INTRODUCTION

It is now recognized that the success in the conservations of sea turtles depends upon the active participation of citizen communities, governmental authorities, scientists and non governmental organizations. The principal objective of these protection programs should be to produce healthy offspring that have the best possibility of surviving, maturing and increasing the species populations.

It is of the utmost importance, that the management (collection, planting of eggs and release of hatchlings) be done in the best way possible, no matter whether involving biologists, students, fishermen, farmers or volunteers.

This manual was designed to be used by these diverse groups, organizations and communities, working together to protect the sea turtles all along the Pacific coast of Mexico. It is based on the recommended management practices, according to the best scientific information available. It includes only the most important information necessary and focuses on the aspects of practice that people in these communities have asked us for over the years. The manual is presented in clear and simple terms for those with no prior knowledge of the subject. At the end there is a glossary that explains many of the terms that may be helpful for those who are not familiar with sea turtles.

We hope you will find this guide useful as you begin your involvement with sea turtle conservation. “Gracias” in advance for your efforts in aiding the recovery of the many species of marine turtles of Mexico.

THE SPECIES

In Baja Sur, Tortugueros Las Playitas collects and protects nests from three turtle species.

	LEATHERBACK *Dermochelys coriacea*	OLIVE RIDLEY *Lepidochelys olivacea*	BLACK TURTLE *Chelonia mydas*
Status	**Critically Endangered**	**Vulnerable**	**Endangered**
Nesting Season	October - April	June - January	August - January
Typical Nests per Season	5	1 - 2	1 - 7
Interval between nests	10	15 - 17	14
Remigration Interval (in years)	2 - 3	1, 2 y 3	2-3
Average clutch size (eggs per nest)	62	109	65
Incubation Period (in days)	60	45	50

Why is it necessary to protect the eggs?

If the eggs are not incubated, no turtles will hatch. In order to recover and increase the population of sea turtles, we need to produce the largest possible number of healthy offspring, we apply suitable management techniques.

When do we protect the nests?

Ideally, the nests should be left in place in their natural positions. But their are negative factors that influence our decision to relocate the nests.

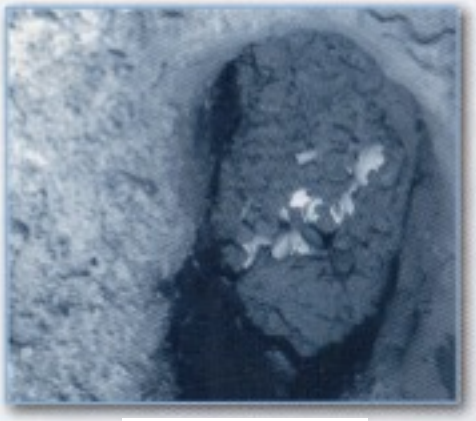
Natural: Tidal Flooding or erosion, natural predators like coyotes, skunks, opossums, and many types of sea birds.

Humans: Poaching, domestic animals like dogs, recreational or vehicular use of the beach

A good working relationship between organizations, communities and authorities is vital to program success.

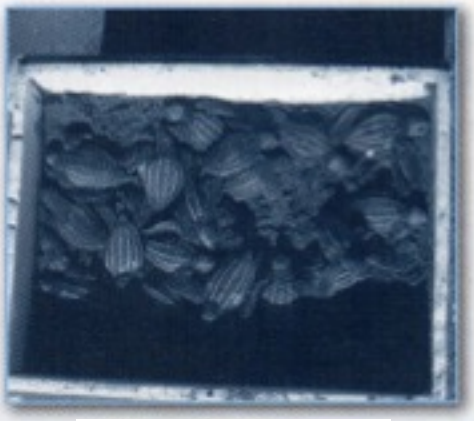
EACH INCUBATION TECHNIQUE HAS ADVANTAGES

Natural Site	Incubation Corral	Incubation Greenhouse
Most natural type of incubation	The nests are protected in a zone near the beach	The nests are protected against harmful factors on the beach
The eggs are not relocated, so they are not damaged by movement or vibration	The eggs are planted in nests of the same form and size as natural nests	If there are economic resources and capacity, good control can be achieved over the factors influencing incubation
The hatching percentage is natural for the population.	There are straightforward techniques for best management of the hatching	Trained technicians are able to achieve a higher hatching rate and potentially increasing the number of females
Efforts are focused on protecting the beach and the ocean as the home of the sea turtles.	The corral prevents depredation and poaching of the eggs.	The relocation of the eggs, prevents depredation and poaching
Does not require spending on construction materials	The corral can be constructed with material from the region	The passive solar heating of the greenhouse increases sand temps



Natural Site

Corral



Incubation Greenhouse

EACH INCUBATION TECHNIQUE HAS DISADVANTAGES

Natural Site	Incubation Corral	Incubation Greenhouse
Loss of nests to poaching and predators	Danger of hatchling loss to birds or from infestations of flies & beetles	Requires increased monitoring to carefully control incubation temperatures
Loss of nests from flooding or erosion	Death of embryos from improper techniques of collection, transport and replanting	Potential injury or death if hatchlings are not monitored carefully when hatching under high temperatures
Loss of nests or breakage of eggs from sand compaction due to vehicles, humans, or livestock	Requires resources to purchase construction materials	Requires resources to construct, maintain and monitor
Difficulty in evaluating the success of the incubation without providing adequate security to the nests	Diminished quantities of offspring compared with natural site nests	Requires more volunteer man hours to construct, maintain and monitor the greenhouse facilities
Difficulty with the need to maintain vigilance in protecting entirely the large nesting areas	Requires constant vigilance, cleanliness and care	Requires constant vigilance, cleanliness and care

Recovery and Collection of Nests

During the recovery and collection of nests, the following rules should be observed:

- Do not bother the the turtles: use minimal lighting and avoid direct contact as this may frighten or disorient them.
- The collections should occur daily and throughout the entire night.
- Collection of the eggs should take place with two hours after being laid by the female.
- Collect the eggs with the least amount of sand possible. It is best to "catch" the eggs in a bag, directly from the turtle as they are being laid, or carefully with your hands. (Fig.1)
- When collecting the eggs, do not mix the eggs of different turtles in the same bag. (Fig.2)
- The transport of the eggs to the corral should be as rapid as possible, but always with care. (Fig.3)

Fig. 1

Fig. 2

Fig. 3

The eggs must always be treated with care. Avoid jostling , cracking, shaking, or breaking them. And never expose the eggs to the sun.

It is important to know and record the total number of eggs laid that contain yolks. You should record any eggs lost to predators, poaching, or breakage. In the case of the Leatherback turtle, there will be smaller infertile eggs without yolks, that should not be counted. To identify the presence of yolks you can use a light to backlight the eggs. Eggs with yolks will appear yellow inside. (Fig. 5)

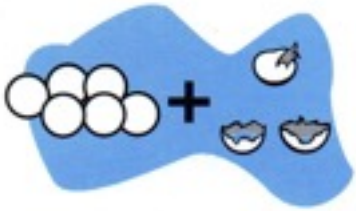


Fig. 4

REGISTRATION FORMS

Each collected nest should have a form or registration card prepared with the following data:

Date	June 24, 2014
Beach	La Cachora
Species	Leatherback
Nest # Assigned	# 003
Eggs Replanted	68
Eggs Broken	2
Eggs Lost to Poaching/Predators	0
Total of Eggs Laid	70
Observations	turtle had damaged right front flipper

Selection of the Site

- The corral should be located on or near the same beach where the eggs are collected and it should be monitored regularly.
- The best site will be flat, free of rocks, trees and vegetation, and standing water.
- Care should be taken to insure that the area is far enough from the sea to insure that tidal swells and waves do not inundate the corral area. It should also be located far enough from vegetation to insure that roots do not interfere with the eggs or the emerging hatchlings.
- Do not locate the corral in the same site year after year.
- Try to use an area of the beach where the majority of the nesting is occurring.

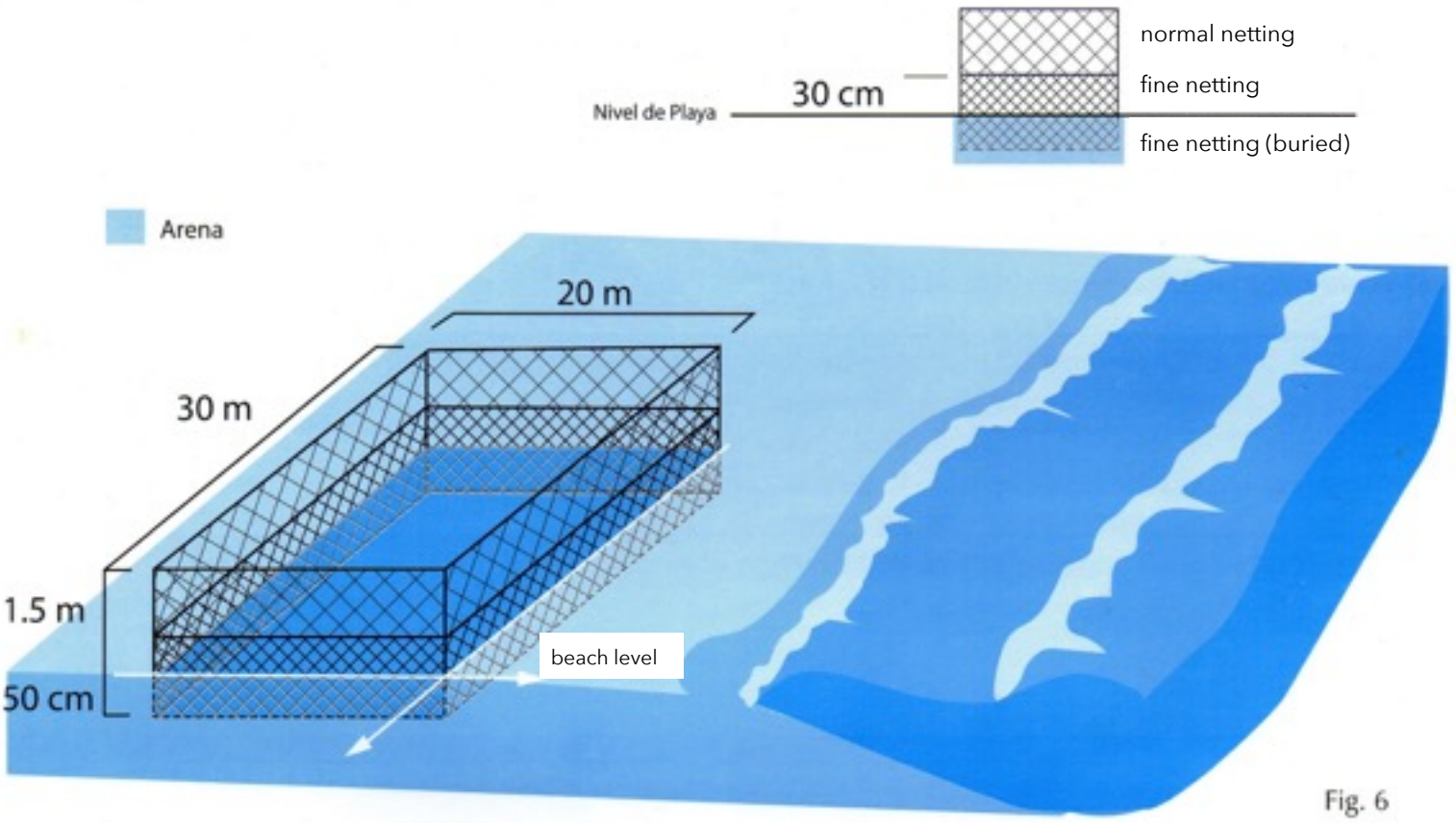


Fig. 6

Materials

- Any solid material which represents an obstacle to predators and is also durable may be used.
- The size of the corral depends upon the quantity of nests that are being collected. A corral of 60 x 100 feet is sufficient to accommodate up to 500 nests.
- The enclosure should have a minimum height of five feet, and the surrounding material should be buried 12-18 inches into the sand to prevent the entry of predators.
- It is important that the buried material be fine enough to prevent the entry of digging predators like crabs and also to prevent the escape of hatchlings.

What is the form of a nest?

The nests of sea turtles all have a "boot shaped" consisting of the following parts:

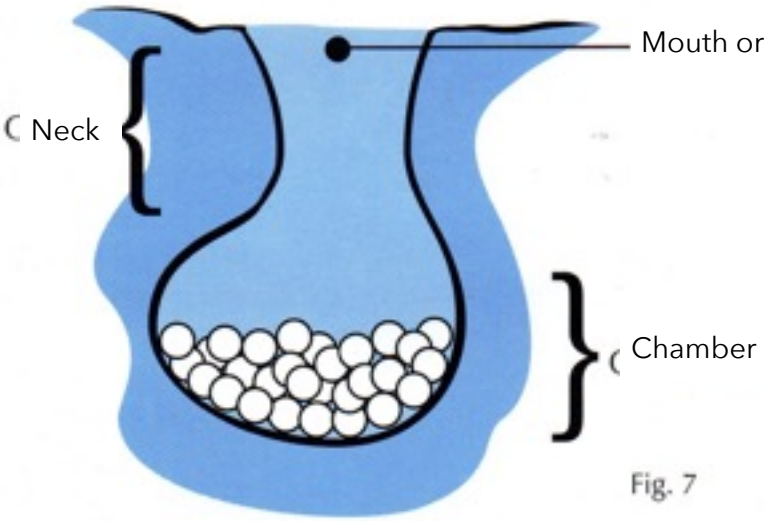


Fig. 7

How large is a nest?

	LEATHERBACK	OLIVE RIDLEY	BLACK TURTLE
Width of the mouth and the neck	30 - 35 cm	20 - 25 cm	20 - 25 cm
Length of the neck	35 - 40 cm	15 - 20 cm	20 - 25 cm
Length of the chamber	40 - 45 cm	25 - 30 cm	25 - 30 cm
Total depth	80 cm	45 cm	50 cm

How do you make a nest?

1. Remove the superficial dry sand. (Fig. 8)

Fig. 8

2. Dig to the appropriate depth for the species. (Fig. 9)

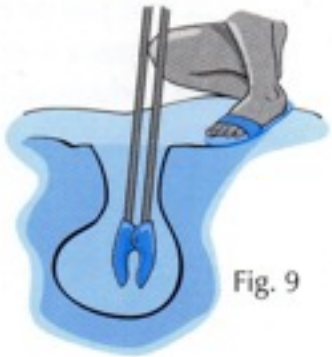


Fig. 9

3. Use the hands to round out the incubation chamber giving the nest a teardrop shape. (Fig. 10)

Fig. 10

4. Place the eggs on the bottom of the hole, being careful not to drop them. The eggs should occupy only the chamber and not the neck area. If it is necessary to enlarge the nest, be careful not to make it deeper. (Fig. 11)

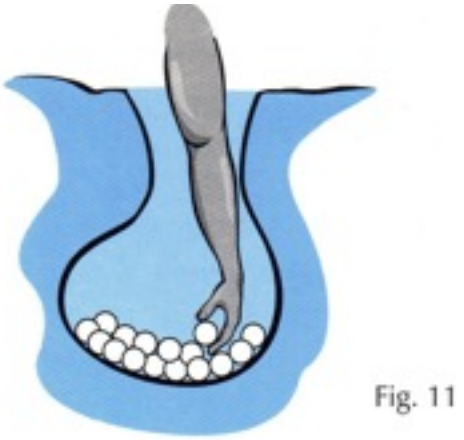


Fig. 11

5. When finished placing eggs, fill the nest with moist sand that you removed when constructing it. Firming the sand every few inches, patting gently so as not to jar the eggs. (Fig. 12)

Fig. 12

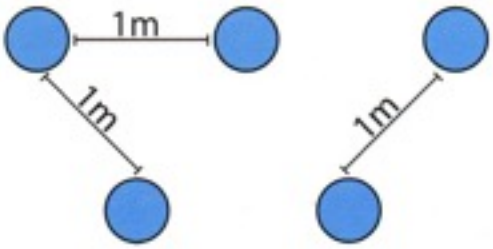


Fig. 13

6. Locate the nests approximately three feet apart in alternate rows. (Fig. 13)

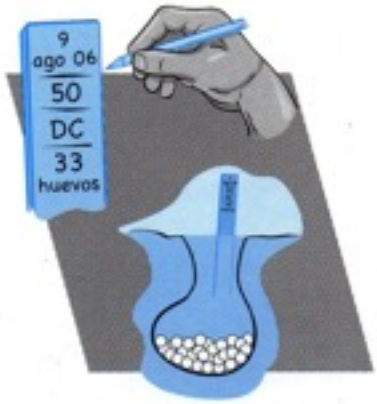


Fig. 14

7. Prepare and place a stake with the date, number of the nest, species, and number of eggs. Always in the same order. (Fig. 14)

How do you care for the nest?

- Be vigilant about protecting the nests from predators like birds, dogs and ants.
- Protect the nests with a light fabric, like tule to prevent infestations of flies. Do not wet the nests.
- Do not throw trash, eat, or smoke inside of the incubation corral.
- Only authorized people should be allowed entrance to the corral. Do not walk between the nests unless it is necessary to do so. Use caution not to step on the nests or to disturb the marker stakes.
- Do not shade the nests unless advised to do so my an expert who is monitoring the incubation temperatures.

Emergence and Release of the Hatchlings

- Ten days before the date of the expected emergence of the hatchlings, position wire cages over the tops of the nests and bury the edges into the wet sand. Cover the tops of the cages and shade them. (fig. 15, following page.
- The nursery should be monitored constantly, at least each hour, until all of the hatchlings have emerged. This is important to prevent the hatchlings dying of heat stroke or being taken by a predator.
- Count the hatchlings from each nest carefully.
- Place the hatchlings in a container filled with moist sand.
- The hatchlings should be set free immediately after they have surfaced and are active, without regard to the time of day.

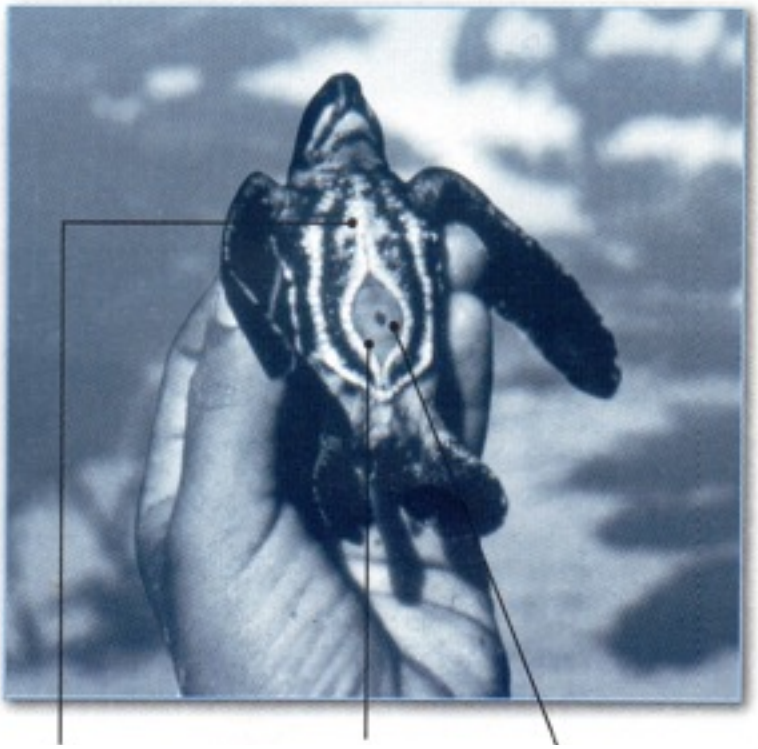
- If you recover the hatchlings and they are not active, place them in a container with moist sand in a safe area out of the sun and away from predators until they become active. **Never place them in water.**
- Allow the hatchlings to move about the sand before they enter the sea.
- Frequently, change the place where the hatchlings are released.
- Take care that there are no birds, dogs or crabs in the area.
- Before leaving the area, make certain that all of the hatchlings have entered the sea and that none have been washed back onto the beach by the waves.
- The hatchlings should be retained only if they have a protrusion/opening on their bellies where you can see part of the yolk from the egg remaining. (see photo on page 11)
- Place such hatchlings in a covered container with moist sand and wait until the opening has closed and the hatchling becomes active to liberate it.

Fig. 15

Review and Cleaning of the Nests

- Remove the contents of the nest after half of the hatchlings have emerged (based on the egg count of the nest) or wait until the third day after the emergence of the first hatchling.
- It is recommended that you use gloves (cleaning or surgical)
- Remove any live hatchlings or embryos that you find
  - If the hatchling has not fully emerged from the shell and still has a pronounced yolk, a) place the hatchling, preferably with shell still attached into a container with moist and clean sand. Cover and bury the container. or b) rebury the hatchling in a new nest within the corral, and wait for it to emerge on its own.
  - If the hatchling still has an opening on it's belly, without attached yolk, place such hatchlings in a covered container with moist sand and wait until the opening has closed and the hatchling becomes active to liberate it.
- Remove and bury any remaining contents of the nest. (eggshells, dead embryos, or unhatched eggs) This should be done far from the incubation corral so as not to attract predators, turning them into a persistent problem.

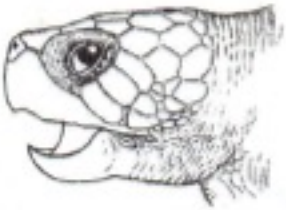
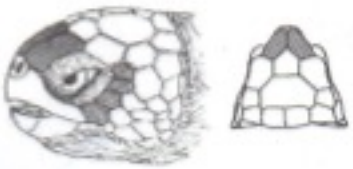
Hatchling not fully emerged from the shell



side of the hatchling umbilical opening yolk

Observation of Dead Turtles (when discovered)

- note the species, sex, approximate size and age if possible to determine.
- check the four fins for the presence of marks or distinguishing characteristics.
- make notes of any injuries or scars and the state of decomposition.
- record the date the turtle was observed and it's location or section of the beach

	LEATHERBACK	OLIVE RIDLEY	BLACK TURTLE
Characteristics	Soft shell with seven quadrants, bluish gray skin-like covering with white markings but without scales.	Hard shell with more than six shield-like sections forming a circular shape. Olive green to yellow.	Hard shell, elongated toward the rear, with four pair shield-like sections and a pair of prefrontal scales on the head.
Adult	more than 140cm length shell.	more than 60cm length shell.	more than 70cm length shell.
Juvenile	less than 140cm length shell.	less than 60cm length shell.	less than 70cm length shell.
Male	large fat tail, surpassing the length of the shell, without nails	large fat tail, surpassing the length of the shell, large curved nails on front flippers	large fat tail, surpassing the length of the shell, large curved nails on front flippers
Female	small tail and flippers	small tail and flippers	small tail and flippers
Shape of the Shell			
Head Shape			

1 Tomado de: Márquez, R. 1995. **GuíaFAO para la identificación de especies para los fines de la pesca.**

GLOSARIO

Caparazón: concha de la tortuga

Cloaca: parte de la tortuga por donde salen los huevos, debajo de la cola

Chelonia mydas: nombre científico de la tortuga prieta, que también es llamada negra, sacasillo o parlama

Depredadores: animales que atacan a las tortugas o sus crías

Dermochelys coriacea: nombre científico de la tortuga laúd, que también es llamada garapacho, machincuepo, siete filos, de canal o burrón

Eclosión: cuando la tortuguita rompe el cascarón

Embrión: tortuguita desarrollándose dentro del huevo

Emergencia: salida de las tortuguitas a la superficie

Erosión: cuando el viento o la marea arrastran la arena que cubre un nido

Incubación: proceso por el cual se desarrollan las tortuguitas

***In situ*:** nidada que se queda donde la dejó la tortuga

Intervalo de puesta: tiempo que transcurre entre dos puestas de una tortuga

Intervalo de remigración: tiempo que tarda una tortuga en regresar a la playa a poner, en diferentes temporadas

Lepidochelys olivacea: nombre científico de la tortuga golfina, que también es llamada simplemente tortuga

Nidada: conjunto de huevos que pone una tortuga

Nido: lugar donde la tortuga pone los huevos

Plastrón o peto: vientre ("panza") de la tortuga

Vitelo: yema del huevo

Vivero: corral donde se reubican las nidadas para protegerlas

Glossary

Caparazon

Cloaca

Chelonia Mydas

Predators

Dermochelys coriacea

Eclosion

Embryo

Emergence

Erosion

Incubation

In situ

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