biodiversity Conservation Act 1999 - List of Marine Species (Commonwealth of Australia, 2000c) [Legislative Instrument]Migratory:List of Migratory Species (13/07/2000) (Commonwealth of Australia, 2000b) [Legislative Instrument]Recovery Plan:Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2007y) [Legislative Instrument]Recovery Plan:Instrument Jointly Making the National Recovery Plan for Marine Turtles in Australia (Commonwealth of Australia, 2017f) [Legislative Instrument]Threat Abatement Plan:Threat abatement plan for predation, habitat degradation, competition and disease transmission by feral pigs (*Sus scrofa*) (2017) (Commonwealth of Australia, 2017c) [Legislative Instrument]Threat Abatement Plan:Instrument under section 270B of the Environment Protection and Biodiversity Conservation Act 1999 to make a Threat Abatement Plan (Commonwealth of Australia, 2018i) [Legislative Instrument]Threatened:Declaration under s178, s181, and s183 of the Environment Protection and Biodiversity Conservation Act 1999 - List of threatened species, List of threatened ecological communities and List of threatening processes (Commonwealth of Australia, 2000) [Legislative Instrument]Threatened:Inclusion of species in the list of threatened species under section 178 of the Environment Protection and Biodiversity Conservation Act 1999 (73) (17/12/2008) (Commonwealth of Australia, 2008j) [Legislative Instrument]\ State Government Documents and Websites\NSW:Death or injury to marine species following capture in shark control programs on ocean beaches - factsheet (NSW Department of Environment, Climate Change and Water (NSW DECCW), 2003b) [Information Sheet].NSW:Leathery Turtle - profile (NSW Department of Environment, Climate Change and Water (NSW DECCW), 2005ce) [Internet].NT:Threatened Species of the Northern Territory - Leatherback Turtle *Dermochelys coriacea* (Taylor, R., R. Chatto, S. Whiting & S. Ward, 2013) [Information Sheet].QLD:Leatherback turtle (Department of Environment and Heritage Protection (DEHP), 2011j) [Database].TAS:*Dermochelys coriacea* (Leatherback Turtle, Leathery Turtle, Luth): Species Management Profile for Tasmania's Threatened Species Link (Threatened Species Section (TSS), 2014vy) [State Action Plan].VIC:Flora and Fauna Guarantee Action Statement 250-Leathery Turtle *Dermochelys coriacea* (Victorian Department of Sustainability and Environment (Vic. DSE), 2009b) [State Action Plan].\ State Listing Status\NSW:Listed as Endangered (Biodiversity Conservation Act 2016 (New South Wales): February 2021 list)\ NT:Listed as Critically Endangered (Territory Parks and Wildlife Conservation Act 2000 (Northern Territory): 2012 list)\ QLD:Listed as Endangered (Nature Conservation (Animals) Regulation 2020 (Queensland): August 2020 list)\ SA:Listed as Vulnerable (National Parks and Wildlife Act 1972 (South Australia): January 2020 list)\ TAS:Listed as Vulnerable (Threatened Species Protection Act 1995 (Tasmania): November 2020 list)\ VIC:Listed as Threatened (Flora and Fauna Guarantee Act 1988 (Victoria): January 2021 list)\ WA:Listed as Vulnerable (Biodiversity Conservation Act 2016 (Western Australia): September 2018 list)\ Non-statutory Listing Status\ IUCN:Listed as Vulnerable (Global Status: IUCN Red List of Threatened Species: 2020.2 list)\ VIC:Listed as Critically Endangered (Advisory List of Threatened Vertebrate Fauna in Victoria: 2013 list)\ Naming\Top\Scientific name\ *Dermochelys coriacea* [1768]\ Family\ Dermochelyidae:Testudines:Reptilia:Chordata:Animalia\ Species author\ Vandelli, 1761\ Infraspecies author\ Reference\ Distribution Map\Top\Distribution

map  
The distribution shown is generalised from the Departments Species of National Environmental Significance dataset. This is an indicative distribution map of the present distribution of the species based on best available knowledge. Some species information is withheld in line with sensitive species policies. See map caveat for more information.  
Illustrations  
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Other Links, Including Superseded Commonwealth Documents  
Commonwealth of Australia (2000). Declaration under s178, s181, and s183 of the Environment Protection and Biodiversity Conservation Act 1999 - List of threatened species, List of threatened ecological communities and List of threatening processes. F2005B02653. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2005B02653>. In effect under the EPBC Act from 16-Jul-2000.  
Commonwealth of Australia (2000b). List of Migratory Species (13/07/2000). F2007B00750. Canberra: Federal Register of Legislative Instruments. Available from: <http://www.comlaw.gov.au/Details/F2007B00750>.  
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Department of the Environment and Heritage (DEH) (2006gy). *Dermochelys coriacea* in Species Profile and Threats (SPRAT) database. Unpublished species profile. Canberra, ACT: DEH. Available from: [http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon\\_id=1768](http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1768).  
Department of the Environment, Water, Heritage and the Arts (2009t). Threat abatement plan for the impacts of marine debris on vertebrate marine life. Department of the Environment, Water, Heritage and the Arts. Available from: <http://www.environment.gov.au/marine/publications/threat-abatement-plan-impacts-marine-debris-vertebrate-marine-life>. In effect under the EPBC Act from 01-Jul-2009. Ceased to be in effect under the EPBC Act from 21-Jul-2018.  
Environment Australia (2003ai). Recovery Plan for Marine Turtles in Australia. Prepared by the Marine Species Section, Approvals and Wildlife Division, Environment Australia in consultation with the Marine Turtle Recovery Team. Available from: <http://www.environment.gov.au/coasts/publications/turtle-recovery/index.html>. In effect under the EPBC Act from 21-Jul-2003.  
Environment Australia (EA) (1999a). NON-CURRENT Threat Abatement Plan for Predation by the European Red Fox. Biodiversity Group, Environment Australia. Available from: <http://www.environment.gov.au/archive/biodiversity/threatened/publications/tap/foxes/index.html>. In effect under the EPBC Act from 16-Jul-2000.  
Limpus, C.J (2009). A biological review of Australian marine turtle species. 6. Leatherback turtle, *Dermochelys coriacea* (Vandelli). Queensland: Environmental Protection Agency.  
Newsletters  
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EPBC Act email updates can be received via the Communities for Communities newsletter and the EPBC Act newsletter.  
Caveat  
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This database is designed to provide statutory, biological and ecological information on species and ecological communities, migratory species, marine species, and species and species products subject to international trade and commercial use protected under the Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). It has been compiled from a range of sources including listing advice, recovery plans, published literature and individual experts. While reasonable efforts have been made to ensure the accuracy of the information, no guarantee is given, nor responsibility taken, by the Commonwealth for its accuracy, currency or completeness. The Commonwealth does not accept any responsibility for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the information contained in this database. The information contained in this database does not necessarily represent the views of the Commonwealth. This database is not intended to be a complete source of information on the matters it deals with. Individuals and organisations should consider all the available information, including that available from other sources, in deciding whether there is a need to make a referral or apply for a permit or exemption under the EPBC Act.  
Citation: Department of the Environment (2022). *Dermochelys coriacea* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: <https://www.environment.gov.au/sprat>. Accessed Tue, 18 Jan 2022 20:55:39 +1100.  
Where available the sections below provide a biological profile for the species. Biological profiles vary in age and content across species, some are no longer being updated and are

retained as archival content. These profiles are still displayed as they contain valuable information for many species. The Profile Update section below indicates when the biological profile was last updated for some species. For information to assist regulatory considerations, please refer to Conservation Advice, the Recovery Plan, Policy Statements and Guidelines.

Profile Update
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The following detailed profile was last updated on 7 April 2009.
Description
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Leatherback Turtles are the largest of all sea turtles, with adult females having a mean size of 1.6 m curved carapace length (Limpus et al. 1984c) and some females reaching up to 1 t in weight. Both males and females have a spindled shaped body with unscaled keeled carapaces (shells) (Marquez 1990). Adults are black with pale spots. These spots turn pinkish when out of the water as blood flows to the surface of the skin to cool the body (Spotila et al. 1996).

Leatherback Turtles have a number of physiological adaptations that allow them to maintain elevated body temperatures in cold water and avoid overheating in warmer water, including low metabolic rate, large thermal inertia, blood flow adjustments and peripheral insulation (Paladino et al. 1990, Southwood et al. 2005, Wallace et al. 2005, cited in Houghton et al. 2008).

Australian Distribution	Top
The Leatherback Turtle is a pelagic feeder, found in tropical, subtropical and temperate waters throughout the world (Marquez 1990). Large body size, high metabolism, a thick adipose tissue layer and regulation of blood flow (Spotila et al.1997) allow them to utilise cold water foraging areas unlike other sea turtle species. For this reason this species is regularly found in the high latitudes of all oceans including the South Pacific Ocean in the waters offshore from NSW, Victoria, Tasmania and Western Australia (Benson et al. 2011; Limpus & MacLachlan 1979, 1994). It has been recorded feeding in the coastal waters of all Australian States (Hamann et al. 2006).	

No major nesting has been recorded in Australia, although scattered isolated nesting (one to three nests per annum) occurs in southern Queensland (Limpus & MacLachlan 1979, 1994; Limpus et al. 1984b) and the Northern Territory (Hamann et al. 2006; Limpus & MacLachlan 1994). Some nesting has occurred in northern NSW near Ballina (Tarvey 1993). However, no nesting has occurred in Queensland or NSW since 1996 (Hamann et al. 2006). Nesting in Western Australia is still unknown or unconfirmed (Prince 1994b).

Various authors have described foraging area distribution in Australia. The species is most commonly reported from coastal waters in central eastern Australia (from the Sunshine Coast in southern Queensland to central NSW); south-east Australia (from Tasmania, Victoria and eastern South Australia) and in south-western Western Australia (Bone 1998; Hamann et al. 2006; Limpus & MacLachlan 1979). It is regularly seen in southern Australian waters (Bone 1998; Green 1971). Limited data from overseas indicates that Leatherback Turtles concentrate in areas where currents converge with steep bathymetric contours, presumably where food is more readily available (Eckert et al. 1989; Houghton et al. 2006). More detailed assessments of foraging area distribution for the species are needed.

The current area of occurrence is 6 006 685 km<sup>2</sup>. There is no data to indicate that there has been a decline in extent in the area of occurrence over the past three generations (Hamann et al. 2006) and there is no empirical data to indicate future changes in the extent of occurrence. However, changes to air and sea temperatures, sea level rise and other physical aspects that may change with global warming have the potential to alter the species occurrence (Hamann et al. 2007).

There is not enough data to separate occurrence from occupancy, there is no data to indicate that there has been a decline in the area of occupancy over the past three generations and there is no empirical data to indicate future changes in the extent of occupancy. However, changes to air and sea temperatures, sea level rise and other physical aspects that may change with global warming have the potential to alter the species occurrence (Hamann et al. 2007).

There are three former nesting sites in Queensland:

- Wreck Rock beach
- Moore Park Beach
- Mon Repos beach.

Three, or possibly four, Leatherback Turtle clutches were laid on beaches near Ballina, NSW (Tarvey 1993). One clutch was laid in Bootie National Park, south of Forster, NSW (Hamann et al 2006 ).

Nesting sites have been found at Cobourg Peninsula, Manangrida and Croker Island (Chatto 1998) in the Northern Territory though the only confirmed nesting of Leatherbacks during Chatto and Baker's (2008) survey between 1991 and 2004 was at Danger Point, Cobourg Peninsula.

Genetic data indicates that distinct genetic populations/stocks occur in the Indian, Pacific and Atlantic Oceans (Dutton et al. 1999).

Global Distribution	Top
Leatherback Turtles have a global tropical and temperate distribution. This species has an unusually wide latitudinal range as adults can withstand cold (10 °C) water. The Leatherback Turtle has been recorded north to Alaska and south to the Cape of Good Hope and occurs regularly in waters off New England, in the Bay of Biscay and off south-east Australia (Hamann et al. 2006). It is a highly pelagic species, venturing close to shore mainly during the nesting season, and is capable of diving to several hundred metres. Adults feed mainly on pelagic soft-bodied creatures such as jellyfish and tunicates, which occur in greatest concentrations at the surface in	

areas of upwelling or convergence. While the Leatherback Turtle has a global distribution, Spotila (2004) documents six main nesting colonies around the world in 2004:

- Western Atlantic, with 5995 nesting females per year out of female population size of 13 800
- Eastern Atlantic, with 4300 nesting females per year out of female population size of 9890
- Caribbean, with 1670 nesting females per year out of female population of 3840
- Indian Ocean, with 1140 nesting females per year out of female population of 3420
- East Pacific, with 240 nesting females per year out of female population of 940
- West Pacific, with 1052 nesting females per year out of female population of 4000.

It has not been established whether the Leatherback Turtles nesting in the Northern Territory are from the same genetic stock as those that nest in southern Indonesia (Sumatra), West Papua or Papua New Guinea. Regardless, only very small numbers of nests are laid per year in the Northern Territory and thus would only be a minor contributor to the global population (Hamann et al. 2006). No estimates of the numbers of Leatherback Turtles that forage in Australian waters are available (Hamann et al. 2006).

There is insufficient data to determine whether the Australian population is distinct, geographically separate or whether it moves in/out of Australia's jurisdiction. There has been only one tag recovery reported from an Australian foraging area which was a female tagged while nesting in Java, Indonesia which was recaptured from north-western Western Australia.

**Surveys Conducted**

**Top**

The areas of the Queensland coast where Leatherback Turtles nested in the past are monitored each year by Queensland's Parks and Wildlife Service (QPWS) for other sea turtle species (Hamann et al. 2006). These sites have been well surveyed and there is a strong likelihood that no Leatherback Turtles have nested in Queensland since 1996 (Hamann et al. 2006).

No ground-based tagging surveys have been conducted on Leatherback Turtles in the Northern Territory; all data comes from aerial surveys or opportunistic sightings of tracks (Chatto & Baker 2008; Hamann et al. 2006).

No surveys have been conducted on foraging Leatherback Turtles in Australia and fisheries bycatch data and opportunistic sightings provide the only distribution data for the species (Hamann et al. 2006).

**Population Information**

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The best available data for population size at a global level are the numbers of adult females that breed in particular years. In 1982 there were an estimated 115 000 adult female Leatherback Turtles in the world but in 1996 the estimate was 34 500 (Spotila et al. 1996). This estimate has been revised to 35 800 (Spotila 2004) in 2004. In the Eastern Pacific Ocean the Leatherback population was around 1690 adult females in 1999, down from 4638 in 1995 (Spotila et al. 2000). The most recent estimate (Spotila 2004) had this Eastern Pacific population down to around 1000. In the Western Pacific, Leatherback Turtles are effectively extinct in Malaysia (Hamann et al. 2006) and recently studied rookeries in Indonesia, Papua New Guinea and the Solomon Islands are believed to have high rates of mortality (Hamann et al. 2006; Spotila et al. 1996). In the Indian Ocean, the South African population is increasing and there is a lack of data from Sri Lanka, Andaman Islands and Western Indonesia (Hamann et al. 2006; Hughes 1996). The largest populations occur in the Atlantic Ocean and trends for these large populations are not obvious (Girondot & Fretey 1996; Spotila et al. 1996). Given the magnitude of the fisheries based impacts in the Pacific Ocean (Lewison et al. 2004) and the lack of quantitative mortality data in the Indian Ocean (Hamann et al. 2006) the likelihood of extinction of the Pacific Leatherback population is high (Spotila 2004).

In Australia the capture of Leatherback Turtles by the Queensland Shark Control program has declined which may indicate declining populations (Hamann et al. 2006). Limpus (2004) notes that a detailed summary of Leatherback Turtle mortality is being prepared for the Western Australian waters, however this is not yet completed.

Genetic data has indicated that there are several distinct genetic stocks for the species (Dutton et al. 1999). In the Indian Ocean, the South African/Mozambique rookeries form a distinct stock and no genetic analyses have been completed for rookeries in Sri Lanka, Andaman Islands, Thailand, Western Indonesia or northern Australia. There are two populations in the western Pacific Ocean: Malaysia, and West Papua, PNG and Solomon Islands (see Hamann et al 2006 for a review).

Under the IUCN Red List protocol, the main procedure for evaluating the status of sea turtles is through surveys of reproductive activity at nesting beaches. Decline in nesting of Leatherback Turtles has been documented to be much greater than 80% in most of the populations of the Pacific, which has been considered the species' major stronghold. In other areas of its range, the observed declines are not as severe, with some populations showing trends towards increasing or stable nesting activity (Sarti Martinez 2000). Analysis of published estimates of global population sizes (Spotila et al. 1996), suggest a reduction of over 70% for the global population of adult females in less than one generation. The populations in the Pacific Ocean, the species' stronghold until recently, have declined drastically in the last decade, with current annual nesting female mortalities estimated at around 30% (Sarti et. al. 1996; Spotila et al. 2000). In some areas of the Pacific Ocean and South East Asia, formerly abundant rookeries have almost disappeared. For the Atlantic Ocean, the available information demonstrates that the largest population is in the French Guyana but the

trends there are unclear. Some of the Caribbean and USA nesting populations appear to be increasing but data is unclear (Spotila et al. 1996). Data to predict future population(s) trends for the species in the Pacific include mortality associated with longline fishing which indicates a continued decline, with no evidence of rates of decline slowing. In the Indian Ocean and South-East Asian region fisheries-based mortality of Leatherback Turtles occurs in most countries and high predation of eggs by pigs, dogs or humans occurs in many rookeries (Hamann et al. 2006). As Lewison and colleagues (2004) describe, "Despite infrequent rates of encounter, our analyses show that more than 200 000 loggerheads and 50 000 leatherbacks were likely taken as pelagic longline bycatch in 2000. Our analyses suggest that thousands of these turtles die each year from long line gear in the Pacific Ocean alone. Given 80% declines for Pacific loggerhead and leatherback populations over the last 20 years, this bycatch level is not sustainable."

The species is not known to undergo extreme natural variations in population numbers. Cross breeding has not been recorded for the Leatherback Turtle.

**Land Tenure of Populations**

None of the current nesting locations in Australia are in reserves, however some are on Indigenous owned land in very remote parts of northern Australia.

**Habitat**

The Leatherback Turtles is a highly pelagic species, venturing close to shore mainly during the nesting season (Sarti Martinez 2000). Houghton and colleagues (2008) tracked deep (300-1250 m) and protracted dives (> 1 hour) by Leatherback Turtles in the North Atlantic. It is known from waters all around Australia (Robins et al. 2002) and can be found foraging year round in Australian waters (Limpus in Hamann et al. 2006) over Australian continental shelf waters. Adults feed mainly on pelagic soft-bodied creatures such as jellyfish and tunicates (Bone 1998; Cogger 1992), which occur in greatest concentrations at the surface in areas of upwelling or convergence. The regular appearance of Leatherback Turtles in cool temperate waters is probably due to the seasonal occurrence of large numbers of jellyfish. Leatherback Turtles require sandy beaches to nest, with some evidence that coarser sand is more conducive to successful hatching than finer sand (Limpus et al. 1984). Sand temperatures between 24-34 °C are needed for successful incubation (Limpus et al. 1984). Beaches free from light pollution are required to prevent disorientation, disturbance and to allow nesting females to come ashore. There is no information on post hatchling dispersal although it is presumed that, like other species (except Flatback Turtles), the hatchlings are dispersed by ocean currents. Juveniles through to adults reside in a variety of ocean and coastal habitats and span a large latitudinal range (Hamann et al. 2006). The species is not known to rely on a threatened ecological community. It would co-occupy marine and nesting beach habitat with other marine turtle species.

**Life Cycle**

The generation time for Leatherback Turtles is unknown though Sarti Martinez (2000) suggests that as the life-span of Leatherback Turtles is 30 years or more, then age to maturity plus one half of the reproductive life span (22 years) is a reasonable approximation of generation length (Sarti Martinez 2000). Natural mortality rates are unknown.

**Breeding**

Female Leatherback Turtles may lay four to five times per season (although this varies substantially between genetic stocks), each time depositing 60 to 120 eggs. About half the eggs in each clutch fail to develop or lack a yolk (Spotila et al. 1996). Leatherback Turtles produce 10-40 small egg-like structures at the end of each clutch of eggs; these "yolkless eggs" contain neither yolk nor embryo and are produced as a result of excess albumin production in the oviduct (Spotila 2004). Sex ratio of hatchlings is dependent on the temperature of the sand (Mrosovsky et al. 1984) although this has not been reported in Australia. A 50% ratio of male to females is produced when nest temperature is 29.5 °C (Spotila 2004). The incubation period is approximately 60 days. Leatherback Turtles appear to nest once every two or three years.

**Life Cycle**

Hatchlings weigh 45 g (Spotila 2004). Hatchlings move immediately to the sea and swim actively offshore (Lutz & Musick 1996) and live off the internalised yolk sac until they reach deep ocean waters (Limpus 2009). The fate of juvenile Leatherbacks after leaving the nesting beach is unknown (Lutz & Musick 1996) and there are very few records of Leatherback Turtles smaller than 110 cm in curved carapace length (CCL). Little is known of the movements or diet of juvenile Leatherback Turtles and Lutz and Musick (1996) suggest that juveniles effectively "disappear" for about four years. There are no data on the distribution and diet of post-hatchling Leatherback Turtles in the Australian region (Limpus et al. 1994 cited in Limpus 2009). Juvenile Leatherback Turtles may remain in tropical waters warmer than 26 °C, near the coast, until they exceed 100 cm in CCL (Sarti Martinez 2000). The estimate of age to sexual maturity for the species is unknown though Zug and Parham (1996 cited in Limpus 2009) estimate it to be 13-14 years of age. Adults are pelagic and live in the open ocean, sometimes in temperatures below 10 °C. There are very few sightings of males near the coast during the breeding season (Sarti Martinez 2000). The life-span of Leatherback Turtles is unknown. Only limited data exist on nesting Leatherback Turtles in Australia because of low numbers



row of white scutes which are lost as the turtle grows (Limpus & McLachlan 1979 cited in Limpus 2009).

**Nesting beaches** There are essentially three methods which can be used singly or in combination to monitor nesting populations - aerial track counts, beach based track counts and individual marking. Each method has associated error, costs, advantages and disadvantages. The specific methods used for nesting beach surveys for Leatherback Turtles will be site specific and depend on ease of access to the sites, cost of surveys, availability of staff/volunteers, and time of year. There are some clear gaps in our knowledge of Leatherback Turtle populations that future research and monitoring could address:

- Nesting beach-based population surveys and genetic identification of turtles nesting at the Northern Territory rookeries.
- Surveys of predation rates and hatchling production.
- Experimental and/or comparative studies that address the impacts of climate change on the behaviour, survival, physiology and reproductive biology of hatchling and adult turtles.
- Foraging studies

There are large gaps in the knowledge of Leatherback Turtle biology outside of the nesting beaches.

**Threats**

Due to the low incidence of Leatherback Turtle nesting on Australian beaches, and their pelagic foraging habits, a number of threats faced by other marine turtles, such as coastal infrastructure and development, feral animal predation and indigenous harvest are not significant threats to those Leatherback Turtles in Australian waters. Elsewhere in the world, commercial egg harvest, harvest for meat or inappropriate coastal development are significant threats, such as in the Malaysian rookeries where there has been a well-documented decline from approximately 5000 nests per year in the 1960s down to less than 10 nests per year in the 2000s (Hamann et al. 2006). The main threats faced by Leatherback Turtles in Australia arise from accidental catch or entanglement in commercial fishing operations (Hamann et al. 2006).

**Fishing - commercial and recreational**

While commercial harvest of turtles in Australia is no longer allowed, death or injury to turtles as a result of incidental capture (or bycatch) is a threat. Longline fishing and set crab pots are the two types of fishing activity that kill or injure Leatherback Turtles.

**Longline and Pot Fishing**

Leatherback Turtles are mostly reported as entangled in fishing line or externally hooked in the shoulder or flipper (Beverley 2004). Based on logbook records kept between 1997 to 2001, Robins and colleagues (2002) estimated that the Eastern Tuna and Billfish Fishery and the Southern and Western Tuna and Billfish Fishery may incidentally catch around 400 marine turtles each year. They estimate that over 60% of these caught are Leatherback Turtles. Mortality rates for Leatherback Turtles caught in Australian longline fisheries are unknown but are expected to be relatively low (Robins et al. 2002). Mortality rates for this bycatch have been estimated to be between 4% (Beverly & Chapman 2007; Lewison et al. 2004). Based on these figures, around 10 to 40 Leatherback Turtles may die through longline fishery operations in Australian waters annually (TSSC 2008a). Logbook figures (AFMA 2009) document that the Eastern Tuna and Billfish Fishery and the Western Tuna and Billfish Fishery caught 14 Leatherback Turtles with one death, while during this same period the Torres Strait Fisheries caught two Leatherback Turtles. Varying levels of fishing effort between years will influence levels of bycatch. While capture and mortality in Australia is relatively low (Robins et al. 2002), an estimated 50 000 Leatherback Turtles globally and 20 000 in the Pacific were caught in 2000 as bycatch by pelagic longliners (Lewison et al. 2004).

Turtles can be hooked on the front and hind flippers, head, mouth, neck and carapace or get entangled in either the monofilament, mainline or balldrop/buoy line. In pot fisheries, turtles may become entangled in the float lines or enter pot traps and drown (DEWHA in prep.). In the southern Queensland crab fisheries, there were an estimated 0.14 deaths/year from entanglement in crab lines between 1990-2003 (Hamann et al. 2006). Lobster fisheries in Tasmania, Victoria, South Australian and south-west Western Australia pose a threat to Leatherback Turtles, which can become entangled in the floatlines of the traps. A Tasmanian study indicates that 75% of Leatherback Turtles entangled in lobster pot lines are released alive, although post release survival rates are unknown (Bone 1998). Limpus (2009) observes that entanglement in buoy lines to rock lobster pots may be the most significant cause of death from human related activities for the species in Australian continental shelf waters.

**Trawling**

Hundreds of marine turtles used to be killed annually in trawling activities in northern Australia (EA 2003a) prior to the introduction of Turtle Excluder Devices (TEDs), though Hamann and colleagues (2006) report that Leatherback Turtles were rarely caught in trawling activities, with less than one death of Leatherback Turtles per year between the 1970s to the 1990s. Since the introduction of TEDs in the Northern Prawn Fishery in 2000, there has been no record of Leatherback Turtles caught at all (Perdrau & Garvey 2005).

**Gill nets**

Marine turtles may also become entangled in nets set for inshore fish species, such as barramundi and shark (DEWHA in prep.). While there have been no known occurrences of accidental catches in gillnet fisheries in recent years, the northern Australian barramundi gillnet fishery historically recorded a low rate of less than one Leatherback death per year while the tuna driftnet fisheries in southern Australia probably had an appreciable impact in previous years, though no records are available (Hamann et

al. 2006). Records from Queensland's Shark Control Program indicate that shark control nets represent a relatively small threat, with around 0.25 deaths/year from entanglement in shark control nets between 1996\u00962003 (Hamann et al 2006).

**Ghost Nets**  
While ghost nets (lost and discarded fishing nets) pose a serious threat to marine turtles as they float in the ocean and coastal waters and indiscriminately capture marine animals (DEWHA in prep.), this threat is not well quantified for Leatherback Turtles (Hamann et al. 2006). A dead 2 m Leatherback Turtle was washed ashore in South Australia in early 2009, having been entangled in netting (The Border Watch 2009)

**Coastal Infrastructure and Development**  
Coastal developments, including residential, industrial and tourism development, can directly destroy or degrade beach habitats used as nesting sites. Given the low incidence of nesting on Australian beaches by Leatherback Turtles, this threat is considered to be relatively low within Australia.

**Light Pollution**  
Light pollution on nesting beaches alters nocturnal behaviors in sea turtles, including; how sea turtles choose nesting sites; how they return to the sea after nesting; and how hatchlings find the sea after emerging from their nests (Witherington & Martin 1996). Given the low incidence of nesting on Australian beaches by Leatherback Turtles, this threat is considered to be low.

**Boat Strike**  
Fast moving boats have the potential to cause marine turtle injury or death (DEWHA in prep.) though in Queensland boat strike caused 0.07 deaths/year between 1990\u00962003 (Hamann et al. 2006).

**Marine Debris**  
Death can occur when turtles become entangled in, or ingest, marine debris. Carr (1987 cited in DEWHA in prep.) records that fishing line, rope and cord fragments, styrofoam beads, tar balls, plastic bags and balloons are all known to have killed marine turtles through ingestion or entanglement. Because Leatherback Turtles consume large quantities of jellyfish, some researchers propose that they are more likely to ingest plastic debris mistakenly. Mrosovsky and colleagues (2009) examined the autopsy records of 408 Leatherback Turtles, spanning 123 years (1885\u00962007), for the presence or absence of plastic in the digestive tract. Plastic was reported in 34% of these cases. The first mention of plastic in the gut was made in 1968. Hamann and colleagues (2006) record that in Queensland there were 0.07 deaths of Leatherback Turtles per year between 1990\u00962003 through ingestion of marine debris. They note a rapid increase in the incidence of ingestion of plastic from the late 1960s to the 1980s with levelling off after that.

**Indigenous Harvest**  
Marine turtles are economically and culturally significant to Indigenous Australians (Aboriginal and Torres Strait Islanders) (DEWHA in prep.). In a summary of threats to Leatherback Turtles by Hamann and colleagues (2006), indigenous harvest for meat was not listed as a threat.

**Animal Predation**  
Goannas destroy a significant number of nests in northern Australia: in Fog Bay and Cobourg Peninsula, Northern Territory, 52% (Blamires 1999) and 58% (Hope & Smit 1998) of all nests were raided by goannas. Pigs destroy up to 90% of the nests on western Cape York (Limpus et al. 1993). Foxes and dogs destroy hundreds of nests in eastern Queensland (EA 2003ai). Chatto and Baker (2008) record that around 8% of all nestings recorded in the Northern Territory between 1994\u00962004 were disturbed by goannas (over 500 nests), dogs (over 400 nests) or other unknown predators (nearly 300 nests). No predation of eggs or nesting female Leatherback Turtles has been recorded in Australia (Hamann et al. 2006)

**Seismic Survey**  
While seismic surveys, which produce noise pollution in the water, are unlikely to cause the death of turtles, they may impact on the foraging, inter-nesting, courting or mating behaviour of turtles. McCauley and colleagues (2000, cited in Limpus 2007) document the circumstances in which turtles will change behaviour as a result of seismic surveys and recommend the timing and location of seismic surveys take into account time and place specific activities of turtles. Hamann and colleagues (2006) do not list seismic survey as a threat to Leatherback Turtles.

**Human Interactions with Turtles Outside Australia's Jurisdiction**  
As marine turtles are migratory, threats to turtles, originating in other countries (such as nesting beach degradation, tourism, fishing and pollution of foraging areas) may result in population decline in species nesting or foraging in Australia. A comprehensive review of threats to Leatherback Turtles in territories outside Australia is provided in the Assessment of the conservation status of the leatherback turtle in the Indian Ocean and South-East Asia report (Hamann et al. 2006) prepared under the Indian Ocean-South-East Asian Marine Turtle Memorandum of Understanding. Some of the key threats include egg harvest (both legal and illegal), disruptive coastal infrastructure construction, bycatch and egg predation. Subsistence hunting of Leatherback Turtles occurs in Kei, Indonesia and Papua New Guinea (Hamann et al. 2006).

**Climate Change and Extreme Events**  
Changing temperatures and weather patterns associated with climate change are likely to have both direct physiological impacts on marine turtles, as well as indirect effects through impacts on critical turtle habitats (DEWHA in prep.). The sex of marine turtle hatchlings is determined by the incubation temperature of the eggs, with warmer incubation temperatures leading to the production of female hatchlings and cooler incubation temperatures leading to production of male hatchlings. Climate change may alter the temperature of nesting beaches, thereby affecting the male/female ratio. Cyclones and associated storm surges are aperiodic events that can alter hatchling production in particular seasons by washing away

and/or inundating clutches or create erosion banks so females cannot emerge to nest (Hamann et al. 2007). Wetter than average years can drop sand temperatures and increase the percentage of male hatchlings. Warmer than average years can increase sand temperatures and increase the percentage of females. There was considerable concern about the impact that the December 2004 tsunami had on the two key nesting areas for the Leatherback Turtle - India (Andaman and Nicobar Islands) and Sri Lanka (Hamann et al. 2006).

Threat Abatement and Recovery  
National Recovery Plan  
The Recovery Plan for Marine Turtles in Australia (EA 2003ai) outlines actions for the protection, conservation and management of the six marine turtles listed under the EPBC Act, including the Leatherback Turtle. This Plan is currently under review (DEH 2005a).

Fishing  
Both Commonwealth and State governments manage fisheries in Australia and each are subject to a mix of legislative, regulatory and policy instruments that contribute to reducing the threat that bycatch poses to marine turtles (EA 2003ai). The Australian Fisheries Management Authority (AFMA) shares responsibility for managing some fisheries with the states and Northern Territory, though in general states and the Northern Territory manage inshore species, such as rock lobster and abalone, whereas AFMA generally manages deeper water finfish and tuna species. AFMA is the Commonwealth agency responsible for implementing the Fisheries Management Act 1991 (FMA) and managing Commonwealth fisheries. The EPBC Act broadly requires that actions taken when fishing do not have a significant impact on the Commonwealth marine environment and its biodiversity, including protected species such as marine turtles. All Commonwealth fisheries have to be assessed and accredited under Part 13 and 13A of the EPBC Act. Other more specific actions are controlled through recovery plans, wildlife conservation plans and threat abatement plans made under the EPBC Act as a result of a protected species listing or type of fishing activity being listed. For instance, Incidental catch (bycatch) of Sea Turtle during coastal otter-trawling operations within Australian waters north of 28° South (TSSC 2001x) was listed as a key threatening process in 2001 under the EPBC Act and harmful marine debris was also listed as a key threatening process in 2003.

Relevant Commonwealth policies and programs include the Guidelines for the Ecologically Sustainable Management of Fisheries 2007 (DEWR 2007) and AFMA's Bycatch and Discarding Program. The Australian Government released the Commonwealth Policy on Fisheries Bycatch in 2000 to guide Commonwealth fisheries in the pursuit of legislative objectives relating to non-target species and the broader marine environment. The key tool used to pursue bycatch minimisation under the Commonwealth bycatch policy is the requirement for each fishery to implement a Bycatch Action Plan (BAP). AFMA (2008) established a Bycatch and Discarding Implementation Strategy (AFMA 2008) to provide additional resources and direction for pursuing policy and legislative objectives in relation to bycatch and discarding.

To assist in the management and mitigation of bycatch in longline fleets a DVD called "Crossing the Line" has been produced by "Hatchling Productions" and the Australian Government's Fisheries Research and Development Corporation (Belldi & Hatchlings Productions 2005) and provided to the Australian longline fleet. Research into mitigation of bycatch in the longline fisheries in Australia has been undertaken and includes design and testing of numerous modifications to longline practices, including deep setting of lines (Beverly 2004) and the use of circle hooks (Ward et al. 2008) as well as education of fishers.

Bycatch of Leatherback Turtles in lobster fisheries of southern Australia is not well understood and research into spatial and temporal trends of capture events and demographic and genetic profiles of caught animals is required.

Bycatch Action Plans (BAP)  
The Australian Tuna and Billfish Longline Fisheries Bycatch and Discarding Workplan (AFMA 2008a) addresses the minimisation and management of interactions with marine turtles; six monthly reports detail progress of implementation of the workplan. For instance the Eastern Tuna and Billfish implementation plan reports that arrangements are being developed for turtle releasing devices to be placed on board all their vessels and research is under way to assess circle hooks to reduce turtle impacts.

State governments are also responsible for managing a large number of commercial fisheries and each state has its own range of legislative, regulatory or policy instruments that serve to reduce bycatch of marine turtles.

Ghost nets  
There is a substantial network of communities working together to remove ghost nets from beaches, quantify its impact and reduce turtle mortality (Ghost Nets). A comprehensive assessment of the nature and impact of marine debris was made in 2003 (Kiesling 2003). This study detailed 25 activities that could be implemented to help reduce the volume and impact of marine debris, including in matters of research and monitoring, communication, education and outreach, incentives, regulation and technical advances. A key advance in the monitoring of ghost nets was the release of the tool "The Net Kit: A Fishing Net Identification Kit for Northern Australia" by the World Wildlife Fund in 2002 (with support from the Natural Heritage Trust) (White 2006).

While the majority of nets found in the Gulf of Carpentaria are of foreign origin, a pilot study to model drift and circulation patterns (Griffin 2008) found no evidence that nets stranding on the shores of Arnhem Land and Gulf of Carpentaria were likely to have been lost or discarded in

south-east Asian waters further away than the Arafura Sea. Instead, modelling indicated that marine debris passing through Torres Strait was likely to come close to the Arnhem Land coastline, or enter the Gulf of Carpentaria, where it might strand in the Cape Arnhem-Groote Eylandt region in the Dry Season, or in the Weipa region during the Wet Season (Griffin 2008). Understanding where marine debris is coming from is an important prerequisite for management of the threat that marine debris poses to Leatherback and other turtles.

[Mitigation Approach](#)

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AFMA and Fisheries Research and Development Corporation are providing funding assistance for a research project to test the efficacy of the the smart hook system in tuna longline fisheries to reduce accidental injury to seabirds and marine turtles (AFMA 2008b). The mitigation measure has been developed by a modification to any tuna longline hook, allowing a shield to be attached after the hook has been baited. The shield disarms the hook, increases the sink rate and prevents ingestion of the baited hook. Technology used to hold the shield in place releases once it is below the feeding range of the seabirds and marine turtles, providing a normal baited hook. Preliminary results are promising (AFMA 2008b).

[Marine Bioregional Plans](#)

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Marine bioregional plans have been developed for four of Australia's marine regions - South-west, North-west, North and Temperate East. Marine Bioregional Plans will help improve the way decisions are made under the EPBC Act, particularly in relation to the protection of marine biodiversity and the sustainable use of our oceans and their resources by our marine-based industries. Marine Bioregional Plans improve our understanding of Australia's oceans by presenting a consolidated picture of the biophysical characteristics and diversity of marine life. They describe the marine environment and conservation values of each marine region, set out broad biodiversity objectives, identify regional priorities and outline strategies and actions to address these priorities. [Click here for more information about marine bioregional plans.](#)

The leatherback turtle has been identified as a conservation value in the South-west (DSEWPaC 2012z), North-west (DSEWPaC 2012y), North (DSEWPaC 2012x) and Temperate East (DSEWPaC 2012aa) marine regions. See Schedule 2 of the North Marine Bioregional Plan (DSEWPaC 2012x) for regional advice. Maps of Biologically Important Areas have been identified for leatherback turtle in the North (DSEWPaC 2012x) Marine Region and may provide additional relevant information. Go to the conservation values atlas to view the locations of these Biologically Important Areas. The "species group report card - marine reptiles" for the South-west (DSEWPaC 2012z), North-west (DSEWPaC 2012y), North (DSEWPaC 2012x) and Temperate East (DSEWPaC 2012aa) marine regions provide additional information.

[Major Studies](#)

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Following on from Robins study in 2002 (Robins 2002), more recent analysis of marine turtle mitigation in Australia's pelagic longline fisheries has been released (Robins et al. 2007).

[Management Documentation](#)

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Management documents include:

- Marine turtle recovery plan (EA 2003ai) (under review as of June 2008)
- Australian Tuna and Billfish Longline Fisheries Bycatch and Discarding Workplan November 1 2008 to October 31 2010 (AFMA 2008a)
- Threat Abatement Plan for the impacts of marine debris on vertebrate marine life (DEWHA 2009t)
- Commonwealth Conservation Advice on Dermochelys coriacea (TSS 2008aer).
- North West Marine Bioregional Plan Bioregional Profile (DEWHA 2008b).
- North Marine Bioregional Plan Bioregional Profile (DEWHA 2008).

An issues paper on protection of sea turtles is in preparation (DEWHA in prep.). In addition, fisheries, both Commonwealth and State managed, are guided by bycatch action plans and ecological assessment processes.

[Species Profile References](#)

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