

# **Information Manual**

## **Bare Sand Island Sea Turtle Research**



**Northern Territory University**

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**CONTENTS**

Note this is an old out dated document. Check the Things to bring on the Volunteering page for the latest information. MLG 2015

**CONTENTS** ..... 1

**1. BARE SAND ISLAND** ..... 2

    1.1 GETTING THERE ..... 2

    1.2 ENVIRONMENT..... 2

**2. RESEARCH PROJECT** ..... 3

    1.3 RESEARCH ACTIVITIES ..... 3

        1.3.1 *Nesting Turtles* ..... 3

        1.3.2 *Foraging Turtles* ..... 3

        1.3.3 *Examples of Typical Days* ..... 3

    1.4 OTHER DUTIES..... 3

**3. CAMP CONDITIONS** ..... 4

    1.5 FOOD..... 4

    1.6 WATER..... 4

    1.7 RUBBISH ..... 4

    1.8 SLEEPING ..... 4

    1.9 PERSONAL EQUIPMENT ..... 4

    1.10 BATHING..... 4

    1.11 TOILET FACILITIES ..... 4

    1.12 SHADE..... 4

    1.13 COMFORT..... 4

    1.14 RECREATIONAL TIME ..... 5

**4. SAFETY AND WELL BEING** ..... 6

    1.15 FIRST-AID..... 6

    1.16 SUNBURN ..... 6

    1.17 DEHYDRATION..... 6

    1.18 SEA SICKNESS..... 6

    1.19 FOOTWARE ..... 6

    1.20 SATELLITE PHONE / SAFETY BARREL ..... 6

    1.21 CROCODILES ..... 6

    1.22 TURTLES ..... 6

    1.23 LIFTING ..... 6

    1.24 BOATING..... 6

**5. MISCELLANEOUS** ..... 7

    1.25 FISHING..... 7

    1.26 CAMERAS AND ELECTRONICS ..... 7

    1.27 OTHER VISITORS TO THE ISLAND ..... 7

**6. THINGS TO BRING – SUMMARY** ..... 7

**7. PHOTO PAGE**..... 8

**8. SEA TURTLE INFORMATION**..... 9

## 1. BARE SAND ISLAND

Bare Sand Island is located about 50km west of Darwin. It is the second northern most island in a chain of 15 islands that extend 15 km from the mainland. See Map.

### 1.1 Getting There

The research trip leaves from Darwin by chartered vessel. It is 3 to 4 hr trip to Bare Sand Island.

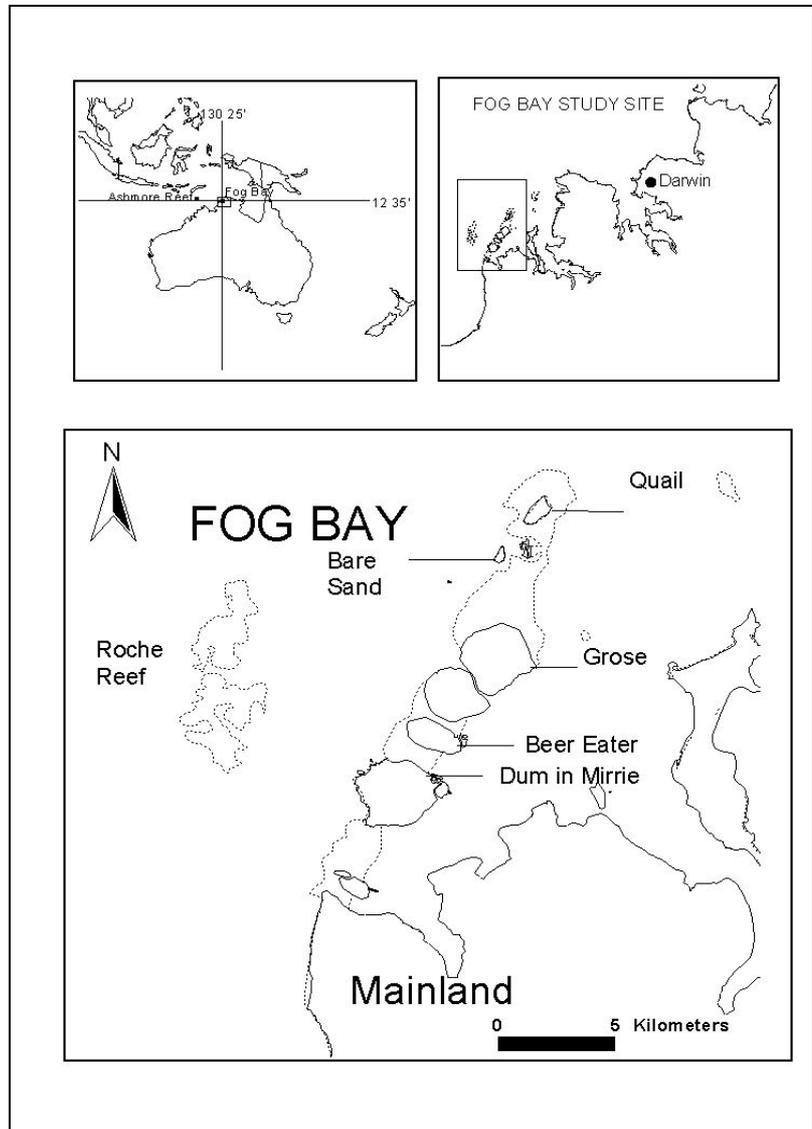
### 1.2 Environment

Bare Sand Island, like the name suggests is mostly sand. It consists of low dunes covered with sparse grasses and herbs. Two trees occur on the island but only one is suitable for shade. The island is 1.8 km in circumference and takes about 40 min to walk around.

The region is subject to a large tidal range (up to 8 m ) and therefore the island is subject to strong currents.

Strong winds can occur in the area and this makes camping uncomfortable in the sandy conditions.

The nearest settlement is a house on Dum in Mirrie Island (over 10 km away). Other wise the research camping a fairly isolated with the next community over 20 km to the south



## 2. RESEARCH PROJECT

The Bare Sand Island Sea Turtle Research Project has been running since 1996. It began as a small project but has become one of the longest running studies of its type in northern Australia. It has minimal funding and most of the equipment and logistics are kept simple.

### 1.3 Research Activities

#### 1.3.1 Nesting Turtles

The flatback turtle (*Natator depressa*) is the common nesting turtle on Bare Sand Island, although the olive ridley (*Lepidochelys olivacea*) does lay one or two nests each year. Volunteers will help with nesting research during the night. Duties will include:

- Patrolling the beach at night for nesting turtles
- Tagging
- Measuring
- Monitoring nesting success and hatching success
- Help with nest studies

Approximately 4 hours per night.

#### 1.3.2 Foraging Turtles

Green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtles forage in large numbers on the rocky reefs in the region around Bare Sand Island. During the research trip we will catch both species using nets and by hand. Three people will have an opportunity to help with the catching each day. The turtles will be brought back to shore and everybody will be trained in tagging, measuring, weighing and data recording. Duties will include:

- Helping with catching turtles (Optional)
- Tagging
- Measuring
- Collecting samples

Approximately 3 hours catching each day (2-3 different people each day).

Approximately 1 hour tagging and measuring

#### 1.3.3 Examples of Typical Days

High Tide at 600am and 600pm – At 800am two volunteers would accompany the researcher in the boat and set a net to catch turtles swimming off the reef with the falling tide. They would be brought back to shore at 1030am and the tagging, measuring and weighing of the turtles would last until 1200pm. Depending on conditions, another two volunteers would accompany the researcher

in the boat at 3pm to catch turtles foraging on the incoming tide. These would be brought back to shore and tagging, measuring and weighing would take until 600pm. In the meantime the evening meal has been prepared and a group of volunteers are ready to monitor the beach for early nesters on the high tide. Everyone has finished work by 1000pm. Those not catching during the morning or afternoon get to catch up on rest.

High tide at Midday and Midnight - 900am Two volunteers accompany the researcher to catch turtles on the incoming tide. Turtles are brought back to shore and tagged, measured and weighed. All work finished by 1200pm. At 300pm another two volunteers accompany the researcher in the boat to catch turtles by netting channels on the falling tide. All work finished by 600pm. The evening meal has been prepared and volunteers catch up on sleep until 1000pm. Nesting turtles use the high tide so volunteers patrol the beach between 1030pm and 230am. Sleep-in the next morning.

These two days are examples in good conditions. Some days it is too windy to catch during the day and volunteers can catch up on rest etc.

### 1.4 Other Duties

Volunteers help with all duties on the island.

Duties include:

- loading and unloading the vessels
- setting up the camp
- camp maintenance (filling water bottles etc)
- food preparation

### 3. CAMP CONDITIONS

The camp conditions are simple. The main camp consists of a portable dome structure (5m in diameter) constructed of timber and cover with shade material. This provides a communal area during the day and is used as a storage area for food and equipment. Another large tent also provides a storage area for food.

#### 1.5 Food

Meals are also simple. There is no refrigeration. Breakfast and lunches are a help yourself affair. Breakfast usually consists of cereal with UHT or powder milk, crackers and/or bread with spreads etc. Lunches are usually crackers or sandwiches with tinned meat, cheese and spreads. Remember that bread is usually only fresh for the first week. Packet noodles and pastas are available for cooking. Remember that resources are limited, so large tins etc should not be opened if there is only one person to eat them.

Dinner is communal. Usually two or three people help with cooking. Don't be afraid if you can't cook, there are opportunities to help with preparation. It is not a strict roster system, so some people may cook several times. Most of the time it works itself out naturally. Dinner usually consists of large pots of food, with one main dish plus rice, pasta or potatoes. There are usually lots of vegetables and less meat, mainly because of the lack of refrigeration.

Washing up is done at the camp. Seawater is collected during the day by buckets and used for the washing up. Freshwater is not to be used. Sometimes if we are busy then it will be done in the morning.

#### 1.6 Water

Freshwater is a precious resource. We have plenty of water for drinking and cooking. All washing of dishes, clothes and people is conducted with seawater.

We carry the fresh water from Darwin using 20-25L plastic containers. Two of these containers have taps and are located in the camp for easy access. These two containers are refilled using the other containers. This is a small job that can be conducted during the day when there are few activities.

#### 1.7 Rubbish

All rubbish is squashed and placed in garbage bags to take back to Darwin. The camp must be kept clean because strong winds can occur during the night and blow rubbish around. Smokers must keep all butts and place them in the bins.

#### 1.8 Sleeping

Usually the small two-person dome tents with a floor are the best for the conditions at Bare Sand Island. These tents hold up to the strong winds, plus keep the sand out relatively well. Swags are not recommended because they get covered in sand and there is nowhere to store your gear. Although many nights are pleasant to sleep outside, it is always nice to have a place to go if the wind starts.

#### 1.9 Personal Equipment

Personal gear is usually stored in your own tent. Some room is available under the Dome for film or electronics. All your clothes will become sandy. It may be better to pack some things separately in plastics bags inside your travel bag so sand doesn't get through everything at once.

#### 1.10 Bathing

Bathing is done using saltwater only. Crocodiles are known to occur in the area so bathing is only done in shallow clear water and only for short periods. Always let somebody know where you are going. A solar shower using seawater is available.

#### 1.11 Toilet Facilities

We now have a portable composting toilet that is located in a set position away from the camp. It has a cover around it to ensure privacy. An alternative is to dig a hole below the high tide line on the beach.

#### 1.12 Shade

Shade is very limited. Shade is provided by the communal Dome and also by a Casuarina tree located on the beach.

#### 1.13 Comfort

The island is very hot and sandy. The following items are recommended so that your trip is more comfortable:

- Sandshoes for walking on the beach at night
- Warm clothing for night work
- If staying for two weeks a second set of sheets are recommended

- The brush from a dust-pan set – to remove sand from feet before enter personal tents
- Long sleeve shirt to avoid sunburn
- Cheap Shampoo lathers well for saltwater washing
- Talcum powder is an extra comfort after saltwater washing
- Moisturiser

#### **1.14 Recreational Time**

During the day there will be plenty of recreational time during the day. This can be spent exploring the island, taking photographs, reading, fishing or catching up on sleep. Volleyballs, Frisbees etc will be available. Remember to bring books etc.

## 4. SAFETY AND WELL BEING

### 1.15 First-aid

A first-aid kit is provided.

### 1.16 Sunburn

Avoid sunburn at all times. Cover up with long sleeves and sunburn cream. Zinc cream is good and remains on during water activities and sweating. A sun-screen for the lips is also good. Remember it is too late once you are burnt.

### 1.17 Dehydration

Sunburn and dehydration are probably the most common ailment. Every person should drink at least 3 L of water per day but more will be required on most days. For people from colder climates this will be strange at first. A good way to keep track of your water consumption is to have your own water bottle (1 or 2L) and keep a count of how many times you refill it each day.

### 1.18 Sea Sickness

The trip to Bare Sand can be rough and so for those people who suffer from travel sickness it is best to taken something at least 30 minutes before we depart.

### 1.19 Footware

Footware should be worn on the beach at night during the nesting activities. This will help to avoid minor injuries such as cuts from coral or rocks. Sandshoes or wetsuit-boots work well. When catching during the day, wet suit booties must be worn. We have some spares, but if you have a pair bring them along as well.

### 1.20 Satellite Phone / Safety Barrel

A satellite phone is present on the island. This allows for regular check-ins with the mainland and for contact during emergencies. It is not for general calls.

A safety barrel (a replica to that kept in the boat) is kept on shore. It holds flares, and other signalling devices in case of emergencies.

### 1.21 Crocodiles

The saltwater crocodile (*Crocodylus porosus*) occurs in the waters around Bare Sand Island. Although few are sighted and no tracks have been sighted on the beach, precautions must be taken. One small crocodile was sighted at the waters edge in 2001. Bathing is restricted to clear and large areas of shallow water.

### 1.22 Turtles

There are few risks of injury caused by handling the turtles if some simple procedures are followed.

Nesting turtles –

- Never stand in front of the turtle - Flatback turtles can bite if given the opportunity
- When tagging or measuring keep feet and legs away from the turtle because the claws on the flippers can scratch
- Be careful not to get sand in your eyes when turtles are digging or covering their nest.

Foraging Turtles

- Be careful near the beak of the turtles. The green and hawksbill turtles can bite, but very infrequently.
- Turtles can be heavy. Only lift turtles within your capabilities
- For catching turtles, wetsuits, gloves and wetsuit-boots are available for your protection.

### 1.23 Lifting

There are many tasks requiring lifting. For example turtles, water bottles and camp equipment. Each person must recognise their own ability and not go beyond this point. There are many people to help and lifts can always be shared

### 1.24 Boating

We have a 4.3m aluminium dinghy with a 30 hp motor and forward controls. This vessel is used to catch the foraging turtles during the day. It is kept on a mooring just off the beach so that we can access it at all times.

The safety barrel onboard carries all the required safety equipment including, EPIRB, flares, V-sheet, torch and signalling mirror plus various spares. Life jackets, oars and a bucket are kept onboard.

Smoking is not permitted in the boat because of fuel.

## 5. MISCELLANEOUS

### 1.25 Fishing

There are no fishing restrictions on the island. There will be spare time during the day, so if you are a keen fisher your catches will be welcome for dinner.

### 1.26 Cameras and Electronics

The sand is very fine on the island and the windy conditions don't help. A clip seal bag or a waterproof dry-bag are recommended for cameras. Film can be stored in the shade of the Dome.

### 1.27 Other Visitors to the Island

The island has open access to the public and many fishers, yachties and boaters visit the island. If they are interested in the turtles we invite them to join us on the beach at night and explain our research and turtle conservation. A tour operator also runs turtle tours to the island.

## 6. THINGS TO BRING – SUMMARY

### Essential

- ~~Tent (unless otherwise stated)~~
- Sleeping Mat (unless otherwise stated)
- Sleeping bag or other
- Sun glasses
- Long sleeve clothes
- Alarm clock (essential to ensure that you wake for your shift)
- Torch for your tent. We have head spotlights for nesting work
- Personal water bottle
- Personal toiletries
- Sand Shoes
- Warm Clothes

### Optional

- Camera
- Moisturiser
- Talcum powder
- Books/walkman etc (there will be spare time)
- Any special food you require
- Fishing Gear

No alcohol (there are several reasons for no alcohol on the island - we will be living and working in a remote area, we will be working in shifts and we will be working with animals). Without alcohol all of the work is easier and safer.

## 7. PHOTO PAGE



## **8. SEA TURTLE INFORMATION**

## **Green Turtle (Chelonia mydas)**

### **Species Description**

The carapace of adult and juvenile turtles is highly variable and consists of greenish-brown background colour with orange, brown and blackish, streaks, blotches and spots. Adult females have an average curved carapace length of 107 cm and can weigh over 150kg. Hatchlings measure almost 5 cm in carapace length and weigh 23 g. Green turtles are characterised by four costal scales, one pair of pre-frontal scales, no preocular scales and 4 post ocular scales.

### **Generalised Life Cycle**

Green turtle hatchlings emerge from the nest, run down the beach and enter the sea. It is during this time that they are thought to be imprinted with the characteristics of the beach that enable them to return to breed when mature. For several days they swim directly out to sea guided by the direction of the onshore waves. After this period they begin a planktonic phase, that may last 5-10 years, where they are carried by the ocean currents. When they reach about 40 cm in curved carapace length, they enter shallow benthic foraging habitat. This habitat includes coral or rocky reefs and inshore areas that support algae or seagrass. When mature both males and females migrate long distances to the nesting beaches. After mating the males return to the foraging area while the females return at the end of the breeding season. All of the hard shelled sea turtles have a similar life cycle.

### **Population Distribution**

Green turtles are found in tropical and subtropical waters throughout the world. In Australia, major nesting areas are found in the northern and southern Great Barrier Reef, the Gulf of Carpentaria and Western Australia. Australia's breeding population is estimated to be over 30 000 adult females.

### **Reproduction**

Females nest of sandy tropical and subtropical beaches. They lay an average of 5 clutches per season, at 14 day intervals, each containing approximately 115 eggs. Females nest at intervals of between 1 and 9 years and is affected by the Southern Oscillation Index. The incubation period is approximately 64 days. The sex of the hatchlings is determined by the temperature of the sand. Warmer nests producing females, cooler nests producing males.

### **Habitat**

Foraging habitat includes coral and rocky reefs and inshore areas that support algae and/or seagrass. Nesting habitat includes tropical and sub-tropical sandy beaches. Most important nesting areas in Australia occur on islands.

### **Diet**

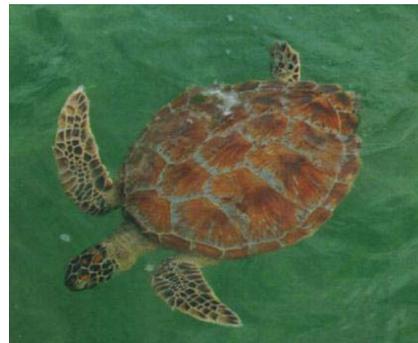
Green turtles are primarily herbivores with their diet dominated by seagrass and algae. They will take animal material when available.

### **Threats**

A variety of threats affect green turtles and include a number of commercial fishing activities, excess indigenous harvest of eggs and adults, destruction of nests by feral animals, marine litter, habitat destruction and boat strike.

### **Status**

Internationally they are listed as Endangered and nationally they are listed as Vulnerable.



## **Hawksbill Turtle (*Eretmochelys imbricata*)**

### **Species Description**

The carapace is high domed with imbricate or overlapping scales. The margin of the carapace forms sharp projections on the posterior edge. The colour of carapace is variegated with brown, reddish, yellow and black markings. Adult females have an average curved carapace length of 82 cm and weight of 50kg. Hatchlings measure approximately 4 cm in carapace length and weigh 14g. Hawksbill turtles are characterised by four costal scales, 2 pair of pre-frontal scales, no preocular scales and 3 post ocular scales. Adult females have an alternate gait on land.

### **Generalised Life Cycle**

Hawksbill turtle hatchlings emerge from the nest, run down the beach and enter the sea. It is during this time that they are thought to be imprinted with the characteristics of the beach to enable them to return to breed when mature. For several days they swim directly out to sea guided by the direction of the onshore waves. After this period they begin a planktonic phase, that may last approximately 5 years. When they reach about 30 cm in curved carapace length, they enter shallow benthic foraging habitat comprising coral or rocky reefs. Both males and females migrate to nesting areas to mate. After mating the males return to the foraging area while the females return at the end of the breeding season. All of the hard shelled sea turtles have a similar life cycle.

### **Population Distribution**

Hawksbill turtles are found in tropical and subtropical waters throughout the world. In Australia, two main nesting populations exist; one in the northern Great Barrier Reef and the other in Western Australia. Australia's nesting population comprises approximately 5000 adult females.

### **Reproduction**

Females nest on sandy tropical and subtropical beaches. They lay 1 to 6 clutches per season, at 14 day intervals, with each containing approximately 122 eggs. Nesting season are at intervals of between 2 and 4 years. The incubation period is approximately 59 days. The sex of the hatchlings is determined by the temperature of the nest. Warmer nests producing females, cooler nests producing males.

### **Habitat**

Foraging habitat includes coral and rocky reefs. Nesting habitat is most on tropical sandy beaches.

Most important nesting areas in Australia occur on islands.

### **Diet**

Hawksbill turtles are omnivores consuming both animal and plant material. Some evidence suggests they are specialist spongivores. In Australia, they consume both sponges and algae.

### **Threats**

A variety of threats affect hawksbill turtles and include a number of commercial fishing activities, excess indigenous harvest of eggs and adults, illegal harvesting neighbouring countries, destruction of nests by feral animals, marine litter, habitat destruction and boat strike.

### **Status**

Internationally they are listed as Critically Endangered and nationally they are listed as Vulnerable.



## **Flatback Turtle (Natator depressus)**

### **Species Description**

The carapace is low domed, fleshy, has reflex margins and is olive-brown in colour. Adult females have an average curved carapace length of 92 cm and weight of 90 kg. Hatchlings measure approximately 6 cm in carapace length and weigh 43g. Flatback turtles are characterised by four costal scales, 1 pair of pre-frontal scales and one preocular scale. Adult females have a parallel gait on land.

### **Generalised Life Cycle**

Flatback turtle hatchlings emerge from the nest, run down the beach and enter the sea. It is during this time that they are thought to be imprinted with the characteristics of the beach to enable them to return to breed when mature. For several days they swim directly out to sea guided by the direction of the onshore waves. Unlike other sea turtles, they lack an oceanic phase and remain in the surface waters of the continental shelf. They gradually shift to a benthic foraging behaviour but remain in relatively deeper waters. When mature, both males and females migrate to nesting areas to mate. After mating the males return to the foraging area while the females return at the end of the breeding season.

### **Population Distribution**

Flatback turtles are only found in Australia waters. Of the 7 sea turtle species in the world, the Kemp's ridley is the only other turtle with a restricted distribution. Nesting occurs throughout northern Australia.

### **Reproduction**

Females nest on sandy tropical and subtropical beaches. They lay an average of 2.8 clutches per season, at 15 day intervals, with each containing approximately 55 eggs. Nesting seasons are at intervals of between 1 and 5 years. The incubation period is approximately 50 days. The sex of the hatchlings is determined by the temperature of the nest. Warmer nests producing females, cooler nests producing males.

### **Habitat**

Adults occur in the soft bottom habitat over the continental shelf of northern Australia. Nesting habitat is most on tropical sandy beaches.

### **Diet**

Little is known about the diet of these turtles. However, they are known to eat molluscs, squid, cuttlefish, soft corals and jellyfish.

### **Threats**

A variety of threats affect flatback turtles and include a number of commercial fishing activities, excess indigenous harvest of eggs and adults, destruction of nests by feral animals, marine litter, habitat destruction and boat strike.

### **Status**

Both internationally and nationally they are not listed. More information is needed for this species.



## **Olive Ridley Turtle (*Lepidochelys olivacea*)**

### **Species Description**

This is the smallest of the Australian sea turtles. With an average curved carapace length of 70 cm and weight of 40kg. Hatchlings measure approximately 4 cm in carapace length and weigh 15g. Olive ridley turtles are characterised by more than 5 costal scales, no preocular scales and more than 4 prefrontal scales. Adult females have an alternate gait on land. The carapace is high domed and olive-grey in colour.

### **Generalised Life Cycle**

Olive ridley turtle hatchlings emerge from the nest, run down the beach and enter the sea. It is during this time that they are thought to be imprinted with the characteristics of the beach to enable them to return to breed when mature. For several days they swim directly out to sea guided by the direction of the onshore waves. After this period they presumably enter a planktonic phase of which little is known. Post-hatchlings and adults may use the same pelagic and benthic habitats. Both males and females migrate to nesting areas to mate. There is no data to suggest they use the same foraging grounds after nesting. All of the hard shelled sea turtles have a similar life cycle.

### **Population Distribution**

Olive ridley turtles are found in tropical and subtropical waters throughout the world. In Australia, low density nesting occurs in northern Australia, particularly in Arnhem Land. The size of the Australian nesting population is unknown.

### **Reproduction**

Females nest of sandy tropical and subtropical beaches. They lay between 1 and 8 clutches per season, at 17 to 45 day intervals, with each containing approximately 101 eggs. The incubation period is approximately 50 days. The sex of the hatchlings is determined by the temperature of the nest. Warmer nests producing females, cooler nests producing males.

### **Habitat**

Adults and juveniles occur in pelagic and benthic habitats ranging in depths of several metres to over 100 metres. Nesting occurs on tropical sandy beaches. In Australia, this is mostly on the inshore islands of Arnhem Land.

### **Diet**

Little is known about the diet of this turtles. In Australia, their diet consists of gastropod molluscs

and crabs. Other items may include jellyfish, shrimp, tunicates and algae.

### **Threats**

A variety of threats affect olive ridley turtles and include a number of commercial fishing activities, excess indigenous harvest of eggs and adults, illegal harvesting neighbouring countries, destruction of nests by feral animals, marine litter, habitat destruction and boat strike.

### **Status**

Internationally and nationally they are listed as Endangered.



## Dugong (Dugong dugon)

### Species Description

One of the four living species of the Order Sirenia and the only living member of the family Dugoniidae. They are grey-brownish in colour, have a fusiform body shape with a dolphin like tail. They grow to between 2.4 and 3 m in length and can weigh over 400 kg.

### Generalised Life Cycle

Dugongs reach maturity when they reach about 14 years of age. They are estimated to live to approximately 70 years of age.

### Population Distribution

They occur in tropical and subtropical waters of the Indo-Pacific. Over 85000 dugongs are estimated to occur in Australia waters, between Shark Bay, WA and Moreton Bay, Qld.

### Reproduction

The breeding season appears to depend on the water temperature and occurs in summer in cooler waters, but is less pronounced in warmer waters. Pregnancy last about 13 months and the calf with suckle from its mother for about 18 months.

### Habitat

Dugongs inhabit inshore and island waters in both turbid and clear environments. They are usually found close in shallow waters but may be found offshore in areas where deep water seagrass occur.

### Diet

Dugongs are vegetarians and feed primarily on seagrass. However, they are known to consume benthic invertebrates and small amounts of algae. They have poor eyesight, but very sensitive bristles around their mouth which help them find food.

### Threats

A variety of threats affect dugongs and include; commercial fishing using mesh nets, shark control netting, boat strikes, excessive indigenous harvest, disturbance through increase boating activity and habitat destruction.

### Status

Internationally, dugongs are listed as Vulnerable to extinction (IUCN) and are listed in Appendix II of the Convention on International Trade in Endangered Species. In Australia, they are listed as Vulnerable under Commonwealth legislation.

