

APPENDIX H

Species Consultation Keys



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960



August 1, 2017

Donnie Kinard
U.S. Army Corps of Engineers
Post Office Box 4970
Jacksonville, Florida 32232-0019

Subject: Consultation Key for the Eastern Indigo Snake – Revised

Dear Mr. Kinard:

This letter revises and replaces the January 25, 2010, and August 13, 2013, letters to the U.S. Army Corps of Engineers (Corps) regarding the use of the eastern indigo snake programmatic effect determination key (Key) for projects occurring within the South Florida Ecological Service's Office (SFESO) jurisdiction. This revision supersedes all prior versions of the Key in the SFESO area. The purpose of this revision is to clarify portions of the previous keys based on questions we have been asked, specifically related to habitat and refugia used by eastern indigo snakes (*Drymarchon corais couperi*), in the southern portion of their range and within the jurisdiction of the SFESO. This Key is provided pursuant to the Service's authorities under the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C.1531 *et seq.*). This Key revision has been assigned Service Consultation Code: 41420-2009-I-0467-R001.

The purpose of this Key is to assist the Corps (or other Federal action agency) in making appropriate effects determinations for the eastern indigo snake under section 7 of the Act, and streamline informal consultation with the SFESO for the eastern indigo snake when the proposed action can be walked through the Key. The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

This Key uses project size and home ranges of eastern indigo snakes as the basis for making determinations of "may affect, but is not likely to adversely affect" (NLAA) and "may affect, and is likely to adversely affect" (may affect). Suitable habitat for the eastern indigo snake consists of a mosaic of habitats types, most of which occur throughout South Florida. Information on home ranges for individuals is not available in specific habitats in South Florida. Therefore, the SFESO uses the information from a 26-year study conducted by Layne and Steiner (1996) at Archbold Biological Station, Lake Placid, Florida, as the best available

information. Layne and Steiner (1996) determined the average home range size for a female eastern indigo snake was 46 acres and 184 acres for a male.

Projects that would remove/destroy less than 25 acres of eastern indigo snake habitat are expected to result in the loss of a portion of an eastern indigo snakes home range that would not impair the ability of the individual to feed, breed, and shelter. Therefore, the Service finds that take would not be reasonably certain to occur due to habitat loss. However, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take. Consequently, projects less than 25 acres that include the Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and a commitment to excavate underground refugia as part of the proposed action would be expected to avoid take and thus, may affect, but are not likely to adversely affect the species.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range.

Projects that would remove 25 acres or more of eastern indigo snake habitat could remove more than half of a female eastern indigo snakes home range. This loss of habitat within a home range would be expected to significantly impair the ability of that individual to feed, breed, and shelter. Therefore, the Service finds take through habitat loss would be reasonably certain to occur and formal consultation is appropriate. Furthermore, these projects have the potential to injure or kill an eastern indigo snake if the individual is crushed by equipment during site preparation or other project aspects. The Service's *Standard Protection Measures for the Eastern Indigo Snake* (Service 2013 or most current version) and the excavation of underground refugia (where a snake could be buried, trapped and/or injured), when implemented, are designed to avoid these forms of take.

Eastern indigo snakes use a variety of habitat and are difficult to detect. Therefore, site specific information on the land use, observations of eastern indigo snakes within the vicinity, as well as other factors, as appropriate, will all be considered by the Service when making a final recommendation on the appropriate effects determination and whether it is appropriate to conclude consultation with the Corps (or other Federal action agency) formally or informally for projects that will impact 25 acres or more of habitat. Accordingly, when the use of the Key results in a determination of "may affect," the Corps (or other Federal action agency) is advised that consultation may be concluded informally or formally, depending on the project specific effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps (or other Federal action agency) desires to proceed with a consultation request prior to receiving

additional technical assistance from the Service, we recommend the agency documents the biological rationale for their determination and proceed with a request accordingly.

If the use of the Key results in a determination of “no effect,” no further consultation is necessary with the SFESO. If the use of the Key results in a determination of “NLAA,” the SFESO concurs with this determination based on the rationale provide above, and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake. For “no effect” or “NLAA” determinations, the Service recommends that the Corps (or other Federal action agency) documents the pathway used to reach your no effect or NLAA determination in the project record and proceed with other species analysis as warranted.

Eastern Indigo Snake Programmatic Effect Determination Key
Revised July 2017
South Florida Ecological Service Office

Scope of the Key

This Key should be used only in the review of permit applications for effects determinations for the eastern indigo snake (*Drymarchon corais couperi*) within the South Florida Ecological Service's Office (SFESO) area (Broward, Charlotte, Collier, De Soto, Glades, Hardee, Hendry, Highlands, Lee, Indian River, Martin, Miami-Dade, Monroe, Okeechobee, Osceola, Palm Beach, Polk, Sarasota, and St. Lucie Counties). There is no designated critical habitat for the eastern indigo snake.

This Key is subject to revision as the Corps (or other Federal action agency) and Service deem necessary and in particular whenever there is new information on eastern indigo snake biology and effects of proposed projects.

The Key is a tool available to the Corps (or other Federal action agency) for the purposes of expediting section 7 consultations. There is no requirement to use the Key. There will be cases when the use of the Key is not appropriate. These include, but are not limited to: where project specific information is outside of the scope of the Key or instances where there is new biological information about the species. In these cases, we recommend the Corps (or other Federal action agency) initiates traditional consultation pursuant to section 7 of the Act, and identify that consultation is being requested outside of the Key.

Habitat

Habitat use varies seasonally between upland and wetland areas, especially in the more northern parts of the species' range. In southern parts of their range eastern indigo snakes are habitat generalists which use most available habitat types. Movements between habitat types in northern areas of their range may relate to the need for thermal refugia (protection from cold and/or heat).

In northern areas of their range eastern indigo snakes prefer an interspersed of tortoise-inhabited sandhills and wetlands (Landers and Speake 1980). In these northern regions eastern indigo

snakes most often use forested areas rich with gopher tortoise burrows, hollowed root channels, hollow logs, or the burrows of rodents, armadillos, or land crabs as thermal refugia during cooler seasons (Lawler 1977; Moler 1985a; Layne and Steiner 1996). The eastern indigo snake in the northern region is typically classified as a longleaf pine savanna specialist because here, in the northern four-fifths of its range, the eastern indigo snake is typically only found in vicinity of xeric longleaf pine–turkey oak sandhills inhabited by the gopher tortoise (Means 2006).

In the milder climates of central and southern Florida, comprising the remaining one fifth of its range, thermal refugia such as those provided by gopher tortoise burrows may not be as critical to survival of indigo snakes. Consequently, eastern indigo snakes in these regions use a more diverse assemblage of habitats such as pine flatwoods, scrubby flatwoods, floodplain edges, sand ridges, dry glades, tropical hammocks, edges of freshwater marshes, muckland fields, coastal dunes, and xeric sandhill communities; with highest population concentrations of eastern indigo snakes occurring in the sandhill and pineland regions of northern and central Florida (Service 1999). Eastern indigo snakes have also been found on agricultural lands with close proximity to wetlands (Zeigler 2006).

In south Florida, agricultural sites (*e.g.*, sugar cane fields and citrus groves) are occupied by eastern indigo snakes. The use of sugarcane fields by eastern indigo snakes was first documented by Layne and Steiner in 1996. In these areas there is typically an abundance of wetland and upland ecotones (due to the presence of many ditches and canals), which support a diverse prey base for foraging. In fact, some speculate agricultural areas may actually have a higher density of eastern indigo snakes than natural communities due to the increased availability of prey. Gopher tortoise burrows are absent at these locations but there is an abundance of both natural and artificial refugia. Enge and Endries (2009) reporting on the status of the eastern indigo snake included sugarcane fields and citrus groves in a Global Information Systems (GIS)-base map of potential eastern indigo snake habitat. Numerous sightings of eastern indigo snakes within sugarcane fields have been reported within south Florida (Florida Fish and Wildlife Conservation Commission Indigo Snake Database [Enge 2017]). A recent study associated with the Comprehensive Everglades Restoration Plan (CERP) (A-1 FEB Project formerly A-1 Reservoir; Service code: 41420-2006-F-0477) documented eastern indigo snakes within sugarcane fields. The snakes used artificial habitats such as piles of limerock, construction debris, and pump stations. Recent studies also associated with the CERP at the C-44 Project (Service code: 41420-2009-FA-0314), and C-43 Project (Service code: 41420-2007-F-0589) documented eastern indigo snakes within citrus groves. The snakes used artificial habitats such as boards, sheets of tin, construction debris, pipes, drain pipes in abandoned buildings and septic tanks.

In extreme south Florida (*i.e.*, the Everglades and Florida Keys), eastern indigo snakes also utilize tropical hardwood hammocks, pine rocklands, freshwater marshes, abandoned agricultural land, coastal prairie, mangrove swamps, and human-altered habitats. Though eastern indigo snakes have been found in all available habitats of south Florida it is thought they prefer hammocks and pine forests since most observations occur there and use of these areas is disproportionate compared to the relatively small total area of these habitats (Steiner *et al.* 1983).

Even though thermal stress may not be a limiting factor throughout the year in south Florida, eastern indigo snakes still seek and use underground refugia. On the sandy central ridge of central Florida, eastern indigo snakes use gopher tortoise burrows more (62 percent) than other underground refugia (Layne and Steiner 1996). Other underground refugia used include armadillo (*Dasypus novemcinctus*) burrows near citrus groves, cotton rat (*Sigmodon hispidus*) burrows, and land crab (*Cardisoma guanhumi*) burrows in coastal areas (Layne and Steiner 1996; Wilson and Porras 1983). Natural ground holes, hollows at the base of trees or shrubs, ground litter, trash piles, and crevices of rock-lined ditch walls are also used (Layne and Steiner 1996). These refugia are used most frequently where tortoise burrows are not available, principally in low-lying areas off the central and coastal ridges.

Minimization Measures

The Service developed protection measures for the eastern indigo snake “Standard Protection Measures for the Eastern Indigo Snake” (Service 2013) located at:

https://www.fws.gov/verobeach/ReptilesPDFs/20130812_EIS%20Standard%20Protection%20Measures_final.pdf. These protection measures (or the most updated version) are considered a minimization measure for projects proposed within eastern indigo snake habitat.

Determinations

If the use of this Key results in a determination of “**no effect**,” no further consultation is necessary with the SFESO.

If the use of this Key results in a determination of “**NLAA**,” the SFESO concurs with this determination and no further consultation is necessary for the effects of the proposed action on the eastern indigo snake.

For no effect or NLAA determinations, the Corps (or other Federal action agency) should make a note in the project file indicating the pathway used to reach your no effect or NLAA determination.

If a proposed project would impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, the subsequent Key should not be used. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual’s home range.

If the use of this Key results in a determination of “**may affect**,” consultation may be concluded informally or formally depending on project effects to eastern indigo snakes. Technical assistance from the Service can assist you in making a determination prior to submitting a request for consultation. In circumstances where the Corps desires to proceed with a consultation request prior to receiving additional technical assistance from the Service, we recommend the Corps document the biological rationale for their determination and proceed with a request accordingly.

- A. Project is not located in open water or salt marsh.....go to B
- Project is located solely in open water or salt marsh.....no effect
- B. Permit will be conditioned for use of the Service's most current guidance for Standard Protection Measures For The Eastern Indigo Snake (currently 2013) during site preparation and project construction.....go to C
- Permit will not be conditioned as above for the eastern indigo snake, or it is not known whether an applicant intends to use these measures and consultation with the Service is requested.....may affect
- C. The project will impact less than 25 acres of eastern indigo snake habitat (e.g., sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....go to D
- The project will impact 25 acres or more of eastern indigo snake habitat (e.g., sandhill, scrub, pine flatwoods, pine rocklands, scrubby flatwoods, high pine, dry prairie, coastal prairie, mangrove swamps, tropical hardwood hammocks, hydric hammocks, edges of freshwater marshes, agricultural fields [including sugar cane fields and active, inactive, or abandoned citrus groves], and coastal dunes).....may affect
- D. The project has no known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and/or injured during project activities.....NLAA
- The project has known holes, cavities, active or inactive gopher tortoise burrows, or other underground refugia where a snake could be buried, trapped and /or injured.....go to E
- E. Any permit will be conditioned such that all gopher tortoise burrows, active or inactive, will be excavated prior to site manipulation in the vicinity of the burrow¹. If an eastern indigo snake is encountered, the snake must be allowed to vacate the area prior to additional site manipulation in the vicinity. Any permit will also be conditioned such that holes, cavities, and snake refugia other than gopher tortoise burrows will be inspected each morning before planned site manipulation of a particular area, and, if occupied by an eastern indigo snake, no work will commence until the snake has vacated the vicinity of proposed work.....NLAA²
- Permit will not be conditioned as outlined above.....may affect

End Key

¹ If excavating potentially occupied burrows, active or inactive, individuals must first obtain state authorization via a Florida Fish and Wildlife Conservation Commission Authorized Gopher Tortoise Agent permit. The excavation method selected should also minimize the potential for injury of an indigo snake. Applicants should follow the excavation guidance provided within the most current Gopher Tortoise Permitting Guidelines found at <http://myfwc.com/gophertortoise>.

² Please note, if the proposed project will impact less than 25 acres of vegetated eastern indigo snake habitat (not urban/ human-altered) completely surrounded by urban development, and an eastern indigo snake has been observed on site, NLAA is not the appropriate conclusion. The Service recommends formal consultation for this situation because of the expected increased value of the vegetated habitat within the individual's home range

Working with the Fish and Wildlife Foundation of Florida, the Service has established a fund to support conservation and recovery for the eastern indigo snake. Any project that has the potential to affect the eastern indigo snake and/or its habitat is encouraged to make a voluntary contribution to this fund. If you would like additional information about how to make a contribution and how these monies are used to support eastern indigo snake recovery please contact Ashleigh Blackford, Connie Cassler, or José Rivera at 772-562-3559.

This revised Key is effective immediately upon receipt by the Corps. Should circumstances change or new information become available regarding the eastern indigo snake and/or implementation of the Key, the determinations herein may be reconsidered and this Key further revised or amended.

Thank you for your continued cooperation in the effort to conserve fish and wildlife resources. If you have any questions or comments regarding this Key, please contact the SFESO at 772-562-3909.

Sincerely,



Roxanna Hinzman
Field Supervisor
South Florida Ecological Services

Cc:

Corps, Jacksonville, Florida (Dale Beter, Muriel Blaisdell, Ingrid Gilbert, Angela Ryan,
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Service, Athens, Georgia (Michelle Elmore)
Service, Jacksonville, Florida (Annie Dziergowski)
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LITERATURE CITED

- Enge K. M. 2017. Personal communication. Email from Kevin Enge, Florida Fish and Wildlife Conservation Commission, Gainesville, Florida to Steve Mortellaro, U.S. Fish and Wildlife Service, Vero Beach, Florida, July 5, 2017. Locations of Eastern Indigo Snake (*Drymarchon couperi*).
- Enge K. M. and M. J. Endries. 2009. Status of the Eastern Indigo Snake (*Drymarchon couperi*) in Florida. Southeast Partners in Amphibian and Reptile Conservation Meeting.
- Landers, J. L. and D.W. Speake. 1980. Management Needs of Sandhill Reptiles in Southern Georgia. Proceedings Annual Conference of Southeastern Association of Fish and Wildlife Agencies. 34: 515-529.
- Layne, J.N., and T.M. Steiner. 1996. Eastern indigo snake (*Drymarchon corais couperi*): summary of research conducted on Archbold Biological Station. Report prepared under Order 43910-6-0134 to the U.S. Fish and Wildlife Service; Jackson, Mississippi.
- Lawler, H.E. 1977. The status of *Drymarchon corais couperi* (Holbrook), the eastern indigo snake, in the southeastern U.S.A. *Herpetological Review* 8(3):76-79.
- Means, D. B. 2006. Vertebrate faunal diversity of longleaf pine ecosystems. In *The Longleaf Pine Ecosystem* pp. 157-213. Springer New York.
- Molar, P.E. 1985a. Distribution of the eastern indigo snake, *Drymarchon corais couperi*, in Florida. *Herpetological Review* 16(2):37-38.
- Moler, P.E. 1985b. Home range and seasonal activity of the eastern indigo snake, *Drymarchon corais couperi*, in northern Florida. Final performance report, Study E-1-06, III-A-5. Florida Game and Fresh Water Fish Commission; Tallahassee, Florida.
- Steiner, T.M., O.L. Bass, Jr., and J.A. Kushlan. 1983. Status of the eastern indigo snake in Southern Florida National Parks and vicinity. South Florida Research Center Report SFRC-83-01, Everglades National Park; Homestead, Florida.
- U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. 23 pp.
- U.S. Fish and Wildlife Service (Service). 2013. Standard Protection Measures for the Eastern Indigo Snake. August 12, 2013. U.S. Fish and Wildlife Service, South Florida Ecological Services Office; Vero Beach, Florida.
- Wilson, L.D. and L. Porras. 1983. The ecological impact of man on the south Florida herpetofauna. *University of Kansas Museum of Natural History Special Publication* 9:1-89.
- Zeigler, M. 2006. Personal communication. Citrus grove operations manager. Meeting with the U.S. Fish and Wildlife Service on August 1, 2006. Agricultural Resource Management; Vero Beach, Florida.

Peninsular Florida Species Conservation and Consultation Guide

Sand Skink and Blue-tailed (Bluetail) Mole Skink

This guide for sand skink (*Plestiodon* [*Neoseps*] *reynoldsi*) and blue-tailed mole skink (*Plestiodon* [*Eumeces*] *egregius lividus*) conservation and Endangered Species Act (ESA) consultation is intended to assist project proponents to determine if or how a proposed action may affect sand skinks or blue-tailed mole skinks.

The sand skink and blue-tailed mole skink are listed as threatened pursuant to the ESA. The ESA prohibits the unauthorized “take”^a of threatened and endangered species. Individuals and entities intending to conduct projects that may affect listed species may lawfully incidentally take those species after consulting with the U.S. Fish and Wildlife Service (Service) pursuant to section 7 or 10 of the ESA. When a project is conducted, funded, or authorized by a Federal agency, listed species consultation occurs through section 7 of the ESA. When there is no Federal nexus (*e.g.*, Federal authorization or funding), a non-Federal entity who wishes to conduct an activity may legally “take” listed species after obtaining an Incidental Take^b Permit (ITP) from the Service in accordance with section 10 of the ESA.

In this guide, we first summarize sand skink and blue-tailed mole skink status, life history, distribution, habitat, and threats. Then we discuss the consultation steps, including: assessing the effects of the proposed action, making effect determinations, and incorporating conservation measures into proposed actions to maximize beneficial effects and to avoid or minimize negative effects to listed skinks and their habitat. Appendix A provides a recommended skink survey protocol, Appendix B provides a method for estimating skink habitat use based upon movement data and survey results, Appendix C provides a variety of possible Conservation Measures, including conservation, compensation, and mitigation guidance, and Appendix D provides a Habitat Equivalency Analysis calculator. The current guide will be updated as new information becomes available and will be posted on the Service’s South Florida website at <http://www.fws.gov/verobeach/>.

For more information on sand skink and blue-tailed mole skink biology, habitat needs, threats, taxonomy, and recovery criteria and goals, see the Bluetail Mole Skink and Sand Skink 5-Year

^a “Take” is defined as harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. The term “harm” includes any act which actually kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish and wildlife. The term “harass” is defined as any act that creates the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include but may not be limited to breeding, feeding, or sheltering.

^b “Incidental Take” is defined as take that results from, but is not the purpose of, carrying out an otherwise lawful activity.

Status Review (Service 2007) and the South Florida Multi-Species Recovery Plan (Service 1999). Published literature as well as unpublished reports, information, and data referenced in the skink conservation and consultation guide are available at the Service's South Florida Ecological Services Office (SFESO) in Vero Beach, Florida (by phone at 772-562-3909 or by mail at 1339 20th Street, Vero Beach, Florida 32960-3559).

Status

The Service listed the sand skink and the blue-tailed mole skink as threatened under the ESA in 1987 primarily due to modification and destruction of xeric upland communities in central Florida. Habitat loss, habitat fragmentation, and changes in land use still threaten sand skinks and blue-tailed mole skinks. In addition, lack of habitat management, competition from non-native and invasive plant species, and loss of genetic diversity threaten sand skink and blue-tailed mole skink existence (Service 1999; 2007).

Life History

Little is known about sand skink and blue-tailed mole skink population or reproduction ecology. Both sand skinks and blue-tailed mole skinks are difficult to detect and study due to their small size and semi-fossorial to fossorial habits. Sand skinks and blue-tailed mole skinks generally partition rather than compete with one another for resources. Sand skinks are primarily fossorial; they move or "swim" below the surface of the ground in sandy soils and take prey below the surface. Blue-tailed mole skinks are semi-fossorial; they hunt at the soil surface and consume mostly terrestrial arthropods (Smith 1977).

No data are available on sand skink or blue-tailed mole skink home ranges, or blue-tailed mole skink dispersal. Information on sand skink dispersal and movement patterns is limited. Sand skink studies in the early 2000s documented several instances where movement distances exceeded 460 feet (ft) (140 meters [m]) (Mushinsky et al. 2001; Penney 2001; Penney et al. 2001) and one instance where an adult male moved over 780 ft (240 m) (Penney 2001). Other studies suggested that some individual sand skinks may move more than 3,280 ft (1 kilometer [km]) and up to 26,250 ft (8 km) where suitable soils are contiguous with no natural or manmade barriers to movement, but some data points in this dataset could not be verified (Mushinsky et al. 2011). Schrey et al. (2011) conducted a genetic analysis of sand skinks ($n = 470$) within 25 m of each other, and reported "the Florida sand skink occurs with higher genetic similarity than expected by chance within 25 m (82 ft)". Although dispersal data are not available for blue-tailed mole skinks, Schrey et al. (2012) found no genetic evidence of long-distance dispersal. Penney (2001) reported translocated sand skinks moved a median distance of 25.6 m (84 ft; $n = 64$). Perry and Garland (2002) reviewed literature and examined home range as a function of snout-vent length in lizards. Of the 489 data sets they examined, 108 met their criteria for their analysis. Lizards of the Autarchoglossa (the clade that contains all skink species) with snout-vent lengths ranging from 30 millimeters (mm) to 100 mm (i.e., the range representative of sand skinks) had home ranges of approximately 10 m² to approximately 1,700 m². A 1,700 m² area has a radius of 23 m (75 ft). After reviewing this information, the Service has determined that sand skinks are reasonably certain to feed, breed, and shelter within 80 ft of a track when the

habitat is suitable. Currently, a multi-year study on home range sizes and/or movement distance is being conducted. If additional scientific information is obtained, data will be evaluated and changes to these guidelines may be necessary at that time.

Distribution

Reptile research and incidental observations to date indicate blue-tailed mole skinks typically occur with sand skinks. Only sand skinks leave visible signs, or tracks, on sandy soil surfaces. Therefore, sand skink occurrence is used as an indicator of blue-tailed mole skink occurrence where the two species overlap in distribution. Blue-tailed mole skink genetic studies indicate that conservation actions for sand skinks will also likely benefit blue-tailed mole skinks (Schrey et al. 2012).

Both sand skinks and blue-tailed mole skinks are endemic to, which means they occur only on, the sandy ridges of central Florida. Skink distribution is defined by three factors: county, elevation, and soil types. Primary populations of sand skinks occur on the Lake Wales, Winter Haven, and Mt. Dora Ridges in Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties. Blue-tailed mole skinks are restricted to the Lake Wales Ridge in Highlands, Polk, and Osceola Counties.

Skinks are generally found at elevations 82 ft above sea level and higher (Florida Natural Areas Inventory 2007). Recent skink occurrences documented at 70 ft above sea level indicate skinks occur at lower elevations where suitable soil conditions for skinks continue down slope (Service unpubl. data).

Skinks occur in excessively drained, well-drained, and moderately well-drained sandy soils that include the Apopka, Arredondo, Archbold, Astatula, Basinger, Candler, Daytona, Duette, Florahome, Gainesville, Hague, Immokalee, Kendrick, Lake, Millhopper, Orsino, Paola, Placid, Pomello, Pompano, Satellite, Samsula, Smyrna, St. Lucie, Urban land (when open sandy soils persist and remnant scrub remains), Tavares, Zolfo and Zuber soil series, referred to as “skink soils” in this guide. Soil series maps are available online (<https://sdmdataaccess.nrcs.usda.gov/>) and through county extension offices.

Habitat

Skink habitat identified in this guide includes skink soils at and above 82 ft above sea level. Skink searches or surveys following a standardized protocol (Appendix A) should be conducted in all skink soils above 82 ft elevation or in projects areas that are directly adjacent to suitable habitat. Additional skink surveys, monitoring, and observations will likely improve knowledge of skink occurrence and distribution, as well as understanding of skink habitat use.

Skink soils typically support scrub, sandhill, or xeric hammock natural ecological communities, such as oak-dominated scrub, turkey oak (*Quercus laevis*) barrens, high pine, and xeric hammocks. Typical upland habitat for both sand skinks and blue-tailed mole skinks consists of sand pine (*Pinus clausa*)-rosemary (*Ceratiola ericoides*) scrub or longleaf pine (*Pinus palustris*)-

turkey oak/sand live oak (*Quercus geminate*) association. Sand skinks have also been documented in skink soils where natural vegetative cover has been altered for human uses such as pine plantations, active or inactive citrus groves, pastures, and residential developments, as well as neglected vegetative cover like old fields and overgrown scrub, especially in areas with overgrown or remnant scrub adjacent (Pike et al. 2008). Blue-tailed mole skinks occur in habitat similar to that used by sand skinks. Habitat condition or vegetative cover alone cannot be used to exclude areas that might be used by sand skinks or blue-tailed mole skinks.

Both sand skinks and blue-tailed mole skinks typically occur in areas that contain a mosaic of open sandy patches interspersed with forbs, shrubs, and trees. Sand skink tracks are usually observed in open sandy areas, yet both skink species use a variety of micro-habitats within xeric vegetative communities. Sand skink tracks appear most abundant in the ecotone, or edges, between areas with abundant leaf litter and vegetative cover and adjacent open sands. Blue-tailed mole skinks are typically found under leaf litter, logs, palmetto fronds, and other ground debris (Christman 1992).

Specific physical structures of habitat that sustain sand skink populations, and likely blue-tailed mole skink populations as well, include a well-defined leaf litter layer on the ground surface and shade from either a tree canopy or a shrub layer, but not both. Leaf litter likely provides important skink foraging opportunities. Shade provided by a tree canopy or a shrub layer likely helps skinks regulate body temperature to prevent overheating. However, having both a tree canopy and a shrub layer appears to be detrimental to skinks (McCoy 2011, University of South Florida, pers. comm.).

Either natural fires started by lightning or prescribed burns are necessary to maintain habitat in natural scrub ecosystems. However, if fire occurs too frequently, leaf litter might not build up sufficiently to support skink populations. At Archbold Biological Station, sand skinks appear to be most abundant after 10 years of leaf litter development. The ideal fire frequency to maintain optimal leaf litter development for skinks likely varies by site and other environmental conditions (Mushinsky 2011, University of South Florida, pers. comm.).

Threats

Habitat loss, fragmentation, and changes in land use continue to threaten sand skinks and blue-tailed mole skinks. Development and agricultural conversion have resulted in the loss of approximately 85 percent of the scrub and sandhill habitats on the Lake Wales Ridge (Turner et al. 2006). Habitat degradation and fragmentation also continue to affect populations, even on protected lands. Active management is necessary to maintain suitable habitat for skinks. Much of the remaining habitat occurs in small, isolated patches surrounded by residential areas or citrus groves, making the suitable habitat patches and connections between patches difficult to protect and manage. Many habitat patches are overgrown and in need of restoration, but vegetation restoration and management programs are costly and depend upon availability of funding. Privately-owned sites remain at risk of being developed, and destruction or habitat modification due to improper or lack of management remains a concern. Conversion of rural lands to urban use in central Florida where skinks occur is projected to continue over the next 50

years. In addition, fire suppression, improper stand management, competition from invasive plant species, and loss of genetic diversity continue to threaten the existence of the sand skink and blue-tailed mole skink.

Critical Habitat

Critical habitat has not been designated for either sand skinks or blue-tailed mole skinks.

Consultation Area

The Service delineated a consultation area (Figure 1 and Figure 2) to assist project proponents to determine if a proposed action might affect sand skinks or blue-tailed mole skinks (skinks). The consultation area is intended to guide project proponents of both Federal and non-Federal actions. Some locations inside the consultation area may not contain appropriate soils and elevation to support skinks. The consultation area includes: (1) known skink locations, (2) skink soils at appropriate elevations defined as skink habitat, and (3) natural and developed ecosystems that are known to support skinks. Experts cannot determine the location of each skink throughout the year, or the exact areas that support skink feeding, breeding, and sheltering, even if extensive continuous year-long research is conducted in central Florida. Therefore, the consultation area outlines a geographic landscape with a higher likelihood of skink habitat use than the landscape outside of the consultation area.

In general, proposed actions inside the consultation area are more likely to affect skinks, and proposed actions outside the consultation area are less likely to affect skinks. Though the consultation area provides an initial analysis tool, users evaluating a proposed action should not consider the consultation area as the only factor in deciding whether or not consultation is required. The consultation area is based on best available information to date. We expect that more information will improve and refine our knowledge of skink occurrence in the future. Consultation is required if proposed actions outside the delineated consultation area may affect skinks. Similarly, consultation may not be required if proposed actions inside the consultation area will not affect skinks (*e.g.*, if the project location is not within the appropriate elevation or does not contain suitable skink soils).

Consultation

Federal and non-Federal project proponents have different responsibilities for conducting consultations to ensure compliance with the ESA. This section outlines a stepwise process to guide consultation for skinks. All project proponents should follow Steps 1 and 2 regardless of whether they are consulting on Federal actions through section 7 or seeking technical assistance through section 10. Federal project proponents should continue with Steps 3 and 4. Non-Federal project proponents seeking incidental take authorization through section 10 of the ESA should contact the Service at 772-562-3909 in South Florida or 904-731-3336 in North Florida for additional information.

Federal Action Agencies

In addition to this guide, the ESA section 7 Consultation Handbook (Services 1998), and the [Service's consultation checklist](#) provide information on consultation for Federal actions. The Guide to a Complete Initiation Package (Service 2004b) and checklist provide details on how to prepare a complete consultation initiation package.

Non-Federal Entities

When an action, such as clearing vegetation, conducting development activities, or permitting of such activities, is proposed within the Skink Consultation Area and there is no Federal nexus, we recommend that non-Federal entities (*i.e.*; private land owners; businesses; state, county, or local municipalities) request technical assistance from the Service under section 10 of the ESA prior to initiating or authorizing the proposed activity. The Service will review the information provided to assess if the action has the potential to result in take of skinks or other listed animal or plant species. If the proposed action is likely to take listed species, the Service recommends that the non-Federal entity apply for an Incidental Take Permit (ITP) to ensure compliance with the ESA and to minimize the risk of third party lawsuits. As part of the ITP application, applicants develop a Habitat Conservation Plan (HCP). Among other things, the HCP describes the actions that the applicant will implement to minimize and mitigate negative effects to listed species, demonstrates that there will be no appreciable reduction in the survival of the species, and demonstrates that there is adequate funding and other assurances to ensure the plan will be fully implemented. For more information, contact the Service at 772-562-3909 in South Florida or 904-731-3336 in North Florida. Additional information on section 10 consultation can be found on the Service's national website (<http://www.fws.gov/endangered/what-we-do/hcp-overview.html>) and the South Florida Ecological Services (SFESO) website (<http://www.fws.gov/verobeach/>).

Step 1: Describe the Proposed Action

Fully describe all features and activities related to the proposed action, such as: proposed project purpose; all aspects of proposed construction, including road access, staging areas, and any associated land clearing and filling; information on surveys and monitoring; and anticipated post-project operations, maintenance, and management. Describe the project location, habitat, soil types, and elevations affected. Develop and provide maps of all project locations, boundaries, county lines, soil types, elevation, and habitat. On the maps, delineate project boundaries, map suitable soils and elevations, and quantify the acreage of proposed impact. On the maps, also designate those areas that are not considered habitat (*e.g.*, existing paved surfaces, water bodies, existing structures, etc.).

Consequences of the action should be considered. Consequences are a result or effect of an action, and we apply the two-part test to determine whether a given consequence should be considered an effect of the proposed action that is under consultation. An example is constructing a road to access a proposed action site. The access road would not be necessary but for the proposed action. Interdependent activities have no independent utility apart from the

proposed action. An example is annual maintenance of the access road. Maintenance would not be necessary but for continued need for access to the proposed action.

More information on complete proposed action descriptions can be found in the Species Conservation Guidance Introduction of this document. Early coordination with the Service can reduce requests for additional information and reduce consultation time frames.

Step 2: Determine and Describe Species, Habitat, or Critical Habitat that May Be Affected.

Note: Because no critical habitat has been designated for skinks, it will not be addressed further in this guidance.

- 2a: Species Location by County. Check to determine if the proposed action is in a county where skinks occur. Skink habitat typically supports federally listed plants and other species that should be consulted on, as well (See Figure 1 or the Service's website at <http://ecos.fws.gov/ipac/>).
- 2b: Consultation Area. If the proposed action is in a county where skinks generally occur, check the skink consultation area map (Figure 1 and Figure 2) to see if the proposed action is in or close to the delineated consultation area. Keep in mind that a proposed action may affect skinks whether or not it is within the consultation area boundary (e.g., where skink soils are found or skinks or skink sign are detected outside of the boundary). Additional analysis may be needed.
- 2c: Species Occurrence by Habitat. If the proposed action is in the consultation area or otherwise might affect skinks, determine if skink habitat may be affected. Potential skink habitat includes all areas with skink soils (Refer to *Distribution*). Skink habitat consists of natural xeric vegetative cover and areas altered for human uses, including but not limited to: pine plantations, active or inactive citrus groves, pastures, residential developments, and neglected vegetative cover like old fields and overgrown scrub.

Check the natural community maps to determine if the proposed action is in or might affect natural ecological communities that traditionally indicated skink habitat. Because of the cumulative conversion of natural xeric communities for human uses, remaining natural xeric scrub is particularly important to maintain and support remaining skink populations.

This concludes the desktop analysis of the proposed action. However, site-specific assessments of parcels proposed for modification are necessary to determine if the proposed action may affect skink habitat.

- 2d: Early coordination. The Service highly recommends that applicants and their representatives contact the Service early in the planning process to determine if surveys are recommended or if methodology is sufficient to detect presence. Early coordination will also assist in determining mitigation or minimization needs at the beginning of the consultation process.

In situations where projects meet soil, elevation, and habitat criteria, the Service recommends surveying the project site to indicate whether skinks occur within the project area, or if present, what extent of the project area they are utilizing. Prior to coverboard surveys, pedestrian surveys may be used to detect skink presence. However, pedestrian surveys may not be used to determine absence. See Appendix A for the Service's recommended survey protocol. Survey procedures should be followed closely and surveyors should have qualifications that include prior skink survey experience to increase the probability of detecting listed skinks where they occur. As stated in the protocol, the Service strongly recommends that project proponents contact us prior to initiating surveys.

If skinks are confirmed to occur within all or part of a proposed action area, whether inside or outside of the consultation area (Figure 1 and Figure 2), the site where skinks occur is considered occupied where habitat is suitable. The proposed action must be evaluated to determine if it may affect skinks.

The risk of a proposed action affecting occupied skink habitat does not depend solely on whether or not the action is located within known occupied skink habitat. Additional analysis (as described in Step 3a-b below) is needed to determine if project activities might affect skinks. A project may be so benign as to not affect skinks. If an analysis indicates a project presents only insignificant (small in size) or discountable (extremely unlikely to occur) negative risks to skinks, the applicant may consider incorporating conservation measures (see Step 3c and Appendix C), as appropriate, into the project design to further avoid or minimize direct or indirect negative effects to skinks. If a project will adversely affect skinks, it may be necessary to incorporate compensation or mitigation into the project design (Appendix C) to help offset anticipated incidental take.

Contact the Service or other sources early in the project planning and development process for more information on skinks and their habitat that may be affected by a proposed action.

Step 3: Evaluate Effects of the Proposed Action and Incorporate Conservation Measures.

- 3a: Describe potential effects of the proposed action, as well as consequences of the action, which may affect skinks. Proposed actions that would alter sites occupied by skinks could potentially affect skinks (*e.g.*, ground-disturbing or soil-compacting activities; clearing; construction, access, and staging activities; operation and maintenance activities; chemical applications; etc.)(Figure 1 and Figure 2).
- 3b: Describe potential cumulative effects which are the effects of future State or private activities, not involving Federal activities, which are reasonably certain to occur within the action area of the Federal action subject to consultation. These include effects that result in abiotic disturbances like chemical, radiation, or temperature changes and biotic disturbances like water quality, soil condition, vegetation cover, or topographic changes.

- 3c: Describe conservation measures incorporated into the project plan to avoid or minimize negative effects, in particular avoidance or minimization of adverse effects to skinks or their habitat. Describe conservation measures applied to compensate for anticipated incidental take. See more on Conservation Measures in Appendix C.

Contact the Service early in the consultation process for assistance in evaluating effects of the proposed action on skinks.

Step 4: Document methods, evidence, analyses, and reasoning and make a determination; prepare and submit a complete consultation initiation package that includes:

- 4a. A complete description of the proposed action.
- 4b. A complete description of federally listed resources (listed species and, if applicable, designated critical habitats) that may be affected.
- 4c. A complete description of potential direct (caused by the action, likely to affect listed resources, reasonably certain to occur), indirect (similar to direct effects but occur later in time), and cumulative (non-Federal actions reasonably certain to occur in the action area) effects and conservation measures incorporated to avoid, minimize, or compensate for adverse effects. Provide a complete description of conservation measures applied to avoid, minimize, or compensate for adverse effects anticipated to result in incidental take. Adverse effects may be either permanent or temporary in nature. See Appendix C for guidance on how to determine the nature of the adverse effects and calculate compensation for each.
- 4d. Reasoning or logic statements that connect the proposed action, affected listed resources, potential effects, and conservation measures; the reasoning should provide logical support and justification for the effect determinations.
- 4e. (An) effect determination(s), or a conclusion(s), and further coordination with the Service. Three effect determinations are possible:
 - i. “No effect” - If the proposed action is 1) outside the consultation area and contains no suitable habitat, or 2) inside the consultation area but contains no suitable habitat, then the action will not affect skinks, and the proposed action determination should be “no effect.”
 - ii. “May affect, not likely to adversely affect” - If the proposed action is in the consultation area and contains suitable habitat, elevation, and soils, the Service recommends proceeding with surveys within the project area (see Step 2). If skinks or their sign are detected and the proposed action will have only beneficial, insignificant, or discountable effects on skinks, the proposed action determination should be “may affect, not likely to adversely affect.” The Service will concur with this determination unless

survey protocols were not followed. Clearly document your survey methods and results, effects analyses, and reasoning so that we can evaluate your findings to prepare the Service's written concurrence, which is required for a "may affect, not likely to adversely affect" determination.

iii. "May affect, likely to adversely affect" – If sand skinks or their sign have been detected within the project area and if all avoidance and minimization measures have been incorporated into the design of your project and the remaining adverse effects to skinks are not insignificant or discountable, the determination for the proposed project should be "may affect, likely to adversely affect" skinks. This is true if skinks have been documented to occur, are detected, whether or not the proposed action is within or outside of the consultation area. Formal consultation with the Service is required. The Service may be contacted early for technical assistance to help identify additional conservation measures to minimize adverse effects to skinks. For guidance on when to seek an incidental take permit, see memo 067674.

Reinitiation of Consultation

While the issuance of the Service's biological opinion or concurrence letter concludes consultation, reinitiation of consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals the action may affect listed species or critical habitat in a manner or to an extent not considered; (3) the action is modified which causes an effect not previously considered; or (4) a new species is listed or critical habitat designated that may be affected by the action. Any operation causing incidental take which exceeds the amount or extent anticipated must cease, and the Service must be contacted immediately.

Literature Cited

- Christman, S.P. 1992. Bluetail mole skink. Pages 117-122 in P.E. Moler, editor. Rare and Endangered Biota of Florida. Vol. 3. Amphibians and Reptiles. University Press of Florida, Gainesville, Florida.
- Florida Natural Areas Inventory. 2007. "FNAI FLEO Internal, March 2007" for *Eumeces egregius lividus* and *Neoseps reynoldsi*. Data file submitted to U.S. Fish and Wildlife Service, Vero Beach, Florida. June 12.
- McCoy, E.D. 2011. Personal communication. Professor and Associate Chair in the Department of Biology. Sand skink scrub-jay scrub management field trip to Lake Marion. May 16.
- Mushinsky, H.R. 2011. Personal communication. Professor and Graduate Director in the Department of Biology. Sand skink scrub-jay scrub management field trip to Lake Marion. May 16.
- Mushinsky, H.R., E.D. McCoy, K. Gianopulos, K. Penney, and C. Meyer. 2001. Biology of

- the threatened sand skink on restored scrub habitat and its responses to land management practices. Final report to the Disney Wildlife Conservation Fund. University of South Florida, Tampa, Florida.
- Mushinsky, H.R., E.D. McCoy, and C.E. Rizkalla. 2011. Effective monitoring of Florida sand skink, *Plestiodon reynoldsi*, population trends. Interim report submitted to U.S. Fish and Wildlife Service. Vero Beach, Florida.
- Penney, K.M. 2001. Factors affecting translocation success and estimates of dispersal and movement patterns of the sand skink *Neoseps reynoldsi* on restored scrub. M.S. Thesis. University of South Florida, Tampa, Florida.
- Penney, K.M., H.R. Mushinsky, and E.D. McCoy. 2001. Translocation success of the threatened sand skink. Proceedings from the Florida Scrub Symposium, Orlando, Florida.
- Perry, G. and T. Garland. 2002. Lizard home ranges revisited: effects of sex, body size, diet, habitat, and phylogeny. *Ecology* 83(7):1870-1885.
- Pike, D.A, K.S. Peterman, R.S. Mejeur, M.D. Green, K.D. Nelson and J.H. Exum. 2008. Sampling techniques and methods for determining the spatial distribution of sand skinks (*Plestiodon reynoldsi*). *Florida Scientist* 71-02-01.3d
- Schrey, A.W., A.M. Fox, H.R. Mushinsky, and E.D. McCoy. 2011. Fire increases variance in genetic characteristics of Florida sand skink (*Plestiodon reynoldsi*) local populations. *Molecular Ecology* 20: 56-66.
- Schrey, A.W., K.G. Ashton, S. Heath, H.R. Mushinsky, and E.D. McCoy. 2012. Range-wide genetic analysis of the threatened bluetail mole skink identifies similar genetic structure with sympatric lizards. *Journal of Herpetology* 46(2): 241-247.
- Smith, C.R. 1977. Food resource partitioning of burrowing sand pine scrub reptiles. *Herpetological Review* 8(3):17.
- Turner, W.R., D.S. Wilcove, H.M. Swain. 2006. State of the scrub: Conservation progress, management responsibilities, and land acquisition priorities for imperiled species of Florida's Lake Wales Ridge. Final report submitted to U.S. Fish and Wildlife Service, Vero Beach, Florida.
- U.S. Fish and Wildlife Service (Service). 1998. Endangered species consultation handbook: procedures for conducting consultation and conference activities under section 7 of the Endangered Species Act. Washington, D.C. www.fws.gov/endangered/esa-library/pdf/esa_section7_handbook.pdf

U.S. Fish and Wildlife Service (Service). 1999. South Florida multi-species recovery plan. Atlanta, Georgia. <http://verobeach.fws.gov/Programs/Recovery/vbms5.html>

U.S. Fish and Wildlife Service (Service). 2004b. Guide to a complete initiation package. South Florida Ecological Services Office, Vero Beach, Florida.

U.S. Fish and Wildlife Service (Service). 2007. Bluetail mole skink (*Eumeces egregius lividus*) and sand skink (*Neoseps reynoldsi*) [Internet]. 5-year review: summary and evaluation. South Florida Ecological Services Office, Vero Beach, Florida. Available from: http://ecos.fws.gov/docs/five_year_review/doc1071.pdf

GIS Data

Sand_Skink_Consultation_Area_20200528 Consultation Area for sand skinks

Blue-Tail_Mole_Skink_Consultation_Area_20200528 Consultation Area for blue-tailed mole skinks

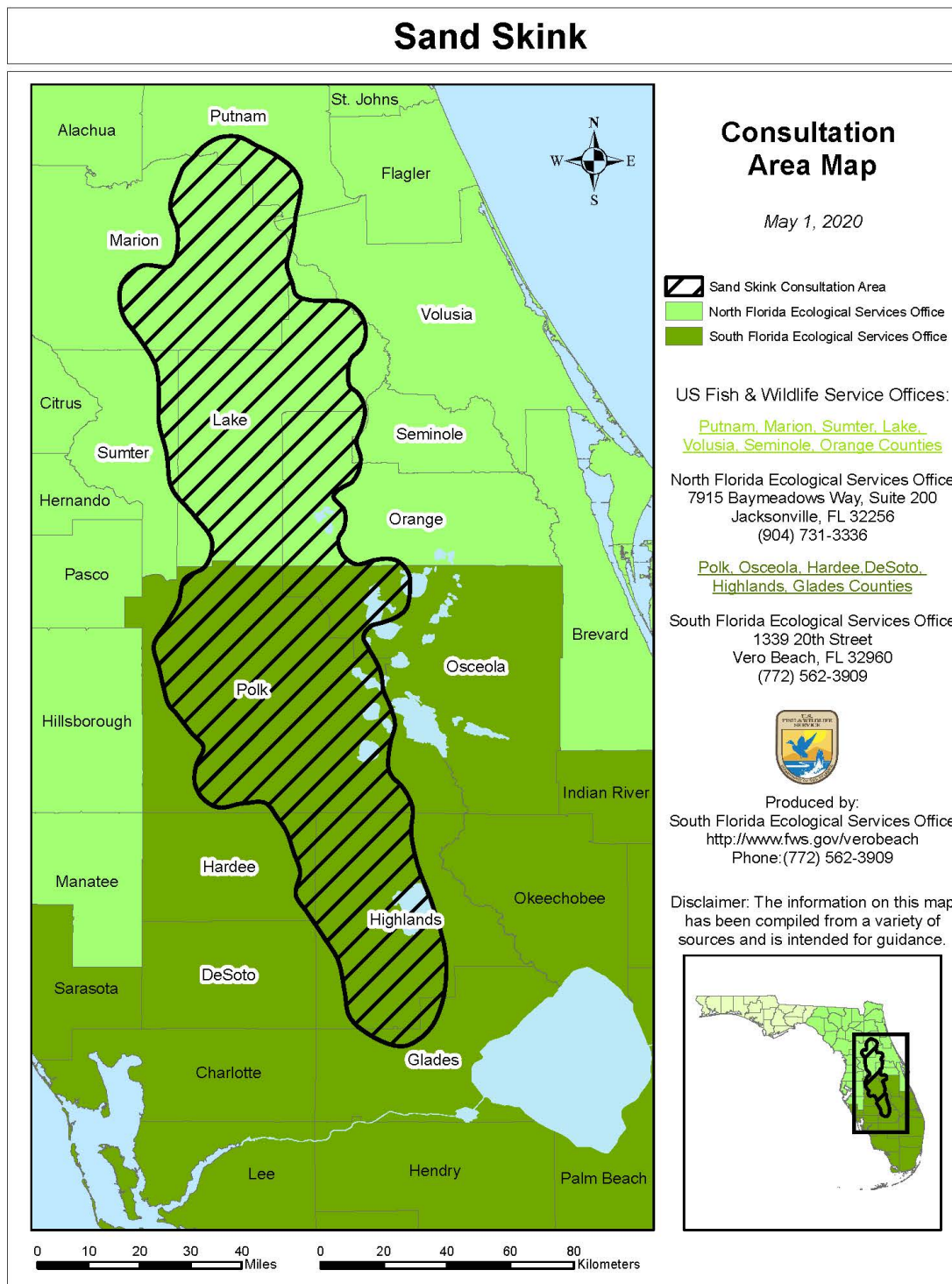


Figure 1. Sand skink consultation area. County names depicted in shadowed bold text indicate the counties where skinks are known to occur.

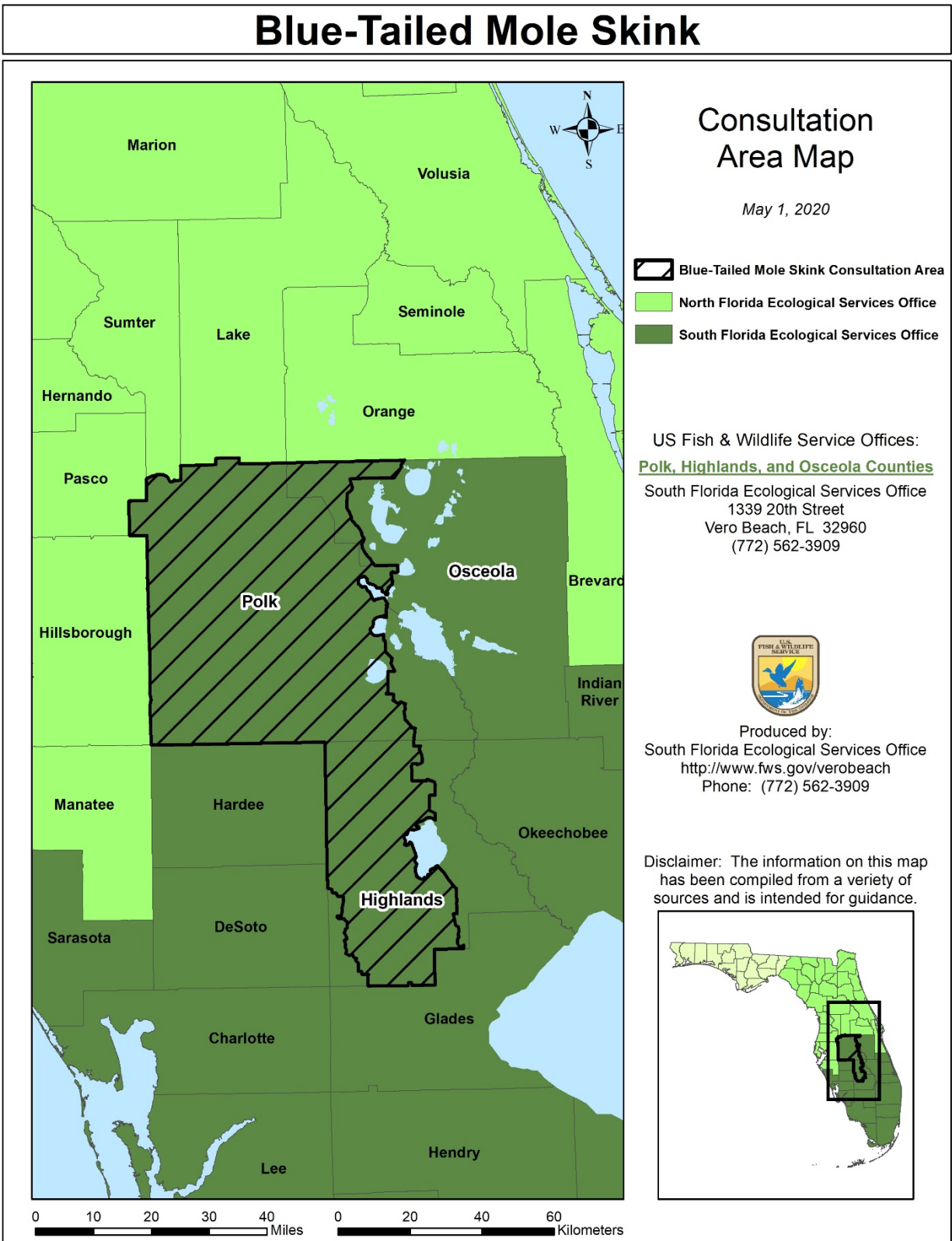


Figure 2. Blue-tailed mole skink consultation area. County names depicted in shadowed bold text indicate the counties where skinks are known to occur

**U.S. Fish and Wildlife Service
Florida Ecological Services Field Office**

FLORIDA BONNETED BAT CONSULTATION GUIDELINES

2024 REVISION

The U.S. Fish and Wildlife Service's Florida Ecological Services Field Office (Service) developed the Florida Bonneted Bat Consultation Guidelines (Guidelines) to assist in avoiding and minimizing potential negative effects to roosting and foraging habitat and assessing effects to the Florida bonneted bat (*Eumops floridanus*; FBB) from proposed projects. The Consultation Keys within the Guidelines assist applicants in evaluating their proposed projects and identifying the appropriate consultation paths under sections 7 and 10 of the Endangered Species Act of 1973 (Act), as amended (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). The Florida Bonneted Bat Consultation Guidelines and associated Consultation Keys are designed to streamline and expedite consultations; however, use of the Consultation Keys are voluntary and may not be appropriate for some projects.

These Guidelines are a revision of the 2019 Guidelines. The Consultation Area, Consultation Key, Survey Methods, and Best Management Practices (BMPs) were revised based upon the best available scientific information. These Guidelines also include a Key for the Critical Habitat for the Florida bonneted bat. As more information is obtained, these Guidelines will be revised as appropriate. If you have comments or suggestions on any section of these Guidelines, please email FBBguidelines@fws.gov. Comments will be reviewed and incorporated into future revisions.

These Guidelines do not apply to projects involving the renovation of an existing artificial structure (*e.g.*, building, house) within the urban environment with or without additional ground disturbing activities (please contact the Service for additional guidance). For communication tower projects, please confer with additional and supplemental guidance ([USFWS Comm Tower Guidance](#), [2020 Florida Comm Tower Clearance](#)).

Without other, project-specific guidance provided by the Service, the Guidelines and Determination Keys must be followed explicitly. If they are not followed properly, your project may not be in compliance with the Act. If you have question regarding the Guidelines, including application of the Keys for your specific project, BMPs, designing surveys, definitions, or other questions, contact the Florida Bonneted Bat Recovery Lead (Sandra_Sneckenberger@fws.gov; 772-925-5510).

HOW TO COMPLETE PROJECT REVIEWS WITHIN THE FLORIDA BONNETED BAT'S RANGE

1. Refer to “[Guidance for Completing Project Reviews Under the Endangered Species Act](#)” for steps that must be completed before using the Keys below.
2. Use both FBB Consultation Key and FBB CH Consultation Key (below) and follow all instructions and steps in keys and appendices. If additional information is needed or you want personal assistance regarding application of the Consultation Keys, survey design, or BMPs, please contact the [Florida Bonneted Bat Recovery Lead](#).
3. Include detailed information on how required BMPs are incorporated into your project designs. If all required BMPs cannot be incorporated into project, further consultation with the Service is required.
4. Again, refer to “[Guidance for Completing Project Reviews Under the Endangered Species Act](#)” for information on submitting your project for review. If additional information is needed or you want assistance regarding the consultation process, please contact FW4FLESRegs@fws.gov.

FLORIDA BONNETED BAT CONSULTATION KEY

1a. Action area is wholly or partially within the FBB consultation area (Figure 1)Go to 2

1b. Action area does not overlap with any of the FBB consultation area (Figure 1).....No Effect

2a. Action area contains potential FBB foraging or roosting habitat.....Go to 3

2b. Action area does not contain potential FBB foraging or roosting habitat.....No Effect

3a. Project entirely consists of land management, conservation, or restoration activities, such as prescribed fire, forestry practices, and invasive species removal, and the activities and effects to the FBB are addressed under a current Biological Opinion (BO)

..... **Follow all applicable avoidance and minimization measures included in the BO. No additional consultation is required.**

3b. Project entirely consists of land management, conservation, or restoration activities, such as prescribed fire, forestry practices, and invasive species removal, but does not have a current BO that addresses these activities or their effects to the FBB**MANLAA with required BMPs**

3c. The project’s purpose is not solely intended for conservation/restoration or land management actions.....**Go to 4**

4a. Project proponents choose to assume presence of FBB based on potential foraging habitat and/or suitable roosting habitat, historical or recent detection records (e.g., FBB capture, telemetry data, acoustic records), and/or the project location is within the FBB assumed presence polygon (Figure 1)**Go to 5**

4b. Project proponents choose to not assume presence of FBB.....**Go to 9**

- 5a. One or more [potential FBB roost trees](#) are present within the [action area](#) ([foraging](#) and [roosting habitat](#) exists on site), but trees are too numerous within the [action area](#) to properly inventory/visually survey.....[LAA](#)
Further consultation with the Service is required.
- 5b. One or more [potential FBB roost trees](#) are present within the [action area](#) ([foraging](#) and [roosting habitat](#) exists on site) and all trees on site can be properly inventoried/visually surveyed.....**Conduct [Roost Structure Inventory/Survey](#), then Go to 6**
- 5c. No potential [FBB roosting habitat](#) is present within the [action area](#) ([foraging habitat](#) only is present on the site).....**Go to 7**
- 6a. Survey results do not show [active FBB roosting](#) is likely.....**Go to 8**
- 6b. Survey results show [active FBB roosting](#) is likely[LAA](#)
Further consultation with the Service is required.
- 7a. [Project impact area](#) is less than 25 acres (10 hectares) of FBB [foraging habitat](#) and [outside](#) of Miami-Dade County.....[MANLAA](#) with required [BMPs](#)
- 7b. [Project impact area](#) is 25 acres (10 hectares) or greater of FBB [foraging habitat](#) or project is [within](#) Miami-Dade County..... [LAA](#)
Further consultation with the Service is required.
- 8a. [Project impact area](#) is less than 25 acres (10 hectares) of FBB [roosting habitat and foraging habitat](#) and [outside](#) of Miami-Dade County.....[MANLAA](#) with required [BMPs](#)
- 8b. [Project impact area](#) is 25 acres (10 hectares) or greater of FBB [roosting habitat and foraging habitat](#) or project is [within](#) Miami-Dade County..... [LAA](#)
Further consultation with the Service is required.
- 9a. [Project impact area](#) is less than or equal to 5 acres (2 hectares), trees are few enough that they can be visually surveyed/inventoried individually, and project is located outside of Miami-Dade County.....**Conduct [Roost Structure Inventory/Survey](#), then Go to 10**
- 9b. [Project impact area](#) is more than 5 acres (2 hectares), or trees are too numerous to properly survey individually, or the project is located in Miami-Dade County
.....**Conduct [Acoustic Survey](#), then Go to 11**
- 10a. Results do not show [active FBB roosting](#) is likely.....[MANLAA](#) with required [BMPs](#)
- 10b. Results show [active FBB roosting](#) is likely..... [LAA](#)
Further consultation with the Service is required.
- 11a. Survey results yield no detection of [FBB acoustic activity](#)
.....[MANLAA](#) with required [BMPs](#)
- 11b. Survey results indicate [FBB acoustic activity](#).....**Go to 12**

12a. [Project impact area](#) is less than 25 acres (10 hectares) of FBB [foraging habitat](#) or [roosting habitat](#) and [outside](#) of Miami-Dade County.....**MANLAA with required BMPs**

12b. [Project impact area](#) is 25 acres (10 hectares) or greater of FBB [foraging habitat](#) or [roosting habitat](#) or project is [within](#) Miami-Dade County..... **LAA**
Further consultation with the Service is required.

FLORIDA BONNETED BAT CRITICAL HABITAT CONSULTATION KEY

1a. [Action area](#) does not overlap with or have indirect effects on any designated FBB critical habitat ([Figure 1](#)).....**No Effect (to CH)**

1b. [Action area](#) is wholly or partially within designated FBB critical habitat ([Figure 1](#)) OR may have indirect effects on designated critical habitat.....**Go to 2**
Indirect effects on critical habitat adjacent or near the project area may include, for example, changes in hydrology, or reduced ability to perform prescribed fire or other land management activities.

2a. Project entirely consists of land management, conservation, or restoration activities, such as prescribed fire, forestry practices, and invasive species removal, and the activities and effects to the FBB CH are addressed under a current BO..... **Follow all the Reasonable and Prudent Measures, Terms and Conditions, and Monitoring and Reporting Requirements included in the current BO. No additional consultation is required.**

2b. Project entirely consists of land management, conservation, or restoration activities, such as prescribed fire, forestry practices, and invasive species removal, and the activities, but the effects to the FBB CH are not addressed under a current BO.....**MANLAA (CH) with required BMPs**

2c. The project's purpose is not solely intended for conservation/restoration or land management actions..... **Go to 3**

3a. The [action area](#) overlaps with less than 0.01% of the CH unit**MANLAA (CH) with required BMPs**

3b. The [action area](#) overlaps with more than 0.01% of the CH unit **Further consultation with the Service is required.**
Formal consultation may or may not be required. The Service will determine if adverse effects or adverse modification thresholds have been reached based on the function and context of the unit or subunit in which the action occurs.

Unit	Total Acreage	0.01%
1	175,735	17.5
2	28,046	2.8
3	134,677	13.5
4	12,995	1.3
5	48,865	4.9
6	714,085	71.4
7	16,604	1.7
8	25,337	2.5
9	4,281	~ 0.5

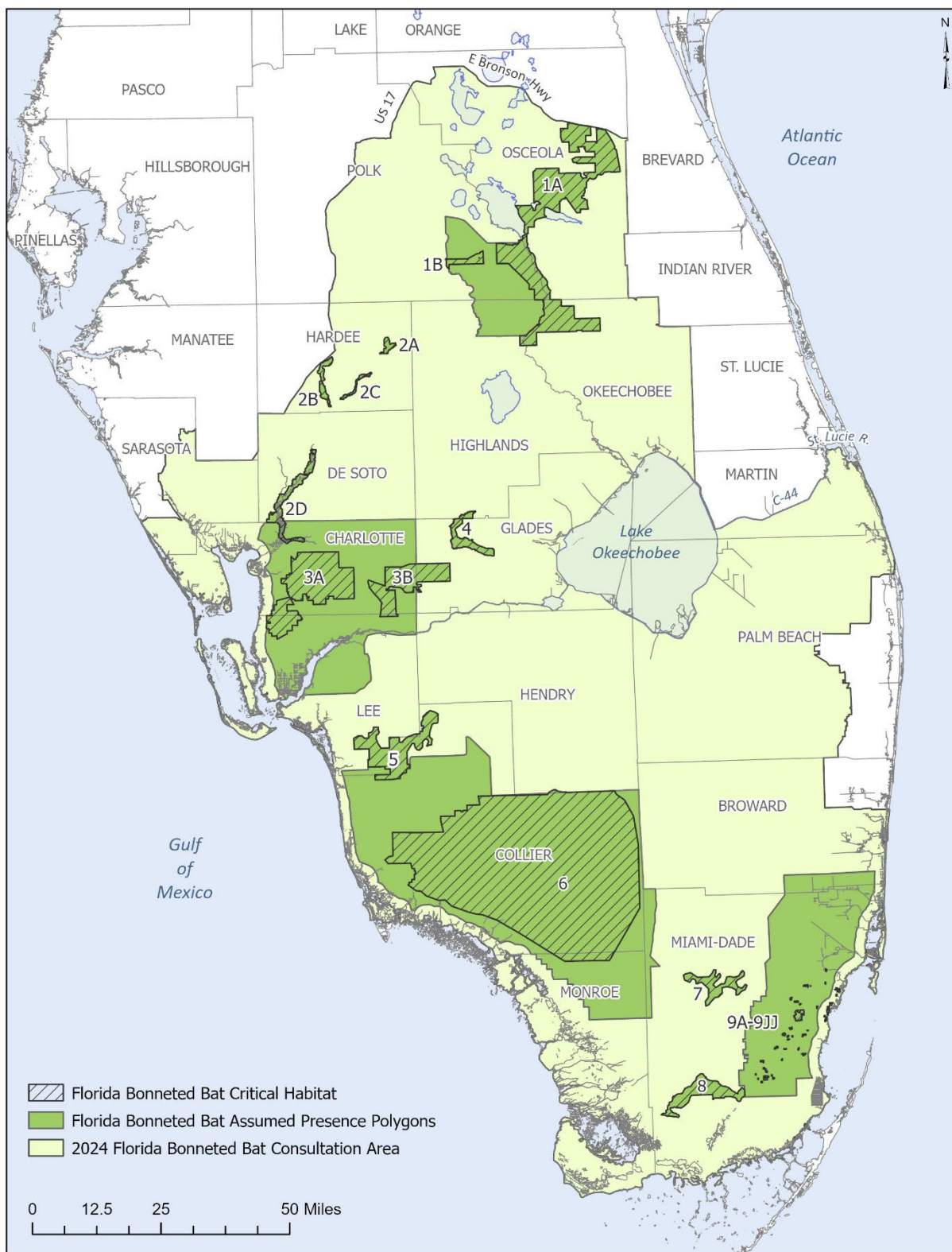


Figure 1. Florida Bonneted Bat Consultation Area, Critical Habitat Units, and Assumed Presence Polygons.

Appendix C: Best Management Practices for Land Management Activities, Development Activities, and Actions within Critical Habitat

These BMPs consist of actions intended to avoid, minimize, or offset impacts to Florida bonneted bats. BMPs required to reach a “may affect, but is not likely to adversely affect” ([MANLAA](#)) determination are listed below. If the applicant is unable or does not want to incorporate the required BMPs into the project, this Consultation Key cannot be followed and further coordination and consultation with the Service is required. In these cases, formal consultation may not be required, but further evaluation of the project and discussions with the Service are needed.

Best Management Practices for Land Management Activities

The BMPs **LM1 through LM6** are required for MANLAA projects keying out to **3b** in the FBB Consultation Key (see note), no further consultation is required:

LM1. Conduct tree removal in areas with known or suspected roosting activity from November 15 to April 15. From April 16 to November 14, visual, peeping, and emergence surveys must be done prior to removal of trees 7.4 in (19 cm) dbh or greater with cavities (or snag height) at 15 ft or higher.

LM2. When feasible, roost surveys are recommended year round prior to removal of trees 7.4 inch (19 cm) dbh or greater with cavities (or snag height) at 15 ft or higher, especially for slash and longleaf pine, royal palm, and cypress.

LM3. Conduct prescribed burns in areas of known or suspected roosting activity from November 15 to April 15.

LM4. Protect known and suspected roost trees by raking and/or manually clearing vegetation around the base (150-ft (46 m) buffer) of identified trees prior to prescribed burning.

LM5. In areas of suitable FBB roosting habitat, plan to conduct only low intensity prescribed burns.

LM6. Avoid conducting frequent or sustained loud land management activities (generally above 80 decibels, such as chainsaw or heavy equipment) within 100 ft (15 m) of known or suspected roosts during the FBB breeding season (April 15 to November 15).

LM7. When possible, protect trees or snags 7.4 in (19 cm) dbh or greater with cavities (or snag height) at 15 ft or higher. These efforts may consist of avoiding removal of trees with these characteristics, raking and/or manually clearing vegetation around the base of known or potential roost trees to remove fuel prior to prescribed burning.

LM8. Forestry practices: Follow/Establish forest management efforts to maintain tree species and size class diversity to ensure long-term supply of FBB potential roost sites. Preserve large snags in open canopy when possible.

For land management activities or restoration projects that are not addressed in a current BO and cannot incorporate the BMPs above, contact the Service ([Florida Bonneted Bat Recovery Lead](#) or the Service’s Environmental Review project manager) for further guidance. Note: Many land management activities are not expected to follow these BMPs (and key out to a MANLAA), nor would it be beneficial for the FBB and many other species if all management actions followed all BMPs. However, the Service is required to evaluate the need to provide take coverage for those projects that may result in take of individuals. For example, these projects could include management actions in areas with potential roost trees during peak pup season or where fire is likely to result in significant loss of potential roost trees.

Best Management Practices for Development, Construction, and Other Similar Activities

Use the table below to determine which BMPs are required for projects keying out to a [MANLAA](#) with required BMPs (7a, 8a, 10a, 11a, or 12a) in the FBB Consultation Key. Information on how each BMP is each incorporated into the project must be submitted with the project for review. In cases of multiple home or multiple (future) ownership developments, how these measures will be maintained and enforced in perpetuity must also be addressed (e.g., through deed restrictions, Homeowner or Property Owner Associations (HOA/POA), Community Development Districts (CDD), planned communications to new owners and leases). If a BMP is not relevant to the project (for example, D2, if no water or water features are present or planned), please explain why it does not apply to the project.

Project keys out to:	Required BMPs
7a	D1 through D7; see specifics regarding D1 (20%) and D6 (\$4,875 per acre)
8a or 12a	D1 through D9; see specifics regarding D1 (25%) and D6 (\$7,387 per acre)
10a	D1 through D9; see specifics regarding D1 (20%) and D6 (\$7,387 per acre)
11a	D4 and D8; incorporation of additional BMPs is encouraged

D1. Retain or restore a portion of the parcel in native contiguous vegetation. In most cases, habitat types similar to the habitat type impacted should be retained or restored. (For example, if upland habitat is impacted, then upland habitat with native vegetation should be retained.)

Projects keying out to **7a** or **10a** must retain or restore a minimum of 20% of the [project impact area](#) acreage. Projects keying out to **8a** or **12a** must retain or restore a minimum of 25% of the [project impact area](#) acreage.

D2. Buffer all bodies of water and water features by a minimum of 50 feet (15.2 m) within which there are no impacts to substrate or vegetation. In cases where artificial water bodies (i.e., stormwater ponds) are created, edges should be enhanced with native plantings (typically herbaceous wetland vegetation).

D3. Maintain natural light conditions. Avoid and minimize the use of artificial lighting and avoid permanent night-time lighting. Where lighting is necessary to meet minimum life safety requirements it must be designed to meet each of these recommendations:

- Utilize fully-shielded fixtures to restrict the amount of upward-directed light. Light sources must be downward directed and shielded so that the luminaire emits no more than

10% of its vertical output above 80 degrees from nadir. Examples of appropriate fixtures can be found in [FWC Sea Turtle Lighting Guidelines](#).

- Use the “Backlight, Uplight, Glare” (BUG) system developed by the Illuminating Engineering Society to avoid glare, excessive lighting and light trespass. The “uplight” rating should be zero, and “backlight” and “glare” ratings should be as close to zero as possible. Fixtures on edges of developed areas should have zero backlight ratings.
- Avoid broad spectrum and excessive short wavelength artificial light below 560 nanometers. Lights with less than 3000 Kelvin (K) color temperature must be used, while color temperatures of 2700 K or less are ideal. Lights with the lowest lumens possible should be used.
- Utilize shielding, louvers and baffles, dimming and other appropriate lighting controls to direct and minimize lighting when not in use.
- Implement partial-night lighting schemes to reduce the amount of artificial light used throughout the night. Motion-sensor lighting is also highly encouraged.
- Lighting must not illuminate any retained or restored vegetated areas.
- Prevent indoor artificial lighting reaching the outdoor environment. Use fixed window screens, blinds or tinting on fixed windows and skylights to contain artificial light inside buildings.

D4. Avoid engineering designs that encourage bats from using roofs, buildings, or structures. For example, minimize and seal any gaps, cracks, holes in roofing, siding, soffits during construction.

D5. Avoid widespread use/application of pesticides and insecticides (e.g., mosquito control, agricultural pest control). Chemicals should not be used or applied within and adjacent to areas where Florida bonneted bats are known or expected to forage or roost.

D6. Use the [Florida Bonneted Bat Conservation Fund](#) to offset impacts to roosting and foraging habitat.

Donate a recommended minimum of \$7,387 per acre (based on 2023 agricultural land values (USDA 2023)) of foraging or roosting habitat impacted (projects keying out to **8a, 10a, or 12a**), and \$4,875 per acre for projects keying out to **7a**. Donations are not required for temporary impacts to foraging habitat.

D7. Retain trees and snags that could provide current or future roosting habitat. This includes native [potential roost trees](#) or live royal palm, cypress, longleaf or slash pine trees of various sizes or dead or dying native trees with cavities, hollows, crevices, and loose bark. At minimum, 50% of the number of trees of these species (i.e., royal palm, cypress, longleaf or slash pine) present or 50% of the acreage of trees of these species present must be retained.

D8. Conduct roost surveys of potential roost trees prior to removal; necessary removals should occur November 15 to April 15. If potential roost trees or structures need to be removed, trees, snags, and structures need to be visually surveyed within 30 days prior to removal. Any cavities must be peeped with a “treetop” camera, and any cavities that cannot be reached or fully viewed by camera should be surveyed at emergence. If evidence of use by any bat species is observed, discontinue tree removal efforts in that area and coordinate with the Service on how to proceed. Tree, snag, or structure removals should not occur from April 15 to August 15; ideally removal should occur November 15 to April 15.

D9. When using heavy equipment, establish a minimum 150 foot (46 m) buffer around retained known or potential roosts.

Again, if the applicant is unable or does not want to incorporate the required BMPs into the project, this Consultation Key cannot be followed and further coordination and consultation with the Service is required. Formal consultation may not be required, but further evaluation of the project and discussions with the Service are needed.

Best Management Practices for Land Management Activities within FBB CH

BMPs **LM5**, **LM7**, and **LM8** are required for MANLAA projects keying out to **2b** in the FBB CH Consultation Key. No further consultation is required.

Best Management Practices for development related impacts within FBB CH

BMPs **D1 through D3, D5, D6, and D7** are required for MANLAA projects keying out to **3a** in the FBB CH Consultation Key, and information on how they are incorporated into the project must be submitted with the project for review.

Literature Cited - Appendix C

United States Department of Agriculture (USDA). 2023. Land Values 2023 Summary (August 2023). Released August 4, 2023, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board. Washington, D.C.

Appendix D: Definitions

DEFINITIONS

Action area: All areas affected directly or indirectly by the project/action, and not merely the immediate area involved in the action. The action area may include areas where, for example, effects of increased noise, artificial lighting, changes in hydrology or water quality, or increased traffic occur.

Active Florida bonneted bat roosting: The appropriate conclusion if ANY of the following occurs: (a) FBB calls are recorded within 1½ hours after sunset or 1½ hours before sunrise; (b) emergence and/or social calls are recorded; (c) human observers see (or hear) FBBs flying from or to potential roosts just after sunset (e.g., within 1½ hour of) or just before sunrise; (d) human observers see and identify FBBs within a natural roost or artificial roost; and/or (e) other bat sign (e.g., guano, staining, etc.) is found that is identified to be FBB through additional follow-up.

Best Management Practices (BMPs): Avoidance and minimization measures designed to be incorporated into the project's design such that take is not expected to occur as a result of the proposed project (i.e., not result in harassment, harm, injury, or death), after which a MANLAA determination may be possible. These recommendations for actions to conserve roosting and foraging habitat are implemented before, during, and after proposed development, land use changes, and land management activities. BMPs may also be used to offset impacts of a project with a LAA determination.

Florida bonneted bat acoustic activity: The appropriate conclusion if a valid acoustic survey yields at least one call file with FBB identified manually or via auto-ID with appropriate regional or species suite selected, with manual vetting from a reputable acoustic reviewer agrees that the auto-ID is correct.

Florida bonneted bat assumed presence polygons: The polygons indicate areas where repeated acoustic surveys have yielded detections of FBB. Project proponents may choose to assume presence of FBB if the project is within one of the polygons. Presence of FBB can also be assumed, if desired, based on potential foraging habitat and/or suitable roosting habitat, or other detection records (e.g., FBB capture, telemetry data).

Florida Bonneted Bat Consultation Area: The Florida Bonneted Bat Consultation Area ([Figure 1](#)) represents the general range of the species. The Consultation Area represents the area within which consideration should be given to potential effects to Florida bonneted bats from proposed projects or actions. Coordination and consultation with the Service helps to determine whether proposed actions and activities may affect listed species. This Consultation Area defines the area where proposed actions and activities may affect the Florida bonneted bat.

Florida bonneted bat foraging habitat: This species forages in a variety of habitats including open fresh water, permanent or seasonal freshwater wetlands, wetland and upland forests,

wetland and upland shrub, and agricultural lands. In urban and residential areas, drinking water, prey base, and suitable foraging conditions (*i.e.*, open habitat structure) can be found in relatively small patches of natural or semi-natural habitat. A project area existing within the consultation area lacking potential foraging habitat (2b) would be unlikely, therefore, please consider contacting the Service to discuss this determination if it appears to apply to your project.

Florida bonneted bat roosting habitat: This species roosts in live or dead trees and tree snags. Trees of any species 34 ft (10.4 m) or taller, snags 28 ft (8.5 m) or taller, with dbh 7.4 in (19 cm) or greater are potential FBB roosting habitat. Artificial structures 15 ft (4.5 m) in height and greater that may mimic natural roosting conditions (*e.g.*, bat houses, utility poles, buildings over one story high), situated in natural or semi-natural habitats should also be considered potential FBB roosting habitat. Such buildings with chimneys, gaps in soffits, gaps along gutters, or other structural gaps or crevices (outward entrance approximately 1 inch (2.5 centimeters) in size or greater can be potential roosting habitat. Bridges and culverts 15 ft and higher are also expected to provide roosting habitat, based upon the species' morphology and behavior (Keeley and Tuttle 1999).

LAA/LAA CH: May Affect, and is Likely to Adversely Affect. The appropriate conclusion if any adverse effect to listed species (/on designated critical habitat units) may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not: discountable, insignificant, or beneficial (see definition of "is not likely to adversely affect"). In the event the overall effect of the proposed action is beneficial to the listed species (/on designated critical habitat units), but also is likely to cause some adverse effects, then the proposed action is "likely to adversely affect" the listed species (/on designated critical habitat units). If incidental take is anticipated to occur as a result of the proposed action, an "is likely to adversely affect" determination should be made. An "is likely to adversely affect" determination requires the initiation of formal section 7 consultation.

In some scenarios, applicants may be able to design projects that would not result in LAA. For example, if appropriate avoidance measures (*e.g.*, BMPs) could be incorporated into the project's design such that take is not expected to occur as a result of the proposed project (*i.e.*, not result in harassment leading to harm, harm, injury, or death), then a MANLAA determination may be possible. When take cannot be avoided, Applicants and Action Agencies are encouraged to incorporate compensation to offset adverse effects. The Service can assist the Applicant in identifying appropriate compensation (*e.g.*, conservation on site, conservation off-site, contributions to the Service's FBB conservation fund).

MANLAA/ MANLAA CH: May Affect, but is Not Likely to Adversely Affect. The appropriate conclusion when effects on listed species (/on designated critical habitat units) are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species (/on designated critical habitat units). Insignificant effects relate to the size of the impact and should never reach the scale where take occurs in a MANLAA. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur. To use these

Guidelines and Consultation Key applicants must incorporate the required BMPs to reach a MANLAA determination.

Detailed information regarding how required BMPs are incorporated into your project designs must be included in your project submittal. If all required BMPs cannot be incorporated into project, further coordination and consultation with the Service is required.

No Effect/No Effect to CH: The appropriate conclusion when the action agency determines its proposed action will not affect listed species or designated critical habitat. The FESFO defines No Effect as projects with no impacts, positive or negative, to federally-listed species or designated critical habitat from the proposed action. This determination is usually not appropriate if suitable habitat, designated critical habitat, or species are present in the action area.

Potential roost tree: Trees of any species 34 ft (10.4 m) or taller, snags 28 ft (8.5 m) or taller, with dbh 7.4 in (19 cm) dbh or greater are potential FBB roost trees.

Project impact area: This is the area within the project area where any temporary or permanent impacts to foraging or roosting habitat are planned or will occur.

Take: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. **Harm** is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. **Harass** is defined by FWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering.