

**WILDLIFE SURVEY RESULTS
TARMAC KING ROAD LIMESTONE MINE
LEVY COUNTY, FLORIDA**

**Issued September 2008
Revised July 2009**

Prepared for:



Mr. Edward P. Sarfert
USACOE
Pensacola Regulatory Office
41 N. Jefferson Street, Suite 111
Pensacola, FL 32502

and



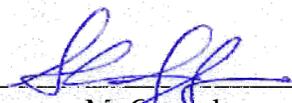
Ms. Candace Martino
US Fish and Wildlife Service
7915 Baymeadows Way, Suite 200
Jacksonville, Florida 32256-7517

Prepared by:



ENTRIX, Inc.
3905 Crescent Park Drive
Riverview, FL 33578


Annette L. Doyle
Senior Ecologist


Shannon M. Gonzalez
Senior Project Scientist

1.0 Introduction

Tarmac America is proposing a Tarmac King Road Mine project area on a $\pm 9,277$ -acre site located one mile west of U.S. 19 and two miles north of S.R. 40 in Levy County, Florida (Figures 1 – 3). The project purpose is to provide construction grade aggregate that meets the Florida Department of Transportation (FDOT) specifications for buildings and infrastructure. The proposed mine will provide this aggregate for the use of Tarmac and its customers in the west central region of Florida.

Tarmac submitted a Section 404 Clean Water Act dredge and fill permit application to the US Army Corps of Engineers (COE) on 14 September 2007. As a result of this application, the COE determined that an Environmental Impact Statement (EIS) would be required and advertized the initiation of the EIS process in the Federal Register on 19 February 2008. On behalf of the Applicant, ENTRIX, Inc. (f.k.a., Biological Research Associates -BRA), submitted to the COE and the U.S. Fish and Wildlife Service (FWS) a wildlife survey report for the project on 15 October 2008. The wildlife survey methodology was coordinated with both agencies. Subsequently, additional wildlife observations have been made and the activities proposed on various portions of the site clarified. This report updates the wildlife survey results to conform to these changes and to assist in the evaluation of the effects of the proposed action on wildlife.

The Tarmac King Road Limestone Mine consists of a $\pm 4,762$ -acre Mine Parcel and a $\pm 4,515$ -acre Mitigation Parcel that contiguous (Figure 4). Under the Applicant's preferred alternative, mining and related infrastructure development will occur on $\pm 3,899$ acres of the Mine Parcel (Mine/Disturb Area) with the remainder (± 863 acres, No Mine Area) left undisturbed (Figure 5). These undisturbed areas include all intermittent streams on the Mine Parcel with 25' wetland setbacks, and a natural vegetative buffer of variable width around the perimeter of the Mine Parcel.

2.0 Survey Methods

ENTRIX developed the sampling design specifically to satisfy the EIS survey requirements. Surveys were conducted across the entire site, including representative habitats at sampling locations on Mine/Disturb and No Mine Areas of the Mine Parcel and the Mitigation Parcel. The habitat types proposed for sampling have been assigned a land use code based on the Florida Land Use, Cover and Forms Classification System (Figure 6, FLUCFCS: Florida Department of Transportation, 2004). For the design of the wildlife sampling methodology, different FLUCFCS land types were lumped into five habitat types based on upland/wetland character and degree of silviculture and/or land management activities (Figure 7). The sampling design combines meandering transects with predetermined sampling locations. Both pedestrian and vehicular meandering transects were conducted randomly during all four seasons to cover all land use types identified on the site. In addition to the seasonal surveys, several repeated pedestrian and vehicular transects that were good representative transects were repeated during every season.

Surveys were conducted in the summer (1 August 2007 – 30 September 2007); fall (1 October 2007 – 30 November 2007); winter (1 December 2007 – 15 March 2008); or spring (16 March 2008 – 7 June 2008) based on the suggested survey windows (Table 1). Additional wildlife observations were included in the database as they became available.

Table 1 Survey Timeline for Wildlife Surveys on the Tarmac King Road Limestone Mine

Survey Type/Species	Summer	Fall	Winter	Spring
	1 Aug 07 – 30 Sept 07	1 Oct 07 – 30 Nov 07	1 Dec 07 – 15 Mar 08	15 Mar 08 – 7 Jun 08
Meandering Transects	X	X	X	X
Repeated Transects	X	X	X	X
Helicopter Survey	--	--	X	--
Small Mammal Trapping	--	--	X	X
Florida Scrub-Jay Survey	--	--	--	X
Bird Survey	--	X	X	X
Southeastern American Kestrel Survey	--	--	--	X
Red-cockaded Woodpecker Survey	--	--	X	X
Freshwater Fish Survey	^	--	X	X
Aquatic Trap	^	--	X	--
Frog Survey	^	^	X	^

X = surveys conducted

^ = surveys not conducted due to absence of water

-- = no surveys proposed

3.0 Habitat Types

ENTRIX utilized land use coverage (Figure 6) and soil data along with field verification to determine suitable habitat for specific surveys. Sampling locations were chosen to represent similar habitat types present in both Mine and No Mine areas (Table 2). General habitat types include Upland Planted Pine, Wetland Planted Pine, Natural Upland Forest, Natural Wetland Forest, and Deep Water Habitats (Figure 7). The following section provides a brief description of the five habitat types.

Table 2 Sampling Locations by Habitat Type

Habitat Type	Acres	FLUCFCS Designation (acres)	Sampling Locations	
			Mine	No Mine
Upland Planted Pine	1911.7	441, 443	4	4
Wetland Planted Pine	3615	6291, 6292, 6301	2	3
Natural Upland Forest	250.3	425, 427, 434	1	1
Natural Wetland Forest	2814.8	617, 621, 628, 630, 633	4	4
Deep Water Habitats	585	510, 530, 616a, 616b, 641, 642, 651	2	2

UPLAND PLANTED PINE

Within this habitat type two land uses were distinguished according to FLUCFCS. This distinction was based on canopy age as follows: age of the tree stand: Upland Coniferous Plantation >8 years old (FLUCFCS 441) and Upland Coniferous Plantation < 8 years old (FLUCFCS 443). The common pine species on the site is loblolly pine (*Pinus taeda*). Tree stands are typically generated by aerial seeding and are densely uniform. In stands greater-than eight years, the canopy is typically dominated by loblolly pine

with occasional hardwood species such as live oak (*Quercus virginiana*), laurel oak (*Q. laurifolia*), water oak (*Q. nigra*), and sweetgum (*Liquidambar styraciflua*). The subcanopy in these areas consists mainly of sapling loblolly pine and yaupon holly (*Ilex vomitoria*). The shrub layer is sparse due to the dense canopy cover and historic silvicultural practices and is dominated by saw palmetto (*Serenoa repens*). Herbaceous cover in this community is sparse and includes saw greenbrier (*Smilax bona-nox*), blackberry (*Rubus* spp.), and muscadine grape (*Vitis rotundifolia*).

In stands less than eight years old, the area has either been cleared or recently planted with pine. These areas are typified by a sparse canopy cover, and only a few individual live oak, laurel oak, and sweetgum are found scattered throughout the stratum. Due to the recent clearing activities opportunistic species are recruiting in the subcanopy and shrub stratum, including saplings of live oak, eastern red cedar (*Juniperus virginiana*), persimmon (*Diospyros virginiana*), American elm (*Ulmus americana*), swamp dogwood (*Cornus foemina*), and pignut hickory (*Carya glabra*). Herbaceous cover is dense and speciose due a sparse canopy and disturbance of the soil surface. As the canopy matures, the shrub and groundcover stratum thins and becomes more sparse due to shading and crowding.

WETLAND PLANTED PINE

Within this sample location two land use types, in both Mine and No Mine Areas, were distinguished by age of the tree stand: Hydric Coniferous Plantation >8 years old (FLUCFCS 6291) and Hydric Coniferous Plantation < 8 years old (FLUCFCS 6292), and Wetland Forested Mixed – Cleared (FLUCFCS 6301). These habitat types were sampled because of their jurisdictional status and general habitat type. The common pine species on the site is loblolly pine. Tree stands are typically generated by aerial seeding and are densely uniform. In stands greater-than eight years, the canopy is typically dominated by loblolly pine with occasional hardwood species such as laurel oak, water oak, Florida maple (*Acer saccharum* subsp. *floridanum*), pop ash (*Fraxinus caroliniana*), and red maple (*Acer rubrum*). The subcanopy in this area consists mainly of sapling loblolly pine and recruiting canopy species. The shrub layer is sparse due to the dense canopy cover and historic silvicultural practices and is dominated by gallberry (*Ilex glabra*) and groundsel bush (*Baccharis halimifolia*). Herbaceous species are infrequent due to the dense canopy cover and include snakeroot (*Eryngium yuccifolium*), beakrush (*Rhynchospora* spp.), and musky bushmint (*Hyptis alata*).

In stands less than eight years old, the area has either been cleared or recently planted with loblolly pine. These areas are typified by a sparse canopy cover and only a few individual water oak, Florida maple and sweetgum are found scattered throughout the stratum. Due to the recent clearing activities, opportunistic species are recruiting in the subcanopy and shrub stratum, including saplings of laurel oak, sweetbay (*Magnolia virginiana*), American elm, swamp dogwood, and pignut hickory. Herbaceous cover is dense and speciose due a sparse canopy and disturbance of the soil surface. Common herbaceous species include dog fennel (*Eupatorium capillifolium*), milkweed (*Asclepias* spp.), and slender woodoats (*Chasmanthium laxum*).

NATURAL UPLAND FORESTS

A variety of FLUCFCS classifications were included in the Natural Upland Forest habitat type, including Temperate Hardwood Forests, Live Oak, and Hardwood-Conifer Mixed (FLUCFCS 425, 427, and 434, respectively). These areas are generally the least disturbed upland habitat type with minimal silvicultural activity and are typically confined to slopes between Upland Planted Pine and Natural Wetland Forests or Deep Water Habitats.

The canopy encountered is dense and comprised of mainly slash pine (*Pinus elliottii*), loblolly pine, live oak, eastern red cedar, cabbage palm, and American basswood (*Tilia americana* var. *caroliniana*). The shrub stratum is typically sparse due to the dense canopy cover and consists almost entirely of saw

palmetto. Herbaceous species within Natural Upland Forests is quite diverse and cover is typically sparse throughout and most dense in tree fall gaps and cleared areas.

NATURAL WETLAND FORESTS

A variety of FLUCFCS classifications are included within the Natural Wetland Forests habitat type including Mixed Wetland Hardwoods, Cypress, Mesic Oak, Wetland Forested Mixed, and Coastal Maritime Hammock (FLUCFCS 617, 621, 628, 630, 633). These areas are generally minimally disturbed with minimal silvicultural activity due to their hydric regime. The canopy encountered is typically dense and very diverse. The shrub stratum is also diverse and consists of sapling tree species and common shrubs such as saw palmetto and hawthorns (*Crataegus* spp.). Herbaceous species within Natural Wetland Forests is quite diverse and cover was typically sparse throughout due to the dense overstory.

DEEP WATER HABITATS

A variety of FLUCFCS classifications were included within the Deep Water Habitats type including Streams and Waterways, Borrow Pits, Inland Ponds and Sloughs, Freshwater Marsh, Saltwater Marsh, Tidal Flats (*FLUCFCS 510, 530, 616a, 616b, 641, 642, and 651*).

These areas are typically inundated year round or are seasonally flooded. Two named systems, Spring Run, and Bone Slough, are included within this habitat type. Borrow pits occur in areas where limerock was excavated for construction of the network of roads on the site. Isolated freshwater marshes are infrequent, generally herbaceous, and typically only seasonally flooded. The saltwater marshes and tidal flats are found only on the No Mine Areas and are tidally connected to the Waccasassa Bay State Preserve, Demory Creek, and the Gulf of Mexico.

4.0 Wildlife Survey

A scientific literature search was conducted to determine current and historic distributions and abundances of all vertebrates (mammals, birds, reptiles, amphibians and fishes) known from the region. This search focused on native species, but also included well-known naturalized non-native vertebrate species. These lists were annotated with (1) information on distribution, historical abundance, existing abundance, seasonality, and general habitat requirements for each species, (2) source(s) of status information, (3) an indication of whether a species would be expected to occupy available habitats or be restricted to only a portion of it, and (4) some indication of the amount of published or otherwise available biological/ecological information available on each species (e.g., scant, minimal, ample, abundant).

A concise “checklist” of all the identified animal species was prepared for reports and for use during field activities associated with this project to assist biologists in appropriately recording observations during survey and mapping efforts. The checklist also identified the listing status of all species considered imperiled by the Florida Fish and Wildlife Conservation Commission (FFWCC) or USFWS.

MEANDERING AND REPEATED TRANSECTS

Pedestrian and vehicular transects were conducted during summer, fall, winter and spring to look for any wildlife species, including migratory species, occurring on the property. Surveys were conducted between 0600 and 1200 and again between 1500 and 2000. During these surveys, biologists recorded all sightings, bird calls and sign (tracks, scat, etc.) of listed and non-listed wildlife that were observed on the site. Transects were conducted in all suitable habitat. Open areas that offered good visibility and were easily accessible by vehicle were driven. Pedestrian transects were conducted in all other areas.

While conducting meandering transects, biologists searched for gopher tortoise (*Gopherus polyphemus*) burrows and investigated the mouth of any burrows found for signs of use by gopher frogs (*Rana capito*), eastern indigo snakes (*Drymarchon corais couperi*), and Florida mice (*Podomys floridanus*). Biologists searched for burrowing owls (*Speotyto cunicularia*) and Florida sandhill cranes (*Grus canadensis pratensis*) in suitable habitat. Logs were randomly overturned along transects and the ground was scanned for evidence of other reptiles and amphibians. Biologists surveyed for Sherman's fox squirrels (*Sciurus niger shermani*) and their feeding stations especially under pines and oaks, where nests are typically located. During transects conducted at dusk, biologists inspected dead cabbage palm fronds, Spanish moss (*Tillandsia usneoides*) hanging from oaks, sheaths of bark on snags, and the crevices of hollow trees for the presence of bat species, such as the eastern red bat (*Lasiurus borealis*), Seminole bat (*Lasiurus seminolus*), and northern yellow bat (*Lasiurus intermedius*). Biologists searched for bald eagles (*Haliaeetus leucocephalus*) as well as bald eagle nests in all suitable trees. All ditches, ponds and wetlands were surveyed for American alligators (*Alligator mississippiensis*) and listed wading birds, including the roseate spoonbill (*Ajaja ajaja*), white ibis (*Eudocimus albus*), little blue heron (*Egretta caerulea*), snowy egret (*Egretta thula*), tri-colored heron (*Egretta tricolor*), wood stork (*Mycteria americana*) and limpkin (*Aramus guarauna*). The results of these surveys are summarized in Table 6.

The locations of each transect, as well as the location of all species and/or sign of listed species (e.g. nests) were recorded with Global Positioning System (GPS) when available or directly marked on 1"=200' ortho rectified aerial photographs. These data are provided on Figure 8. The data was also recorded on printed data sheets and entered into a database. While on meandering pedestrian transects, biologists sometimes crossed No Mine and Mine /Disturb Area boundaries in the Mine Parcel. To be conservative, in these cases species observed were recorded as occurring within Mine/Disturb Areas.

HELICOPTER SURVEY

Aerial surveys are the most effective survey method for identifying wading bird nesting and roosting colonies and locating Florida sandhill crane and bald eagle nests. As such, ENTRIX conducted a helicopter aerial survey of the site in February 2008. The survey was conducted to search for early nesting wading birds, Florida sandhill crane nests and eagle nests. The entire site was viewed from a helicopter by experienced ecologists. Observations were marked on an ortho-rectified infrared image and digitized into a GIS database. Survey coverage is depicted on Figure 8 and notable observations are included on Figure 9 and Table 6.

SMALL MAMMAL TRAPPING

Small mammal trapping was conducted during winter in suitable habitat at 21 sample locations within the five habitat types. An additional week of sampling was added during summer 2008. At each wildlife survey station, Sherman live traps were laid out on transects with 30 traps per transect (Figure 8). Traps were baited with sunflower seeds and set in the late afternoon. The following morning the traps were checked and closed for the day, and then reset in the late afternoon. Each trapping session occurred for four consecutive nights.

Separate surveys for the salt marsh vole (*Microtus pennsylvanicus dukecampbelli*) were conducted during March 2008. These surveys were not associated with wildlife sampling stations and occurred within No Mine areas associated with salt marsh communities adjacent to Waccasassa Bay. Suitable salt marsh habitat was identified by large areas of saltgrass (*Distichlis spicata*) abutting or surrounded by needlerush (*Juncus roemerianus*). Two areas with suitable habitat were identified within the site boundary (Figure 8). Thirty stations across the two areas were trapped with two traps per station for four nights for a total of 240 trap nights.

BIRD SURVEYS

Twenty-seven bird survey locations were established within the boundaries of each of the five habitat types (Figure 8). Each survey took place on calm mornings beginning at or near sunrise. Survey protocol was to listen for five minutes without auditory enticement, followed by a ten-minute survey using a recording of screech owl (*Megascops asio*) to draw inconspicuous song birds closer for identification. Species, behavior and microhabitat classifications were noted.

AMPHIBIAN, REPTILE, AND FRESHWATER FISH SURVEYS – AQUATIC TRAPS

Baited aquatic funnel traps were used to catch aquatic amphibians and reptiles, as well as freshwater fish. Survey dates and exact locations were dependent on water levels. Three traps were placed at 14 survey sites (Figure 8) in wetlands and opened for 3 trap nights in winter and spring for a total of 126 trap nights. Each trap was baited with five nuggets of commercially available catfish bait. All vertebrates were identified and released on-site.

FRESHWATER FISH SURVEYS

Fish sampling was conducted in at 9 sample locations in aquatic habitats during spring 2008. Survey dates and exact locations were dependent on water levels (Figure 8). Three methods of fish sampling were employed during the survey. Electrofishing was conducted using a Smith-Root model LR-24 electroshocking backpack unit. This method is particularly useful in areas with limited mobility as well as open water because the hand-held electrode and capture net can be maneuvered in small areas where the use of larger sampling tools is not possible. Seining was employed in open areas. Seines were 6 to 10 feet in length, 4 feet wide, and constructed of 1/4-inch nylon square mesh. Cast netting was used in open water where water depths were unsuitable for wading, thereby eliminating seining or electrofishing. The cast net had a radius of 6 feet and is constructed of 3/8-inch (stretched) monofilament webbing. The specific sampling methodology used was recorded for each site. Captured individuals were identified to species, recorded, and released.

FROG CENSUS

A census consisting of roadside nighttime surveys was used to identify breeding habitat utilization by frog species. The censuses were conducted according to the North American Amphibian Monitoring Protocol (NAAMP). Census locations were selected based on aerial representation of 1 habitat and ease of accessibility (Figure 8). Biologists recorded the calling index of each species within 20 meters of the roadway, at 14 sample locations. Surveys began 30 minutes after sunset and were completed before 0100. Surveys were conducted after or during rainfall events when temperatures were higher than 55°F and wind is less than 12 mph. Biologists listened for five minutes at each stop and recorded the call index for each observed species.

An additional anuran survey method consisted of placing two 1.5-inch diameter PVC poles in shade at each sampling location (Figure 8) to survey for treefrogs. The pipes were placed during winter to better target rainfall events and the subsequent movement of frogs. Pipes were checked for the presence of frogs after rain events and during wildlife surveys at the sampling locations.

SUITABLE HABITAT SURVEYS

In-depth GIS analyses were combined with habitat conditions during meandering transects to determine if suitable habitat for Florida the scrub-jay (*Aphelocoma coerulescens*), red-cockaded woodpecker (*Picoides borealis*), or southeastern American kestrel (*Falco sparverius paulus*) occurs on the site. The results of this survey revealed that no suitable on-site habitat is present for any of these species and, as a result, no further specific surveys were performed.

LISTED PLANT SURVEY

While conducted our wildlife survey, ENTRIX ecologists searched for plant species listed by the USFWS as threatened or endangered, listed by the Florida Department of Community Affairs (DCA) as critically imperiled, imperiled, or rare, and listed by the Florida Department of Agriculture and Consumer Services (FDACS) as threatened or endangered during all meandering pedestrian transects.

5.0 Survey Results

From 29 August 2007 through 7 June 2008 a total of 112 meandering pedestrian transects ranging from 0.29 – 10.72 kilometers were conducted, totaling over 165 miles. The total combined time spent surveying transects was 492 hours. Of these transects, 22 occurred throughout Proposed Mine Areas, 52 occurred through No Mine Areas, and 36 crossed Proposed Mine and No Mine Areas at least once (Figure 8). Meandering transects were conducted throughout all seasons: 27 occurred during winter, 12 during spring, 12 during fall, and 61 during summer. Repeated transects were completed during every season and totaled 882 miles. The total combined time spent conducting these transects was 1907 hours. These transects occurred throughout Proposed Mine Areas and through No Mine Areas (Figure 8). A summary of linear distance for transects in Mine and No Mine Areas is included in Table 3.

Table 3 Vehicular and Pedestrian Listed Wildlife Transects	
Habitat Type	Transect Miles Surveyed
Upland Planted Pine 441, 443	218
Wetland Planted Pine 6292, 6291, 6301	440
Natural Upland Forests 425, 427, 434	24
Natural Wetland Forests 617, 621, 628, 630, 633	254
Deep Water 510, 530, 616a, 616b, 641, 642, 651	83
Total	1020

SMALL MAMMAL TRAPPING

Surveys for small mammals across 21 sample locations, for 2,520 trap nights, yielded four small mammal species. On No Mine Areas all four species were represented including the cotton mouse (*Peromyscus gossypinus*), cotton rat (*Sigmodon hispidus*), eastern wood rat (*Neotoma floridana*) and opossum (*Didelphis virginiana*). On Proposed Mine Areas, the cotton mouse and eastern woodrat were the only two small mammal species observed. A separate survey was conducted for salt marsh vole (*Microtus pennsylvanicus dukecampbelli*) at two salt marsh small mammal trap locations (Figure 6) for a total of 240 trap nights along Waccasassa Bay (No Mine Area). Only one species, the marsh rice rat (*Oryzomys palustris*), was observed during this effort.

BIRD CALL SURVEYS

Bird surveys yielded 60 species, 8 of which were not observed via any other survey method. These species include the gray-cheeked thrush (*Catharus minimus*), Swainson’s thrush (*Catharus ustulatus*), brown creeper (*Certhia familiaris*), northern flicker (*Colaptes auratus*), Swainson’s warbler (*Limnothlypis swainsonii*), ruby-crowned kinglet (*Regulus calendula*), brown-headed nuthatch (*Sitta pusilla*), and black-whiskered vireo (*Vireo altiloquus*).

AQUATIC TRAPPING

A total of 9 species of fish, amphibian, and reptile were observed with surveys using aquatic traps. Of these species, 5 were not observed via any other survey method and include the pirate perch, marsh killifish (*Fundulus confluentus*), Seminole killifish (*Fundulus seminolis*), two-toed amphiuma (*Amphiuma means*), and peninsula newt (*Notophthalmus viridescens piaropicola*).

FRESHWATER FISH SAMPLING

Freshwater fish surveys included electrofishing, cast netting, and seine netting and resulted in 15 species observations. Of these species, nine were not observed via any other survey method and include the lake chubsucker (*Erimyzon sucetta*), swamp darter (*Etheostoma fusiforme*), golden topminnow (*Fundulus chrysotus*), least killifish (*Heterandria formosa*), dollar sunfish (*Lepomis marginatus*), redear sunfish (*Lepomis microlophus*), spotted sunfish (*Lepomis punctatus*), white mullet (*Mugil curema*), and golden shiner (*Notemigonous crysoleucas*).

FROG CALL CENSUS

A total of 14 stations across No Mine and Mine Areas were established as frog call survey locations where six species were identified over a total of 56 sampling events. These species included the southern toad (*Anaxyrus [= Bufo] terrestris*), Cope’s grey treefrog (*Hyla chrysoscelis*), Florida chorus frog (*Pseudacris nigrita*), little grass frog (*Pseudacris ocularis*), bullfrog (*Lithabates [= Rana] catesbeiana*), and southern leopard frog (*Lithabates [= Rana] sphenoccephala*). The Florida chorus frog was observed at every station and was the most abundant; calling index values were highest for this species.

The 54 PVC pipes installed in February of 2008 to identify treefrogs on-site (Figure 8) were checked on 5 and 26 March and did not yield any species.

HELICOPTER SURVEY

On 5 February 2008, biologists conducted an aerial survey by helicopter. Biologists searched the site for wading birds, sandhill cranes (*Grus canadensis*), and bald eagle (*Haliaeetus leucocephalus*) nests and other listed species. Two bald eagle nests were located off site. One nest is north of the site in a large live oak snag. Another nest is located southeast of the site in a live pine tree on an island in Waccasassa Bay (Figure 9). No sandhill crane nests were observed during the survey and little nesting habitat exists on the site. Two wading bird roosts were seen in the No Mine Area (Figure 9). The northern roost had 20 wood storks (*Mycteria americana*) and 10 great egrets (*Ardea alba*) and the southern roost had 20 wood storks, 15 great egrets and 15 white ibises (*Eudocimus albus*).

LISTED PLANT SURVEY

No federally listed plant species were observed during the survey and none are known from Levy County. Six state listed plant species were observed on meandering pedestrian transects during the survey. Only two of the six species occurred within Proposed Mine Areas, while all six species were observed on No Mine Areas. The six species observed and their status is listed in Table 4.

Species Name	Common Name	DCA	FDACS
<i>Leitneria floridana</i>	corkwood	Rare	Threatened
<i>Lobelia cardinalis</i>	cardinal flower	--	Threatened
<i>Matalea</i> spp.	unidentified shiny-pod	Imperiled or Critically Imperiled	Endangered
<i>Matalea gonocarpus</i>	climbing anglepod	--	Threatened

<i>Phyllanthus liebmannianus</i> subsp. <i>platylepis</i>	pinewood dainties	Imperiled	Endangered
<i>Rudbeckia triloba</i> var. <i>pinnatifida</i>	pinnate-lobed coneflower	--	Endangered

6.0 Discussion

A total of 187 vertebrate species (24 fishes, 16 amphibians, 27 reptiles, 104 birds, and 16 mammals) were recorded from the Tarmac King Road Limestone Mine from 29 August 2007 through 7 June 2008. No Mine Areas tended to have the highest number of species (156) followed by Mine Areas (133). Table 5 shows the total number of species observed on the site.

	Fish	Amphibians	Reptiles	Birds	Mammals	Total
Total Number of Individuals	1359	2728	247	3650	740	8724
Species within No Mine Areas	20	13	23	86	14	156
Species within Mine Areas	13	13	14	80	13	134
Overall Number of Species	24	16	27	104	16	187

Birds were the most speciose class of vertebrates (104) and tended to be the most widely distributed. The most commonly observed species were the northern cardinal (*Cardinalis cardinalis*), American crow (*Corvus brachyrhynchos*), white-eyed vireo (*Vireo griseus*), and pileated woodpecker (*Drycopus pileatus*). Reptiles were the second most speciose class with 27 species recorded from both Mine and No Mine areas. The ground skink (*Scincella lateralis*) and green anole (*Anolis carolinensis*) were the most common reptile species.

Of the 25 fish species observed, the eastern mosquitofish (*Gambusia holbrooki*) and least killifish (*Heterandria formosa*) were the most widely distributed across Mine and No Mine areas. The nine-banded armadillo (*Dasypus novemcinctus*), white-tailed deer (*Odocoileus virginianus*) and cotton mouse (*Peromyscus gossypinus*) were the most common of the 16 mammal species observed. Sixteen species of amphibians were observed, with the Florida chorus frog (*Pseudacris nigrita verrucosa*) and southern toad (*Anaxyrus [= Bufo] terrestris*) observed most frequently.

Biologists observed several listed species within the site considered Endangered, Threatened, or of Special Concern by the Florida Fish and Wildlife Conservation Commission (FFWCC) under Chapter 68A-27.002-004 F.A.C. or as Endangered or Threatened by the United States Fish and Wildlife Services (USFWS) under 50 CFR 17 (Table 6). One active gopher tortoise burrow was observed but no gopher frogs or Florida mice were observed on the site or while inspecting the single burrow. No suitable habitat for burrowing owls was found on the site and no burrowing owls were observed. Three Western indigo snakes were observed on the site (Figure 9). Florida sandhill cranes, Sherman's fox squirrels, and bats were not observed. Three bald eagles were observed perching on snags or flying over the site. Twenty-one American alligators, 2 roseate spoonbills, 88 white ibises, 19 little blue herons, 10 snowy egrets, 6 tri-colored herons, 78 wood storks, and 1 limpkin were observed foraging and or loafing in the ditches, ponds, and wetlands on the site during wildlife transect surveys (Figure 9). Most of the wading birds, including wood storks were seen in the two roosts found on the No Mine site.

NO MINE AREAS

A total of 156 species were observed within No Mine Areas via meandering pedestrian transects and at wildlife sampling stations (Table 5). Within No Mine Areas, a total of 20 species of fish were observed; common species include the eastern mosquitofish, least killifish, sailfin molly (*Poecilia latipinna*),

Florida flagfish (*Jordanella floridae*), and white mullet (*Mugil curema*). Less abundant species include the pirate perch (*Aphredoderus sayanus*), sheepshead minnow (*Cyprinodon variegatus*), and Atlantic needlefish (*Strongylura marina*). Species collected only on No Mine Areas include the marsh killifish (*Fundulus confluentis*), Seminole killifish (*Fundulus seminolis*), longnose gar (*Lepisosteus osseus*), and spotted sunfish (*Lepomis punctatus*).

Fourteen amphibian species were observed within No Mine Areas. Common species include the Florida chorus frog, southern toad, southern leopard frog, pig frog ([*Lithabates* = *Rana*] *grylio*), and squirrel treefrog (*Hyla squirella*). Less abundant species include the green treefrog (*Hyla cinerea*), oak toad ([*Anaxyrus* = *Bufo*] *quercicus*), two-toed amphiuma, Cope's grey treefrog, and Florida cricket frog (*Acris gryllus dorsalis*). Species unique to No Mine Areas include the bullfrog, Cope's grey treefrog, and the Florida cricket frog.

Twenty-three species of reptiles were observed within No Mine Areas with the most common species being the ground skink, green anole, American alligator, and Florida cottonmouth (*Agkistrodon piscivorus conanti*). Other species were less abundant and those only found on No Mine areas include chicken turtle (*Deirochelys reticularia*), yellow-bellied slider (*Trachemys scripta*), Florida cooter (*Pseudemys floridana*), Eastern diamondback rattlesnake (*Crotalus adamanteus*), southern ringneck snake (*Diadophis punctatus punctatus*), Eastern indigo snake (*Drymarchon couperi*), Florida mud turtle (*Kinosternon subrurum*), Florida kingsnake (*Lampropeltis getula*), scarlet kingsnake (*Lampropeltis triangulum elapsoides*), eastern coral snake (*Micrurus fulvius fulvius*), gulf salt marsh snake (*Nerodia clarkii*), five-lined skink (*Plestiodon inexpectatus*), and bluestripe garter snake (*Thamnophis sirtalis similis*).

Bird species were the most diverse within No Mine Areas, and consisted of 86 species. The most common species include the northern cardinal, American crow, gray catbird (*Dumetella carolinensis*), white-eyed vireo, pileated woodpecker, white ibis, wood stork, glossy ibis, red-bellied woodpecker (*Melanerpes carolinus*), red-shouldered hawk (*Buteo lineatus*), and black vulture (*Coragyps atratus*). Species unique to No Mine Areas included the roseate spoonbill, limpkin, marsh wren (*Cistothorus palustris*), prairie warbler (*Dendroica discolor*), common moorhen (*Gallinula chloropus*), black-crowned night-heron (*Nycticorax violacea*), common grackle (*Quiscalus quiscula*), clapper rail (*Rallus longirostris*), gray kingbird (*Tyrannis dominicensis*), and barn owl (*Tyto alba*).

Finally, fourteen species of mammals were observed; the most common species was the cotton mouse, marsh rice rat (*Orzomys palustris*), white-tailed deer, nine-banded armadillo, and grey squirrel (*Sciurus carolinensis*). Species unique to No Mine Areas included the river otter (*Lutra canadensis*) and marsh rice rat.

A greater diversity and abundance of species were observed within No Mine Areas as compared to Proposed Mine Areas on the Tarmac King Road Limestone Mine. Our detailed surveys yielded a total of 22 more vertebrate species occupying the No Mine Areas as compared to Proposed Mine Areas.

PROPOSED MINE AREAS

A total of 133 species were observed within Proposed Mine Areas via both meandering pedestrian transects and wildlife sampling stations.

Within Proposed Mine Areas, a total of 13 species of fish were observed. Common species observed include the eastern mosquitofish, least killifish, largemouth bass (*Micropterus salmoides*), and least killifish. Species found only on Proposed Mine Areas include the lake chubsucker (*Erimyzon sucetta*), swamp darter (*Etheostoma fusiforme*), and largemouth bass.

Thirteen amphibian species were observed within Proposed Mine Areas. Common species include the Florida chorus frog, squirrel treefrog, southern leopard frog, and southern toad. Species observed only on Proposed Mine Areas include the greenhouse frog (*Eleutherodactylus planirostris planirostris*), peninsula newt (*Notophthalmus viridescens*), and bronze frog (*Lithabates [= Rana] clamitans clamitans*).

Within Proposed Mine Areas, 14 species of reptiles were observed, with the most common species being the ground skink, American alligator, and green anole. Species encountered only within Proposed Mine areas included the gopher tortoise, eastern glass lizard (*Ophisaurus ventralis*), southeastern five-lined skink (*Plestiodon inexpectatus*), and the peninsular ribbon snake (*Thamnophis sauritus sackeni*).

Bird species were the most speciose vertebrate within Proposed Mine Areas, with 80 species. The most common species include the northern cardinal, barn swallow, American crow, white-eyed vireo, pileated woodpecker, Carolina wren, red-bellied woodpecker, tufted titmouse (*Baeolophus bicolor*), red-shouldered hawk, and gray catbird. Species unique to Proposed Mine Areas included the ruby-throated hummingbird (*Archilochus colubris*), cedar waxwing (*Bombycilla cedrorum*), great horned owl (*Bubo virginianus*), short-tailed hawk (*Buteo brachyurus*), northern harrier (*Circus cyaneus*), northern flicker (*Colaptes auratus*), northern bobwhite (*Colinus virginianus*), American kestrel (*Falco sparverius*), American coot (*Fulica Americana*), Swainson's warbler (*Limnothlypis swainsonii*), eastern screech owl, prothonotary warbler (*Protonotaria citrea*), ruby-crowned kinglet (*Regulus calendula*), eastern phoebe (*Sayornis phoebe*), solitary sandpiper (*Tringa solitaria*), and black-whiskered vireo (*Vireo altiloquus*).

Thirteen species of mammals were observed in the Proposed Mine Area. The most common mammal species was the nine-banded armadillo, feral pig (*Sus scrofa*), and white-tailed deer. No mammal species was unique only to the Proposed Mine Areas.

HABITAT TYPE

Sampling locations within Natural Wetland Forests within No Mine Areas were the most speciose (43) with all classes of vertebrates represented except for reptiles: nine fish species, three amphibians, twenty-nine birds, and two mammals were observed. The second most speciose habitat type within No Mine Areas was Wetland Planted Pine where biologists observed 39 species with all classes represented. The habitat type within No Mine Areas where the least number of species were observed (12) was Upland Planted Pine. The only vertebrate classes represented were nine bird species and three mammals in this habitat.

Within Proposed Mine Areas the most speciose habitat type was Deep Water. Thirty-five species were observed across only three classes. Twenty-one birds, twelve fishes, and two amphibians were documented. The habitat type within Proposed Mine Areas where the least number of species was observed (14) was the Natural Upland Forest. The only vertebrate class represented was birds, with twelve species. No fish, amphibians, reptiles, or mammals were observed in this habitat.

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Fish							
Gulf Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	forages in gulf estuaries; spawns in coastal rivers with limestone outcrops	G3T2/S2	SSC	T	Extremely unlikely due to absence of suitable habitat	electrofishing, seining and cast-netting
Mountain Mullet	<i>Agonostomus monticola</i>	freshwater tropical and subtropical streams; spawn at sea	G5/S3	—	—	Not observed, however suitable habitat may occur on the site.	electrofishing, seining and cast-netting
Spotted Bullhead	<i>Ameiurus serracanthus</i>	deep holes of large streams and rivers with moderate currents; rock substrates or sand bottoms with proximity to holes	G3/S3	—	—	Not observed, unlikely due to absence of suitable habitat.	electrofishing, seining and cast-netting
Suwannee Bass	<i>Micropterus notius</i>	fast-moving shoal areas with a limestone bottom	G3/S3	SSC	—	Extremely unlikely due to absence of suitable habitat.	electrofishing, seining and cast-netting
Amphibians							
One-Toed Amphiuma	<i>Amphiuma pholeter</i>	deep, organic, liquid muck in alluvial swamps of low-gradient 2nd or 3rd order streams, spring runs, and occasionally floodplain swampy terrace streams.	G3/S3	—	—	Not observed, however suitable habitat does occur on the site.	aquatic traps
Tiger Salamander	<i>Ambystoma tigrinum</i>	pine, hardwood, mixed forests; breeds in isolated wetlands	G5/S3	—	—	Not observed, unlikely due to absence of suitable habitat	aquatic traps for immature stages, pedestrian transects
Southern Dusky Salamander	<i>Desmognathus auriculatus</i>	mucky areas around cypress swamps	G5/S3	—	—	Not observed, unlikely due to absence of suitable habitat	aquatic traps for immature stages, pedestrian transects
Striped Newt	<i>Notophthalmus perstriatus</i>	sandhill, scrub, scrubby flatwoods, mesic flatwoods, and isolated, ephemeral wetlands within these habitats (e.g., sinkhole ponds, depression ponds and marshes, and ditches)	G3G3/S2S3	—	—	Not observed, suitable habitat does not occur on the site.	pedestrian transects
Gulf Hammock Dwarf Siren	<i>Pseudobranchius striatus lustricolus</i>	wetlands within hydric hardwood hammock; may include stagnant bogs and decaying organic mucks associated with cypress and flatwoods ponds, ditches, and small floodplain lakes.	G5T1/S1	—	—	Not observed, however suitable habitat does occur on the site.	aquatic traps and pedestrian transects

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Gopher Frog	<i>Lithobates (= Rana) capito</i>	xeric oak scrub, sand pine scrub, breed in shallow grassy ponds or ditches, use tortoise burrows	G3G4/S3	SSC	—	Not observed, unlikely due to absence of suitable habitat	inspection of burrow entrances, call census
Reptiles							
American Alligator	<i>Alligator mississippiensis</i>	Ditches and open water wetlands, ponds, and lakes	G5/S4	SSC	T	21 individuals were observed on the site.	pedestrian transects and aerial surveys
Spotted Turtle	<i>Clemmys guttata</i>	mostly unpolluted, small, shallow bodies of water such as small marshes, bogs, fens; also occurs in brackish tidal streams.	G5/S3	—	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Cedar Key Mole Skink	<i>Plestiodon (=Eumeces) egregius insularis</i>	sandy areas along island shores, under driftwood or seaweed; also further inland in loose sand at base of trees.	G5T1/S1	—	—	Extremely unlikely due to absence of suitable habitat.	pedestrian transects
Common Kingsnake	<i>Lampropeltis getula</i>	open coniferous forest, woodland, swamps, coastal marshes, river bottoms, farmland, prairie, chaparral, and desert.	G5/S2S3	—	—	One Florida Kingsnake was observed on the site.	pedestrian transects
Gulf Salt Marsh Snake	<i>Nerodia clarki clarkii</i>	estuarine; coastal salt marshes containing <i>Spartina</i> , <i>Juncus</i> , <i>Salicornia</i>	G4T4/S3	—	—	One <i>N. clarkii</i> was observed in the salt marsh habitat in the Mitigation Area; possible intergrade with <i>N.C. compressicauda</i> .	pedestrian transects
Diamondback Terrapin	<i>Malaclemys terrapin</i>	marshes, tidal creeks, bays, lagoons	G4/S4	—	—	Not observed, likely to occur in estuarine areas	pedestrian transects, electrofishing, seining, cast-netting, and aquatic traps
Suwannee Cooter	<i>Pseudemys concinna suwanniensis</i>	rivers, large streams, estuaries	G5T3/S3	SSC	—	Not observed, unlikely due to absence of suitable habitat	pedestrian transects, electrofishing, seining, cast-netting, and aquatic traps
Gopher Tortoise	<i>Gopherus polyphemus</i>	sandhills, xeric oak scrub, sand pine scrub, scrubby flatwoods	G3/S3	T	—	One burrow was observed on the site. Widespread occurrence unlikely due to shallow occurrence of the limerock substrate.	pedestrian transects

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Alligator Snapping Turtle	<i>Macroclemys temminckii</i>	rivers, swamps, lakes	G3G4/S3	SSC	—	Not observed, no suitable habitat occurs on the site.	pedestrian transects, electrofishing, seining, cast-netting, and aquatic traps
Short-tailed Snake	<i>Stilosoma extenuatum</i>	sandhills, xeric oak scrub, sand pine scrub, and scrubby flatwoods. Use gopher tortoise burrows.	G3/S3	T	—	Extremely unlikely due to absence of suitable habitat.	pedestrian transects
Reptiles (continued)							
Florida Pine Snake	<i>Pituophis melanoleucus mugitas</i>	sandhills, xeric oak scrub, sand pine scrub, and scrubby flatwoods. Use gopher tortoise burrows.	G4T3?/S3	SSC	—	Not observed, unlikely due to absence of suitable habitat	pedestrian transects
Eastern Indigo Snake	<i>Drymarchon couperi</i>	sandhills, xeric oak scrub, sand pine scrub, scrubby flatwoods	G4T3/S3	T	T	One individuals was observed in the Mine/Disturb Area; two others off-site	pedestrian transects
Southern Hognose Snake	<i>Heterodon simus</i>	xeric scrub, hammock, ephemeral wetlands	G2/S2	—	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Eastern Diamondback Rattlesnake	<i>Crotalus adamanteus</i>	piners, sandhills, flatwoods, floodplains, hardwood hammocks, dry prairie	G4T1/S1	—	—	One individual was observed on the site.	pedestrian transects
Mammals							
Southeastern Bat	<i>Myotis austroriparius</i>	caves, culverts, bridges, hollow trees; forages over creeks, rivers, lakes	G4/S3	—	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Southeastern Big-eared Bat	<i>Corynorhinus rafinesquii</i>	floodplains, pine flatwoods and forests with hollow trees	G3G4/S2	—	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Southeastern Weasel	<i>Mustela frenata olivacea</i>	old fields, hammocks, cypress swamps, sand pine scrub	G5T4/S3?	—	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Florida Black Bear	<i>Ursus americanus floridanus</i>	large undeveloped wooded tracts; pine flatwoods, hardwood swamp, cypress swamp, cabbage palm forest, sand pine scrub; usually in areas of multiple forest types	G5T2/S2	T	—	Not observed, however suitable habitat does occur on the site.	pedestrian transects
Sherman's Fox Squirrel	<i>Sciurus niger shermani</i>	sandhills w/some pine, mesic flatwoods w/low ground cover	G5T2/S2	SSC	—	Not observed, unlikely due to absence of suitable habitat	pedestrian transects

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Florida Mouse	<i>Podomys floridanus</i>	sandhills, xeric oak scrub, sand pine scrub, and scrubby flatwoods. Use gopher tortoise burrows	G3/S3	SSC	—	Extremely unlikely due to absence of suitable habitat.	small mammal trapping
Salt Marsh Vole	<i>Microtus pennsylvanicus dukecampbelli</i>	saltgrass, black needlerush, smooth cordgrass	G5T1/S1	E	E	Not observed, and very little suitable habitat occurs on the site.	small mammal trapping
Mammals (continued)							
Gulf Salt Marsh Mink	<i>Mustela vison hallimnetes</i>	salt marshes, freshwater swamps and adjacent uplands	G5T3/S3	—	—	Not observed, and very little suitable habitat occurs on the site.	pedestrian transects
Manatee	<i>Trichechus manatus</i>	coastal waters, bays, rivers, lakes	G2/S2	E	E	Extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Birds							
Brown Pelican	<i>Pelecanus occidentalis</i>	coastal, estuaries, mangroves	G4/S3	SSC	—	Not observed, no suitable nesting habitat occurs on the site.	pedestrian transects and aerial surveys
Snowy Egret	<i>Egretta thula</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S3	SSC	—	Observed foraging on the Mine and No Mine Areas.	pedestrian transects and aerial surveys
Little Blue Heron	<i>Egretta caerulea</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S4	SSC	—	Observed foraging on the Mine and No Mine Areas.	pedestrian transects and aerial surveys
Tricolored Heron	<i>Egretta tricolor</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S4	SSC	—	Observed foraging on the No Mine Areas only..	pedestrian transects and aerial surveys
Reddish Egret	<i>Egretta rufescens</i>	coastal	G5/S2	SSC	—	One individual was observed foraging on the No Mine Area.	pedestrian transects and aerial surveys
Cooper's Hawk	<i>Accipiter cooperii</i>	migrates mostly along ridges and coastlines; breeding: primarily mature forest, open woodland, and forest edge	G5/S3	—	—	Not observed, however species occurrence is likely and suitable habitat does occur on the site.	pedestrian transects and aerial surveys

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Bachman's Sparrow	<i>Aimophila aestivalis</i>	requires well-developed grass and herb layer with limited shrub and hardwood midstory components; breeding: open pine woods with thick cover of grasses or saw palmetto	G3/S3	—	—	Extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Great Egret	<i>Ardea alba</i>	marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, and ponds; also fields and meadows.	G5/S4	—	—	Observed foraging on the Mine and No Mine Areas and roosting on the No Mine Area.	pedestrian transects and aerial surveys
Birds (continued)							
Piping Plover	<i>Charadrius melodus</i>	breeding: sandy upper beaches, sparsely vegetated shores. Non-breeding: usually on ocean beaches or on sand or algal flats in protected bays	G3/S2	T	T	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Wilson's Plover	<i>Cahradrius wilsonia</i>	coastal sandy and shell beaches, barrier and spoil islands, tidal mudflats, inlets, bays, estuaries, and mud banks of rivers near the coast	G5/S2	—	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Florida Prairie Warbler	<i>Dendroica discolor paludicola</i>	closely associated with mangroves; live oaks near the coast	G5T3/S3	—	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
White Ibis	<i>Eudocimus albus</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S4	SSC	—	Observed foraging on the Mine and No Mine Areas and roosting on the No Mine Area.	pedestrian transects and aerial surveys
Roseate Spoonbill	<i>Ajaia ajaja</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S2	SSC	—	Two individuals were observed foraging in No Mine Areas.	pedestrian transects and aerial surveys
Wood Stork	<i>Mycteria Americana</i>	estuarine or freshwater wetlands; nest in tops of trees in cypress or mangrove swamps	G4/S2	E	E	Observed foraging on No Mine Areas and roosting on the No Mine Area.	pedestrian transects and aerial surveys
Osprey	<i>Pandion haliaetus</i>	near lakes, rivers, coastal areas	G5/S3S4	SSC	—	Observed foraging on the Mine and No Mine Areas and nesting on the No Mine Area.	pedestrian transects and aerial surveys
Swallow-tailed Kite		pine forests, savannas, swamps, hardwood hammocks, prairies, marshes	G5/S2	—	—	Observed on the site. One pair nested in No Mine Area in 2008	pedestrian transects and aerial surveys

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	nests in tall trees along coasts, rivers and lakes	G4/S3	T*	T*	Three individuals were observed flying in Mine and No Mine Areas. Two nests were found off site.	pedestrian transects and aerial surveys
Short-tailed Hawk	<i>Buteo brahyurus</i>	cypress swamps, sandpine scrub, tropical hammocks, temperate forests	G4G5/S1	—	—	One individual was observed on the site.	pedestrian transects and aerial surveys
Merlin	<i>Falco columbarius</i>	marshes, deserts, seacoasts, near coastal lakes and lagoons, open woodlands	G5/S2	—	—	Not observed, and very little suitable habitat occurs on the site.	pedestrian transects and aerial surveys
Birds (continued)							
Peregrine Falcon	<i>Falco peregrinus</i>	marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports	G4/S2	E	—	Not observed, and very little suitable habitat occurs on the site.	pedestrian transects and aerial surveys
Southeastern American Kestrel	<i>Falco sparverius paulus</i>	sandhill; nest in natural cavities of dead trees and abandoned woodpecker nests.	G5T4/S3	T	—	Not observed, and very little suitable habitat occurs on the site.	pedestrian transects and aerial surveys
Magnificent Frigate Bird	<i>Fregata magnificens</i>	in coastal waters; generally within sight of land; nests on islands in mangroves, low trees, and shrubs; sensitive to disturbance	G5/S1	—	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Least Bittern	<i>Ixobrychus exilis</i>	Breeding: tall emergent vegetation in marshes, primarily freshwater, Prefers marshes with scattered bushes or other woody growth	G5/S4	—	—	Not observed, however species occurrence is likely and suitable habitat does occur on the site.	pedestrian transects and aerial surveys
Black Rail	<i>Laterallus jamaicensis</i>	salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy "swamps"	G4/S2	—	—	Not observed, however species occurrence is likely and suitable habitat does occur on the site.	pedestrian and vehicular transects
Black-crowned Night heron	<i>Nycticorax nycticorax</i>	marshes, swamps, wooded streams, mangroves, shores of lakes, ponds, lagoons; salt water, brackish, and freshwater	G5/S3	—	—	One individual was observed foraging on the No Mine Areas.	pedestrian transects and aerial surveys
Yellow-crowned Night heron	<i>Nyctanassa violacea</i>	marshes, swamps, lakes, lagoons, and mangroves; chiefly coastal.	G5/S3	—	—	Three individuals were observed foraging on the No Mine Areas.	pedestrian transects and aerial surveys

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Glossy Ibis	<i>Plegadis falcinellus</i>	marshes, swamps, lagoons, pond margins, lakes, flooded pastures; fresh, brackish, and salt water	G5/S3	—	—	Observed foraging on the site in the No Mine Areas.	pedestrian transects and aerial surveys
Limkin	<i>Aramus guarauna</i>	breeding: marshes, swamps, ponds, estuaries, rivers; nest in shrubs and small trees	G5/S3	SSC	—	One individual was observed foraging in the No Mine Areas.	pedestrian transects and aerial surveys
Florida Sandhill Crane	<i>Grus canadensis pratensis</i>	Breeds in emergent palustrine wetlands; forages in pastures	G5T4/S3	T	—	Not observed, little suitable nesting habitat occurs on the site.	pedestrian transects and aerial surveys
Birds (continued)							
American Oystercatcher	<i>Haematopus palliatus</i>	beaches, sandbars, mud flats, sparsely vegetated sandy areas	G5/S2	SSC	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Caspian Tern	<i>Sterna caspia</i>	breeding: small barren islands; nesting: dredged islands; forage: coastal bays, rivers, inland lakes, and impoundments	G5/S2	—	—	Not observed and extremely unlikely due to absence of suitable habitat	pedestrian transects and aerial surveys
Least Tern	<i>Sterna antillarum</i>	coastal areas including beaches, lagoons, bays and estuaries.	G4/S3	T	—	Not observed and extremely unlikely due to absence of suitable habitat	pedestrian transects and aerial surveys
Royal Tern	<i>Sterna maxima</i>	beaches, lagoons, bays, estuaries, inlets, phosphate pits	G5/S3	—	—	Not observed and extremely unlikely due to absence of suitable habitat	pedestrian transects and aerial surveys
Sandwich Tern	<i>Sterna sandvicensis</i>	beaches, bays, estuaries, mudflats, inlets, lagoons, dredge spoil islands	G5/S2	—	—	Not observed and extremely unlikely due to absence of suitable habitat	pedestrian transects and aerial surveys
Florida Clapper Rail	<i>Rallus longirostris scottii</i>	coastal salt marshes	G5T3?/S3?	—	—	One was observed on the site foraging in the salt marsh habitat in the No Mine Area.	pedestrian transects and aerial surveys
Black Skimmer	<i>Rynchops niger</i>	beaches, bays, estuaries, sandbars, tidal creeks, large lakes, phosphate pits	G5/S3	SSC	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys

*The bald eagle was federally delisted on 8 August 2007

Table 6 Listed Animal Species that were Observed or Potentially May Occur on the Tarmac King Road Limestone Mine							
Common Name	Scientific Name	Preferred Habitat	Designated Status			Species Occurrence and Comments	Sampling Method
			FNAI	FFWCC	USFWS		
Florida Burrowing Owl	<i>Athene cunicularia</i>	sandhills, ruderal communities, dry prairies	G4T3/S3	SSC	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian and vehicular transects
Hairy Woodpecker	<i>Picoides villosus</i>	forest, open woodland, swamps, well-wooded towns and parks; most abundant in mature woods with large old trees suitable for cavity nesting	G5/S3	—	—	Six individuals were observed on the site in both Mine and No Mine Areas.	pedestrian transects and aerial surveys
Red-cockaded Woodpecker	<i>Picoides borealis</i>	open stands of pines with a minimum age of 80-100 years old. Nest and forage almost exclusively in live long-leaf pines.	G3/S2	T	E	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects to identify suitable nesting and foraging habitat
Birds (continued)							
Florida Scrub-jay	<i>Aphelocoma coerulescens</i>	low, open xeric oak scrub in peninsular Florida.	G3/S3	T	T	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and playback surveys
Marian's Marsh Wren	<i>Cistothorus palustris marianae</i>	tidal marshes with black needlerush	G5T3/S3	SSC	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys
Scott's Seaside Sparrow	<i>Ammodramus maritimus peninsulae</i>	black needlerush, smooth cordgrass, saltgrass	G4T3/S3	SSC	—	Not observed and extremely unlikely due to absence of suitable habitat.	pedestrian transects and aerial surveys

FNAI - GLOBAL RANK DEFINITIONS:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

G2 = Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3 = Either very rare and local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

G4 = Apparently secure globally (may be rare in parts of range).

G5 = Demonstrably secure globally.

S1 = Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

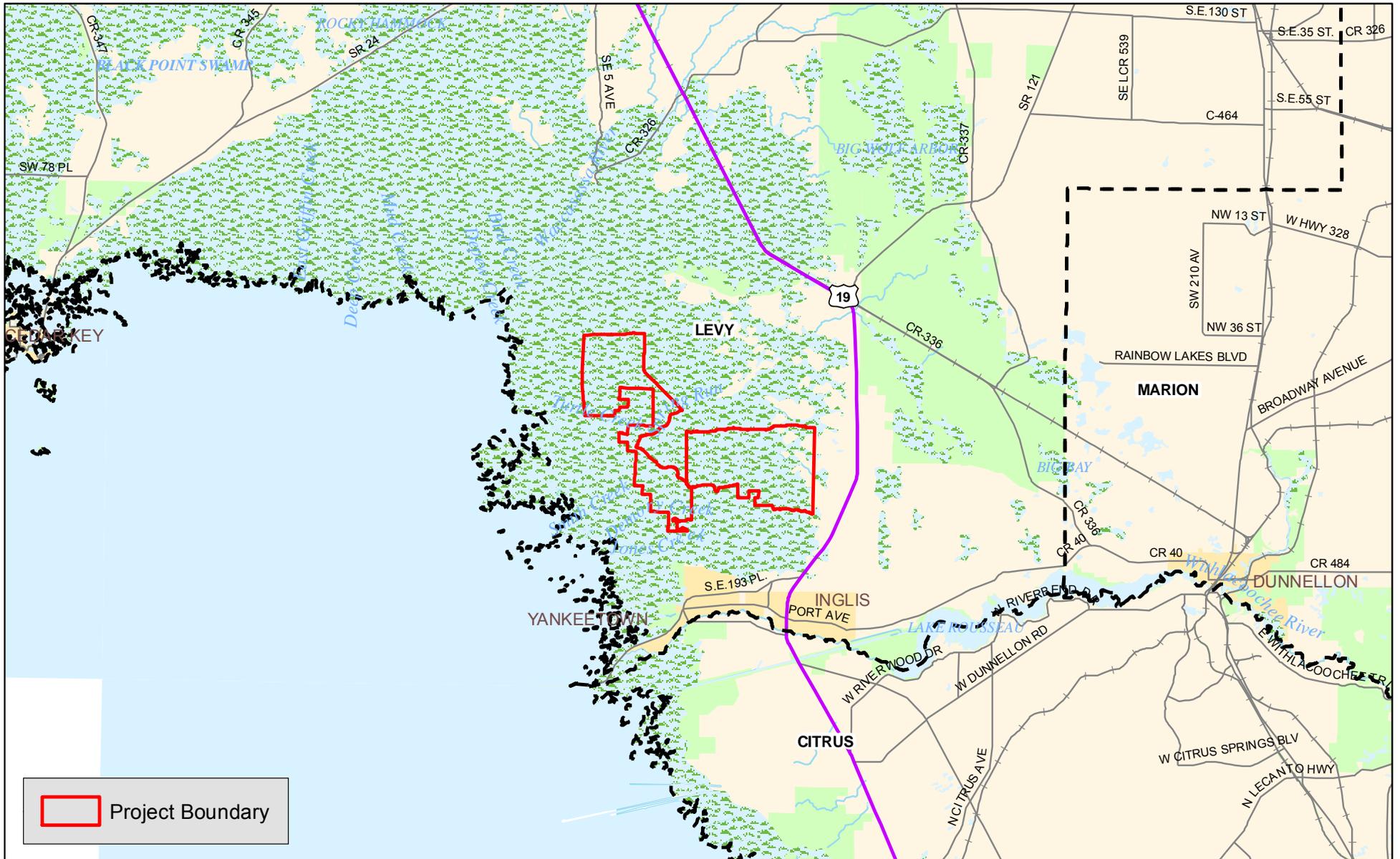
S2 = Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

S3 = Either very rare and local in Florida (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction from other factors.

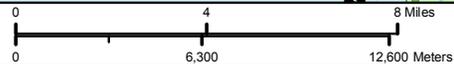
S4 = Apparently secure in Florida (may be rare in parts of range).

S5 = Demonstrably secure in Florida

*The bald eagle was federally delisted on 8 August 2007



 Project Boundary



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 1 - Location Map
Tarmac King Road Limestone Mine
Levy County, Florida



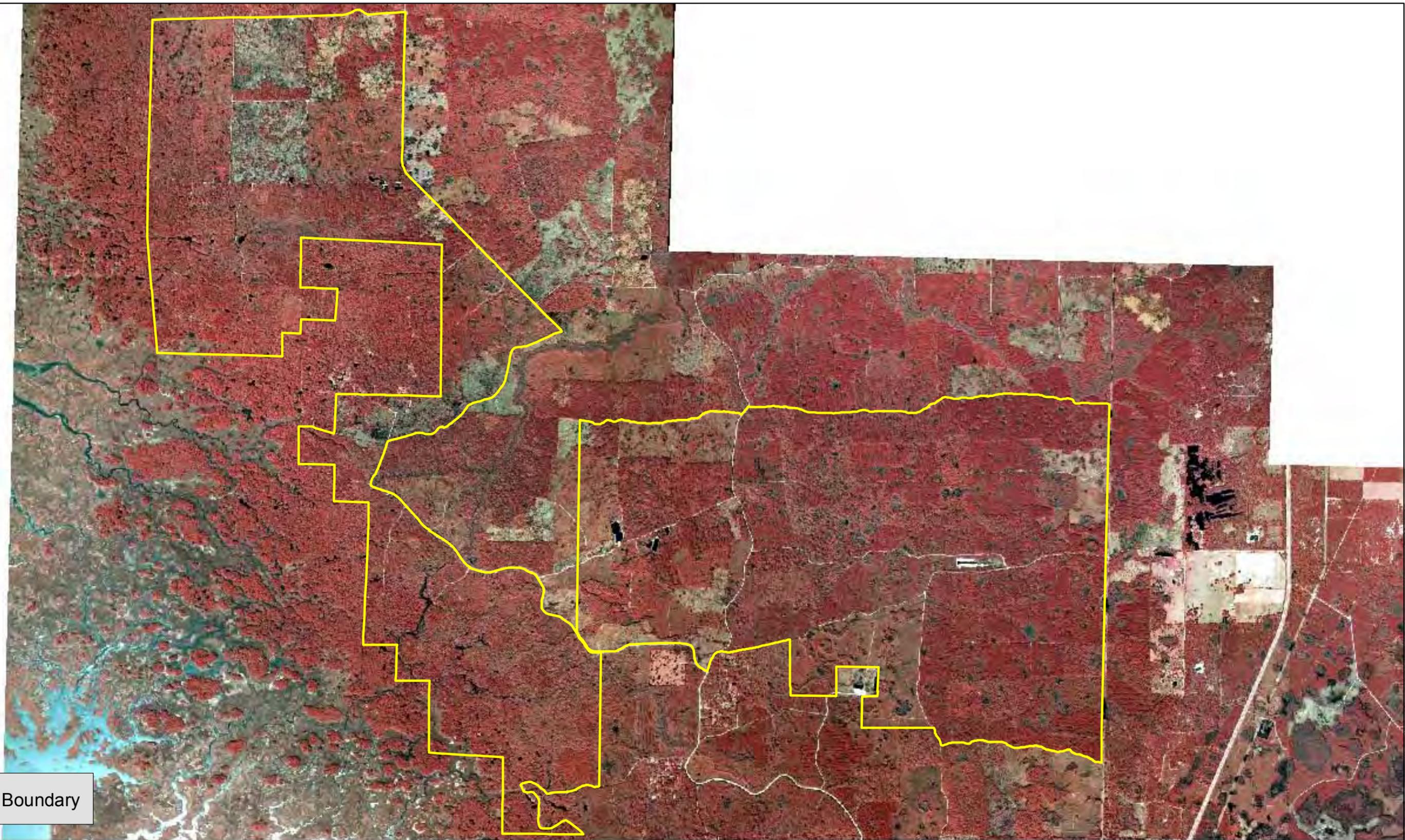
Image: Basemap



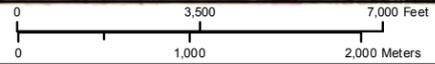
3905 Crescent Park Drive
 Riverview, FL 33578-3625
 ph. (813) 664-4500
 fx (813) 664-0440

www.entrix.com

Coordinate System:
 NAD 1983 UTM Zone 10N feet



 Project Boundary



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 2 - Aerial Map
Tarmac King Road Limestone Mine
Levy County, Florida

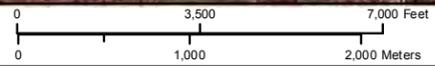
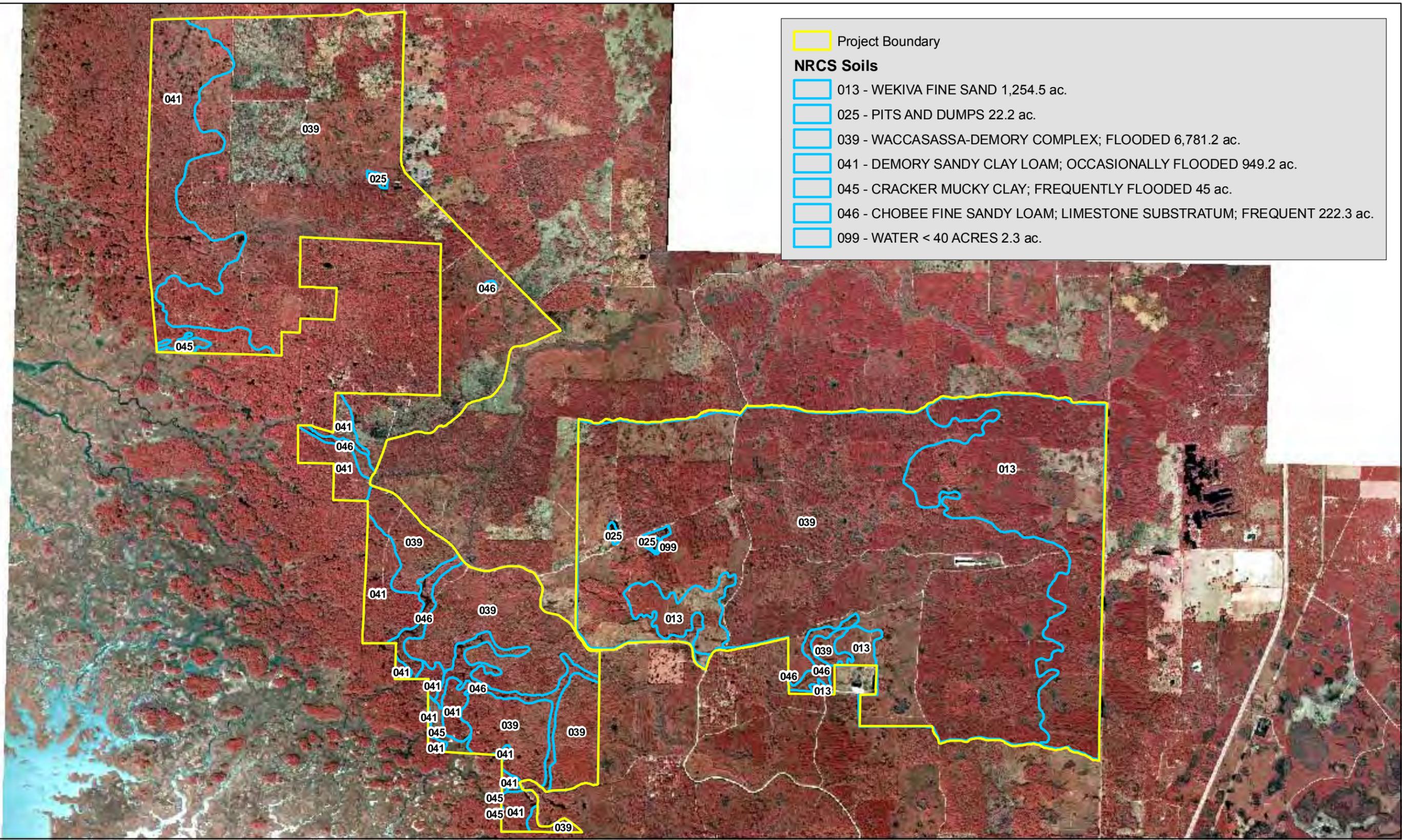


3905 Crescent Park Drive
 Riverview, FL 33578-3625
 ph. (813) 664-4500
 fx (813) 664-0440

Image:2007 IR

www.entrix.com

Coordinate System:
 NAD 1983 UTM Zone 10N feet



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 3 - NRCS Soils Map
Tarmac King Road Limestone Mine
Levy County, Florida

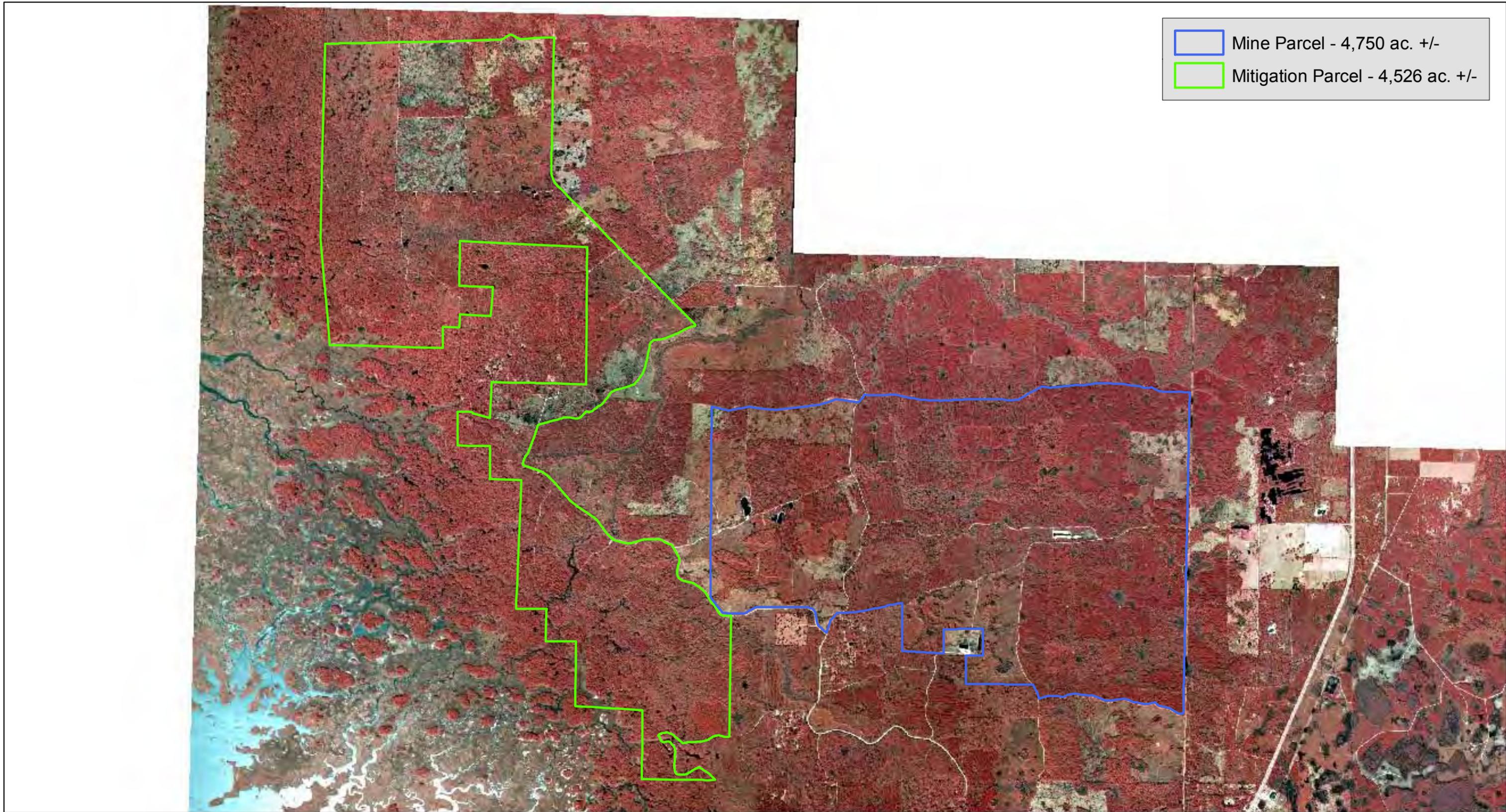


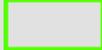
3905 Crescent Park Drive
 Riverview, FL 33578-3625
 ph. (813) 664-4500
 fx (813) 664-0440

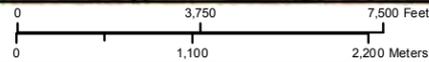
Image:2007 IR

www.entrix.com

Coordinate System:
 NAD 1983 UTM Zone 10N feet



	Mine Parcel - 4,750 ac. +/-
	Mitigation Parcel - 4,526 ac. +/-



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

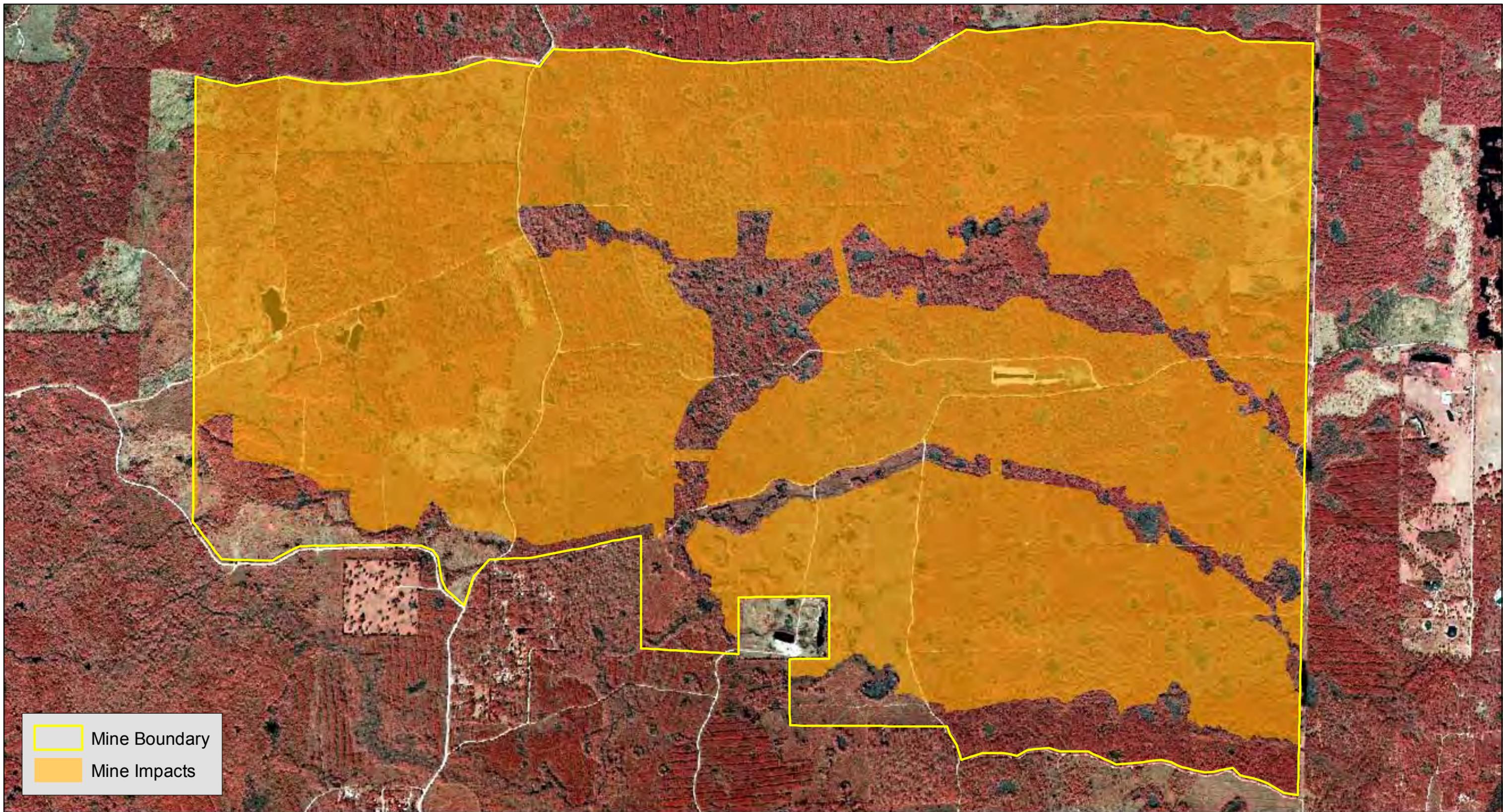
Figure 4 - Aerial Map
Tarmac King Road Limestone Mine
Levy County, Florida



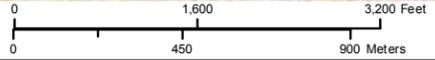
3905 Crescent Park Drive Riverview, FL 33578-3625	ph. (813) 664-4500 fx (813) 664-0440
--	---

www.entrix.com

Coordinate System:
 NAD 1983 UTM Zone 10N feet



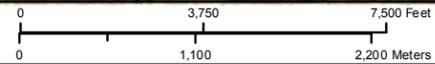
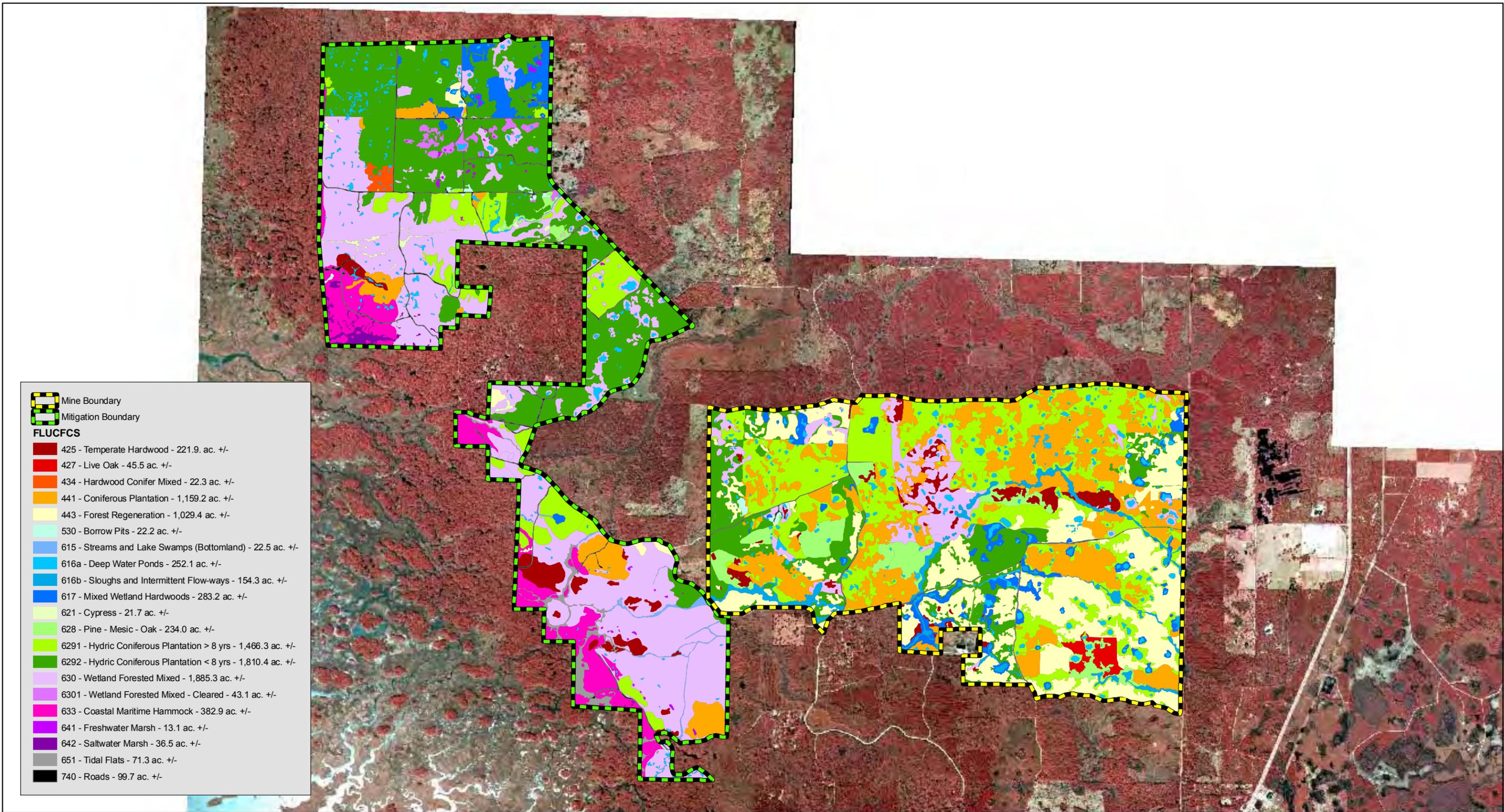
	Mine Boundary
	Mine Impacts



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 5 - Mine / Disturbance Areas Map
Tarmac King Road Limestone Mine
Levy County, Florida

		
	3905 Crescent Park Drive Riverview, FL 33578-3625	ph. (813) 664-4500 fx (813) 664-0440
Image:2007 IR	www.entrix.com	
Coordinate System: NAD 1983 UTM Zone 10N feet		



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 6 - Existing Vegetative Cover Map (FLUCCS)

**Tarmac King Road Limestone Mine
 Levy County, Florida**

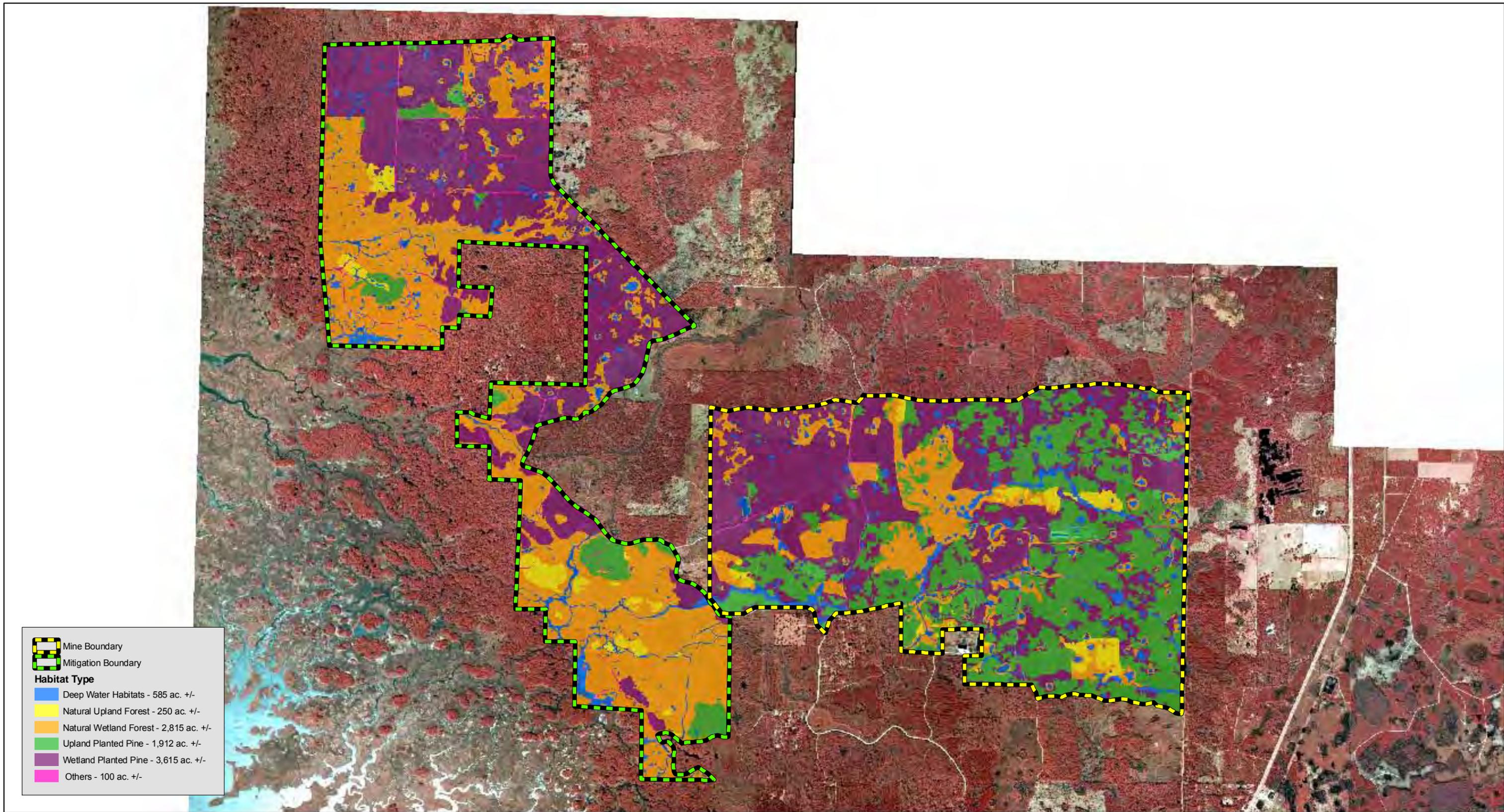


3905 Crescent Park Drive
 Riverview, FL 33578-3625
 ph. (813) 664-4500
 fx (813) 664-0440

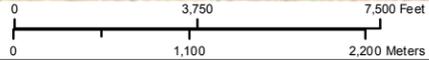
Image:2007 IR

www.entrix.com

Coordinate System:
 NAD 1983 UTM Zone 10N feet



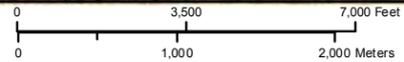
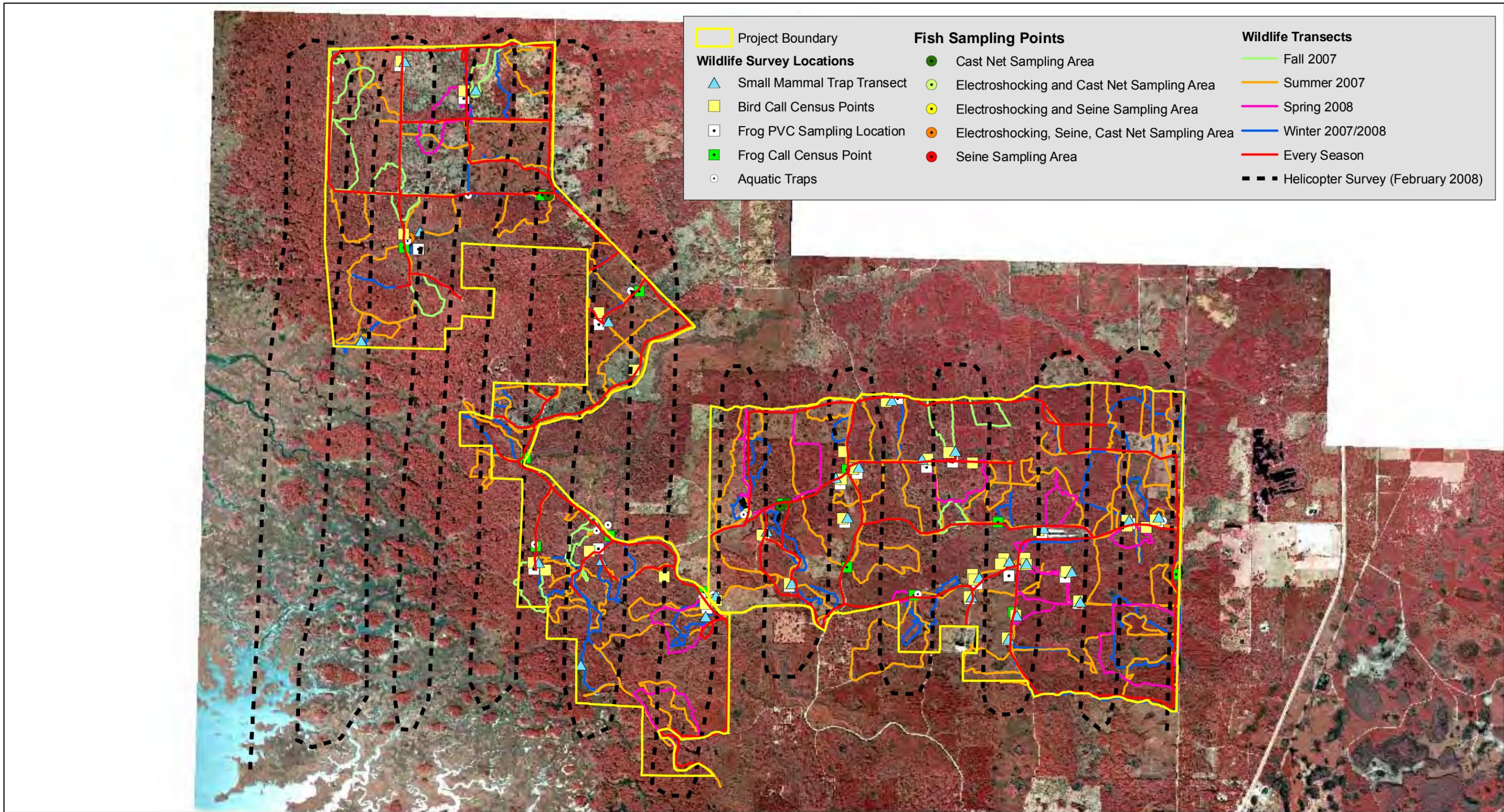
 Mine Boundary
 Mitigation Boundary
Habitat Type
 Deep Water Habitats - 585 ac. +/-
 Natural Upland Forest - 250 ac. +/-
 Natural Wetland Forest - 2,815 ac. +/-
 Upland Planted Pine - 1,912 ac. +/-
 Wetland Planted Pine - 3,615 ac. +/-
 Others - 100 ac. +/-



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 7 - Habitat Type Based on FLUCFCS
 Tarmac King Road Limestone Mine
 Levy County, Florida

 Image:2007 IR		
	3905 Crescent Park Drive Riverview, FL 33578-3625	ph. (813) 664-4500 fx (813) 664-0440
Coordinate System: NAD 1983 UTM Zone 10N feet		
www.entrix.com		



This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 8 - Wildlife Sampling Points & Transect Locations Map

**Tarmac King Road Limestone Mine
Levy County, Florida**

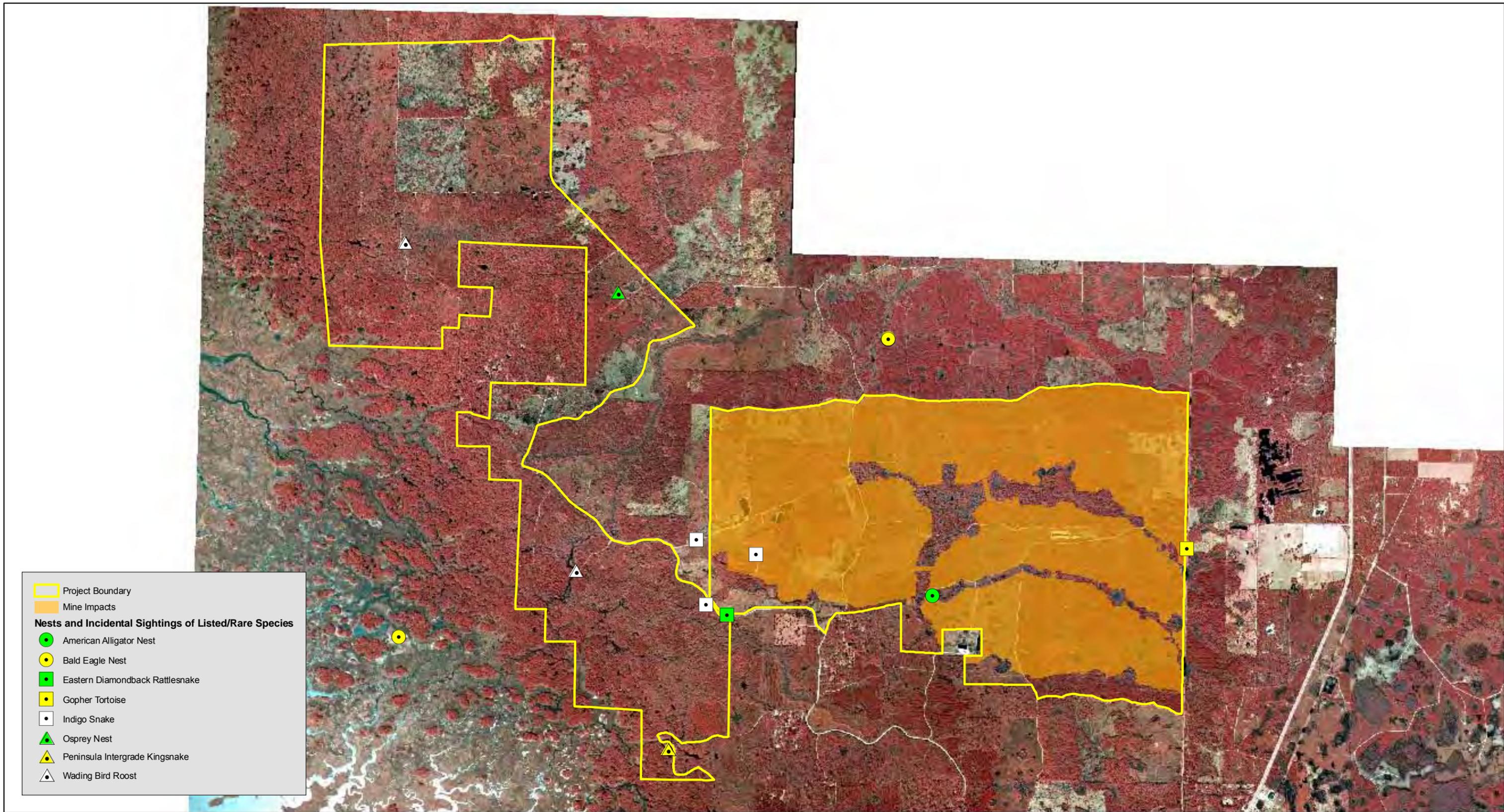


3905 Crescent Park Drive
Riverview, FL 33578-3625
ph. (813) 664-4500
fx (813) 664-0440

Image:2007 IR

www.entrix.com

Coordinate System:
NAD 1983 UTM Zone 10N feet



- Project Boundary
- Mine Impacts
- Nests and Incidental Sightings of Listed/Rare Species**
- American Alligator Nest
- Bald Eagle Nest
- Eastern Diamondback Rattlesnake
- Gopher Tortoise
- Indigo Snake
- ▲ Osprey Nest
- ▲ Peninsula Intergrade Kingsnake
- ▲ Wading Bird Roost

0 3,750 7,500 Feet
0 1,100 2,200 Meters

This map and all data contained within are supplied as is with no warranty. ENTRIX, Inc. expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map meets the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

Figure 9 - Rare / Listed Species Sightings Map
Tarmac King Road Limestone Mine
Levy County, Florida

3905 Crescent Park Drive Riverview, FL 33578-3625	ph. (813) 664-4500 fx (813) 664-0440
www.entrix.com	
Coordinate System: NAD 1983 UTM Zone 10N feet	