Lesson 2. Coastal Reptiles: The Diamondback Terrapin

Lesson Objectives:

- This section focuses on the Diamondback Terrapin.
- The student will become familiar with its physiology, habitat, and nesting behaviors.

Diamondback terrapins live in coastal **salt marshes** and estuaries along the Atlantic coast from Cape Cod, Massachusetts southward to the Florida Keys then northward along the Gulf coast and west to Texas. Diamondback terrapins have a wide tolerance of salt in their water, and are the only North American turtles native to **brackish** (salty, but not as salty as the ocean) waters. Terrapins may hibernate in their northerly ranges but do not seem to hibernate in their warmer southerly ranges.

They are small to medium sized turtles, and the females are larger than the males. Their

carapace, the top of their shell, is oblong-shaped, and range in color from gray to light brown to black. Each of the seven sub-species of diamondback terrapins has slightly different markings, with grooves and different-colored concentric markings on the scutes. For instance, there is a Florida form of the diamondback terrapin which is slate black in color with a widened head and jaw, which is used for eating barnacles off the roots of mangrove trees. Diamondback terrapins may change in appearance as they get older.

When its time to lay their eggs, females leave the water to find land in which they bury their eggs. They prefer sand, but can be very resourceful when they have to find a suitable site, resorting to people's yards or roadsides when necessary. They dig a hole using their hind

legs only, alternating each leg to dig. They then lay approximately five to seven eggs in the hole, and cover it up leaving no evidence that they have been there. They then make their way back to the water.

Conservation of the Diamondback Terrapins

A major problem facing the diamondback terrapin is that the coastal areas where they are found are becoming so developed, it is getting harder for the female to find sites to lay her eggs. Prime laying areas are being paved over, forcing female terrapins to cross busy coastal roads to find a nesting site. Often, they are hit by cars before they can lay their eggs.

A study was conducted on the northern diamondback terrapin by scientists from the Wetlands Institute, Stone Harbor, NJ and from Stockton College in Pomona, NJ. They found that from 1989-95, 4020 terrapins were killed during the nesting seasons (early June through mid-July) on the Cape May (NJ) Peninsula alone. They were able to **harvest** 3690 **eggs** from terrapins that they found killed in the road, and of those eggs, 1175 produced hatchlings.

The Wetlands Institute at Stone Harbor, New Jersey, is giving terrapins a head start. In this program, researchers retrieve eggs from female terrapins killed by road traffic. The researchers **incubate** and hatch the eggs, and raise the hatchlings until they are 2-3 years old. The young terrapins are then released back into the wild. They are much larger and stronger and, hopefully, have a better chance of surviving than new hatchlings.

Researchers at the Wetlands Institute have incubated diamondback terrapin eggs at various temperatures. They have found that at 26°C (78.8°F) the hatchlings are predominately male. At 32°C (89.6°F) the hatchlings are all females. Scientists refer to this as **temperature dependent sex determination**.

Wetlands Institute Findings

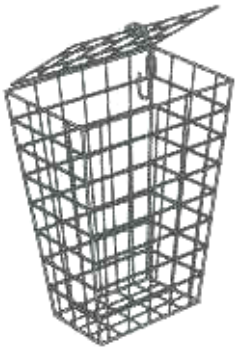
	1989	1990	1991	1992	1993	1994	1995	Total
Total # of Road Kills	273	1077	712	586	535	419	418	4020
Total # of eggs salvaged	180	933	746	734	448	399	250	3690
# of Resultant Hatchlings	77	85	286	235	222	157	113	1175
Hatchling Success	43%	9%	38%	32%	50%	39%	45%	32%

The scientists have concluded by the declining number of killed terrapins found on the roadside, that the terrapin population is reducing. They factor in the fact that vehicular traffic has increased, that there are no barriers established to keep the terrapins from crossing the roads. Scientists also consider the fact that they have more students on "terrapin patrol" looking for either live terrapins crossing the road (which the students help) or killed terrapins.

Scientists have created indoor farms to raise the hatchlings so they can safely grow. Protecting the hatchlings gives them a better chance of survival than they would have in the wild. Once they get to a certain length, 5 to 7 cm, they are large enough to be released. When they attain that size, it is difficult for most **marsh predators** to swallow them whole, giving the terrapin a better chance of reaching adulthood. Unfortunately, even if all the hatchlings were to reach adulthood, which does not occur, they still do not number enough to replace the population of females killed in the road.

Crab Traps

In cooperation with the Bureau of Marine Fisheries, Dr. Roger Wood of the Wetlands Institute was contracted to continue evaluating a simple device



designed to reduce **by-catch** of diamondback terrapins in commercial **crab traps**. Biologists suspect that one of the primary sources of mortality for diamondback terrapins is incidental drowning in commercial crab traps. It is estimated that five terrapins die each day per 100 crab traps; along New Jersey's coast alone, an estimated 30,000-40,000 terrapins die each year in traps. One out of three terrapins caught in a crab trap dies. By developing an inexpensive way to reduce drowning in crab traps, and one which does not unfairly burden

commercial crab trappers, biologists hope to preclude the necessity of federal listing and begin restoring diamondback terrapin populations. Researchers have developed a device, called a **Bycatch Reduction Apparatus** (BRA), that has reduced terrapin drowning by 70-90%. It is simply a 5" X 7" wire opening in the upper part of the trap that is large enough for most of the trapped terrapins to escape. Although some of the smaller crabs may also escape through the BRA, the marketable crabs are left in the trap for the crabber.

Often traps are left for years without being recognized as an abandoned trap.

Percentage of traps set where terrapins occur	Number of drowned terrapin in 4 month season	Number of drowned terrapin in 5 month season
50%	71,340	88,740
25%	35,670	44,370
10%	14,268	17,748

Source: The Wetlands Institute, NJ

Threats

Other potential threats to the diamondback terrapin include development of coastal regions, the terrapin's nesting grounds; incidental kills by motor boats; road mortality of nesting females, predation on adults by raccoons and pet trade by humans.

For the past five years, scientists have recommended placing the diamondback terrapin on the federal endangered species list. Their numbers dwindled at the turn of the century, mostly due to the fact that the terrapins were a delicacy and were served at the fanciest of dinners. Although they were never **federally protected**, some states, such as Massachusetts, have fully protected the diamondback, while others, such as New Jersey, allow a legal hunting season with no capture limit. Studies show that the diamondback terrapin population is declining in several states: Louisiana, Mississippi, Florida, South Carolina, Maryland and New Jersey and remaining stable or even increasing in its other locales.

How you can help:

Do not buy terrapins in a pet store. This is a great way to end up with a sick animal, which will only be a hassle to you. Let's end the demand for pet store turtles by not buying them.

1. Support turtle conservation and land acquisitions organizations.

2. Educate others about the plight of this species.

3. Create public awareness on roadways near terrapin nesting areas.

4. Support state regulations that will help reduce terrapin mortality in crab traps.

5. Support state regulations restricting the commercial trade in Diamondback terrapins

LISTING STATUS

The following definitions apply to listings for FCREPA, FGFWFC, and USFWS.

***ENDANGERED*:** Species in danger of extinction if the deleterious factors affecting their populations continue to operate.

***THREATENED*:** Species that are likely to become endangered in the foreseeable future if current trends continue.

***RARE*:** Species that, although not presently endangered or threatened as defined above, are potentially at risk because they are found only within a restricted geographic area or habitat.

***SPECIES OF SPECIAL CONCERN (SSC)*:** Species that do not clearly fit into one of the preceding categories yet warrant special attention.

LISTING AGENCIES

CITES: Convention of International Trade of Endangered Species

FCREPA: Florida Committee for Rare and Endangered Plants and Animals

FGFWFC: Florida Game and Fresh Water Fish Commission

FNAI: Florida Natural Areas Inventory

USFWS: U.S. Fish and Wildlife Service

Picture credits:
http://www.best5.net/animal/APAsrch3.cgi?dspNum=5&qt=terrapin

References

Boykin, Scott. Independent biologist. Gulfport, Florida.

Heinrich, George L. Boyd Hill Nature Park, St. Petersburg Florida.

Wood, Roger C. and R. Herlands.Terrapins, tires and traps: conservation of the northern diamondback terrapin (Malaclemys terrapin terrapin) on the Cape May Peninsula, New Jersey, USA. The Wetlands Institute: Stone Harbour, NJ. 1996.
State of New Jersey Department of Environmental Protection

Great Web sites:

http://www.tortoise.org/archives/malaclem.html
http://www.uga.edu/~srel/terrapin.htm
http://www.state.nj.us/dep/fgw/diaback.htm

Student Information Sheet 2. Coastal Reptiles II: Diamondback Terrapin

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Crab Traps

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device designed to reduce **by-catch** of diamondback terrapins in commercial **crab traps**. Biologists suspect that one of the primary sources of mortality for diamondback terrapins is incidental drowning in commercial crab traps. It is estimated that five terrapins die each day per 100 crab traps; along New Jersey's

coast alone, an estimated 30,000-40,000 terrapins die each year in traps. One out of three terrapins caught in a crab trap dies. By developing an inexpensive way to reduce drowning in crab traps, and one which does not unfairly burden commercial crab trappers, biologists hope to preclude the necessity of federal listing and begin restoring diamondback terrapin populations.

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Activity 2-1. Classroom Discussion Questions

1. What would be the benefits of having a crab season? Crab season would reduce the number of unused, abandoned crab traps, thus reducing the number of terrapins caught in these traps.

2. What would be the disadvantages? Crabbers would lose money.

3. Do you think there is a way reduced the number of terrapins killed by vehicles? If you were able to create a device that would alert the turtles to vehicles what would it look like? How would it work?

4. What are other potential threats to Terrapins? Other potential threats to the diamondback terrapin include development of coastal regions, the terrapin's nesting grounds; incidental kills by motor boats; road mortality of nesting females and predation on adults by raccoons.