

Turtle Tracks

Miami-Dade County Marine
Extension Service

Florida Sea Grant Program



DISTURBING A SEA TURTLE NEST IS A VIOLATION OF STATE AND FEDERAL LAWS.

What To Do If You See A Turtle

If you observe an adult sea turtle or hatchling sea turtles on the beach, please adhere to the following rules and guidelines:

1. It is normal for sea turtles to be crawling on the beach on summer nights. DO NOT report normal crawling or nesting (digging or laying eggs) to the Florida Marine Patrol unless the turtle is in a dangerous situation or has wandered off the beach. (on a road, in parking lot, etc.)
2. Stay away from crawling or nesting sea turtles. Although the urge to observe closely will be great, please resist. Nesting is a critical stage in the sea turtle's life cycle. Please leave them undisturbed.
3. DO REPORT all stranded (dead or injured) turtles to the Florida Marine Patrol.
4. NEVER handle hatchling sea turtles. If you observe hatchlings wandering away from the ocean or on the beach, call:
Florida Marine Patrol 1-800- DIAL-FMP (3425-367)

MIAMI-DADE COUNTY SEA TURTLE CONSERVATION PROGRAM



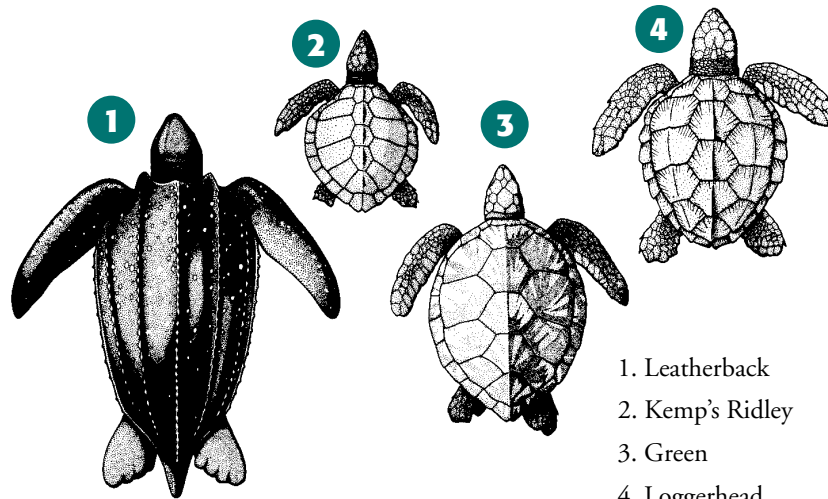
Josef Azei

"To Protect Endangered or Threatened Marine Turtles for Future Generations"

Before 1980, there was no documented sea turtle activity in Miami-Dade County, due mainly to the lack of an adequate beach-nesting habitat. In 1979, the Parks and Recreation Department's Sea Turtle Conservation Program began a comprehensive beach re-nourishment project and in 1980, with the advent of our newly re-nourished beaches, sea turtle activity started to prosper. Today, the program has documented over 3,886 nests, which has resulted in the release of over 356,414 hatchlings.

10800 Collins Avenue
Miami Beach, Florida 33154
(305) 947-3525

• Save and See a Sea Turtle Friend •



1. Leatherback
2. Kemp's Ridley
3. Green
4. Loggerhead

U.S. GOVERNMENT PRINTING OFFICE: 1999-557-736

This information is a cooperative effort on behalf of the following organizations to help residents of Miami-Dade County learn about sea turtle conservation efforts in this coastal region of the state.



**NATIONAL
SAVE THE SEATURTLE
FOUNDATION**



4419 West Tradewinds Avenue
Fort Lauderdale, Florida 33308
Phone: 954-351-9333
Fax: 954-351-5530
Toll Free: 877-Turtle3

Information has been drawn from "Sea Turtle Conservation Program", a publication of the Broward County Department of Planning and Environmental Protection, Biological Resources Division. Photos have been provided courtesy of Miami-Dade County Parks and Recreation Department.

For further information, please contact the Florida Sea Grant Marine Extension Agent at:

Florida Sea Grant College Program
RSMAS
4600 Rickenbacker Causeway
Miami, FL 33149-1098
(305) 361-4017

Florida Sea Grant is the only statewide, university-based coastal research, education, extension/outreach and communications program in Florida.

www.FlSeaGrant.org

SGEF-141

• Save Our Sea Turtles • Be A Lifesaver Friend •

TURTLE TRACKS

SEA TURTLE CONSERVATION IN MIAMI-DADE COUNTY



Mike Severus



Bill Ahern

Florida Sea Grant College Program

Sea turtles are marine reptiles that have existed since their giant land turtle ancestors returned to the sea sometime during the Age of Dinosaurs. Scientific study places sea turtles back in time as far as 150 million years ago.



New hatchlings making their trek toward the sea.

Seven species of sea turtles have managed to survive to the 21st Century. Three of these species, the Loggerhead Sea Turtle (*Caretta caretta*), the Green Sea Turtle (*Chelonia mydas*), and the Leatherback Sea Turtle (*Dermochelys coriacea*), nest on the beaches of Miami-Dade County from March to early September.

The Loggerhead is the most common, but Greens and Leatherbacks have also been documented in small numbers. In fact, Florida is responsible for 90% of nesting Loggerheads, making this state the largest nesting area in the Western Hemisphere for Loggerhead Sea Turtles.

Sea Turtles are Endangered or Threatened Species

Sea turtle populations have been seriously reduced worldwide through a number of human influences. Overdeveloped coastal areas have eroded natural nesting habitats. Breeding populations of adult turtles have been diminished by capture for eggs, meat, leather, oils, and tortoise shell, or mortality from long line fishing, discarded nets, fishing line, pollution, plastic products and motorboat injuries. Incidental captures of adults in fishing nets and shrimp trawls have brought one species, the Kemp's Ridley (*Lepidochelys kempi*), right to the brink of extinction. At one time, many feared the Kemps would vanish completely from our ecosystem.

For these reasons, the Marine Turtle Protection Program protects ALL sea turtles. Sea turtles in Florida are protected through Florida Statutes, Chapter 370.12(11-c-1) and by the United States Endangered Species Act of 1973. Briefly these laws state that: "No person may take, harass, harm, hunt, pursue, shoot, wound, kill, trap, capture or attempt to engage in any such conduct to marine turtles, turtle nests, and/or turtle eggs." Any persons who knowingly violate any provision of the act may be assessed civil penalties up to \$25,000 or a criminal penalty up to \$50,000 and up to one (1) year imprisonment.

Of the species that nest in Miami-Dade County, the Green and the Leatherback sea turtles are listed officially as endangered. The Florida population of Loggerheads is considered threatened.

Sea Turtle Nesting Behavior

Nesting begins in Miami-Dade County in late February. If undisturbed, the female leaves the ocean and crawls up the beach to a point well above the high tide line. There, using her rear flippers, she digs an egg chamber about 9 inches in diameter. Loggerheads and Greens will dig a chamber from 18 to 24 inches deep; a Leatherback's nest chamber can be as deep as 36 inches. After resting briefly, she deposits from 60 to 180 eggs that are soft and range from the size of a ping-pong ball to, in the case of a Leatherback, the size of a tennis ball. After she has deposited her eggs in the chamber, she uses her rear flippers again to cover the eggs with sand. She then energetically throws sand backward with her front flippers to cover and disguise the exact location of the nest chamber. She then leaves the nest site and returns to the sea.



Rick Poley

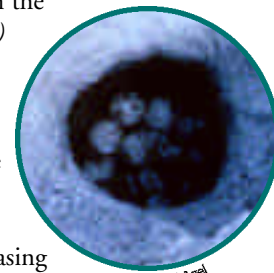
Since sea turtles do not nurture their hatchlings, the female never returns to the nest site. A single female may nest several times during a season and then not nest again for one or two years. Sometimes the female emerges from the sea without digging a nest chamber. These are called "false crawls" and usually occur because the turtle was disturbed or could not find a suitable nest site. The tracks left on the beach by the nesting turtle resemble marks left by a tractor tire. Male sea turtles rarely come ashore, unless they are injured or dead, which is why little is known about them.

The nesting season for the Leatherback in Miami-Dade County begins in late February and runs through late May; for the Loggerhead, from mid-April through late August; and for the Green sea turtle, from late May through mid-August.

Sea Turtle Hatchlings

Hatchlings start emerging from nests in mid-July to Mid-October. Here in Miami-Dade County, the eggs that are deposited in the chamber are either left to incubate naturally (*insitu*) or relocated to a fenced hatchery or a safer area of the beach. Because of the extent of the development on our beaches and associated bright lights from hotels, condominiums, streets and highway traffic, most of the nests in Miami-Dade County are moved by authorized and permitted personnel.

There are two types of hatchery systems – self-releasing and restraining hatcheries. The self-releasing hatchery allows the



José Azel

emerging hatchling to crawl out of the hatchery and traverse the beach toward the water's edge on their own unencumbered. Restraining hatcheries require the collection of hatchlings and manually releasing them at the water's edge.

Incubation of the nests takes about 50 to 60 days. After this period, the hatchlings emerge from the nest en masse, and in the case of insitu nests, using various environmental and inherited cues, quickly migrate to the water's edge. If artificial lights are lighting the beach, the hatchlings become disoriented, travel in the wrong direction, and possibly never make it to the water.

Once in the water the hatchlings swim directly out to sea, facing a perilous struggle to survive to adulthood. The best scientific estimates available indicate that only approximately one percent of the hatchlings will survive to adulthood.

The maximum age of adult turtles is unknown, but some have been kept in captivity longer than fifty years.

How You Can Help

Without the support of the public, the survival of sea turtles on our planet is doubtful. Here are some ways you and other citizens of Miami-Dade can help:

- As much as possible, refrain from walking on the beach at night during the summer months (March through mid-September.). No matter how quiet, humans will often – and unknowingly – frighten nesting sea turtles back into the sea.
- Never keep baby or newly hatched sea turtles in aquariums. They may survive for short time, but without proper chemical treatment of the aquarium they will perish.
- Keep bright lights from shining onto the beach. If you have security or safety lights near the beach, build shades around the light so the beach is not directly illuminated. The bright lights will disorient hatchlings.
- If you see someone harassing a sea turtle or poaching a nest, call the local police or the Florida Marine Patrol (1-800-DIAL-FMP).
- Do not dispose of plastic bags or trash in the ocean. Plastic bags very closely resemble a favorite food of sea turtles, jelly fish, and will cause illness or death to turtles and other marine life that eat them.
- Stay clear of marked sea turtle nests on the beach.

Sea Turtle Presentation

Evaluation Form

Please rate the presentation on a scale of 1 to 10, with 1 being “Least” and 10 being “Most.”

1. What knowledge of the subject did you have before the presentation? _____
2. What is the level of your knowledge as a result of the presentation? _____
3. Please indicate with an **X** if you learned something today about sea turtles:

	YES	NO	DON'T KNOW
1. Biology of sea turtles	_____	_____	_____
2. Behavior of sea turtles	_____	_____	_____
3. Nesting biology of sea turtles	_____	_____	_____
4. How to identify sea turtles	_____	_____	_____
5. Coastal development and impact on turtles	_____	_____	_____
6. Threats to sea turtles	_____	_____	_____
7. Sea turtle tumors	_____	_____	_____
8. Organizations that protect turtles	_____	_____	_____
9. How to decrease lighting on beaches	_____	_____	_____
10. What to do if you see a sick or dead turtle	_____	_____	_____

4. Beginning today, which of the following practices will you do regarding sea turtles? You can select more than one practice.

- _____ Support measures to conserve beach habitat
- _____ Support measures to decrease light pollution on beaches
- _____ Contact Florida Marine Patrol for any sea turtle related problems or questions
- _____ Support research and education efforts on sea turtles

Please answer the following questions by circling the number that best indicates your opinion about various aspects of the presentation (1 = do not agree at all, 2 = do not agree, 3 = undecided or neutral, 4 = agree, 5 = strongly agree). You are also encouraged to provide additional comments explaining your answer.

5. The talk was interesting and informative. 1 2 3 4 5
 Comments: _____

6. The presentation was clear and understandable. 1 2 3 4 5
 Comments: _____

FOR STATISTICAL USE ONLY:

Gender: _____ Male _____ Female

Ethnic Background: _____

Bullets are animated on slides

SEA TURTLES

Developed by: April Weaver and Dr. Mark Hostetler, Department of Wildlife Ecology and Conservation, University of Florida, PO Box 110430, Gainesville, FL 32611

Slide 1 Title Slide

Sea turtles are among the oldest creatures on earth and have remained essentially unchanged for 110 million years. However, they face an uncertain future. Sea turtles are threatened in many ways, such as encroachment of coastal development on their nesting beaches, encounters with pollutants and marine debris, accidental drowning in fishing gear, and international trade in turtle meat and products. Today we are going to talk about some of these issues and discuss a little turtle biology as well.

Slide 2 Biology of Sea Turtles

- Sea turtles are air-breathing reptiles remarkably suited to life in the sea. Their hydrodynamic shape, large size, and powerful front flippers allow them to dive to great depths and swim long distances.
- After they crawl from the nest to the ocean, male sea turtles rarely return to land again.
- Females come back only long enough to lay eggs.
- The turtles range from 85 to 2,000 pounds according to the species.

Slide 3 Worldwide Turtle Species

- There are seven species of sea turtle.
- Loggerhead, Green, Leatherback, Kemp's Ridley, Olive Ridley, Hawksbill, and Flatback.
- An additional turtle, the Pacific Green or "Black Turtle" is considered by some to be a separate species from the Green turtle.
- All but the olive ridley and flatback are found in Florida. All of these species are listed as either Threatened or Endangered under the Federal Endangered Species Act.

Slide 4 Biology of Sea Turtle

- Sea turtles cannot retract their heads very far into their shells, unlike land turtles.
- Most sea turtles grow slowly and have a life span of many decades. Although sea turtles can remain submerged for hours at a time while resting or sleeping, they typically surface several times each hour to breathe.
- Turtles are tropic and temperate region animals. They are prone to hypothermia in winter. They become sluggish, and may die if not rehabilitated.
- In most sea turtles, the top shell, or carapace, is composed of many bones covered with horny scales or "scutes." Turtles are toothless but have powerful jaws to crush, bite, and tear their food.

Slide 5 Nesting Biology

Florida is home to the nation's only refuge designated specifically for sea turtles. On Florida's East Coast, the Archie Carr National Wildlife Refuge serves as a nursery for approximately one-quarter of all loggerhead turtle nests in the Western Hemisphere.

- From May through September the females leave the sea and crawl ashore to dig a nest in the sand.
- Sea turtles nest almost exclusively at night, except the Ridley's. They nest in masses during the day.
- She uses her rear flippers to dig the nest hole and then she deposits about 100 eggs the size of Ping-Pong balls.
- When egg laying is complete, the turtle covers the eggs, camouflages the nest site, and returns to the ocean. Nesting turtles may return several times in a nesting season to repeat the process

- They usually nest every two to three years.
- As is true for some other reptiles, the temperature of the sea turtle nest determines the sex of the hatchlings. Warmer temperatures produce more females, whereas cooler temperatures result in more males. Consequently, conservationists prefer to leave turtle eggs in their original location whenever possible so that sex ratios are determined naturally. After incubating for about two months, the eggs begin to hatch. 2-inch hatchlings emerge as a group. This mass exodus usually occurs at night, and the hatchlings use the bright, open view of the night sky over the water to find their way to the sea.

Slide 6 Nesting Behavior

- Female sea turtles often appear to be weeping as they nest: the main purpose for these tears is to remove salt from the turtle's body. All turtles have glands in the corners of their eyes. Turtles live in a saline environment, but they too need water to survive. They ingest seawater and need a way to remove salt from their tissues.

Slide 7 Florida's Sea Turtles

Now we are going to talk about the five species of turtles that occur in Florida's waters. They are the Loggerhead, Green, Leatherback, Kemp's Ridley, and Hawksbill.

Slide 8 Green turtle (*Chelonia mydas*)

- Adult green turtles are unique among sea turtles in that they are largely vegetarians, consuming primarily sea grasses and algae.
- Approximately 100 to 1,000 green turtles nest on Florida's beaches each year from June through late September.
- Green turtles, were named for their green body fat, were valued by European settlers in the New World for their meat, hide, eggs, and "calipee" (the fat attached to the lower shell that formed the basis of the popular green turtle soup). At one time, Key West was a major processing center for the trade.
- A streamlined-looking turtle, the green turtle weighs an average of 350 lbs and has a small head for its body size.
- Its oval-shaped upper shell averages 3.3 feet in length.
- Is olive-brown with darker streaks running through it; its lower shell, or plastron, is yellow.

Slide 9 Turtle tumors

Many of Florida's green turtles have numerous tumors on their bodies called fibropapillomas. Researchers believe a virus causes these growths but have not yet isolated a specific pathogen. The number of green turtles with these tumors appears to be increasing. Many think it affects the health and survival of the Green turtles.

Slide 10 Ocular (eye) Tumors

This is a picture of the same turtle a few months later. You can see the rapid progression of the tumors. Her vision is now completely impaired in this eye.

Slide 11 Leatherback Turtle

- Leatherbacks are capable of descending more than 3,000 feet and of traveling more than 3,000 miles from their nesting beach.
- Researchers have found that leatherbacks are able to regulate their body temperature so that they can survive in cold waters.
- The leatherback is found in Florida's coastal waters, and a small number (from 30 to 60 a year) nest in the state.

Slide 12 Leatherback turtle (*Dermochelys curia*)

- Most leatherbacks average 6 feet in length
- And weigh from 500 to 1,500 pounds, but the largest leatherback on record was nearly 10 feet long and weighed more than 2,000 pounds.
- Leatherbacks look distinctively different from other sea turtles. Instead of a shell covered with scales

or shields, leatherbacks are covered with a firm, leathery skin and have seven ridges running lengthwise down their backs.

- They are usually black with white, pink, and blue splotches.
- Leatherbacks eat soft-bodied animals such as jellyfish and their throat cavity and scissors-like jaws are lined with stiff spines that aid in swallowing this soft and slippery prey.
- They are found throughout the Atlantic, Pacific, and Indian oceans, as far north as Alaska and Labrador.

Slide 13 Loggerhead (*Caretta caretta*)

The most common sea turtle in Florida, the loggerhead is named for its massive, block-like head. The beaches of Brevard, Indian River, St. Lucie, Martin, and Palm Beach counties are the most important loggerhead nursery areas in the Western Hemisphere, attracting more than 15,000 female loggerheads each May through August.

On Florida's east coast, the Archie Carr National Wildlife Refuge serves as a nursery for approximately one-quarter of all loggerhead nests in the Western Hemisphere.

Slide 14 Loggerheads

- Loggerheads are among the larger sea turtles; adults weigh an average of 275 pounds
- And have a shell length of about 3 feet.
- Its carapace, which is a ruddy brown on top and creamy yellow underneath, is very broad near the front of the turtle and tapers toward the rear.
- The powerful jaws of the loggerhead allow it to easily crush the clams, crabs, and other armored animals it eats.
- A slow swimmer compared to other sea turtles, the loggerhead occasionally falls prey to sharks, and individuals missing flippers or chunks of their shell are a common sight.

Slide 15 Mystery Illness

In the winter of 2000, almost 150 sick or dead loggerheads have been found in south Florida. Because many dead or dying turtles never wash ashore, biologists are concerned that this may represent only a fraction of the turtles that may have been affected. The turtles have all had similar symptoms. Two of the most noticeable are extreme lethargy and pneumonia. Researchers are working to discover the cause of this illness. They are worried that if the agent that is causing the illness stays in Florida's waters during the summer, the females that come to nest in south Florida will become ill, and if it is infectious, they could carry it to other populations of loggerheads.

Slide 16 Kemp's ridley (*Lepidochelys kempii*)

The Kemp's ridley is the rarest sea turtle in the world and is the most endangered. It has only one major nesting beach, an area called Rancho Nuevo on the Gulf coast of Mexico. Fewer than 1,000 nesting females remain in the world.

Slide 17 Kemp's Ridley

- Kemp's ridleys are small, weighing only 85 to 100 pounds
- And measure 2 to 2.5 feet in carapace length.
- Their principal diet is crabs and other crustaceans.
- There is only one major nesting beach left for them in the world, and that is on Rancho Nuevo in Mexico.

- There are Fewer than 1000 nesting females left.
- During the 1980s, many eggs were removed from the beach at Rancho Nuevo and incubated in containers. The hatchlings that emerged from these eggs were then raised for almost a year in a National Marine Fisheries Service facility in Galveston, Texas. Upon release, it was hoped that these "head started" turtles had a better chance of survival than they would have had as hatchlings. Unfortunately, there were many problems with this program. When it was discovered that the sex of turtle hatchlings was influenced by temperature, project workers realized that the artificial egg incubators were producing only male turtles. They also discovered that many of the "head started" turtles did not behave like their wild cousins after release. Many scientists worried that these "head-started" turtles would never become reproducing adults. Although two "head started" turtles have finally been known to nest, head starting is generally considered to be an inappropriate conservation technique for marine turtles.

Slide 18 Hawksbill turtle (*Eretmochelys imbricata*)

The hawksbill is a small, agile turtle whose beautiful tortoise-colored shell is its greatest liability. The shell is still used in some European and Asian countries to make jewelry, hair decorations, and other ornaments, although international trade in hawksbill products has been banned in much of the world.

Slide 19 Hawksbill Turtle

- Hawksbills weigh from 100 to 200 pounds as adults
- Are approximately 30 inches in shell length.
- Its carapace is shaded with black and brown markings on a background of amber. The shields of this kaleidoscopic armor overlap, and the rear of the carapace is serrated.
- Its body is oval-shaped, its head is narrow, and its raptor-like jaws give the hawksbill its name.
- These jaws are perfectly adapted for collecting its preferred food, sponges. Although sponges are composed of tiny glasslike needles, this diet apparently causes the turtle no harm.
- Hawksbills are the most tropical of the sea turtles and are usually found in lagoons, reefs, bays, and estuaries of the Atlantic, Pacific, and Indian oceans. Divers off the Florida Keys frequently spot them and a few nests are documented annually from the Keys to Canaveral National Seashore.

Slide 20 Threats to Turtles

There are many threats to turtles. These three here are associated with eggs and hatchlings, artificial lights, predators, and beach driving.

Slide 21 Lighting

Artificial lights on beachfront buildings and roadways distract hatchlings on their way to the ocean. Because of this danger, many beachfront communities in Florida have adopted lighting ordinances requiring lights to be shut off or shielded during the nesting and hatching season. People have also been restricted from access to the beach during the nesting season.

In the past hatchling turtles were guided to the ocean by an instinct to travel away from the dark silhouettes of the dune vegetation and toward the brightest horizon, which was the light from the sky reflecting off the ocean. In present times however, many coastal -areas are highly populated. There are many artificial lights near the beach that can deter females from nesting and disorient hatchling sea turtles. The hatchlings travel inland, toward the artificial lights, where they often die from dehydration, or sometimes crawl onto the road where they are run over by cars.

Slide 22 Crows and Ghost Crabs

Hatchlings are preyed upon by fire ants, crows and ghost crabs.

Slide 22 Coyotes and Foxes

Man is not the only threat to turtles, we mentioned a few above, but there are others. Coyotes and foxes are a threat to turtles because they dig up nests for the eggs. As you can see here, the nests are destroyed.

Slide 23 Raccoons

Raccoons have been known to sit behind a turtle and scoop up the eggs as they are laid, not even waiting until the female leaves.

Slide 24 Beach Driving

Beach driving destroys nests and often leaves the beach in such a bad state that it is difficult for the females to crawl ashore far enough out of the reach of the tide.

Slide 26 Additional Threats to Turtles

Sea turtles face many threats from humans. They are hunted for their meat and shells, their eggs are pilfered, and condominiums, seawalls, and other structures often degrade their nesting beaches. Hatchlings are lured to their deaths by the artificial lights on developed beaches; they may die after consuming discarded plastic bags, balloons, and other marine debris; and turtles may be drowned in shrimp trawls and gill nets. Now these issues are a major concern of the public

- Trawling
- TED's (Turtle Exclusion devices)
- Pollution

Slide 27 Trawling

Before turtle exclusion devices or TED's were required, approximately 11,000 sea turtles died each year when they became trapped in shrimp nets and drowned. This is a picture of two shrimp boats. Kemp's Ridley's were especially hard hit by the nets.

Slide 28 TED

- Perhaps the most important step forward for sea turtles came in 1989, when all shrimpers in the United States were required to use special "turtle-excluder devices," or TEDs.
- Which allowed turtles accidentally caught in nets to escape through a trap door.

Slide 29 TED

This is a diagram of one type of TED. There are several types. TEDs are panels of large-mesh webbing or metal grids inserted into the nets. As the nets are dragged along the bottom, shrimp and other small animals pass through the TED into the end of the net. Sea turtles, sharks and other large fish are deflected through the hatch. Compliance with TED regulation is still a problem. There is still a high mortality rate for turtles from the fishing industry. The fisherman will sew shut the trap door, or will use mesh of the wrong gauge. Fisherman believe they cause them to lose 20 percent or more of their catch, while proponents say that they improve the catch by not having all of the shrimp crushed by the heavier animals.

Slide 30 Pollution

Pollution is a factor because not only does it degrade the beaches, it collects in the oceans as well. Turtles often mistake plastic bags or balloons as jellyfish, and ingest them, causing death.

Slide 31 Coastal Impacts

Beach Armoring, Coastal development and Beach Renourishment are three other topics we need to discuss. They affect turtles in less obvious, but not inconsequential ways.

Slide 32 Beach Armoring

Managing coastal development on nesting beaches is another critical concern. State rules impose some limits on the construction of seawalls and other shoreline-hardening structures such as bulkheads and sandbags that can erode sandy nesting beaches, but such structures are still permitted in many areas where turtles nest. They are designed to protect property, but have the unfortunate effect of degrading habitat instead. Plus, it prevents turtles from laying eggs up above the tide line. The eggs will die if the tide reaches them.

Slide 33 Coastal development

Coastal development has taken over much of former turtle nesting territory. This has caused deaths from drowned nests, because the turtles cannot get up past the high tide mark. Also the beaches are eroding because much of the vegetation that keeps the sand from washing away has been destroyed. Wherever there is coastal development, there is increases in beach lighting, which adversely affects turtle populations.

Slide 34 Beach renourishment

Beach renourishment projects, designed to restore sandy beaches, may pose a threat when they are conducted during the prime turtle-nesting season. It is not always possible to relocate all turtle nests in the path of the renourishment projects. Renourishment can be done in several ways. The projects are designed to restore beaches that have eroded away. Sand can be brought from inland, or can be dredged from offshore. There are several problems with these projects to go along with the positive benefits. Offshore reefs provide feeding sites and shelter for turtles as well as other animals. Often enough, the sand that is trucked in washes right back out to sea and smothers the reefs, destroying food sources. Sometimes sediment is dumped directly into shallow waters to form berms. Seagrass beds often suffer from these projects.

- On the positive side, renourishment projects provide nesting habitat where there was none previously.
- Researchers are not sure how these projects affects site fidelity. Turtles imprint, so if the sand is different from what was originally there, will the turtles still nest?
- Since much of the sand used for these projects comes from inland, it is not the same as beach sand. Particle size affects drainage, which affects the hydro environment of the beach.. The color of the sand affects the temperature. All of these factors influence the incubation of the eggs and the metabolism of the embryos.
- Over 90 additional large-scale dredge projects are planned to occur between 2000 and 2046.

Slide 35 Conservation efforts

There are signs of recovery and positive action in Florida: the number of green turtle nests appears to be increasing slowly, and the number of dead turtles found on beaches is decreasing gradually. Many coastal construction and beach renourishment permits now incorporate sea turtle protection measures. Researchers are busy finding answers to help us save these denizens of the deep, and there are more laws than ever to help us protect them.

- Research done
- Organizations devoted to saving the turtles
- Laws and Statutes to protect the turtles

Slide 36 Sea Turtle Research

Information about these ancient nomads of the deep has until recently focused on nesting females and hatchlings because they are the easiest to find and study. The advent of new research techniques, such as satellite tracking technology, has allowed scientists to peer into other phases of their lives. At the University of Florida, scientists at the Archie Carr Center for Sea Turtle Research along with scientists from the Fish and Wildlife Unit, Department of Wildlife Ecology & Conservation of are conducting research on the following topics:

- The distribution, abundance, life histories, ecology, and migrations of marine turtles.
- The incidence of marine turtle death and disease and their causes.
- The identification of genetic stocks of marine turtles that use Florida's beaches
- The development of reliable sex-determination techniques for marine turtles;
- The nesting ecology of loggerheads;
- The effect of artificial light, beach armoring, and beach renourishment on turtles.

Slide 37 Organizations Bureau of Protected Species Management

The Sea Turtle section within the Bureau of Protected Species Management is primarily responsible for the management efforts toward sea turtle recovery. Specific actions include;

- Recovery program planning, management, and administration,
- Coordination of research and management activities
- Habitat protection, and
- Education.

Slide 38 Organizations Florida Fish and Wildlife Conservation Commission

- FWC's sea turtle program contributes to the protection of sea turtles and their habitat by
- Staff participation in decisions regarding coastal construction activities, land acquisition, and management of nesting beaches and foraging habitats.
- Staff reviews and comments on permits for coastal construction activity, dredge and fill permits, renourishment projects, beach lighting ordinances, and beach cleaning practices.
- Field evaluations of proposed activities are conducted to evaluate the success of turtle protection measures.
- Educational activities include distribution of brochures, booklets, responding to requests for information to interested parties, attendance at conferences, and providing slide shows and lectures to groups

Slide 39 Organizations Florida Marine Research Institute

Operating under the Florida Marine Research Institute, a network of permit holders monitor marine turtle nesting activity on more than 768 miles of Florida beaches. The Sea Turtle Stranding and Salvage Network (STSSN) operates statewide.

- FMRI staff responds or coordinate response to all reported sea turtle strandings in Florida. This is done through a network of federal agencies, the Florida Marine Patrol and over 350 trained STSSN participants.
- Species, location, measurements, and anomalies are documented for each turtle.
- Fresh turtle carcasses are retained for necropsy and/or organ and tissue sample collection.
- This information is used to monitor and document sea turtle mortality factors, and to aid in the development of sea turtle recovery actions.

Slide 40 Laws and Statutes

Humans have drastically reduced natural populations of marine turtles through incidental capture, intentional harvesting, and the alteration and destruction of nesting and foraging habitats. Recognizing that these impacts could lead to the extinction of marine turtles, both state and federal governments listed the species as threatened or endangered. (The loggerhead is the only one that has a population high enough to be threatened in Florida).

- They are protected under the Federal Endangered Species Act of 1973.
- And Florida's Marine Turtle Protection Act.
- There are also many counties and municipalities in Florida that have passed ordinances prohibiting light from reaching the beach.

Slide 41 How you can help

There are ways that beach front property owners can modify their lights to prevent them from being seen from the beach. The following is a list of suggestions.

Slide 42 How you can help Solutions to Decrease Light

- Turn off unnecessary lights.
- Don't use decorative lighting (such as runner lights or uplighting of vegetation) in areas that are visible from the beach and permanently remove, disable, or turn off fixtures that cannot be modified in any other way.
- For lights that can be repositioned, face them away from the beach so that the light source is no longer visible.
- Shield the light source. Materials such as aluminum flashing can be used as a shield to direct light and keep it off the beach. When shielding lights, it is important to make sure they are shielded from all areas on the beach (including from either side and on top), and not just from the beach directly in front of the light.
- Paint may be used as a temporary solution. The fixture or the bulb itself may be painted, so no lateral light shows.
- Light sockets with an exposed light source (such as plain bulbs) should be replaced with fixtures that are specially made to recess and/or the light source should be shielded.
- Replace fixtures that scatter light in all directions (such as globe lights or carriage lights) with directional fixtures that point down and away from the beach.
- Replace lights on poles with low profile, low-level lamps so that the light source and reflected light are not visible from the beach.
- Replace incandescent, fluorescent, and high intensity lighting with the lowest wattage low-pressure sodium vapor lighting or replace white incandescent bulbs with "bug" lights of 50 watts or less.
- Plant or improve vegetation buffers (such as sea grapes and other native beach vegetation) between the light source and the beach to screen light from the beach.
- Use shielded motion detector lights for lighting, and set them on the shortest time setting.
- To reduce spillover from indoor lighting move light fixtures away from windows, apply window tint to your windows that meets the 45% inside to outside transmittance standards for tinted glass (you'll save on air conditioning costs too), or use window treatments (blinds, curtains) to shield interior lights from the beach.

Slide 43 Sick, Injured or Dead Sea Turtle

If you see a dead, sick or injured sea turtle:

- Call the Florida Marine Patrol at
- 1-800-DIAL-FMP or
- Contact FMRI Turtle Stranding Staff by Pager

- 1-800-241-4653 (ID#274-4867)
- Please be prepared to answer the following questions:

Slide 44 How you can help Sick injured or dead turtles

- What is the exact location of the animal?
- Is the turtle alive or dead?
- What is the approximate size of the turtle
- Is the turtle marked with spray paint? (This indicated that the turtle has been documented).
- What is the location of the closest access point to the turtle?

Slide 45 Summary

- Air-breathing reptiles
- There are 7 species of turtles and 5 occur in Florida
- All are endangered or threatened
- As with most reptiles, the temperature of the nest determines the sex of the hatchlings; warmer temperatures mean more females, cooler more males.

Slide 46 Summary

- Turtles are threatened in many ways: by coastal development, pollution, drowning in nets, and artificial lights
- Research has focused on females and hatchlings because they are the most accessible
- Protection of these giants is in our hands. Protection of their nesting beaches remains a key goal in their survival.

Literature cited

“Sea Turtles: Nomads of the Deep.” Florida Fish and Wildlife Conservation Commission. Pp. 1-4

Rudloe, Jack. 1979. Time of the Turtle. Truman Talley Books, New York.

Rudloe, Jack and Ann. “Shrimpers and Lawmakers Collide Over A Move to Save the Sea Turtle.” Smithsonian Dec. 1989: 44-7.

Williams, Ted. “The Exclusion of Sea Turtles.” Audubon Jan. 1990: 24-37.

Environmental Defense, “Environmental Standards in Beach Dredge and Fill Projects” June 27, 2000 1-6.

Florida Fish and Wildlife Conservation Commission. January, 2001. “Solutions to Decrease Light-Pollution Affecting Sea Turtles.”

Florida Fish and Wildlife Conservation Commission Website (for contact information)

The Archie Carr Center for Sea Turtle Research. April 2001. Website. Mission Statement.

