



United States Department of the Interior

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



June 22, 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: 41420-2006-FA-1479
Service Consultation Code: 41420-2007-F-0403
Corps Application No.: SAJ-2007-100 (NW-IS)
Formal Consultation Initiation Date: January 24, 2007
Applicant: Atlantic Osceola I, LLC
County: Osceola

Dear Colonel Grosskruger:

This document transmits the Fish and Wildlife Service's (Service) biological opinion for the proposed "Bristol" project in Osceola County, Florida, and its effects on the endangered wood stork (*Mycteria americana*), threatened Eastern indigo snake (*Drymarchon corais couperi*) threatened bluetail mole skink (*Eumeces egregius lividus*) and the threatened sand skink (*Neoseps reynoldsi*) in accordance with Section 7 of the Endangered Species Act of 1973, as amended (Act) (87 Stat. 884; 16 U.S.C. 1531 *et seq.*). This document also represents Service's review of the proposed projects referenced above in accordance the provisions of the Fish and Wildlife Coordination Act of 1958, as amended (48 Stat. 401; 16 U.S.C. 661 *et seq.*).

This biological opinion is based on information provided by the U.S. Army Corps of Engineers (Corps), the applicant's consultant (Austin Environmental Consultants, Incorporated), email messages; telephone conversations, and other sources of information. A complete administrative record of this consultation is on file at the South Florida Ecological Services Office, Vero Beach, Florida.

Consultation History

On September 13, 2006, Austin Environmental Consultants, Incorporated, submitted a sand skink habitat preservation plan for the Service's review.

On October 18, 2006, Austin Environmental Consultants, Incorporated requested the Service perform a site inspection of the Bristol project.

On November 8, 2006, Service biologists, accompanied by the consultant, conducted a site inspection of the Bristol project site.



By letter to the Service dated January 24, 2007, the Corps determined that the proposed work “may affect” the sand skink, bluetail mole skink and wood stork; and requested initiation of formal consultation for these species. The Corps also determined that the proposed work “may affect, but is not likely to adversely affect” the eastern indigo snake and requested the Service’s concurrence with this determination.

On May 21, 2007, Mitigation Marketing, LLC, provided the Service a copy of the conservation area reservation agreement for the Bristol proposal.

THREATENED AND ENDANGERED SPECIES

Wood stork

The Corps determined the proposed action “may affect” the wood stork and requested initiation of formal consultation for this species. The Service believes the loss of wetlands within a CFA may reduce foraging opportunities for wood storks. To minimize adverse effects to the wood stork, the Service’s *Draft Supplemental Habitat Management Guidelines for the Wood Stork in the South Florida Ecological Services Consultation Area* (Service 2002) (Guidelines) recommends the applicant replace wetlands lost due to the action. The compensation plan should include a temporal lag factor, if necessary, to ensure wetlands provided as compensation adequately replace the wetland functions lost due to the project. Moreover, wetlands offered as compensation should be of the same hydroperiod, and located within the CFA of the affected wood stork colony. In some cases, the Service accepts wetlands compensation located outside the CFA of the affected wood stork nesting colony. Specifically, wetland credits purchased from a “Service Approved” mitigation bank located outside the CFA would be acceptable to the Service, provided the impacted wetlands occur within the permitted service area of the bank.

The proposed work will impact 1.3 acres of herbaceous wetlands and 0.08 acre jurisdictional littoral shelf wetlands that adjoin a 7-acre stormwater management facility. As compensation for impacts to 1.5 acres of wetlands, the applicant has proposed to purchase mitigation credits at a mitigation bank. Because of the small impact to low-quality jurisdictional wetlands and the proposed mitigation for impacts to the higher-quality non-jurisdictional wetlands, the Corps will not require compensation for the impacts to the 0.08 acre jurisdictional wetlands. Consequently, the Service believes that the proposal’s impacts to wood stork foraging habitat will be insignificant because it appears the wetland mitigation proposal is consistent with our Guidelines regarding conservation of wetlands in CFAs.

Since adverse effects from this project are unlikely to occur, we recommend that you withdraw your request for formal consultation under the Act and revise your finding to “may affect, not likely to adversely affect” wood storks. This letter may be used as a concurrence of that finding.

Eastern indigo snake

The Corps determined the proposed action “may affect, but is not likely to adversely affect” the eastern indigo snake. Suitable habitat for the eastern indigo snake may exist on-site. The applicant has agreed to comply with the Service’s *Eastern Indigo Snake Standard Construction Conditions* (Service 2004), as a condition of the permit, if issued. Therefore, the Service concurs with the Corps’ determination.

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This letter fulfills the requirements of section 7 of the Act regarding the wood stork and Eastern indigo snake and no further action is required for these species. If modifications are made to the project, if additional information involving potential effects to federally listed species becomes available, or if a new species is listed, reinitiation of consultation may be necessary.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Proposed Action

The applicant proposes to construct a commercial development on a 21-acre site known as “Bristol.” The proposed work included construction of a resort complex with associated parking, maintenance and stormwater management facilities. The project site contains about 17 acres citrus grove that was abandoned after a freeze in 1989. The citrus grove has since reverted to xeric oak scrub. The site also contains about 3 acres of undisturbed xeric oak uplands and 1.5 acres of wetlands. The project will result in 1.5 acres of permanent impacts to wetlands and 17 acres of xeric oak scrub. As compensation for impacts to 1.5 acres of wetlands, the applicant has proposed to purchase mitigation credits at a mitigation bank. The site also contains about 9 acres of sand skink (skink) and bluetail mole skink (skink) habitat that will be impacted by the proposed work. In order to minimize the project’s impacts to sand skinks, the applicant has agreed to purchase 18 acres xeric scrub from the Morgan Lake Wales Preserve. The Corps has assigned application number SAJ-2007-100(NW-IS) to the proposal. The project site is located north of U.S. 192, between Black Lake Road and Sherberth Road, Section 03, Township 25 South, Range 27 East, Osceola County, Florida.

Action Area – Sand Skink and Bluetail Mole Skink

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 resort facility and associated infrastructure. The proposed project may result in a variety of indirect and cumulative effects in the project area. The increase in the local commercial activity will likely stimulate further development in the project area (*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 project area. Consequently, existing skink habitat in the project area is threatened by development. However, the extent of the project’s effects to surrounding lands is difficult to discern. Due to the fragmented configuration and extent of the potentially suitable sand skink habitat present on the project site, the Service has established a skink action area for this project that includes the proposed impacts to 9 acres of occupied skink habitat and the 18 acres of occupied skink habitat to be purchased and preserved/managed as part of the Morgan Lake Wales Preserve in Polk County, Florida. The Service believes an action area of this size is sufficiently large to capture the indirect and cumulative effects resulting from the proposed residential development.

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 with the flexibility to accommodate changes identified through ongoing and planned research and be compatible with adaptive management strategies. These principles 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; Telford 1998; Service 1999). 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 also found on the Mount Dora Ridge (MDR), including sites within the Ocala National Forest (Christman 1970, 1992a). Despite intensive sampling efforts in scrub habitat with similar herpetofauna, the sand skink has not been recorded at Avon Park Air Force Range on the Bombing Range Ridge (Branch and Hokit 2000). 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 primary considerations 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 that 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 that the amount of genetic differentiation between the two species (5 percent) is similar to other species of North American skinks and that *Neoseps*, Stejneger (1910) should be synonymised. They argue that 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 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 that 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” (Burgman 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, 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 that 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 Archbold Biological Station (ABS), Meshaka and Layne (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 (1965) 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 hot fires may negatively affect sand skink densities and 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 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 the bluetail mole skink 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 represent 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 (*Prorethodes* 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. The literature states that sand skinks lay two eggs typically in May or early June (Ashton 2005) under logs or debris, approximately 55 days after mating (Telford 1959). However, there have been observations of three to four eggs per clutch this year (Mushinsky 2007 in litt.). 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 moved less than 40 m between captures, but

some moved over 140m 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 = nine 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 will also be important to preserve the genetic diversity of sand skinks by protecting sites in each of the four genetically distinct populations, from the Mount Dora Ridge, the northern LWR, the central LWR, and the southern LWR.

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% of its estimated historic extent (Turner et al. 2006). Sand skinks are present on sites that total 87.4% 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 84 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 eight 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 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. Turner et al. (2006) suggested that bluetail mole skinks may be under-represented in the reserve network of protected public lands, but could not determine if their absence is a result of exclusion or sampling effort. 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 density study of bluetail mole and sand skinks was conducted in 2004-2005 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 84 sand skinks (ratio = 1:41). Christman (1992) suggested 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 that habitat loss be stopped and that 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 sand and bluetail mole skinks. Both species are endemic to central Florida and are habitat specialists that rely on early successional xeric scrub habitat for their continuing existence. 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). However, the sand skink is relatively widespread in remaining xeric uplands. 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. Combined, these land acquisition programs have protected 10,000 acres of xeric uplands (Florida Department of Environmental Protection 1998, South

Florida Water Management District 1998). 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 – SAND SKINK AND BLUETAIL MOLE SKINK

Status of the Species Within the Action Area

Approximately 9 acres of sand skink occupied habitat has been identified on the Bristol Project site (Figure 2). Occupied habitat delineated for this site consists primarily xeric scrub oak habitat. Occupied areas were delineated by the outcome of a sand skink survey conducted according to the *Sand and Bluetail Mole Skink Survey Protocol and Conservation Guidelines* (Service 2002). A site inspection was also conducted with Service biologists to review the quality of the scrub habitat areas.

Factors Affecting the Species' Environment Within the Action Area

Sand skinks and bluetail mole skinks are vulnerable within the action area due to habitat loss resulting from the intense development pressures related to central Florida's burgeoning human population. From 2004 to 2010, Florida's population is expected to increase 12.2 percent from 17.5 million to 19.7 million (an increase of 366,000 people per year, or 1,000 people per day. Between 2005 and 2060, Florida's population is projected to double to approximately 36 million people (Zwick and Carr 2006). Assuming a similar pattern of development at current gross urban densities for each county, this translates into the need to convert an additional 7 million acres of undeveloped land into urban land uses (Zwick and Carr 2006). Accordingly, it is extremely likely remaining unprotected skink habitats in the project area will be converted to residential subdivisions, golf courses, and shopping centers.

Remaining skink habitats are also threatened by degradation resulting from fire exclusion and lack of management. Xeric habitats favored by skinks require periodic fire to maintain optimal habitat values such as patches of bare sand and low shrub architecture. The need to protect agricultural, residential, and commercial development has resulted in the suppression of wildfires. Furthermore, implementing prescribed burns in areas adjacent to residential areas is difficult due to safety concerns and objections of local residents. The Service is unaware of any recent fires within the action area. Xeric habitats lacking periodic fire or management become overgrown and less suitable to skinks. Over time, skinks will diminish in abundance and eventually may be extirpated. All occupied and potentially suitable skink habitat on the proposed project is isolated habitat within a highly urbanized area. The project site is not likely to provide viable habitat for sand skinks in the long term given existing surrounding land use. The occupied skink habitat in the action area associated with the Morgan Lake Wales Preserve would benefit greatly from burning, roller chopping, and other suitable types of management practices. Mechanical treatments, such as roller chopping, are not the preferred method for management of skink habitat because the use of heavy equipment could potentially crush and kill skinks, adversely affect suitable skink habitat by depositing vegetative debris into bare areas, and compact soils over time. However, mechanical management of skink habitat can be employed if the use of fire is not feasible.

EFFECTS OF THE ACTION – SAND SKINK AND BLUETAIL MOLE SKINK

Factors to be considered

This project site contains potentially suitable skink habitat and is located within 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 phases. The time required to complete construction of the project is not known. The disturbance associated with the project will be permanent and will result in a loss of remnant habitat currently available to the skinks.

Beneficial Effects – About 18 acres of occupied skink habitat located on the Morgan Lake Wales Preserve will be preserved and managed in perpetuity as part of the Management Plan developed for this regionally significant mitigation site. The Morgan Lake Wales Preserve consists of approximately 487 acres located on the Lake Wales Ridge (Figure 3). The purpose for establishing the Morgan Lake Wales Preserve is to conserve these on-site communities and habitats and to manage them in perpetuity for sand skinks, bluetail mole skinks, Florida scrub-jays, gopher tortoises, and other commensal species, including the Florida mouse, eastern indigo snake, Florida gopher frog, and other indigenous wildlife species. The Morgan Lake Wales Preserve has been established and Conservation Rights secured which will be assigned to the FWC on a permit by permit basis, until such time as the entire Preserve has been assigned to the Florida Fish & Wildlife Conservation Commission (FWC). Such assignment of acreages shall be provided as mitigation to offset the development-related loss of habitat for the sand skink, bluetail mole skink, Florida scrub-jay, gopher tortoise and its commensals, in accordance with the conditions of individual permits that may be issued by the FWC and/or Biological Opinions issued by the Service as a result of a Section 7 or Section 10 consultation under the Act.

A Management Plan has been prepared for the Morgan Lake Wales Preserve and approved by the FWC. A Conservation Easement (in a form acceptable by FWC) has been recorded, and a Mitigation Trust Fund Agreement to Demonstrate Perpetual Management Financial Assurance has been executed and accepted by the FWC to assure financial support for dedication and management of the Morgan Lake Wales Preserve in perpetuity. The FWC provided written approval and concurrence with establishment of the Morgan Lake Wales Preserve on May 26, 2006. 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 areas will provide conservation benefits for skinks and promote their long-term persistence.

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 9 acres of occupied 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 proposed work is expected to directly affect 9 acres of sand and bluetail mole skink habitat and result in the incidental mortality of sand and bluetail mole skinks 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. Interrelated actions include road construction to and from the proposed development. Interdependent actions are not 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 commercial development will increase vehicle traffic in the action area. The increase in the commercial activity from the project may stimulate further development in the project 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 may result in the conversion of skink habitat to buildings, parking lots, roadways, and other land uses unsuitable as skink habitat. The habitat loss resulting from these projects may 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 Osceola County. Many of the construction projects 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.

Some 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. Issuance of an incidental take permit under Section 10 of the Act requires the applicant to 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. An acceptable HCP for a non Federal action affecting federally listed skinks would generally require conservation measures that include the enhancement, restoration, or preservation of skink habitat. The Service has considered cumulative effects within the action area for the sand skink and bluetail mole skink, and based on the above discussion, we have not identified any additional cumulative effects beyond those already discussed in the Environmental Baseline.

CONCLUSION

After reviewing the current status of the sand skink and the bluetail mole skink, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the project as proposed, is not likely to jeopardize the continued existence of the sand skink or bluetail mole skink. Critical habitat for the sand skink and bluetail mole skink has not been designated. Therefore, critical habitat will not be affected.

Construction of the project will result in the permanent loss of 9 acres of occupied sand skink and bluetail mole skink habitat. However, the loss of this habitat is expected to be offset by the purchase of appropriate off-site mitigation from the Morgan Lake Wales Preserve, and is not expected to appreciably affect the overall survival and recovery of the sand skink or bluetail mole skink.

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 Atlantic Osceola I, LLC, 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 Atlantic Osceola I, LLC, 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 incidental take, the Corps or Atlantic Osceola I, LLC, 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 ANTICIPATED

The Service has reviewed the biological information for these species, information presented by the applicant's consultant, and other available information relevant to this action, and based on our review; incidental take is anticipated for 9 acres of skink-occupied habitat due to the construction of a new commercial development. The Service anticipates incidental take of sand skinks and bluetail mole skinks will be difficult to detect and quantify for the following reasons: skink density varies considerably within and between apparently suitable habitat patches; density dependent mechanisms are currently unknown and may be due to territorial requirements, micro habitats, and other unknown environmental influences; individuals have a small body size and spend the majority of their time underground; and finding a dead or impaired specimen is unlikely. Bluetail mole skinks have not been located onsite; however, this species is usually found in habitats occupied by sand skinks in Polk, Highlands, and Osceola Counties, and a reliable survey technique to detect bluetail mole skinks is not currently available. However, incidental take of sand skinks and bluetail mole skinks can be anticipated within the 9 acres of occupied 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 9 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.

The Service has determined this level of anticipated take is not likely to result in jeopardy to the species. If during the course of this action, this level of take is exceeded; such take would represent new information requiring review of the reasonable and prudent measures provided. The Federal agency must immediately provide modification of the reasonable and prudent measures.

REASONABLE AND PRUDENT MEASURES

When providing an incidental take statement, the Service is required to give reasonable and prudent measures it considers necessary or appropriate to minimize the take along with terms and conditions that must be complied with, to implement the reasonable and prudent measures. Furthermore, the Service must also specify procedures to be used to handle or dispose of any individuals taken. The Service believes the following reasonable and prudent measures are necessary and appropriate to reduce take and to minimize the direct and indirect effects of the proposed project on the sand skink and bluetail mole skink:

1. Notify the Service of any unauthorized take of sand skinks or bluetail mole skinks.
2. Minimize adverse effects of habitat loss and fragmentation to sand skinks and bluetail mole skinks by implementing an appropriate habitat management plan.

TERMS AND CONDITIONS

To implement the above reasonable and prudent measures, the Service has outlined the following terms and conditions. In accordance with the Interagency Cooperation Regulation (50 CFR 402), these terms and conditions must be complied with to implement the reasonable and prudent measures:

1. As a condition of the permit for the project, the Corps will require the applicant to purchase mitigation credit for 18 acres of sand skink and bluetail mole skink habitat located within the Morgan Lake Wales Preserve. The applicant will finalize the transfer of funds for this purchase prior to commencement of activities authorized under Department of the Army permit application number SAJ-2007-100 (NW-IS), if issued.
2. As a condition of the permit, the Corps will require that the 18 acres of land associated with the mitigation credit purchase are managed in accordance with the Morgan Lake Wales Preserve's Management Plan described in this biological opinion.
3. As a condition of the permit, the Corps will require the applicant to provide a copy of the recorded Mitigation Trust Fund Agreement to assure financial support for dedication and management of the Morgan Lake Wales Preserve in perpetuity. Signed copies of these documents shall be provided to the Service prior to commencement of activities authorized under Department of the Army permit application number SAJ-2007-100 (NW-IS), if issued.
4. As a condition of the permit, 18 acres of preserved skink habitat within the Morgan Lake Wales Preserve, with Conservation Rights for those acres, will be assigned to the FWC prior to commencement of activities authorized under Department of the Army permit application number SAJ-2007-100 (NW-IS), if issued.
5. As a condition of the permit, a detailed monitoring report for the Morgan Lake Wales Preserve will be provided to the Service every five years. The monitoring report will include a discussion of the effectiveness of each management treatment (fire and/or mechanical), unit response to treatment, and responses of skinks to changing habitat conditions.

Upon locating a dead sand skink or bluetail mole skink specimen, initial notification must be made to the nearest Service Law Enforcement Office (Mr. Edward Lewis; Fish and Wildlife Service; 1-(239) 561-8148. Secondary notification should be made to the FWC; 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 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 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. If not specifically instructed by Service law enforcement to submit dead specimens, all dead specimens should be provided to the Florida Museum of Natural History, FL 32960. Contact the museum for details on how best to preserve and provide the specimen.

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 minimize or avoid adverse effects of a proposed action on Act listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following:

- Place any additional sand skink habitat on the project site, not needed for construction of the project, under conservation easement.

REINITIATION - CLOSING STATEMENT

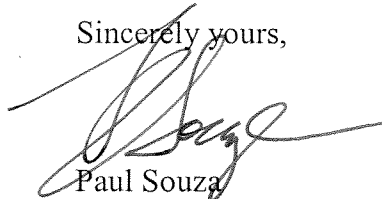
This concludes formal consultation on the Bristol project. As provided in 50 CFR Section 402.16, reinitiation of formal consultation is required when discretionary Federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect Act listed species or critical habitat in a manner or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the Act listed species or critical habitat not considered in this biological opinion; or (4) a new species is listed or critical habitat is 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.

FISH AND WILDLIFE RESOURCES

The Service recommends following the Clean Water Act section 404(b)(1) guidelines in the sequence of avoidance, minimization, and the provision of compensatory mitigation for wetland impacts.

Thank you for your cooperation and effort in protecting fish and wildlife resources. If you have any questions regarding this project, please contact Chuck Kelso at 772-562-3909, extension 241.

Sincerely yours,



Paul Souza
Field Supervisor
South Florida Ecological Services Office

cc:

Corps, Cocoa, Florida (Irene Sadowski)
District, Orlando, Florida
FWC, Vero Beach, Florida
Service, Atlanta, Georgia (Noreen Walsh) electronic copy

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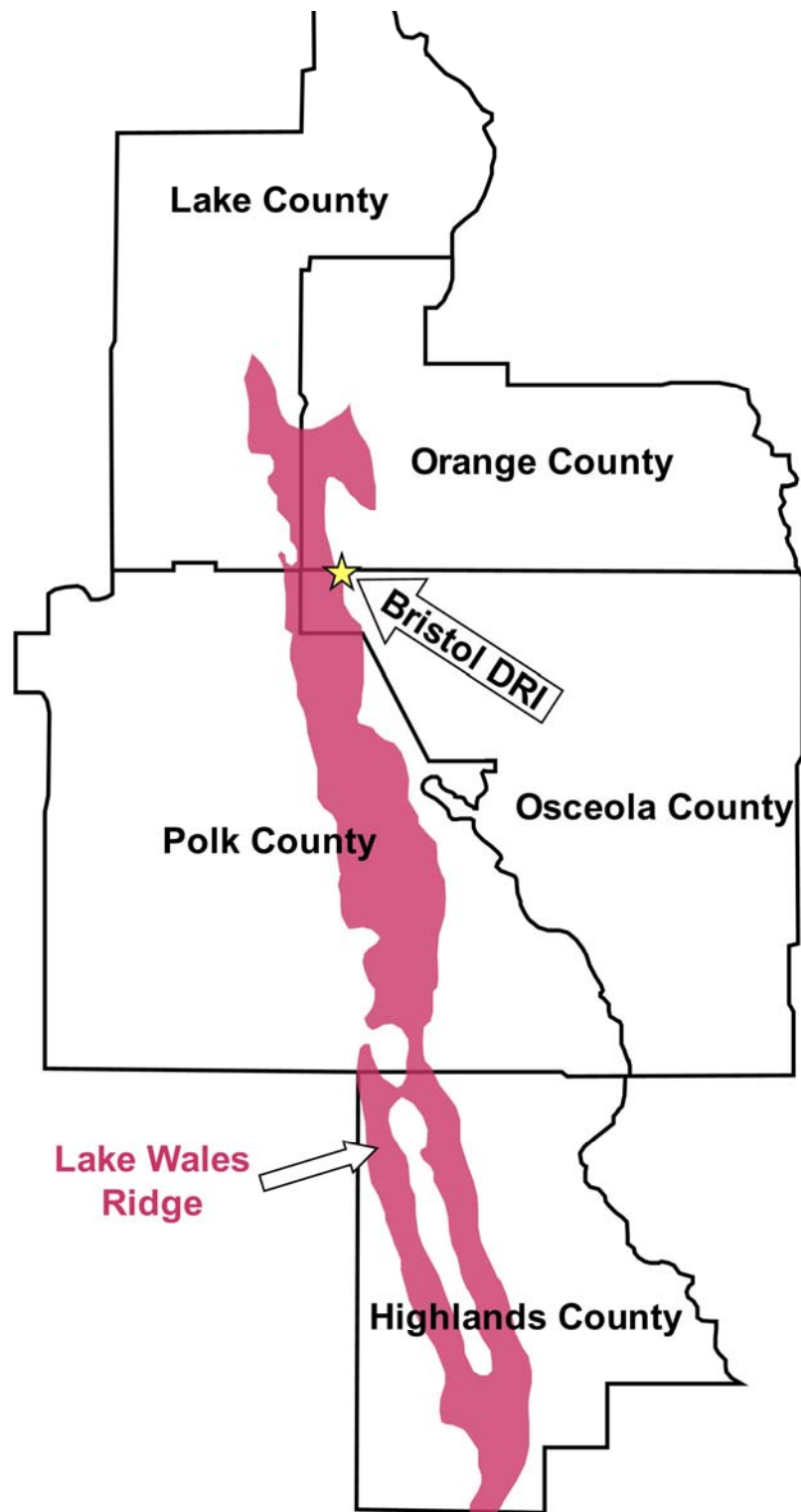


Figure 1. Map showing the location of the Bristol project site.

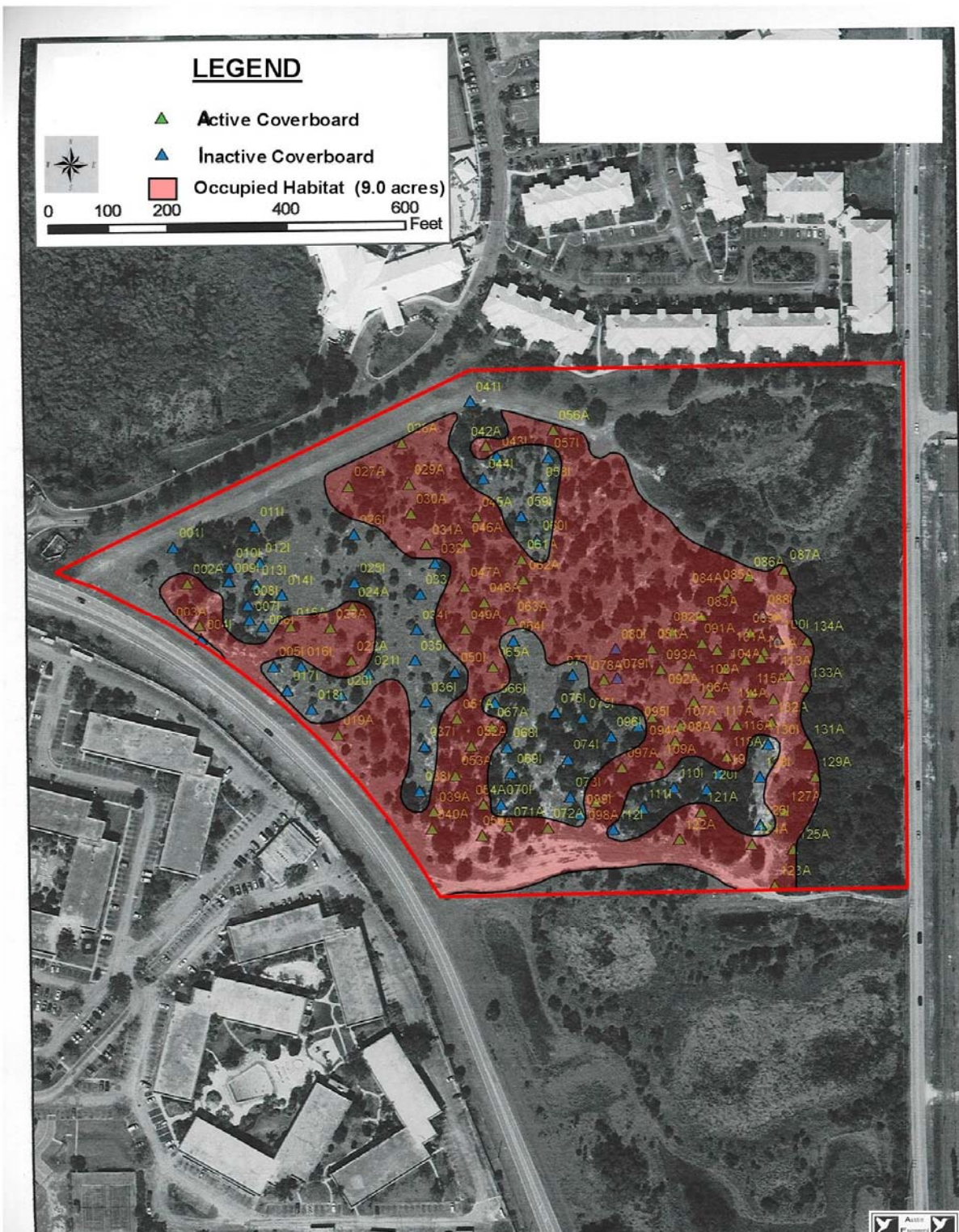


Figure 2. Map showing the skink-occupied habitat on the Bristol site.

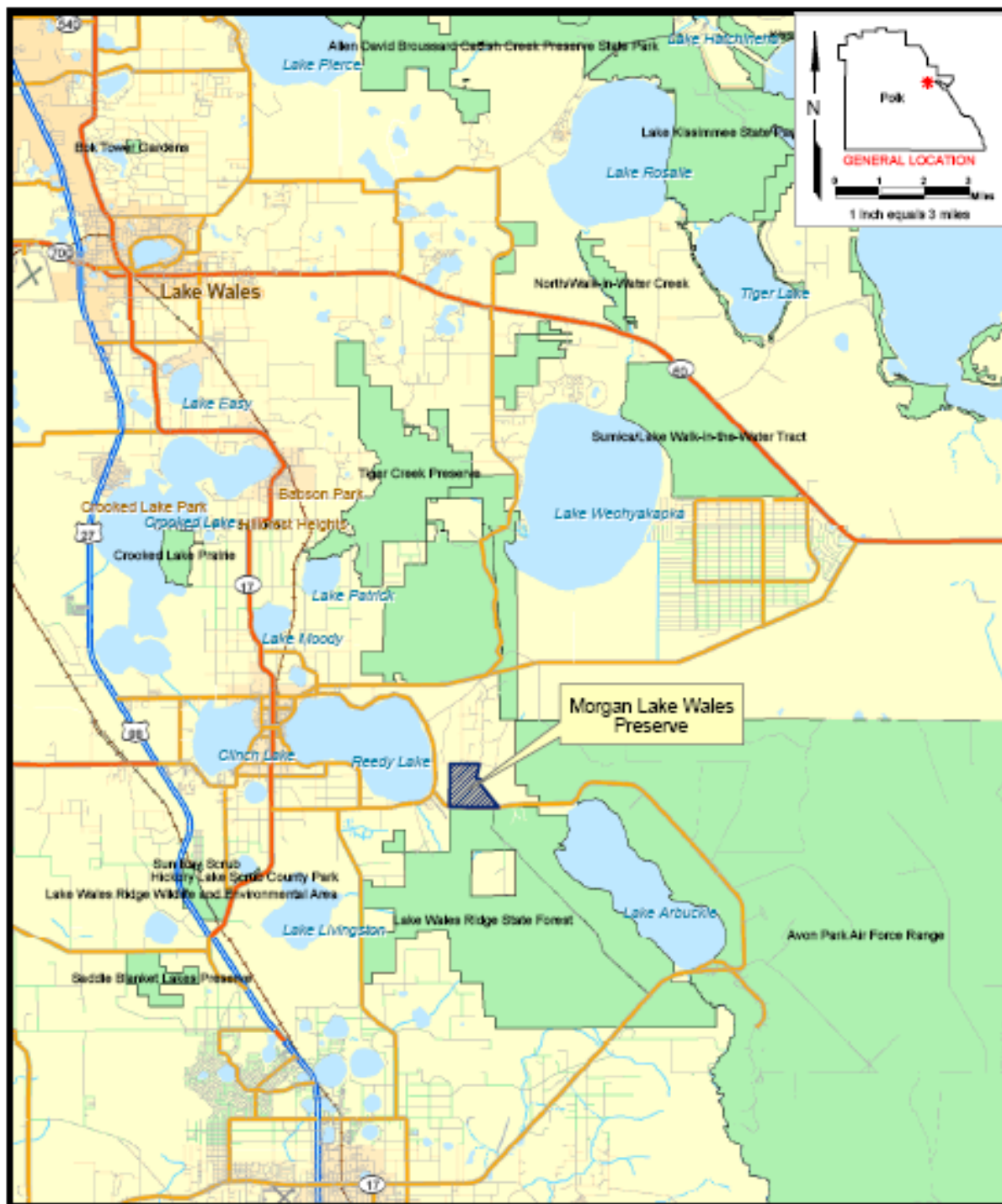


Figure 3. Map showing the location of the Morgan Lake Wales Preserve in Polk County.