Gopher Tortoise
Gopherus polyphemus


Photo by SC DNR

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DESCRIPTION

Taxonomy and Basic Description

The gopher tortoise was described by Daudin in 1791. This is the only species of tortoise found in the eastern United States and one of only four tortoise species found in North America.

The gopher tortoise is a large, terrestrial turtle with front legs that are spade-like, an adaptation for digging and hind legs that are elephantine. The carapace of the gopher tortoise can vary from brown to dark gray. Carapace length averages 25.4 to 30.5 cm (10 to 12 in.) for adults; maximum length is approximately 38 cm (15 in.). The carapace of the adult tortoise is generally dull and unmarked. Adult tortoises can weigh up to 4.5 kg (10 lbs.). The head of a tortoise is square in profile with a flat, blunt nose (Conant and Collins 1991).


Photo by SC DNR

Juvenile tortoises are typically lighter colored than adults, varying from yellow-brown to light gray. Juveniles may have light colored centers on their carapacial scutes, and visible growth annuli. As tortoises grow, their annuli become worn and are seldom apparent on adult specimens (Ernst et al. 1994).

Tortoises are herbivorous, feeding primarily on grasses and plants, but they have also been documented to scavenge on carrion and other materials, as available (Conant and Collins 1991; Ernst et al. 1994)

The gopher tortoise is a long-lived species, possibly reaching 50 to 60 years, or greater, in age. This species is believed to reach sexual maturity between 12 to 14 years of age and can be reproductively active until death. Tortoises mate in spring and nesting occurs during April though July. Clutch sizes typically number five to seven eggs. Hatchlings emerged in late summer to early autumn (Conant and Collins 1991; Ernst et al. 1994).

Status

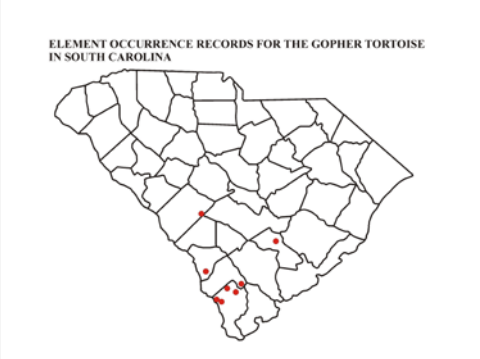
The gopher tortoise is legally protected throughout its range as follows:

Georgia - state listed as threatened
Florida -state listed as a species of concern

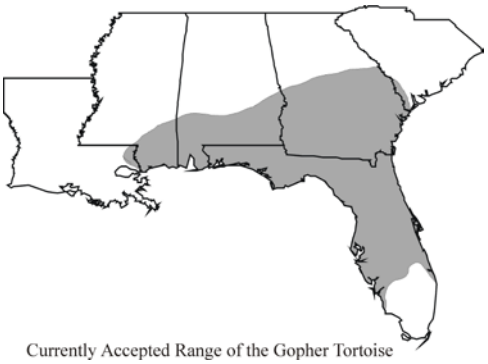
Mississippi - state listed as endangered; federally listed as threatened
Alabama - state listed as protected; populations west of the Tombigbee and Mobile Rivers are federally listed as threatened
Louisiana - state and federally listed as threatened

In South Carolina, the gopher tortoise is currently listed as endangered in and critically imperiled with a ranking of S1 Globally, the species is considered vulnerable (G3) [NatureServe 2013]

POPULATION SIZE AND DISTRIBUTION

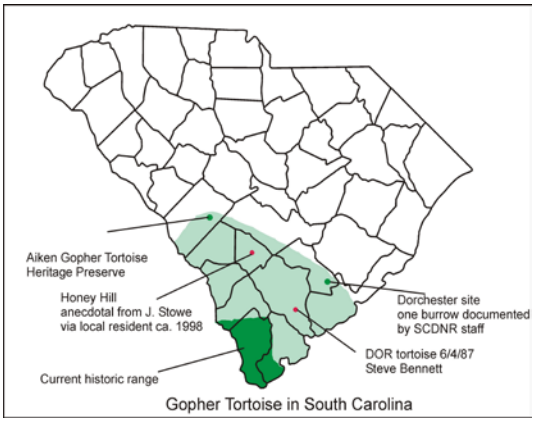


In South Carolina, gopher tortoise populations currently occur in the Sandhills and Inner Coastal Plain ecoregions in three counties: Jasper, Hampton and Aiken. There are additional records of the tortoise in Colleton and Dorchester Counties and an anecdotal record for Bamberg County. Another additional record for the gopher tortoise came from Allendale County; this is believed to be an introduced population, although it is likely that Allendale County was in the historic range of the tortoise.


Currently Accepted Range of the Gopher Tortoise

The currently accepted (historic) range of the gopher tortoise in South Carolina includes the southern portion of the state. Additional records have added to the range of this tortoise in South Carolina. Based on all of the records for the tortoise, it is reasonable to believe that the gopher tortoise once occurred throughout the southeastern portion of South Carolina.

Native, extant, reproducing populations of the gopher tortoise are currently known from three different "metapopulation" areas: 1) the sandhills along the South Edisto River in Aiken County; 2) the sandhills along the Coosawhatchie River in both Jasper and Hampton Counties; and 3) in the Tillman Sand Ridge Heritage Preserve (TSRHP), along the Savannah River in Jasper County.



Gopher Tortoise in South Carolina

Little is known about the population status of the gopher tortoise in Aiken County or in the Coosawhatchie region. Holbrook (1842) noted that gopher tortoises were abundant in the “Edgefield and Barnwell” districts (Tuberville et al. in review). A portion of the Aiken population is protected on the Aiken Gopher Tortoise Heritage Preserve, but this population is believed to be in severe decline, with perhaps no more than 50 individuals contained within the entire region. An experimental translocation project using gopher tortoises is currently

entering its fourth year on the Savannah River Site (SRS). Researchers from the University of Georgia's Savannah River Ecology Laboratory and the U.S. Forest Service-Savannah River worked with South Carolina Department of Natural Resources (SCDNR) and Georgia Department of Natural Resources to obtain tortoises from an industrial development site in Georgia (Tuberville et al. in review).

Three sub-populations of the tortoise occur within the Coosawhatchie region: one near the town of Grays in Jasper County; one near the town of Gillisonville in Jasper County; and one on Buckfield Plantation in Hampton County. The two Jasper County populations are on land owned by the Mead-Westvaco Corporation; SCDNR holds conservation easements from Mead-Westvaco on these two tracts; Mead-Westvaco is managing for the tortoise at these two sites. Buckfield Plantation is currently in private ownership; no management for the tortoise is currently occurring at this site.

The tortoise population at TSRHP has been the subject of past surveys by Franz in 1974/1975 (Auffenberg and Franz 1982) and Wright in 1977/1979 (Wright 1982). Currently, approximately 567 ha (1,400 ac.) of the TSRHP are protected. Approximately 121 ha (300 ac.) of this preserve supports the xeric sandhill habitat preferred by the tortoise. In 1977 and 1979 Wright surveyed tortoises at TSRHP. In 1998 Tuberville and Dorcas re-surveyed this preserve (Tuberville and Dorcas 2001). The population estimates derived from these surveys indicates a steady decline in the adult population of tortoises at this preserve.

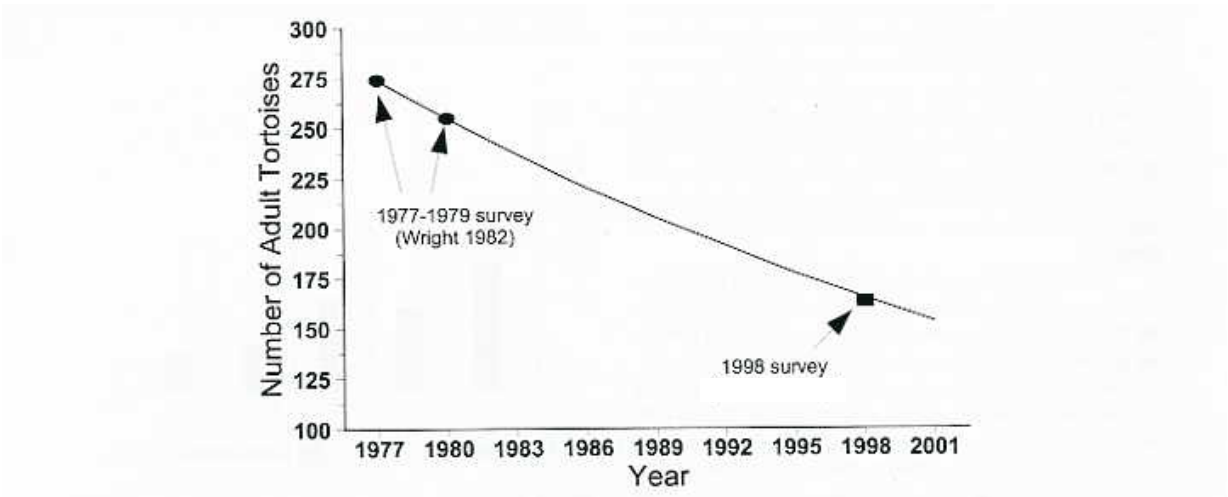


Figure 3. The projected change in adult gopher tortoise population size on the Tillman Sand Ridge Heritage Preserve from 1977 to 2001. The projection assumes an initial population size in 1977 of 274 individuals as estimated by Wright (1982) and an average 2.33% loss per year in the adult population, which was observed by Wright during 1977–79 (indicated by circles), leading to a projected population of 165 individuals in 1998. Based on our 1998 survey, we estimated the maximum adult population size at 163 tortoises (indicated by square).

Tuberville and Dorcas (2001) estimate that approximately 163 adult tortoises occur on the TSRHP. This estimate does not account for juveniles and sub-adults. The current estimate indicates that this population is in decline, despite the protection afforded and appropriate management at the site.

Recently, SCDNR began a mark-recapture and radio telemetry study of tortoises on the TSRHP. Two sites, one on the TSRHP and another 405 ha (1,000 ac.) tract owned by the Public Service Authority (PSA), are currently being studied. This study is in its second year; however, anecdotal evidence suggests that the tortoise population on the PSA tract is also in decline. To date, little evidence of reproduction or recruitment has been found at this site. The population seems to be made up entirely of older, adult tortoises, indicating that it might be a senescent population (data from current SCDNR tortoise project).

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

The gopher tortoise is a fossorial, burrowing species that primarily inhabits xeric longleaf pine sandhills in South Carolina. The deep, droughty sands of such habitats provide the ideal substrate for the excavation of the tortoise's burrow. Adult tortoises may excavate a burrow that can be from 3 to 9 m (10 to 30 ft.) in length; at its deepest point the burrow may be 3 m (10 ft.) underground (Ernst et al. 1994).

An individual tortoise may excavate several such burrows over its lifetime; it may also take over and utilize burrows excavated by other tortoises. Tortoises typically use more than one burrow during the active period of the year, but typically over-winter in only one burrow (Ernst et al. 1994).

The burrow system within a tortoise colony may provide the organization and structure for these social animals. Courtship occurs at burrow mouths and egg deposition typically occurs within 4 m (12 ft.) of the burrow (Ernst et al. 1994).


Photo by SC DNR

Tortoise burrows are not just important to the tortoises but are also a critical resource for many species that are found in sandhill habitats. Over 250 species of vertebrate and invertebrate animals have been documented to use tortoise burrows, whether active or abandoned.

Longleaf pine sandhill habitat is fire adapted, that is, it requires periodic wildfire (historically) or prescribed burning (currently) for establishment, restoration, and maintenance of this vegetative community. This habitat type has declined due to the suppression of fire in the southeast and the conversion of longleaf pine forests to commercial loblolly plantations.

Historical tortoise habitat would consist of longleaf pine in an open, park-like stand with a lush ground cover dominated by wiregrass (*Aristida stricta*). Herbaceaous plants such as gopher apple, goat’s rue, lupine and other grass species would have also occurred. A sparse understory would have been composed of scrub oaks.

The gopher tortoise shares its Sandhill habitat with several other reptile species of concern in South Carolina. These include the Florida pine snake (*Pituophis melanoleucus mugitus*), Southern hognose snake (*Heterodon simus*), and Eastern diamondback rattlesnake (*Crotalus*

adamanteus), all of which have all been documented from areas with active gopher tortoise populations in this state.

CHALLENGES

Tortoise populations have been historically adversely affected by take or harvest. The gopher tortoise was collected for food throughout the southeast prior to its range-wide protection. Illegal take for food still occurs, especially on private lands where little or no management or protection occurs. Gopher tortoises have also been confiscated when found for sale as pets. It is often unknown from where these individuals originated.

Currently, the primary challenge to the gopher tortoise is habitat loss, either through direct means, such as type conversion to loblolly plantations, agriculture or development; or through indirect means, such as fire suppression that results in successional changes that render the habitat unsuitable for tortoises.

Direct threats to habitat may cause immediate mortality in tortoises or result in displacement of tortoises into unsuitable habitats. Heavy equipment can collapse burrows; this can result in additional tortoise mortality.

Using fire as a management tool has become increasingly difficult; this is a particularly troubling issue for gopher tortoise management and for longleaf pine ecosystem management, in general. The PSA site in Jasper Country has been managed for hunting by excluding fire and mowing strips between stands of trees. This type of management has allowed scrub oak to become dominant over longleaf pine; it has also shaded the understory so that wiregrass and other forbs have declined. On SRS, prescribed fire is used too infrequently due to Department of Energy concerns about facilities and general disruption to highway traffic, personnel, and operations.

Indirect threats to habitat may result in long-term population declines correlated to declines in available food and burrow sites and increases in predators. While adult tortoises have few predators, with the exception of man, juvenile tortoises are predated by a wide array of animals, including foxes, raccoons and snakes. Declining gopher tortoise habitat may favor predators of juvenile tortoises. In addition, armadillos, which have recently established in South Carolina, may pose a threat to the tortoise by modifying existing burrows and potentially predating tortoise eggs.

CONSERVATION ACCOMPLISHMENTS

Four areas that support gopher tortoise populations have been protected through SCDNR's Heritage Trust Program. Two areas, Tillman Sand Ridge Heritage Preserve and Aiken County Gopher Tortoise Heritage Preserve, are owned and managed by SCDNR. The Aiken preserve is 565 ha (1,395 ac.) in size, most of which is suitable tortoise habitat. The Tillman preserve is 576 ha (1,422 ac.) in size, approximately 162 ha (400 ac.) of which currently contain suitable tortoise habitat. There are approximately 40 ha (100 ac.) of potentially suitable habitat at the Tillman preserve that require some restoration.

Two additional gopher tortoise sites on private lands are currently protected under conservation easements with the Mead-Westvaco Corporation. These sites are located near the small communities of Grays and Gillisonville in Jasper County, South Carolina.

In addition to habitat protection efforts, SCDNR is currently conducting a study on the tortoise population at TSRHP. Sixteen tortoises, 8 each at 2 study sites, have been outfitted with telemetry radios and are being tracked to determine home range, habitat use, and seasonal movement patterns. In addition, a mark-recapture study of tortoises is ongoing at both sites. To date, 20 tortoises have been captured, measured, weighed, the sex determined, and the shell marked at both sites.

SCDNR initiated a population augmentation project for the gopher tortoise at the Aiken Gopher Tortoise Heritage Preserve in 2005, funded initially by State Wildlife Grant dollars. The results of this project and the State Wildlife Grant funded tortoise and telemetry study were submitted to USFWS in a project completion report in 2011. In addition, a 2009 conservation strategy for managing the Gopher Tortoise in the state can be found online.

SCDNR is a partner in a Candidate Conservation Agreement (CCA) for the gopher tortoise in the non-listed (federal) portion of the species range. This CCA details the voluntary conservation measures to be undertaken on behalf of the tortoise by the CCA partners.

In 2011, after a two year review following a petition to list the gopher tortoise, the USFWS issued a finding that listing the gopher tortoise as endangered was warranted, but precluded at this time due to budgetary constraints, in effect adding the species to the candidate list. The Service will review the status of the species and make a determination as to proceeding with a listing package in the future.

CONSERVATION RECOMMENDATIONS

- Inventory known gopher tortoise populations and relict individual localities to determine the extent of the population.
- Protect all gopher tortoise sites identified in the inventory through land acquisition or conservation easement. Monitor these sites to determine stability of known populations.
- Conduct landowner workshops to educate landowners about the importance of gopher tortoises and methods for protecting this species.
- Conduct fire management operations at known gopher tortoise locations on SCDNR properties.
- Encourage other property owners, especially owners/operators of public lands such as SRS, PSA and others to conduct fire management operations to further enhance gopher tortoise populations.
- Continue gopher tortoise life history research.
- Continue gopher tortoise repatriation/relocation technology research.
- Monitor impacts to gopher tortoise burros from armadillos.

MEASURES OF SUCCESS

As results from current research and surveys are identified and analyzed, we will initiate projects to address specific needs that arise from these results. Data from ongoing life history and ecology studies will be used to develop specific management plans for the species and its habitat. The maintenance and growth of existing tortoise populations along the Tillman Sand Ridge and recovery of the tortoise population at Aiken Gopher Tortoise Heritage Preserve will serve as two measures of success.

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