



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
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February 6, 2007

Colonel Paul L. Grosskruger
District Commander
U.S. Army Corps of Engineers
701 San Marco Boulevard, Room 372
Jacksonville, Florida 32207-8175

Service Federal Activity Code: 41420-2007-FA-050
Service Consultation Code: 41420-2007-F-0040
Corps Application No.: SAJ -2006-3482 (PCN) (NW-MLS)
Date Received: October 6, 2006
Date of Initiation of Formal Consultation: October 26, 2006
Project: Lake Pierce Subdivision
Applicant: Patriot Homes, Incorporated
County: Polk

Dear Colonel Grosskruger:

This document transmits the Fish and Wildlife Service (Service) Biological Opinion (BO) based on our review of the Lake Pierce Subdivision submitted by Patriot Homes Incorporated located in Polk County, and its effects on the sand skink (*Neoseps reynoldsi*) and the bluetail mole skink (*Eumeces egregius lividus*) in accordance with Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This BO is based on information received from the consultant for this project, Biological Research Associates (BRA), Florida Fish and Wildlife Conservation Commission (FWC), the U.S. Army Corps of Engineers (Corps), and the Service. A complete administrative record of this consultation is located at the Service's South Florida Ecological Services Office in Vero Beach, Florida.

CONSULTATION HISTORY

On March 24, 2006, the environmental consultant for this project, Austin Environmental Consultants, Incorporated, on behalf of the applicant, submitted to the Corps and the Service a Biological Assessment report, along with an application to construct the Lake Pierce Residential Subdivision in Polk County.

On October 2, 2006, the Corps transmitted a copy of the letter for the application received for this project and requested initiation of section 7 consultation with the Service. In the letter, the Corps determined the proposed project "may affect, and is likely to adversely affect" the threatened sand and bluetail mole skinks.



On September 29, 2006, Service staff and the environmental consultant conducted a field review of the site to assess the extent of occupied sand skink habitat relative to the entire project parcel. Evidence of the skink's presence was confirmed in the previously designated area.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The applicant proposes to construct a 56-lot, single family residential subdivision and associated infrastructure. The 25-acre project site is comprised of 21.0 acres of uplands and 4.0 acres of wetlands. The uplands on the site consist of 6.0 acres of xeric oak (*Quercus spp.*) and 15.0 acres of sand live oak (*Quercus geminata*), while the wetlands are composed of 4.0 acres of lake swamp. The project will result in impacts to 0.1 acre of wetlands. To compensate for wetlands impacts, the applicant proposes to preserve, and manage 3.9 acres of on-site wetlands. The proposed project is located on Masterpiece Gardens Road just south of Masterpiece Road (C.R. 17A) in Section 17, Township 29 South, Range 28 East, in Polk County, Florida (Figure 1)

The project will also impact 1.3 acres of occupied sand skink habitat (Figure 2). To compensate for impacts to the sand skink, the applicant proposes to purchase, preserve, maintain, and manage 2.6 acres of occupied sand skink and bluetail mole skink habitat. The compensation represents a ratio of 2 acres compensated for each acre of occupied habitat impacted. The 2.6-acre compensation site is a portion of the 115-acre Dantzman property, which is located adjacent to the Lake Wales Ridge State Forest Walk-in-Water Tract, in Polk County (Figure 3). Pedestrian surveys conducted by Austin Environmental Consultants indicated that sand skinks occur in the mitigation parcel; therefore the Service expects that the acquisition and management will benefit the sand and bluetail mole skink. The entire 115-acre mitigation parcel will be maintained according to Appendix B of the Lake Pierce Subdivision Habitat Preservation Plan submitted by the applicant to the Corps and the Service. The Florida Division of Forestry currently manages the Lake Wales Ridge State Forest Walk-in-Water Tract; therefore upon acceptance of this parcel by the Florida Bureau of Land Acquisition, the longterm management responsibilities of the Dantzman property will be assumed by the Florida Division of Forestry. Upon transfer of the longterm management responsibility, the Dantzman property will be maintained according to the Lake Wales Ridge State Forest 10-year Resource Management Plan. The compensation land is bisected by Sullivan Road and located west of Lake Wales Ridge State Forest Walk-in-Water Tract in Section 06, Township 31 South, Range 29 East, in Polk County, Florida (Figure 4).

Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The project will result in the construction of a residential development. The presence of a residential development may result in a variety of indirect and cumulative effects in the action area. The increase in the local human population resulting from the project will likely stimulate further development (e.g., road widening and construction of new roadways to accommodate the increase in local traffic; construction of related facilities such as grocery stores, gas stations, etc.) and increase the loss of skink habitat in the action area. Consequently, existing sand skink habitat in the action area is

threatened by development. However, the extent of the project's effects to surrounding lands is difficult to discern. Therefore, the Service has established an action area for this project that includes the project site and all lands within 5 miles of the project site located in Polk County, Florida. The Service believes an action area of this size is sufficiently large enough to capture the majority of indirect and cumulative effects resulting from this project.

STATUS OF THE SPECIES AND CRITICAL HABITAT RANGE-WIDE

Use of Best Scientific and Commercial Information by the Service

The Service will use the most current and up-to-date scientific and commercial information available. The nature of the scientific process dictates that information is constantly changing and improving as new studies are completed. The scientific method is an iterative process that builds on previous information. As the Service becomes aware of new information, we will ensure it is fully considered in our decisions, evaluations, reviews, and analyses as it relates to the base of scientific knowledge and any publications cited in our documents.

South Florida Multi-Species Recovery Plan (MSRP)

The MSRP (Service 1999) was designed to be a living document and it was designed to be flexible to accommodate the change identified through ongoing and planned research and would be compatible with adaptive management strategies. These principals are set forth in both the transmittal letter from the Secretary of the Interior and in the document itself. As predicted, this is what indeed occurred in the intervening years since the MSRP was published. The Service uses the MSRP in the context it still presents useful information when taken in conjunction with all the new scientific information developed subsequent to its publication.

Species/Critical Habitat Description

Sand skink

The sand skink is a small, fossorial lizard that occurs on the sandy ridges of interior central Florida from Marion County south to Highlands County. The extant range of the sand skink includes Highlands, Lake, Marion, Orange, Osceola, Polk, and Putnam Counties (Christman 1988). Principal populations occur on the Lake Wales (LWR) and Winter Haven Ridges (WHR) in Highlands, Lake, and Polk Counties (Christman 1992a; Mushinsky and McCoy 1991; P. Moler, FWC, personal communication 1998). The sand skink is uncommon on the Mount Dora Ridge (MDR), including sites within the Ocala National Forest (Christman 1970, 1992a). According to the Florida Natural Areas Inventory (FNAI) database updated as of September 2006, there were 132 locality records for the sand skink, including 115 localities on the LWR, four on the WHR and seven on the MDR. FNAI also reports four localities for this species west of the MDR in Lake County and two localities between the LWR and the Lake Hendry Ridge. The modification and destruction of xeric upland communities in central Florida were a primary consideration in listing the sand skink as threatened under the Act in 1987 (52 FR 42662). No critical habitat has been designated for the sand skink.

Recent morphological (Griffith et al. 2000) and molecular studies (Schmitz et al. 2004, Brandley et al. 2005) have demonstrated the scincid lizard genus *Eumeces*, Weigmann (1834) is paraphyletic and that *Plestiodon*, Dumeril and Bibron (1839) has nomenclatural priority for the American species formally referred to as *Eumeces*, except for those now placed in the genus *Mesoscincus* (Smith 2005). Molecular analysis of ribosomal RNA gene sequences also show that "*Eumeces*" *egregius* and *Neoseps reynoldsi* are closely related sister species (Schmitz et al. 2004, Brandley et al. 2005). Schmitz et al. (2004) suggested the amount of genetic differentiation between the two species (5%) is similar to other species of North American skinks and *Neoseps*, (Stejneger 1910) should be synonymised. They argue sand skinks are a striking example of morphological adaptation for burrowing, where the rate of morpho-ecological change exceeds phylogenetic change.

The sand skink is believed to have evolved on the central LWR and radiated from there (Branch et al. 2003). Analysis of mitochondrial DNA (mt DNA) indicates that populations of the sand skink are highly structured with most of the genetic variation partitioned among four lineages: three subpopulations on the LWR characterized by high haplotype diversity and a single, unique haplotype detected only on the MDR (Branch et al. 2003). Under the conventional molecular clock, the 4.5% divergence in sand skinks between these two ridges would represent about a 2 million-year separation; the absence of haplotype diversity on the MDR would suggest this population was founded by only a few individuals or severely reduced by genetic drift of a small population (Branch et al. 2003).

The sand skink reaches a maximum length of about 5 inches. The tail makes up about half the total body length. The body is shiny and usually gray to grayish-white in color, although the body color may occasionally be light tan. Hatchlings have a wide black band located along each side from the tip of the tail to the snout. This band is reduced in adults and may only occur from the eye to snout on some individuals (Telford 1959). Sand skinks contain a variety of morphological adaptations for a fossorial lifestyle. The legs are vestigial and practically nonfunctional, the eyes are greatly reduced, the external ear openings are reduced or absent (Greer 2002), the snout is wedge-shaped, and the lower jaw is countersunk.

The sand skink is widespread in native xeric uplands with excessively well-drained soils (Service 2002), principally on the ridges listed above at elevations greater than 25 m above mean sea level. Various authors have attempted to characterize optimal sand skink habitat (Telford 1959, Campbell and Christman 1982, Christman 1978, 1992, Service 1993), but McCoy et al. (1999) have argued these notions are "educated guesswork" (Bergman et al. 1993) with little empirical basis. Commonly occupied native habitats include Florida scrub variously described as sand pine scrub, xeric oak scrub, rosemary scrub and scrubby flatwoods, as well as high pine communities that include sandhill, longleaf pine/turkey oak, turkey oak barrens and xeric hammock (see habitat descriptions in Myers 1990 and Service 1999). Coverboard transects extended from scrub or high pine (sandhill) through scrubby flatwoods to pine flatwoods revealed that sand skinks left more tracks in scrub than the other three habitats and did not penetrate further than 40 m into scrubby flatwoods or 20 m into pine flatwoods (Sutton et al. 1999).

McCoy et al. (1999) used trap-out enclosures to measure sand skink densities at seven scrub sites and attempted to rank each area individually based on eight visual characteristics used in the literature (Telford 1959, 1962; Christman 1992; Service 1993) to identify good habitat: root-free, grass-free, patchy bare areas, bare areas with lichens, bare areas with litter, scattered scrubs, open canopy and sunny exposure. None of the individual literature descriptions of optimal habitat (or any combination thereof) accurately predicted the rank order of actual sand skink abundance at these sites, which ranged in density from 125 individuals/ha to 650/ha (Sutton 1996). However, knowledgeable researchers (“experts”), especially as a group, appear to be able to visually sort out the environmental variables important to sand skinks, but had difficulty translating their perceptions into a set of rules that others could use to identify optimal sand skink habitat (McCoy et al. 1999).

Collazos (1998), Hill (1999) and Mushinsky et al. (2001) used grids of pitfall traps and coverboards to quantify the relationship between sand skink density and a suite of environmental variables. These authors found sand skink relative density was positively correlated with low canopy cover, percent bare ground, amount of loose sand and large sand particle size, but negatively correlated with understory vegetation height, litter cover, small sand particle size, soil moisture, soil temperature and soil composition. In an unburned sandhill site at ABS, Meshaka and Lane (2002) captured significantly more sand skinks in pitfall traps set in openings without shrubs than at sites with moderate to heavy shrub density. Telford (1959) suggested scattered debris and litter provided moisture that was important to support an abundant food supply and nesting sites for sand skinks. Cooper (1953) noted the species was most commonly collected under rotting logs, and Christman (1992a) suggested they nest in these locations.

The trap-out enclosure surveys of Sutton et al. (1999) and Christman (2005) provide evidence that hot fires may negatively affect sand skink densities and that the species continues to occupy scrub with a closed canopy and thick humus layer, although at lower densities. Also, recent coverboard surveys conducted by permit applicants have shown sand skinks may occupy both actively managed lands such as citrus groves and pine plantations and old field communities (Service files), particularly if these sites are adjacent to patches of native habitat that can serve as a source population for recolonization.

Bluetail mole skink

The bluetail mole skink (*Eumeces egregius*) is a small, fossorial lizard that occupies xeric upland habitats of Florida, Alabama and Georgia (Mount 1963). Five subspecies have been described (Mount 1965), but only the bluetail mole skink (*Eumeces egregius lividus*) is federally listed. It requires open, sandy patches interspersed with sclerophyllous vegetation (Service 1999). The historic and anticipated future modification and destruction of xeric upland communities in central Florida were primary considerations in listing the bluetail mole skink as threatened under the Act in 1987 (52 FR 42662). No critical habitat has been designated for the bluetail mole skink.

Mount (1965) described *Eumeces egregius lividus* largely on the basis of a bright blue tail in juveniles and restricted this subspecies to the southern LWR in Polk and Highlands Counties. Christman (1978) limited the range of bluetail mole skinks to these two counties, but later added

Osceola County to the range, based on the collection of a single bluetailed juvenile just north of the Polk County line on the LWR (Christman 1992, FNAI records). Analysis of mitochondrial DNA (Branch et al. 2003) supports Mount's (1965) hypotheses that bluetail mole skinks from the lower LWR represents the ancestral stock with radiation from there. Genetic analysis also indicates high population structure with limited dispersal in mole skinks among sandy habitats (Branch et al. 2003). Based on conventional estimates of molecular evolutionary clocks, these authors suggest a separation of approximately 4 million years between mole skinks occurring on the two oldest ridges (LWR and MDR), which overlaps the proposed Pliocene origin of scrub habitats (Webb 1990).

The bluetail mole skink reaches a maximum length of about 5 inches, and the tail makes up about half the body length. The body is shiny, and brownish to pink in color, with lighter paired dorsolateral stripes diverging posteriorly (Christman 1978b). Males develop a colorful orange pattern on the sides of the body during breeding season. Juveniles usually have a blue tail (Christman 1992b; P. Moler, FWC, personal communication 1998). Regenerated tails and the tails of older individuals are typically pinkish. The legs are somewhat reduced in size and used only for surface locomotion and not for "swimming" through the sand (Christman 1992b).

A variety of xeric upland communities provide habitat for the bluetail mole skink, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks. Areas with few plant roots, open canopies, scattered shrub vegetation, and patches of bare, loose sand provide optimal habitats (Christman 1988, 1992b). Within these habitat types, bluetail mole skinks are typically found under leaves, logs, palmetto fronds, and other ground debris. Shaded areas presumably provide suitable microhabitat conditions for thermoregulation, egg incubation, and foraging (Mount 1963). Bluetail mole skinks tend to be clumped in distribution with variable densities that may approach 25 adults per acre (Christman 1992b). The distribution of bluetail mole skinks appears to be closely linked to the distribution of surface litter and, in turn, suitable microhabitat sites.

Life History

Sand skink

The sand skink is highly adapted for life in the sand. It spends the majority of its time below the surface where it burrows through loose sand in search of food, shelter, and mates. Sand skinks feed on a variety of hard and soft-bodied arthropods that occur below the ground surface. The diet consists largely of beetle larvae and termites (*Prorhinotermes* spp.). Spiders, larval ant lions, lepidopteran larvae, roaches and adult beetles are also eaten (Myers and Telford 1965, Smith 1982).

Sand skinks are most active during the morning and evening in spring and at mid-day in winter, the times when body temperatures can easily be maintained between 28°C-31°C in open sand (Andrews 1994). During the hottest parts of the day, sand skinks move under shrubs to maintain their preferred body temperatures (Andrews 1994) in order to remain active near the surface. With respect to season, Telford (1959) reported skinks most active from early March through early May, whereas Sutton (1996) found skinks most active from mid-February to late April.

Based on monthly sampling of pitfall traps, Ashton and Telford (2006) found that captures peaked in March at Archbold Biological Station (ABS), but in May at Ocala National Forest. All of these authors suggested the spring activity peak was associated with mating. At ABS, Ashton and Telford (2006) noted a secondary peak in August that corresponded with the emergence of hatchling sand skinks. Sand skinks lay two eggs typically in May or early June (Ashton 2005) under logs or debris, approximately 55 days after mating (Telford 1959). The eggs hatch from June through July. Sand skinks first reproduce at 2 years of age and females produce a single clutch in a season, although some individuals reproduce biennially or less frequently (Ashton 2005). Sand skinks can live at least to 10 years of age (Meneken et al. 2005). Most sand skinks move less than 40 m between captures, but some move over 140 m in 2 weeks (Mushinsky et al. 2001). Limited dispersal ability has been suggested to explain the relatively high degree of genetic structure within and among sand skink populations (Branch et al. 2003, Reid et al. 2004).

Bluetail mole skink

Bluetail mole skinks are typically found under leaves, logs, palmetto fronds, and other ground debris in a variety of xeric upland communities, including rosemary and oak-dominated scrub, turkey oak barrens, high pine, and xeric hammocks. Foraging activities of the bluetail mole skink are primarily at the soil surface or at shallow depths to 2 inches (Service 1993), usually during the morning or evening. Roaches, crickets, and spiders make up the bulk of the diet (Mount 1963). Their diet is more generalized than that of the fossorial sand skink, which probably reflects their tendency to feed at the surface (Smith 1982). Like sand skinks, mole skinks show an activity peak in spring (Mount 1963, Smith 1982). The reproductive biology of the bluetail mole skink is poorly known. Reproduction is presumably very much like that of the peninsula mole skink, *E.e.onocrepis*, where mating occurs in the fall or winter. In the peninsula mole skink, two to nine eggs are laid in a shallow nest cavity less than 12 inches below the surface. The eggs incubate for 31 to 51 days, during which time the female tends the nest. Individuals probably become reproductively active at 1 year of age (Mount 1963, Christman 1978a).

Population Dynamics

The Service has little information on the population dynamics of sand and bluetail mole skinks within their extant ranges. The skinks' diminutive size and secretive habits make their study difficult. As noted above, sand skinks can reach densities of up to 650 individuals/ha (263/ac) in high quality habitat, particularly on the LWR. Delayed maturity (2 years), a small clutch size (two eggs) of relatively large eggs, low frequency of reproduction and a long lifespan in sand skinks are life-history traits that also characterize a number of other fossorial lizards that occur in high densities (Ashton 2005). Such character traits may reflect high intra-specific competition and/or predation (Ashton 2005). In contrast, bluetail mole skinks often seem absent or rare on the same LWR study sites where sand skinks are common, and when present, are patchily distributed (Christman 1988, 1992b; Mushinsky and McCoy 1995). Mount (1963) noted peninsula mole skinks also are patchily distributed and mostly occurred on xeric sites greater than 100 ac (40 ha) in size. Early maturity (1 year in laboratory) and a large clutch size (maximum = 9 eggs) of relatively small eggs (Mount 1963) suggest the population dynamics of mole skinks are different from sand skinks.

STATUS AND DISTRIBUTION

Sand skink

Reason for listing

The modification and destruction of xeric upland communities in central Florida were a primary consideration in listing the sand skink as threatened under the Act in 1987 (52 FR 42662). By some estimates, as much as 90 percent of the scrub ecosystem has already been lost to residential development and conversion to agriculture, primarily citrus groves (Florida Department of Natural Resources 1991, Kautz 1993). Xeric uplands remaining on private lands are especially vulnerable to destruction because of increasing residential and agricultural pressures.

Range-wide trends

Except for a few locations where intensive research has been conducted, limited information about the presence or abundance of sand skinks exists. An extensive 1992 survey in Ocala National Forest (ONF) failed to capture any sand skinks despite placement of traps near historical locations and the capture of a number of other fossorial reptiles. Telford (1992) cited the ephemeral nature of early successional scrub habitats due to dynamic successional changes as an important confounding factor in the evaluation of the sand skink's present status in the Ocala National Forest. However, 24 sand skinks were collected later from ONF for genetic analysis (Branch et al. 2003) and population studies (Ashton and Telford 2006). Additional studies have provided presence/absence information that has been used to determine the extant range of the species (Mushinsky and McCoy 1991, Stout and Corey 1995). However, few long-term monitoring efforts have been undertaken to evaluate the status or trends of sand skinks at these or other sites.

At the time of Federal listing in 1987, FNAI had recorded 31 known sites for the sand skink. By September 2006, 132 localities were known by FNAI. This increase is largely the result of more intensive sampling of scrub habitats in recent years and does not imply that this species is more widespread than originally thought. Of the known locations, 50 (38 percent) occur on public lands or private lands placed under conservation easement, and offer habitat protection. It is likely continued residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded habitat containing sand skinks. Approximately 60 to 90 percent of xeric upland communities, historically used by sand skinks on the LWR, are estimated to have been lost due to development (Christman 1988, Christman and Judd 1990, Kautz 1993, Center for Plant Conservation 1995). More recently, Turner et al. (2006) calculated 12.9 percent of this habitat remains.

Protection of the sand skink from further habitat loss and degradation provides the most important means of ensuring its continued existence. Existing protection of occupied skink habitat consists primarily of private preserves such as Archbold Biological Station, Hendry Ranch, Tiger Creek Preserve, and Saddle Blanket Lakes Scrub Preserve, coupled with publicly owned lands such as Lake Arbuckle State Park and State Forest, Lake Louisa State Park, and Highlands Hammock State Park (Service 1993). Current efforts to expand the system of protected xeric upland communities on the LWR, coupled with implementation of effective land management practices, represent the most likely opportunity for assuring the sand skink's survival (Turner et al. 2006).

It is likely a substantial sand skink population is present on existing private and public conservation lands on the LWR. As of 2003, about 21,597 acres (8,740 ha) of Florida scrub and high pine on the LWR have been protected, which represents almost half of the remaining xeric habitat on this ancient ridge, but only 6.3 percent of its estimated historic extent (Turner et al. 2006). Sand skinks are present on sites that total 87.4 percent of the currently protected xeric acreage (Turner et al. 2006), but many of the other conserved sites have not been surveyed adequately. Fourteen trap-out enclosures at seven protected sites with a known burn history on the LWR in Polk and Highlands Counties contained a minimum of 85 sand skinks for a mean density of 152 individuals/ha (61/ac) and one enclosure set in dry flatwoods yielded none (Christman 2005). Fourteen of these sites had burned in the last 8 years and the one “rosemary bald” that has not burned for 37 years had 275 sand skinks/ha (110/ac). Five similar enclosures set on unburned xeric sites in Orange and Osceola Counties averaged 385 sand skinks/ha (155/ac) (Sutton 1996). K. Ashton (Personal communication, 2006) sampled skinks with pitfall traps on 12 rosemary scrub sites in Highlands County. Sand skinks were significantly less common in recently burned rosemary scrub, with abundance increasing with time since last fire. Fewer bluetail mole skinks were captured by K. Ashton, but the relationship was similar. Meshaka and Lane (2002) found that both species persisted on a sandhill at ABS that remained unburned for 67 years (1927-1994). The relative abundance of sand skinks decreased over time, but bluetail mole skinks did not.

Recovery of the sand skink also may require rehabilitation of suitable but unoccupied habitat or restoration of potentially suitable habitat. Because sand skinks do not readily disperse, introductions into restored or created unoccupied habitat may be necessary. Sand skinks relocated to two former citrus groves in Orange County have persisted for at least 5 years (Hill 1999, Mushinsky et al. 2001).

Bluetail Mole Skink

Reason for listing

The historic and anticipated future modification and destruction of xeric upland communities in central Florida were primary considerations in listing the bluetail mole skink as threatened under the Act in 1987 (52 FR 42662). As stated previously, almost 90 percent of the xeric upland communities on the LWR have already been lost because of habitat destruction and degradation due to residential development and conversion to agriculture, primarily citrus groves (Turner et al. 2006). Remaining xeric habitat on private lands is especially vulnerable because projections of future human population growth suggest additional demands for residential development within the range of the bluetail mole skink. Campbell and Christman (1982) characterized bluetail mole skinks as colonizers of a patchy, early successional, or disturbed habitat type, which occurs throughout the sandhill, sand pine scrub, and xeric hammock vegetative associations as a result of biological or catastrophic factors. Susceptibility of mature sand pine to windthrow may be an important factor in maintaining bare, sandy microhabitats required by bluetail mole skinks and other scrub endemics (Myers 1990).

Range-wide trends

At the time of Federal listing, there were 20 locality records for the bluetail mole skink. Currently, 43 sites are known. The increase in locality records is largely the result of more

intensive sampling of scrub habitats in recent years and does not imply that this species is more widespread than originally supposed. Of the known locations, only 13 occur on public land or on private land protected under conservation easement. It is likely continued residential and agricultural development of xeric upland habitat in central Florida has destroyed or degraded extensive tracts of habitat containing the bluetail mole skink. Estimates of habitat loss range from 60 to 90 percent, depending on the xeric community type (Christman 1988, Christman and Judd 1990, Kautz 1993, Center for Plant Conservation 1995).

Bluetail mole skinks are known to be present on sites which total 52.4 percent of the 21,597 acres (8,740 ha) of Florida scrub and high pine that currently is protected (Turner et al. 2006). However, the extent of potential habitat that is actually occupied is unknown, as is their total population size. As noted above, this species appears to be patchily distributed, even in occupied habitat (Mount 1963, Christman 1992b). Unlike sand skinks, their tracks cannot be easily detected in the sand, and most of the extant scrub sites on the LWR have not been adequately surveyed for bluetail mole skinks, including protected sites.

A range-wide survey of the bluetail mole skink was conducted in 2004-2005 at the study sites listed above by Christman (2005). Only two bluetail mole skinks were observed in the enclosures (mean density = 3.3/ha, 1.3/ac) relative to at least 85 sand skinks (ratio = 1:41). However, the enclosure sample size was small (total area = 0.6 ha, 0.24 ac). Christman (1992) suggested that only one bluetail mole skink is encountered for every 20 sand skinks. Other range-wide pitfall trap data on the LWR revealed a bluetail mole skink to sand skink ratio of 1:1.89 based on 54 total skinks captured in six trap arrays (Christman 1988), 1:4.3 based on 332 total skinks in 58 trap arrays (Mushinsky and McCoy 1991) and 1:2.7 based on 49 total skinks in 31,640 pitfall trap-days (Meshaka and Lane 2002). Mushinsky and McCoy (1991) confirmed that detection rates for bluetail mole skinks increased with sampling effort.

The protection and recovery of bluetail mole skinks will require habitat loss be stopped and unoccupied, but potentially suitable, habitat be restored. The existing protection of the bluetail mole skink includes a number of private and public preserves within the LWR. Current efforts to expand the system of protected xeric upland habitats on the LWR, in concert with implementation of aggressive land management practices, represent the most likely opportunity for securing the future of this species. Comprehensive land acquisitions that protect areas occupied by the bluetail mole skink include the Service's Lake Wales Ridge National Wildlife Refuge, and the State of Florida's Conservation and Recreation Lands (CARL) Lake Wales Ridge Ecosystem Project (Service 1993).

SUMMARY

In summary, little information is available to adequately assess the status and population dynamics of the bluetail mole skink. However, the sand skink is relatively widespread in remaining xeric uplands. Both species are endemic to central Florida, and are habitat specialists that rely on xeric scrub and high pine habitat for their continued existence. Earlier estimates of habitat loss ranged from 60 to 90 percent, depending on the xeric community type (Christman 1988, Christman and Judd 1990, Kautz 1993, Center for Plant Conservation 1995). Tuner et al. (2006) suggested that only 12.9 percent of the historic upland habitats on the LWR remained as

of 2003. Furthermore, the implementation of favorable management practices can create and maintain suitable habitat conditions for both sand and bluetail mole skinks, as well as other xeric upland-dependent species. A number of actions over the last 20 years have resulted in conservation benefits to xeric uplands within the extant range of both species. The State of Florida has acquired xeric upland habitat through the CARL, Save Our Rivers, and other P-2000 acquisition programs. The Service has also acquired portions of several small tracts (totaling 800 acres) as a component of the LWR National Wildlife Refuge. Finally, private organizations, such as The Nature Conservancy and Archbold Biological Station have bought and currently manage xeric uplands within the LWR.

ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area; the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation; and the impact of State or private actions, which are contemporaneous with the consultation in progress.

STATUS OF THE SPECIES/CRITICAL HABITAT WITHIN THE ACTION AREA

Coverboard surveys performed in accordance with the Service's draft *Sand and Bluetail Mole Skink Survey Protocol* (Service 2002a), detected multiple areas occupied by sand skinks and bluetail mole skinks within the action area. Sand skinks were identified within the onsite xeric oak (Figure 2). The entire 1.3 acres of occupied skink habitat within the xeric oak are proposed for development.

FACTORS AFFECTING SPECIES HABITAT WITHIN THE ACTION AREA

Sand skinks and bluetail mole skinks are vulnerable within the action area due to the intense development pressures in the region resulting from central Florida's burgeoning human population. The University of Florida's Bureau of Economic and Business Research estimates that Polk County's population is projected to increase from 541,840 in 2005, to 598,978 by 2010.

Sand and bluetail mole skinks appear to occupy essentially all successional stages of Florida scrub and high pine habitats, although their densities seem to vary in response to fire, the degree of open, sandy areas and other variables that are not well understood. Most conservation lands currently are managed to benefit such focal species as the Florida scrub-jay (*Aphelocoma coerulescens*) and the gopher tortoise (*Gopherus polyphemus*), species whose populations require a fire frequency return interval which is much shorter than that of sand skinks and perhaps bluetail mole skinks. This information suggests conservation lands may need to be managed as a mosaic of habitats to maintain viable populations of xeric-adopted vertebrate species of concern and that unmanaged private lands may be particularly important to listed skink species on the LWR. The occurrence of at least sand skinks on many man-altered xeric sites on the LWR also suggest these disturbed habitats support viable populations, especially if they are adjacent to patches of native habitat that can serve as a source population for recolonization.

EFFECTS OF THE ACTION

This section includes an analysis of the direct and indirect effects of the proposed action on the sand skink and bluetail mole skink, including beneficial effects and interrelated and interdependent actions. As noted above, both species share similar habitat requirements and are presumed to co-occur at the project site. Therefore, the effects of the action are expected to affect the sand skink and the bluetail mole skink in the same manner.

Factors Affecting the Species Environment Within the Action Area - This project site contains skink habitat and is located within the central portion of the geographic range of the sand skink and bluetail mole skink. The timing of construction for this project, relative to sensitive periods of the skink's life cycle, is unknown. Skinks are currently found within the proposed construction footprint. The project will be constructed in a single, disruptive event and result in permanent loss and alteration of the native vegetation within the project site. The time required to complete construction of the project is not known, but it is likely the majority of the land clearing will be completed within a few months. The disturbance associated with the project will be permanent and will result in a loss of habitat currently available to skinks.

Beneficial Effects – Approximately 2.6 acres of occupied skink habitat will be managed and preserved in perpetuity. The preservation area is located adjacent to and contiguous with the Lake Wales Ridge State Forest Walk-in-Water Tract, is bisected by Sullivan Road, and on the Lake Wales Ridge in Section 06, Township 31 South, and Range 29 East in Polk County, Florida. The preservation area will be placed under conservation easement for the protection of skinks. The following management activities will be undertaken in the conservation area to benefit skinks:

1. The 2.6 acres of skink habitat will be placed under conservation easement in perpetuity, and held by the Florida Division of Forestry.
2. No development will be allowed on the site;
3. Signs will be erected around the preservation area, identifying the site as a preserve area and indicating entry is restricted;
4. The applicant will prevent vegetation on the site from becoming overgrown and maintain patches of open, bare sand in the area. The vegetation management plan includes prescribed burns as well as mechanical, manual, and chemical maintenance;
5. Exotic vegetation on the site will be maintained by prescribed burning, mechanical, manual, or chemical maintenance; and
6. The applicant will conduct annual monitoring of the vegetation and skinks on and adjacent to the site to assess the success of the on-going management and modify management where needed.

The placement of occupied habitat under conservation easement and its proposed management is consistent with the Service's draft *Species Guidelines for Endangered Species – Sand Skink and Bluetail Mole Skink* (Service 2002). The preserve area will benefit the species and ensure the longterm persistence of skinks on the project site.

Direct Effects – Direct effects are those effects caused by the proposed action, at the time of construction, and are reasonably certain to occur. The direct effects this project will have on sand skinks and bluetail mole skinks within the action area are discussed below.

The construction of the project will result in the direct loss of 1.3 acres of skink habitat. Incidental mortality of skinks due to land clearing and construction activities may also occur. Mechanical preparation of the proposed project site can crush or injure individual skinks and skink eggs, and destroy or degrade occupied and potential habitat and foraging areas. In addition, any clearing activities and/or prescribed fires may adversely affect skinks by causing them to leave the area and possibly miss foraging and mating opportunities. Individual skinks fleeing the area may be more vulnerable to predation. The Service considers this project, as proposed, to represent a threat of disturbance to skinks. In addition, the project will add to the continued fragmentation of skink habitat in the region and result in a small reduction of the geographic distribution of these species. Therefore, the project proposed by Patriot Homes is expected to directly affect skink mortality in the action area.

Interrelated and Interdependent Actions – An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is an activity that has no independent utility apart from the action under consultation. No interrelated or interdependent actions are expected to result from the project.

Indirect Effects – Indirect effects are those effects that result from the proposed action, and are reasonably certain to occur. The indirect effects this project will have on skinks within the action area are discussed below.

The construction of the proposed residential development will increase the human population in the action area. The increase in the local human population resulting from the project may stimulate further development in the action area such as road widening and construction of new roadways to accommodate the increase in local traffic and construction of service related facilities (e.g., grocery stores, gas stations, etc.) on privately owned lands in the project vicinity. Such development would result in the conversion of skink habitat to buildings, parking lots, roadways, and other areas unsuitable as skink habitat. The habitat loss resulting from these projects will continue to fragment habitat in the action area and further reduce the geographic range of the species.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Anticipated future county actions in the action area that will adversely affect skink habitat include the issuance of county building permits. Permits to construct single-family homes and commercial buildings within the action area are required by Polk County. Many of the construction permits impacting skink habitat in the action area will require both a county building permit and a Corps permit, and will require consultation under section 7 of the Act.

A small proportion of construction projects requiring county building permits will not impact wetlands and will not require a permit from the Corps. In general, these projects will not have a Federal nexus requiring consultation with the Service under the Act. However, applicants obtaining county building permits are not absolved from the prohibition of take of listed species under the Act. Section 10 of the Act provides a means for permitting the incidental take of listed species associated with non-Federal actions such as county building permits. In order to obtain an incidental take permit, the applicant must prepare a Habitat Conservation Plan (HCP), acceptable to the Service, describing how impacts to the species will be minimized and compensated for to the greatest extent practicable. In order to be acceptable to the Service, an HCP for a non-Federal action affecting federally listed skinks would generally include the enhancement, restoration, or preservation of skink habitat. The Service has considered cumulative effects within the action area, and based on the above discussion, we have not identified any additional cumulative effects beyond those already discussed in the Environmental Baseline.

SUMMARY OF EFFECTS

The Service, based on the above evaluation, believes the project area provides habitat that currently benefits the sand skink and bluetail mole skink. The project will result in the direct loss of 1.3 acres of sand skink and bluetail mole skink habitat. The project will also add to the continued fragmentation of skink habitat in the region and reduce the geographic distribution of these species. The preservation and longterm management of the 2.6-acre skink preserve will compensate for the direct adverse effects of the project to the sand and the bluetail mole skink by maintaining the habitat quality of the site and by protecting the land from future development.

CONCLUSION

After reviewing the status of the sand skink and bluetail mole skink, the environmental baseline for the action area, the effects and mitigation proposed for impacts on occupied sand and bluetail mole skink habitat by the proposed action, and the cumulative effects, it is the Service's biological opinion that the construction of the Lake Pierce Subdivision, as proposed by Patriot Homes, is not likely to jeopardize the continued existence of the sand skink or bluetail mole skink. No critical habitat has been designated for either species and, therefore none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent 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. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of the agency action, is not considered to be prohibited taking under the Act provided such taking is in compliance with the terms and conditions of this incidental take statement.

The terms and conditions described below are nondiscretionary and must be undertaken by the Corps so they become binding conditions of any grant or permit issued to Patriot Homes as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require Patriot Homes to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protection coverage of section 7(o)(2) may lapse. In order to monitor the impact of the incidental take, the Corps or Patriot Homes must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR § 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates incidental take of sand skinks and bluetail mole skinks associated with the conversion of 1.3 acres of skink habitat to a residential development. The Service anticipates incidental take of sand skinks and bluetail mole skinks will be difficult to detect and quantify for the following reasons: (1) skink density varies considerably within and between apparently suitable habitat patches; (2) density dependent mechanisms are currently unknown and may be due to territorial requirements, microhabitats, and other unknown environmental influences; (3) individuals have a small body size and spend the majority of their time underground; and (4) finding a dead or impaired specimen is unlikely. However, take of sand skinks and bluetail mole skinks can be anticipated within the 1.3 acres of skink habitat located in the project footprint due to land clearing and construction activities associated with the project. Therefore, the Service believes all individuals occurring within this 1.3-acre portion of the project footprint will be incidentally taken. The incidental take is expected to be in the form of harm, injury, or death due to construction activities and/or habitat loss, or disturbance.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measure is necessary and appropriate to minimize take of the sand skink and bluetail mole skink:

Minimize adverse effects from habitat loss and fragmentation to sand and bluetail mole skinks by implementing an appropriate habitat preservation plan for sand skinks.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implements the reasonable and prudent measure described above and outlines required reporting/monitoring requirements. These terms and conditions are nondiscretionary and as follows:

1. Implement the Sand Skink Habitat Management Plan for the 2.6 acres of occupied sand skink habitat within the Dantzman property;
2. Allow prescribed burning and hand-removal of vegetation from within the conservation area, if necessary. The tires of tree cutters and bushhogs and the barrels of roller choppers associated with the mechanical removal of vegetation may crush individuals and compress the substrate, which may create a barrier and destroy habitat; and
3. Upon locating a dead sand skink or bluetail mole skink specimen, initial notification must be made to the nearest Service Law Enforcement Office (Mr. Vance M. Eaddy; Fish and Wildlife Service; 9549 Koger Blvd., Suite 111; St. Petersburg, Florida 33702; (727-570-5398). Secondary notification should be made to the Florida Fish and Wildlife Conservation Commission; South Region, 3900 Drane Field Road, Lakeland, Florida, 33811-1299; (1-800-282-8002). Care must be taken in handling any dead specimens of proposed or listed species that are found in the project area to preserve the specimen or its remains in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the Act. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure the terms and conditions are appropriate and effective.

CONSERVATION RECOMMENDATIONS

Section 7(a) (1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to further minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Our recommendations are listed below:

1. The applicant is encouraged to adopt a policy prohibiting the killing of all reptiles unless physical harm to a human is imminent during project construction.
2. Develop experimental techniques to re-establish sand skinks in historically occupied areas.

3. Investigate techniques to effectively survey for sand skinks.
4. Continue research to better evaluate home range size, age of dispersal, and dispersal distance of the sand skink and bluetail mole skink.

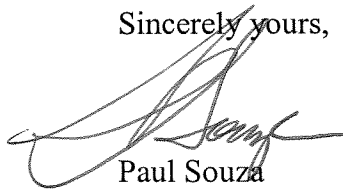
In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or actions benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the October 2, 2006, request. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Al Begazo at 772-562-3909, extension 234.

Sincerely yours,



Paul Souza
Field Supervisor
South Florida Ecological Services Office

cc:

Austin Environmental Consultants, Kissimmee, Florida (Summer Pardo)
Corps, Tampa, Florida (Mary Saunders)
FWC, Vero Beach, Florida
District, Orlando, Florida
Service, Atlanta, Georgia (Joe Johnston-Electronic Copy Only)

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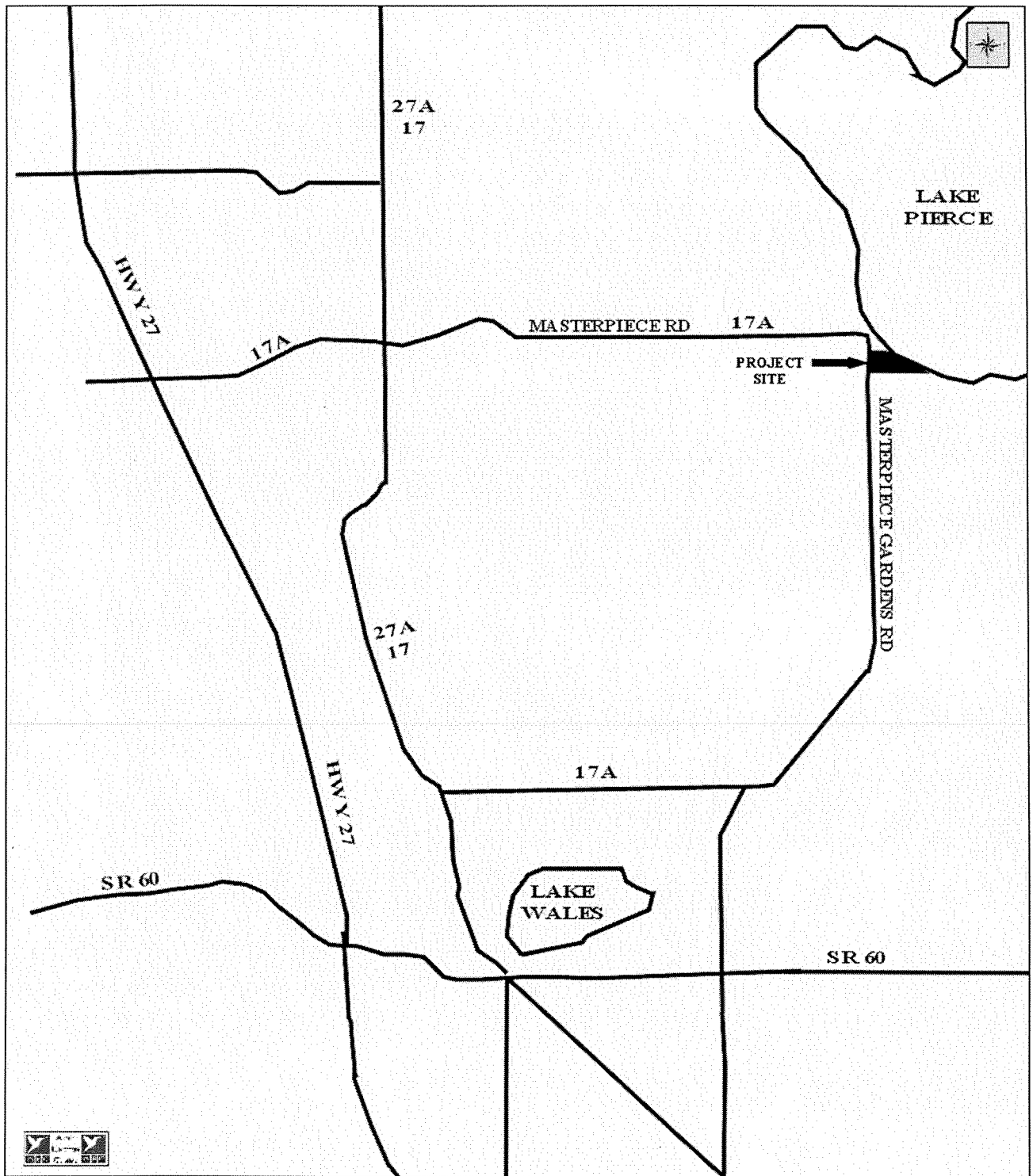


Figure 1. Map showing the location of the Lake Pierce Subdivision project site



Figure 2. Aerial photo showing the extent of occupied sand skink habitat within the Lake Pierce Subdivision project

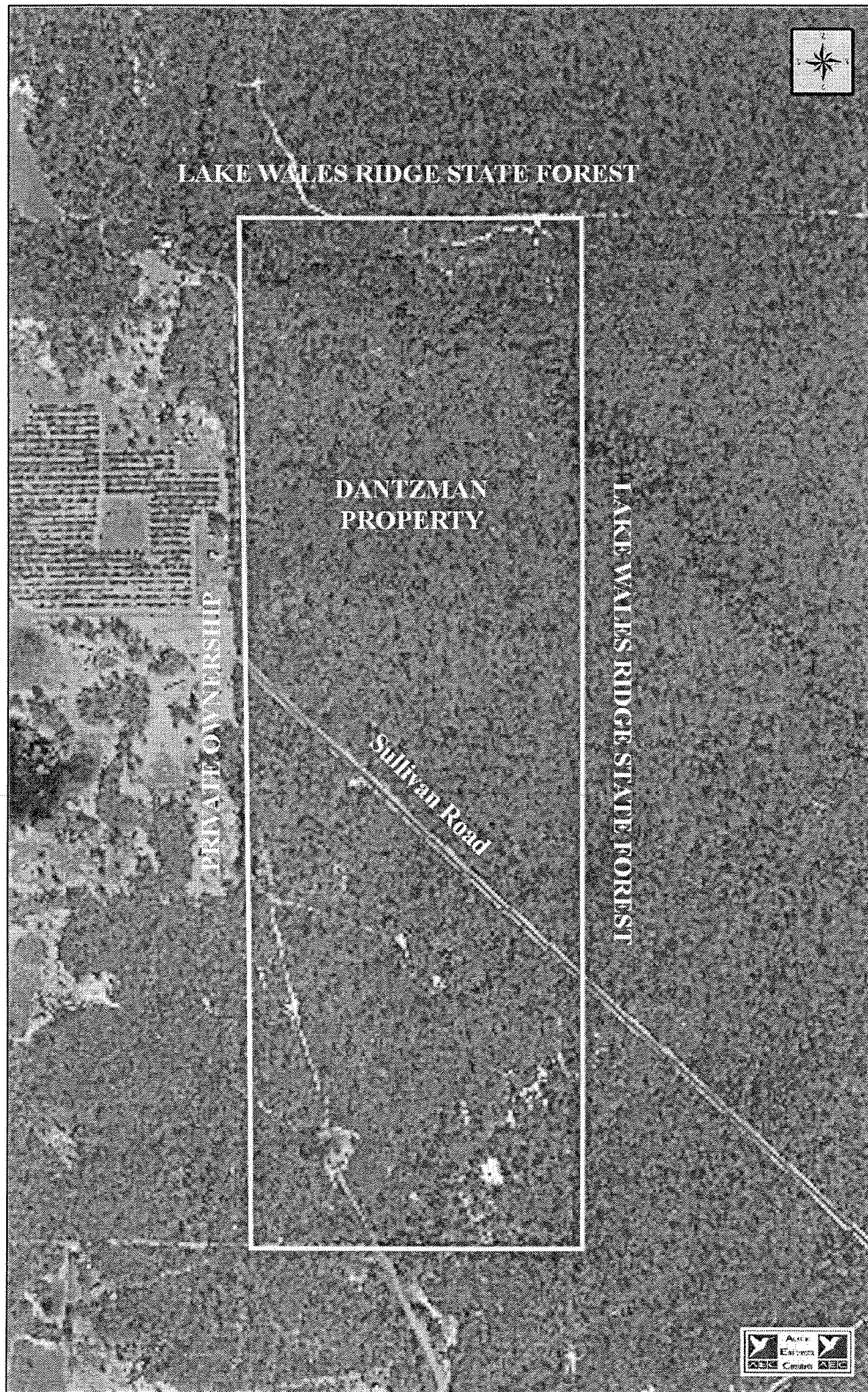


Figure 3. Aerial photo showing the location of the mitigation parcel relative to the Lake Wales Ridge State Forest Walk-in-Water Tract

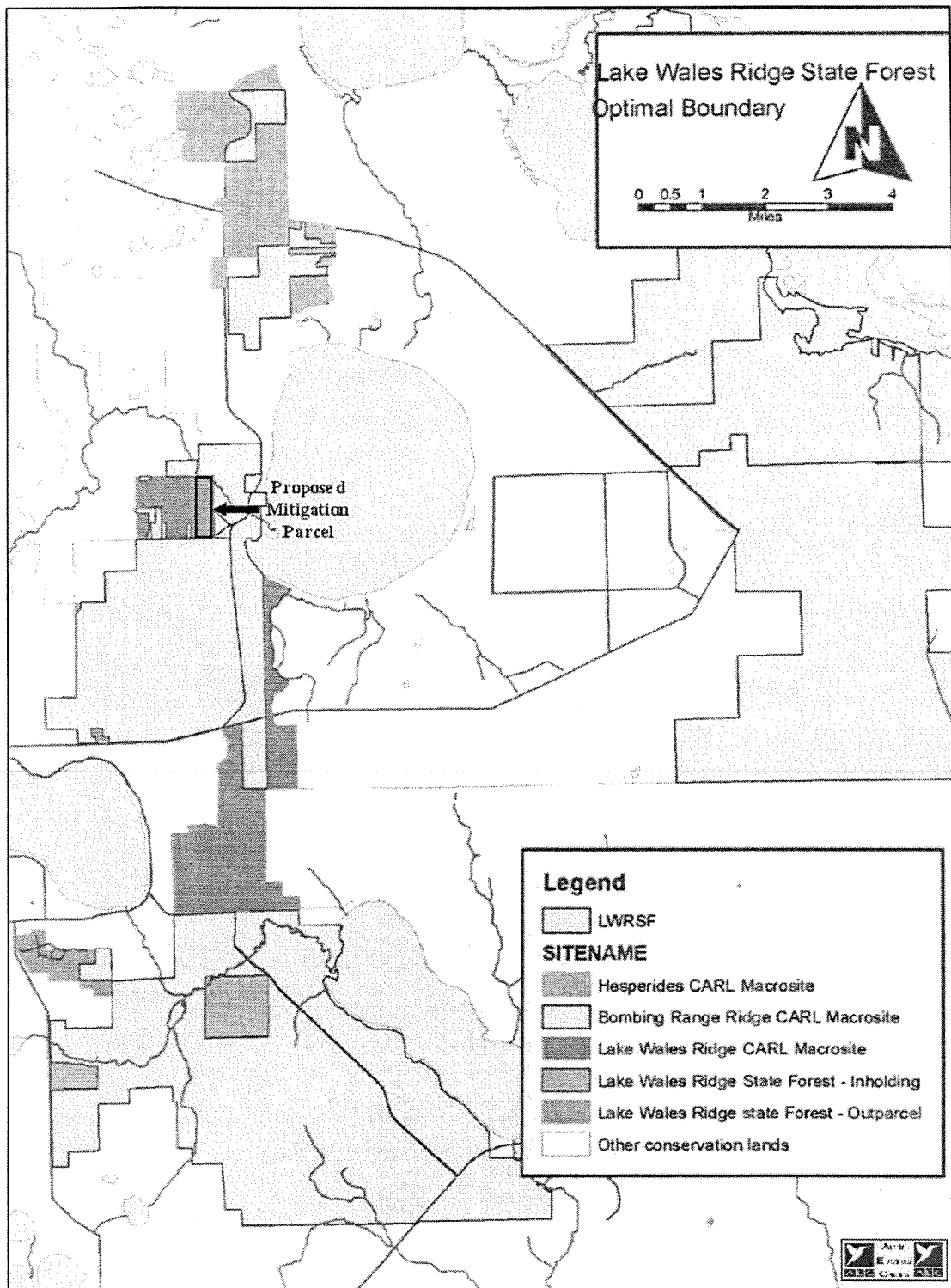


Figure 4. Map showing the location of the mitigation area within the Lake Wales Ridge State Forest Optimal Boundary