South Carolina Department of Natural Resources

State Listed Species Protection Guidance

September 2024

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Introduction

The South Carolina Department of Natural Resources (SCDNR) is the state agency charged by state law with the management, protection, and enhancement of wildlife, fisheries, and marine resources in South Carolina. The agency's mission is to serve as the principal advocate for and steward of the State's natural resources.

Further, under S.C. Code of Laws Title 50 Chapter 15, the SCDNR is charged with protecting species listed as endangered or threatened. Currently, there is no allowance for take of a state listed species except expressly for scientific, zoological, or educational purposes, for propagation in captivity of such wildlife, or for other special purposes (§50-15-40(D)).

The SCDNR's Office of Environmental Programs section reviews proposed environmental impacts published by the regulatory arena and provides science-based expertise to avoid and minimize impact to state protected species. The purpose of this document is to provide clarity for the avoidance of a take of a state listed species and what may be needed from permit applicants.

Process

What species could exist within the proposed project?

To determine what protected species may exist within a project area, the first step is for an applicant to utilize the SCDNR's Natural Heritage Database to generate a report of what protected species element of occurrences may be within the project footprint, as well as outside of the project footprint. The distance outside of the project area that an applicant may need to review depends on the habitats onsite – how connected they are to other areas that may be utilized by protected species and the protected species' movement and use of different habitat types as a part of its life history. At a minimum, a review of element of occurrences beyond one mile of the project boundary should be conducted.

The Natural Heritage Data and the list of state protected species can be found at the following: https://natural-heritage-program-scdnr.hub.arcgis.com/

There are some things that are important to understand about interpreting the Heritage Trust data. First, the lack of an element occurrence record does not equate to absence of the species from a site. This information reflects only where data exists from surveys conducted and the SCDNR does not assume that it is complete. Additionally, due to sampling bias, where an animal was captured by survey methods may not necessarily be representative of an organism's preferred habitat location. Also note, if a last observation date of 2020 or even 2003 is depicted for an element occurrence record, it does not imply that the species is no longer occupying that area if suitable habitat is still present today. Please note that areas not yet inventoried by SCDNR biologists may contain significant species or communities.

It is important to note that the element of occurrence records for protected species are approximate and typically include a buffer of uncertainty around certain records. Also, the distance from suitable habitat will vary based on individual species movement, such as size of home ranges, and modes of locomotion (e.g., flight, swimming, ambulation, etc.). For example, a male spotted turtle can have a home range of 5 hectares, where females have been documented to have home ranges of 16 hectares (Litzgus and Mousseau 2004). In contrast, Rafinesque's big-eared bats have been documented to have mean home ranges of 93.1 hectares (Menzel et.al 2001). Similarly, when it comes to aquatic species, it is important to consider the connectivity of contiguous habitat. For example, if an aquatic species is documented to occur in the upper reaches of a watershed and lower in the watershed it can be assumed that the species likely occurs in between the documented records if there also appears to be appropriate habitat. How animals move, the distance from existing element of occurrence records to other suitable habitat, home range, habitat connectivity and presence of suitable habitat, all inform whether a species is likely present on a given site, which is why a habitat assessment is often requested in SCDNR project reviews.

What types of habitats should be of concern?

Once a list of what species could exist within a proposed project area are determined, the applicant will need to assess what habitats exist within the current project footprint. This is very important to determine what protected surveys or what avoidance and minimization measures may be needed. Habitats onsite should be described with as much detail as possible including type of aquatic features (e.g., streams, isolated wetlands, seeps, swamps, tidal creek, brackish water, etc.) with a description of the predominant vegetation community types. Habitat communities can be described using The Natural Communities of South Carolina, supplemented with the A Guide to the Wildflowers of South Carolina or the Flora of the Southeastern United States.

The Protected Species Habitat Assessment should be compiled to include what suitable habitat exists onsite and that information provided with all permit applications to the regulatory agencies. Information regarding each species habitat characteristics can be found in the subsequent sections. If suitable habitat for a state protected species exist, then the subsequent sections also include information regarding the species-specific survey protocols. The SCDNR recommends that surveys be conducted for all project sites that include suitable habitat for a state listed species to ensure avoidance and minimization of take unless otherwise noted in the species section.

Protected Species Survey Permits

Prior to conducting a survey for a state protected species, a scientific collecting permit will be required from the SCDNR. The authority of SCDNR to require a scientific collection permit for wildlife is outlined under S.C. Code of Laws §50-11-1180. Permits are issued for scientific or propagating purposes, where take is defined in statute as a means to harass, hunt, capture, or kill and "protected wildlife" means any wildlife, part, product, egg,

offspring nest, dead body, or part thereof which is managed or protected or the taking of which is specifically regulated by the SCDNR.

A freshwater fisheries scientific collection permit is required when collection methods or harvests are not legal under general licenses, such as sportfishing or commercial fishing licenses. Freshwater fisheries scientific collection permits are only issued when agency judgment indicates the obtained information will benefit resource management efforts.

To acquire a scientific collecting permit, please review and follow the application guidelines found here:

Wildlife - https://www.dnr.sc.gov/wildlife/scientificcollinstructions.pdf
Freshwater Fisheries - https://www.dnr.sc.gov/wildlife/publications/pdf/inlandscientificcollection.pdf

If any species data is collected, the SCDNR asks that you consider entering the data into the SCDNR Natural Heritage Database. This can be done simply through a mobile device using the ArcGIS Survey123 app for free, no ArcGIS license is required. If there is interest in contributing to this database, you can access it one of three ways:

1) By visiting https://natural-heritage-program-scdnr.hub.arcgis.com/ for the direct survey link;
2) By visiting the direct survey link to share the location of any protected species observation: https://survey123.arcgis.com/share/c4a2d0cb5e4f447184b5c78309dc847b; or
3) By contacting speciesreview@dnr.sc.gov.

Any records of species of concern found would greatly benefit the quality and comprehensiveness of the statewide dataset for rare, threatened and endangered species.

Protected Species Surveys

Once the appropriate permits are acquired, the person performing all surveys should abide by all scientific collection permit conditions. In addition, if the surveys are being performed for the purpose of regulatory review and potential environmental impacts, the following should be captured if a protected species is detected/found on the proposed project site:

- GPS coordinates for location where the individual was detected or a GPS centroid/polygon of area of detection.
- Photographs of the habitat where detected and when possible a photograph of the organism collected.

If any of the species are also federally listed, please contact and consult with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service regarding the appropriate pathway to prevent a take of a federally listed species under Section 7 when a federal nexus is present or Section 9 of the Federal Endangered Species Act.

SCDNR Environmental Review

The SCDNR is the state agency charged by state law with the management, protection, and enhancement of wildlife, fisheries, and marine resources in South Carolina. In addition to natural resource management responsibilities through research, management and licensing, the SCDNR is also charged with statewide responsibilities for regulating watercraft operation and associated recreation on state waters, conducting geological surveys and mapping, promoting soil and water conservation, flood mitigation, drought response planning and coordination, and the coordination of the state scenic rivers program. SCDNR's mission is to serve as the principal advocate for and steward of South Carolina's natural resources. (SCDNR authorities and responsibilities are described in Titles 48, 49 and 50, South Carolina Code of Laws (1976), as amended). As such, the agency's Office of Environmental Programs is involved in reviewing proposed environmental impacts as published in the regulatory arena and providing science-based expertise to benefit the state's natural resources and its citizens. If you need to request agency review of your project, please contact environmental@dnr.sc.gov.

The agency's Natural Heritage Database is an excellent resource to provide an overview of potential impacts associated with a proposed activity, a list of known element occurrence records for rare threatened or endangered species within a project area, and a list of known state or threatened endangered species that can occur within the County. Reports generated by the Natural Heritage Database are helpful in determining what species should be assessed within a project area. Anyone can request a report from the Natural Heritage Database by emailing speciesreview@dnr.sc.gov; however, if you foresee using this data routinely as a part of your work as a state/federal agency, consultant, planner, or other profession, please request access through our online form found here: https://arcg.is/1y5LaP.

Please note that the Natural Heritage Database does not constitute final agency comments regarding a proposed project's environmental impacts. The Office of Environmental Programs is the responsible party for submitting final agency comments that might be related to any unspecified local, state or federal permit, certification or license applications that may be needed by any applicant or their contractors, consultants or agents presently under review or not yet made available for public review. In accordance with its policy 600.01, Environmental Review Activities, the SCDNR reserves the right to comment on any permit, certification or license application that may be published by any regulatory agency which may incorporate, directly or by reference, the guidance provided in this resource.

Birds

American Peregrine Falcon (*Falco peregrinus anatum*)

STATE THREATENED

Habitat Assessment

The American Peregrine Falcon has an extremely limited nesting distribution in South Carolina, as their preferred habitat for nesting includes ledges on open cliff faces. They will also use artificial structures such as church towers, cell towers, smoke/power plant stacks, bridges, etc. with some sort of isolated ledge. The only known nesting sites in South Carolina are along cliff faces at Table Rock State Park and Jocassee Gorges. Peregrine Falcon will use a variety of habitats as they migrate and winter in South Carolina, primarily along the coast or Piedmont of the state with a preference for wetlands and beaches (SWAP 2015).

Suitable habitat for nesting can be identified as isolated, tall (i.e., prefer 50-200m), broad cliffs with smooth surfaces that have ledges or rock overhangs. Preferred ledges are usually at least one-third of the way down from cliff peaks (GADNR 2022). Nesting sites can occur on natural cliffs and in quarries.

Survey Protocol

Surveys are not recommended for this species with the exception of proposed activities in quarries or near natural cliffs.

Visual surveys for Peregrine Falcon nests may be completed from April 1 to June 15. Surveys should be performed by a biologist with Peregrine Falcon survey experience. Survey stations should be established that allow visual coverage of all potential nesting areas. More than one survey station may be needed. Binoculars or spotting scope shall be used to can the suitable nesting habitat for Peregrine Falcons. The observer should scan the suitable habitat for four hours from each station looking for Peregrine Falcon activity (USFWS 2003). Four hours is generally the maximum amount of time between a nest visit by adults, so it may take this long to see any activity. The survey at a station can be completed once it is determined there is a nest even if it is less than four hours. Potential habitat not visible from that station will still need to be surveyed.

Bald Eagle (*Haliaeetus leucocephalus*)

STATE THREATENED
FEDERAL BALD & GOLDEN EAGLE ACT PROTECTIONS

Habitat Assessment

Bald Eagle utilize a variety of habitats near fresh and saltwater for foraging and nesting. Suitable habitat for nesting includes large trees, typically pines, but occasionally cypress trees and hardwood trees, that stand above the canopy within contiguous forest. Nests are located almost near the top of the tree where the branches whorl out above the trunk. Nest sites are typically located near foraging sites. Bald Eagles forage in fresh and salt water along reservoirs, impoundments and rivers, but they will also forage and nest near locations that provide scavenging opportunities (e.g., landfills).

Bald Eagle nests are generally about 4 to 6 feet in diameter and 3 to 4 feet tall. As nests are reused in subsequent years, nests can become quite large and weight up to a ton. Bald Eagles can use sticks about 6 feet long and 2-inch diameter to build their nest, although the stick sizes are variable and smaller sticks are also used. Judging the size of a nest can be challenging (Hope personal communication).

Survey Protocol

Visual pedestrian transect surveys for Bald Eagle nests may be completed year-round. Surveys should be performed by a biologist with Bald Eagle survey experience. Binoculars or spotting scope shall be used to scan the suitable habitat for Bald Eagles or their nests prior to conducting transects and occasionally along transects. The detection of a Bald Eagle may indicate a nest is nearby. Surveyors shall walk transects across suitable habitat at a spacing based on the density of onsite vegetation. Line of sight should always be maintained between surveyors. Surveyors should be spaced in a manner where all area in between them will be inspected with a slight overlap (ex. closer for densely vegetated habitat vs. open habitat). Movement shall be at a slow pace with minimal noise to avoid disturbance, particularly between September to May while Bald Eagles are breeding. Should transect surveys be prohibitive due to the size of the area needing to be surveyed, the SCDNR finds the use of aerial surveys would be appropriate.

Aerial surveys should be completed using a slow-flying (approximately 45-80 mph) light aircraft (helicopter preferred) at about 500ft or closer to tree-top level. Flights should occur during clear or overcast weather. Multiple passes should be made over all potential habitat (Call 1978).

Because this species is also federally protected, please follow the U.S. Fish and Wildlife Service National Bald Eagle Management Guidelines found at the following link: https://www.fws.gov/sites/default/files/documents/national-bald-eagle-management-guidelines_0.pdf.

Figure 1: Bald Eagle nest.

Bewick's Wren (*Thryomanes bewickii*)

STATE ENDANGERED

Habitat Assessment

Bewick's Wren populations have expanded and contracted its range in response to habitat changes in Eastern North American and once could be found in the Western Appalachian Mountains. The Bewick's Wren is extremely rare in South Carolina. Bewick's Wren prefer scrub thickets of stunted vegetation interspersed within an open woodland landscape. Remnant populations in the East are often found near buildings or brushy areas on farms in relatively open country (SWAP 2015).

Survey Protocol

Surveys are not recommended.

Kirtland's Warbler (*Setophaga kirtlandii*)

STATE ENDANGERED

Habitat Assessment

Kirtland's Warbler migrate through South Carolina. They use different spring and fall migration routes (Cooper et al. 2017). Kirtland's Warbler typically migrate through South Carolina between April-May and August-October (ebird). During breeding they use young Jack Pine forest. During wintering and migration Kirtland's Warbler are less specific, tending to use young, scrubby habitat.

Survey Protocol

Surveys are not recommended.

Least Tern (*Sternula antillarum*)

STATE THREATENED

Habitat Assessment

Least terns inhabit South Carolina during the spring and summer months for nesting. Suitable habitat for nesting includes bare or sparsely vegetated beaches (typically near inlets or areas of accretion), sand flats/spits, and sand bars. Least terns will also use unvegetated dredge spoil areas and artificial habitats such as gravel parking lots, rooftops, piers, and bridges. In South Carolina only 1/3 of the nests are in natural beach habitats.

Survey Protocol

Least Terns nest in colonies of several birds to hundreds of birds from May to July. Surveys must be conducted during the nesting season. Surveyors must be able to identify least terns by call and sight, identify suitable habitat and be familiar with survey methodology. Equipment needed for surveys: binoculars, spotting scope and a GPS unit. No surveys should be conducted if winds exceed 25 mph. All suitable habitats must be surveyed by walking. When approaching a nesting colony, adults may leave their nests and chicks, call loudly and dive bomb the perceived predator, the surveyor. If a colony is discovered, count the adults flying. Counts of incubating adults are preferable when visibility is high and the colony can be observed from a distance, as disturbance to least terns and other beach nesting birds should be minimized. This also minimizes the risk of attracting the attention of nest predators or stepping on eggs or chicks.

Piping Plover (*Charadrius melodus*)

STATE ENDANGERED
FEDERALLY THREATENED

Habitat Assessment

Piping plover inhabit coastal South Carolina during the winter, and during spring and fall migration. During migration, sites may have more piping plovers than during the winter. Fall migration is from August to November and peaks in September. Spring migration is from late February to April and peaks in March. Winter abundance is December to January.

Suitable habitat for this species includes sparsely vegetated sandy beaches, sand spits, tidal flats, shoals and inlets. Primary foraging habitats include sandy mud flats, and ephemeral pools.

Survey Protocol

Surveyors must be able to identify piping plovers by call and sight, identify suitable habitat and be familiar with survey methodology. Piping plover surveyors must be capable of detecting and recording locations of roosting and foraging plovers. Equipment needed for surveys: binoculars, a GPS unit, and a 10-60x spotting scope with a tripod. No surveys should be conducted if winds exceed 25 mph. All suitable habitats must be surveyed by

walking. Because piping plovers are small shorebirds and can be cryptic, two roosting and two foraging surveys should be conducted during the potential construction month. Roosting surveys must be completed within a four-hour window surrounding high tide (two hours before and two hours after high tide make up the four-hour window). Two foraging surveys must be conducted during the potential construction season and be completed within a four-hour window surrounding low tide (two hours before and two hours after low tide make up the four-hour window). All observations must be confirmed through a spotting scope. (Adapted from M. Chaplin, USFWS, personal communication).

Red-cockaded Woodpecker (*Dryobates borealis*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Habitat Assessment & Survey Protocol

Red-cockaded woodpecker utilize open pine (e.g., longleaf pine ecosystems) or a combination of pine and hardwood habitat. Suitable habitat includes pine trees for both nesting and foraging habitat. Pine trees in excess of 50 years in age provide habitat that allow the excavation of nesting/roosting cavities, whereas foraging habitat consists of pines of any species that are at least 30 years old and are typically a minimum of 10 inches in diameter at breast height (DBH). Pine species should be the dominant trees (50% or greater) in a foraging stand. However, please note red-cockaded woodpecker can also use younger pine stands for both nesting and foraging as the use of artificial cavity inserts have allowed the colonization of red-cockaded woodpecker in younger pine stands.

For all habitat assessments and surveys for this species, please follow the U.S. Fish and Wildlife Service recovery plan – Guidelines for Surveys to Assess Potential Project Impacts to Red-cockaded Woodpecker Nesting and/or Foraging Habitat found at the following link: https://ecos.fws.gov/docs/recovery_plan/030320_2.pdf. Surveys to rule out red-cockaded woodpecker within the project footprint is advised, regardless of habitat condition.

If red-cockaded woodpecker or their cavity trees are located, the SCDNR's Red-cockaded Woodpecker Project should be notified immediately by calling 803-260-4132 or emailing RCW@dnr.sc.gov, as well as the U.S. Fish and Wildlife Service before proceeding with any construction activities. Once red-cockaded woodpecker or cavity their trees are located, all cavity trees should be marked and a foraging habitat analysis of any suitable foraging habitat within ½ mile should be conducted.

If it is determined that the proposed activity would reduce available forage for each identified red-cockaded woodpecker group to less than 3000 ft^2 in pines greater than 10 inches DBH within the range of 40-70 ft^2/acre, the activity would result in take. If suitable foraging habitat exists, but suitable nesting habitat does not, it will need to be determined if there are known red-cockaded woodpecker groups on adjacent properties who may rely on the foraging habitat. This determination should be made through correspondence with

SCDNR's Red-cockaded Woodpecker Project biologists by calling 803-260-4132 or emailing RCW@dnr.sc.gov. If it is determined that the neighboring group is reliant upon forage within the project area, a foraging habitat analysis will need to be conducted to determine the project effect.

Swallow-tailed Kite (*Elanoides forficatus*)

STATE ENDANGERED

Habitat Assessment

Swallow-tailed kite suitable habitat includes forested wetlands associated with Coastal Plain rivers, streams and swamps that are also associated with open areas for foraging (open pine forests, agricultural fields, clear cuts and other habitat types in early succession).

In South Carolina, the swallow-tailed kite is closely associated with large tracts of forested wetlands such as those found in the Francis Marion National Forest and along the lower Savannah, Salkehatchie, Coosawhatchie, Edisto, Santee, Black, Great Pee Dee and Waccamaw Rivers. Although there is the potential for nesting along all of the major river swamps of the coastal plain inland to the fall line (Cely and Day 2005). The species shows a strong preference for nesting in dominant or co-dominant loblolly pines (*Pinus taeda*) or bald cypress (*Taxodium distichum*) growing within or sometimes on the edges of wetland forests (SWAP 2015). However, keep in mind, this species has also been recorded nesting in water tupelo (*Nyssa aquatica*), sweetgum (*Liquidamber styraciflua*), and willow oak (*Quercus phellos*).

In accordance with the habitat description for nesting trees for swallow-tailed kite in the 2015 SWAP,

> The average dimensions of loblolly pine nest trees in the Francis Marion National Forest were 32 m (104 ft.) tall and 49 cm (19 in.) diameter breast height. Pines were located within stands averaging 13.5 m 2 /ha (60 ft.2 /ac.) basal area and 61 years of age (Cely and Sorrow 1990). Dimensions for cypress nest trees were similar to the pines; these trees had an average height of 29 m (96 ft.), with a diameter above the swell of 50.5 cm (20 in.) and a basal area of 13.5 m 2 /ha (60 ft.2 /ac.). Cypress ages were not determined but all were at least second, if not third, growth and probably no more than 75 years of age (J. Cely, unpublished data). Nest trees were only slightly larger than surrounding trees. The average distance to a waterway for kite nests in South Carolina was 135 m (455 ft.), but this distance ranged from 25 to 544 m (82 to 1,795 ft.) (J. Cely and A. Day, unpublished data). As Spanish moss (*Tillandsia usenoides*) is a key component of nest construction, this epiphyte may be a necessary ecological requirement (Meyer 1995).

Swallow-tailed Kites show strong breeding site fidelity and nest in the same general location year after year. They sometimes reuse the previous year's nest tree, and sometimes build within a few hundred feet of the previous year's nest. Nesting areas can contain nests from several breeding pairs, sometimes up to four or five nests within a mile diameter circle (Cely and Day 2005). Distance to the nearest stream or river can range from 84 to 1797 ft. Nests are typically not located on the stream edge so they are not always visible from the stream (Cely and Day 2005). Swallow-tail nests are not substantial and show noticeable wear by the end of the first nesting season. By the second season little usually remained of the nest except a few twigs and small clumps of Spanish moss (Cely and Day 2005). Note birds must have initiated nest building for surveys to be effective.

Survey Protocol

If suitable habitat exists on the project site, the SCDNR recommends an avoidance window for all tree clearing from March 1 to July 31. Should the applicant prefer to conduct a survey, the following protocol should be used during the time when Swallow-tailed Kite have initiated nesting.

A visual pedestrian transect survey for Swallow-tailed Kite nests may be completed from April 1 to June 30. It can be easier to find Swallow-tailed Kite nests during nest construction, typically in early April (Cely and Day 2005). Surveys should be performed by a biologist with Swallow-tailed Kite survey experience. Binoculars or spotting scope shall be used to scan the suitable habitat for Swallow-tailed Kites or their nests prior to conducting transects and occasionally along transects. The detection of a Swallow-tailed Kite may indicate a nest is nearby. Surveyors shall walk transects across suitable habitat at an appropriate spacing based on the density of onsite vegetation. Line of sight should always be maintained between surveyors. Surveyors should be spaced in a manner where all area in between them will be inspected with a slight overlap (ex. closer for densely vegetated habitat vs. open habitat). Movement shall be at a slow pace with minimal noise to avoid disturbance.

Alternatively, helicopter aerial surveys for Swallow-tailed Kite nests can be completed from April to June. Surveys should be performed by a biologist with aerial Swallow-tailed Kite survey experience. Fixed-wing aircraft are inadequate because of high ground speeds and altitudes (Cely and Day 2005). Swallow-tailed Kite nests are usually at the top of the tallest trees available, and the white heads of incubating adults can be noticeable against the dark green forest foliage. Conditions permitting, searches should generally be made at elevations of 200 feet and airspeeds of 40-50 kts. The low elevation results in a narrow transect width. Surveyors shall fly across suitable habitat at a spacing with a slight overlap between transects.

Wilson's Plover (*Charadruis wilsonia*)

STATE THREATENED

Habitat Assessment

Wilson's plover inhabit South Carolina primarily during the summer months for nesting. They can be present during the winter, but most Wilson's plovers migrate south after the nesting season. Suitable habitat for nesting includes primarily dune systems. They nest in front or behind dunes in areas that are open due to washover (SWAP 2015). The species also utilizes intertidal sand flats, mud flats, dredge spoil islands and shell rakes. Breeding habitat is primarily located on outer barrier island beaches with limited nesting occurring on dredge deposit sites and shell rakes. Nest sites are found on dry parts of beaches often near driftwood, a clump of grass, or other conspicuous objects. Nests may be barely above the high tide line, or well back among secondary dunes if they are not fully vegetated. Wilson's plovers typically require wide or accreting beaches as opposed to erosional beaches that often have scarps formed along the high tide line. Foraging occurs in tidal sloughs, beach edges, as well as dune and marsh habitats. (Adapted from GADNR 2022).

Survey Protocol

Surveyors must be able to identify Wilson's plovers by call and sight, identify suitable habitat and be familiar with survey methodology. Wilson's plover surveyors must be capable of detecting and recording locations of roosting and foraging plovers. Equipment needed for surveys: binoculars and a GPS unit. All suitable habitats must be surveyed by walking. To maximize detection, surveys should be conducted when the weather is calm, and visibility is high. Surveys should be conducted near high tide (2 hours before to 2 hours after high tide) from April 1 – June 15. Surveyors should record all adult Wilson's plovers observed in the survey area and attempt to not double-count birds by keeping track of their movements. Surveyors should watch the ground carefully for nests and chicks.

Avoidance & Minimization Measures

The SCDNR recommends no construction during April 1st - July 31st to avoid impacts to nesting females and their offspring.

Wood Stork (*Mycteria americana*)

STATE ENDANGERED

Habitat Assessment

Habitat assessments should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes both nesting and foraging areas that are associated with fresh and estuarine waters. Nesting habitat occurs in trees or shrubs that are found in standing water or along the edges of ponds, impoundments or marshes. The species will forage in isolated depressions, ponds, marshes, tidal creeks, tidal pools, and even roadside ditches with water levels that are 6 to 10 inches deep and little to no canopy cover (GADNR 2022). The foraging areas are typically located within 20 km of a breeding colony or rookery.

Survey Protocol

Surveys to rule out nests in the project area are advised to avoid negative impacts to wood stork. While nesting sites may not be located on the project site, wood storks and other wading birds may seasonally use the water features if any are within the project footprint.

Fishes

Broadtail Madtom (*Noturus sp.*)
STATE THREATENED

Habitat Assessment
In South Carolina, the Broadtail Madtom occurs in relatively deep, mid-channel habitats of medium-sized rivers and is known from the Edisto, Lynches and Little Pee Dee rivers (Rohde et al. 2009). It is rarely collected during most standard fisheries sampling using traditional methods and has primarily been observed by targeting benthic habitats during extreme low flow conditions (Rohde et al. 2009).

Survey Protocol
The SCDNR does not recommend survey for this species at this time.

Brother Spike (*Elliptio fraterna*)
STATE ENDANGERED

Habitat Assessment
This species is found in the Savannah River basin in large rivers, however it has also been found in smaller streams, such as Turkey Creek. When located, it has been found inhabiting sand bars in swift flowing sections of streams and rivers (SWAP 2015).

Survey Protocol
Prior to habitat disturbance in the proposed work area, the areas of impact be completely surveyed by individuals qualified to identify Brother Spike and other Unionid mussels. It is unlawful for any person to take, possess, transport, import, export, process, sell, offer for sale, ship, or receive for shipment any Brother Spike without a permit from the department.

Brother Spike may be allowed to be relocated into areas of suitable habitat, management, and conservation status; however, any plans for relocation should be submitted for review to SCDNR with a detailed description and images of the current and future habitat and proposed work plan and methodologies as it pertains to a relocation project.

Carolina Pygmy Sunfish (*Elassoma boehlkei*)
STATE THREATENED

Habitat Assessment
The Carolina Pygmy Sunfish inhabits slow-moving acidic waters of ponds, ditches, and streams in the Waccamaw River drainage and isolated sites in the Wateree and Congaree drainages, with a preference for areas with abundant aquatic vegetation and shallow

water. Impacts to this state threatened species can be reduced by protecting these areas from increased turbidity or pollution and the removal of vegetation (whether mechanical or chemical to eliminate or reduce aquatic vegetation).

Survey Protocol
Sampling should take place in late fall (October) in order to allow sufficient growth of fish over the year for maximum capture efficiency and identification accuracy. Each site is sampled by 2-4 people, each using one dip net, for a minimum effort of 1 person-hour per site (i.e., a minimum of 2 people sampling for 30 minutes each). Dipnetting should focus on areas with aquatic vegetation and other physical cover. Water quality parameters including temperature (C), conductivity (µS/cm), pH, dissolved oxygen (mg/L) and ammonia (units) should be measured prior to sampling.

Pinewoods Darter (*Etheostoma mariae*)
STATE ENDANGERED

Habitat Assessment
The Pinewoods Darter is known from only one locality in South Carolina—a 1949 collection from Beaverdam Creek in the Little Pee Dee River drainage near McColl, Marlboro County (Rohde et al. 2009). This species occurs in small to medium Sandhill streams with pronounced current and gravel substrate, usually near aquatic vegetation. Juveniles are typically found in slower habitats with vegetation. Targeted efforts to document the species in South Carolina waters using traditional stream fish sampling methods have not yielded any specimens (Rohde et al. 2009).

Survey Protocol
In South Carolina, sampling in potential Pinewoods Darter habitat should include following the SCDNR Fish Sampling Guidance (Appendix 1) with emphasis placed on areas of higher current velocity, gravel substrate and/or aquatic vegetation. A seine should be employed as described in the protocol for Piedmont and Blue Ridge streams.

Shortnose Sturgeon (*Acipenser brevirostrum*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Habitat Assessment

Shortnose Sturgeon exist in all the major river drainages in South Carolina – the Great Pee Dee, Santee, Cooper, Edisto and Savannah Rivers. They prefer areas of the main river channel with deep water and are often found in areas with soft substrate and a vegetated bottom.

Survey Protocol

The SCDNR recommends determining if the species exists within the project boundary utilizing the Natural Heritage Database. Should the species be found present, the SCDNR recommends that SCDNR and the National Marine Fisheries Service (NMFS) be notified for input on the proposed project. The SCDNR may be reached at environmental@dnr.sc.gov and the NMFS at 727-824-5312.

Herpetofauna

Bog Turtle (*Glyptemys muhlenbergii*)

STATE THREATENED
FEDERALLY THREATENED DUE TO SIMILARITY OF APPEARANCE

Habitat Assessment
Habitat assessments should be conducted via pedestrian survey. Surveyors must avoid stepping on the tops of hummocks because this can destroy turtle nests and eggs. Habitat assessment surveys can be conducted year-round (except when significant snow and/or ice cover is present). Suitable habitat consists of streamside bogs, seeps, beaver ponds and other wetlands found within the Blue Ridge ecoregion and upper Piedmont of South Carolina. Although they are most often found related to spring-fed waters, they have been found crossing roads adjacent to streams or beaver ponds. The preferred habitat, however, are those of what would be described as a wet meadow with open, shallow water. Some forested wetlands with a more open canopy may also be suitable if the hydrology and soft, deep organic substrates exist. (Floyd and Jensen, 2011; SWAP 2015; USDOI, 2006).

Nelson's Communities of South Carolina defines upland bogs as poorly drained wet seepage areas at the headwaters of small streams, which are nearly always saturated. Habitats are typically found above 2800 feet in elevation.

Survey Protocol
Currently, SCDNR is testing the use of camera trapping techniques for detecting the presence of bog turtle. As this technique is developed, additional details will be added to this section.

Coal Skink (*Plestiodon anthracinus*)

STATE THREATENED

South Carolina has only one known record for Coal Skink is in upper Pickens County.

Survey Protocol
The SCDNR does not recommend survey for this species at this time.

Dwarf Siren (*Pseudobranchus striatus*)

STATE THREATENED

Habitat Assessment

Habitat assessments should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat consists of heavily vegetated cypress swamps and ponds and flooded ditches, marshes and other permanent and semi-permanent aquatic habitats in the Coastal Plain. They also inhabit small Coastal Plain streams that exhibit little or no flow and have muck bottoms (SWAP 2015).

Survey Protocol

All surveys must be completed when water is present in the wetlands and air temperatures are above freezing. Surveys should be performed by a biologist with wetland amphibian survey experience. Surveys are typically conducted from fall through the spring. Although summer surveys can occur, it is not recommended as this is when the ephemeral wetlands utilized by this species are often dry. Surveys can be conducted using either dip netting or funnel traps. Preferred surveys would consist of a combination of dipnetting and trapping simultaneously.

Dipnetting

Each wetland determined to be suitable habitat shall be sampled via walking transect lines throughout the wetland using a 4 millimeter (mm) or less mesh dipnet. Survey effort should focus solely on areas with emergent or submerged vegetation. For smaller wetlands (0.1 acre or less), it is preferred that transects are spaced tightly enough that the entirety of the aquatic resource surface area is sampled. For larger wetlands, transect spacing does not need to be a set distance; however, at least 50 transects should be sampled throughout the aquatic resource.

The dipnet bag should be initially submerged adjacent to the beginning of the first transect to be sampled. The dipnet should be thrust forward through the submerged vegetation while the surveyor uses their hand or foot to create quick, sweeping motions in the opposite direction they are moving (i.e. towards the net).
In deeper, less heavily vegetated wetlands, the dipnet can instead be vigorously swept back-and-forth in a zig-zag pattern through the inundated vegetation (Palis, 1997a).

Funnel Traps

Funnel traps can result in mortality if neglected. Traps should never be left unchecked for more than 24 hours; however, a successful survey effort should extend for at least 5 days, or 4 trap nights. Trap locations should be well-marked and secured so that traps are not lost. All traps should be "set" so funnels are completely submerged, but at least 25% of the trap remains above the water surface. Additionally, a small floatation device should be left inside each trap in case the trap is moved, or a rain event occurs; this prevents drowning of air breathing organisms. When available, plastic, or mesh, is preferred over metal wire traps to reduce the injury to captured individuals. "Baiting" traps with a glow

stick/trap has been shown to increase capture rates for aquatic salamander larvae and should be considered while trapping for this species (Bennett et al. 2012).

Frosted Flatwood Salamander (*Ambystoma cingulatum*)

STATE ENDANGERED
FEDERALLY THREATENED

Habitat Assessment

Habitat assessments should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes both aquatic (breeding) habitat and terrestrial (non-breeding) habitat and can be broadly defined as forested pine uplands with relatively open mid-story and understory often dominated by wiregrass with isolated wetlands or depression that are seasonally flooded. Please note that wiregrass is not the only groundcover that could be deemed suitable habitat—other similar grass species may serve as a supplemental habitat.

Aquatic habitat includes wetlands that are seasonally flooded by rainfall in late fall or early winter and dry in late spring or early summer within the pine flatwoods-savanna communities that have relatively open canopies. Suitable depressional wetland habitat for breeding and larvae/juvenile life stages meets the following characteristics:

- Occurs within 1,500 feet or immediately adjacent to suitable terrestrial habitat as described below.
- Occurs in areas with 0-2% slopes.
- Wetlands are isolated from other water bodies via overland flow and ephemeral/seasonal in nature, meaning they are completely dry at least annually. Wetlands obtain only a small accumulation of organic matter and have average water depths less than 24 inches. The acreage of the wetland is not a determining factor in suitability; the species has been found in wetlands as small as 0.074 acres (ac) and as large as 31 ac (Palis, 1997b).
- Canopy and mid-story are often dominated by pond cypress (*Taxodium distichum* var. *ascendens*), with a smaller component of swamp blackgum (*Nyssa biflora*) and slash pine. Red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), sweetbay magnolia (*Magnolia virginiana*), and loblolly bay (*Gordonia lasianthus*) saplings may be present as well if fire has been suppressed in the area. Most often occurs with the aforementioned species in addition to myrtle leaved holly (*Ilex myrtifolia*), titi (*Cyrilla racemiflora*), sweet pepperbush (*Clethra alnifolia*), fetterbush (*Lyonia lucida*), and bamboo vine (*Smilax laurifolia*) (Palis, 1996).
- Wetlands often appear marsh-like with groundcover dominated by graminaceous species, including beakrushes (*Rynchospora* spp.), sedges (*Carex* spp.), panic grasses (*Panicum* spp.), witch grasses (*Dichanthelium* spp.), bluestems (*Andropogon* spp.), jointtails (*Coelorachis spp.*), three-awned grasses (*Aristida* spp.), plumegrasses (*Erianthus* spp.), nutrush (*Scleria baldwinii*), hatpins (*Eriocaulon* spp.), and yelloweyed grasses (*Xyris* spp.) (Palis, 1996). However, in

sinkhole ponds, herbaceous vegetation can be patchier, often only occurring around the edges. These herbaceous communities within the wetlands are of more significance to the suitability of the habitat than the canopy and mid-story story species within the wetland.
- Roadside ditches and borrow pits nearby natural isolated wetlands with the aforementioned herbaceous communities that are only inundated late winter through spring may be suitable habitat in drought years when there may be more limited fillings of ideal habitats (Palis 1996; Anderson and Williamson 1976).

The terrestrial habitat includes upland pine flatwoods-savanna habitat that are within 1,500 feet of adjacent or accessible aquatic habitats. Suitable upland, terrestrial habitat for adults meets the following characteristics (Palis, 1996):

- Topographically flat or slightly rolling.
- Seasonally saturated, poorly drained sandy soils
- Ideal upland habitat consists of open (widely scattered), mesic longleaf pine (*Pinus palustris*) woodlands maintained by frequent fire with wiregrass-dominated groundcover and little to no mid-story.
- Groundcover may also contain low-growing shrubs such as saw palmetto (*Serenoa repens*), gall berry (*Ilex glabra*), and blueberries (*Vaccinium* spp.)
- Due to losses in ideal habitat, areas that have been converted to slash pine (*Pinus elliottii*) flatwoods can also be considered suitable habitat, so long as the soil isn't heavily disturbed by bedding, root-raking, etc.

Flatwood salamander live underground most of the year and migrate between these isolated wetlands and uplands. Should appropriate habitat exist within the project area, surveys are recommended to rule out presence of frosted flatwood salamander.

All seasonally ponded wetlands identified as suitable habitat shall be classified as either "active habitat" or "inactive habitat" based on whether there is enough water to allow larvae to inhabit the site during the current season for which it is surveyed.

Presence of the following species likely notes the lack of suitable habitat for *A. cingulatum*: Large predatory fish such as bass (*Micopterus spp.*), sunfish (*Lepomis spp.*), and bowfin (*Amia calva*) (Palis, 1997a). It should be noted, however, that smaller fish species such as pygmy and dwarf sunfishes (*Elassoma* spp.), pigmy killifish (*Leptolucania ommata*), least killifish (*Heterandria formosa*), mosquitofish (*Gambusia* spp.), grass pickerel (*Esox americanus vermiculatus*) and redfin pickerel (*E. americanus americanus*) may coexist with *A. cingulatum*.

Survey Protocol

Due to the fossorial nature of adult and subadult flatwoods salamanders, surveys should be conducted during the larval stage during late January 15 through April 15. All surveys must be completed when water is present in the wetlands and should be performed by a

biologist with flatwoods salamander survey experience. Surveys can be conducted using either dip netting or funnel traps. Preferred surveys would consist of a combination of dipnetting and trapping simultaneously.

Dipnetting

Each isolated wetland previously determined to be suitable habitat shall be sampled via walking transect lines throughout the wetland using a 4 millimeter (mm) or less mesh dipnet. Survey effort should focus solely on areas with emergent or submerged vegetation. For smaller wetlands (0.1 acre or less), it is preferred that transects are spaced tightly enough that the entirety of the aquatic resource surface area is sampled. For larger wetlands, transect spacing does not need to be a set distance; however, at least 50 transects should be sampled throughout the aquatic resource.

The dipnet bag should be initially submerged adjacent to the beginning of the first transect to be sampled. The dipnet should be thrust forward through the submerged vegetation while the surveyor uses their hand or foot to create quick, sweeping motions in the opposite direction they are moving (i.e. towards the net).

In deeper, less heavily vegetated wetlands, the dipnet can instead be vigorously swept back-and-forth in a zig-zag pattern through the inundated vegetation (Palis, 1997a).

Funnel Traps

Funnel traps can result in mortality if neglected. Traps should never be left unchecked for more than 24 hours; however a successful survey effort should extend for at least 5 days or 4 trap nights. Trap locations should be well-marked and secured so that traps are not lost. All traps should be "set" so funnels are completely submerged, but at least 25% of the trap remains above the water surface. Additionally, a small floatation device should be left inside each trap in case the trap is moved, or a rain event occurs; this prevents drowning of air breathing organisms. When available, plastic, or mesh, is preferred over metal wire traps to reduce the injury to captured individuals. "Baiting" traps with a glow stick/trap has been shown to increase capture rates for aquatic salamander larvae and should be considered while trapping for this species (Bennett et al. 2012)

Gopher Frog (*Lithobates capito*)

STATE ENDANGERED
FEDERALLY AT-RISK SPECIES

Habitat Assessment

Habitat assessments should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes both aquatic (breeding) habitat and terrestrial (non-breeding) habitat and can be broadly defined as forested upland pine and scrub oak habitats with open canopies and herbaceous ground cover, as well as more poorly drained longleaf pine (*Pinus palustris*) flatwoods. The gopher frog is essentially terrestrial during

the non-breeding season and extensively uses stumps for retreats in South Carolina. However, gopher frogs may also use gopher tortoise burrows, mouse burrows, stump holes, root mounds, and in soggier soils may be found in crayfish burrows. During the breeding season (October through March), gopher frog can be found in ephemeral/seasonal shallow ponds that lack larger predatory fish and have an open canopy with emergent vegetation. This can include depression marshes, dome swamps, sinkhole ponds, Carolina bays and borrow pits.

Survey Protocol

Gopher frog surveys should be conducted to determine species presence with the use of automated recording devices (preferred) or call surveys. Surveys must be completed when water is present in the wetlands and should be conducted by a biologist with frog survey experience and the ability to decipher the distinctive call of the gopher frog from other frog species.

Please note that suitable habitat conditions for gopher frog breeding may not happen every year due to the dependency of this species on seasonal wetlands. Therefore, if the proposed impacts will occur over a period of time when wetlands are dry and unsuitable for surveys, prior to impacts, the applicant may have to wait for suitable conditions and/or the appropriate time frame to assess gopher frog habitat prior to wetland impacts occurring. Note the SCDNR does not recommend the use of dip net survey to determine presence as the identification of gopher frog tadpoles is extremely difficult and there are very few individuals who can reliably identify gopher frog tadpoles.

Audible surveys using automated recording devices (ARDs) are the preferred method.

<u>Automated Recording Devices (ARDs)</u>

Preferred surveys would entail deploying ARDs from February 1st to April 15th. ARDs should be set to record at least 5 minutes every hour, from one hour after sunset to one hour before sunrise. ARDs should be checked at least weekly to retrieve data and ensure the device is recording properly. <u>ARDs should remain in the wetlands until April 15th</u>.

<u>Call Surveys</u>

All call surveys must be completed under the following criteria:

1) when wetlands have standing water present;
2) at night (at least one hour after sunset for at least one hour); and
3) for at least one week (seven days) each month between January and April, following a rain event that produces more than 0.5 inches of rain (which must be documented).

If electing to do in-person call surveys, any gopher frog calls should be recorded for further analysis and confirmation by SCDNR.

Gopher Tortoise (*Gopherus polyphemus*)

STATE ENDANGERED

Habitat Assessment

Habitat assessments should be conducted via thorough transect survey methods to identify suitable habitat; these can be conducted year-round; however the details of how searches are conducted and the appearance of occupied burrows will vary seasonally with varying degree of gopher tortoise activity. Suitable habitat can be broadly defined as open longleaf pine (P. palustris) habitat in sandy soils with less than 25% canopy cover with interspersed open patches of diverse understory vegetation in Aiken, Bamberg, Barnwell, Allendale, Colleton, Jasper, and Hampton counties.

While references citing typical tree density and soil types provide guidance (e.g., Aresco and Guyer, 1999), more degraded upland habitats should not be dismissed of having gopher tortoise occupancy without first conducting rapid, reconnaissance surveys. Gopher tortoise are long-lived species that can remain on the landscape as a "legacy" long after the habitat has degraded beyond the prescriptive forest or soil coverage. A common example of occupied degraded habitat are those open, developed edges such as roadsides, utility right-of-ways, and old fields.
Additionally, gopher tortoise have been found in a diversity of habitats that are unoccupied by *P. palustris*, including, but not limited to, loblolly (*P. taeda*) and slash pine (*P. elliottii*), in silviculture stands, as well as scrub oak habitats.

Coarse sand grains must be present so that burrows can be constructed without collapsing. Additionally, soil content must be low in clay or gravel/rock content (less than 25%) as these substrates challenge burrow construction.

Gopher tortoise will not be found in wetland habitats or those that are presently inundated. Water table levels are typically greater than or equal to 1 m below the ground surface for gopher tortoise to be present, although exceptions occur, especially in the lower Coastal Plain.

Survey Protocol

Surveys may be conducted year-round. Due to the increased detectability of burrows rather than individual animals, burrow counts and estimations of occupation are the most efficient and reasonable measure of estimating local occupancy and distribution of gopher tortoises.

Burrow scoping for gopher tortoises is most appropriate when gopher tortoises are typically the most inactive (i.e. more likely to be utilizing burrows) in November through

March when temperatures are below 50°F at night and below 60°F during the day. When daily temperatures approach 100°F, gopher tortoises are less active. Windy and rainy conditions also decrease gopher tortoise activity.

As gopher tortoise become more active (April through October), burrow visibility increases due to the apparent "aprons" of an active burrow (Appendix 2). Gopher tortoise activity peaks in the spring (April and May) and early Fall (September and October) when conditions are warm but mild. Surveying during these periods can provide the best sense of occupancy and activity within the population.

During the inactive season when gopher tortoise are not actively maintaining their burrows, the lack of fresh sand spray makes the burrow less likely to be detected as vegetation and plant debris cover the entrance (Appendix 2).

Depending on the size of the survey area, timeframe and vegetation density, surveys can occur most efficiently with 2-4 surveyors. Distances between transects shall be determined by estimating that distance which is necessary to maintain each transect pass at a width less than the surveyors' estimated line-of sight to burrows in a particular habitat. The surveyor should be able to consistently see all area down to the soil between them and the next closest surveyor. Even in lower quality habitat, this technique involves surveyors walking transects 5-10 m apart in unison in the same direction. Verbal communication among surveyors can assist with maintaining straight lines and consistent transect widths in thickly vegetated areas. To ensure gopher tortoise are not present within a proposed development footprint, surveys must be facilitated by using a GPS unit (or an equivalent GPS tracking device or app such as ArcGIS Field Maps) to track the survey paths and ensure sufficient coverage of all suitable habitat.

Since juveniles tend to place burrows under vegetation around the margins of open areas (e.g., wire grass clumps, palmetto fronds, cactus, etc), gopher tortoise surveys should also include the use of a snake hook or stick to lift vegetation in these areas to determine if juvenile gopher tortoise are present. It is likely if juvenile are found that adult gopher tortoise will be found onsite or nearby as SCDNR knows from telemetry data that the juveniles will move relatively long distances (up to 0.5 mile) from their natal burrow.

Gopher tortoises overlap with oldfield mice (*Peromyscus polionotus*) and nine-banded armadillos (*Dasypus novemcinctus*) for much of their range and the same microhabitats can be selected for their burrows. The following characteristics should aid in distinguishing between the burrows of the two species.

Active gopher tortoise burrows are dome or half-moon shaped with fresh aprons (except in the winter). Armadillo burrows tend to be somewhat obscured by leaf litter and vegetation around the entrance, with minimal sand piled in front of them (therefore, lacking the apron typical of a gopher tortoise). When burrow camera scoping for occupancy, armadillo burrows should be scoped as immature gopher tortoise can occupy those burrows.

Oldfield mice burrows can be confused with hatchling gopher tortoise burrows but are also more circular in shape. Mammal burrows can be characterized as more circular in shape and shallow, typically less than or equal to 1 meter. If uncertain, apply a "stick test" to distinguish between the tortoise and mammal burrows. If the stick will not go into the burrow more than a couple of feet (less than 1 m), it is likely a mammal burrow.

Gopher tortoise burrows can be broadly classified into three age classes based on the rough size of the burrow opening:

- Hatchling/juvenile less than 13 cm
- Subadult 13-23 cm
- Adult greater than 23 cm

Burrow condition must be noted as a measure of activity and likelihood of occupation. If the status of the burrow is uncertain, classify it as inactive rather than abandoned. Active and inactive burrows are both considered "potentially occupied" and shall be scoped. All burrows should be marked by hanging brightly colored biodegradable flagging above the burrow or on the closest tree or other structure; in addition, GPS coordinates should be recorded of each burrow opening to aid in more efficient redetection of burrows.

- "Active" designation: burrow that is "in good repair with the classic half-moon shaped entrance and appears to be in use by a *G. polyphemus* (FFWCC, 2017)."
- "Inactive" designation: burrows that are "in good repair [shape and entrance form maintained] but does not show recent *G. polyphemus* use."
- "Abandoned" designation: burrows "appear unused and dilapidated", including situations where "the entrance is partially or completely collapsed, and the burrow is partially or completely filled with leaves or soil."

<u>Occupancy Assessment</u>

Once located, all burrows should be scoped using a burrow camera to determine gopher tortoise occupancy. While survey and scoping may be performed at any time of year, to best detect a gopher tortoise in a burrow, the SCDNR recommends scoping of burrows in the cooler months, from November 1st to February 31st. This method is also recommended as it produces data on other commensal species, some of which are state and federal priority species (e.g., gopher frog). If capture of the animals for removal and relocation will be necessary, burrow scoping provides efficiency in confirming the burrows to target for the more time-consuming processes of trapping or excavation.

Burrow scopes can be different lengths and include camera sizes suited for both juvenile and sub-adult/adult burrows. Burrow scoping should be conducted quickly and efficiently to reduce the possibility of counting an individual multiple times or missing some animals completely as they move within the survey area and utilize multiple burrows. In order to

estimate a local count surrounding the impact boundaries, gopher tortoise shall be continued within all previously identified suitable habitat within the Project.

Pine Barrens Treefrog (*Dryophytes andersonii*)

STATE THREATENED

Habitat Assessment

Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes herb shrub bogs, pocosin and other related vegetated communities in the Sandhills region, often associated with small blackwater tributaries. Pine barrens treefrogs live in the thick, pocosin vegetation that often surrounds this habitat, but they also require the open canopy, slow-flowing seeps as breeding habitat. Small shrubs within seeps and wetlands are important for this species to perch and call from. Edge habitat with midstory shrubs or hardwoods adjacent to open canopy habitats with slow moving or stagnant wetlands or seeps, such as powerline and gas line rights-of-way and some clearcuts are known to provide suitable habitat for pine barrens tree frogs.

Breeding habitat often includes acidic water, generally with a pH of 4.5 or less. Wetland habitats are dominated by sphagnum with other aquatic vegetation such as sedges, rushes, bladderwort, pipeworts, sundews, pitcher plants, club moss and filamentous algae.

Survey Protocol

All surveys must be completed at night during June and July. Surveys should be performed by a biologist with frog survey experience. Surveys should be conducted via call surveys or audible surveys using automated recording devices (ARDs).

Automated Recording Devices (ARDs)

Surveys should be conducted by a biologist with frog survey experience and the ability to decipher the distinctive call of the pine barrens treefrog from other frog species.

Preferred surveys include deployment of ARDs at the beginning of June and setting them to record at least five minutes every hour, from one hour after sunset to one hour before sunrise. ARDs should be checked at least monthly to retrieve data and ensure the device is recording properly. ARDs should remain in the wetlands from June 1st - July 30th.

Call Surveys

Surveys should be conducted by a biologist with frog survey experience and the ability to decipher the distinctive call of the pine barrens tree frog from other frog species.

All call surveys must be completed under the following criteria:

1) when wetlands have standing water present;
2) at night (at least one hour after sunset, for at least one hour); and
3) for at least one week (seven days) each month between June 1st - July 30th following a rain event.

If electing to do in-person call surveys, any pine barrens treefrog calls should be recorded for further analysis by SCDNR.

Southern Hognose Snake (*Heterodon simus*)

STATE THREATENED

Habitat Assessment

Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat can be broadly defined as open longleaf pine habitat in sandy soils. However, to be specific, suitable habitat also includes sandhills that typically consists of a rolling topography and deep sand substrate within a savanna of widely spaced longleaf pine (*Pinus palustris*) and/or turkey oak (*Quercus laevis*), often with a wiregrass (*Aristida stricta*) understory; or scrubby pine flatwoods with low relief having deep, sandy soils within a savanna of widely spaced longleaf pine, with a wiregrass and scrub-shrub understory (FNAI, 2012). However, hognose snake can be found on a variety of xeric habitats with well-drained, sandy soils in addition to the typical fire maintained longleaf pine, sandhills and scrubby pine flatwoods including ruderal and agricultural habitats with similar characteristics (Jensen, 2018d; Jordan, 1998). Typically, where found in altered habitat, there is also a diverse herbaceous groundcover. While altered and not ideal, these habitats can also serve as suitable, although more limited, habitat.

Survey Protocol

Surveys are not recommended for this species.

Avoidance & Minimization Measures

Because Southern hognose snakes are highly fossorial, the SCDNR finds that surveys detectability is extremely low. Therefore, the SCDNR recommends activities, especially the use of heavy equipment, is minimized when the hognose snake is most active and vulnerable above ground during the spring (March-April) and fall (September-early November) to reduce impacts to this species from soil compaction and crushing in lieu of surveys.

In the event the avoidance window cannot be accommodated, the SCDNR recommends the following exclusionary methods:

- Erect silt fencing around the project area in the winter when snakes are dormant and spotted turtles will be in the wetlands. If the timing of this would impact project timelines, the SCDNR asks that the silt fencing be erected now and that a monitoring plan be in place to walk the perimeter of the silt fence daily the week prior to construction beginning to ensure that any herpetofauna within the project footprint along the fencing be moved to outside of the project area prior to any work taking place.
- Monitor the silt fencing to ensure it is effectively working properly on a monthly basis prior to construction activities occurring. This should effectively exclude any herpetofauna and other small wildlife species from the project area prior to excavation. Once construction activities begin, it should be monitored weekly.

Spotted Turtle (*Clemmys guttata*)

STATE THREATENED

Habitat Assessment

Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes heavily vegetated, shallow wetlands with standing or flowing water including Carolina Bays, bogs, swamps, marshes, and wet meadows (wetlands with soft, mucky substrates are preferred) (Jensen et al. 2008). While often associated predominantly with wetlands, spotted turtle spend a considerable amount of time on land throughout the year; however, preferred upland habitat types have not been identified. Keep in mind that spotted turtles are known to move considerable distances between and within habitats; a male can have a home range of 5 hectares, where females have been documented to have home ranges of 16 hectares (Litzgus and Mousseau 2004).

Survey Protocol

All surveys must be completed when water is present in the wetlands. Spotted turtles utilize wetland habitat during certain times of the year, but during periods of drought or low water levels, spotted turtles will aestivate in the surrounding forests adjacent to wetlands. Surveys should be conducted from March 1st – May 15th when air temperatures are between 60-88°F and water temperatures between 60-82°F. Surveys can be conducted using visual survey or trap surveys; however, the SCDNR recommends only the use of trap surveys due to the low detectability of spotted turtle with the use of visual survey only. Trap surveys should be conducted between March 1st and May 15th. Further survey details can be found in the Spotted Turtle Assessment Protocol developed by the Spotted Turtle Working Group in Appendix 3.

<u>Trap Surveys</u>

Trapping is usually most effective March to May. Further survey details for trapping can be found in the Spotted Turtle Assessment Protocol developed by the Spotted Turtle Working Group in Appendix 3.

Spotted turtles may be allowed to be relocated into areas of suitable habitat, management, and conservation status; however, any plans for relocation should be submitted for review to SCDNR with a detailed description and images of the current and future habitat and proposed work plan and methodologies as it pertains to a relocation project. It should be noted that not all habitats are suitable for relocation.

Websters Salamander (*Plethodon websteri*)

STATE ENDANGERED

Habitat Assessment

Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes old-growth oak-hickory forest habitats in rocky terrain. Websters salamander inhabit the forest floor, predominantly under hardwood log debris and leaf litter. While the preference is old-growth forest that have experienced very little disturbance from natural or anthropogenic processes (i.e., heavy equipment, forest practices, erosion, etc.), disturbance should not preclude habitats from being surveyed. Websters salamander is likely to exist inhabit these types of habitats in Saluda, Greenwood, Edgefield, and McCormick Counties.

Survey Protocol

Surveys should be conducted during the months of December through March after rains have moistened the surface, but when temperatures under cover objects are above 40 °F and do not exceed 72 °F. Surveys can be conducted by walking transects and flipping under logs, leaves, rocks and other objects on the forest floor. If cover objects are limited, untreated pieces of plywood can be arranged throughout the forest floor and checked while walking transects. If plywood is deployed, each piece of plywood must be a minimum of 2 x 2 ft and placed in the survey area at a minimum of 6 months prior to the survey occurring. GPS coordinates for all plywood pieces must be provided and all plywood collected and removed at the conclusion of the survey.

Avoidance & Minimization Measures

If Websters salamanders are found to occur on the proposed site, the SCDNR recommends that all known locations should be flagged, and GPS coordinates taken. Impacts to this habitat should be avoided.

Sea Turtle

There are several species of sea turtle under state protections in South Carolina. Should the proposed project involve an area of beach, whether under the authority of the Beachfront Management Act or not, please contact the SCDNR for further review by contacting environmental@dnr.sc.gov regarding any of the following species.

Green Sea Turtle (*Chelonia mydas*)

STATE THREATENED
FEDERALLY THREATENED

Leatherback Sea Turtle (*Dermochelys coriacea*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Loggerhead Sea Turtle (*Caretta caretta*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Kemp's Ridley Sea Turtle (*Lepidocheylys kempii*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Habitat Assessment

Because sea turtles utilize beaches during the nesting season, a habitat assessment to identify suitable habitat is not necessary.

Survey Protocol

Habitat assessments should be conducted via pedestrian or boat surveys to identify suitable habitat and can be conducted year-round. Suitable habitat shall encompass any of the following for the four sea turtle species known to inhabit South Carolina's waters and beaches. Note sea turtle are regulated under two federal agency jurisdictions: the NMFS regulates oceanic and shallow coastal waters sea turtle inhabit called primary habitat and the U.S. Fish and Wildlife Service (USFWS) regulates nesting habitat defined as ocean facing beach fronts, barrier island beaches and inshore "pocket" beach areas. USFWS further defines barrier island beaches as those areas above or landward of the high-water line, in front of, on or behind dune ecosystems and or within heavy vegetation whether present on dune or forested edge.

Figure 2. Left: Adult loggerhead females nesting along dune ecosystem on Pawleys Island beach. Figure 3. Right: Nest crawl and body pit from adult loggerhead female.

Mammals

Bats

Indiana Bat (*Myotis sodalis*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Habitat Assessment & Survey Protocol
Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes forested habitat with roost trees or snags greater than or equal to 5 inches at diameter at breast height with exfoliating bark, cracks, crevices, and/or hollows (GADNR 2023). Roost tree are only considered roost trees if they are located within 1000 feet of other suitable forested habitat. Indiana bat forage in wetlands, open waters, stream, agricultural fields and pastures. Where suitable roost trees and forested habitat exist in association or adjacent to foraging habitats is the most ideal location for Indiana bat. Although surveys may be conducted year-round, please consider how the forested area assessed will appear in the spring and summer. If the understory is too dense, it may be less suitable for Indiana bat during leaf out.

In addition to trees, Indiana bat will also utilize artificial structures such as bridges and culverts. All bridges/culverts planned for maintenance or replacement should be visually surveyed for signs of bats or bat usage (e.g., individuals, urine staining, guano) with the use of a spotlight or other bright light source. Binoculars may be helpful for bridge surveys. For helpful information on completing bat surveys in transportation structures, visit the link below of the training put together by GADNR, USFWS and FHWA. https://www.youtube.com/watch?v=iuFwkT7q8Ws There is a Bats and Transportation Structures survey protocol in Appendix K of the USFWS Range Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines found here: https://www.fws.gov/sites/default/files/documents/2024-04/final_usfws_range-wide_ibat-nleb_survey_guidelines_508-compliant.pdf

For all habitat assessments and surveys for this species, please follow the U.S. Fish and Wildlife Service Range-Wide Indiana Bat & Northern Long-eared Bat Survey Guidelines found at the following link: https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines

Eastern Small-footed Bat (*Myotis leibii*)

STATE THREATENED

Habitat Assessment
Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. Suitable habitat includes caves, mines, and rock crevices and shelters, including ground level rock roosts in talus slopes and rock

fields and vertical cliff faces. They are also found utilizing abandoned buildings and within crevices of bridges in wooded areas. In South Carolina, only a few small-footed bat roosts have been identified (SWAP 2015). This species has been found inhabiting a rock outcrop in mature hardwoods, loose tarpaper on an abandoned log cabin, a wood pile on a porch, a fish hatchery building, and a picnic shelter.

The 2015 SWAP describes the Eastern small-footed bat habitat as follows:

> Hardwood and evergreen forests, mixed hardwood-conifer stands, bottomland, and floodplains are reported as important habitat for the Eastern small-footed myotis. They appear to prefer to forage over streams and ponds. For example, in South Carolina, they have been observed foraging over Reedy Cove Creek >100 m (328 ft.) downstream from the waterfalls. These bats are slow fliers with a fluttery flight pattern. It is likely they require forested corridors between roosts and foraging areas. The winter and summer roosting requirements and foraging habitats are poorly understood for this species.

Survey Protocol
To determine occupancy at bridges, surveys should be conducted for hibernation between Nov 15 – March 1, and maternity season between May 15 – July 15.

All bridges/culverts planned for maintenance or replacement should be visually surveyed for signs of bats or bat usage (e.g., individuals, urine staining, guano) with the use of a spotlight or other bright light source. Binoculars may be helpful for bridge surveys. For helpful information on completing bat surveys in transportation structures, please see Assessing and Surveying Bridges and Culverts for Bat Use in the Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines at https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines. A helpful training video put together by GADNR, USFWS and FHWA can be found here: https://www.youtube.com/watch?v=iuFwkT7q8Ws

Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*)
STATE ENDANGERED

Habitat Assessment - Blue Ridge
Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. The SCDNR recommends a survey for maternity roost trees be conducted prior to any clearing activity to avoid and minimize potential impacts. Suitable habitat includes rock outcrops, mesic and cove hardwood forests, dry deciduous forests (e.g., oak-hickory with peeling-barked tree species), pine woodlands, forested wetlands and bottomlands, bottomland agricultural fields, and forested riparian areas (Trousdale and Beckett 2002, 2004, Johnson and Lacki 2013, Bunch et al. 2015b). Maternity roosting may occur in a variety of large hollow tree species, such as

tulip poplar (Liriodendron tulipfera), caves or rock shelters (Bunch et al. 1998, Clark et al. 1998, Bunch and Dye 1999).

Habitat Assessment - Coastal Plain
Habitat assessments to identify suitable habitat should be conducted via pedestrian surveys and can be conducted year-round. The SCDNR recommends a survey for maternity roost trees be conducted prior to any clearing activity to avoid and minimize potential impacts. Suitable habitat includes that of black gum (*Nyssa sylvatica*) and water tupelo (*Nyssa aquatic*) stands, bald cypress (*Taxodium distichum*) swamp forests, maritime forests, and hardwood or mixed mature forested bottomlands (Cochran 1999, Hofmann et al. 1999, Lance et al. 2001, Gooding and Langford 2004, Trousdale and Beckett 2005). Trees standing 59 to 82 feet tall with large cavities, defined as 3.6 feet tall by 1.2 feet wide, should be surveyed to determine maternity roost occupancy May 1st to July 31st (Mirowsky 1998, Gooding and Langford 2004, Trousdale and Beckett 2005, Carver and Ashley 2008).

Survey Protocol
The SCDNR recommends that where suitable habitat exists, assume presence of the species and avoid tree clearing from May 1st to July 31st to minimize disturbance and destruction of habitat that may be used by females during gestation or maternal care for pups.

Should the applicant want to conduct surveys for this species to determine presence or fine tune use of any proposed project area, the SCDNR recommends a survey plan be provided to SCDNR for review prior to the survey being conducted. Please note the SCDNR does not recommend or support the use of solely acoustic survey methods for detection of Rafinesque's big-eared bat. Rafinesque's big-eared bat echolocation call signatures have a structure, frequency and intensity that are less easily detected by acoustic methods. Additionally, Rafinesque' s big-eared bat use passive-listening to identify prey items (Lacki and Dodd, 2011); thus, likely spending less time emitting echolocation calls while foraging (Bat Conservation International and Southeastern Bat Diversity Network 2013). For these reasons, the absence of acoustic detections may not equate to absence of the species in the project area.

In lieu of mist nest surveys for species presence, the SCDNR recommends the use of surveys for maternity roost trees to protect the species during gestation or maternal care for pups. However, the surveying of maternal roosts is not recommended in the Blue Ridge ecoregion due to lack of data on what is considered suitable maternity roosting habitat. Therefore, the following outlines surveys that would be applicable only in the Coastal Plain Ecoregion.

Surveys for maternity trees may be completed year-round in the Coastal Plain, although high water may deter checking basal hollows for bat presence, so that should be taken into consideration. To identify potential maternity trees, surveyors shall walk transects across suitable habitat at a spacing based on the density of onsite vegetation. Line of sight should always be maintained between surveyors. Surveyors should be spaced in a manner where all area in between them will be inspected with a slight overlap (e.g.,. closer for densely vegetated habitat vs. open habitat).

To determine occupancy of maternity trees, surveys should be conducted May 1st to July 31st. Surveyors should remain as quiet as possible while conducting the survey as Rafinesque's big-eared bat are particularly susceptible to disturbance. All maternity trees identified should be surveyed using the following method (Morris and Coleman, 2017; GADNR 2022):

1) Extend a large, hand-held mirror into the opening with the face of the mirror directed up into the trunk cavity. If grounding is stable enough, a ladder may be useful to access tree openings that are not low to the ground.
2) Shine a spotlight onto the mirror from a slight angle above in order to illuminate the hollow. Slowly change the angle of the mirror in order to inspect 360° inside the tree cavity. As Rafinesque's big eared bat is a particularly skittish species, the light will awaken them and the distinctive ears will uncoil as they begin to echolocate—allowing species identification to be certain. If many spider webs are covering the hollow opening, it is unlikely there has been recent bat use in the tree.

In addition to trees, Rafinesque's big-eared bat will also utilize artificial structures such as bridges and culverts. All bridges/culverts planned for maintenance or replacement should be visually surveyed for signs of bats or bat usage (e.g., individuals, urine staining, guano) with the use of a spotlight or other bright light source. Binoculars may be helpful for bridge surveys. For helpful information on completing bat surveys in transportation structures, please see Assessing and Surveying Bridges and Culverts for Bat Use in the Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines at https://www.fws.gov/media/range-wide-indiana-bat-and-northern-long-eared-bat-survey-guidelines. A helpful training video put together by GADNR, USFWS and FHWA can be found here: https://www.youtube.com/watch?v=iuFwkT7q8Ws. The SCDNR recommends the applicant survey culverts, proposed for impact, that are greater than 4 ft tall, utilizing the SCDNR bats in structures survey 123 form. Culverts provide hibernacula habitat for bat species during Nov 1st to March 15th and maternity habitat from May 1st to July 31st. Therefore, the SCDNR recommends culverts be surveyed from Nov 1st to March 15th and May 1st to July 31st, prior to any work being done. The SCDNR recommends the applicant utilize the SCDNR Bats in Structures form. Please contact the SCDNR Heritage Trust Program GIS manager for access to this form at LemerisJ@dnr.sc.gov.

Florida Manatee (*Trichechus manatus*)

STATE ENDANGERED
FEDERALLY ENDANGERED

For manatee, the SCDNR defers to the USFWS.

Whales

For all listed whale species, the SCDNR defers to the NMFS.

Blue Whale (*Balaenoptera musculus*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Fin Whale (*Balaenoptera physalus*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Humpback Whale (*Megaptera novaeangliae*)

STATE ENDANGERED
FEDERALLY ENDANGERED

North Atlantic Right Whale (*Eubalaena glacialis*)

STATE ENDANGERED
FEDERALLY ENDANGERED

Sperm Whale (*Physeter macrocephalus*)

STATE ENDANGERED
FEDERALLY ENDANGERED

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Appendices

Appendix 1 SC Department of Natural Resources Fish Sampling Guidance

Appendix 2 Gopher Tortoise and Mammal Burrow Photos

Figure 1. Photos above show a typical gopher tortoise apron during the active season.

Figure 2. Photo above shows a burrow that is occupied during the inactive season with leaves and debris at the entrance. Typically, the burrow apron would be smooth with debris no tracks present during the inactive season.

Figure 3. Photos above show inactive burrows.

Figure 4. Photos above show abandoned burrows.

Figure 5. Photos above show abandoned burrows.

Figure 6. Photos above show a small mammals burrow.

Figure 7. Photos above show an armadillo burrow.

Appendix 3 Spotted Turtle Habitat Assessment & Survey Protocol