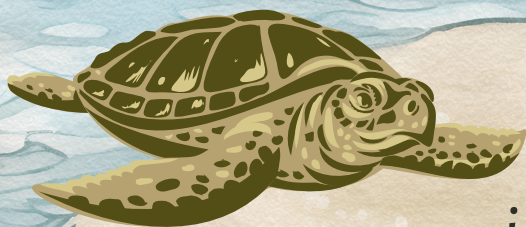


*Dakshin Foundation*

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***A Field Guide***  
**to Monitoring**  
**Olive Ridleys**



*in Odisha*

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**PRODUCED BY THE MARINE FLAGSHIPS  
PROGRAMME, DAKSHIN FOUNDATION**

**Content**

**Chandana Pusapati and  
Vidisha Kulkarni**

**Illustrations**

**Barkhaa Avinash and  
Vidisha Kulkarni**

**Images**

**Bipro Behera and  
Kartik Shanker**

**Design**

**Debangini Ray**

**Programme Head**

**Kartik Shanker**







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## Key to Icons



Data to be collected



A 30-metre  
measuring tape



Graduated  
aluminium poles



A cloth bag



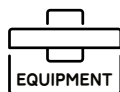
A torch with  
red light



A notebook  
and pen



5m rope



Equipment required



Stick



A digital watch



Pliers



A pair of scissors



Hand-held GPS

# Beach Profiling

Beach profiling involves measuring the slope and width at various segments of the nesting beach. It helps determine the monthly and seasonal changes in the rate of erosion and accretion and its influence on nesting intensity.

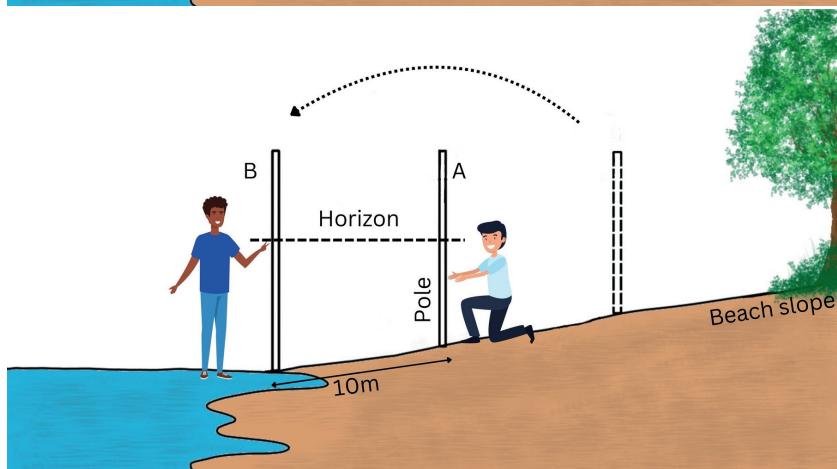
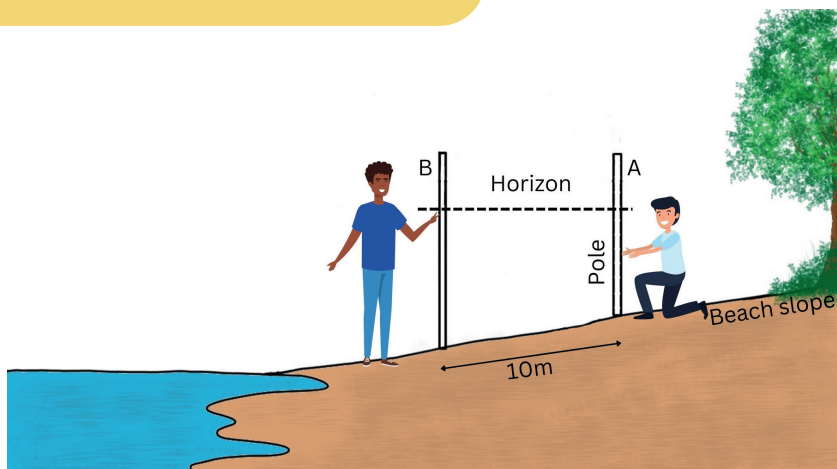
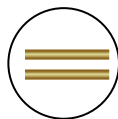
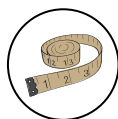
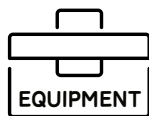
## Profiling Method

1. Lay down sampling points every 100/200 m along the nesting beach. For mass nesting beaches, sample every 100 m. Mark these points on the GPS using the waypoint feature.
2. During low tide, place a graduated aluminium pole (Pole A) at the tree line by burying it in the sand until the base. Place Pole B 10 m away from Pole A in a perfectly straight line, toward the sea.
3. Stand at Pole A and look at the horizon or sand dune. Tell the person at Pole B to adjust a stick or pen until it lines up with the horizon or the top of the sand dune if the beach is steep.
4. Take the height reading of Pole A at eye level and the reading of Pole B by noting the height where the stick/pen is placed.
5. Repeat the same till the shoreline by maintaining a 10 m distance between the poles.

***\*Profiling should be done during low tide***



- GPS location of the sampling points (same location for every mapping event)
- Height of poles at Observer 1 and Observer 2
- Distance between poles (standard distance used is 10m).





# Offshore Monitoring

A line transect method is used to measure the density and location of aggregations in the offshore waters along the nesting beaches.

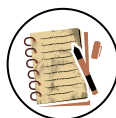
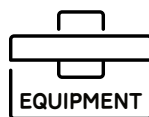
## Sampling Protocol

1. Conduct a recce survey to demarcate the aggregation area.
2. Select sampling locations using GIS platforms and lay down transect design.
3. Establish perpendicular transects, each 5 km long and 1 km apart, in a zigzag pattern covering the entire aggregation area.
4. Conduct transects on a fibre fishing boat, moving at a constant speed (6-10 km/h).
5. Have one observer on each side of the boat to determine the sighting angle and distance for each turtle observation.
6. Record sighting angle and distance, and GPS coordinates of single turtles and mapping pair observations.
7. Perform offshore transects once or twice monthly between December to April.



### General:

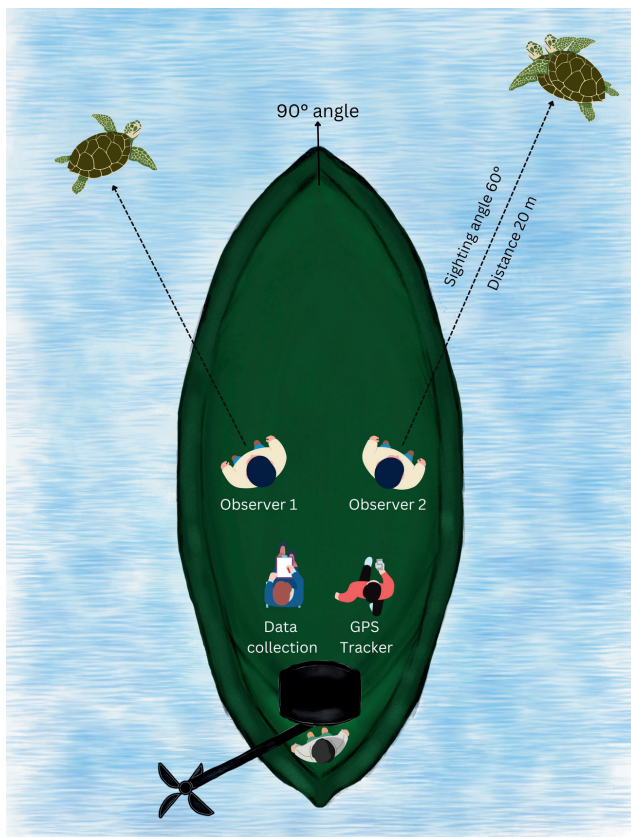
- Sea condition (qualitative information on a Beaufort scale)
- Time and date of the transect





## Upon sighting a turtle, note the following :

- Single or mating pairs
- Sighting distance (visual estimation to an approximation of 50m)
- Sighting angle (visual estimation to an approximation of 10 degrees)
- Direction (left or right side of the boat)
- Distance to be covered until the end of the transect (estimated based on GPS movement)

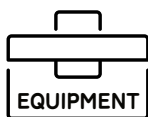


# Solitary Nest Monitoring

Regular night patrols are conducted to estimate the intensity of solitary nesting. It is usually carried out between 11pm - 6am.

## During the night patrol

1. Walk along the high-tide line to detect turtle tracks.
2. Once a track is observed, follow them to the nest mound.
3. If a nesting turtle is encountered, wait until nesting is complete before excavation, and record carapace length and width.
4. If tracks are cleared due to winds, search for obvious nesting signs (see NEST CLEARING PHOTO).
5. If a nest mound is absent, record it as a false crawl.
6. In case of predation, note the date, time, location, and predator type if identifiable.



**DO NOT** 



Use white light

Click photos  
using a flash



Handle  
nesting turtles

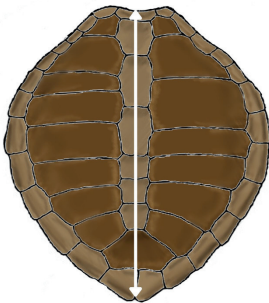




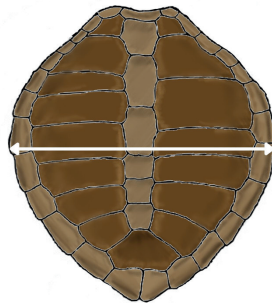
- Record the number of active or predated nests and false crawls
- Note the date and time of the nest, segment number and GPS location (if possible)
- Measure distance from the high tide line



CCL

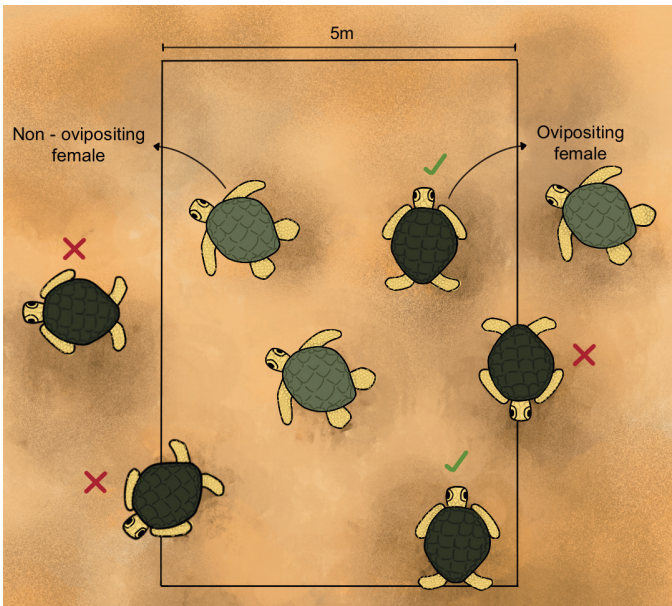


CCW



# Arribada Census

*Arribada* census is conducted to estimate the number of turtles nesting in a single mass nesting event. This number can be indicative of the regional status of the nesting population.



## When to Start:

1. Begin arribada counts when over 100 turtles are nesting simultaneously.
2. If more than 100 turtles are observed nesting in a single night, prepare to begin counts the following evening.

## How to Count:

1. Divide the beach into 100m segments with 5m sub-segments marked.
2. Conduct hourly counts with two people per team covering 4-5 segments each, noting unambiguous egg-laying females based on flipper position during oviposition.

## When to Stop:

1. Conduct hourly counts until nesting stops (where each segment records only 1 or 0 ovipositing females).
2. Continue counts over the entire mass nesting period lasting 2-6 days or longer.

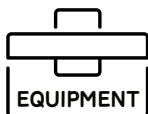
### Oviposition Duration (OPD)

Every night, a team records the average OPD for nesting females (~30-40 per session), measuring the time from egg-laying initiation to sand covering. Additionally, carapace length and width (CCL and CCW) are noted for all turtles.





- Assign 4-5 segments for each team.
- A team should carry out hourly counts for each segment assigned.
- Cover the entire nesting area from the high tide line to the tree line.
- Measure average oviposition duration (OPD).
- Record morphometrics of as many individuals as possible (CCL and CCW).

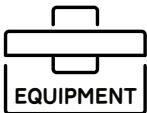


# Nest Relocation

Nest relocation is commonly carried out to ensure the protection of nests from predation and inundation.

## Relocation Procedure

1. Locate the nest and dig in a circular pattern around the nest to prevent collapse. Dig until you see the clutch.
2. Remove eggs gently in groups of 2-3 and note the total clutch size.
3. Place wet sand coated in cloacal fluid on top of the clutch.
4. Measure the neck depth, neck width, total depth, and chamber width.
5. Transport the clutch to the hatchery within 2-6 hours of nesting.
6. In the hatchery, replicate the natural nest dimensions while digging the artificial nest.
7. Relocate the eggs in groups of 2-3, counting them during the process.
8. Cover the nest with the wet sand removed during construction, compacting it firmly.
9. Place label board with details of the nest, date and time of relocation, and estimated emergence date (approximately 45-50 days from the relocation date).





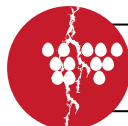
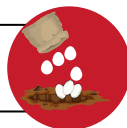
- Clutch size
- Natural nest dimensions - Neck Depth (ND), Neck Width (NW), Total Depth (TD), Chamber Width (CW)
- Date and time of relocation
- Expected emergence date

**DO NOT**



Carry the bag  
on the shoulder

Pour eggs into  
the nest



Split the clutch

Build the nest  
in a V-shape





# Hatchery Management

Hatchery management practices are crucial to ensure high hatching success and hatchling quality.

## Hatchery Best Practices

1. Alter hatchery location every season to avoid any microbial contamination from the previous year. Avoid proximity to thick vegetation.
2. Ensure at least 1.5-2m spacing between nests.
3. Place label boards on top of each nest.
4. Enclose nests before emergence using bamboo baskets.
5. Do not cover or shade nests.

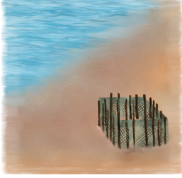
## Emergence and Hatchling Release

1. Count hatchlings emerging from each nest, noting hatching date.
2. Release hatchlings in batches immediately upon emergence during the night/early morning.
3. Allow complete nest emergence over 2-4 days; avoid excavation on the first night.
4. Collect hatchlings in a bucket and release them at least 20-25m from the shoreline.

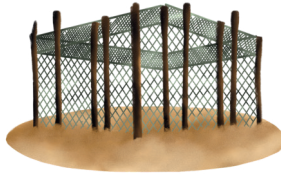
## Determining Hatchling Success

After 90% of the clutch has emerged or 3-4 days have passed since the first day of emergence, excavate the nest to determine hatching success.

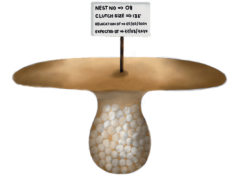
## Do's



Construct hatchery at least 50-100m away from high tide line, depending on width of beach



Determine size of hatchery based on nesting intensity at beach



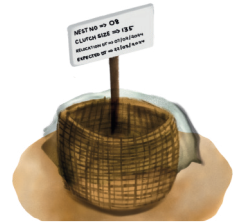
Shape of nest should resemble natural nests



Nests should be atleast 1-2m apart.



Label nests using wooden boards and record basic nest data



Cover nest with inverted basket and mesh when close to emergence



Release hatchlings immediately after emergence. Allow hatchlings to crawl down beach and imprint on beach

## Don'ts



Don't change location of hatchery every year to avoid organic buildup



Don't construct hatchery too close to vegetation or under the shade of trees



Don't hold hatchlings in water as it could trigger "swim-frenzy"



Don't release hatchlings in same location everyday to avoid creating fish feeding stations.



- Carefully excavate each nest and record the following:

**Emerged Hatchlings (E), Shells (S), Live in Nest (LIN), Dead in Nest (DIN), Dead hatchlings in pipped egg (DPE), Live hatchlings in pipped egg (LPE), Undeveloped (UD) and Unhatched eggs (UH).**

- Record clutch size (CS) using the formula:

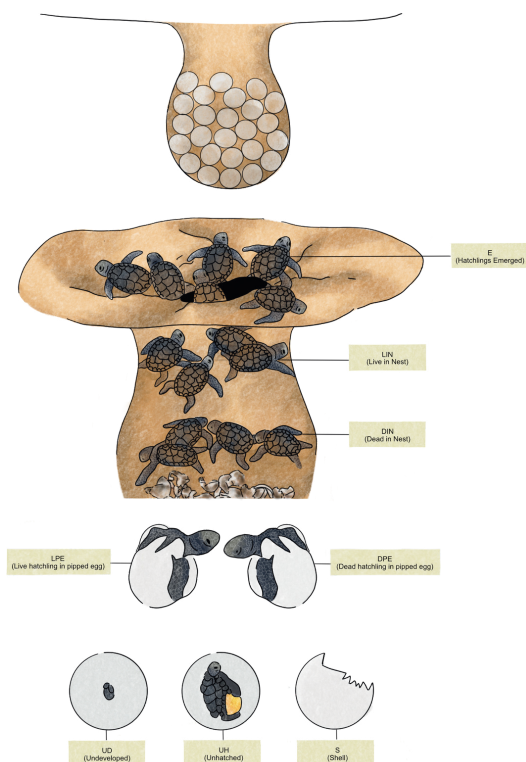
$$CS = (S + UH + DPE + LPE)$$

- Calculate hatching success (%) using the formula:

$$\text{Hatching success (\%)} = (S + LPE) / CS \times 100$$

- Calculate emergence success (%) using the formula:

$$\text{Emergence success (\%)} = [S - (LIN + DIN)] / CS \times 100$$



### **Note:**

Abnormal, yolkless, and multi-yolked eggs should be documented separately and excluded from clutch size calculations.

# Mortality

During beach patrols, it is important to keep a record of any dead turtles that have washed ashore. For each carcass found, observe it closely and record any signs of injury or cause of death.

Additionally, measure the CCL (curved carapace length) and CCW (curved carapace width) of the turtle. To determine the sex of the turtle, examine the length of the tail. If the carcass is extremely decomposed and the tail is not visible, label the turtle as unidentified.







