

ited in Florida, illegal hunting depleted or destroyed tortoise colonies to supply the demand for gopher meat. Gopher tortoises do not reproduce at a rate that can withstand sustained harvest.

**Tortoise Races.** Tortoise races, now prohibited in Florida, were once popular activities in rural areas. Tortoises used in the races were removed from their natural habitat and if released, were rarely returned to their original location. Several communities now hold races using pulley-controlled or remote-controlled replicas of tortoises rather than live tortoises.

**Other factors.** Additional factors believed to be harmful to gopher tortoises include the broad scale use of herbicides and pesticides, the release of exotic pet tortoises, and predation by domestic dogs.

**RESEARCH NEEDS**

Many questions about gopher tortoises remain unanswered. How long do tortoises live? How do tortoises select mates? How much land is needed to provide adequate habitat for a healthy gopher tortoise population? What are the effects of roads on tortoises and tortoise populations? Do tortoises from different populations have different diseases and parasites? Is URTD an indigenous disease and how does it affect wild tortoise populations? Researchers are trying to answer these questions and others by conducting long-term studies of tortoise populations on public lands.

We know that many animals use gopher tortoise burrows for shelter, and that some burrow associates live most or all of their lives in the burrows. If gopher tortoises disappear, what will happen to these animals? Will the gopher frog, Florida mouse, gopher cricket, and other animals disappear along with the tortoise? Many researchers fear that if this "keystone" species becomes extinct, many other species will soon follow.

Further research on the ecology of the gopher tortoise and its habitat is needed to ensure that this species and other unique components of uplands in the southeastern United States are preserved for the future.

**GOPHER TORTOISE COUNCIL**

The Gopher Tortoise Council was formed in 1978 by a group of southeastern biologists and other citizens concerned with the decline of the gopher tortoise. The goals of the Council are: (1) to offer professional advice for management, conservation, and protection of gopher tortoises; (2) to encourage the study of the life history, ecology, behavior, physiology, and management of gopher tortoises and upland ecosystems; (3) to conduct active public information and conservation education programs; (4) to seek effective protection of the gopher tortoise and other upland species throughout the southeastern United States.

The Council supports environmental education programs and through the generous donations of many of our members, has contributed funds for the purchase of critical habitat for the gopher tortoise and other upland species. The Council has contributed financial support to research projects involving reproduction, home range, and feeding studies in the gopher tortoise and ecology of the striped newt and gopher frog. If you would like to become a member of the Gopher Tortoise Council, please complete the form below and return it to the Florida Museum of Natural History.

Original brochure by: Catherine Puckett and Richard Franz; revised by Lora L. Smith and Kristina Sorensen.  
Illustrations by: Stephan Carr and The Florida Museum of Natural History. Photos by Joan Berish.  
First published by the GOPHER TORTOISE COUNCIL in 1980; revised in 2001.

I wish to:

- ☐ join the Gopher Tortoise Council.
- ☐ renew my membership.
- ☐ receive additional information.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ Zip \_\_\_\_\_

Home Phone Number: (\_\_\_\_\_) \_\_\_\_\_

Work Phone Number: (\_\_\_\_\_) \_\_\_\_\_

Email: \_\_\_\_\_

Please indicate your membership category:

- ☐ \$10 Student
- ☐ \$15 Regular Member
- ☐ \$25 Contributor/Society
- ☐ \$50 Corporate
- ☐ \$100 Sustaining Member
- ☐ \$250 Life Membership

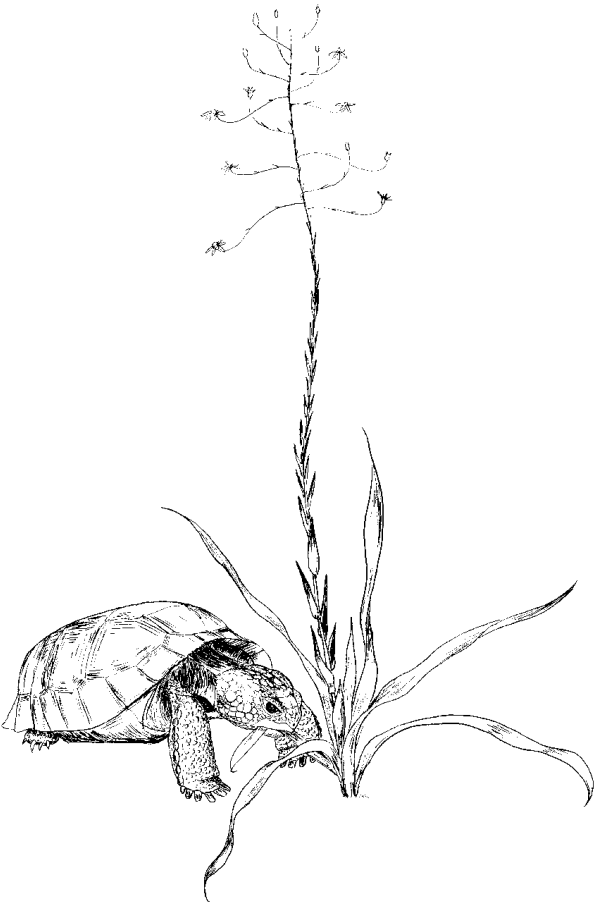
Please make checks payable to the Gopher Tortoise Council.  
The Gopher Tortoise Council is a nonprofit organization and all contributions are tax deductible.

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[www.gophertortoisecouncil.org](http://www.gophertortoisecouncil.org)



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## THE GOPHER TORTOISE: A SPECIES IN DECLINE

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"...Everything affecting the gopher tortoise's habitat affects the tortoise and ... eventually affects all 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. ...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 our world."

Dr. George W. Folkerts  
Dept. of Zoology and Wildlife Sciences  
Auburn University, Alabama

HISTORY

The gopher tortoise (*Gopherus polyphemus*) belongs to a group of land tortoises that originated in western North America nearly 60 million years ago. At least 23 species of tortoise are known to have existed on our continent since that time, but only four remain today. Three of the living species, the desert tortoise (*Gopherus agassizii*), Texas tortoise (*Gopherus berlandieri*), and Bolson tortoise (*Gopherus flavomarginatus*) are found in the southwestern United States and northern Mexico. The ancestors of gopher tortoises, along with those of scrub jays, burrowing owls, and short-tailed snakes, were part of a savanna fauna that migrated into the southeastern United States millions of years ago.

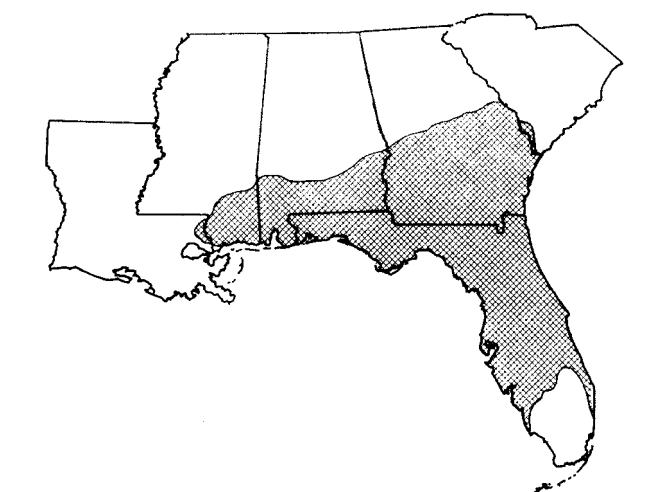


DISTRIBUTION

Gopher tortoises occur in upland habitats throughout the coastal plain of the southeastern United States, with most being found in north-central Florida and southern Georgia. Their numbers have declined rangewide, but have been severely reduced at the western and northern part of their range. Gopher tortoise populations along Florida's southeast coast and the Florida Panhandle also are greatly reduced from their historic numbers.

HABITAT

Gopher tortoises, or "gophers" as they are commonly called, live in extensive subterranean burrows in dry upland habitats. The habitats where gopher tortoises are found include longleaf pine sandhills, dry oak hammocks, scrub, pine flatwoods, dry prairies, and coastal dunes. Tortoises also can live in man-made environments, such as pastures, old fields, and grassy roadsides. To be suitable for gopher tortoises, the habitat must have relatively well-drained sandy soils for digging burrows, herbaceous food plants, and open sunny areas for



nesting and basking. Periodic natural fires play an important role in maintaining tortoise habitat by opening up the tree canopy and promoting growth of herbaceous food plants. If natural fires are suppressed, habitats may become unsuitable for tortoises. Today, land managers use prescribed fire to maintain tortoise habitat.

LIFE HISTORY

The life of a gopher tortoise revolves around a tunnel-like burrow that the tortoise excavates using its shovel-like front feet. Burrows can be up to 40 feet (12 meters) in length and 10 feet (3 meters) in depth. Each burrow has a single opening, and the width of the burrow is approximately equal to the length of the tortoise so the tortoise can turn around at any point within the burrow. This also means that burrow width is a good indicator of the size of the tortoise. Gopher tortoise burrows usually are easy to spot in the landscape because of the characteristic mound of loose sand at the burrow entrance (called the "apron").

Gopher tortoise burrows remain at a fairly constant temperature and humidity levels year-round, thus providing shelter for the tortoise during periods of extreme temperatures, drought, and fire. Tortoise burrows also afford refuge to more than 360 animal species. These include the indigo snake, pine snake, gopher frog, Florida mouse, burrowing owl, gopher cricket, scarab beetles, and many others. Some, such as the Gopher cricket, cannot exist without the tortoise burrow .

Gopher tortoises feed mainly on low-growing plants that require abundant sunlight. Although grasses and legumes make up the bulk of their diet, gopher tortoises eat a large variety of plants including gopher apple, pawpaw, blackberries, saw palmetto berries, and other fruits. If you have gopher tortoises living on your property, landscaping with native plants will help ensure that proper food is available

Gopher tortoises are thought to live 40-60 years. They grow relatively slowly and growth rates vary by geographic region. For example, in northern Florida, female tortoises reach adulthood at 10 to 15 years of age, when the shell length is about nine inches (225-235 millimeters); in southwest Georgia, female tortoises may take 21

years to mature. Adult female gopher tortoises are slightly larger than males, and at maturity, male tortoises can usually be distinguished from females by a concave lower shell (plastron).

Gopher tortoises typically breed from April to June, but males may attempt to mate into the late summer or fall. During May and June, female tortoises usually lay 1-11 eggs (average 5-6), but there are reports that some tortoises may lay up to 25 eggs. Eggs are deposited either in the sand mound in front of the burrow or in another nearby sunny place. The incubation period for eggs varies from 80 to 90 days in Florida to more than 100 days in Georgia. A mature female produces only one clutch of eggs annually but may not reproduce every year. During dry years, they may not lay at all. Nest predation can be quite high and an individual female may produce a successful nest as infrequently as once in 10 years. Nest predators include raccoons, foxes, skunks, armadillos, and fire ants.

Hatchling gopher tortoises may use an adult burrow or dig a small burrow of their own. Young gopher tortoises are especially vulnerable to predation until their shell hardens at about 6-7 years of age. Raccoons, indigo snakes, and red-tailed hawks, among others, eat hatchlings and young tortoises. Adult tortoises have few enemies other than humans, although domestic dogs and raccoons are known to eat them.

LEGAL STATUS

Gopher tortoises are afforded legal protection throughout their range. **A permit is always required to possess, study, or relocate gopher tortoises.** In the 1980s, Florida prohibited the harvest of tortoises, banned the use of gasoline to collect rattlesnakes from gopher tortoise burrows, and banned tortoise races. The legal status of the gopher tortoise in Florida and other states where it occurs is listed below:

- Georgia*- state listed as a Threatened Species.
- Florida*- state listed as a Species of Special Concern.
- South Carolina*- state listed as an Endangered Species.
- Mississippi*- state listed as an Endangered species; federally listed as a Threatened species.
- Alabama*– state listed as protected; populations west of the Tombigbee and Mobile Rivers are federally listed as a Threatened species.
- Louisiana*- state and federally listed as a Threatened species.

PROBLEMS-AND A FEW SOLUTIONS

The gopher tortoise is declining throughout its range. Some researchers have projected that unless something is done to reverse this decline, this species may soon be found only in protected areas. Why is the gopher tortoise in trouble?

**Habitat Loss.** Habitat alteration and land development pose the most serious threat to the continued survival of the gopher tortoise. Both people and tortoises like to live in high, dry areas. In addition, phosphate, limestone, and sand mining have destroyed countless acres, particularly in central Florida. Tortoises living on proposed development sites are sometimes moved (or "relocated") to another area; however, this can result in the spread of disease and may disrupt resident tortoise populations. Relocated tortoises may not stay

at the new site and many are killed crossing roads as they attempt to navigate back to their original home. In Florida, rather than relocate tortoises, developers have the option of "mitigation banking." In this case, the developers must apply for an incidental take permit, and although tortoises at the development site are lost, funds are contributed toward the purchase of gopher tortoise habitat elsewhere. Gopher tortoises at mitigation parks are afforded long-term protection by the state.

**Forestry Practices.** Although the forest products industry contributes a great deal to the protection of natural areas in the southeastern United States, some forestry practices can be harmful to gopher tortoises. For example, if pines are planted too close together, insufficient sunlight reaches the ground, limiting the growth of plants that the tortoises depend on for food. In addition, female gopher tortoises may be unable to find open sunny sites for nesting. Intensive site preparation also can harm gopher tortoises by destroying burrows and nests. However, forestry practices such as tree thinning and the use of prescribed fire can be beneficial to tortoises. These practices open up the tree canopy and allow sunlight to reach the forest floor with minimum soil disturbance, thus encouraging the growth of grasses and other gopher tortoise food plants. Hand-planting of trees and low intensity site preparation also lessen negative impacts to tortoises.

**Disease.** There is little information regarding the diseases of wild tortoises. However, an upper respiratory tract disease (URTD) has been observed in desert tortoises in the western U.S. and in gopher tortoises in Florida, Georgia, and Mississippi. This disease is highly contagious and is transmitted by close contact between tortoises. Symptoms of URTD include a clear or white nasal discharge, watery eyes, and swollen eyelids. Tortoises can be "silent carriers", meaning that they have the disease but do not exhibit obvious signs. Mortality from this disease has been high in some desert tortoise populations, but little is known about the effect of the disease on gopher tortoise populations. The occurrence of URTD is a significant concern in regards to gopher tortoise relocation and restocking programs. There is always the threat that diseases can be introduced into established colonies when tortoises are relocated onto new sites. Captive tortoises, in particular, should never be released back into the wild. It is believed that the release of sick captive tortoises may have been a factor in a 90% decline of desert tortoises on one California preserve.

**Road Mortality.** Many tortoises are killed each year by automobiles. Road mortality will undoubtedly increase as more and more highways are built. Furthermore, roads can act as barriers to tortoise dispersal, effectively isolating populations. A possible solution to this problem is the construction of underpasses to allow tortoises and other wildlife to pass safely beneath roads. If you encounter a tortoise trying to cross the road, it is best to simply carry the tortoise across the road in the direction it was going (**beware of traffic!**).

**Tortoises as Food.** Tortoises were a reliable source of food during the Depression, when there was little else to eat. Of course, these so called "Hoover chickens" were much more plentiful 75 years ago. Currently, tortoise harvesting is illegal in every state where gopher tortoises are found. Unfortunately not all states enforce tortoise protection laws. Even after the harvest of tortoises was prohib-