



MARINE TURTLES

Information Sheet 1

INTRODUCTION TO MARINE TURTLES

1. WHAT ARE MARINE TURTLES?

Marine turtles are large reptiles that inhabit the tropical and subtropical seas throughout the world. They have inhabited the oceans for over 100 million years and are believed to have evolved from an ancient lineage of terrestrial reptiles that developed paddle-like limbs as they adapted to life in the sea. They are highly migratory and travel vast expanses of oceans between feeding and breeding grounds.

2. MARINE TURTLE SPECIES

There are 7 known marine turtle species worldwide. These are the Hawksbill turtle (*Eretmochelys imbricata*), Green turtle (*Chelonia mydas*), Kemp's Ridley turtle (*Lepidochelys kempi*), Olive Ridley turtle (*Lepidochelys olivacea*), Loggerhead turtle (*Caretta caretta*), Flatback turtle (*Chelonia depressa*) and the Leatherback turtle (*Dermochelys coriacea*). The Hawksbill turtle, *Eretmochelys imbricata* and Green turtle, *Chelonia mydas* are native to Samoa. The Leatherback turtle (*Dermochelys coriacea*) is rare and is occasionally caught in offshore fishing operations.

3. GENERAL BIOLOGY OF MARINE TURTLES

3.1. Physical features

As reptiles, marine turtles are cold-blooded, breathe air and have scaly skins. They vary in shape, size and colour and possess a bony outer shell which is mainly for protection. The shell covers both the dorsal (back) and ventral (belly) surfaces and is considered the most highly developed protective armour. The dorsal portion of the shell is known as the carapace and is covered with large scale-like structures called scutes. The ventral portion of the shell is known as the plastron. The carapace and plastron are connected at the sides by hard-shelled plates known as lateral bridges. The arrangement and number of scutes can be used to differentiate the different species. Openings exist between the carapace and plastron for the head, tail, and limbs.

Turtles lack teeth but have modified beak-like jaws adapted to their specific diets. They have two pairs of flippers to propel and steer themselves in the water. These are also used by females as limbs to crawl back on land and dig/cover nests during the nesting periods.

Difference between a female and a male turtle

Generally, a female turtle possesses a slightly convex bottom shell and a short tail. A male has a concave stomach and usually have longer nails and a longer, thicker tail that extends well beyond the tip of the carapace. Sex determination can be made easier from comparing the sides of the animal.

3.2 Growth & Development

Marine turtles' life cycle

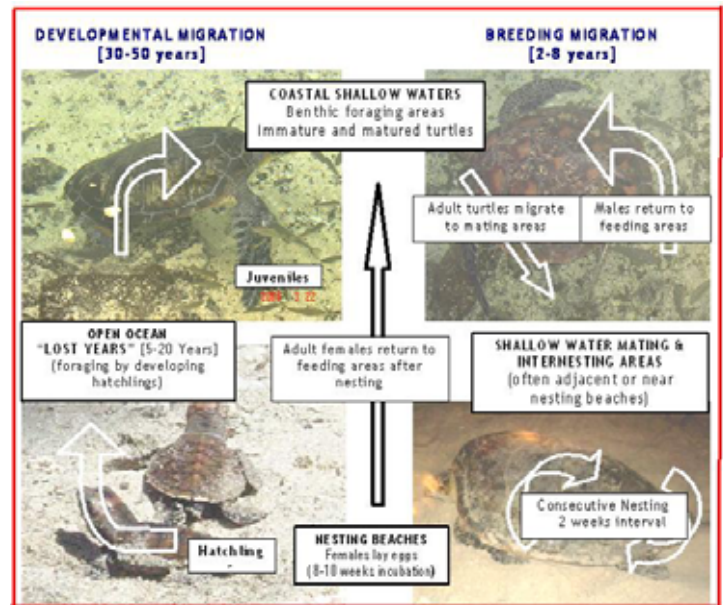


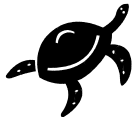
Figure 1: General life-cycle of marine turtles

Marine turtles start off as hatchlings weighing less than 0.5 ounce and having a carapace length of 1 to 1.5 inches. At sexual maturity a female turtle typically weighs around 130 pounds, with a carapace length averaging 2.5 feet long.

Marine turtles begin their life cycle on land. During the nesting season, breeding females emerge out of the sea and find suitable nesting sites on the beaches. Using their flippers they dig a tunnel called the 'egg chamber' in which they deposit their eggs [usually around 120] and cover them with sand until they hatch. Eggs incubate in the sand for about 7-12 weeks before hatching. Hatchlings usually dig themselves out of the nest during the night when it is cool, and make their way towards the sea. Upon reaching the water, hatchlings adjust to swimming and breathing as they move across the reef to the deeper waters where they spend a number of their early years (about 20 years also known as the 'lost years') floating with the seaweed carried around by the ocean currents. After 30-50 years, they develop into sub-adults and move to feeding zones in the shallow waters. This is where they complete their development into matured adults, capable of reproducing.

3.3. Reproduction

Adult males and females during the breeding season migrate from feeding grounds and undergo mating in areas near nesting beaches. During this stage a



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female turtle can mate with more than one male turtle. After mating, adult males return to foraging grounds while females wait in the shallow waters adjacent to nesting beaches. Nesting occurs approximately 4 weeks after successful copulation. After a female lays eggs, she moves to nearby areas but after 2 weeks returns to the same beach to lay a second clutch. Female turtles can lay more than one clutch of eggs in a season, but do not nest every year. After the nesting season (normally from October to June), females return to foraging areas and will not nest again for about 2-8 years. Hatching occurs after 7-12 weeks of incubation and the cycle begins again.

Sand temperature inside the nest plays a significant role in determining the sex of hatchlings. Cool sand temperatures produce mainly male hatchlings after a long incubation period, while warm sand temperatures result in more females after a shorter incubation time.

3.4. Feeding

Jaws of marine turtles have been modified according to their various diets and feeding behaviours. Those with powerful jaws for crushing and grinding food feed on tough shelled shellfish and crustaceans like clams, mussels and crabs. Species with very delicate scissor-like jaws feed almost exclusively on jellyfish and other soft bodied organisms. Carnivorous species (e.g. flat back turtle) feed mainly on soft-bodied organisms such as sea cucumbers, jellyfish and sometimes prawns and soft corals.

3.5. Habitats

Hatchlings inhabit the masses of floating seaweeds that drift with the ocean currents. Sub-adults and matured turtles [with the exception of the Leatherback species] enter shallow coastal waters and live around feeding areas. Some species are usually found in seagrass pastures while others inhabit the reefs and the offshore waters.

4. SOCIAL AND ECONOMIC VALUES OF MARINE TURTLES

Turtles have been exploited for centuries for their eggs, shell and meat which have been a source of food and income. The body parts of some species have been/or are sources of fuel oil, cosmetics, medicines and leather (Hirth, 1993:329). The scutes of hawksbill turtles are carved into trinkets and used in the international trade. Some hatchlings and juveniles are stuffed and sold to tourists.

In Samoa, turtles have been an important part in the traditional way of life, featuring in legends, myths and songs. In the past, turtles were considered sacred (i'a

sa) and were only hunted for special traditional ceremonies such as important *matai* title bestowments and weddings.

5. FACTORS AFFECTING SURVIVAL OF MARINE TURTLES

5.1. Human activities

- **Exploitation**

Worldwide, the advent of the modern technologies such as spearguns, motor boats and SCUBA has facilitated the hunting of turtles. Eggs and juveniles are usually taken from the nesting beaches.

- **Habitat Destruction/Degradation**

The destruction of important nesting and feeding grounds has been a major threat to marine turtles let alone other marine organisms. Erosion from land-based activities smothers seagrass pastures and coral reefs which are home to many species. Coastal and on-shore developments, removal of sand and clearance of vegetation destroy the beaches which are very suitable nesting grounds for turtles. Since turtles use natural light sources (moon and stars) from the surrounding to navigate their way to and from the sea, the artificial lighting from beachfront properties often disorient nesting females approaching land as well as hatchlings emerging from their nests. In addition, the disposal into rivers and the sea of non-biodegradable products, toxic substances, disregarded fishing nets and other garbage is another common reason for turtle mortality.

These, when ingested by a turtle, can block its digestive system, leading to the eventual death of the animal. Turtles also get poisoned when they ingest poisonous materials. In Samoa, all turtle nesting beaches show signs of degradation mainly as a result of the growing settlement of people on coastal areas.

- **Incidental by-catch**

The expansion of fishing operations such as long lining, drift-net and trawling has resulted in mass turtle mortality in the past decades. Turtles make up part of the by-catch during these fishing operations and most die before they are released successfully. Marine turtles can stay submerged for a long time but this is otherwise when they struggle to free themselves when snared in fishing nets and lines.

5.2. Natural predation

Natural predation occurs at all stages of a marine turtle's life. Eggs and hatchlings while on land are predated upon by crabs, lizards, birds, and feral animals like dogs and pigs. Hatchlings while drifting along the ocean currents are heavily predated upon by



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fish, sharks and birds. The adult turtles are taken by sharks, killer whales and other carnivorous sea animals.

5.3. Turtle diseases

Fibropapilloma tumour is a newly discovered disease which affects the survival of turtles. This disease has infected large numbers of turtles in discrete locations. Although the disease needs to be studied, it is known to be wart-like with tumours developing over the eyes as well as in internal organs. This generally renders the species susceptible to other viruses, breakdown in internal systems and eventual death. In addition, fungal infestations is said to be very detrimental to developing eggs in *arribada*-type nestings (Hirth, 1993:338).

6. POPULATION STATUS AND PROTECTION

After a long history of exploitation now exacerbated by growing human population, the trend towards a global market economy, and the lack of long range conservation strategies, all marine turtle species are now categorized in IUCN's Red List of threatened species as 'Critically Endangered', 'Endangered' or 'Vulnerable.' Critically endangered turtles include the hawksbill turtle, Kemp's Ridley and Leatherback. The Loggerhead, Olive Ridley and Green turtle are listed as Endangered. Similarly, all marine turtle species are also listed in Appendix 1 of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [CITES]. If international trade of these species are not eliminated then they may become extinct. All marine turtles are also protected under the Convention on Migratory Species [CMS].

In Samoa, turtle numbers have slumped in the past decades and are still declining. A combination of factors such as the loss of traditional values, unregulated harvesting of adults and eggs, habitats degradation and mortalities through incidental capture in fishing gear, has accelerated this decline.

7. WHY PROTECT/CONSERVE MARINE TURTLES

Marine turtles form a part of the diversity of marine fauna resources that contribute to the socio-economic livelihood of people. Ecologically, they are important to the marine ecosystems such as coral reefs and seagrass beds. They feed on seagrass beds thus maintaining the health of these marine plants. Turtles also help maintain the health of coral reefs by eating sponges and soft corals that grow over and compete with corals for sunlight and space.

The conservation and protection of turtle populations requires more than strongly focused national programmes. Marine turtles are a shared resource, and their management requires cooperation at the national, regional and global levels.

8. CURRENT EFFORTS FOR THE PROTECTION OF MARINE TURTLES

8.1. International protection

Marine turtles are currently protected under the following conventions:

- CITES [prohibits the trade of marine turtles especially the shell (used to make jewelry, eyeglass frames and ornaments) and small leather goods. It also prohibits the trans-boundary movement of turtles and/or their products from and into a country].
- CMS (contains provision for the protection and conservation of migratory species such as marine turtles. Important marine habitats utilized by marine turtles are protected by CMS.

8.1. National protection

- In Samoa, the disturbance of turtles, their nests and eggs are prohibited under the Fisheries Act 1988 and the Fisheries Regulations 1996;
- Previous studies have indicated a decline in marine turtle population. Thus marine turtles are identified as species requiring conservation efforts in Samoa. The MNREM developed a Marine Wildlife Protection Regulations 2005 (yet to be approved by Cabinet) under which turtles are seriously considered. The Regulations prohibit hunting, injuring or harassing of marine turtles. Additionally, it also prohibits holding turtles in captivity for eco-tourism or research purposes without first obtaining a permit/license from MNREM.
- Part VIII of the Lands and Environment Act 1989 contains provisions for the conservation of the environment and natural resources which in general, includes turtles. The Division of Environment and Conservation has embarked on promoting turtle protection and conservation in Samoa, through identifying research, management and enforcement needs.



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9. HOW YOU CAN HELP SAVE THE MARINE TURTLES

You can help protect marine turtles by:

- Reporting turtle tracks, nesting activities, turtles basking on land, or injured or dead marine turtles.
- Avoiding walking through sand dunes and nesting beaches especially during the nesting seasons as this disturbs nests and can cause dune erosion, etc.
- Do not disturb nesting turtles when they come up to nest.
- Complying with the Regulations regarding turtles at all times.
- Support local sea turtle conservation initiatives.
 - Do not discard old fishing lines/nets, plastic and other non-biodegradable rubbish on beaches or into the sea.
 - Do not buy or sell any turtle products
 - Release turtles caught in fishing lines/nets and do not keep them in captivity.
 - Keep a good lookout for turtles while boating to avoid injuries to them, especially in shallow waters. Boat strikes can kill.
 - Never try to spear, harass, catch or ride turtles.
 - Leave breeding female turtles alone.
 - Leave hatchlings crawling into the sea alone.
 - Avoid using turtle nesting beaches for activities such as camping and barbeques.
 - Help control access of pigs and dogs to nesting beaches as they can endanger eggs and hatchlings.
 - Avoid sources of light or campfires near turtle nesting beaches.
 - If you find a turtle, record the tag number and where and when you saw the turtle or if the turtle you find is dead, please call, return or send the tag to the address below.

REFERENCES

- Bell, L.A.J. and A. Mulipola. 1995. Western Samoa Fisheries Resources Profile. Apia, Samoa.
- Hirth, H. F. 1993. Marine Turtles In: Wright, A. & L. Hill (eds): Nearshore Marine Resources of the South Pacific: Information for Fisheries Development and Management. ISP, Suva., FFA, Honiara., ICOD, Canada. p. 329-370.