

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



About This Method



This document helps you to monitor Marine Turtles during Nesting Season. This method has been adapted from: [Population Surveys \(ground and aerial\) on Nesting Beaches](#), B. Schroeder & S. Murphy; [Minimum Data Standards for Nesting Beach Monitoring](#), SWOT Scientific Advisory Board; [Turtle monitoring field guide](#), DBCA. You can find more information on the **Monitoring Country** website: <https://monitoringcountry.org.au>.



This method has three parts: **1. Get Ready**, **2. Out on Country** and **3. Back in the Office**. Each part can be undertaken separately but you must complete all three parts to finish the method. At the end of the document, you will find guidance for all the gear you need - [Gather Your Gear - Complete List](#).

We recommend you read the whole document before you start.

Part 1: Get Ready



GATHER YOUR GEAR



Equipment required for this part:

- Tablets/phones with:
 - ability to take photos
 - data collection and navigation apps
- Laptop/computer with software for:
 - mapping
- GPS device (recommended)
- Reference documents or field guides:
 - [Marine Turtle sign guide](#) to print and laminate



ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey

KEEP IN MIND

Why?

Make sure there is a clear [monitoring question](#) and that the [method](#) you have selected will answer the monitoring question.

If this is the first time you are monitoring, you will need to [design the survey](#): what are you monitoring, where will you survey, and when and how often you will survey?

When?

Prepare well before heading out on Country so that you have time to gather gear or train staff, if needed.

Who?

 At least one ranger/staff to plan and prepare.



Training and skills

Staff involved in planning are trained and competent in:

- Mapping software (like QGIS, Google Earth) and/or [monitoring point generator](#)
- Navigation systems (like Avenza, GPS)
- Data collection systems (like Fulcrum, datasheets)
- Identifying Marine Turtle tracks, nests and other signs



Check permissions

Consult with Traditional Owners, landholders and relevant government agencies and authorities, to determine appropriate access and approvals for environmental monitoring:

1. Where you can go – consult with the owners/managers of the land.
2. What you can do – check if you need [scientific licences or ethics permits](#)
3. What or who can you take photos of
4. What can be done with data and photos – who owns them, where will they be stored and how will data be interpreted and communicated.


Marine Turtle Nesting Season Survey



ACTIONS

Make a plan and prepare

If you have done this monitoring before, it is best to do the surveys at the same time and same sites so that you can compare the data to previous surveys and see if there have been changes.

1. Plan which dates you will conduct the survey/s
 - Which species are you monitoring; when do they normally nest in your survey areas?
 - Find out the start, peak, and end dates for the Marine Turtle/s nesting season/s
 - You may need to do surveys of nesting beaches at different times of year depending on the species, and if peak dates for nesting are not yet known in your area
 - Decide on how often you will monitor during the survey
 - a. Every morning for 2 weeks during peak nesting season OR
 - b. At least 3 morning per week for the entire nesting season
 - Peak season surveys are suitable if the beach is remote and difficult to get to.
 - Entire nesting season surveys are suitable if the beach is easy to get to and rangers can commit to surveying for the entire nesting season.
2. Gather Marine Turtle [records in your area](#) and identify where potential Marine Turtle nesting habitat is.
 - Such as from Traditional Owners, Atlas of Living Australia (ALA), or government databases.
3. Use the [monitoring point generator](#) or mapping software to select your sites
 - Choose which beach/es you will survey; must be accessible by foot or vehicle
 - Sand type, wind direction, human activity and rainfall can affect how easily you can see and identify signs.
 - Use mapping software to define the survey area(s) by dividing the beach into equal sections; maximum recommended length 1 kilometre
4. Give each section a unique name, and export and save the location data in your data management system
5. Prepare maps of sites and load sites onto navigation devices
6. Plan how you will record information on Country (electronic data forms or paper datasheets)
7. Plan your [data management system](#) (how you will store nesting signs data)
-  8. Check **GATHER YOUR GEAR** lists for **Get Ready**, **Out on Country** and **Back in the Office** ([complete list on last page](#)) and get any equipment you don't have. See [buying guide\(s\)](#) for advice.
9. Charge electronic devices (tablets/phones, power banks, GPS) and batteries



ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey

Train



1. Check the **Training and skills** requirements for **Get Ready**, **Out on Country** and **Back in the Office** steps and arrange any training or expertise that you need.
2. Run everyone involved in the survey through the plan.
 - Be clear on how many people will be involved, what everyone will be doing, and what they will need to do the survey.
3. Prepare guides for identifying Marine Turtles and nesting behaviours
 - ID books or apps can be used instead, but a short guide that is specific to your area/species makes it quicker and easier to check when out on Country.
 - Guides can be loaded onto tablets/phones or printed and laminated.
 - Useful photos/diagrams include:
 - Crawl (track) patterns
 - Incoming (emerging) and outgoing (returning) crawls
 - Nesting (laid eggs) and non-nesting emergence (didn't lay eggs) crawls
 - Nests and body pits
 - Signs of nest predation and damage/disturbance
 - Signs of hatching
4. Run a training session for all rangers involved in the survey to learn or refresh:
 - a. How to use the devices (tablets/phones, GPS)
 - b. How to use data collections apps and record data
 - c. How to identify Marine Turtle crawls (tracks), nests and other signs, and how to tell apart different Marine Turtle species.

Next Section – Part 2: Out on Country

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



Part 2: Out on Country



GATHER YOUR GEAR

GATHER YOUR GEAR



One set of this equipment for each team:

- Electronic device(s) – charged and ready to record data, take photos and navigate to sites
- Power bank – charged and ready to charge devices (optional)
- GPS device and spare batteries (recommended)
- Reference documents or field guides: Marine Turtle signs guide
- Measuring tape and/or Rule
- Picket driver, mallet or hammer
- Clipboard with pencil, eraser, maps and spare datasheets (optional)

One set of this equipment for each site:

- 2 star pickets for each section

KEEP IN MIND



When?

Site setup should be done the day before surveys start.

Start surveys at sunrise when tracks and nests are easiest to see and identify.

Repeat surveys should be done at the same time of year as previous surveys.



Who?



At least 2 people per section.

At least 1 person experienced at identifying Marine Turtle signs.

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



Training and skills

Make sure everyone knows the plan.

Field staff are trained and competent in:

- Navigation systems (like Avenza, GPS)
- Data collection systems (like Fulcrum, paper datasheets)
- Identifying Marine Turtle crawls (tracks), nests and other signs

ACTIONS



Check that your electronic devices (tablets/phones, power banks, GPS, batteries) are charged before you head out.



Site setup

The day before the survey starts:

1. Hammer in star pickets at the start and end of each section at or above the high tide line.
2. Walk the survey area and look for Marine Turtle crawls and nests.
3. Use your foot to draw a clear line in the sand across all Marine Turtle crawls that are above the high tide line.
 - Marking over crawls makes it easy to tell which are fresh when you do the survey
 - Make sure everybody marks over crawls in the same way.
4. If you see any nests, check if there are signs of nest disturbance or hatching.



5. Record **site setup data**.



Search for Marine Turtle nesting signs

Each morning of the survey:

6. Arrive at the beach by sunrise and head to your designated section.



7. Record **section data**

8. Walk from the section start along the latest high tide line.

9. Look for turtle crawls inside of the section.

10. When you find a turtle crawl:

- a. Find the incoming and returning crawl
- b. Follow the path taken by the turtle and look for a nest at the end of the incoming crawl
- c. Use the crawl markings to identify the turtle species

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



- d. Decide if it is a fresh crawl
 - If it doesn't have a line drawn across it from the previous day, it should be fresh.
 - If it is an old crawl, do not record any data
- e. Decide if it is nesting (laid eggs) or non-nesting (didn't lay eggs) emergence
 - A nest at the end of the incoming track means it is nesting emergence
 - A turtle may have started digging a nest but then returned to the ocean without laying eggs.
- f. Check the nest for signs of predation or damage and hatching.

11. Save the locations of crawls and nest on your navigation device

12. Take photos of any crawls, nests and other signs.

- Put the measuring tape or ruler across the crawl to show scale

 13. Record **crawl and nest data**

14. Use your foot to draw a clear line in the sand over the incoming and returning crawls to show that it has been recorded.

15. Use your foot to draw a clear line in the sand across the nest, as close to the secondary body pit as possible.

 16. When you reach the section end, record **section data**

17. Make sure that all sections of the survey area have been surveyed.

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



RECORD DATA



Data to record when setting up sites

What to record	Required?	Notes
<i>Information to record about each beach</i>		
Project name	Yes	Make it clear which project this data belongs to and its purpose
Date	Yes	Record the date the site was setup
Personnel	Yes	Record the name of the people who set up the site - this is helpful if any questions come up about the data
Beach name	Yes	Record the name of the beach
Section start and end coordinates	Yes	Record an accurate location of start and end of each survey section (using a handheld GPS if possible) (latitude and longitude or eastings and northings)
Photo of site	Optional	Take a photo of the site and make note of which camera/tablet/phone it was taken on, and the filename of the photo (usually end in .JPG)
<i>Information to record about each nest found during site setup</i>		
Location coordinates of nest	Yes	Record an accurate location of the nest (using a handheld GPS if possible) (latitude and longitude or eastings and northings)
Photo of nest	Yes	Take a photo of the nest and make note of which camera/tablet/phone it was taken on, and the filename of the photo (usually end in .JPG)
Position of nest on the beach	Yes	Choose one: <ul style="list-style-type: none"> • below high-water mark (intertidal) • above high-water mark (high water mark to edge of vegetation) • edge of vegetation to base of dune (slope) • base of due and beyond (in vegetation)
Signs of nest predation or damage	Optional	Describe what you see and the cause of predation or damage like fox, goanna, human.
Signs of hatching	Optional	Describe if you see any signs of hatching like shells

ENVIRONMENTAL MONITORING METHOD:

Marine Turtle Nesting Season Survey



Data to record when searching for Marine Turtle nesting signs

What to record	Required?	Notes
<i>Information to record about each section surveyed</i>		
Project name	Yes	Make it clear which project this data belongs to and its purpose
Date	Yes	Record the date the section was surveyed
Personnel	Yes	Record the name of the people who surveyed the section - this is helpful if any questions come up about the data
Beach and section name	Yes	Record the name of the beach and section surveyed
Start and finish time	Yes	Record the time that the survey of each section started and finished
Weather	Yes	Describe the weather conditions, particularly Wwind and rainfall
Stories and notes	Optional	Record information or stories from Elders, and anything else worth noting about the area or animals.
Video	Optional	Record videos of information or stories from Elders, and rangers performing or describing the work they are doing.
<i>Information to record about each crawl found</i>		
Species of turtle	Yes	Record what species of turtle made the crawl
GPS location for crawl	Yes	Record an accurate location (using a handheld GPS - if possible) i.e. Latitude and longitude or eastings and northings
Photo of crawl	Yes	Take a photo of the crawl and make a note of which camera/tablet/phone it was taken on, and the filename of the photo (usually ends in .JPG)
Emergence type	Yes	Choose one: <ul style="list-style-type: none"> • Nesting emergence • Non-nesting emergence
<i>Information to record about each nest found</i>		
GPS location for nest	Yes	Record an accurate location (using a handheld GPS - if possible) i.e. Latitude and longitude or eastings and northings
Photo of nest	Yes	Take a photo of the nest and make a note of which camera/tablet/phone it was taken on, and the filename of the photo (usually ends in .JPG)
Position of nest on the beach	Yes	Choose one: <ul style="list-style-type: none"> • below high-water mark (intertidal) • above high-water mark (high water mark to edge of vegetation) • edge of vegetation to base of dune (slope) • base of due and beyond (in vegetation).
Signs of nest predation or damage	Optional	Describe what you see and the cause of predation or damage like fox, goanna, human.
Signs of hatching	Optional	Describe if you see any signs of hatching like shells

Next section – Part 3: Back in the Office

Marine Turtle Nesting Survey

Get Ready

On Country

In Office

Gear List





Part 3: Back in the Office



GATHER YOUR GEAR



Equipment required for this part:

- Tablets/phones (or paper datasheets) that you used to record data
- Data management system
- Laptop or computer with software for:
 - Spreadsheets
 - Mapping

KEEP IN MIND



When?

Always try to complete this work as soon as you can after returning from your time on Country so that what you did and what you saw is fresh in your memory.



Who?



At least 1 person to manage the data



Training and skills

Staff managing data are trained and competent in:

- Mapping software (like QGIS or Google Earth)
- Spreadsheet software (like Microsoft Excel)
- Data collection systems (like Fulcrum, paper datasheets)
- Data management systems (like databases, cloud storage, external hard drives)

Marine Turtle Nesting Season Survey



ACTIONS



Data entry, analysis and reporting

1. Record a summary of what you did and why, any observations (like weather conditions, fire history, site condition), anything that went wrong or didn't work and things that worked well.
2. Upload the **site setup and survey (section, crawl and nest) data** to your data management system.
 - Recommended: get someone else to proof the data to check for mistakes.
3. Upload any photos or videos taken during the survey to your data management system.
4. Import the data into a spreadsheet and:
 - calculate how many fresh nests were found in each section of beach
5. Create a simple graph of the number of nests in each section from year to year
6. Use the mapping software to create a map of nesting sites year on year
7. Discuss with the ranger team or community the results of the monitoring, any reasons for the presence or absence of nests, and if there have been any changes to previous years.
 - Consider whether trends might be related to your management (like fox management) to check how well management is working, or if you need to make adjustments.
8. Share the data according to any data sharing or funding agreements you have made

Next section – Full Equipment List



Gather Your Gear – Complete List



The complete **GATHER YOUR GEAR** list for **Get Ready**, **On Country** and **Back in the Office**.

Gear List	Required?	Get Ready	On Country	In Office
Tablets/phones: <ul style="list-style-type: none"> Ability to take photos Apps for data collection (like Fulcrum) and navigation (like Avenza) 	✓	✓	✓	✓
Power bank <ul style="list-style-type: none"> Charged 	Recommended		✓	
Laptop or computer with software for: <ul style="list-style-type: none"> Mapping (QGIS or Google Earth) Spreadsheets (like Microsoft Excel) 	✓	✓	✓	✓
GPS device & spare batteries	Recommended	✓	✓	
Marine turtle signs reference documents and/or field guides	✓	✓	✓	
Star pickets <ul style="list-style-type: none"> 2 per section 	✓		✓	
Picket drive, mallet or hammer	✓		✓	
Measuring tape and/or ruler	✓		✓	
Clipboard with pencil, eraser, maps and datasheets	Optional		✓	
Data management system (like cloud storage)	✓			✓