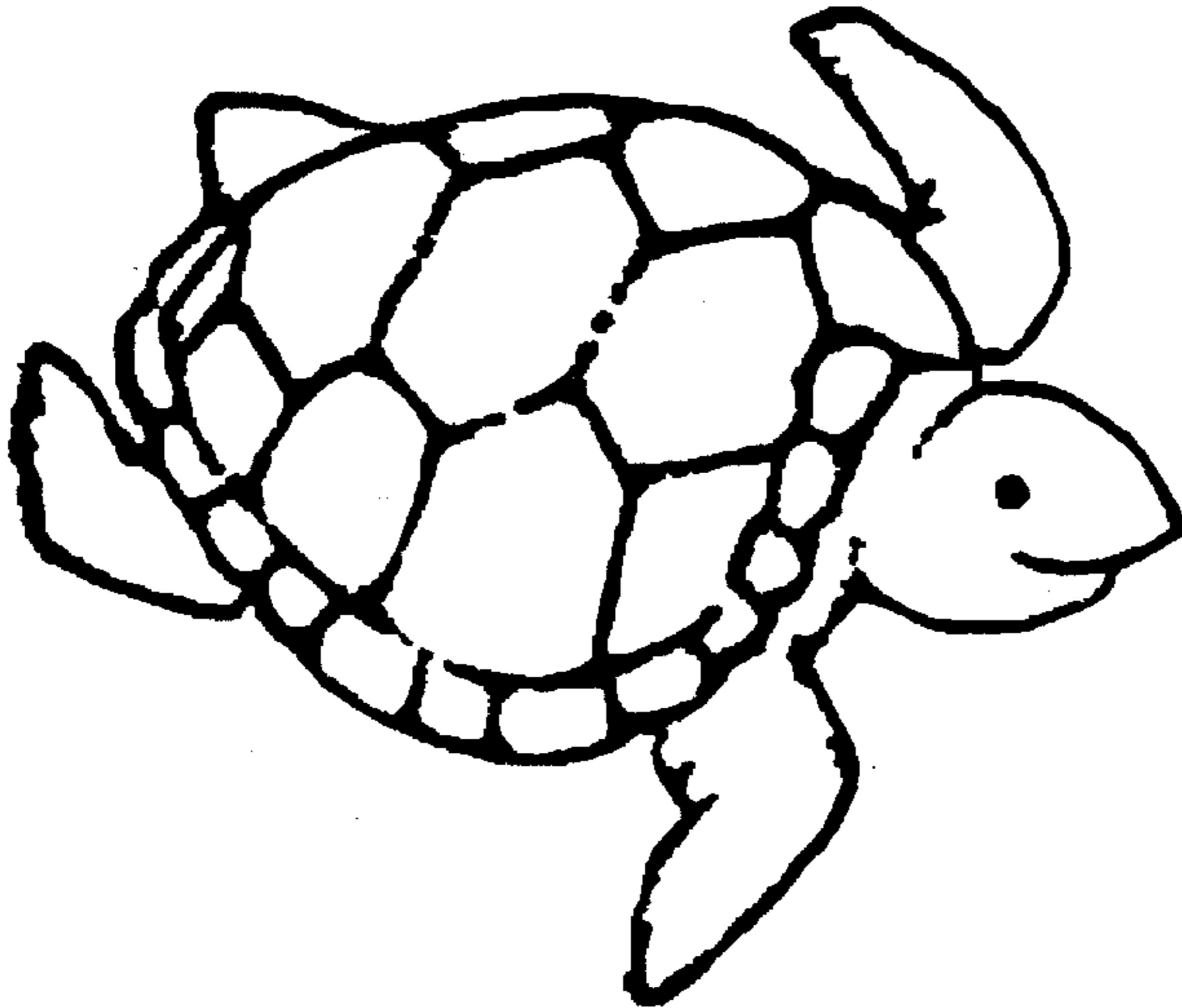


Sea Turtle Activity and Coloring Book



Sea Turtle Research at the
NMFS Galveston Laboratory
Sea Turtle Education Program Supplement

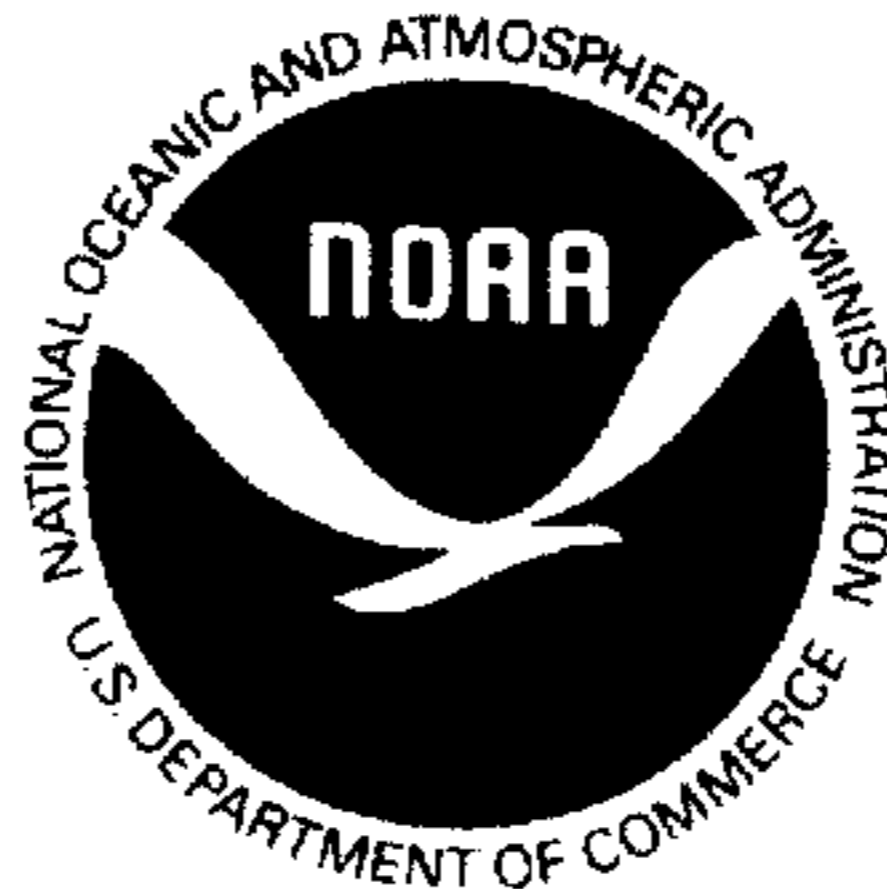


U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
Galveston Laboratory
4700 Avenue U
Galveston, TX 77551-5997

Sea Turtle Activity and Coloring Book

Sea Turtle Research at the
NMFS Galveston Laboratory

Sea Turtle Education Program Supplement



BY

Jo A. Williams and Andrea C. Cannon

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
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4700 Avenue U
Galveston, TX 77551-5997

October 1999

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We would like to acknowledge the following people for contributing illustrations: Ben Higgins (map to lab) and The University of Georgia, Gray's Reef National Marine Sanctuary and Karen Roeder for illustrations of the various sea turtle species, the hatchling used to demonstrate living tags and PIT tags and the shrimp boat with TED insert.

Sea Turtle Research at the National Marine Fisheries Service Galveston, Texas Laboratory

There are 5 different kinds of sea turtles in the Gulf of Mexico: the Loggerhead, Kemp's ridley, Green, Hawksbill and Leatherback. They are all **endangered** or **threatened** because there are very few of them left in the world. The biologists at the National Marine Fisheries Service Galveston Laboratory study sea turtles in many different ways in order to make sure that they survive.

Baby **Kemp's ridley sea turtles** are raised at our lab from the time that they hatch until they are one year old. We use them to learn about different ways of tagging sea turtles. Turtles can live a very long time (maybe up to a hundred years!) and can grow from the size of a fifty cent piece to several hundreds of pounds. We are testing different kinds of tags to see if they will last for the entire lifetime of a turtle and to see if other people can recognize them. The Kemp's ridley **hatchlings** at our lab are tagged with four different kinds of tags: 1) **Flipper tag**, 2) **Living Tag**, 3) **Internal Magnetic Tag** and 4) **Passive Integrated Transponder tag** (PIT tag for short). We release the Kemp's ridley hatchlings back into the Gulf of Mexico.

We raise hatchling **loggerhead** sea turtles at our laboratory until they are 2 years old. Before they are released into the Gulf of Mexico, they are used to test different models of **Turtle Excluder Devices (TEDs)**. A TED is an "escape hatch" that is sewn into the net of a shrimp boats to make sure that turtles don't get caught and drown in the net. Even though sea turtles live in the ocean, they must breathe air just like people. The Loggerheads are only tagged with flipper tags and PIT tags.

Some wild sea turtles (those not raised by our lab) are caught and tagged with other kind of tags that allow us to follow their movements in their natural habitat - the ocean! Radio tags make a beeping sound that we can hear using a radio receiver and antenna. We follow the sea turtles in a boat and record how long they stay underwater. We can also track sea turtles from our lab without ever going out on a boat. A **satellite** that orbits the earth from space picks up the signal from this tag and sends information on the turtle's location to a computer. We can track sea turtles anywhere in the world this way. We track sea turtles to learn more about their

behavior and where they like to live. We want to make sure that humans are not doing anything that could harm them.

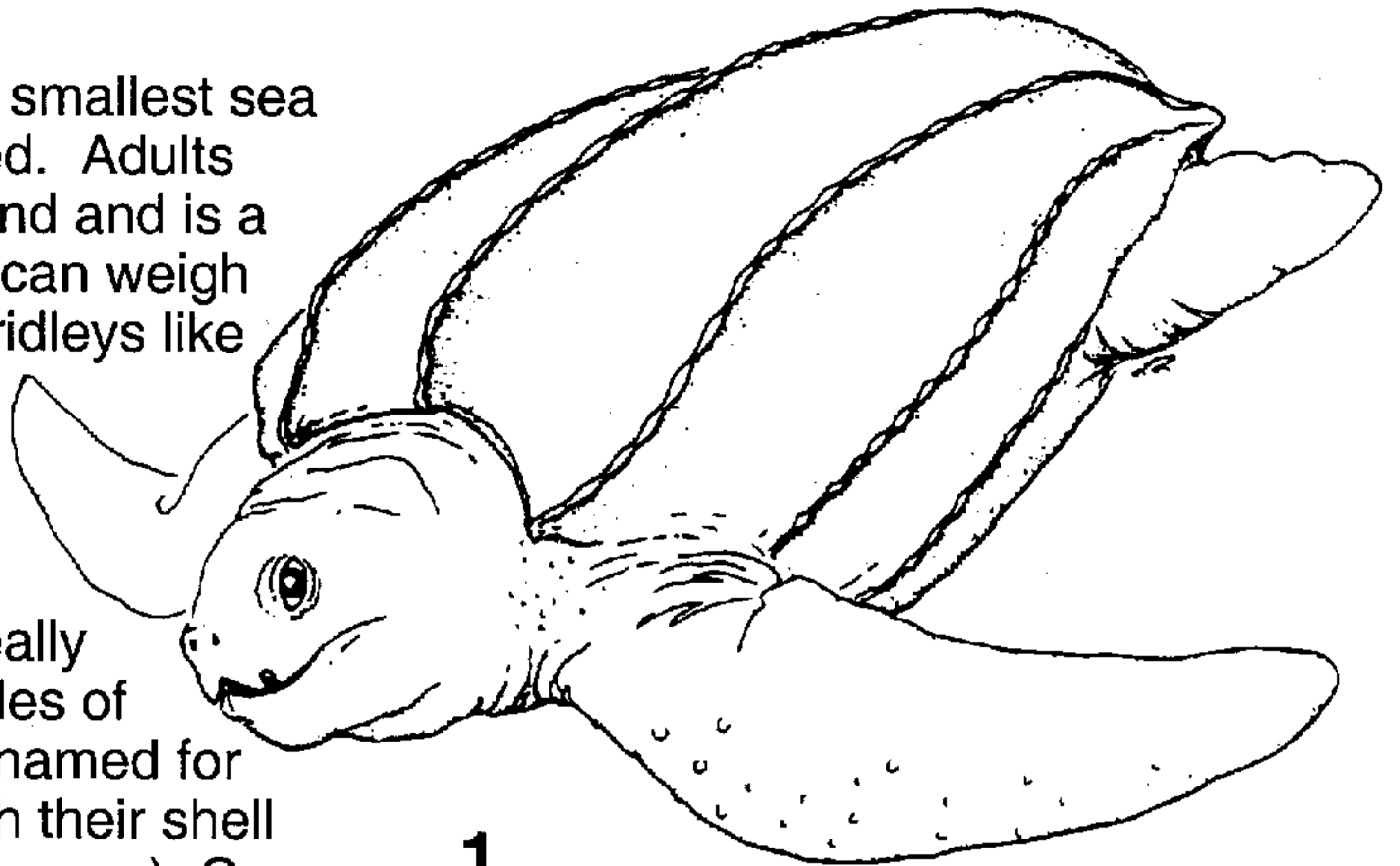
One place that we know sea turtles like to live is near oil platforms in the Gulf of Mexico. Many other sea animals do, too. When they are no longer producing oil, the platforms must be removed. Explosives are used that could injure any animals living nearby. Our laboratory sends observers to the platforms before they are removed to look for sea turtles and dolphins and to make sure that none are hurt by the blast.

Despite all of our efforts, sometimes sea turtles still die or get hurt. Biologists from our lab drive up and down the Texas beaches looking for sea turtles on the beach that are dead or sick or injured. Sea turtles spend their entire lives in the water. Normally, a sea turtle is only found on the beach at two times in its life. The mother sea turtle leaves the ocean to dig a nest on the beach to lay her eggs. After 2 months the baby sea turtles hatch out of the eggs and crawl across the beach to reach the ocean. When a turtle washes up on the beach and it is not nesting or a hatchling that has just left the nest, we call it a **stranding**. If a stranded sea turtle is dead, we try to determine what killed it. This examination is called a **necropsy**. If a sea turtle strands that is still alive, but sick or injured, we bring it back to the turtle "sick bay" at our lab. It is cared for until it is well enough to go back into the ocean. Not all of the sea turtles in the sick bay were stranded. We also take care of turtles that fishermen have caught on hook and line. A veterinarian must remove the hook very carefully to make sure that the turtle is not injured by it. The veterinarian also x-rays the turtle to see if it has swallowed any hooks. The veterinarian may have to operate to remove the hook.

All of the sea turtle research at our laboratory helps us learn more about sea turtle behavior and distribution. Scientists and lawmakers use this information to make decisions that ensure sea turtles will survive.

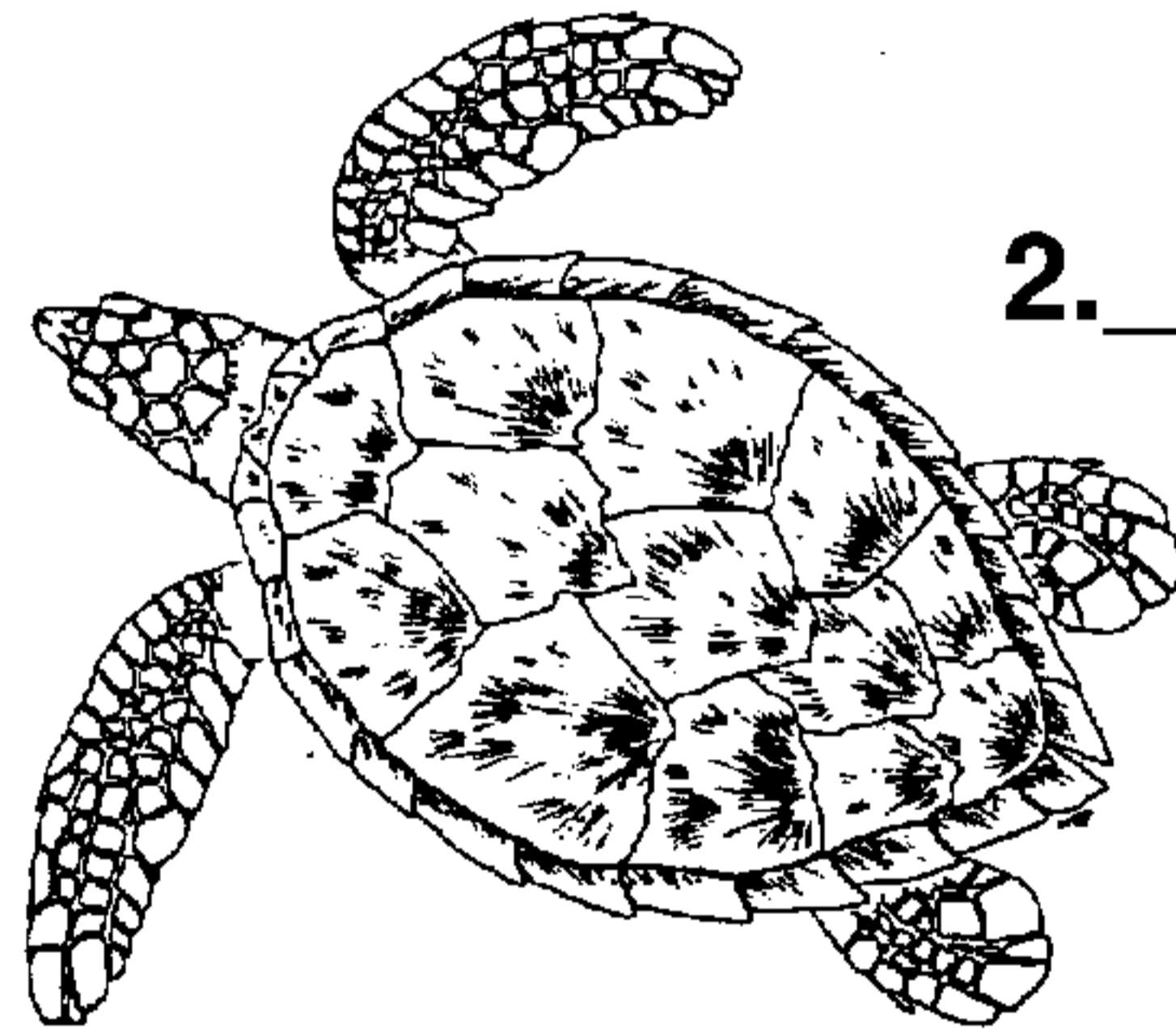
Match the description of the sea turtles with the pictures, then color them the right color.

A. The **Kemp's ridley** is the smallest sea turtle and the most endangered. Adults have a shell that is almost round and is a little over two feet long. They can weigh around 100 pounds. Kemp's ridleys like to eat crabs. Baby ridleys are black, but the adults are olive green.



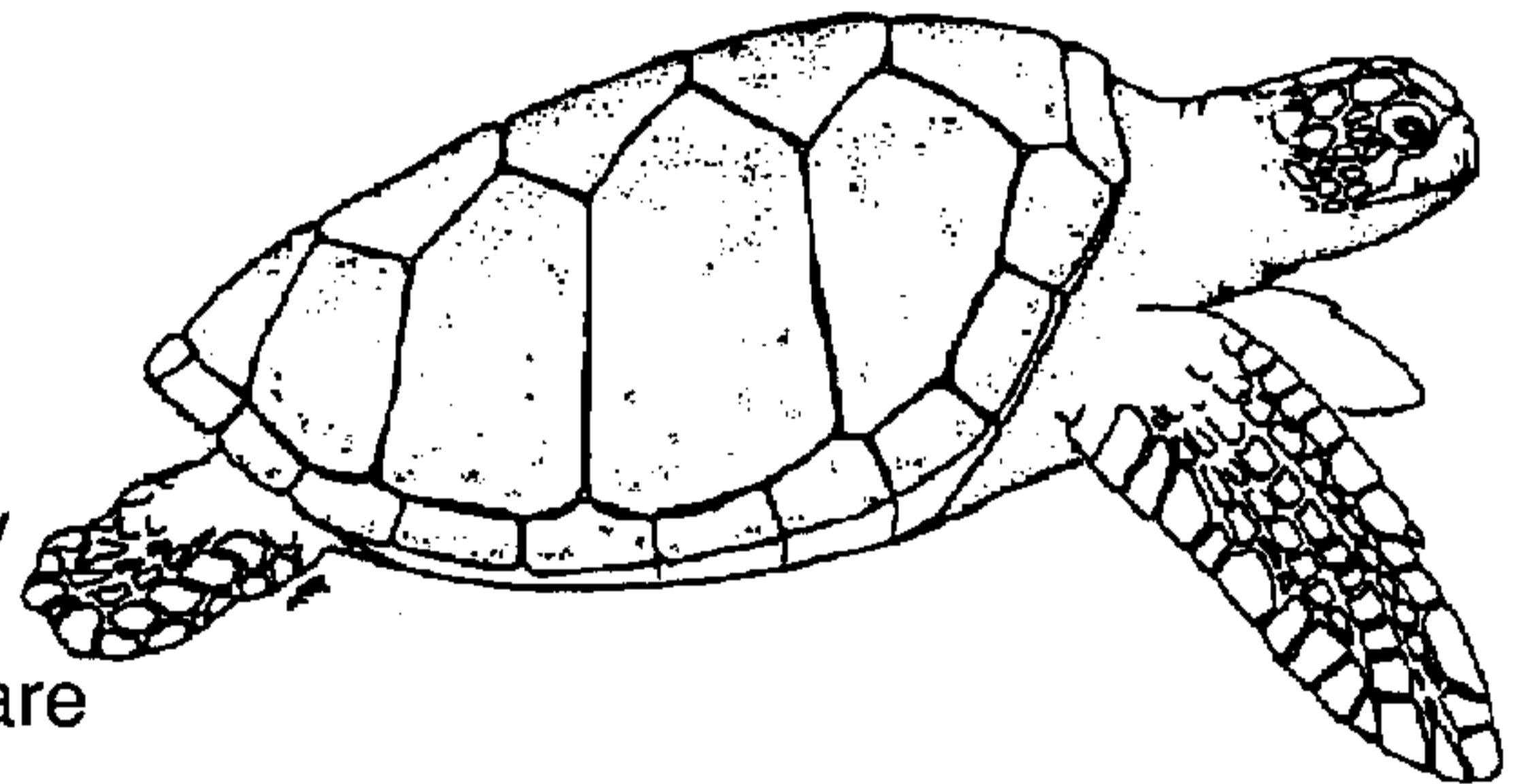
1. _____

B. **Green** sea turtles aren't really green - they are different shades of brown and yellow. (They are named for a green colored fat underneath their shell that was used in making turtle soup.) Green turtles do like to eat green things, though - mostly seagrasses or algae. They are the only sea turtles that are herbivores (plant eaters). Eating only plants must be good because they grow to 3 or 4 feet long and weigh over 300 pounds!



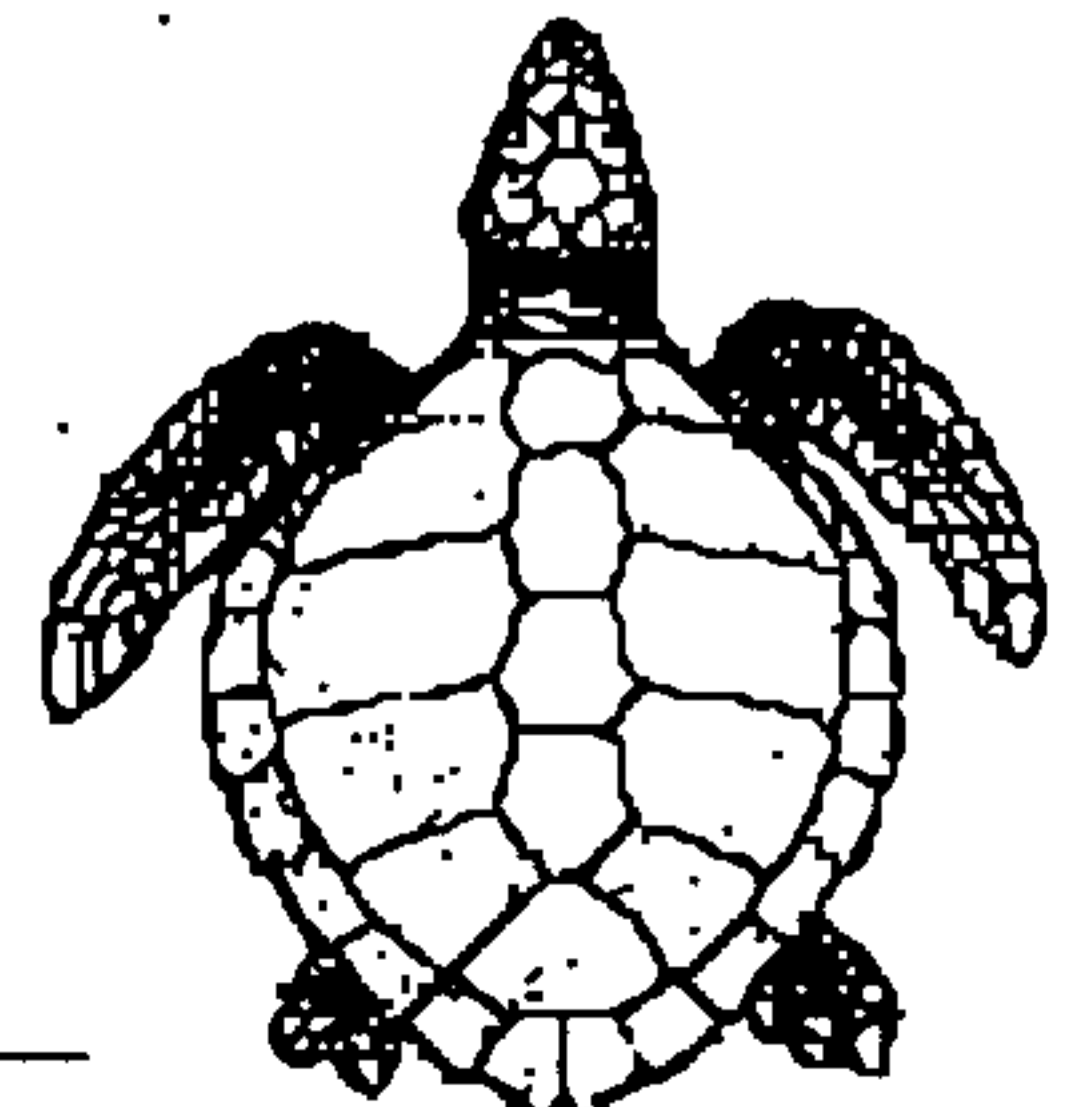
2. _____

C. This is the largest sea turtle of all. It can grow to over 6 feet long and weigh over 1000 pounds. It is black in color and has seven ridges running down its back. It doesn't have a hard shell like other sea turtles. It is covered with a leathery skin. That's where it gets its name - **Leatherback!** Leatherbacks like to eat jellyfish.



3. _____

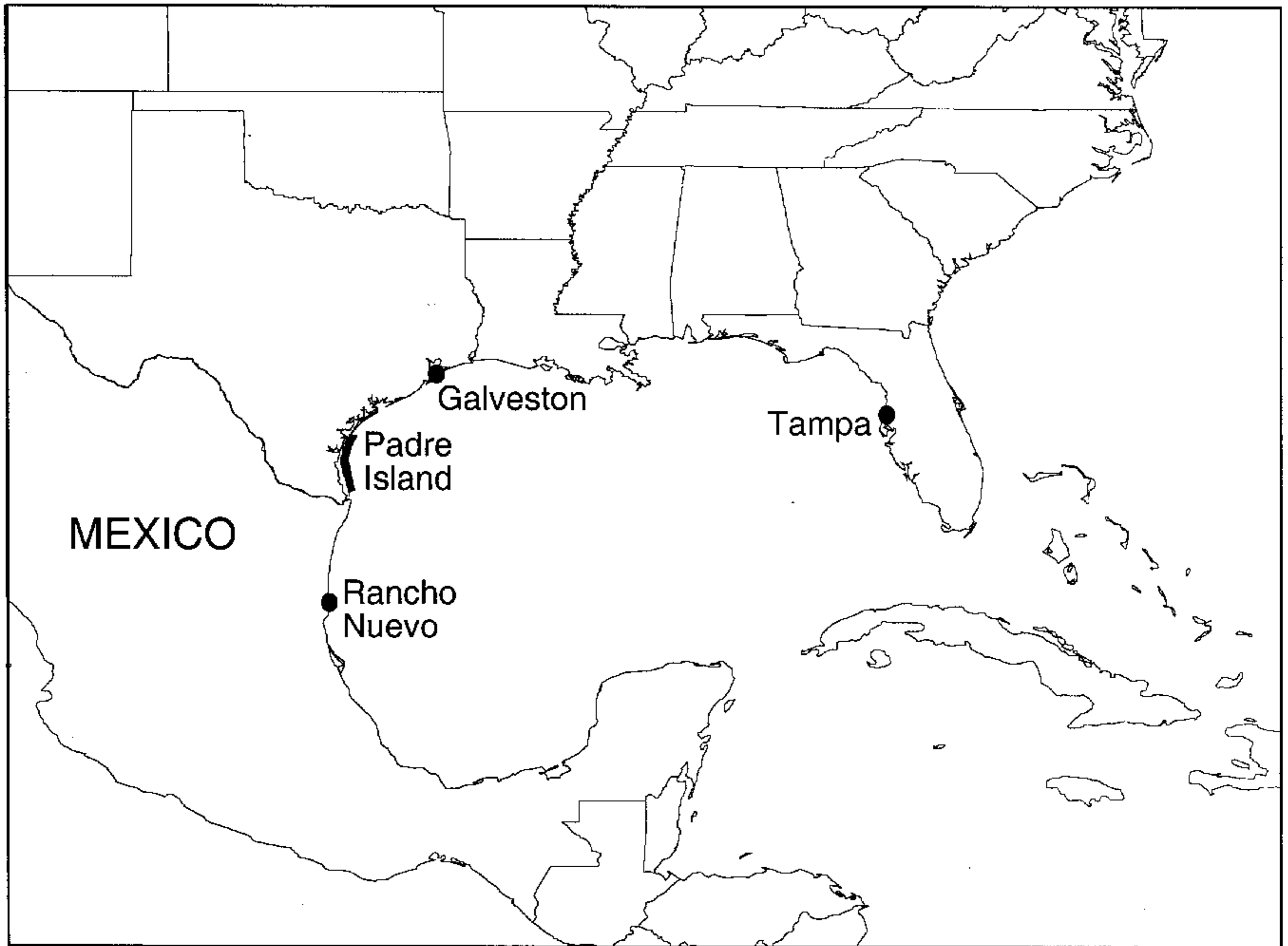
D. **Hawksbill** sea turtles like to eat sponges and they are named for their pointed "beak" that looks like a bird. They have a very beautiful shell that is many different colors of gold and brown. They are endangered because people used their shells to make jewelry. Hawksbills can grow to 200 pounds and get to be 3 feet long.



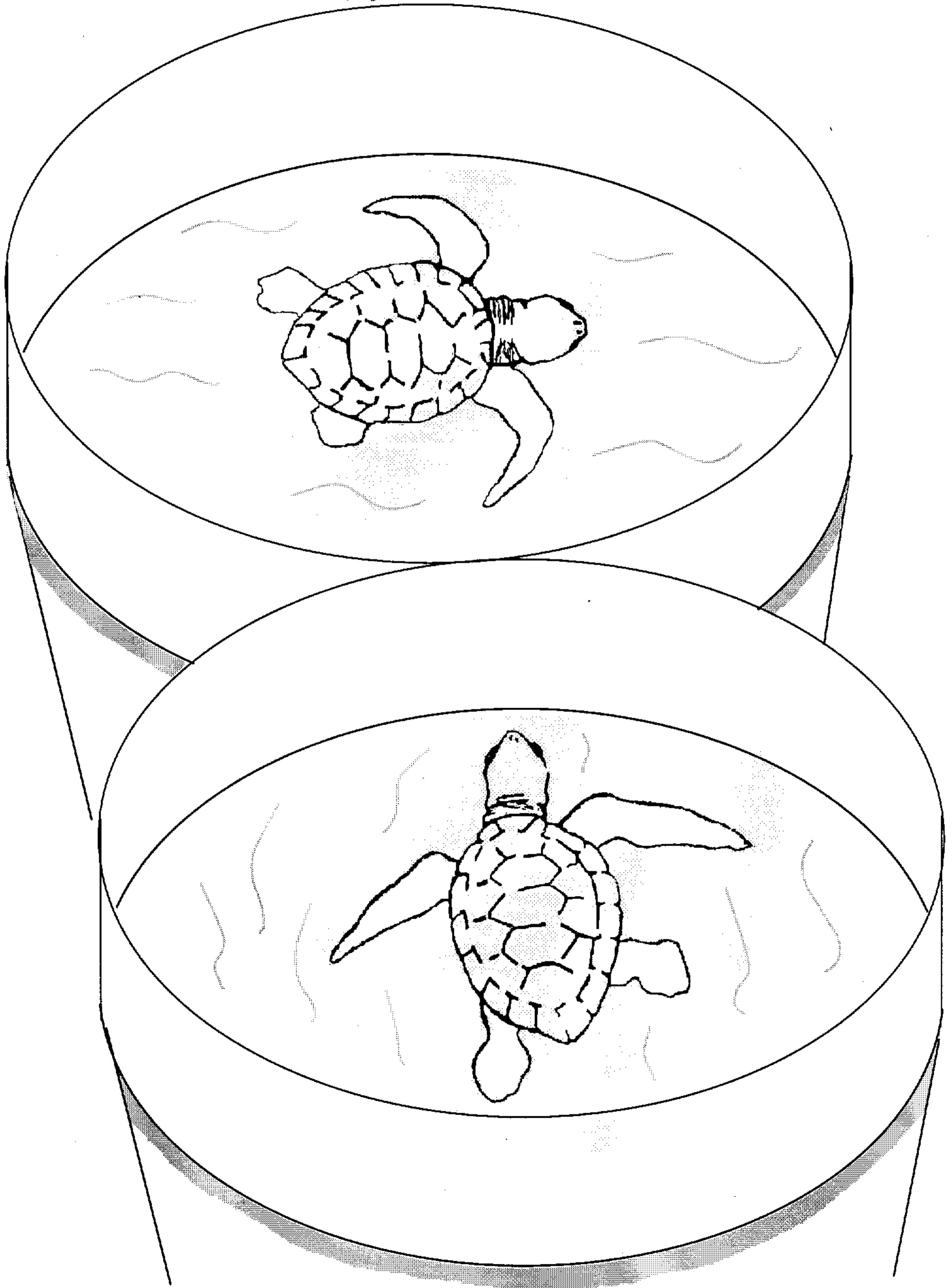
4. _____

Bonus Question: Can you name the type of sea turtle found in the Gulf of Mexico that is not shown here? It is named for its large head. It's a reddish brown color. It also likes to eat crabs and can weigh close to 400 pounds and grow to 3 or 4 feet long.

The National Marine Fisheries Service Galveston Laboratory raises two species of sea turtles. The hatching turtles are collected from their nesting beach. Kemp's ridleys come from Rancho Nuevo, Mexico. This is the only major nesting beach for that species. Kemp's ridley sea turtles nest near Padre Island in Texas occasionally. Loggerhead sea turtles nest in many areas worldwide. The loggerhead hatchlings that we receive come from a beach in Tampa, Florida.

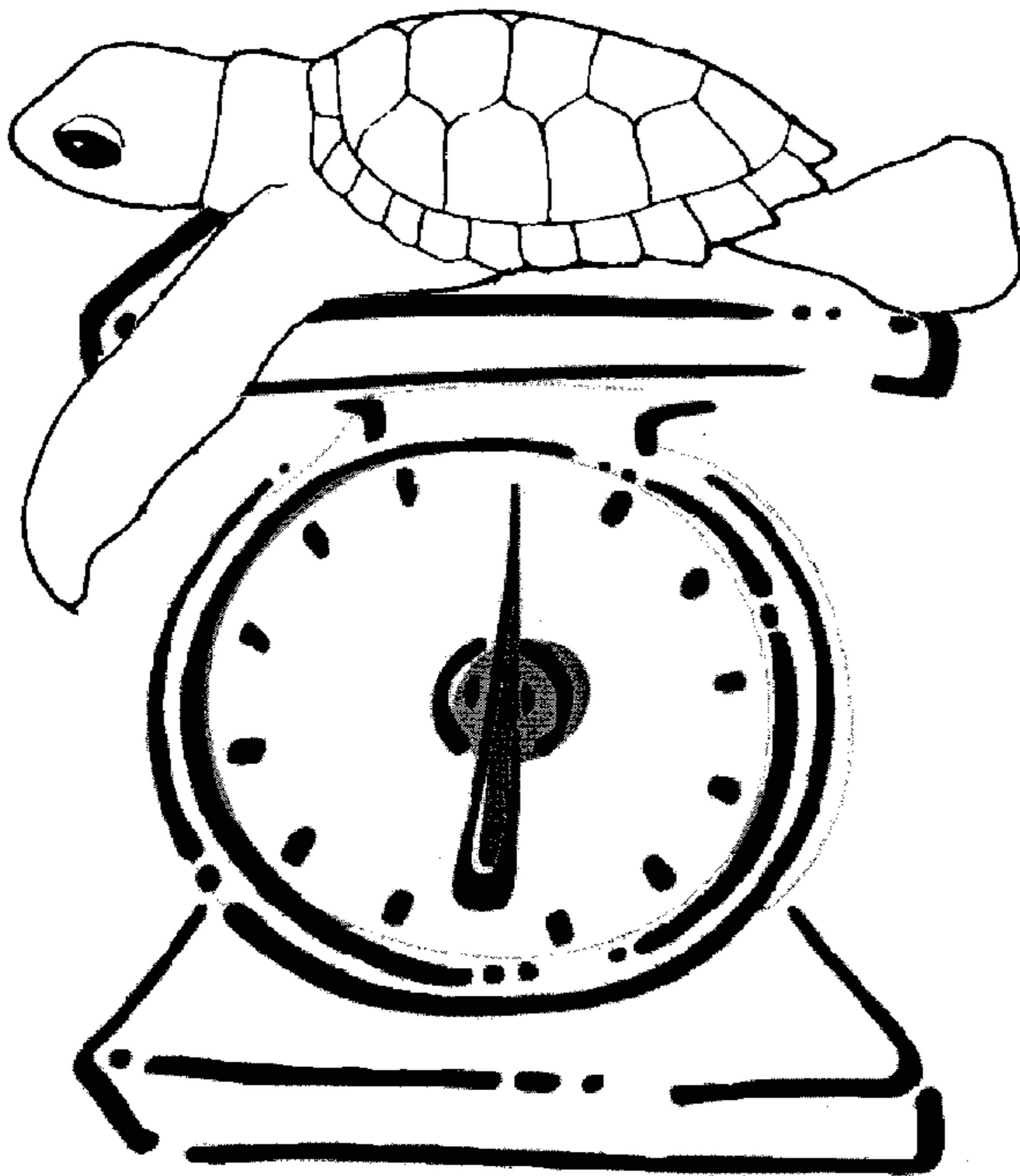


This drawing shows the actual size of a hatchling Loggerhead or Kemp's ridley sea turtle. They are raised in separate containers so that they won't fight with each other. We also want to make sure that each turtle gets the same amount of food. At first, they are placed in flower pots inside of a large tank filled with sea water. They are moved to bigger containers as they grow.



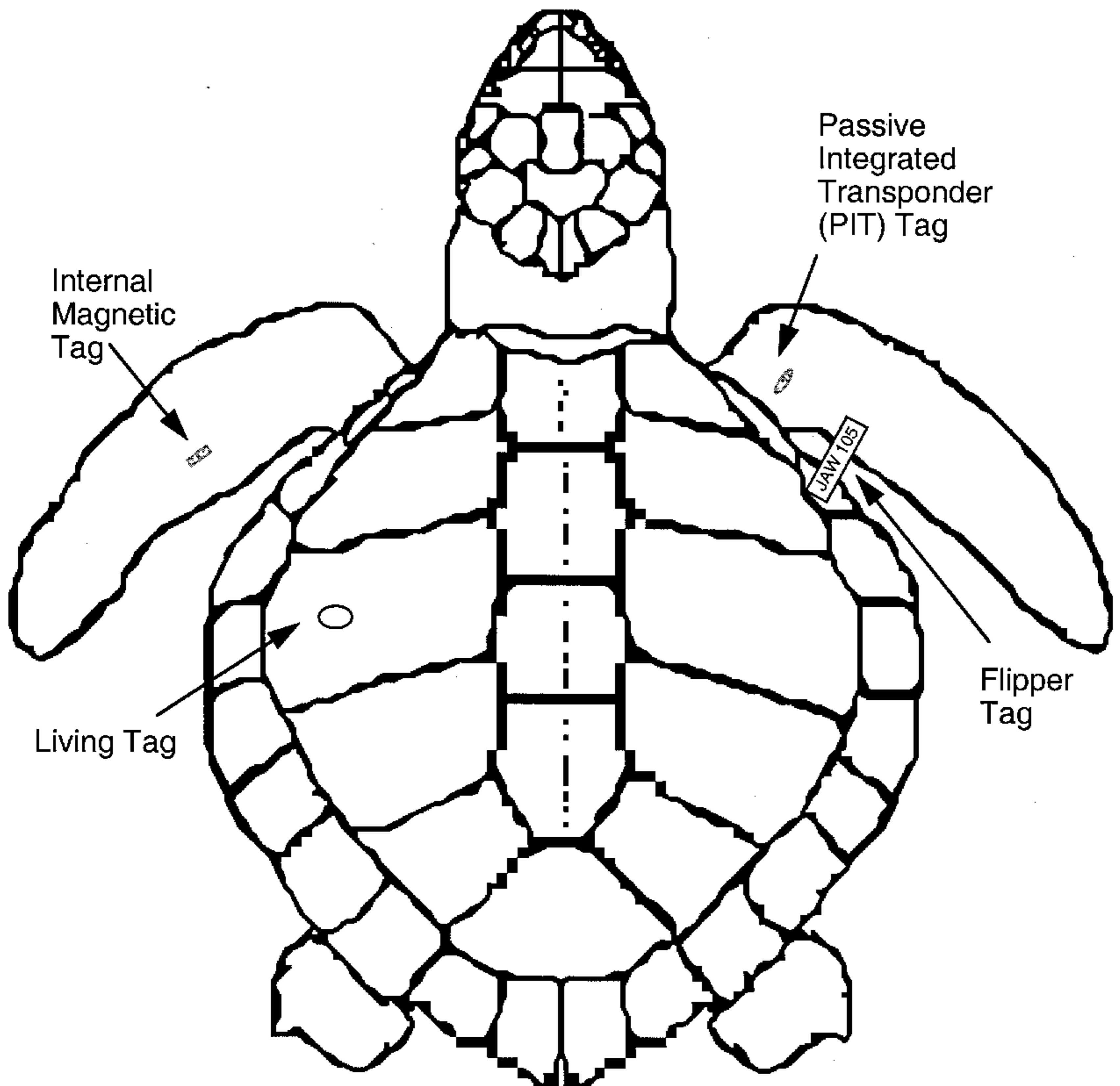
Weighing and Measuring

The turtles are weighed and measured every 2 weeks. The weights are averaged together. The measurements are used to determine how much "turtle chow" they should be fed. The turtles are fed 1% of their body weight each day. It is divided into two feedings - morning and afternoon.



Tags:

Before the yearling Kemp's ridley sea turtles are released, they are tagged with four different types of tags. The living tag and flipper tags are external tags that are visible to anyone who sees the turtle. The magnetic tag and Passive Integrated Transponder (PIT for short) are internal tags that are injected into the flipper with a **syringe**. Special equipment must be used to know if a turtle has been tagged with these tags. The Loggerhead turtles that we raise are only tagged with flipper tags and PIT tags.



Flipper Tags:

Most flipper tags have numbers and letters on them (such as JAW 105) that help biologists tell different sea turtles apart. They also have an address on the opposite side. If you see a tagged sea turtle, you should report the tag number to the address on the tag. Other information on species, size and location of the turtle should also be reported. The flipper tags may fall off after several years because the turtles outgrow them. That is why we use 3 other types of tags also. Usually, the flipper tags don't spell words, but the tags below will if you can unscramble the letters!

1. _____



2. _____



3. _____



4. _____



5. _____



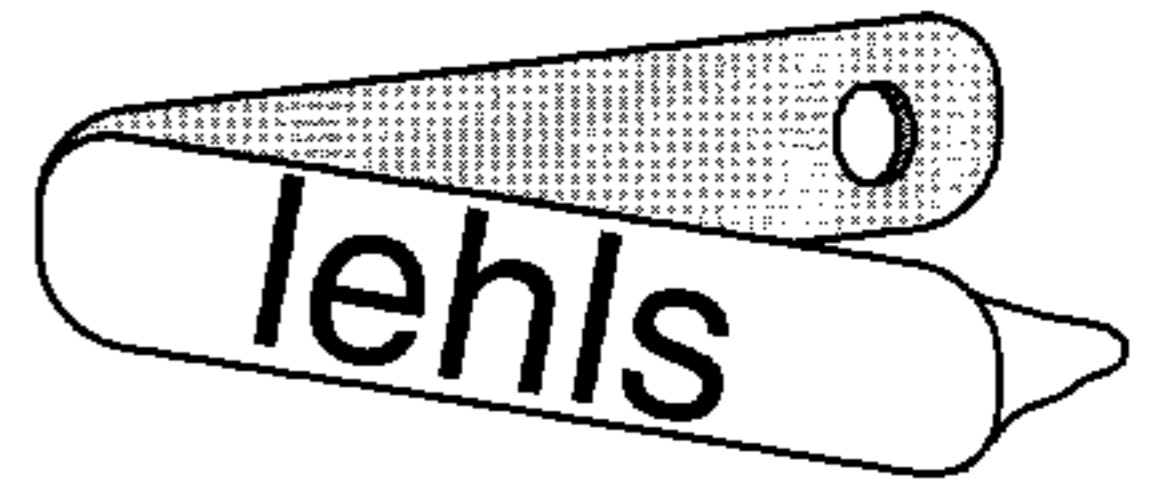
6. _____



7. _____

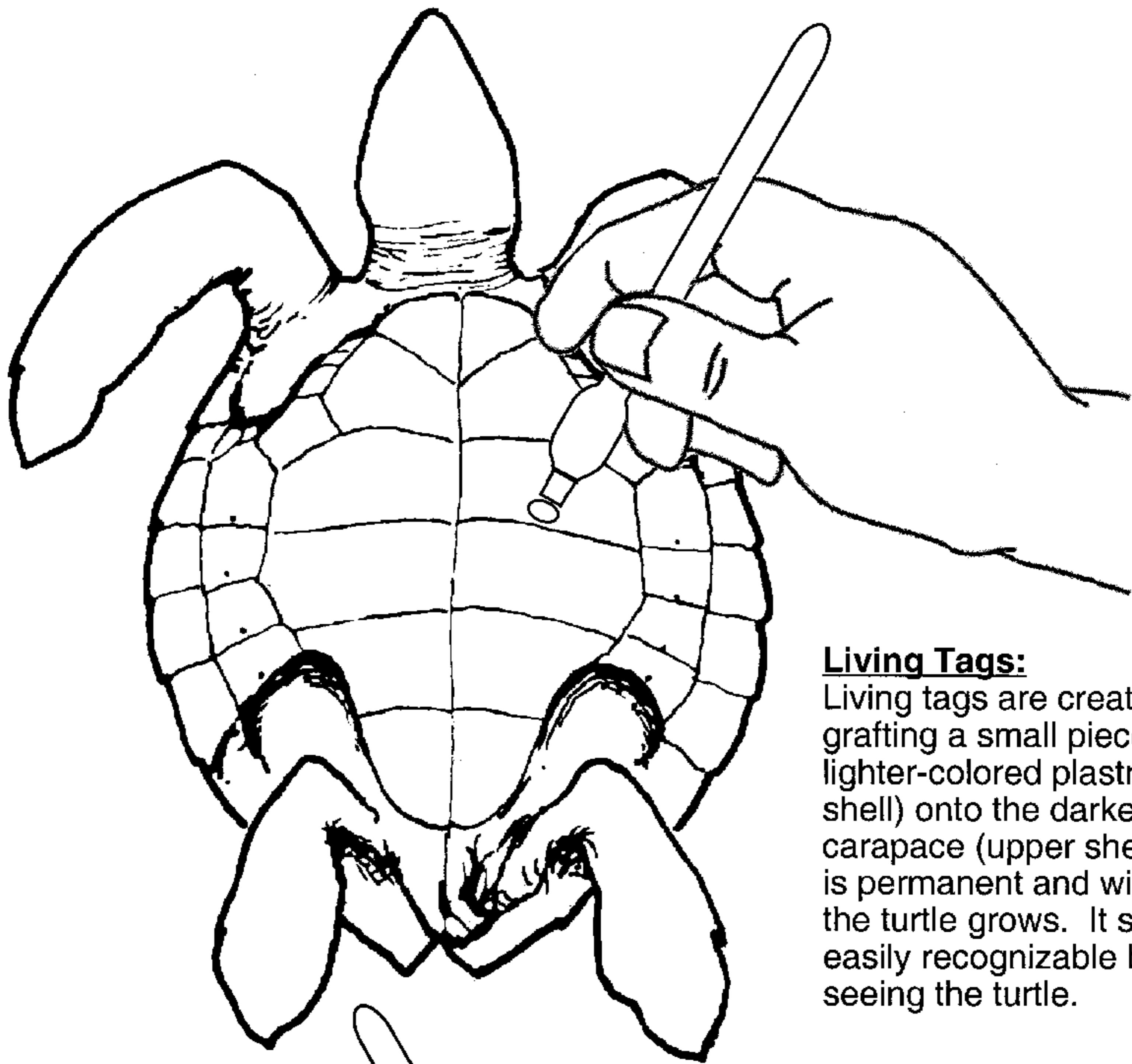


8. _____



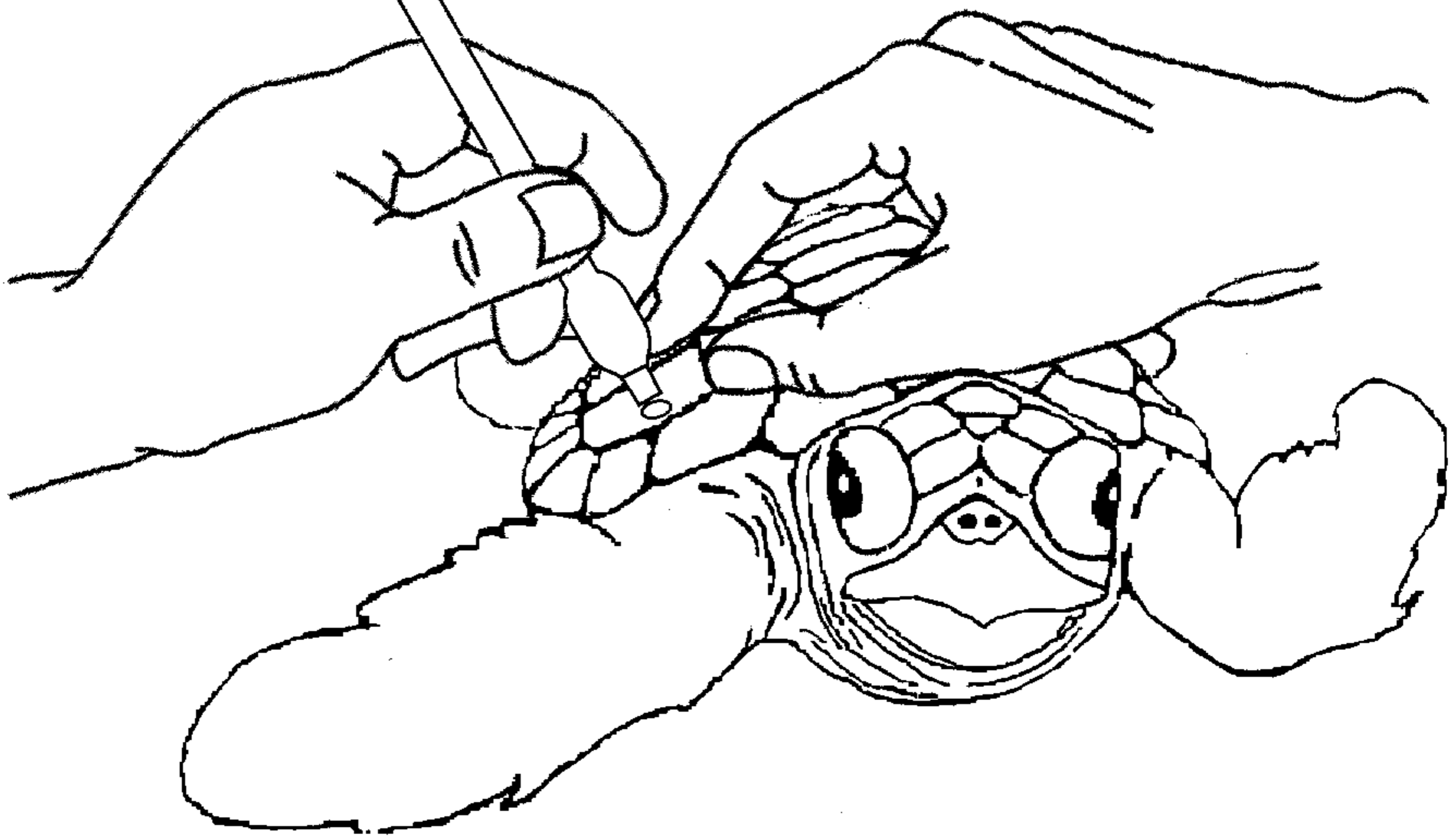
9. _____





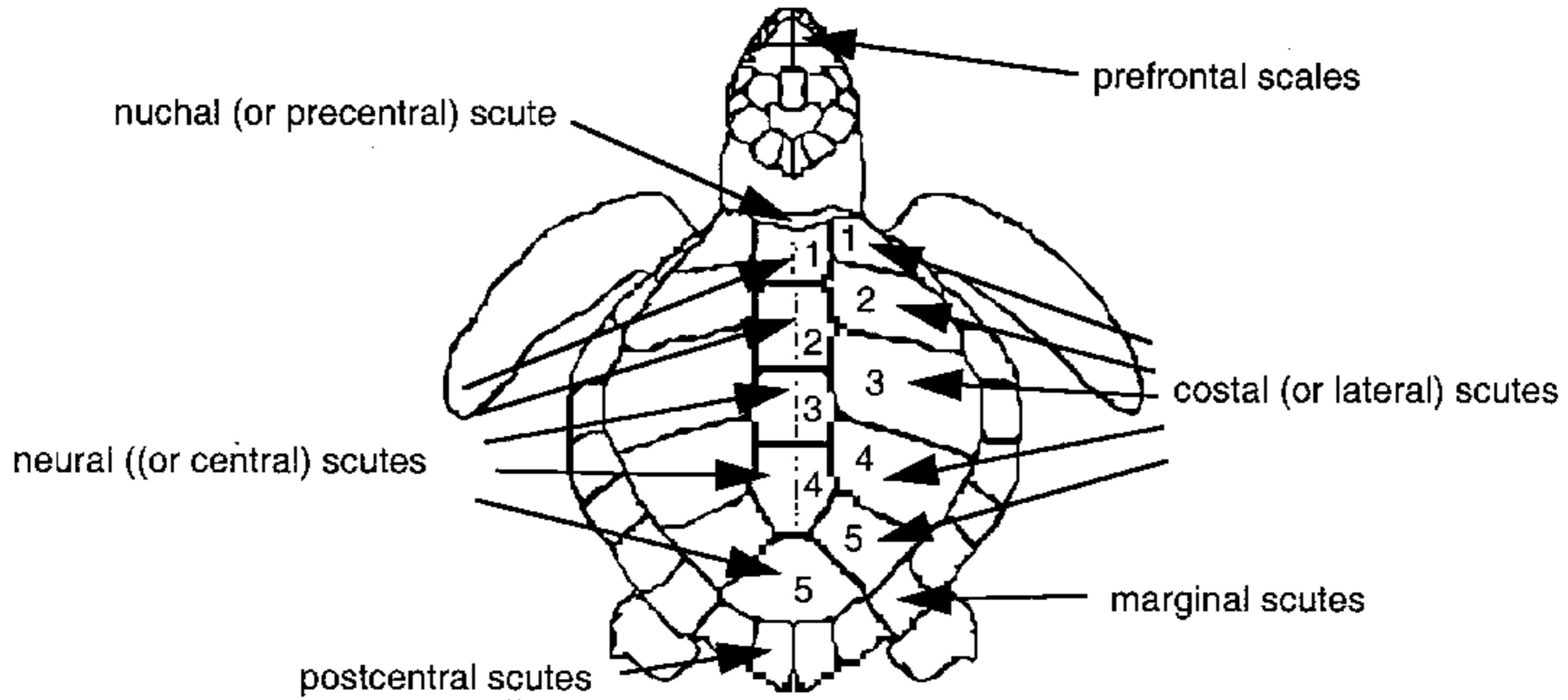
Living Tags:

Living tags are created by grafting a small piece of the lighter-colored plastron (lower shell) onto the darker-colored carapace (upper shell). This tag is permanent and will grow as the turtle grows. It should be easily recognizable by anyone seeing the turtle.

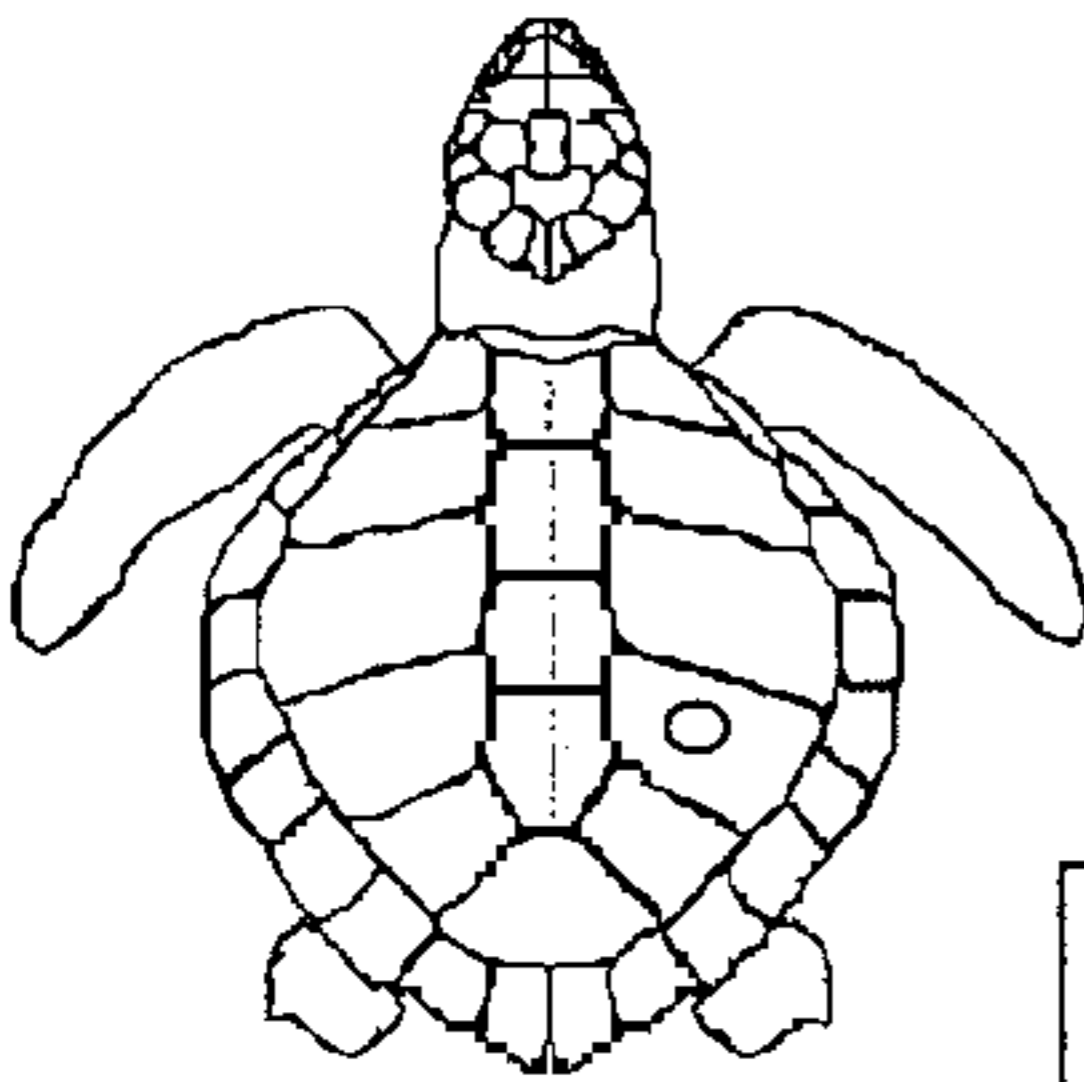


Living Tags:

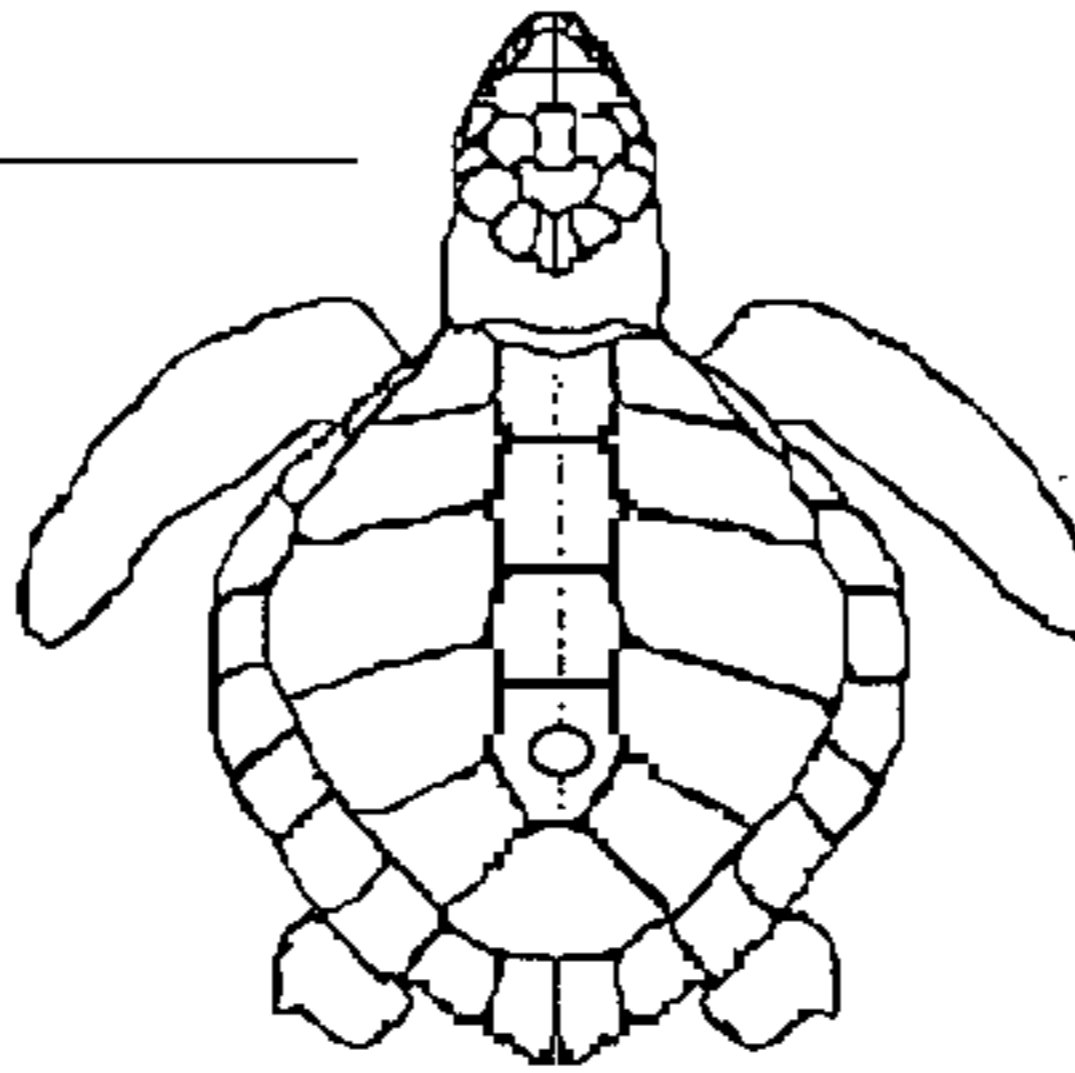
Every year we place the living tag on a different scute (scale) on the shell. The living tag will grow as the turtle grows leaving a permanent white spot on the shell. See if you can identify which year class each of the turtles below belongs to.



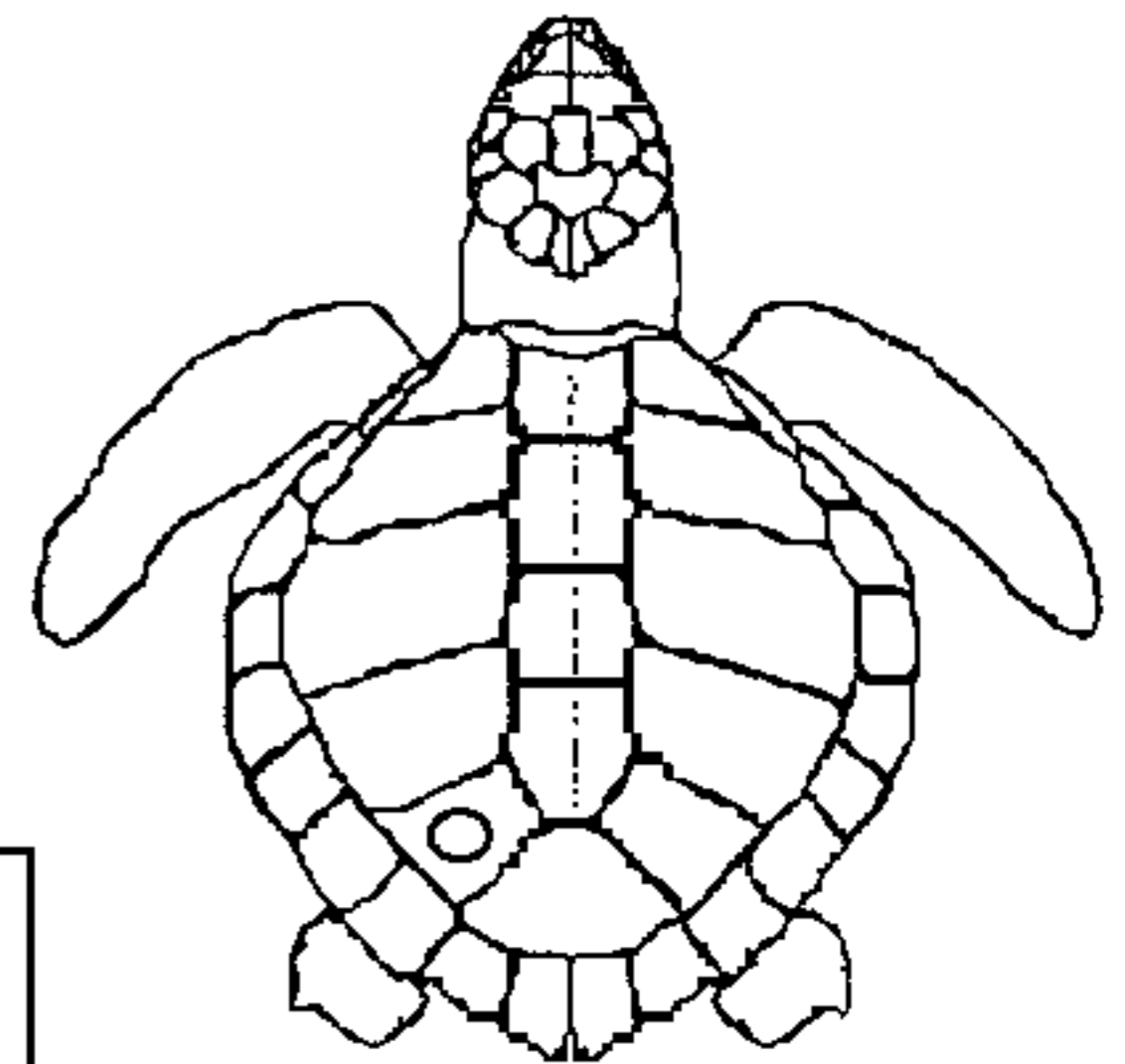
1. _____



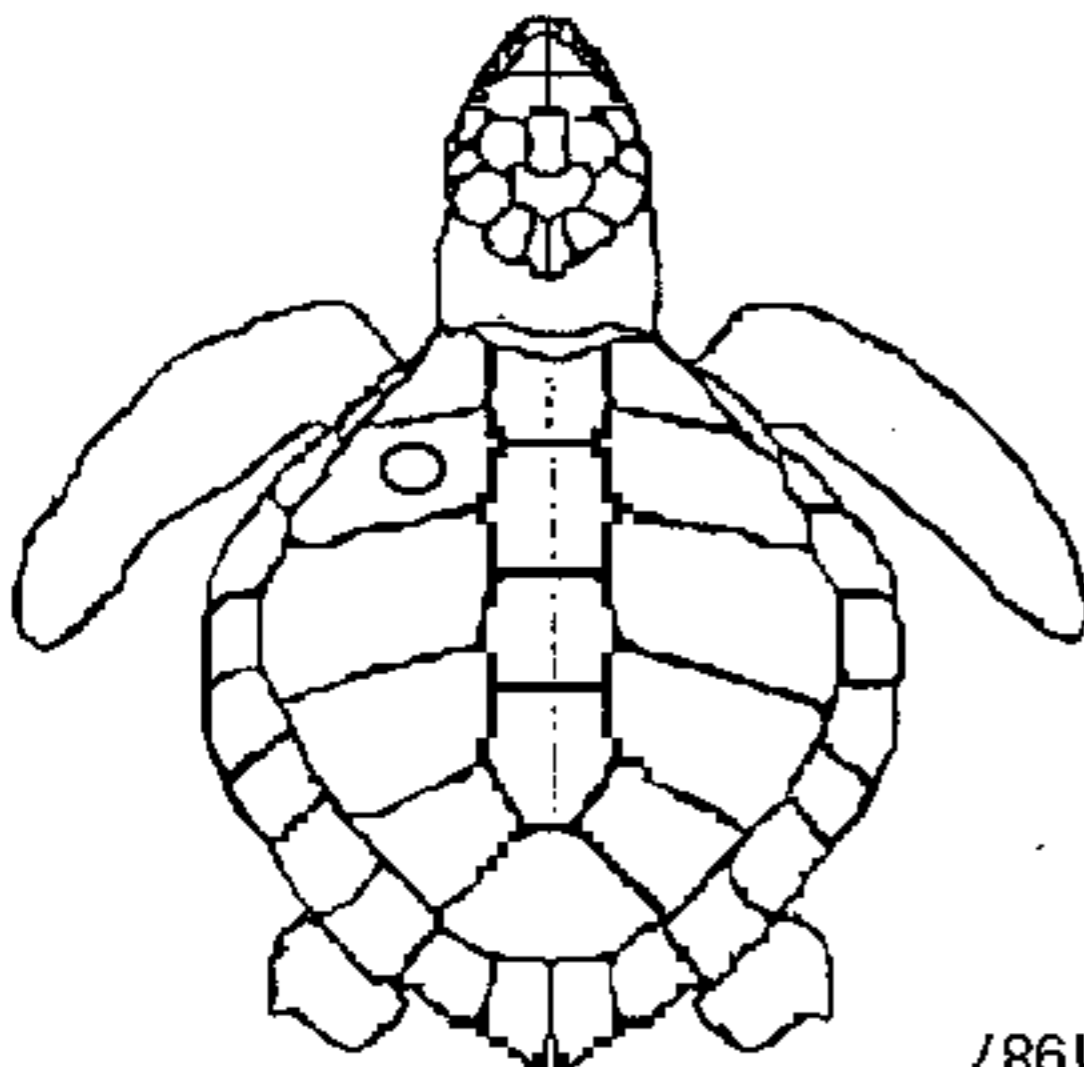
2. _____



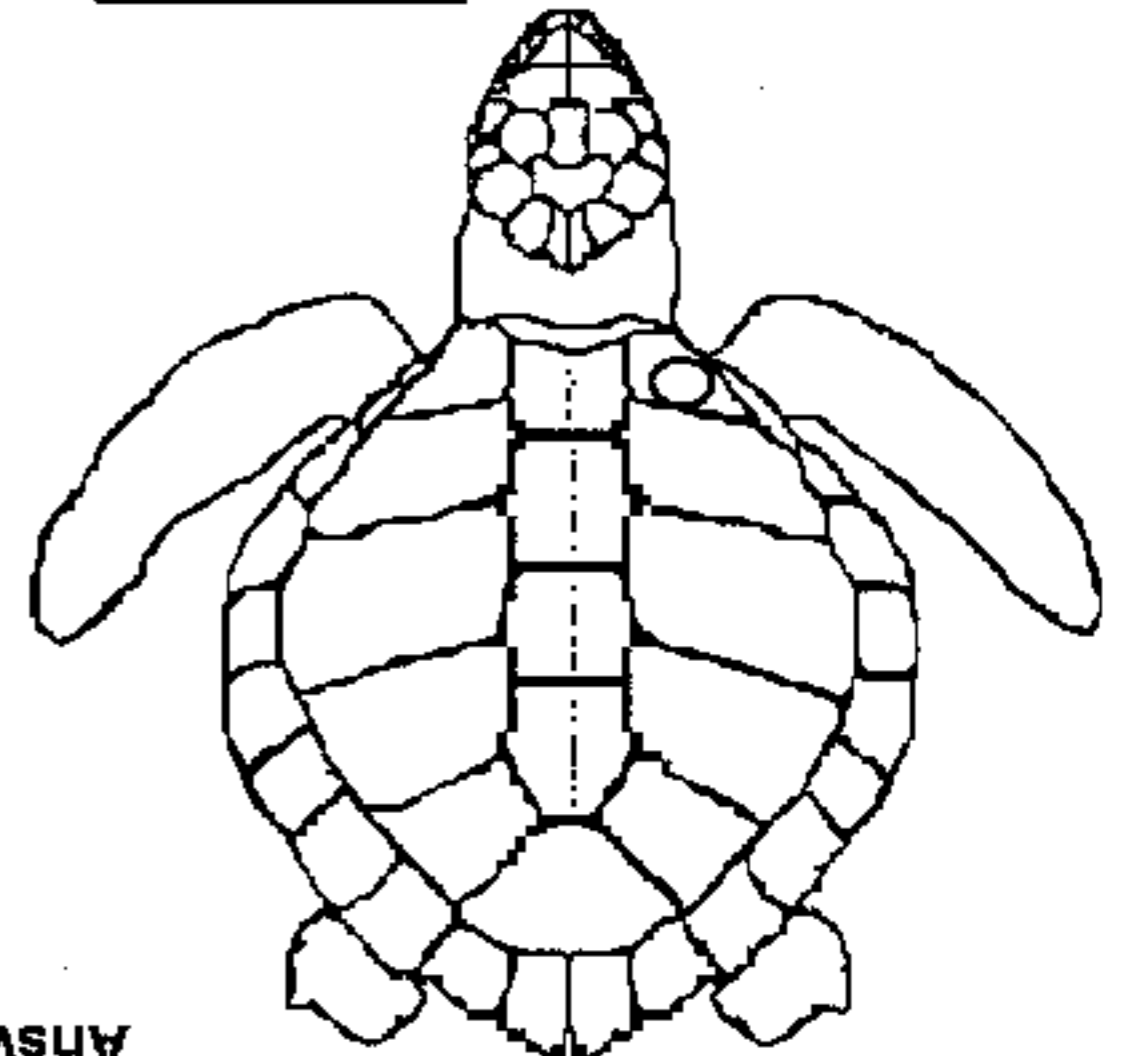
3. _____



4. _____



5. _____



Year	Location of Living Tag
1982	Left Costal 3
1983	Left Costal 4
1984	Left Costal 5
1985	Right Costal 5
1986	Neural 4
1987	Right Costal 1
1988	Left Costal 1
1989	Right Costal 4
1990	Right Costal 2
1991	Left Costal 2
1992	Right Costal 3

(after 1992, locations are repeated. We should be able to identify these turtles from earlier year classes by a difference in size.)

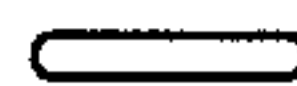
Answers: 1) 1989; 2) 1986; 3) 1984; 4) 1991; 5) 1987

Internal Tags:

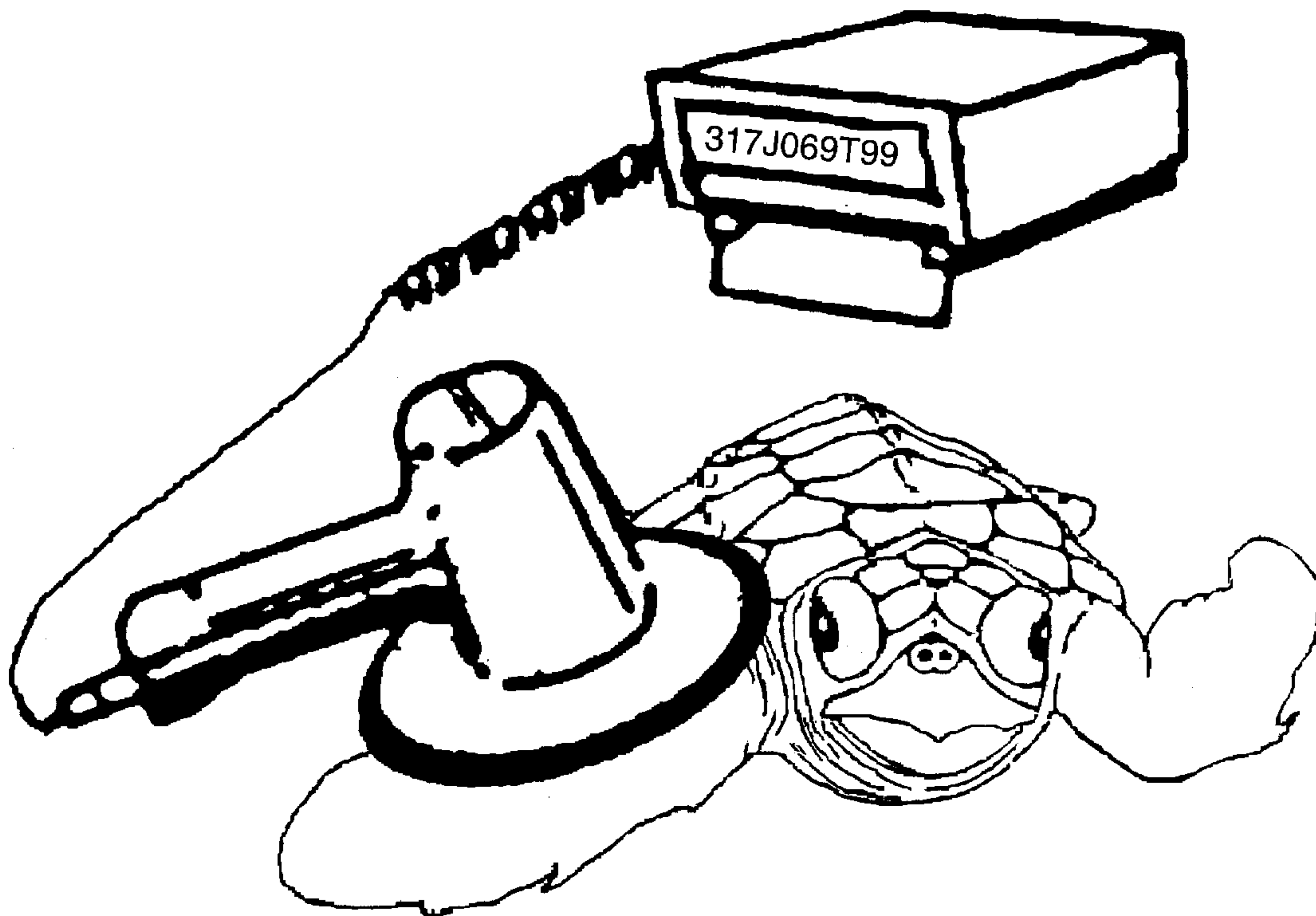
Two different types of internal tags are used on sea turtles. Both are injected with a **syringe**. Special equipment must be used to tell if a turtle has been tagged with one of these tags. A magnetometer is used to detect the internal magnetic wire tag. The Passive Integrated Transponder tag (PIT tag) is a microchip sealed in a glass tube. It is the size of a grain of rice. It will give a 10 digit code when scanned with a special reader. Each turtle is tagged with different code.



Passive Integrated Transponder (PIT) tag
Enlarged view

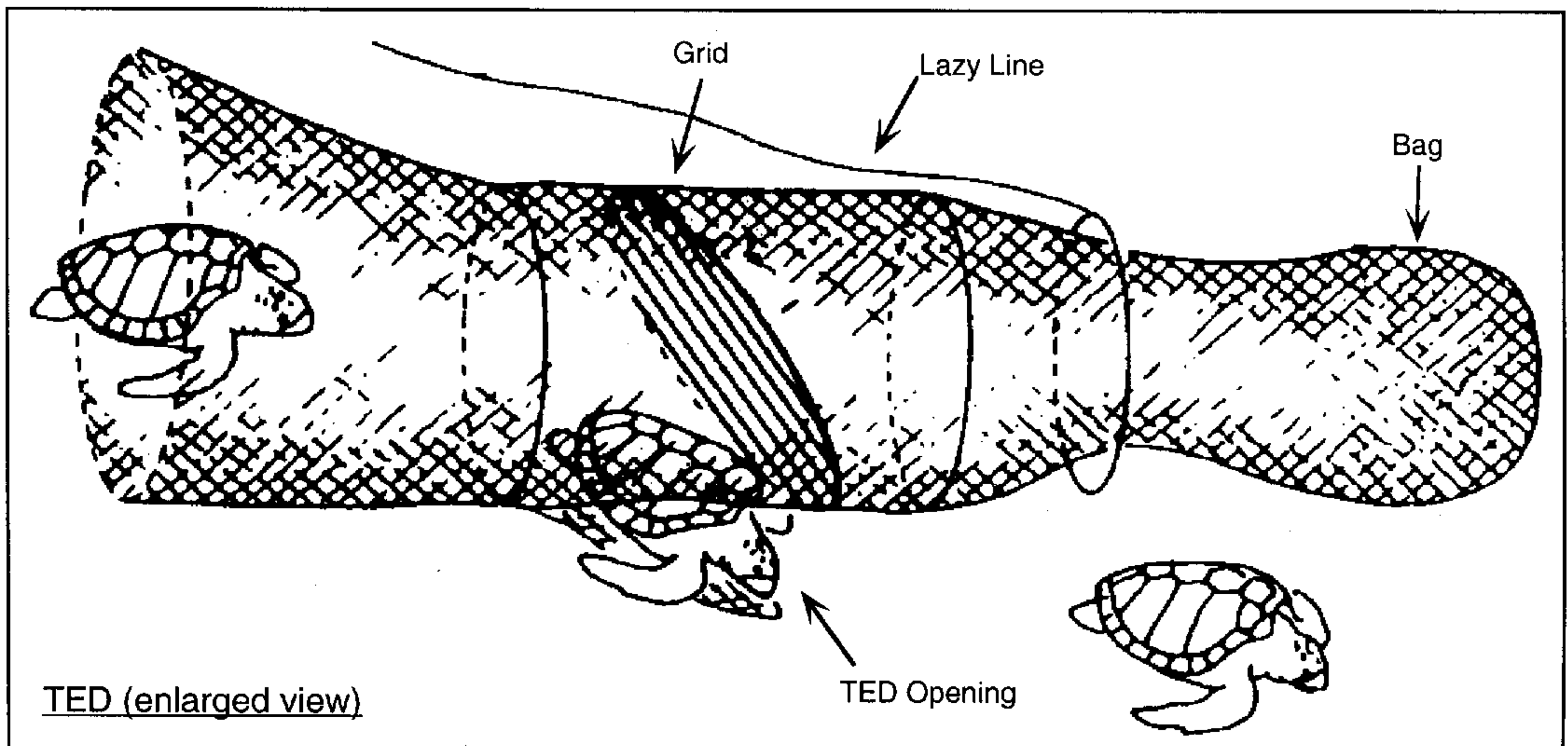
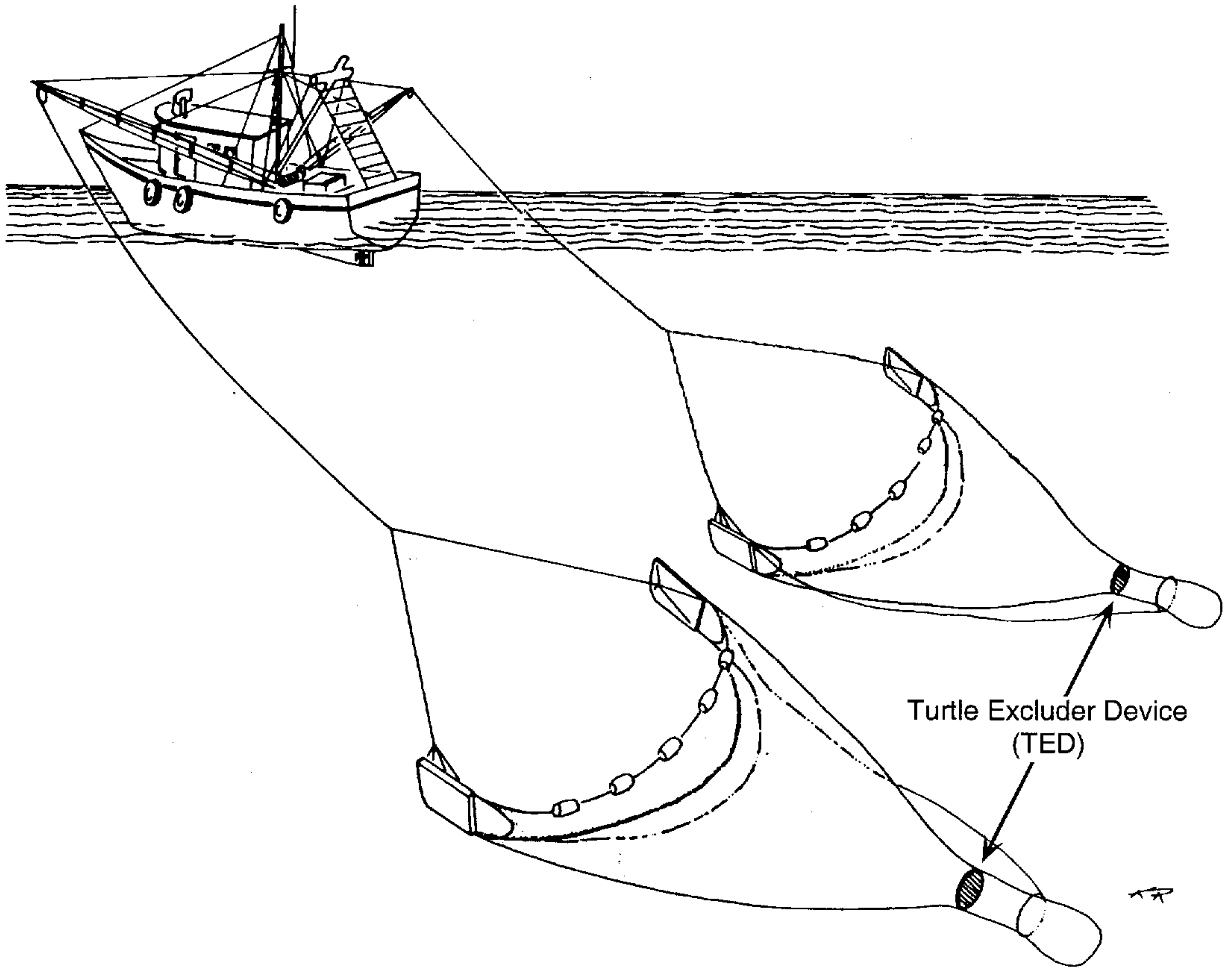


Passive Integrated Transponder (PIT) tag
Actual size



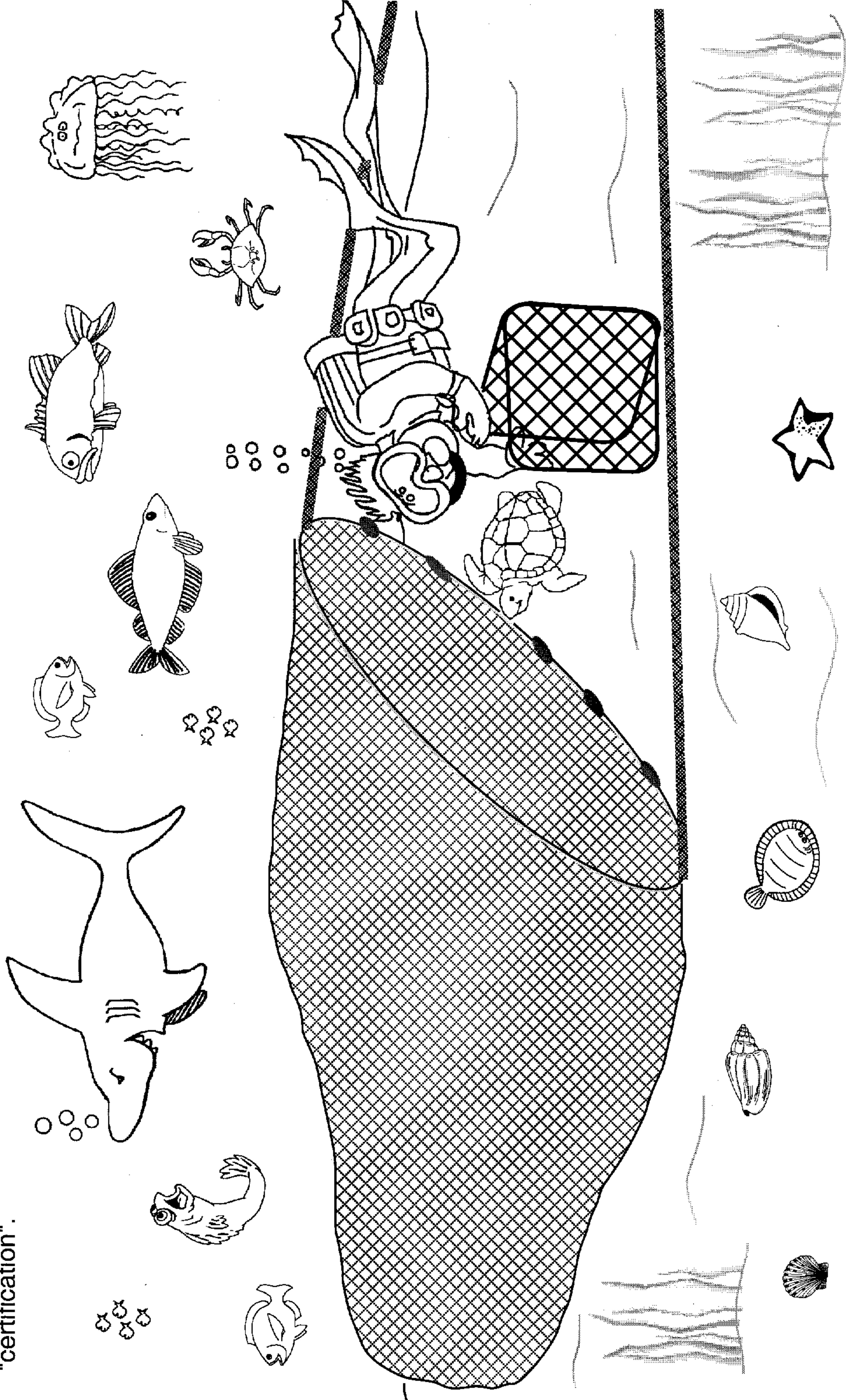
TED Testing:

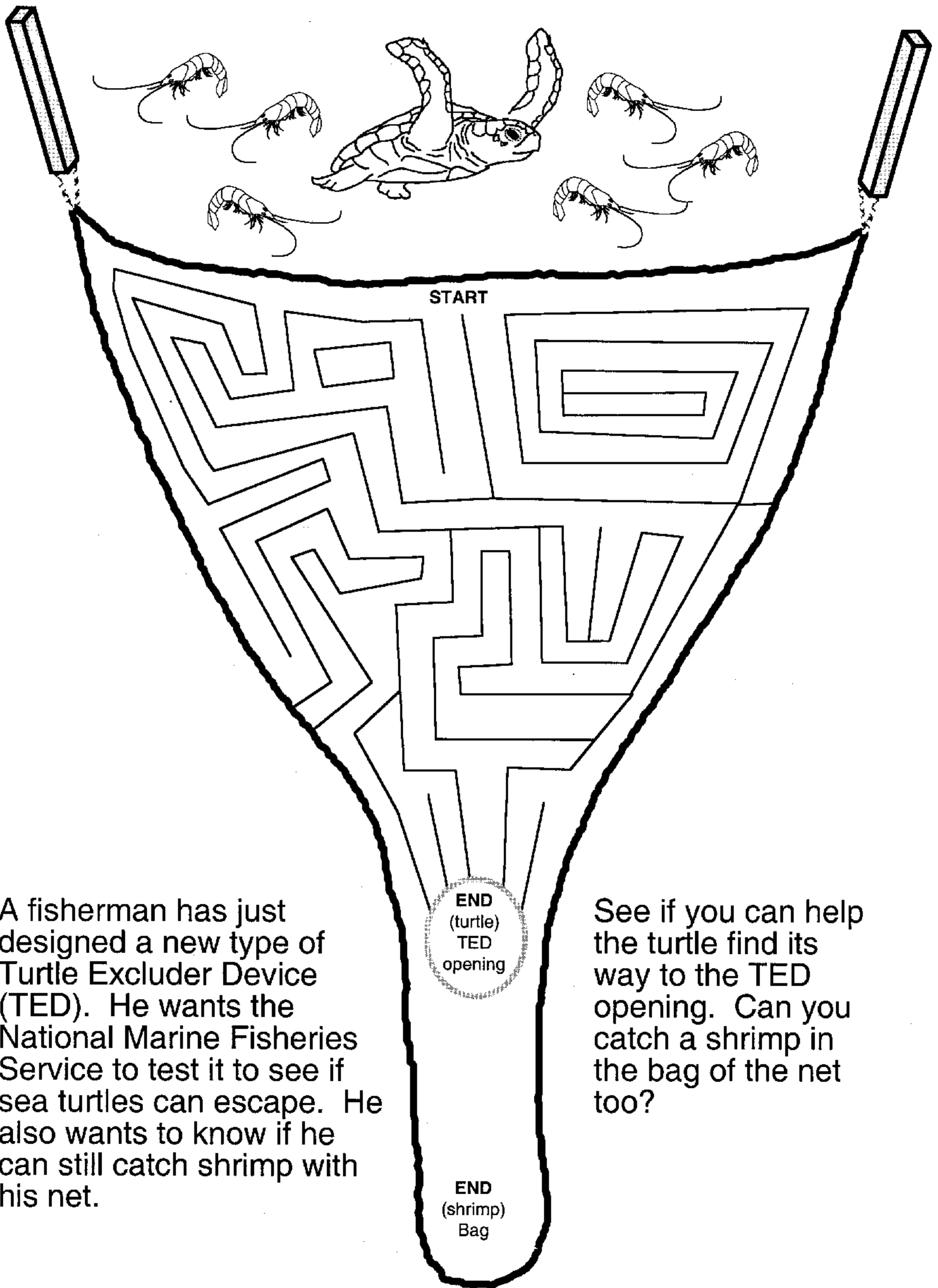
All shrimp boats in the United States are required by law to have TEDs in their nets. New designs must be certified for approval. Hatchling loggerhead sea turtles are raised for 2 years to be used in TED certification trials.



Turtle Excluder Device (TED) testing:

Loggerhead sea turtles are put into a mesh bag and sent to the diver waiting underwater. The diver opens the bag into the shrimp net so that the turtle must swim into the net. The turtles are allowed five minutes to escape from the shrimp net through the TED. If it takes longer than five minutes, then the diver helps the sea turtle out of the net. If 85% of the turtles that are released into the shrimp net can escape in less than 5 minutes, then the TED will be considered for "certification".





A fisherman has just designed a new type of Turtle Excluder Device (TED). He wants the National Marine Fisheries Service to test it to see if sea turtles can escape. He also wants to know if he can still catch shrimp with his net.

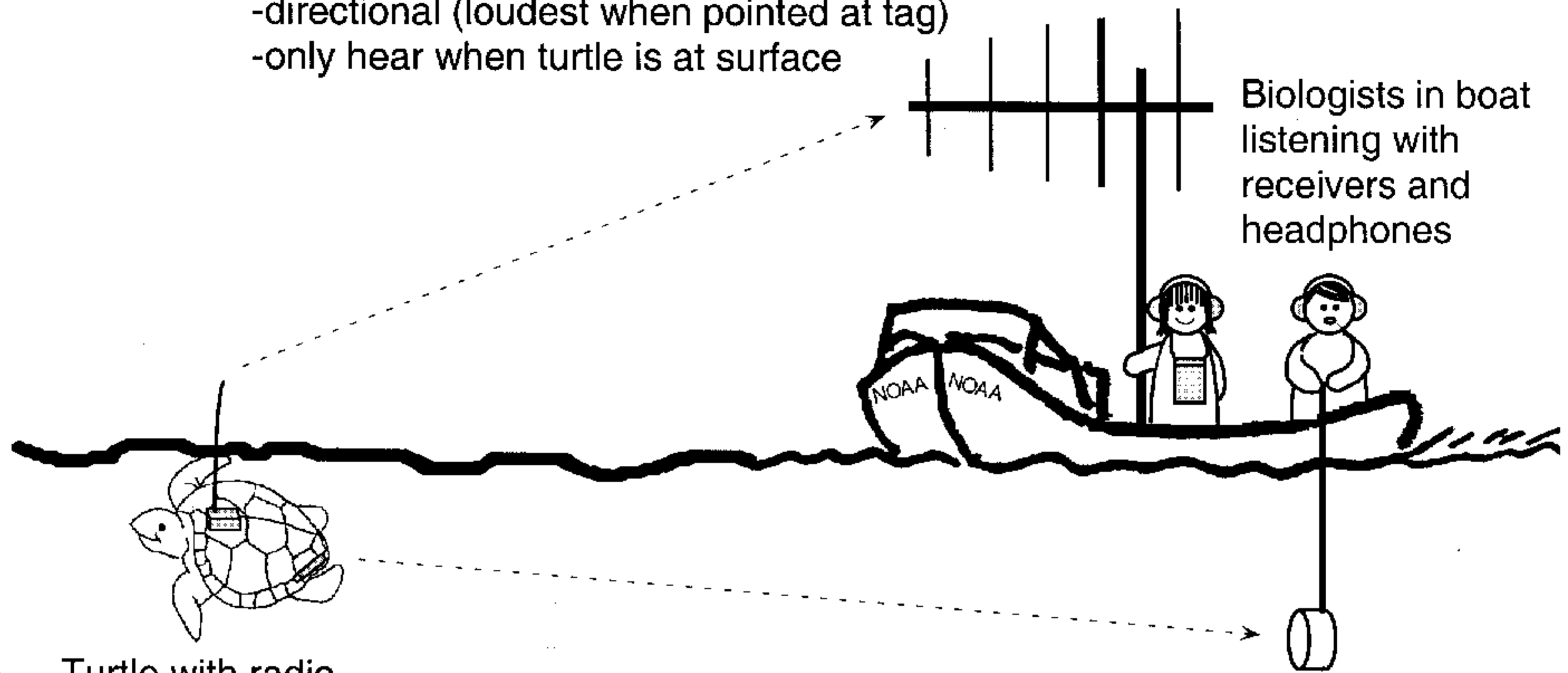
See if you can help the turtle find its way to the TED opening. Can you catch a shrimp in the bag of the net too?

How Radio Tracking Works:

How many things can you find that are different in the bottom picture?

Radio Antenna

- picks up radio tag signals
- directional (loudest when pointed at tag)
- only hear when turtle is at surface



Biologists in boat listening with receivers and headphones

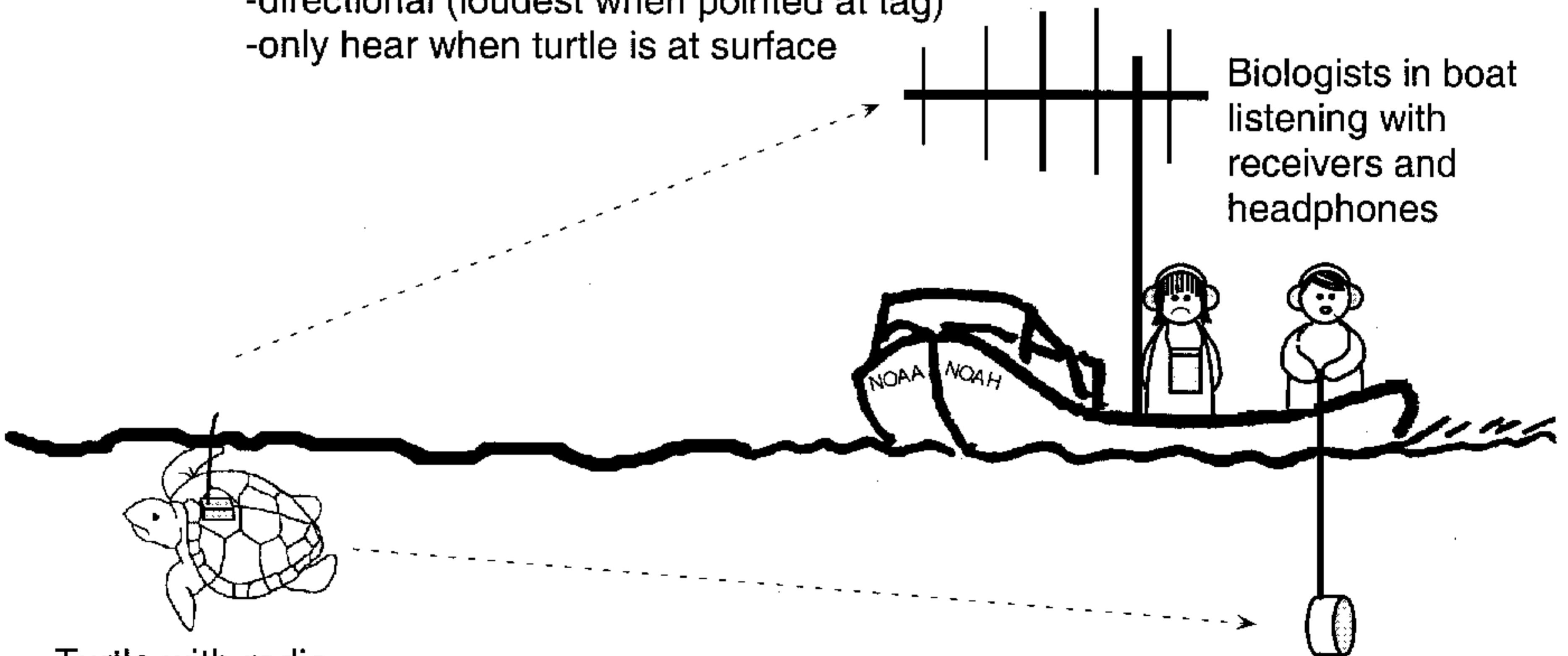
Turtle with radio and sonic tag

Hydrophone (underwater microphone)

- picks up sonic tag signals.
- directional (loudest when pointed at tag)
- short range - have to be close to hear

Radio Antenna

- picks up radio tag signals
- directional (loudest when pointed at tag)
- only hear when turtle is at surface



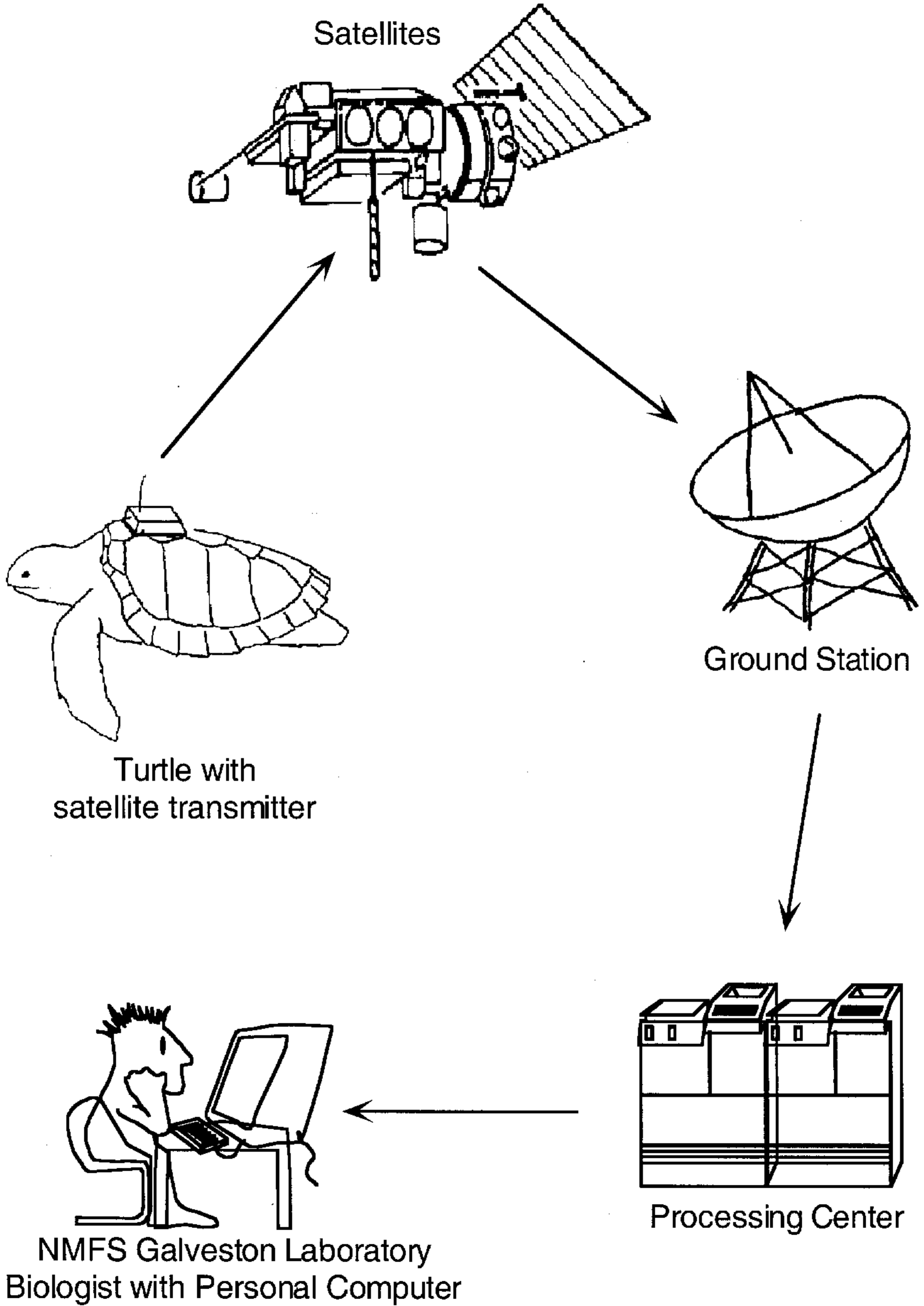
Biologists in boat listening with receivers and headphones

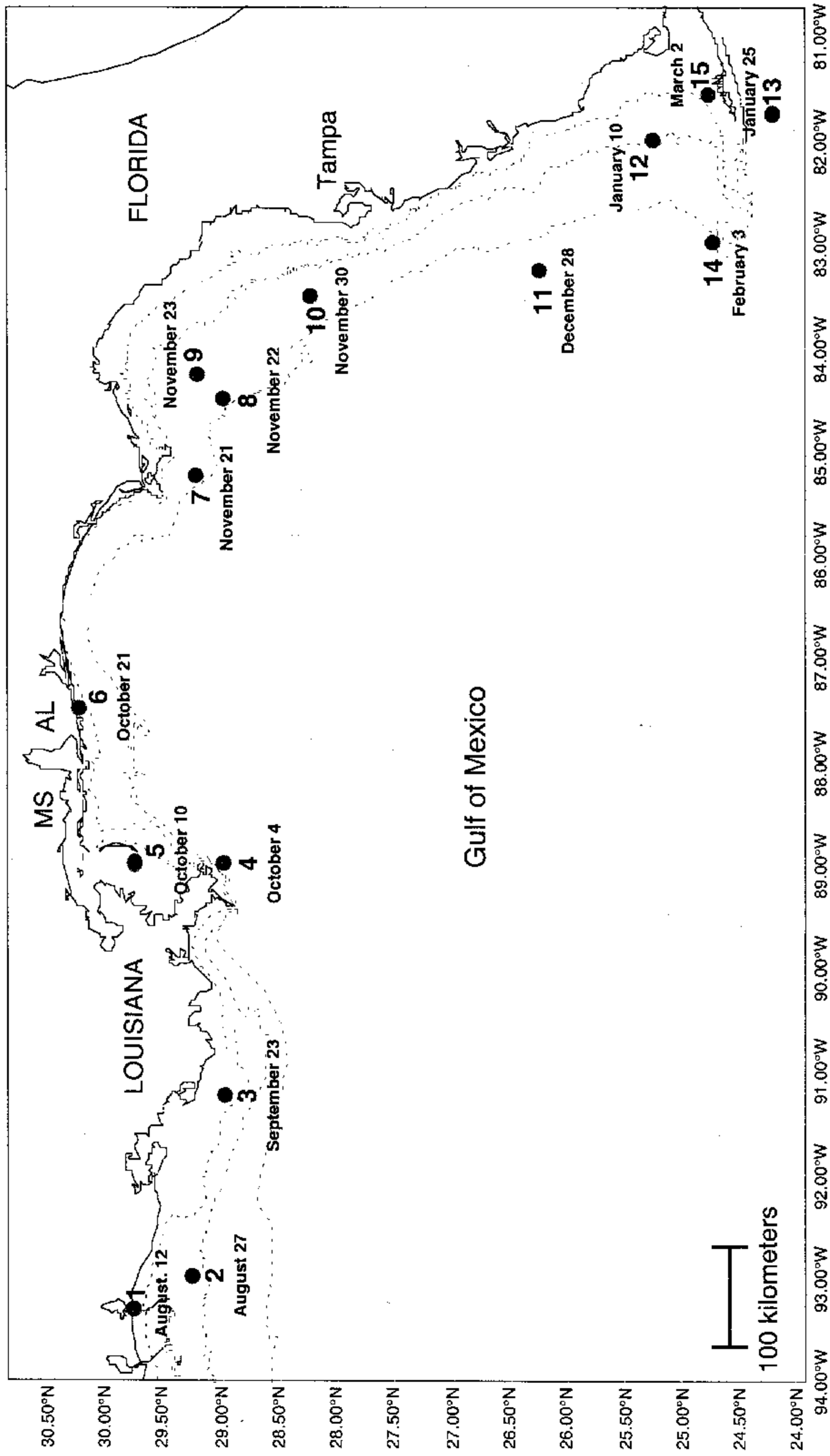
Turtle with radio and sonic tag

Hydrophone (underwater microphone)

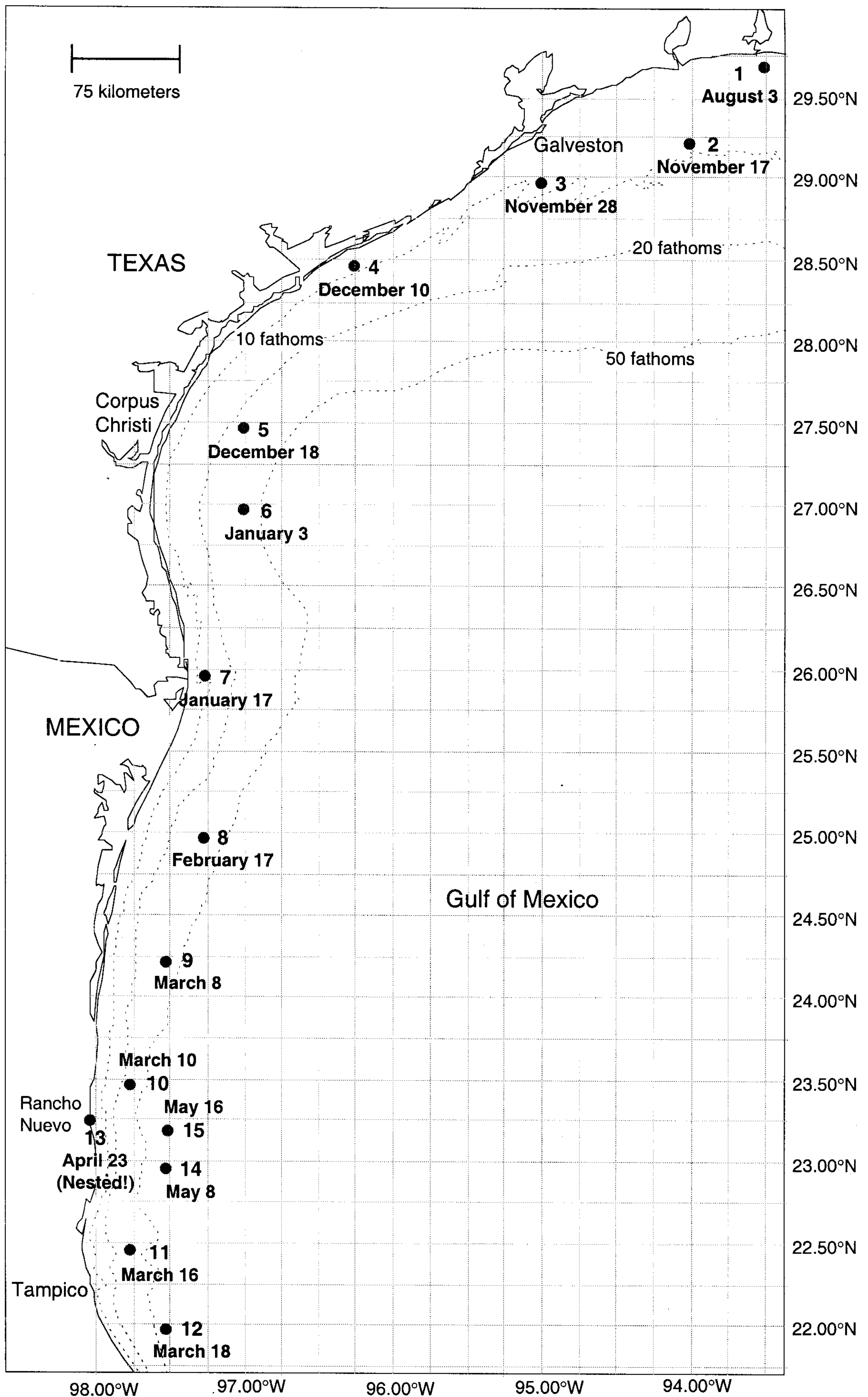
- picks up sonic tag signals.
- directional (loudest when pointed at tag)
- short range - have to be close to hear

How Satellite Tracking Works





Connect the dates to plot the movements of this adult female Kemp's Ridley sea turtle that was also caught at Cameron, Louisiana in August 1994. Where did this turtle go for the winter?

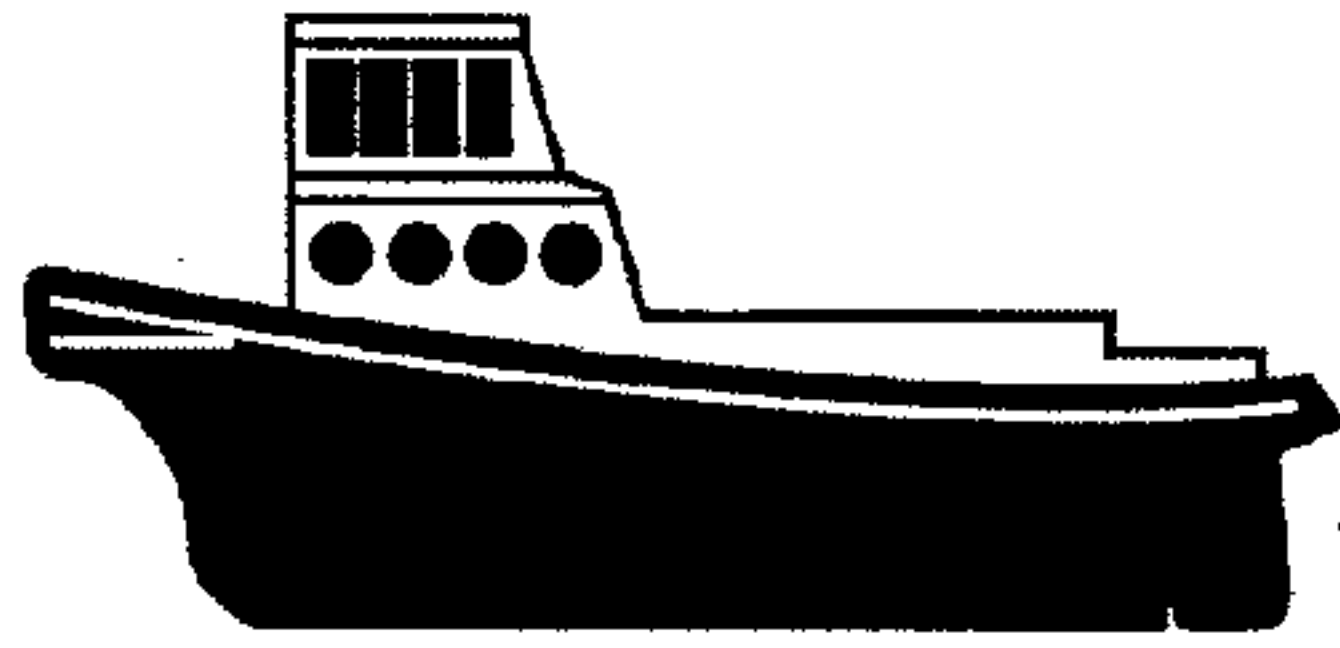


Connect the dates to plot the movements of this adult female Kemp's Ridley sea turtle that was caught at Cameron, Louisiana in August 1994. We tracked her to Rancho Nuevo, Mexico where she nested.

Oil Platform Observer Program:

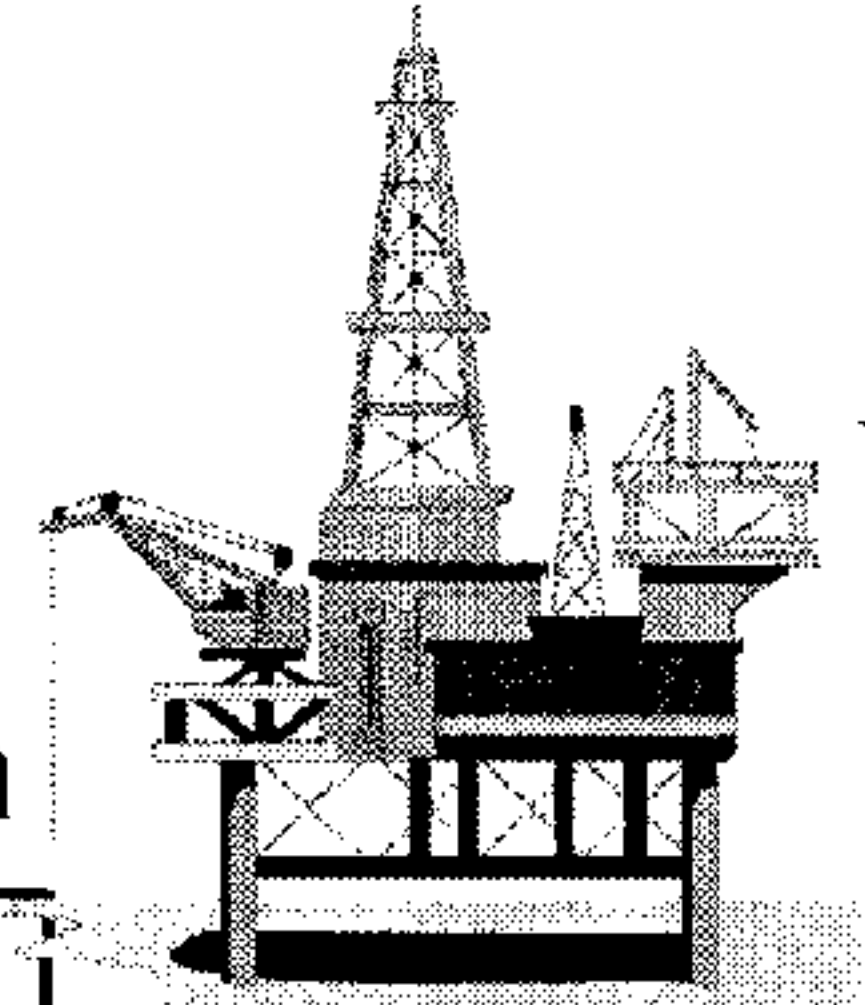
When platforms in the Gulf of Mexico are no longer producing oil or gas, they must be removed. Explosives will be used which could harm any animals living near the platform. Forty-eight hours (2 days) prior to removal, the oil companies are required to have a NMFS observer on site to look for sea turtles and marine mammals.

Observations may be made from the platform, a derrick barge or work boat. Thirty minutes before the blast, the observer makes an aerial survey in a helicopter. If no turtles or marine mammals have been sighted, then they are cleared for removal. If a sea turtle or marine mammal is seen, attempts are made to remove it from the area so it will not be harmed.

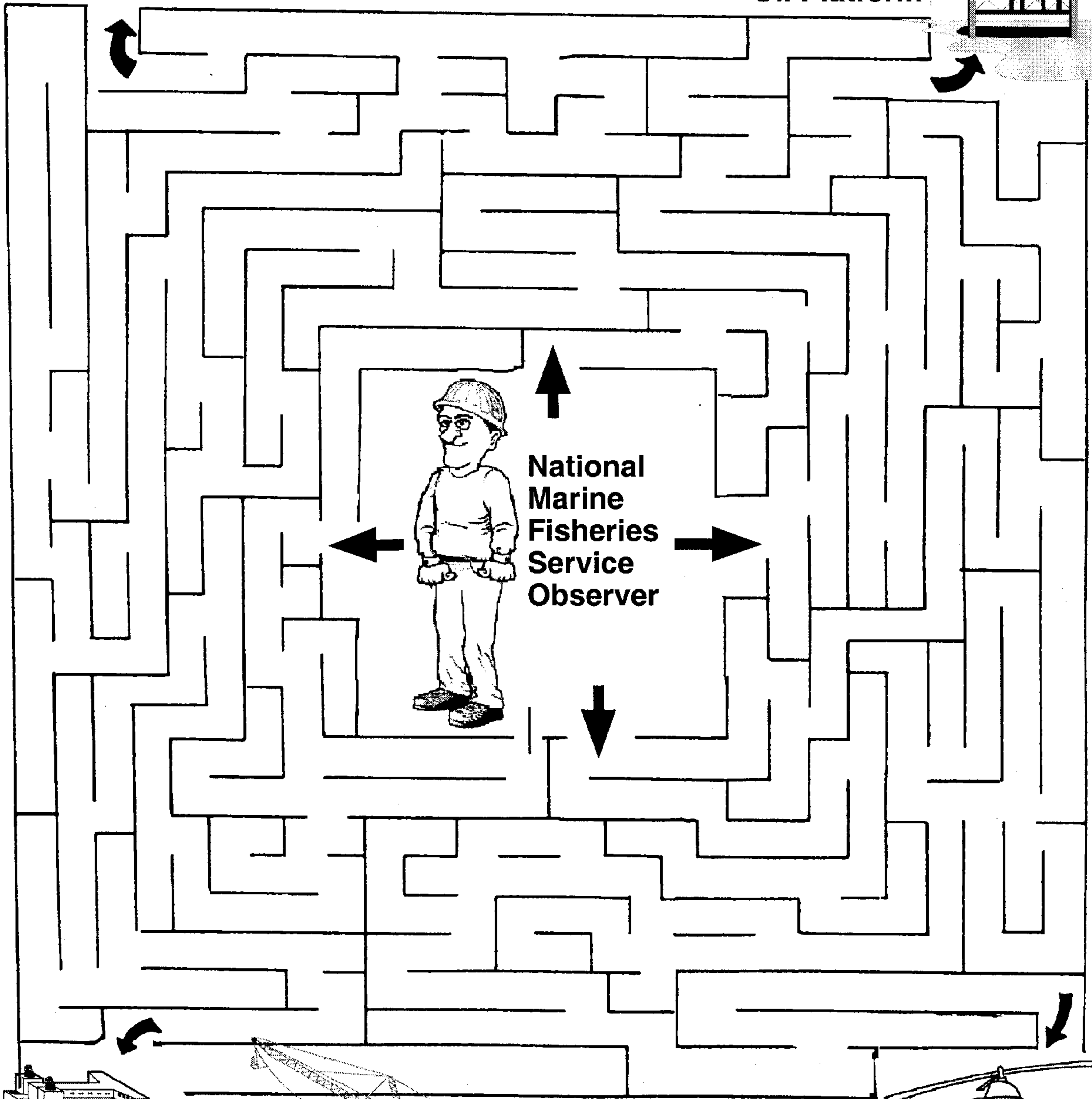


Work Boat

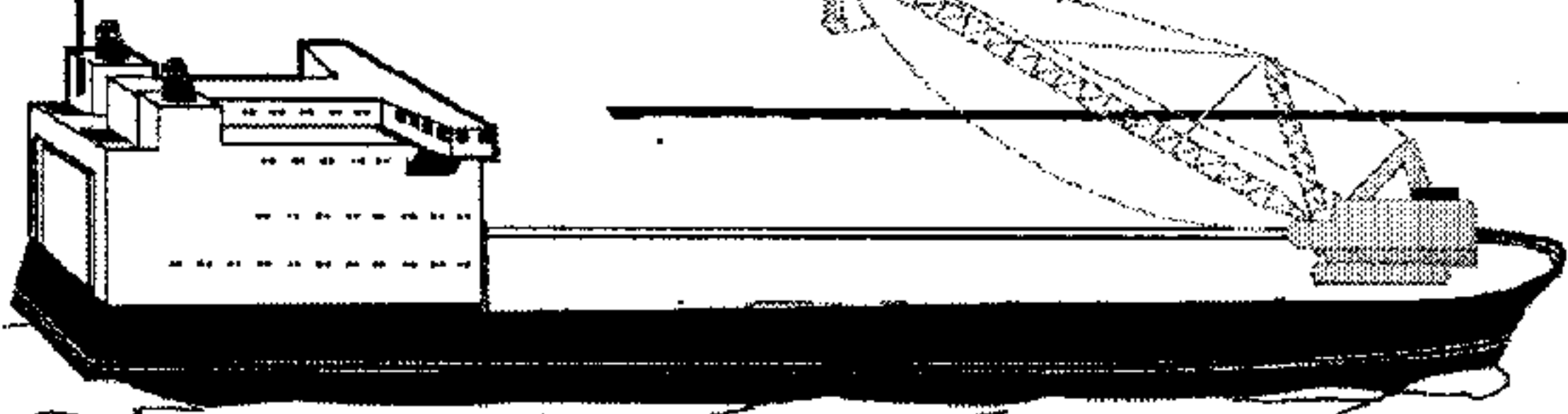
Help the NMFS Observer find his way to the observation sites!



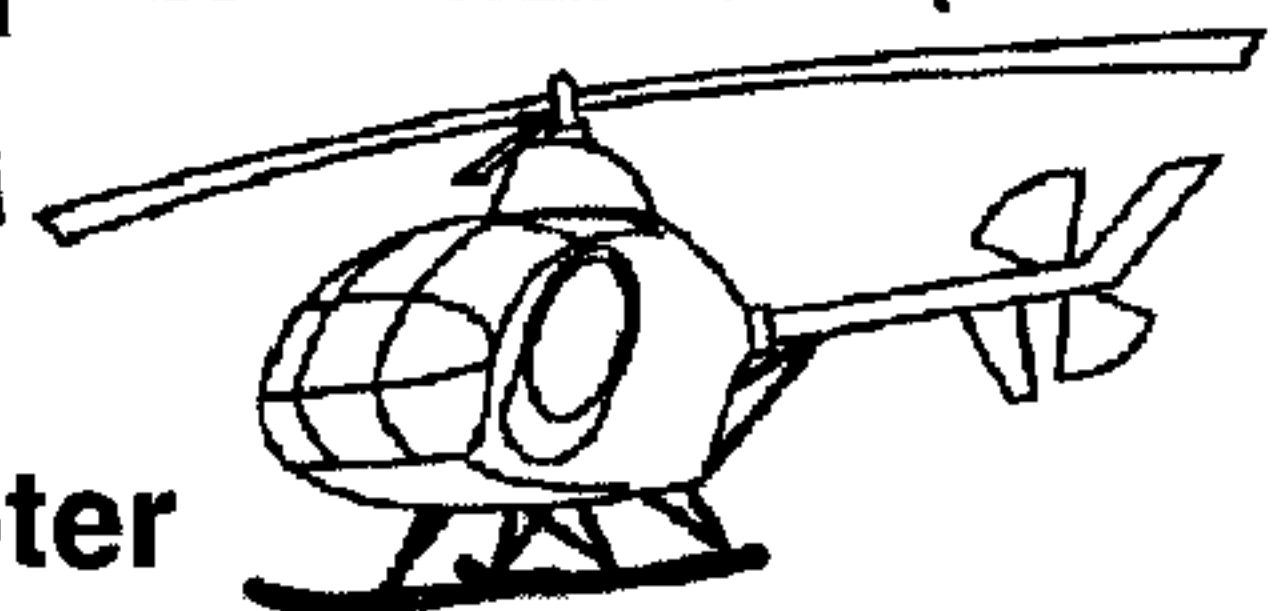
Oil Platform



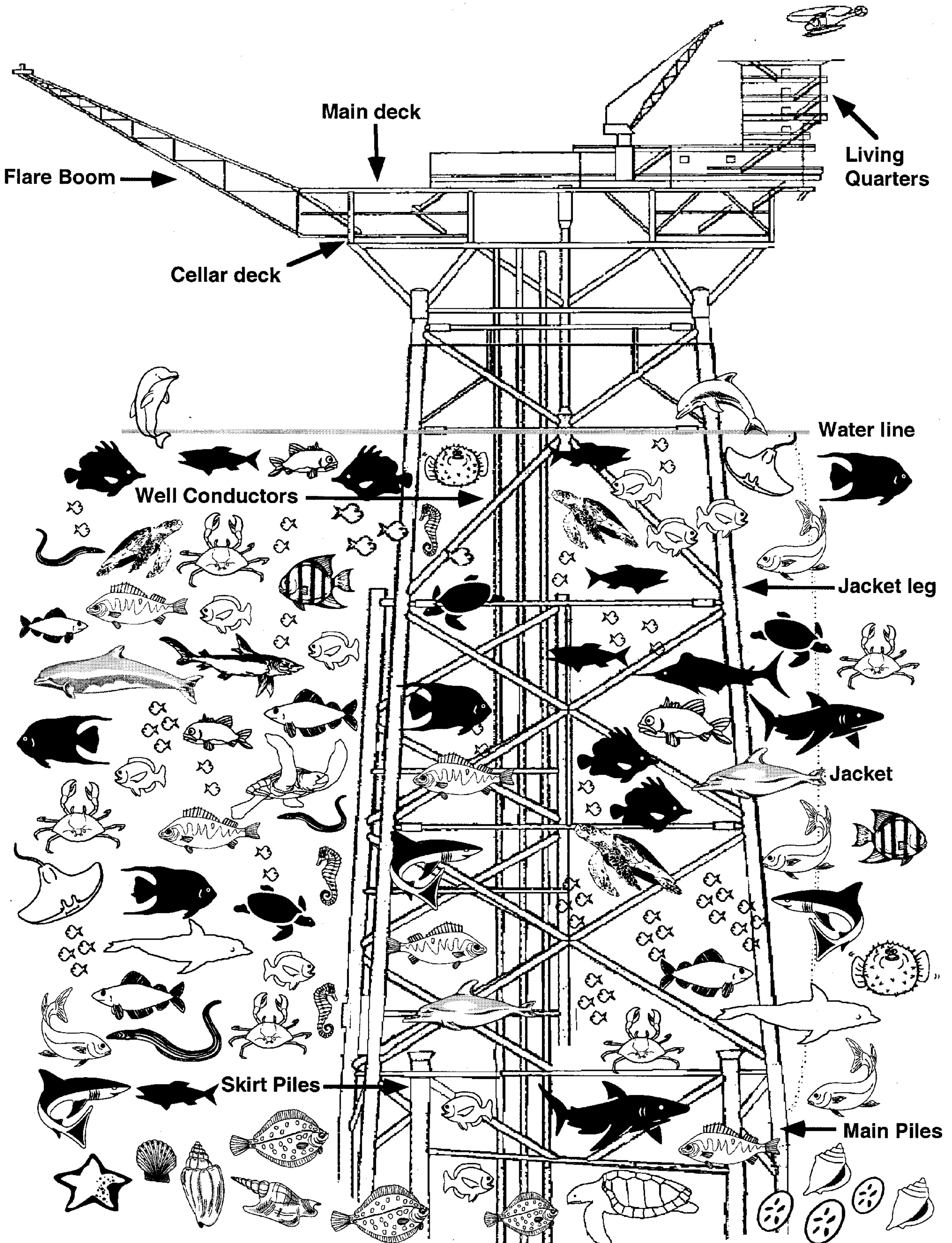
**National
Marine
Fisheries
Service
Observer**



**Derrick
Barge**



Helicopter

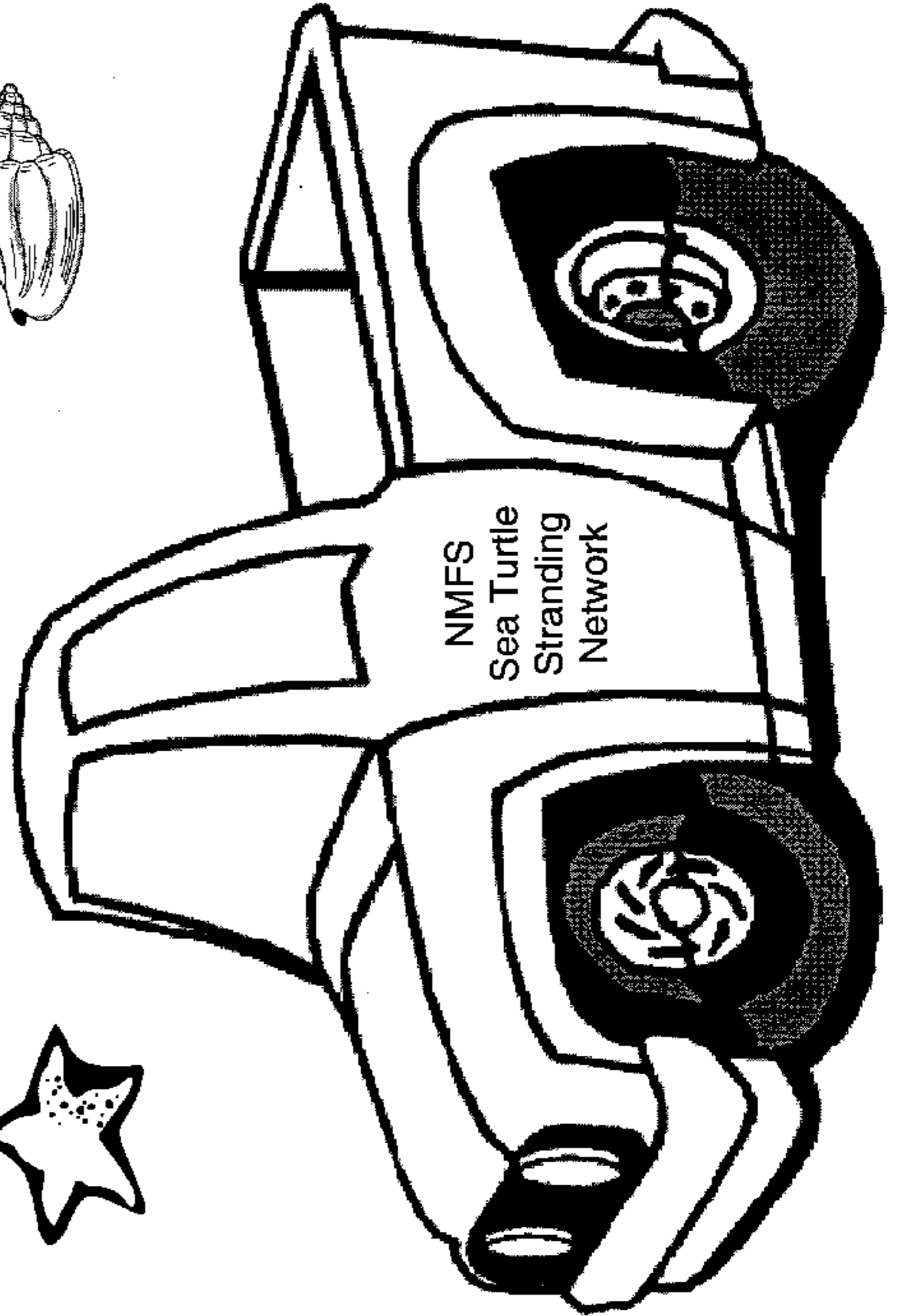
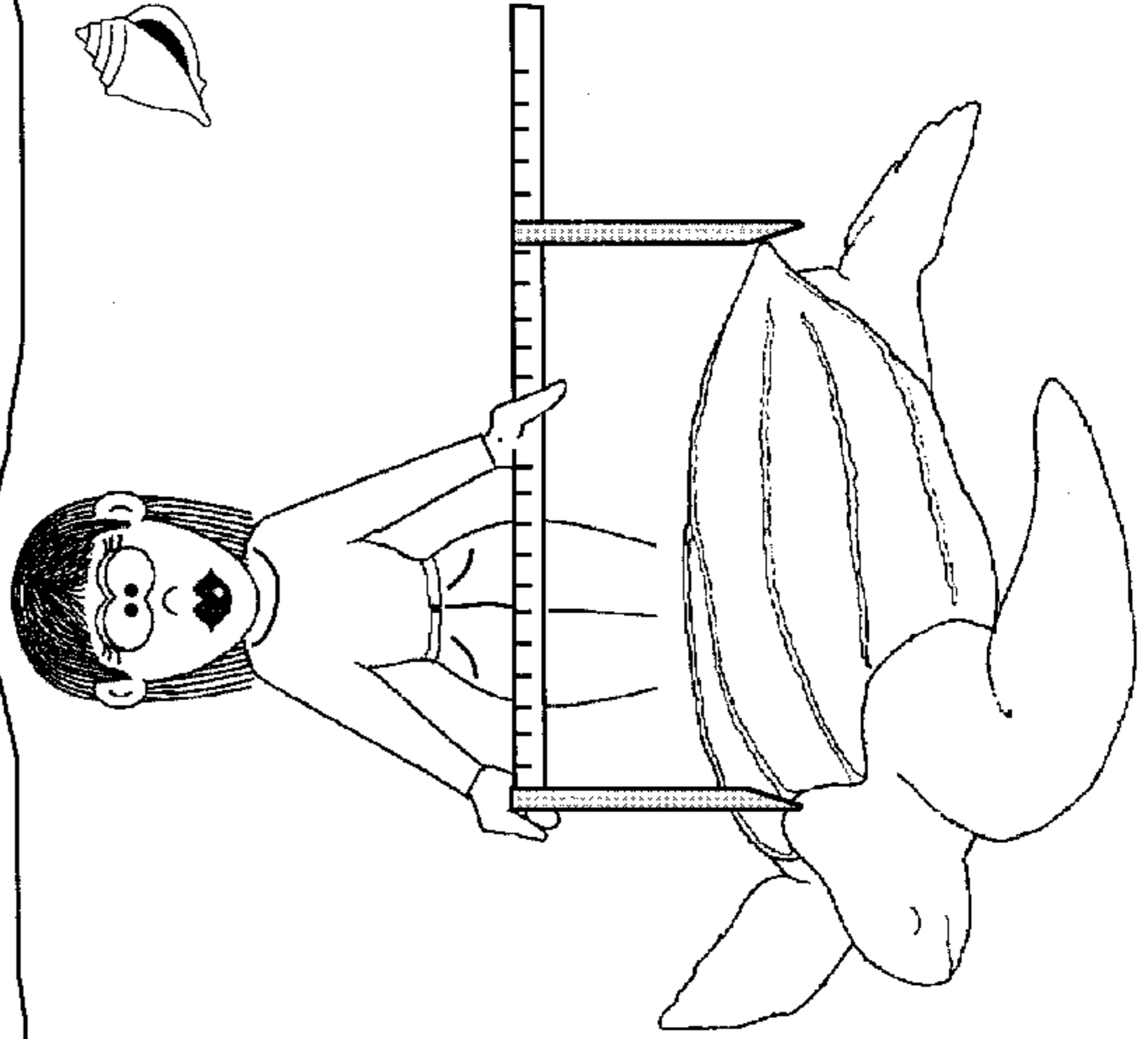
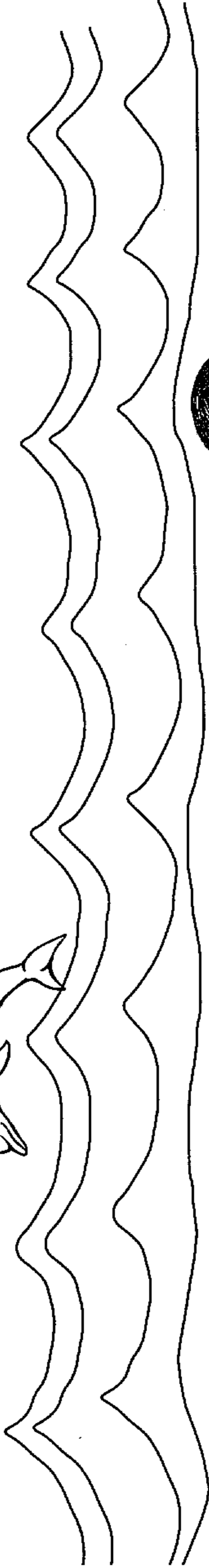
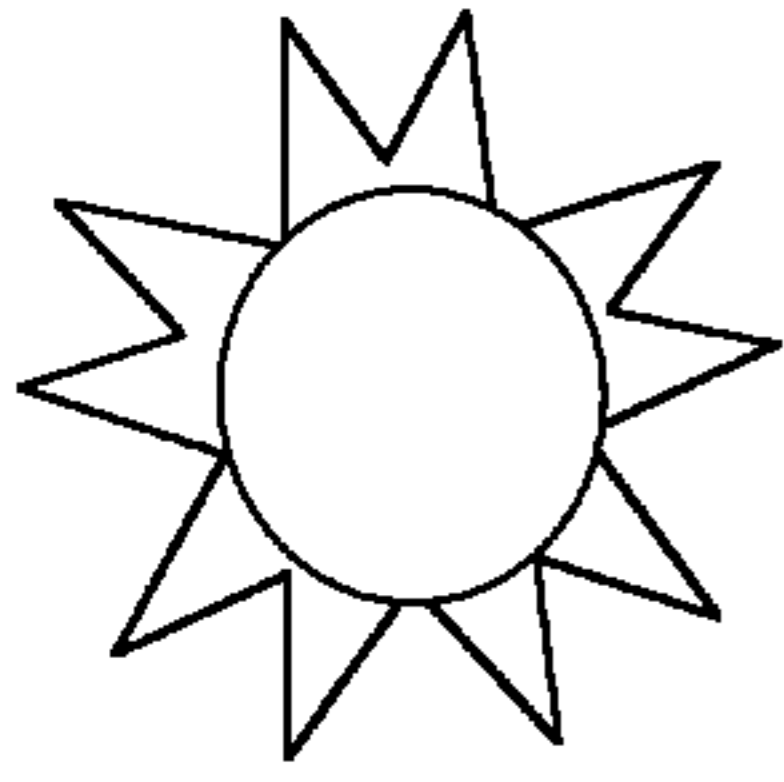


Pretend that you are a National Marine Fisheries Service Observer and try to find all the sea turtles and dolphins that are at this oil platform in the Gulf of Mexico.

(hint: there are 7 dolphins and 8 sea turtles.)

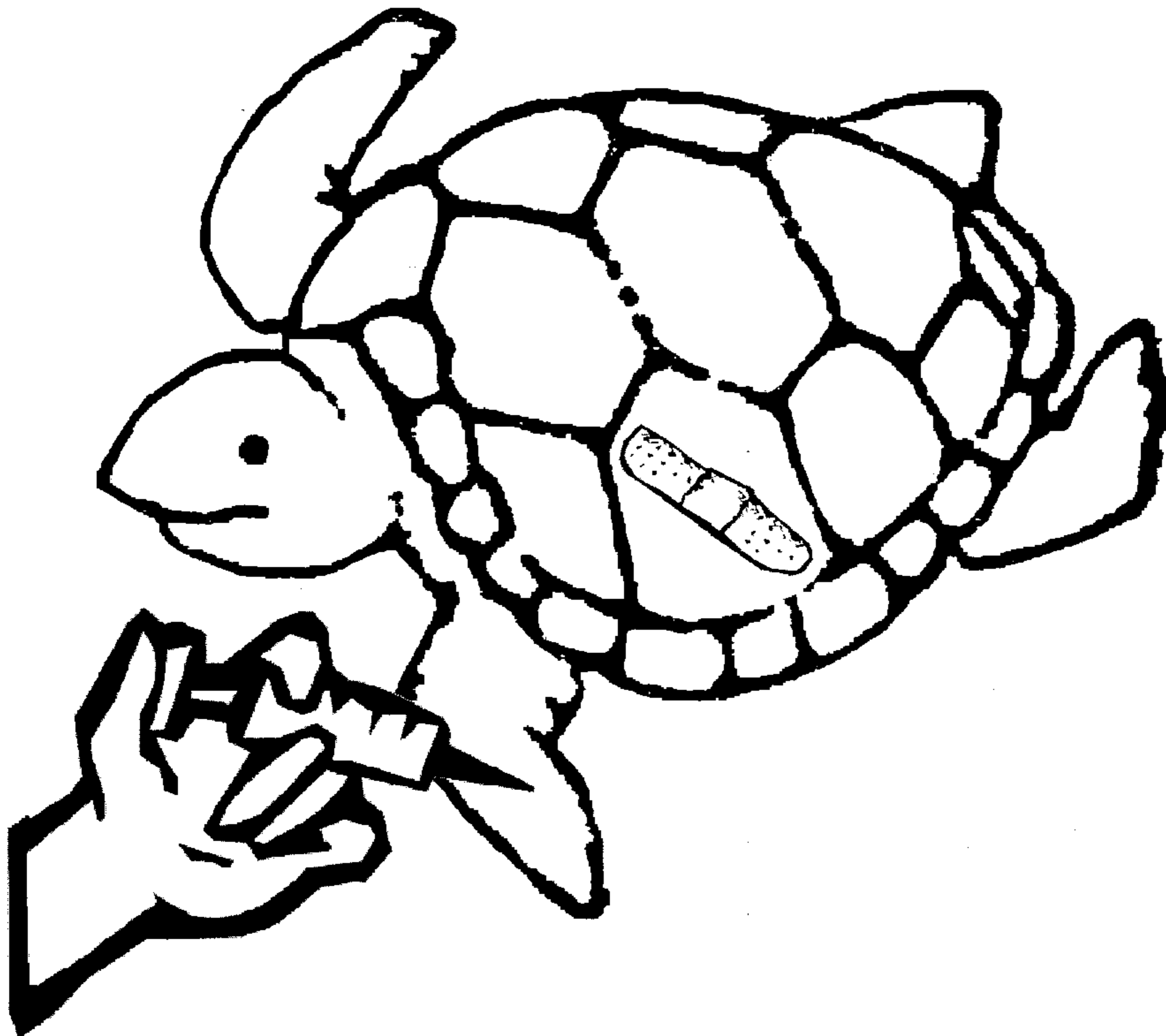
Sea Turtle Stranding and Salvage Network

Biologists from our laboratory drive on the beaches to look for stranded sea turtles. We also pick up stranded sea turtles that are found by other people. If you are on the beach and see a stranded sea turtle (dead or alive), be sure to report it. If a turtle is dead, we perform a **necropsy** to try and determine what killed it.

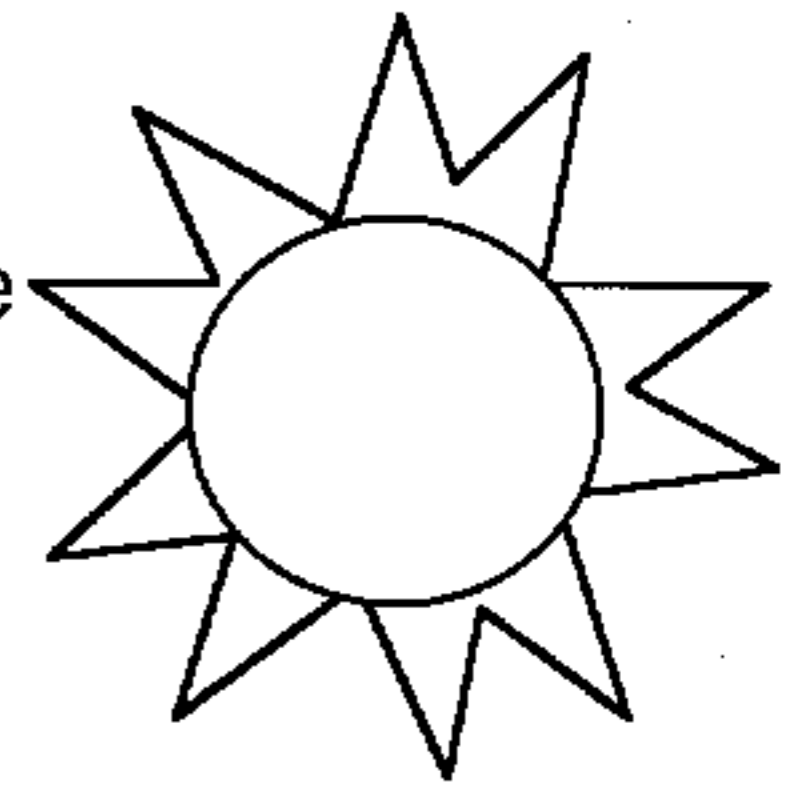


Rehabilitation

Live stranded sea turtles are brought to our lab and treated for their injuries or illnesses. Some of the problems that we treat include shark bites, boat propellor injuries and entanglement in or ingestion of fishing line. Sick turtles are treated with antibiotics. Most of the turtles are released as soon as they recover.



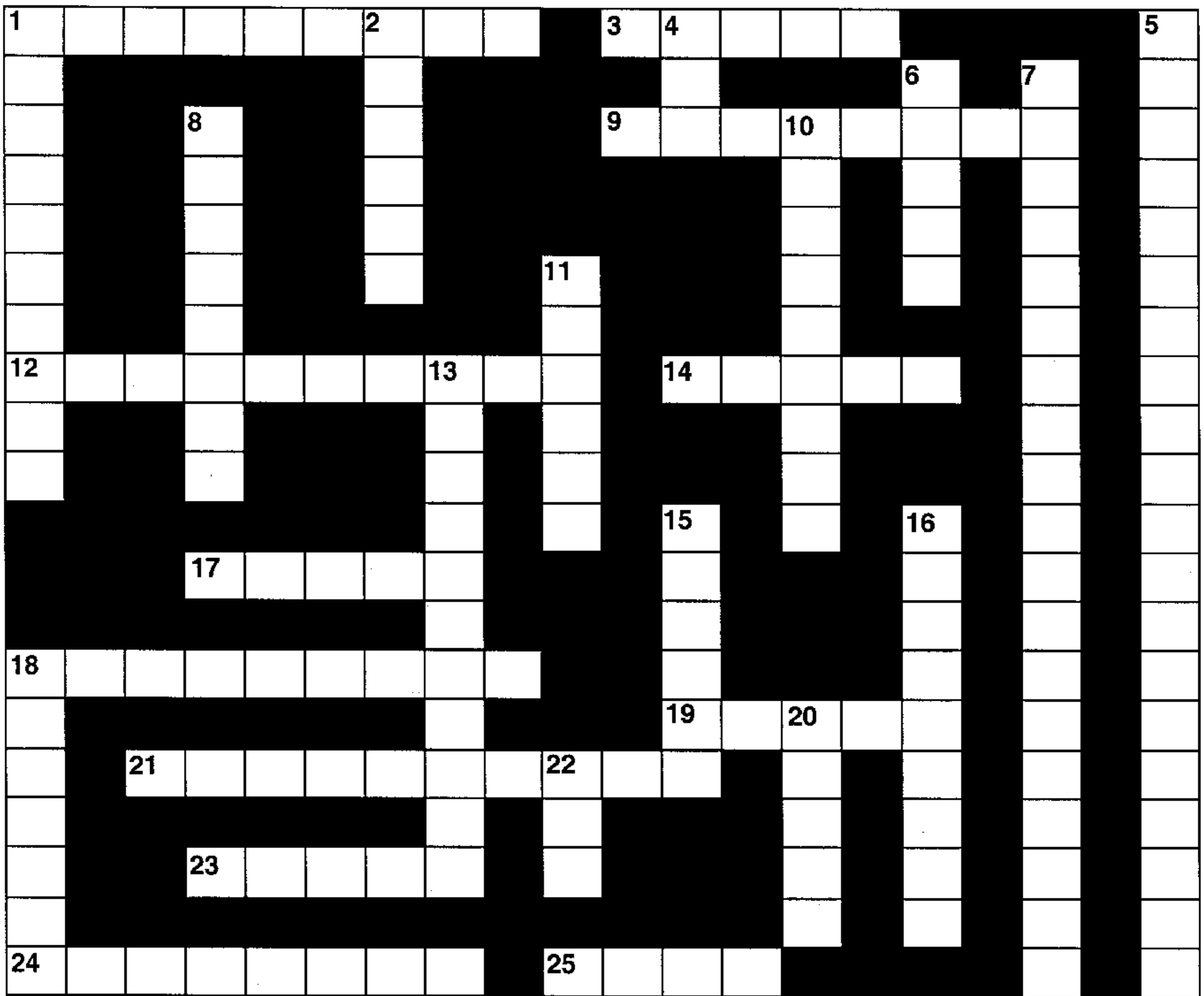
Because Kemp's ridley sea turtles feed near shore, they are often caught by fishermen. You should notify the National Marine Fisheries Service if you catch a sea turtle on hook and line. We will take the sea turtle to a veterinarian to remove the hook. Special care must be taken to prevent injury. We will tag the turtle and release it in the area where it was captured.



Circle the things that are good for turtles to eat. Put an X through the things that are bad for turtles to eat.



Answer:
Good: Seashells (molluscs), Crab, Jellyfish, Seagrass, Corals
Bad: Hooks and fishing line, trash bags, cans



ACROSS

- 1 Type of tag where lighter colored bottom shell is grafted onto darker top shell (2 words)
- 3 Shape of an adult Kemp's ridley's shell
- 9 Scientific name for bottom shell of a turtle
- 12 Almost extinct
- 14 Type of "fish" that Leatherbacks eat (that's not really a fish)
- 17 When a baby sea turtles leaves the egg
- 18 When a non-nesting turtle washes up on the beach
- 19 What green turtles like to eat
- 21 Metal tag that has number, letters and an address (2 words)
- 23 Used to listen for "beeping" tracking tags
- 24 Another food green sea turtles like to eat
- 25 Mother sea turtles lays a nest of these on the beach

DOWN

- 1 Type of sea turtle raised by Galveston Lab that is used in TED testing
- 2 Animal with a shell that has existed for millions of years
- 4 Type of platform where turtles might be injured when explosives are used to remove it
- 5 Used in a shrimp net so that turtles don't get caught (3 words)
- 6 Favorite food of Kemp's ridleys
- 7 Type of turtle tag that's placed inside the flipper (3 words)
- 8 Scientific name for the top shell of a turtle
- 10 Object that orbits the earth - used to track some sea turtles
- 11 The smallest sea turtle
- 13 The main nesting beach for Kemp's ridleys in Mexico (2 words)
- 15 Nickname for Passive Integrated Transponder tag (2 words)
- 16 Location of National Marine Fisheries Service Lab. in Texas
- 18 Hawksbills like to eat this animal
- 20 Sea turtle that is a vegetarian
- 22 Nickname for 4 DOWN

Word Search

Can you find all the words in the list below? They can be found in straight lines running forward, backward, up, down or diagonally.

O R L S C H A T C H L I N G C W J F R E
G I B T W N A M F G O A K L Y F O U C S
P O L L Y F J B R O U N L V E D L I I S
O H U P E R D K I P G D S E W S V K D G
R W E P L G I P K T H J R H Y E D F A N
T O C Y D A G E K C A L K O D L L U O I
U L R U I K T R F O A T U R O I L P X K
G T A E R X S F U R D B E O P V I L O C
E N B O S G N H O A G D R P F I B D P A
S M G G P A M C G R U T E E L N S B J R
E J W K M T E D E L M R D S H G K M G T
M K G G E C U Y C U T O Y K A T W F F E
A F N B K I L X S A P E B B C A A T S T
N G I S D T E L G E J N L S K G H E A I
O R D V U E F F A D A E H R E G G O L L
W E N M L N E S T W W P S J M R R A N L
A A A T O G T E T M M U I V B E V O M E
R C R L G A R H I S S A R G A E S E O T
W U T S S M I K P C O B C R W N O B R A
T X S E H L F T R P L M N U O Y H N E S

Word List:

BLUE CRAB
CORAL REEF
EGGS
FLIPPER TAG
GREEN
HAWKSBILL
KEMP'S RIDLEY
LEATHERBACK
LIVING TAG

LOGGERHEAD
MAGNETIC TAG
NEST
OIL PLATFORM OBSERVER
PIT TAG
SATELLITE TRACKING
SEAGRASS
STRANDING
TURTLE EXCLUDER DEVICE

Fun Facts About Sea Turtles

Most sea turtles nest during the nighttime. Kemp's ridley sea turtles nest during the day. Also, large numbers of female ridley sea turtles nest at the same time in the same location. This mass nesting is known as an "arribada" (Spanish for "arrival").

A female sea turtle lays around 100 eggs in each nest (the average number varies with each species). A female sea turtle will lay several clutches (or nests of eggs) in each nesting season, but she may not nest every year.

Sea turtle eggs are flexible and pliable -- not hard like a chicken's eggs. The size of the eggs varies with each species, but they are generally the size of a ping pong ball (1.5 to 2 inches across).

The temperature of a sea turtle nest can affect whether the eggs develop into male or female turtles. Generally, at temperatures below 28°-30°C (82°-86° F), more male turtles are produced. More females are produced above those temperatures.

It is impossible to tell whether a hatchling or juvenile sea turtle is a male or a female just by looking at it. When they are adults, the male sea turtle will have a much longer tail that extends beyond the shell.

Very little is known about a young sea turtle's life once it hatches and leaves the nesting beach. They disappear offshore and we don't see them again until they are much larger juveniles. Although we are gaining information, this early stage of life is known as the "lost year".

The largest leatherback ever reported measured almost 10 feet (3 meters) from the tip of its beak to the tip of its tail. It weighed over 2,000 pounds.

Sea turtles spend 94% to 97% of their time underwater.

The deepest dive depth ever recorded was over 1000 meters (greater than 3000 feet) by an adult female leatherback.

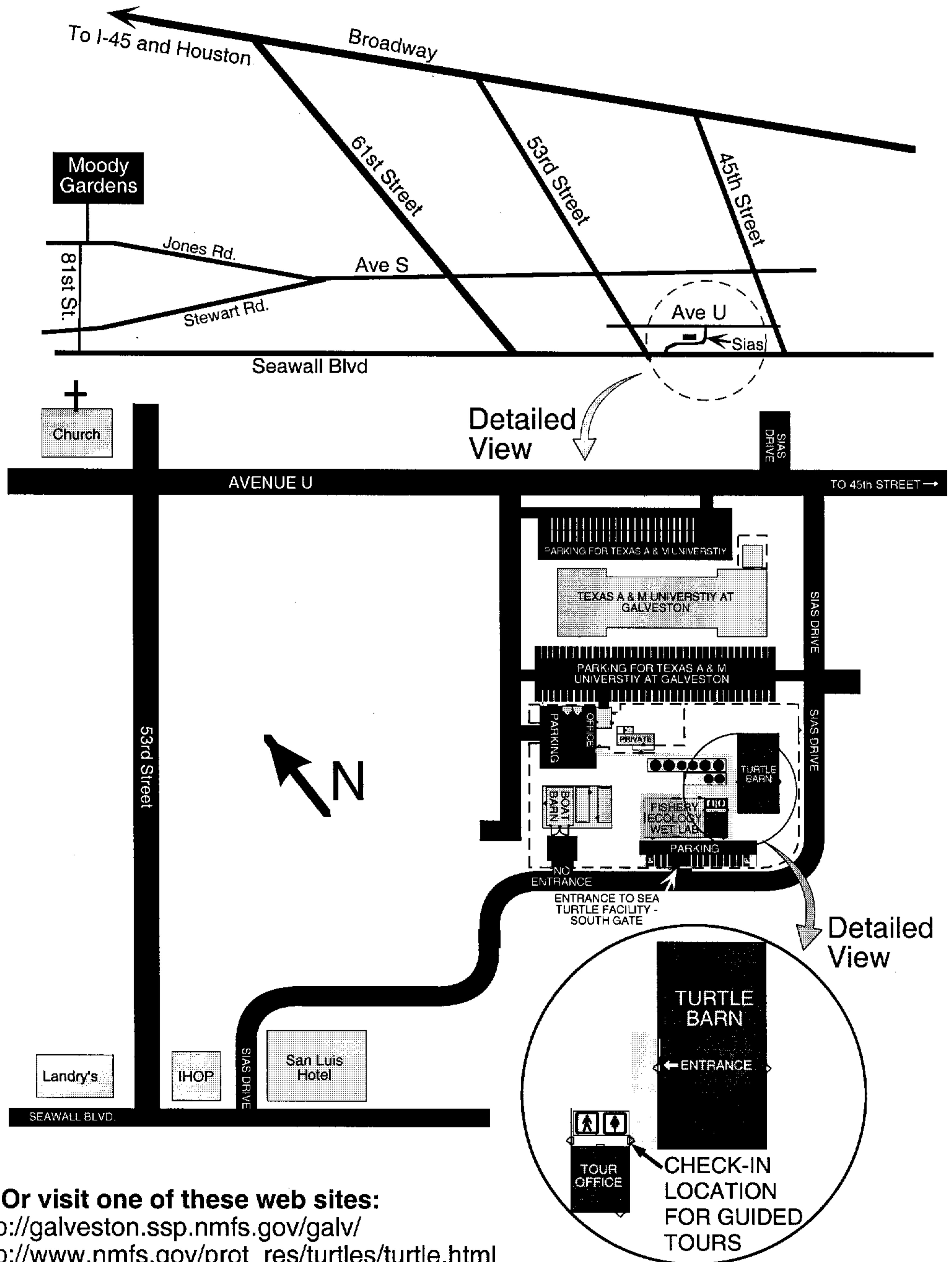
The longest reported dives range from 2 to 5 hours. Some turtles normally dive for close to one hour before they surface for a breath.

There is no way at present to determine the age of a sea turtle. Some people believe that they may live to be over 100 years old.

To Learn More About Sea Turtles:

1. Visit the National Marine Fisheries Service Galveston Laboratory.

Tours are given of our sea turtle facility on Tuesdays, Thursdays and Saturdays at 10:00 a.m., 11:00 a.m., 1:00 p.m. and 2:00 p.m. Please call (409) 766-3670 to schedule a tour or for more information.



2. Or visit one of these web sites:

<http://galveston.ssp.nmfs.gov/galv/>

http://www.nmfs.gov/prot_res/turtles/turtle.html

<http://www.turtles.org/>

<http://cccturtle.org/>

http://www.seaworld.org/Sea_Turtle/stindex.html

Glossary of Terms

Carapace	Top portion of the shell.
Endangered	There are not many left. The species is in danger of becoming extinct.
Extinct	No more of a species left.
Flipper Tag	A metal tag put on the flipper, much like having an ear pierced. Individual identification number. Generally only stays on the turtle for 2-5 years.
Hatchling	A baby sea turtle, right after it hatches.
Internal Magnetic Tag	Small piece of magnetized metal inserted into the flipper (about the size of the head of a pin). Only gives positive or negative results.
Living Tag	A biological tag. A permanent mark on the carapace created by taking a small piece of the plastron and grafting it in to the carapace. This tag will grow for the rest of the turtle's life. Identifies year class.
Necropsy	Examination of a dead animal to determine cause of death.
PIT Tag	Passive Integrated Transponder. The PIT tag is a microchip sealed in a glass tube about the size of a grain of rice. It is injected internally. When scanned by a special detector, it will give an individual 10 digit number . The same tag that veterinarians are using in pets now.
Plastron	Under portion of the shell.
Satellite	Object that orbits the earth (in this case they are man made, and function as relay stations).
Scute	The "scales" or divisions on a turtle's head or shell.
Stranding	When an animal that normally lives in the water is washed up on the beach. For a sea turtle, this is anytime it might be found on the beach EXCEPT for when the mother is nesting or the hatchlings are headed to sea.
Syringe	A medical instrument consisting of a hollow needle and a barrel used for injecting or withdrawing substances (usually fluids) from the body.
TED	Turtle Excluder Device. A trap door in a shrimp net which will allow the sea turtles an escape route.
Threatened	The species is in decline. One step above being considered endangered.