

Appendix C. Mammals Technical Team Report

Prepared by Jim Ozier,* Katrina Morris,* and Clay George, Nongame Conservation Section, Georgia Department of Natural Resources

Technical Team Members and Approach

Because of their recognized expertise, the following individuals were invited to participate on the SWAP revision mammal team via email on September 20, 2013, and specifically invited to the mammal team meeting via email on November 5, 2013; seven of these were also involved with the initial 2005 mammal team:

Dr. Michael Bender, Department of Biology, Gordon State College
 Dr. Brad Bergstrom, Department of Biology, Valdosta State University
 Bobby Bond*, Game Management Section, Georgia Department of Natural Resources
 Dr. Steven Castleberry*, Warnell School of Forestry and Natural Resources, University of Georgia
 Nikki Castleberry*, Museum of Natural History, University of Georgia
 Dr. Mike Chamberlain, Warnell School of Forestry and Natural Resources, University of Georgia
 Doug Chamblin*, Office of Environmental Services, Georgia Department of Transportation
 Dr. Michael Conner, Joseph W. Jones Ecological Research Center
 Dr. Tara Cox, Department of Marine and Environmental Science, Savannah State University
 Dr. Mark Ford, Virginia Cooperative Fish and Wildlife Research Unit, Virginia Tech
 Dr. Greg Hartman*, Department of Biology, Gordon State College
 Dennis Krusac, Southern Regional Office, U. S. Forest Service
 Dr. Susan Loeb, U. S. Forest Service Southern Research Station, Clemson University
 Pete Pattavina*, Ecological Services, U. S. Fish and Wildlife Service
 Carol Ruckdeschel, Cumberland Island Museum
 Dr. Jason Scott, Forest Resources Department, Abraham Baldwin Agricultural College
 Dr. Doug Waid (ret), Forest Resources Department, Abraham Baldwin Agricultural College
 Greg Waters, Game Management Section, Georgia Department of Natural Resources
 Dr. Jim Wentworth*, Chattahoochee National Forest, U. S. Forest Service

Each invitee received the report and other products from the 2005 mammal team, our current working priority species table, and a link to the full online 2005 SWAP. Available participants (*) met December 16, 2013 at the Rum Creek Nongame Conservation Section office near Forsyth where they reviewed and discussed priority mammal (except bats and marine species) conservation needs. Katrina Morris helped coordinate a review of priority bat conservation needs the following day (December 17, 2013) as part of the Georgia Bat Working Group meeting at Gordon State College, Barnesville. Most of those present at the December 16 meeting were present, as well as the following additional participants:

Cecilia Ball, Habitat for Bats
 Robert Ball, Habitat for Bats
 Dr. Jackie Belwood, Georgia Highlands College

Chris Brookshire, Golder Associates, Inc.
Dottie Brown, Ecological Solutions, Inc.
Dr. Stephen Burnett, Clayton State University
Jim Candler, Georgia Power Company
Laci Coleman, Eco-Tech Consultants
Brian Davis, Office of Environmental Services, Georgia Department of Transportation
Ben Dickerson, Georgia Power Company
Lee Droppelman, Eco-Tech Consultants
Dennis Krusac, Southern Regional Office, U. S. Forest Service
Alton Owens, Eco-Tech Consultants
Dr. William Paschal, LaGrange College
Jimmy Rickard, Ecological Services, U. S. Fish and Wildlife Service
Kim Romano, Ecological Solutions, Inc.
Vicky B. Smith, A-Z Animals
Vanessa Terrell, University of Georgia
Dr. Mark Yates, LaGrange College

Additionally, Clay George and Dr. Tara Cox worked separately on the coast to address marine species.

Participants reviewed the draft table of 23 priority species, discussed and updated all data fields, and made the following recommendations:

Add humpback whale (*Megaptera novaeangliae*) – These whales are sighted occasionally in Georgia state and federal ocean waters, they are listed as endangered under the ESA and Georgia Endangered Wildlife Act, and they are threatened by human activities such as shipstrikes and fishery entanglement.

Add northern long-eared bat (*Myotis septentrionalis*) – This species is proposed for listing by the US Fish and Wildlife Service due to impacts from WNS.

Add little brown bat (*Myotis lucifugus*) and eastern pipistrelle (Tri-colored Bat) (*Perimyotis subflavus*) – These are being considered for listing by the US Fish and Wildlife Service due to impacts from WNS.

Add spotted skunk (*Spilogale putorius*) – There are very few records of this species in Georgia and they are apparently in decline throughout much of their range.

Drop star-nosed mole (*Condylura cristata*), masked shrew (*Sorex cinereus*), and Florida black bear (*Ursus americanus floridanus*) from the list. The group felt that these species were sufficiently secure for the short-term. The Florida black bear population in the vicinity of the Okefenokee Swamp is hunted and appears to be doing fine.

Conservation Priorities

Bats – Sixteen species of bats are known to occur in Georgia. During the development of the initial SWAP, six species were considered at risk and in need of additional protection and further research; three additional species are included this time. Work funded by State Wildlife Grants provided a great deal of new information on all of our SWAP species of concern.

Since the development of the initial SWAP bats in the eastern U.S. have been subjected to a new and very serious threat. White-nose Syndrome (WNS) was first documented in New York in the winter of 2006-2007. The disease is caused by a newly discovered fungus (*Pseudogymnoascus destructans*) and has killed millions of cave-dwelling bats in the eastern U.S. (www.whitenosesyndrome.org). WNS was detected in Georgia in 2013 and is now known from 7 counties in the northern part of the state; it continues to spread across the U.S. and Canada. Because of this disease, the U.S. Fish and Wildlife Service has proposed one species for listing under the Endangered Species Act (ESA) and is currently reviewing several others. Georgia has been active completing WNS surveys, participating in research projects and completing education activities across the state. Georgia will continue to monitor the spread of the disease across the state and document the impacts to our bat populations. We will also continue to participate in research projects both to better understand the disease and also to test potential treatment options for WNS. Education has been a critical component of the battle against WNS, helping the caving community and general public to better understand bats, their benefits and the things that threaten their existence. The SWG programs and other federal funding sources have been critical to provide biologists in Georgia with the resources to complete this work in the state.

Another relatively new threat to bats is development of facilities for wind-generated electricity. A recent report estimated that 650,000 to more than 1,300,000 bats were killed between 2000–2011 in the U.S. and Canada. Another study estimated that more than 600,000 bats may have died at wind energy facilities in the U.S. in 2012. The majority of these bats are tree roosting species so far, thus they are not directly impacted by WNS. However, threats from white-nose syndrome, wind energy development, and habitat modification and loss all combine to put several species of bats at risk of serious declines and possibly extinction in the foreseeable future.

Because of the recent declines in bat populations across the eastern use, Beneficial Management Practices (BMPs) for public, private and industrial forests have become a critical need. Currently, BMPs are being developed as part of the Conservation and Recovery Working Group organized during the White-nose Syndrome workshops. This group includes individuals from federal and state agencies, universities, non-profits, industrial forestry and other interested individuals. Sub-groups are currently working on BMP development and these guidelines will be reviewed and revised before being released and implemented. Georgia will continue to work on development and revision of these BMPs. We will implement BMPs for bats on state lands and continue current beneficial practices that are already in action. We will also advise federal agencies and private companies and individuals on implementation of these practices. Many of the BMPs already in place for other species benefit bats as well. Future bat BMPs will be

designed to be a part of overall healthy forest management and will benefit a variety of other high priority species.

Another critical issue includes working with Nuisance Wildlife Control Operators (NWCOs). Bats cause widespread nuisance problems when they occupy buildings, sometimes in large numbers. We need to continue to work to see that nuisance bat situations are handled promptly and in a manner that avoids harm to the bats. Exclusions should be conducted outside the season when non-volant young are present if possible, and the provision of alternate roost structures should be encouraged.

Indiana (*Myotis sodalis*), gray (*Myotis grisescens*) and small-footed (*Myotis leibii*) bats were identified as high priority species in the initial SWAP. All have been impacted by WNS, though gray bats appear to be less susceptible; little mortality has been detected at sites that have shown positive for the disease. We should continue using emergence counts at summer roosts and winter counts at hibernacula to monitor this species. Most historically occupied caves have been heavily disturbed and are no longer used, but it is likely that additional occupied caves remain to be discovered. Identifying and protecting all important sites is critical for the protection of this species in Georgia.

The Indiana bat has been heavily impacted by WNS in the Northeastern U.S. We have no current records of this species in caves in Georgia, but a maternity site was recently discovered in some snags in Gilmer County through radio telemetry, and almost certainly there are other summer sites in northern Georgia. We need to continue to attempt to identify any summer maternity areas using banding, radio-telemetry, Anabat (or other bat detector) surveys and mist netting. Though differentiating between Myotid species using bat detectors is difficult, positive *Myotis* calls can be used to target mist-net surveys to determine species presence.

The small-footed bat has also been impacted by WNS in the northeastern US, however to a lesser degree than the Indiana bat. These bats often go undetected in winter hibernacula surveys either because they roost in areas difficult to survey or they use sites other than caves in winter. Further work to determine important winter and summer sites for this species is critical to better understanding the range and critical habitats for this bat in Georgia. Work should include visual outcrop surveys, radio-telemetry, cave surveys, Anabat (or other bat detector) surveys, harp trapping and mist netting. Banding is a concern for this species because of its use of crevices. Many feel that this bat is more likely to become injured by bands impeding movement or getting stuck in rock crevices. We currently do not recommend banding this species in Georgia.

The little brown bat was not considered a high priority species during the initial SWAP development. Though the range in Georgia is limited geographically, it was thought that this species was common across the Eastern U.S. and north Georgia. However, WNS syndrome has caused major declines in little brown bats in the Northeastern U.S. Because of declines from WNS, the little brown bat will be added as a high priority species in the SWAP revision. Very few of these bats are found in hibernacula in Georgia so it is likely that most of the bats captured in summer hibernate further north. However, these sites are likely already impacted by WNS and we expect to see declines in summer captures of this species in the future. Future work should include banding, radio-telemetry, Anabat (or other bat detector) surveys, cave surveys,

harp trapping and mist netting. Though differentiating between Myotid species using bat detectors is difficult, positive *Myotis* calls can be used to target mist-net surveys to determine species presence.

During the development of the initial SWAP, the tri-colored bat (formerly Eastern pipistrelle) was considered to be a very common bat in Georgia. It has been found in low numbers in most caves and in some of the highest numbers known in a few winter sites in Georgia. It is also detected during summer mist-net and Anabat surveys across the state. However, WNS is impacting populations of this species in the Eastern U.S. including Georgia. Because of declines from WNS, the tri-colored bat will be added as a high priority species in the SWAP revision. The vast majority of hibernating bats in Georgia are tri-colored bats. It was thought that these bats may be able to survive WNS infection better in the Southern states because of shorter, milder winters and the availability of some food almost year-round. However, surveys during the first years of WNS infection detected a decline of about one-third at known sites. This suggests that this species may be vulnerable to WNS across the range. Future work should include banding, radio-telemetry, Anabat (or other bat detector) surveys, cave surveys, harp trapping and mist netting. In addition, work to determine if coastal populations of this species do not migrate to caves during winter is critical. Efforts to implement conservation measures for this species outside of caves will be especially difficult because of its use of a variety of habitat types and its widespread geographic distribution.

Surveys revealed many new locations for Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) and gave us a much better idea of the important habitat factors that make an area suitable for this species. As was our initial suspicion, we discovered this secretive species was more common than indicated by known occurrence records, though it is still rare throughout the state and suitable habitat is limited. We identified important conservation areas for "Raf bats," the most critical being the Altamaha River corridor; this species was used as an example of one that would benefit from protection of the Altamaha corridor and other floodplain forests. During recent drought years, more mature bottomland hardwood forests were lost that likely provided habitat for this species. Identifying these critical areas and protecting and managing them to promote the growth of bottomland hardwood forests is critical. In the northern portion of the range of this species, the threat of WNS was a concern. However, it does not appear that they are susceptible to the disease. It is still important to identify the best sites for them in northern Georgia and continue to monitor them as the disease spreads through the Southeast.

Southeastern myotis (*Myotis austroriparius*) also rely on bottomland hardwood forests and can use the same trees as Rafinesque's big-eared bats. However, this species also relies on cave habitats, especially for large maternity roosts in the summer. Continuing to monitor these sites using thermal imagery or the best available technology is important to track population changes over time. Gathering additional information on the most important sites for this species and their seasonal movements is also very important. The southeastern myotis in SW Georgia may also use sites in Florida and Alabama. None of the three states understand the movements or best sites for this species in the region. Multi-state projects research and survey projects could help answer some of these questions and inform an effective conservation strategy. This species is not known to be affected by WNS yet, but continued monitoring of the southward spread of the disease is needed.

We now have a better understanding of northern yellow bat (*Lasiurus intermedius*) roosting habitat following recent work on Sapelo and Little St. Simons Islands. Interestingly, only two females were captured during this project. Large scale movements of this bat are completely unknown and it is possible that they occupy different areas during different seasons. We continue to collect Anabat calls along the coast, which should also help to identify the best sites for this species; it is likely that urban areas provide suitable habitat. Research and survey projects to better understand the movements and critical habitats for this species are needed across its range.

Marine species -- Seven species of baleen whales, at least 22 species of toothed whales and dolphins, and one sirenian occur in Atlantic Ocean waters offshore of Georgia. Most of these species occur well offshore, are transient, or only enter Georgia state waters when they are ill, stranded or otherwise outside of their normal habitat. Four marine mammal species are known to occur regularly within the U.S. Territorial Sea offshore of Georgia (i.e., within 12 nautical miles of shore): the West Indian manatee (*Trichechus manatus*), North Atlantic right whale (*Eubalaena glacialis*), humpback whale, and bottlenose dolphin (*Tursiops truncatus*). Manatees, right whales and humpback whales are each listed as endangered under federal and state law. Bottlenose dolphin stocks that occur in Georgia waters are listed as “strategic” stocks under the Marine Mammal Protection Act (MMPA) due to their small population sizes and/or depleted status. All four species are directly impacted by human activities that occur in Georgia waters and have been included in this plan accordingly.

North Atlantic right whales are among the most endangered whale species with a population numbering approximately 450 whales. Waters along the South Carolina, Georgia and northeast Florida coast are an important wintering ground and only known calving ground for this species. Right whales are present from November to April and are most frequently observed 10-45 km east of the Georgia shoreline. The most immediate threats to right whales are mortality and injury from ship strikes and entanglement in commercial fishing gear. Coastal and marine development (including recreational, commercial and military activities) poses a growing threat to whales and their habitat. Climate change may negatively impact forage availability in Northeast U.S. and Canada, and the suitability of Southeast wintering habitat (whale distribution in the Southeast is strongly correlated with water temperature). DNR conducts a wide variety of right whale conservation activities in accordance with the North Atlantic Right Whale Recovery Plan (NMFS 2005) using funds primarily from NMFS. This project is implemented in cooperation with Florida Fish and Wildlife Conservation Commission (FWC), NMFS and other partners. Right whales are the highest priority marine mammal species in Georgia because of their small population size and the importance of Georgia waters to the population’s recovery.

Approximately 11,500 humpback whales inhabit waters throughout the North Atlantic Ocean. Humpbacks migrate between high latitude summer foraging grounds and winter mating/calving grounds in the West Indies. Small numbers of humpback whales, primarily juveniles, have been sighted within 30 km of the Southeast U.S. coast during winter and spring in recent decades. It is unknown whether these whales are wayward migrants, winter residents, or a combination. Like right whales, the primary threats to humpback whales are ship strikes, commercial fishing entanglements, and coastal and marine development. As such, efforts to conserve right whales will indirectly benefit humpback whales. DNR monitors humpback whales opportunistically

during right whale monitoring efforts. Additional data on humpback whale distribution and abundance are needed, especially during April and May after right whale monitoring has concluded.

Bottlenose dolphins are the only marine mammal species found year-round in Georgia waters. Georgia dolphins can be categorized into “estuarine” and “coastal” stocks. Estuarine stocks are non-migratory resident groups that inhabit estuaries, brackish tidal rivers and ocean waters within 1 km of shore. Estuarine stocks are geographically constrained, and have relatively small population sizes accordingly (perhaps 200-300 individuals per sound system). Coastal stocks inhabit near-shore ocean waters year-round and move into estuarine habitats at various times of year. The coastal stock along the Georgia and South Carolina coast likely numbers at least 4,000 dolphins. Coastal and estuarine stocks overlap spatially near the beaches and ocean inlets, but genetic research indicates that there is limited interbreeding between stocks. Entanglement in fishing gear and habitat degradation are threats to all dolphin stocks. Harassment and behavioral changes from dolphin feeding may be growing problems in some areas in Georgia. Estuarine dolphins in the Brunswick, GA area have been impacted negatively by high concentrations of persistent environmental contaminants. DNR, NMFS, NOAA’s National Ocean Service and local cooperators monitor bottlenose dolphins using the Georgia Marine Mammal Stranding Network, by conducting photo-identification studies, and through other targeted research. Funding has been provided by NMFS, the Nongame Conservation Fund and private groups.

Manatees inhabit all tidal and near-shore ocean waters along the Georgia coast from April to October. The number of manatees that migrate into coastal Georgia is unknown, but is probably a small fraction of the Florida Atlantic subpopulation, which numbers at least 2,000 manatees. Aerial surveys at Cumberland Sound (along the Georgia/Florida border) found that abundance varies widely within and among seasons, with more than 50 manatees during summer in peak years, to less than 10 manatees during early spring and fall, and during lower years. Manatees disperse widely into coastal Georgia and northward into the Carolinas each summer. They forage on marsh cordgrass (*Spartina alterniflora*) and other emergent vegetation which is abundant throughout coastal Georgia. Threats to manatees in Georgia include watercraft collisions, attraction to artificial freshwater and warm-water sources, and coastal development. Harmful algal blooms (e.g., “red-tides”) and abnormally cold winters regularly cause mass mortalities in Florida waters. Climate-change may exacerbate these impacts in the future, which could impact the number of manatees inhabiting Georgia waters. DNR conducts a wide variety of manatee conservation activities in accordance with the Florida Manatee Recovery Plan (USFWS 2001) using funds primarily from the USFWS and Navy. Recovery efforts are conducted in close cooperation with USFWS, the U.S. Geological Survey, FWC and other partners.

Coastal plain pine savanna species – The extensive, open pine savannas of the southeastern coastal plain have disappeared from the vast majority of this community’s former range. Conversion to agricultural fields, pasture, tree farms, residential areas, roads, etc., has eliminated and fragmented this habitat type, and lack of fire on the landscape has reduced the suitability of many areas.

Although the taxonomy and ranges of fox squirrel subspecies are in question, we consider Sherman's fox squirrel (*Sciurus niger shermani*), which is the large subspecies found in the upper peninsula of Florida and the Okefenokee Swamp region of Georgia, to be of conservation concern because of its rareness and apparent close relationship with declining open longleaf pine habitat. A recent study, funded through a State Wildlife Grant did not find genetic evidence to support subspecific designations, but the results are inconclusive due primarily to small sample sizes. Management to restore suitable savanna-type habitat should benefit this iconic animal and many others of conservation concern.

Southeastern pocket gophers (*Geomys pinetis*) need soft, sandy soil with a grassy/herbaceous groundcover. Loss of longleaf pine savannas has apparently heavily impacted populations, and where they are still found they are often treated as pests because of their burrows. These burrows, however, provide crucial habitat for several other species of wildlife, some invertebrates of which are rarely if ever found elsewhere. DNR needs to work with landowners who still have suitable habitat for these species to promote proper management with frequent fire and responsible timber harvest. Restoration of degraded habitat could also play an important role in building populations of these species eventually. A 2006 roadside survey for Southeastern pocket gophers (*Geomys pinetis*) confirmed suspected recent declines. Of 272 historical locations in 41 counties, gophers were found at only 65 locations in 18 counties. However, the survey did not include known sites in Thomas County on large tracts of private land. Addition of these and other opportunistically discovered sites brought the total to 106 sites in 20 counties. Relatively high densities were identified at 5 locations in Burke, Taylor, Baker, Early, and Camden counties; the population in Thomas County could be added to this list as well. Although pocket gophers appear to do well in some disturbed habitats, such as hay fields, habitat and population fragmentation are significant obstacles to recovery for this species. Reintroduction to suitable sites appears to be a useful management approach; however, opportunistic attempts to trap gophers at sites in Marion and Schley counties for potential relocation to Sand Hills WMA in Taylor County have not been successful so far.

High elevation forest species – The mountains of northeastern Georgia represent the extreme southern limits of the ranges of several species of mammals, including the long-tailed shrew (*Sorex dispar*), water shrew (*Sorex aquaticus*), hairy-tailed mole (*Parascalops breweri*), Appalachian cottontail (*Sylvilagus obscurus*), red squirrel (*Tamiasciurus hudsonicus*), southern bog lemming (*Synaptomys cooperi*), and least weasel (*Mustela nivalis*). Many of these probably represent relict populations left isolated in high elevation sites as the boreal forests retreated northward following the last ice age. Though Georgia provides only a very small amount of the total occupied habitat and supports only a very small portion of the entire population for these species, maintenance of these range extremes could conserve a disproportionate amount of the species' genetic diversity because of isolation and adaptation. In general, these species need high quality forested habitat, with accompanying clean streams, rich soils, and rocky outcrops. In Georgia, much of this habitat occurs on national forest land and is under no immediate threat. However, DNR should work with the Forest Service and private landowners to avoid alteration of these important habitats. The ranges of these species might be particularly vulnerable to climate change. A small increase in average temperature would likely result in a northward retreat, reducing or eliminating occupied habitat in Georgia.