



Gopher Tortoise: A Species in Decline¹

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"...Everything affecting the gopher tortoise's habitat affects the tortoise and...eventually affects all the other organisms in its ecosystem. Efforts to save the gopher tortoise are really a manifestation of our desire to preserve, intact, significant pieces of the biosphere. Even if the gopher tortoise could be assured survival in zoos and gopher farms, few of us would be satisfied. Organisms that exist in the absence of the natural systems of which they are a part are functionally extinct. and when man's care lapses they become truly extinct. I cannot imagine the sandylands without the gopher tortoise or the tortoise without its scrub habitats. They are one. In the end, we are one with them.

...We must preserve...the gopher tortoise and other species in similar predicaments, for if we do not, we lose a part of our humanity, a part of our habitat and ultimately part of our world."

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HISTORY

Gopher tortoises (*Gopherus polyphemus*) burrow into the earth, building homes for themselves and

havens for many other animals. Along with scrub jays, burrowing owls, and short-tailed snakes, ancestors of gopher tortoises were a part of the savanna fauna that migrated millions of years ago into the southeastern United States. Gopher tortoises belong to a group of land tortoises that originated in western North America nearly 60 million years ago. At least 23 species of these tortoises are known to have existed on our continent since that time, but only four remain today. Three of the living tortoises (*Xerobates agassizi*, *Xerobates berlanderi*, and *Gopherus falvomarginatus*) are found in the western United states and northern Mexico. Only the gopher tortoise (*Gopherus polyphemus*, Figure 1) occurs east of the Mississippi River.

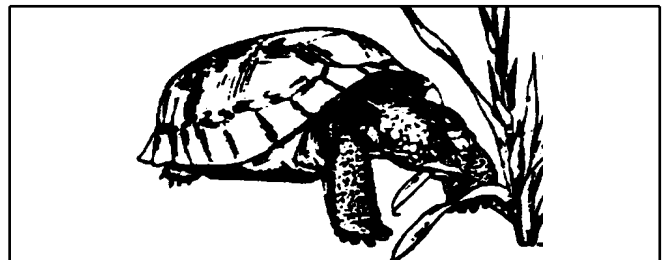


Figure 1.

DISTRIBUTION

Gopher tortoise populations are scattered throughout the coastal plain of the southeastern

1. This document was published by the Gopher Tortoise Council, a group of southeastern biologists and other citizens concerned with the decline of the gopher tortoise. Publication date: 1991. First published: 1980. Minor Revision: July, 2001.

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United States, with most being found in north-central Florida and southern Georgia. (See Figure 2.) The species has been severely reduced in southern Alabama and Mississippi, southeastern Louisiana, southeastern South Carolina, and along Florida's southeast coast and throughout much of the Florida Panhandle. In Florida alone, gopher tortoise populations have dwindled to an estimated 30 percent of their original numbers.

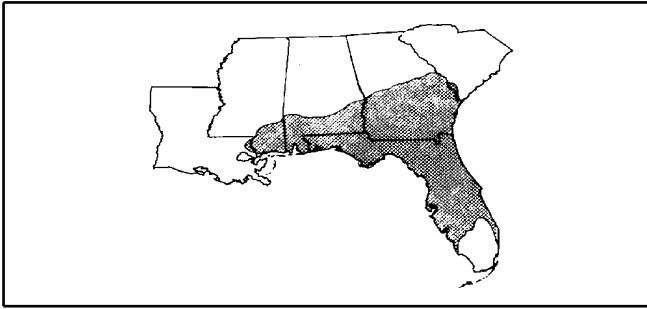


Figure 2.

HABITAT

Gopher tortoises, or "gophers" as they are commonly called, live in dry habitats, such as longleaf pine-scrub oak sandhills and clayhills, live oak and red oak hammocks, sand pine scrub, wire grass flatwoods, dry prairies, and coastal dune ecosystems. Tortoises can also live in some man-made environments, such as pastures, old fields and grassy roadsides. Three conditions are needed for healthy tortoise populations: well-drained sandy soils for digging burrows, sufficient low plant growth for food, and open, sunny areas for nesting.

LIFE HISTORY

Gopher tortoises feed mainly on low-growing plants that require abundant sunlight to grow well. Although wiregrass, broadleaf grasses and legumes are the most important foods, tortoises also eat gopher apples (Figure 3), pawpaws, blackberries, saw palmetto berries, and other fruits when available.

A gopher tortoise's life revolves around its burrow, which can be up to 40 feet (12 meters) in length and 10 feet (3 meters) in depth. The tortoise digs its burrow with its shovel-like front legs. The width of the burrow is approximately the same as the tortoise's length, allowing the tortoise to turn around anywhere in its burrow.

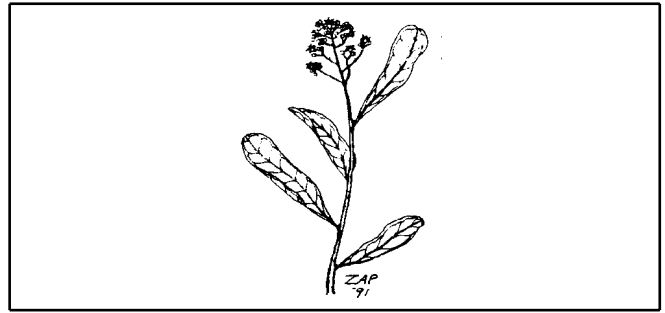


Figure 3.

Gopher burrows are the lifeblood of dry, sandy uplands. Because these environments are desert-like, the burrows, which remain at fairly constant temperatures and high humidity throughout the year, provide an escape from the cold, heat and dryness for the gopher and other animals. They also act as refugia for other animals from the periodic, regenerative fires that occur in these scrubby, dry habitats.

Tortoise burrows provide shelter for more than 360 species of animals, including indigo snakes, gopher frogs (Figure 4), Florida mice, skunks, opossums, rabbits, quail, armadillos, burrowing owls, snakes, lizards, frogs, toads, and many invertebrates. Many of these "commensals" use tortoise burrows to escape predators, adverse weather conditions, and fire; some cannot exist without the burrows.



indigo snakes.

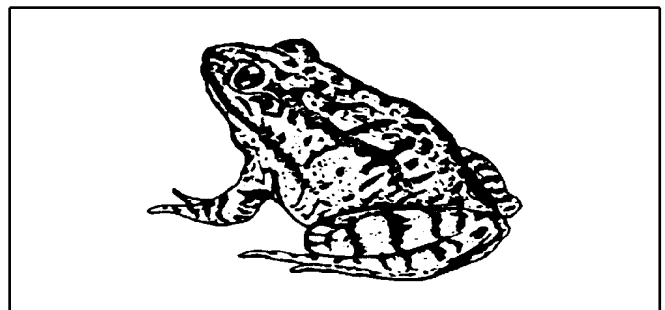


Figure 4.

Gopher tortoises take a long time to mature. In northern Florida, female tortoises reach adulthood at



opossums.



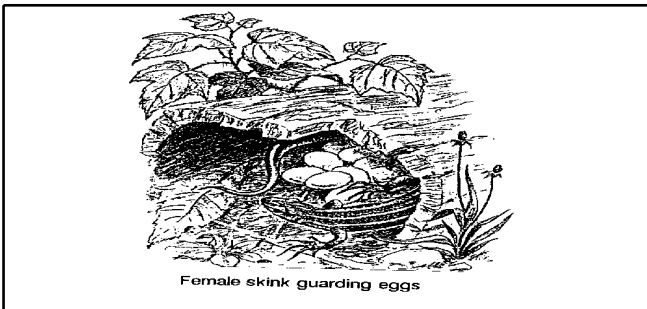
rabbits.



armadillos.



snakes.



lizards.

10 to 15 years of age, when the shell length is about nine inches (225-235 millimeters). Recent studies

indicate that tortoises farther north require as much as 21 years to mature. At maturity, male tortoises can often be distinguished by the concavity of the plastron (lower shell).

Tortoises normally mate during April and May. Several weeks after mating, female tortoises lay 3-15 eggs, usually in the sand mounds in front of their burrows or in some other, nearby sunny place. The incubation period of eggs varies from 70 to 90 days in Florida to more than 100 days in Georgia. A mature female generally produces one clutch of eggs annually. However, because of high losses of nests to predators, her eggs may actually survive as infrequently as once in every 10 years. Armadillos, raccoons, foxes, skunks, alligators, fire ants, and other predators destroy more than 80 percent of gopher tortoise nests.

After hatching, young tortoises either live in their mother's burrow or dig a small tunnel near her burrow. Many hatchlings are eaten by predators. Once they are too big to be swallowed easily, other than man, dogs, raccoons, and possibly coyotes, and are thought to live in excess of 40 years.

PROBLEMS--AND A FEW SOLUTIONS

The gopher tortoise is declining throughout its range. Recent studies project that this species may not exist outside protected areas by the year 2000 unless something is done to reverse this decline. Why is the gopher tortoise in trouble?

Urban Development and Agriculture

Habitat conversion poses the most serious threats to continued survival of the tortoise in much of its range. Both people and tortoises like to live in the high dry areas of the southeastern United States, and although it may take some effort, gophers and people can live in close proximity to one another.

Forestry Practices

Certain forestry practices can be beneficial to gopher tortoises, but others are harmful. For example, the tortoise's food supply becomes limited after the establishment of sand pine or plantations of closely

spaced slash or loblolly pines. The dense canopies that accompany such monocultures reduce the amount of sunlight reaching the ground and limit the production of grasses and herbs that the tortoises depend on for food. In addition, female gopher tortoises may be unable to find sufficiently sunny sites for nesting in these dense pine monocultures. However, forestry practices such as thinning and burning have been shown to be beneficial to tortoises by opening up the canopy and allowing more sunlight to reach the forest floor, thus encouraging the growth of grasses and other gopher food plants.

National Forests in southern Mississippi have recently initiated management practices that provide for the protection of gopher tortoises and the maintenance and enhancement of their habitat. Natural regeneration of longleaf pine stands, hand-planting, and periodic prescribed burning are a few of the forestry techniques that will benefit the gopher tortoises on these lands.

Tortoises as Food

Tortoises are considered a delicacy by a small number of people, including those who mistakenly believe tortoise flesh is an aid in relieving high blood pressure and impotence. Tortoises were a reliable source of food during the Depression, when there was little else to eat. Of course, "Hoover chickens" were much more plentiful sixty years ago. Even since the harvest of tortoises has been prohibited, illegal commercial hunters have destroyed entire colonies to supply the demand for gopher meat. Such losses of mature gopher tortoises are especially devastating because of the species low reproductive rate. Throughout their range, tortoise populations are too depleted to sustain human harvest. Tortoise harvesting is now illegal in every state, but not all states enforce tortoise protection laws.

Tortoise Races

Now prohibited in Florida, tortoise races were popular activities to raise monies to benefit local charities. Taking tortoises from their natural habitats for this purpose depleted populations. Many times the larger, most reproductively active members of the colony were removed. Even if the tortoises were released following the races, they were rarely

returned to their original locations. They may have been unable to adapt to their new site, even if the habitat seemed appropriate to humans. Moreover, introducing new tortoises into established colonies can disrupt the colonies' complex social structures, introduce parasites and diseases, or mix locally adapted gene pools. The Gopher Tortoise Council supports the prohibition on tortoise races in Florida and encourages other states to eliminate similar activities.

Road Mortality

Many tortoises are killed each year by automobiles. Highway mortality will increase as tortoise populations become enclosed and bisected by more and more roads. Construction of roads further isolates colonies. It is possible to build roads with underpasses or other structures that allow tortoises and other wildlife to pass safely beneath.

Inadequate Law Enforcement

Gopher tortoises are protected throughout their range. Florida and Georgia classify the tortoise as a non-game species and require a scientific collecting permit for possession. Florida, which lists the tortoise as a Species of Special Concern, also requires a permit to keep gophers collected before July 1, 1988 as pets. The state outlawed the harvest of tortoises in 1988, and banned the gassing of gopher burrows (a technique commonly used to collect snakes). Florida no longer allows the racing of tortoises. Accordingly, several communities now hold races using pulley-controlled or remote-controlled replicas of tortoises. Alabama designates the gopher tortoise as a game animal but specifies that there is no open season during which it may be lawfully hunted, taken, captured, or killed. Both South Carolina and Mississippi list the tortoise as an Endangered Species. In addition, gopher tortoises west of the Tombigbee and Mobile Rivers in Alabama are listed by the U. S. Fish and Wildlife Service as Threatened under the Endangered Species Act. Unfortunately, these laws are difficult to enforce.

Disease

Release of captive tortoises is thought to have caused an outbreak of serious respiratory disease in

tortoises at Sanibel Island in south Florida. There is always the threat that new diseases can be introduced into established colonies when tortoises are relocated onto new sites.

Other Factors

Mining for phosphate, limestone and sand has destroyed countless acres of tortoise habitat in some areas, particularly central Florida. Other factors believed to be harmful to gopher tortoises include the careless use of herbicides and pesticides and the introduction of gasoline into tortoise burrows by rattlesnake hunters.

RESEARCH NEEDS

Many questions remain unanswered. How do tortoises select mates? How many burrows are used by male and female tortoises within a year? How does temperature affect sex determination? How long do tortoises live? Can gopher tortoises from one colony be transplanted successfully into another colony? If they are transplanted, how do they affect gopher tortoises already in that area? Do different populations have different diseases and parasites that might harm existing populations if transplanted? Researchers are trying to answer some of these questions by collecting data and monitoring tortoises involved in relocations.

We know that many animals utilize gopher tortoise burrows for shelter, and that some of these dependents live most or all of their lives in these burrows. If gopher tortoises disappear, what will happen to these animals? Will the gopher frog, the Florida mouse, the pine snake, the gopher cricket, and other animals also disappear? Many researchers fear that if this "keystone" species becomes extinct, many other species will soon follow. Some call the places where gopher tortoises live the "southeastern desert". The gopher tortoise plays a vital part in making this harsh environment an acceptable place to live for other animals. Without the tortoise, the true meaning of the desert--an extensive sandy region--might fit.

Research on the ecology of the gopher tortoise and the animals that share its burrow is needed to ensure that strategies are designed to safeguard these species and the habitats on which they depend.

GOPHER TORTOISE COUNCIL

In 1978, a group of southeastern biologists and other citizens concerned with the decline of the gopher tortoise formed the Gopher Tortoise Council. Their goal is to work for the wise management and perpetuation of the gopher tortoise, the animals that live with it and their natural habitats.

Some specific Council objectives are:

- to offer professional advice for management, conservation and protection of gopher tortoises;
- to encourage the study of the life history, ecology, behavior, physiology and management of gopher tortoises and other upland species;
- to conduct active public information and conservation education programs;
- to seek effective protection of the gopher tortoise and other upland species throughout their ranges; and
- to promote the conservation of upland habitats through land acquisition.
- More information on the Gopher Tortoise Council can be found at <http://www.gophertortoisecouncil.org>.
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