# WHISKEY GEORGE BASIN

**UWRMP Section 5.5.8**

**January 21, 2009**

## Background:

Much of the present day Tate's Hell State Forest was once a mosaic of wet prairies, hydric pine flatwoods, cypress sloughs, and other vegetative communities. However, intensive silvicultural operations have altered the natural landscape. Between the 1950s and 1980s, extensive areas were converted to slash pine (*Pinus elliottii*) plantation, with many pine stands being bedded and fertilized. Fire was often suppressed. More than 700 miles of roads were constructed to support logging operations and ditches were excavated along most roads to provide road-fill material and drain adjacent wetlands. These silvicultural activities have adversely impacted the hydrology and ecology of historic vegetative communities and have affected the magnitude, timing, and quality of surface water runoff discharged to the Apalachicola Bay system and surrounding waters.

In 1994, the State of Florida began purchasing the property from timber companies with the goal of restoring natural vegetative communities, re-establishing historic surface water drainage patterns, and improving and protecting the quality of surface water runoff discharged from the area to the Apalachicola Bay system and surrounding waters. The Northwest Florida Water Management initiated the land acquisition process with the $3.5 million purchase of the Glawson tract in 1994. To date, the land acquired for Tate's Hell State Forest totals nearly 205,000 acres. The site is now managed by the State Division of Forestry.

## Objectives:

The primary objectives of the Whiskey George Basin Project are to restore historic surface water drainage patterns and wetland vegetative communities to enhance the quality and timing of surface water runoff flowing from the Whiskey George Creek watershed to East Bay. East Bay is a productive estuarine system that serves as the primary nursery area for many commercial fish species and other marine organisms within the Apalachicola Bay system. The Apalachicola River and Bay system has been recognized as a resource of state, national, and international importance. The bay has been designated an Outstanding Florida Water, a State Aquatic Preserve, and an International Biosphere Reserve. In recognition of the Bay's importance and the need to protect and enhance this watershed, the Apalachicola Bay system is designated as the highest priority watershed within the District's Surface Water Improvement and Management (SWIM) Program.

**Mitigation Work Plan:**

This project includes two separate restoration areas within the Whiskey George Creek watershed: the Sumatra Savannas area and the Whiskey George Savannas area.

Sumatra Savannas Area (see attached Mitigation Polygon map)

The Sumatra Savannas Area consists of approximately 960 acres. Historically, the Sumatra Savannas restoration area was a wet savanna – hydric pine flatwoods mosaic, with smaller areas of slash pine swamp forest, shrub wetlands, pine flatwoods, and forested wetlands (FNAI 2000, see maps). Between the 1950s and 1980s, when the area was converted to pine plantation, some areas were clearcut. The site is no longer managed for pine production and has been identified as a high priority area for hydrologic and habitat restoration. Current vegetative communities include regenerating hydric pine savanna (FLUCCS 626) and hydric pine flatwoods (625), shrub wetlands dominated by titi (*Cyrilla racemiflora* and *Cliftonia monophylla*) (FLUCCS 614), slash pine swamp forest (FLUCCS 627), cypress sloughs (FLUCCS 621), forest roads (FLUCCS 814), and regenerating mesic flatwoods (FLUCCS 411). Red-cockaded Woodpecker cavity trees and Florida Beargrass (*Nolina atopocarpa*) have been documented in the area.

Table 1 summarizes the current FLUCCS code, target FLUCCS code, and the details of proposed restoration activities and anticipated benefits for each habitat polygon in the Sumatra Savannas area. In general, historic surface water drainage patterns and vegetative communities will be restored and enhanced by removing approximately 3.3 miles of dirt logging roads and adjacent ditches, constructing a hardened low water crossing, and installing two 30-inch diameter culverts. The footprints of the former roads and ditches (~27 acres total) will be restored to hydric pine savanna and hydric pine flatwoods by replanting these areas with wiregrass and slash pine and/or cypress seedlings and establishing and maintaining an appropriate fire regime. The new culverts will re-connect a former forested and shrub wetland system that once formed the headwaters of the Whiskey George Creek and re-establish surface water flow to the southeast. The new low water crossing will reconnect a historic cypress slough and enable shallow surface water sheet flow to the southwest. Appropriate BMPs will be observed at all times and appropriate sedimentation and erosion control measures will be implemented during all construction activities.

A prescribed burn is planned for this area between January and March 2009. An appropriate fire regime will then be maintained by conducting prescribed burns approximately every two to five years. Post-restoration habitats will be comprised of hydric pine savannas (FLUCCS 626), hydric pine flatwoods (FLUCCS 625), cypress sloughs (FLUCCS 621), shrub wetlands (FLUCCS 690), slash pine swamp forest (FLUCCS 627), and mesic flatwoods (FLUCCS 411).

**Table 1. Habitat Polygons in the Sumatra Savannas Area**

| Poly # | Acres | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Proposed Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 1 | 59.3 | 626 | 626 | Enhance | These regenerating wet savannas will be enhanced by establishing and maintaining an appropriate fire regime and by removing the forest road to the south to restore nature surface water drainage patterns. |
| 2 | 12.2 | 626 | 626 | Enhance | |
| 3 | 38.2 | 626 | 626 | Enhance | |
| 4 | 74.5 | 627 | 627 | Enhance | This depressional slash pine swamp forest consists of a mix of pine, cypress and titi. This site is likely wetter than it was historically. The removal of the roads and ditches will allow surface water runoff from the site to flow south into the cypress slough. |
| 5 | 25.2 | 614 | 627 | Restore | This depressional wetland is dominated by titi. Brush reduction, prescribed fire, and the removal of the roads and ditches to the south will be used to restore this habitat to a slash pine swamp forest. |
| 6 | 16.9 | 625 | 625 | Enhance | These four polygons have slightly higher topographic elevations than the surrounding wetlands. Improved surface water patterns in the surrounding wetlands and more frequent prescribed burns will provide minor enhancements to these hydric pine flatwood and savanna habitats. |
| 7 | 11.4 | 625 | 626 | Enhance | |
| 8 | 3.8 | 625 | 625 | Enhance | |
| 9 | 9.7 | 625 | 625 | Enhance | |
| 10 | 22.5 | 626 | 627 | Enhance | The removal of road which bounds this polygon on the north will increase surface water flow to this area and enhance wetland hydrology. |
| 11 | 15.2 | 621 | 621 | Enhance | Polygons 11 and 12, which are now bisected by West Boundary Road, once formed a cypress slough. Polygon 11 has a cypress canopy but Polygon 12 has a mixed canopy of cypress and titi. The removal of the road on the north edge of polygon 12 and the installation of a low water crossing on West Boundary Road will restore surface water drainage patterns, enhance wetland hydroperiods, and re-connect this historic cypress slough. |
| 12 | 49.1 | 621 | 621 | Enhance | |
| 13 | 2.2 | 625 | 625 | Enhance | This small hydric pine flatwood has a canopy of slash pine with titi in the understory. This habitat will be enhanced by using prescribed burns to reduce the amount of titi cover. |

**Table 1 continued**

| Poly # | Acres | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Proposed Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 14 | 1.3 | 814 | 627 | Restore | Polygons 14, 15, 16, and 17 represent existing forest roads and ditches. These road/ditch areas will be restored to slash pine swamp forest, wet savanna, and hydric pine flatwoods, respectively, by pushing the road fill material into the ditches and restoring the natural topography. The road/ditch footprint will be planted with wire grass and slash pine or cypress seedlings. Prescribed burns will be used to establish and maintain an appropriate fire regime. |
| 15 | 4.5 | 814 | 626 | Restore | |
| 16 | 1.2 | 814 | 625 | Restore | |
| 17 | 3.1 | 814 | 626 | Restore | |
| 18 | 114.4 | 625 | 626 | Enhance | Polygon 18 is a hydric pine flatwood with areas of regenerating hydric pine savanna. This area will be restored to a hydric pine savanna by removing the dirt roads and ditches to the west and south, which will help to re-establish natural surface water drainage patterns. Prescribed burns will be used to establish and maintain an appropriate fire regime. |
| 19 | 61.9 | 626 | 626 | Enhance | This is a formerly clearcut area of regenerating wet savanna. Red-cockaded woodpecker cavity trees are present. Prescribed burns will be used to enhance this habitat and maintain an appropriate fire regime. |
| 20 | 87.6 | 627 | 627 | Enhance | This slash pine swamp forest has inclusions of dense titi. Red-cockaded Woodpecker cavity trees are present. The removal of the nearby roads and ditches will enhance this habitat by restoring surface water drainage patterns. Prescribed burns will be used to maintain an appropriate fire regime. If necessary, manual brush reduction will be conducted to reduce the amount of titi cover. |
| 21 | 7.4 | 614 | 625 | Restore | This shrub wetland with scattered pines will be restored to a hydric pine flatwood by establishing and maintaining an appropriate fire regime and manually removing dense areas of titi (e.g. roller chopping, gyro-tracking). |
| 22 | 15.6 | 625 | 625 | Enhance | Polygons 22 and 24 have slightly higher topographic elevations than the surrounding wetlands. Improved surface water drainage resulting from the proposed hydrologic improvements and maintenance of an appropriate fire regime will provide minor enhancements to these hydric pine flatwoods. |
| 24 | 12.2 | 625 | 625 | Enhance | |

**Table 1 continued**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Proposed Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 23 | 11.7 | 627 | 627 | Enhance | This is a small slash pine swamp forest within polygon 18. Minor enhancements in vegetation and hydrology will result from the hydrologic improvements and the maintenance of an appropriate fire regime. |
| 25 | 8.9 | 614 | 690 | Enhance | The removal of the road and ditches will reconnect this bisected depressional shrub wetland that once formed the headwaters of Whiskey George Creek. Brush reduction, by mechanical means and/or prescribed burning will be used to reduce the titi cover in the northern half of this wetland. |
| 28 | 117.6 | 614 | 690 | Enhance | |
| 26 | 4.0 | 814 | 626 | Restore | Polygons 26, 27, and 29 represent existing forest roads and ditches. These areas will be restored to hydric wet savanna (polygons 26 and 29), and shrub wetlands (polygon 27), by pushing the road fill material into the ditches and restoring the natural topography. The road/ditch footprint will be planted with wire grass and slash pine and/or cypress seedlings. Prescribed burning will be used to maintain an appropriate fire regime. |
| 27 | 3.3 | 814 | 690 | Restore | |
| 29 | 3.0 | 814 | 626 | Restore | |
| 30 | 52.3 | 627 | 627 | Enhance | The hydrology of this slash pine swamp forest will be improved by the removal of the adjoining road and associated ditches. |
| 31 | 42.6 | 625 | 625 | Enhance | This area of regenerating hydric pine flatwood was previously clearcut. The removal of roads and ditches on the northern and northwestern edges of this habitat will restore natural surface water drainage patterns and enhance wetland hydrology. The maintenance of an appropriate fire regime using prescribed burns will also benefit this habitat. |
| 32 | 4.4 | 411 | 411 | Enhance | This pine flatwoods area is anticipated to receive only minor enhancements from the proposed restoration activities. |
| 33 | 22.7 | 626 | 626 | Enhance | This regenerating wet savanna was previously clearcut and has been bisected by a forest road. The removal of the road and maintenance of an appropriate fire regime will enhance this habitat. |

**Table 1 Continued**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Proposed Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 34 | 10.0 | 625 | 626 | Restore | This former hydric pine savanna has been bisected by a road and drained by the ditches adjacent to the road and by ditches constructed through the wetland (Polygon 40). Most of polygon 40 was previously clearcut. The removal of the east-west road and the plugging of the ditches will restore natural surface water drainage patterns. Together with the establishment and maintenance of an appropriate fire regime, these activities will restore this area to a hydric pine savanna. |
| 40 | 16.8 | 625 | 626 | Restore | |
| 35 | 2.3 | 814 | 625 | Restore | Polygons 35, 36, and 37 represent forest roads and ditches that will be restored to hydric pine flatwoods, slash pine swamp forest, and hydric wet savanna, respectively, by pushing the road fill material into the adjacent ditches and restoring the natural topography. The road/ditch footprint will be planted with wiregrass and cypress or slash pine seedlings and an appropriate fire regime will be maintained. |
| 36 | 0.6 | 814 | 627 | Restore | |
| 37 | 3.9 | 814 | 626 | Restore | |
| 38 | 3.8 | 627 | 627 | Enhance | Polygons 38 and 39 were once part of a forested wetland system in the headwaters of Whiskey George Creek. These wetlands have been bisected by logging roads are now isolated from the creek. The removal of the east-west road and adjacent ditches and the installation of culverts across Tower Road will re-connect this wetland system with Whiskey George Creek. |
| 39 | 0.7 | 627 | 627 | Enhance | |
| | 957.9 | TOTAL | | | |

Whiskey George Savannas Area (see Mitigation Polygon map)

The Whiskey George Savannas Area is approximately 1,800 acres. The historic vegetation delineated in this area was comprised of an expansive wet savanna, with smaller areas of wet savanna - pine flatwood mosaic and basin swamp (FNAI 2000). Mesic flatwoods existed on the topographic ridges and mixed forested wetlands bordered the Whiskey George Creek (FNAI 2000) (see attached figures). The area was converted to pine plantation between the 1950s and 1980s. However, the pine stands have been thinned considerably and most of the area can now be classified as hydric pine flatwoods (FLUCCS 625). Other current landcover types include slash pine swamp forest (FLUCCS 627), cypress sloughs (FLUCCS 621), titi swamps (FLUCCS 614), pine plantation (FLUCCS 441), forest roads (FLUCCS 814), and Atlantic White Cedar swamp (FLUCCS 623). Several active Red-cockaded Woodpecker cavity trees are located within the Whiskey George Savannas area.

Table 2 summarizes the current FLUCCS code, target FLUCCS code, and the details of proposed restoration activities and anticipated benefits for each habitat polygon in the Whiskey George Savannas area. Historic wet savannas, hydric pine flatwoods, and forested wetlands will be restored and enhanced by removing approximately 2.7 miles of dirt logging roads and adjacent ditches, constructing four (4) hardened low water crossings, one earthen ditch plug, and several culvert improvements. The two westernmost low water crossings will restore westerly surface water drainage toward the Whiskey George Creek. The other two low water crossings will enable surface water runoff to flow through a natural break in the topographic ridge and then southwest through a forested system toward Whiskey George Creek. The footprints of the road removals will be replanted with wiregrass and cypress or pine seedlings and restored to hydric pine savanna or hydric pine flatwoods habitats.

The 0.4 miles of road removal in the northeast corner of this project area will reconnect a mixed forested wetland comprised of predominantly of Atlantic White Cedar. The earthen ditch plug that will be installed further to the west will help to retain surface water runoff and enhance a former hydric pine savanna.

West Double Bridges Road is needed for public access within Tate's Hell State Forest. However, the culvert improvements proposed along this road will help to re-establish and maintain historic hydrologic connections. A new 36-diameter culvert (westernmost culvert) will reconnect a former cypress slough. Existing 48-inch and 36-inch diameter culverts that convey water west across a dirt logging road and then south across West Double Bridges Road, respectively, are in poor condition and will be replaced with new culverts of the same diameter. A culvert will be taken out during the removal of the road that parallels West Double Bridges Road to the south. Appropriate BMPs will be observed at all times and appropriate sedimentation and erosion control measures will be implemented during all construction activities.

Post-restoration habitats in the Whiskey George Savannas area will include a mix of hydric pine savannas (FLUCCS 626), hydric pine flatwoods (FLUCCS 625), and slash pine swamp forest (FLUCCS 627) with smaller areas of cypress (FLUCCS 621), Atlantic White Cedar swamps (FLUCCS 623), and mixed forested wetlands (FLUCCS 630). A prescribed burn is also planned for this area between January and March 2009. An appropriate fire regime will then be maintained by conducting prescribed burns approximately every two to five years.

**Table 2 Habitat Polygons in the Whiskey George Savannas Area**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 41 | 344.9 | 625 | 625/ 626 | Enhance | This area was converted to pine plantation and the pines were subsequently thinned. The area immediately south remains planted in slash pine. The placement of an earthen ditch plug at the southwest corner of this polygon will help to retain surface water and enhance the hydrology of this former hydric pine savanna. Prescribed burns will be conducted to maintain an appropriate fire regime. |
| 42A | 3.5 | 627 | 627 | Enhance | These polygons are depressional wetland features within polygon 41. The installation of the ditch plug in polygon 41 will result in minor hydrologic enhancement of these slash pine swamp forests. |
| 42B | 45.2 | 627 | 627 | | |
| 42C | 15.3 | 627 | 627 | | |
| 42D | 14.8 | 627 | 627 | | |
| 42E | 13.3 | 627 | 627 | | |
| 43 | 114.0 | 623 | 623 | Enhance | Polygon 43 is a forested wetland with a significant Atlantic White Cedar component. It was once part of a much larger forested swamp that included polygons 43 and 45. Polygons 43 and 45 are now bisected by a road. The removal of a portion of this road and the filling of roadside ditches will reconnect the wetland and enhance wetland hydrology. |
| 45 | 29.3 | 614 | 630 | Enhance | |
| 44 | 3.5 | 814 | 623 | Restore | Polygon 44 represents an existing road and its adjacent ditches. This area will be restored to forested wetland by pushing the road fill material into the adjacent ditches and restoring the natural topography. Cypress seedlings will be planted in the former road/ditch footprint. |
| 46 | 53.0 | 621 | 621 | Enhance | Polygon 46 is a forested riverine wetland dominated by cypress that borders Whiskey George Creek. The road removals and installation of low water crossings will enhance the timing, magnitude, and quality of surface water flows to this wetland system. |

**Table 2 continued**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 47 | 113.9 | 627 | 627 | Enhance | This polygon is a slash pine swamp forest. Surface water drainage to this wetland has been altered by the construction of the adjacent road and ditches. The installation of two low water crossings will help to restore natural drainage patterns and enhance the hydrology of this wetland. |
| 48 | 31.6 | 625 | 627 | Enhance | This mixed forested wetland was converted to pine plantation. The pines have been thinned and cypress trees are now regenerating. The installation of a new 36-in culvert will enhance wetland hydrology by re-connecting this former cypress slough. |
| 49 | 19.4 | 625 | 626 | Restore | This former hydric pine savanna was converted to pine plantation and the pines were subsequently thinned. Surface water drainage from the east was eliminated by the construction of roads. Natural surface water drainage patterns will be restored by installing the two low water crossings. Prescribed burns will be conducted to maintain an appropriate fire regime. |
| 50 | 25.1 | 625 | 626 | Restore | |
| 51 | 58.0 | 625 | 626 | Enhance | This former hydric pine savanna was converted to pine plantation and the pines were subsequently thinned. The removal of the forest roads to the south and to the east will restore natural surface water drainage patterns in this system. Maintenance of an appropriate fire regime using prescribed burning will also contribute to the restoration of this pine savanna. |

**Table 2 continued**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 52 | 116.4 | 625 | 626 | Restore | This former hydric pine savanna was converted to pine plantation. The construction of forest roads altered drainage patterns and reduced the surface water runoff into and out of this area. The removal of the road bordering the northern edge of this polygon and the installation of a low water crossing will restore natural drainage patterns. Prescribed burns will be conducted to maintain an appropriate fire regime. |
| 53 | 13.1 | 625 | 627 | Enhance | FNAI delineated the historic vegetative community of polygons 53 and 54 as hydric pine savanna. However, the 1953 photography suggests a denser tree canopy. After 1953, this area was converted to pine plantation. The trees in polygon 53 were subsequently thinned and now consist of scattered pines and regenerating cypress. The canopy in polygon 54 remains a dense mix of pines, cypress, and shrubs. The low water crossing and nearby road removals will enhance the hydrology of these wetlands. Slash pine swamp forest is the anticipated future wetland type. |
| 54 | 43.8 | 627 | 627 | | |
| 55 | 11.5 | 441 | 626 | Restore | These areas, delineated by FNAI as historic hydric pine savannas, were converted to pine plantation sometime after 1953. The pines were subsequently clearcut but were again replanted in 1989. Cypress and shrubs are also present. The pines in both polygons will be thinned by the Division of Forestry in 2009-2010. Natural drainage patterns will be re-established by removing the road that bisects these polygons and installing a low water crossing. The target community proposed for polygon 55 is hydric pine savanna and the target community proposed for polygon 56 is slash pine swamp forest. |
| 56 | 5.0 | 627 | 627 | Enhance | |

**Table 2 continued**

| Poly # | Area (acres) | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 57 | 4.3 | 814 | 626 | Restore | Polygon 57 comprises an existing forest road and its adjacent ditches. This area will be restored to hydric pine savanna by pushing the road fill material into the adjacent ditches and restoring the natural topography. Wiregrass and slash pine or cypress seedlings will be planted in the road/ditch footprint. |
| 58 | 356.4 | 625 | 625 | Enhance | This area, delineated by FNAI as historic hydric pine savanna, was converted to pine plantation and the pines were subsequently thinned. Surface water drainage patterns will be restored by removing the road on the southern edge as well as the road segments comprising polygons 59 and 63. Prescribed burns will be conducted to maintain an appropriate fire regime. |
| 59 | 2.4 | 814 | 625 | Restore | Polygons 59, 62, 63, and 64 are existing forest roads and ditches that will be restored to hydric pine flatwoods by pushing the road fill material into the ditches and restoring the natural topography. The road/ditch footprints will be planted with wiregrass and slash pine or cypress seedlings. |
| 62 | 5.8 | 814 | 625 | | |
| 63 | 3.1 | 814 | 625 | | |
| 64 | 1.6 | 814 | 625 | | |
| 60 | 1.4 | 814 | 814 | No change | Polygon 60 is an existing forest road that will continue to be maintained by the Division of Forestry to provide access to the adjacent pine stands. |
| 61 | 28.4 | 625 | 626 | Enhance | Polygons 61 and 67 comprise historic hydric pine flatwoods and hydric pine savannas that were converted to pine plantation. The pines were subsequently thinned. Natural surface water drainage patterns will be restored by removing the road that bisects these polygons. Prescribed burns will be conducted to maintain this area as a hydric pine savanna. |
| 67 | 15.4 | 625 | 626 | Enhance | |

**Table 2 continued**

| Poly # | Acres | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 65 | 19.7 | 625 | 625 | Enhance | This polygon has a slightly higher topographic elevation (~ 1.5 ft.) than adjacent polygons. Similar to surrounding areas, this area was converted to pine plantation and the trees were subsequently thinned. The removal of the road forming the northern border of this polygon and maintenance of an appropriate fire regime will enhance this hydric pine flatwoods. |
| 66 | 5.9 | 625 | 625 | Enhance | This hydric pine flatwoods area is slightly uphill from adjacent polygons and is anticipated to have minor benefits from the proposed hydrologic improvements; however the habitat will benefit from the maintenance of an appropriate fire regime. |
| 68<br>69<br>70 | 11.5<br>2.5<br>1.4 | 625<br>627<br>627 | 627<br>627<br>627 | Enhance | Following the removal of the forest roads, polygons 68, 69, and 70 will receive surface water drainage from the north and west. The low water crossing constructed at the southern tip of polygon 70 will enable surface water runoff to be conveyed south through the natural break in the topographic ridge toward Whiskey George Creek. The target community for these polygons is a slash pine swamp forest. |
| 71 | 209.4 | 625 | 625 | Enhance | This area was converted to pine plantation and the pines were subsequently thinned. Natural surface water drainage patterns will be restored by removing the road to the north and installing a low water crossing immediately to the southwest. Prescribed burns will be conducted to maintain an appropriate fire regime. The target community is hydric pine flatwoods. |
| 72 | 4.1 | 627 | 627 | Enhance | Polygon 72 is a small depressional wetland feature (slash pine swamp forest) within polygon 71. Hydrologic improvements to surrounding areas will enhance the hydroperiod of this wetland. |

**Table 2 continued**

| Poly # | Acres | Current Habitat (FLUCCS) | Target Habitat (FLUCCS) | Enhance or Restore | Restoration Activities and Benefits |
|---|---|---|---|---|---|
| 73 | 19.8 | 627 | 627 | Enhance | The removal of the road to the northwest will likely increase surface water runoff entering this wetland. However, this polygon is part of the Sand Branch Creek watershed and will be addressed in future restoration projects. |
| 74 | 0.3 | 627 | 627 | Enhance | This remnant forested wetland once conveyed water south toward Whiskey George Creek. The low water crossing will restore the natural surface water flow path and enhance the hydrology of this slash pine swamp forest system. |
| 75 | 18.5 | 441 | 627 | Enhance | According to FNAI, polygons 75 and 76 were historically comprised of mixed forested wetlands, basin swamp, and wet savanna – pine flatwoods mosaic habitats. These areas were subsequently converted to pine plantation. The existing pines were planted in 1976 and have not been thinned. The Division of Forestry plans to harvest and thin these areas during 2010-2011. The new low water crossing will increase the surface water flow into these areas of planted pines. Following thinning of the pines by the Division of Forestry, this area will be restored to a slash pine swamp forest. |
| 76 | 29.8 | 441 | 627 | Enhance | |
| | 1816.2 | TOTAL | | | |

**Site Protection Instruments:**

The NWFWD will be responsible for the perpetual management of mitigation projects implemented by the District within Tate's Hell State Forest. The NWFWMD works cooperatively with the state Division of Forestry to coordinate management activities such as shrub reduction, revegetation, tree thinning, and prescribed burning in restoration areas. The NWFWMD is currently developing a Hydrologic Restoration Plan for the entire Tate's Hell State Forest, which prioritizes future restoration activities, provides specifications for site maintenance and environmental monitoring, and clarifies agency roles and responsibilities. The Hydrologic Restoration will be completed in 2009.

**Baseline Information:**

Maps (see attached figures)

- Map of Tate's Hell State Forest
- Location of restoration areas within the Whiskey George Creek watershed
- 1953 B&W aerials
- 2004 and 2007 DOQs
- Historic vegetative communities delineated by FNAI
- LiDAR digital elevation model (DEM)
- Soils (NRCS)
- Existing habitat cover (FLUCCS)
- Target habitat cover (FLUCCS)
- UMAM mitigation polygons

**Determination of Mitigation Credits:**

Mitigation credits for this project were derived using the Uniform Mitigation Assessment Method (UMAM). A field visit with the Mitigation Review Team is scheduled for January 27, 2009 to review and confirm the UMAM scores.

**Maintenance Plan:**

This site will be actively maintained by NWFWMD and the state Division of Forestry. The District will be responsible for revegetation, brush reduction, site inspections, environmental monitoring, and maintenance of low water crossings and ditch plugs. Following the establishment of the vegetation planted in the former road and ditch footprints, the Division of Forestry will resume periodic prescribed burns. The District will coordinate with the DOF to ensure that appropriate fire regimes are maintained in the Sumatra Savanna and Whiskey George Savanna areas. Maintenance and management will be performed in accordance with UWRMP Chapter 11. With an appropriate fire regime, both project areas are expected to be largely or fully self-sustaining. However, manual brush reduction will be implemented as needed to manage invasive titi.

**Ecological Performance Standards (from UWRMP Chapter 11):**

Enhancement Success Criteria

EC1 – Desired species showing evidence of increasing coverage

EC2 – No more than 1% coverage of invasive exotic and 5% nuisance native and non invasive exotic species unless otherwise specified. For wetland enhancement areas, titi will be managed as indicated in Tables 1 and 2.

EC3 – Increase in appropriate species diversity

EC4 – Kind and total coverage of species appropriate for management goals and target natural community

EC5 – Kind and total coverage of herbaceous species appropriate for management goals and target natural community

EC6 – Kind and total coverage of tree species appropriate for management goals and target natural community

EC7 – Maintain the ecological conditions so that the mitigation UMAM scores are met for each of the specified community types

Restoration Success Criteria

RC1 – Desired species showing evidence of increasing coverage

RC2 – No more than 1% coverage of invasive exotic and 5% nuisance native and non invasive exotic species unless otherwise specified in a management plan. The coverage of titi will be limited to no greater than 5% in restored areas (former road footprints).

RC3 – Increase in appropriate herbaceous, shrub and / or tree species

RC4 – Kind and total coverage of species appropriate for management goals and target natural community

RC5 – Kind and total coverage of herbaceous species appropriate for management goals and target natural community

RC6 – Kind and total coverage of tree species appropriate for management goals and target natural community

RC7 – Maintain the ecological conditions so that the mitigation UMAM scores are met for each of the specified community types

**Monitoring Requirements:**

Monitoring protocols necessary to ensure effective preservation, enhancement and restoration will be derived from Chapter 11.0 of the UWRMP. Annual monitoring will be conducted for five years from the start of mitigation activities or as required by USACE permit conditions. Photo-points and meandering vegetation surveys by a qualified biologist are expected to comprise the monitoring for this site.

**Long-term Management Plan:**

The Hydrologic Restoration Plan includes specific guidelines for long-term site maintenance and management activities that are based on the broader objective of restoring a mosaic of historic vegetative community types across the Tate's Hell State Forest. Long-term management actions, including prescribed fire and the control of exotic and invasive species will be implemented in accordance with UWRMP Chapter 11.

The NWFWMD is responsible for ensuring the perpetual management of mitigation lands. The NWFWMD will continue to coordinate with the Division of Forestry regarding land management activities (e.g. prescribing burning, control of titi). Site inspections will be performed annually to ensure performance criteria are being achieved and to confirm that ditch plugs, low water crossings, and culverts are functioning properly to meet restoration goals.

**Adaptive Management Plan:**

All ecological restoration projects are site specific and multiple endpoints are possible owing to the stochastic nature of ecological processes, particularly in disturbed habitats. Additionally, human activities beyond the control of the NWFWMD may also influence the course of restoration. If changes in the implementation of this mitigation plan become necessary, the NWFWMD will first obtain approvals from the USACE/MRT.

**Financial Assurances:**

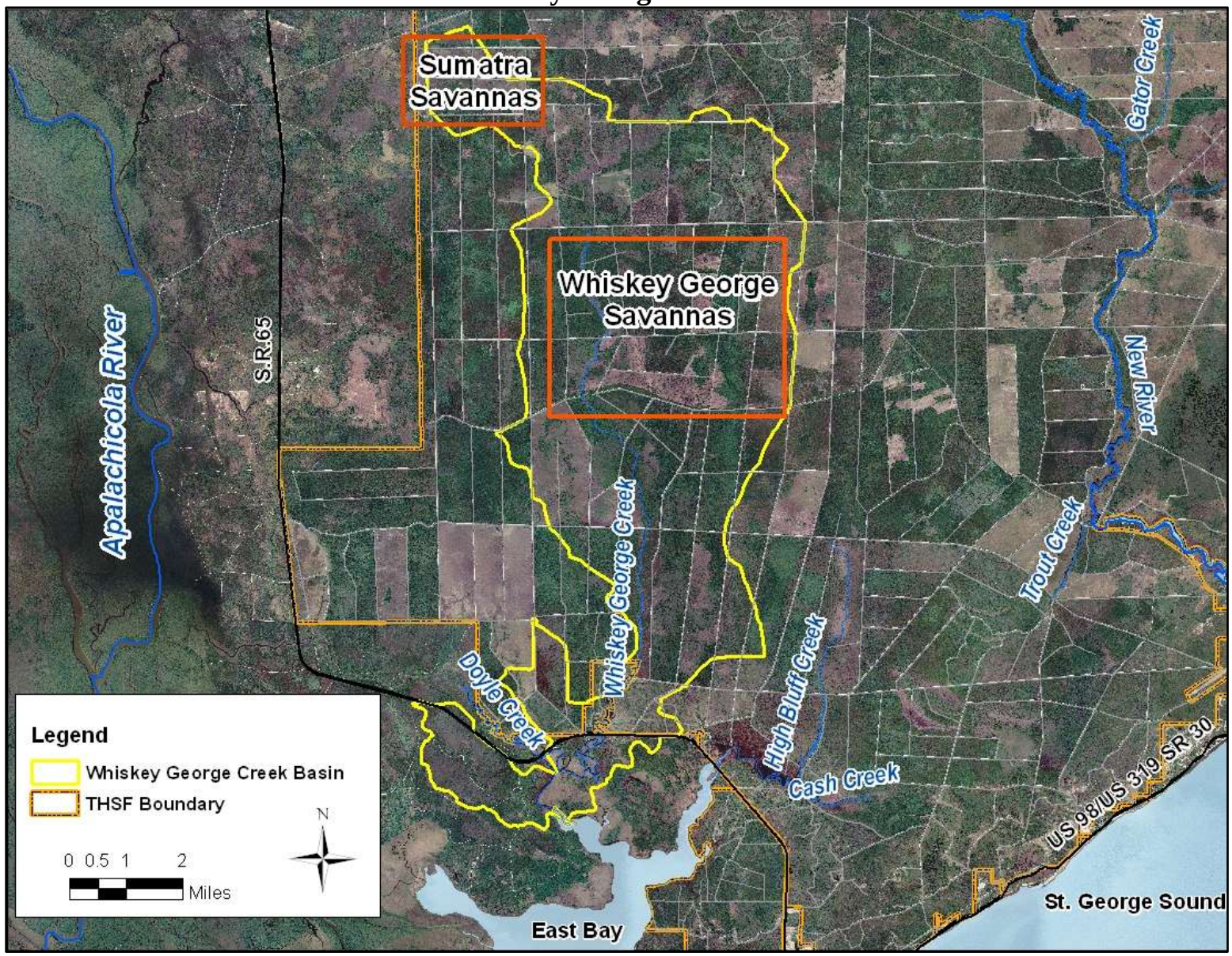
The NWFWMD is a governmental entity created by the Florida Water Resources Act of 1972 with the mission of protecting water resources protection and ecosystem integrity. Details concerning financial assurances are described in UWRMP Chapter 9.

**Annual Status Reports:**

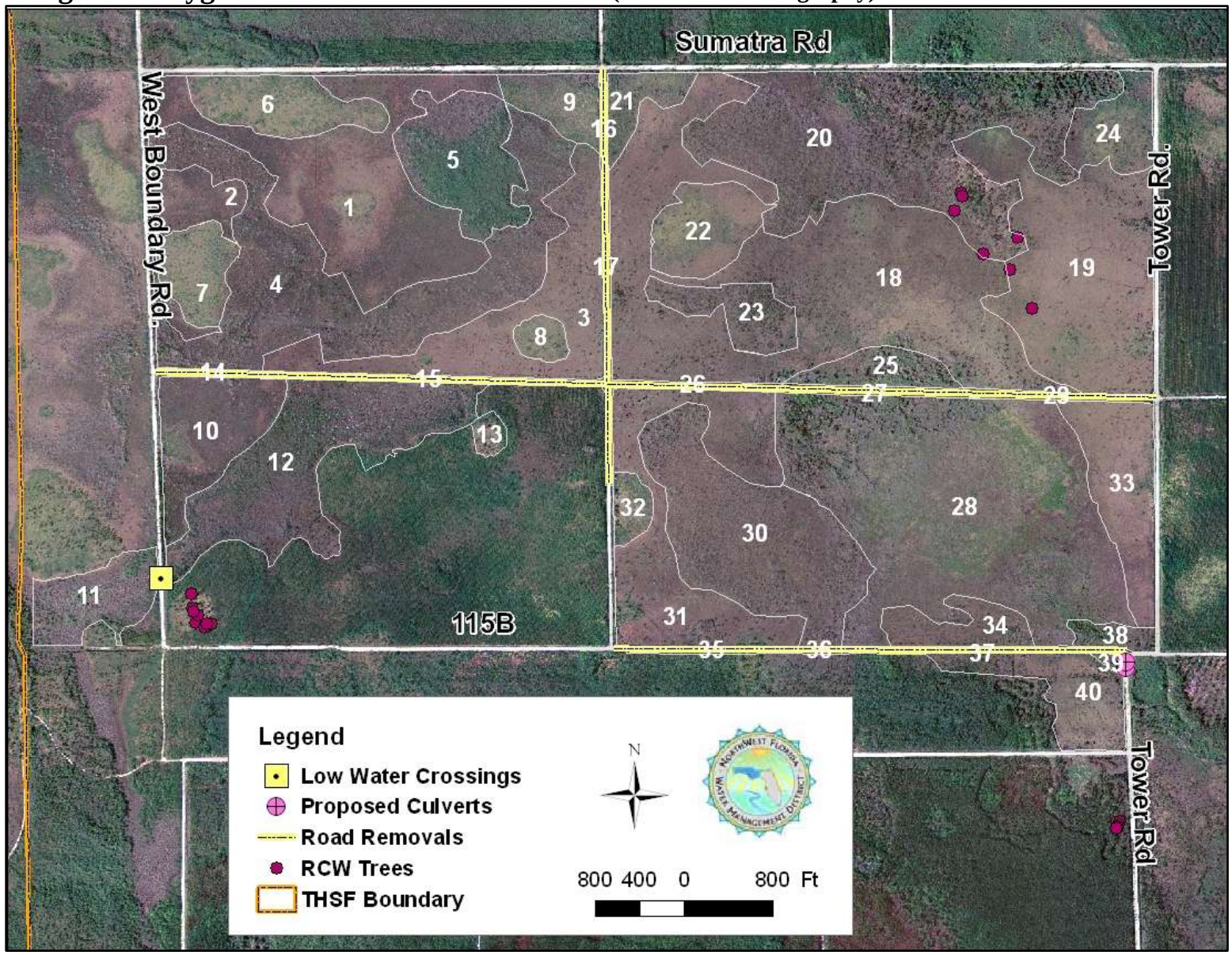
A summary status report for all mitigation projects, including cost accounting, will be provided annually to the CORPS if requested.

**Tate's Hell State Forest Location Map**

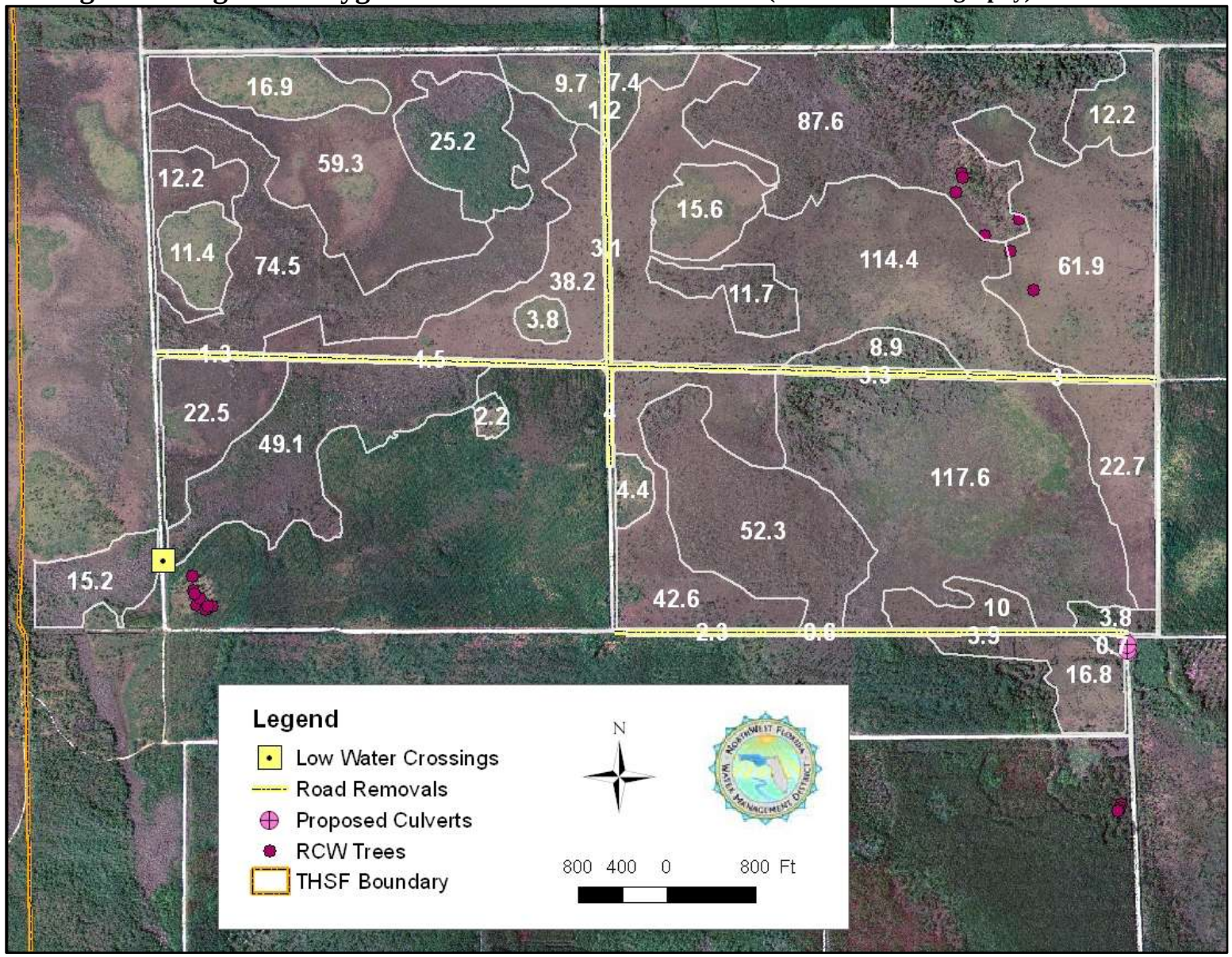
**Location of Sumatra Savannas and Whiskey George Savannas Areas**



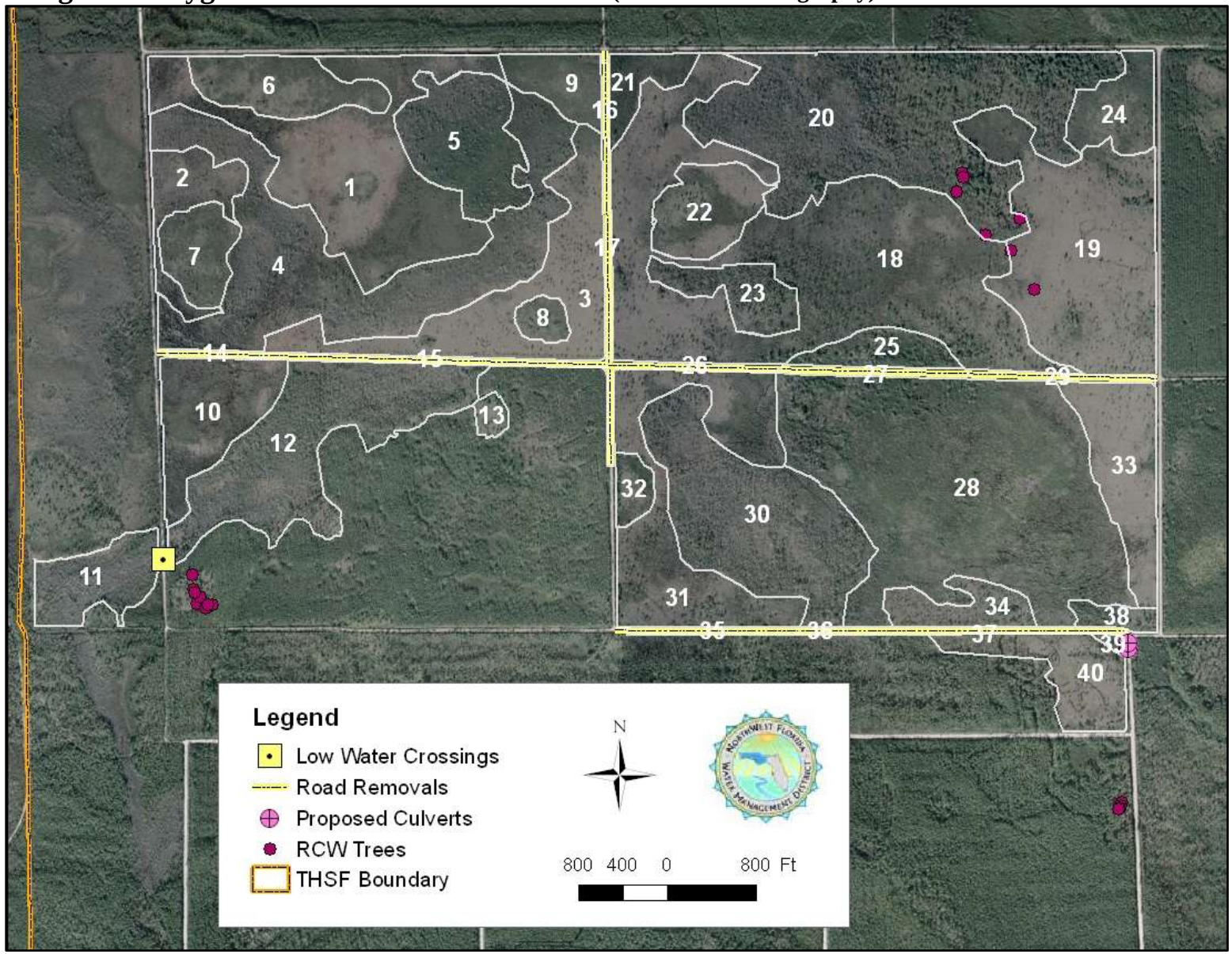
**Mitigation Polygons in Sumatra Savannas Area (2004 Aerial Photography)**



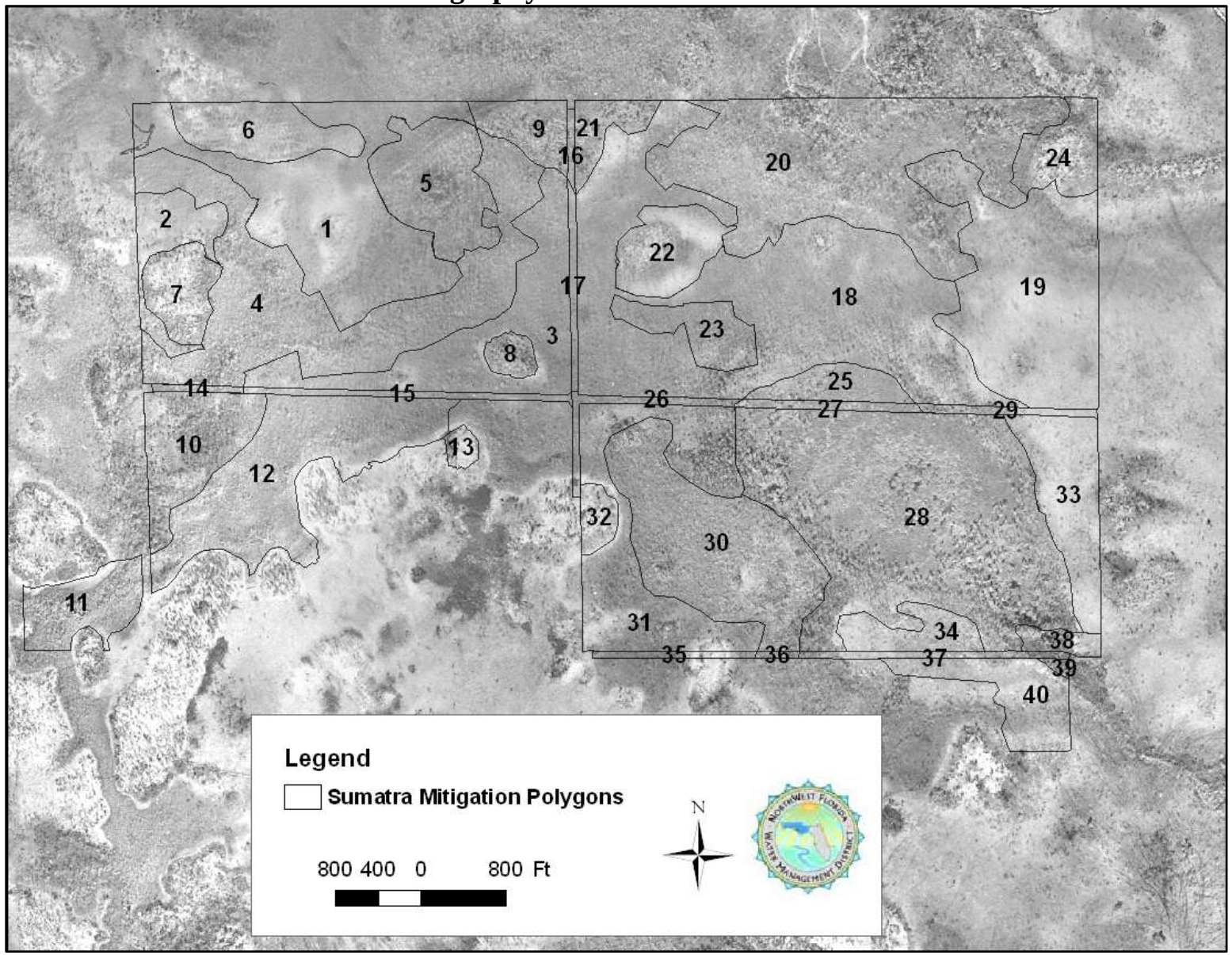
**Acreages of Mitigation Polygons in Sumatra Savannas Area (2004 Aerial Photography)**



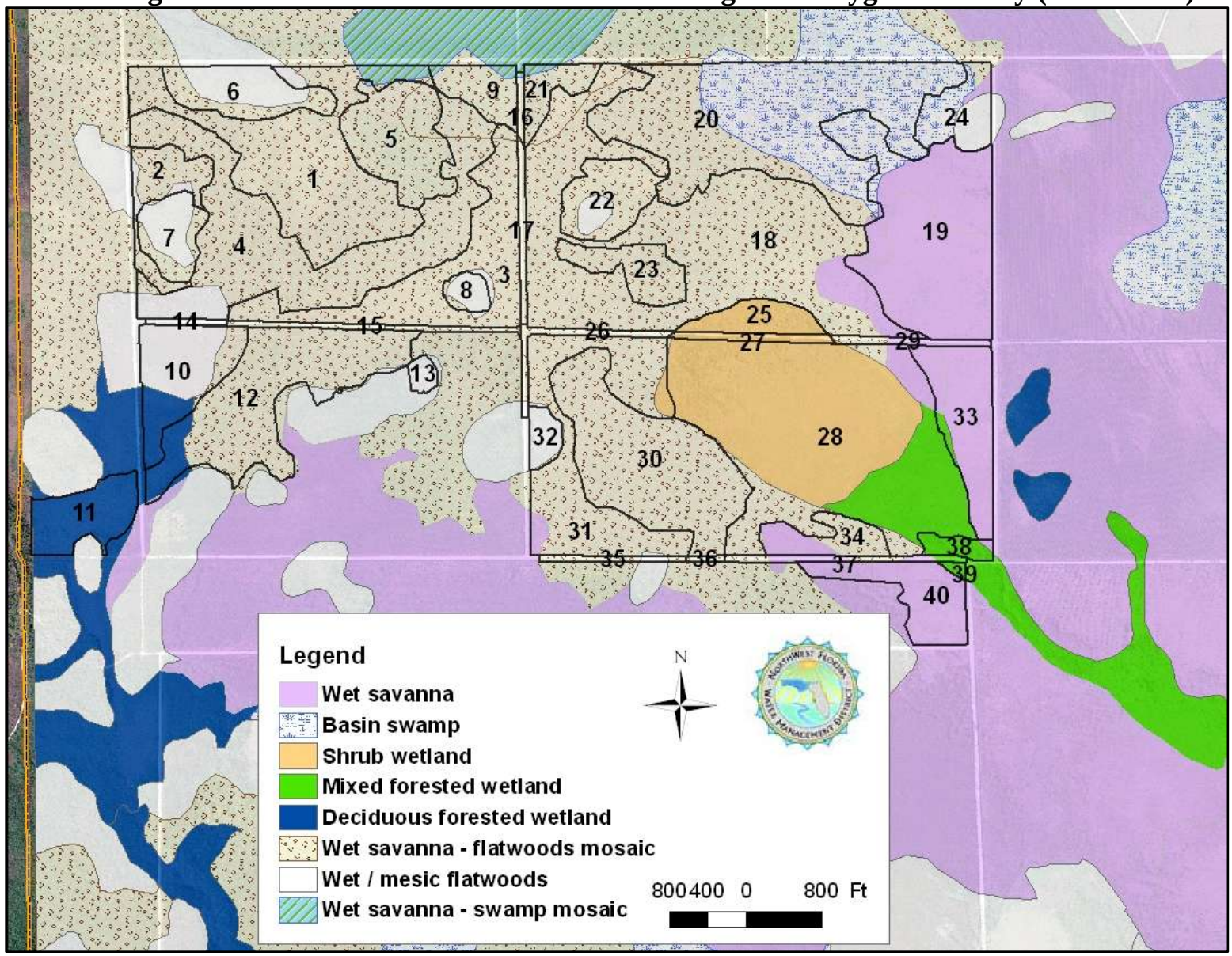
**Mitigation Polygons in Sumatra Savannas Area (2007 Aerial Photography)**



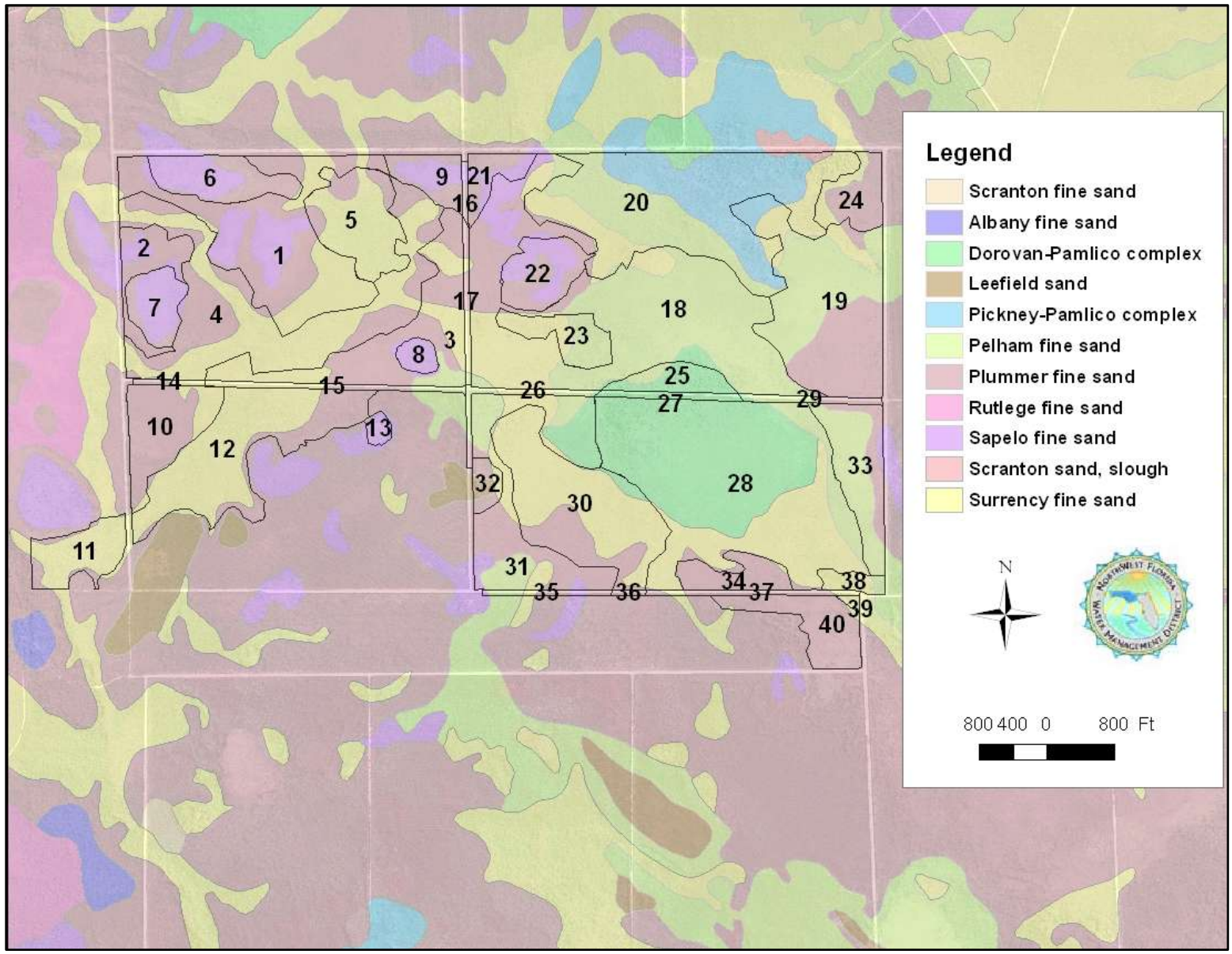
**1953 Black and White Aerial Photography for the Sumatra Savannas Area**



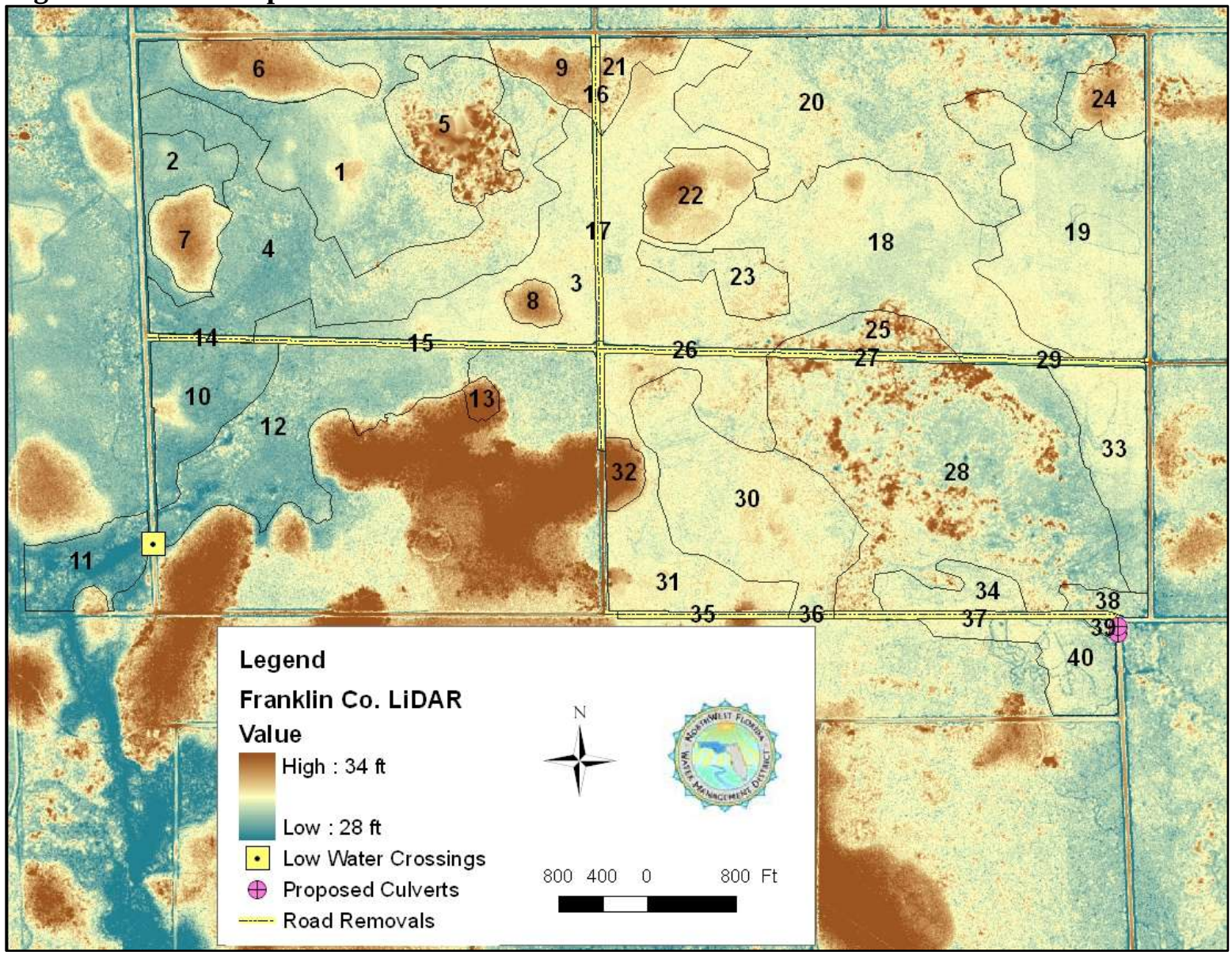
**Historic Vegetation in Sumatra Savannas Area with Mitigation Polygons Overlay (FNAI 2000)**



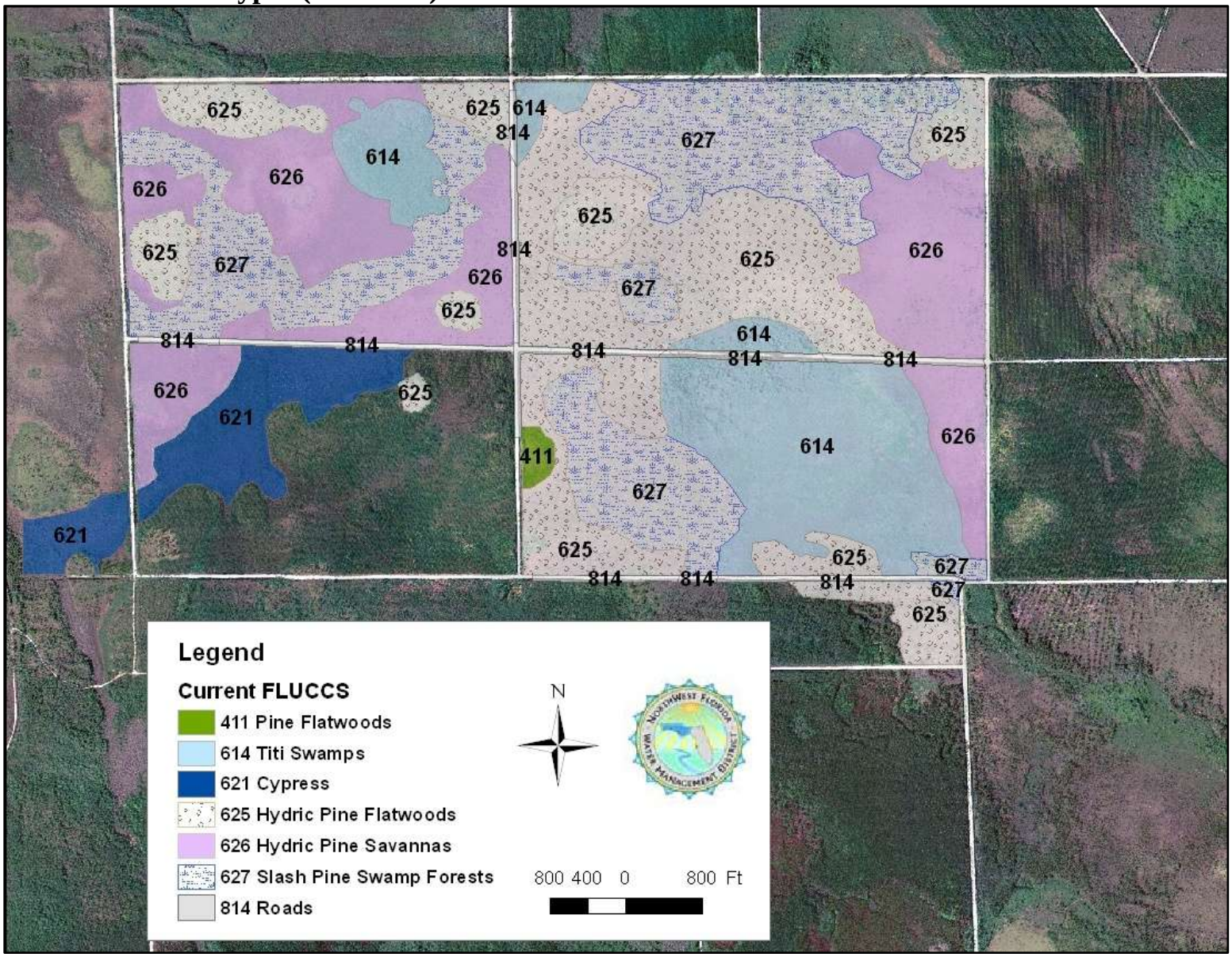
## Soils in the Sumatra Savannas Area



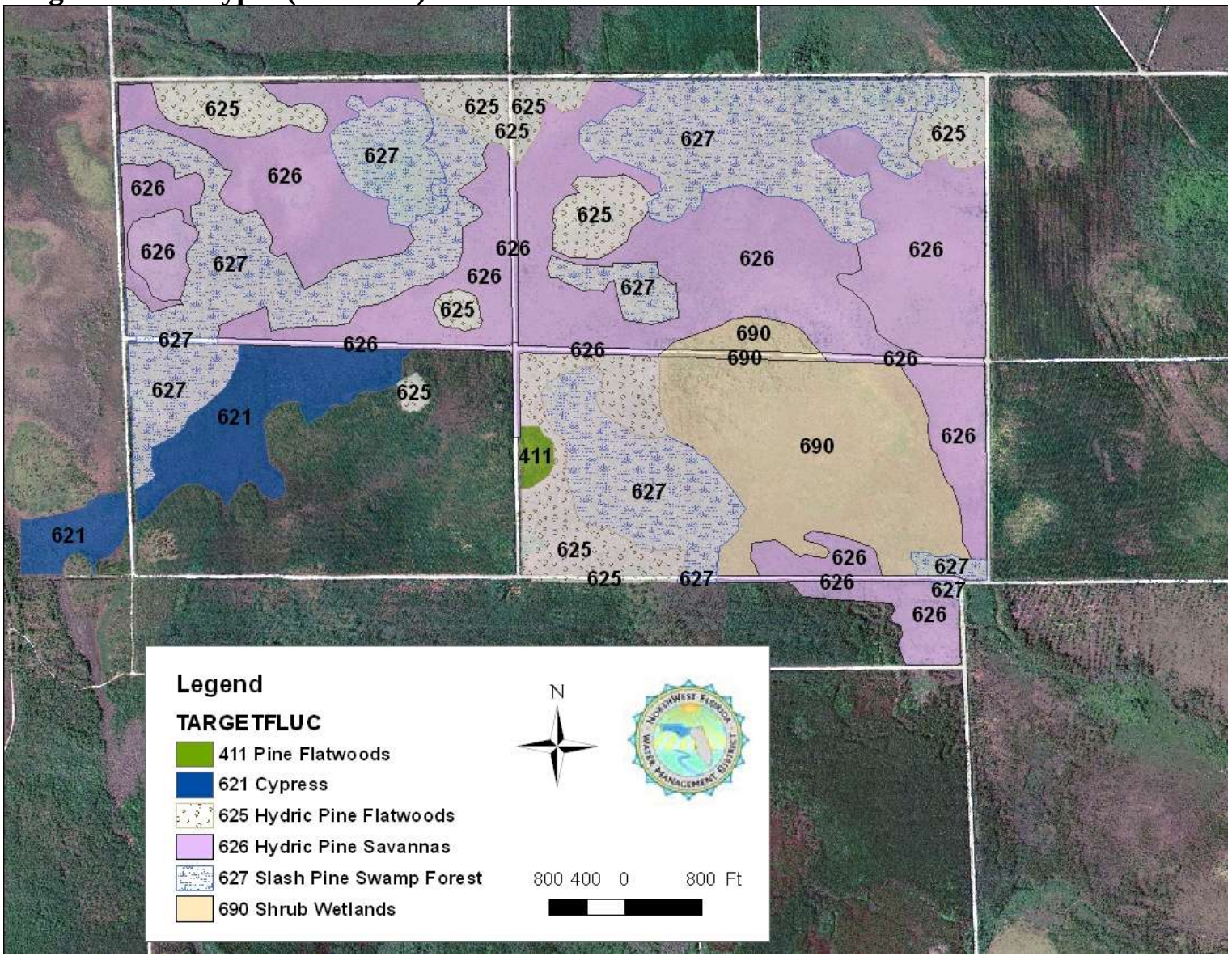
**Digital Elevation Map for the Sumatra Savannas Area**



## Current Habitat Types (FLUCCS) in the Sumatra Savannas Area

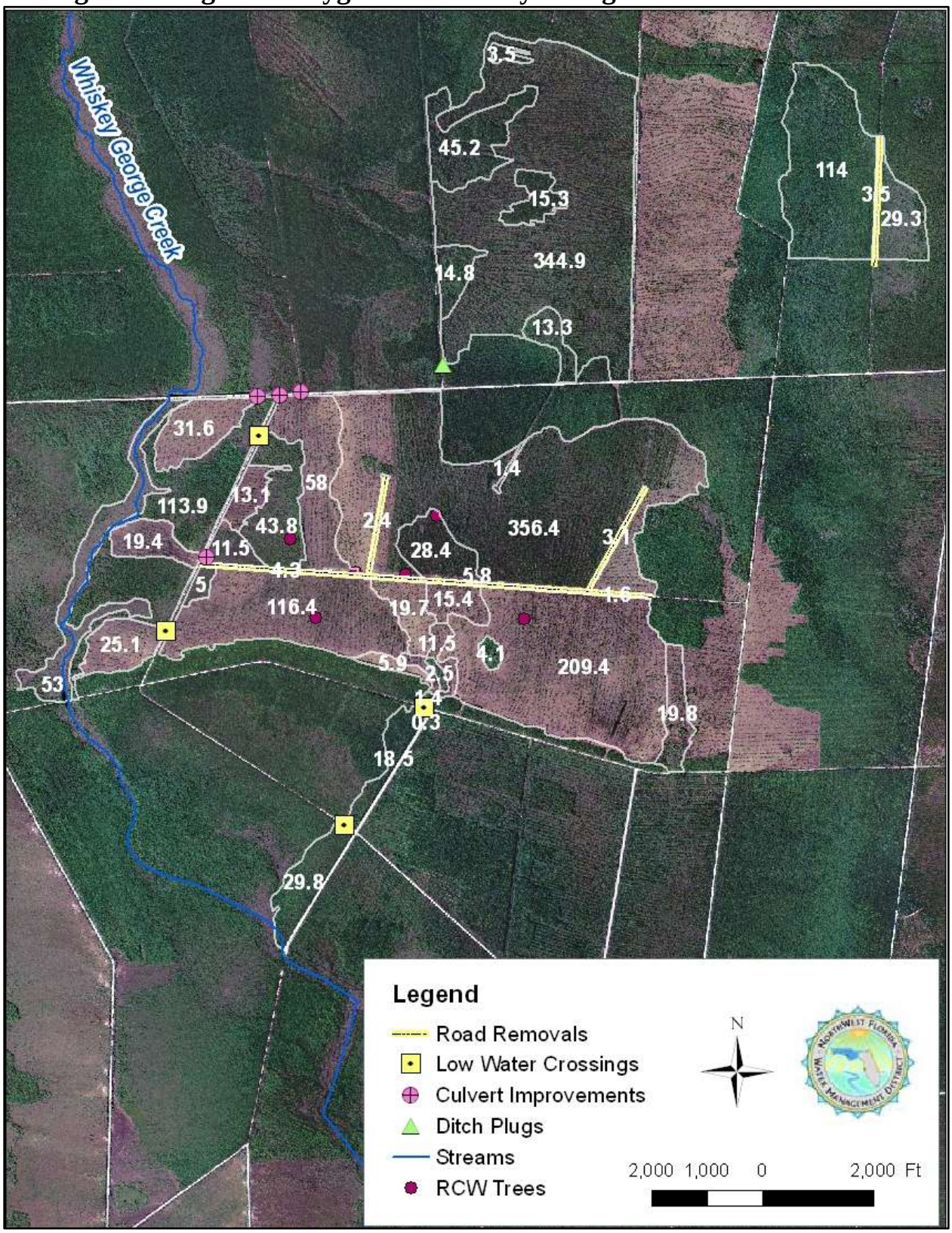


**Target Habitat Types (FLUCCS) in the Sumatra Savannas Area**

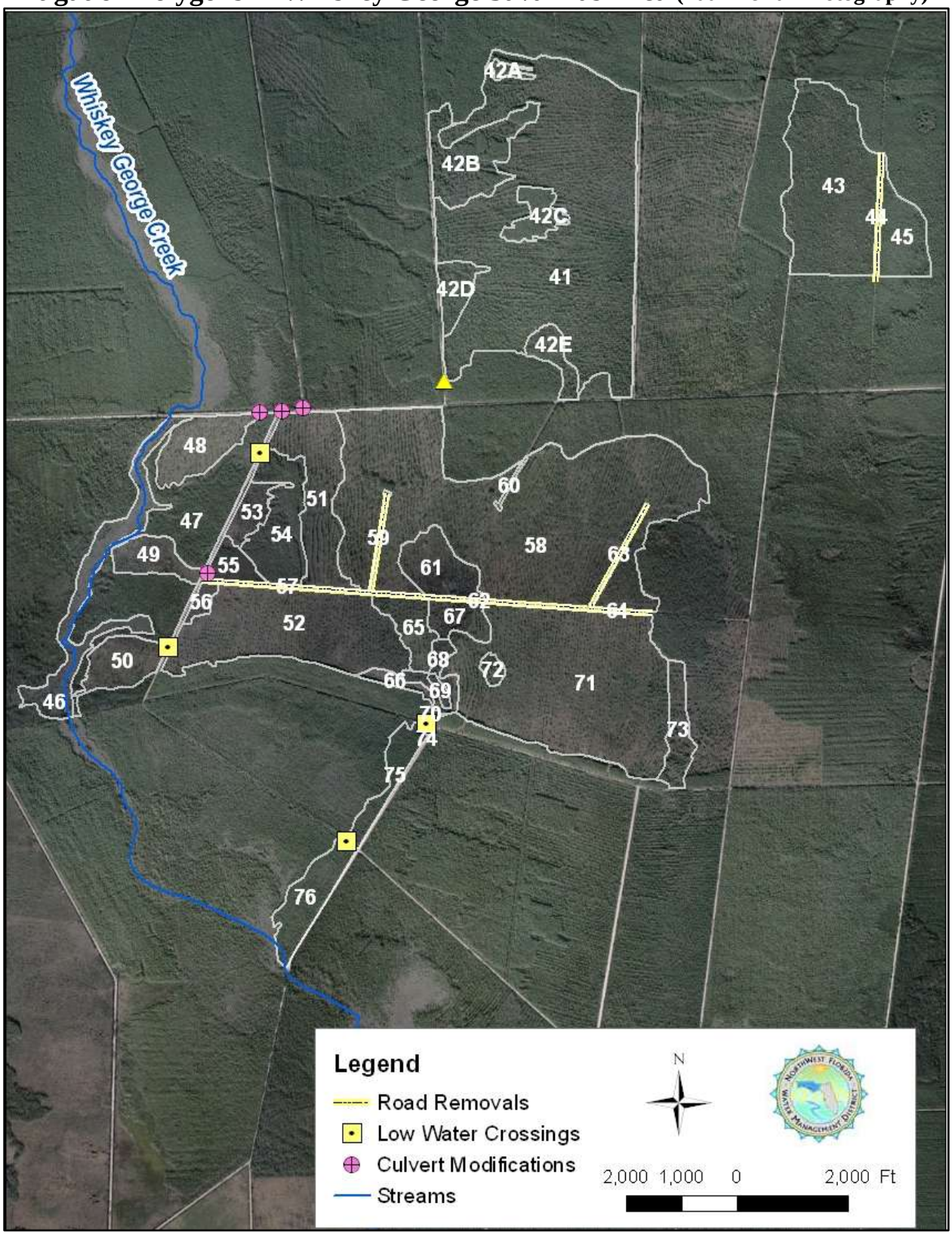


**Mitigation Polygons in Whiskey George Savannas Area (2004 Aerial Photography)**

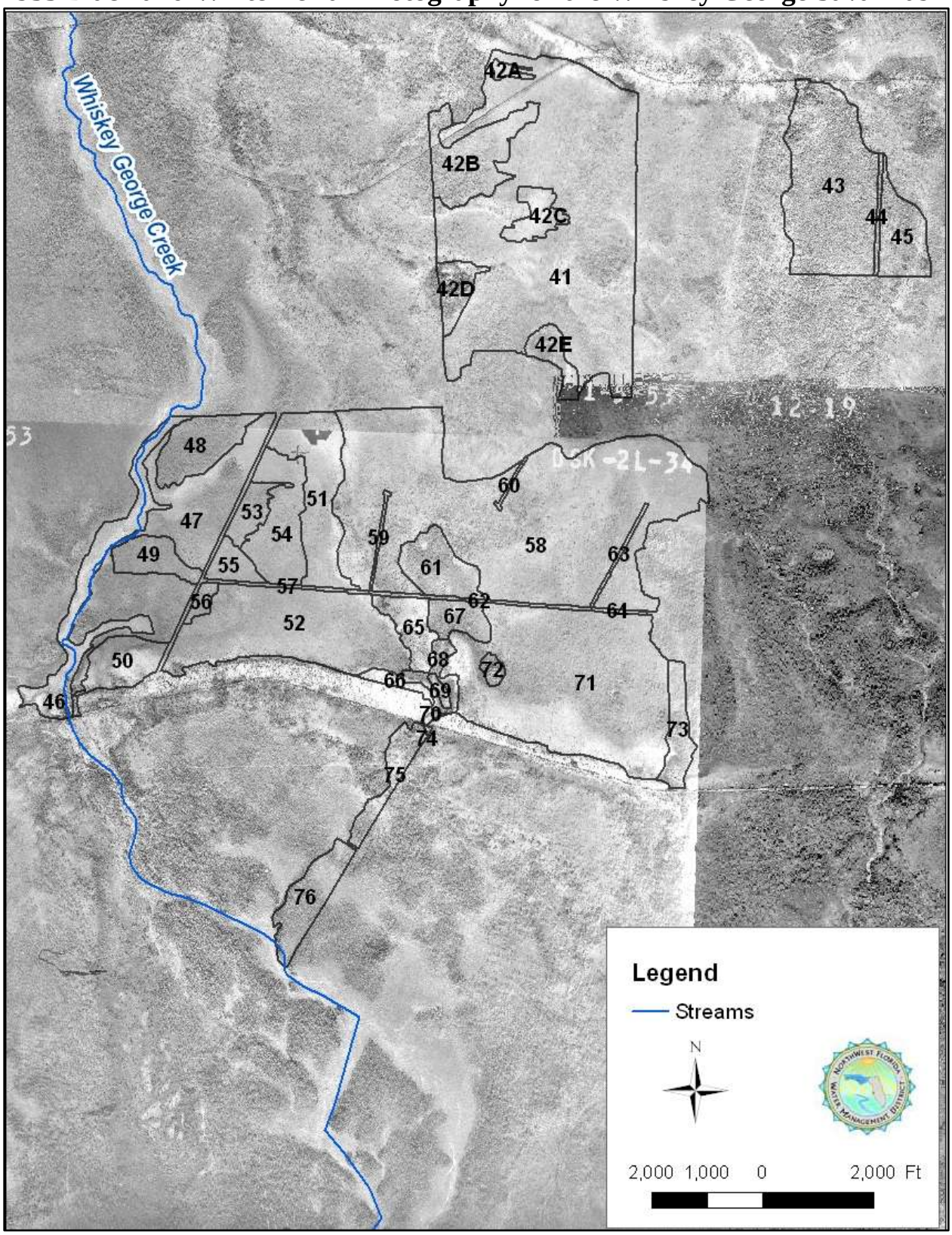
**Acreages of Mitigation Polygons in Whiskey George Savannas Area**



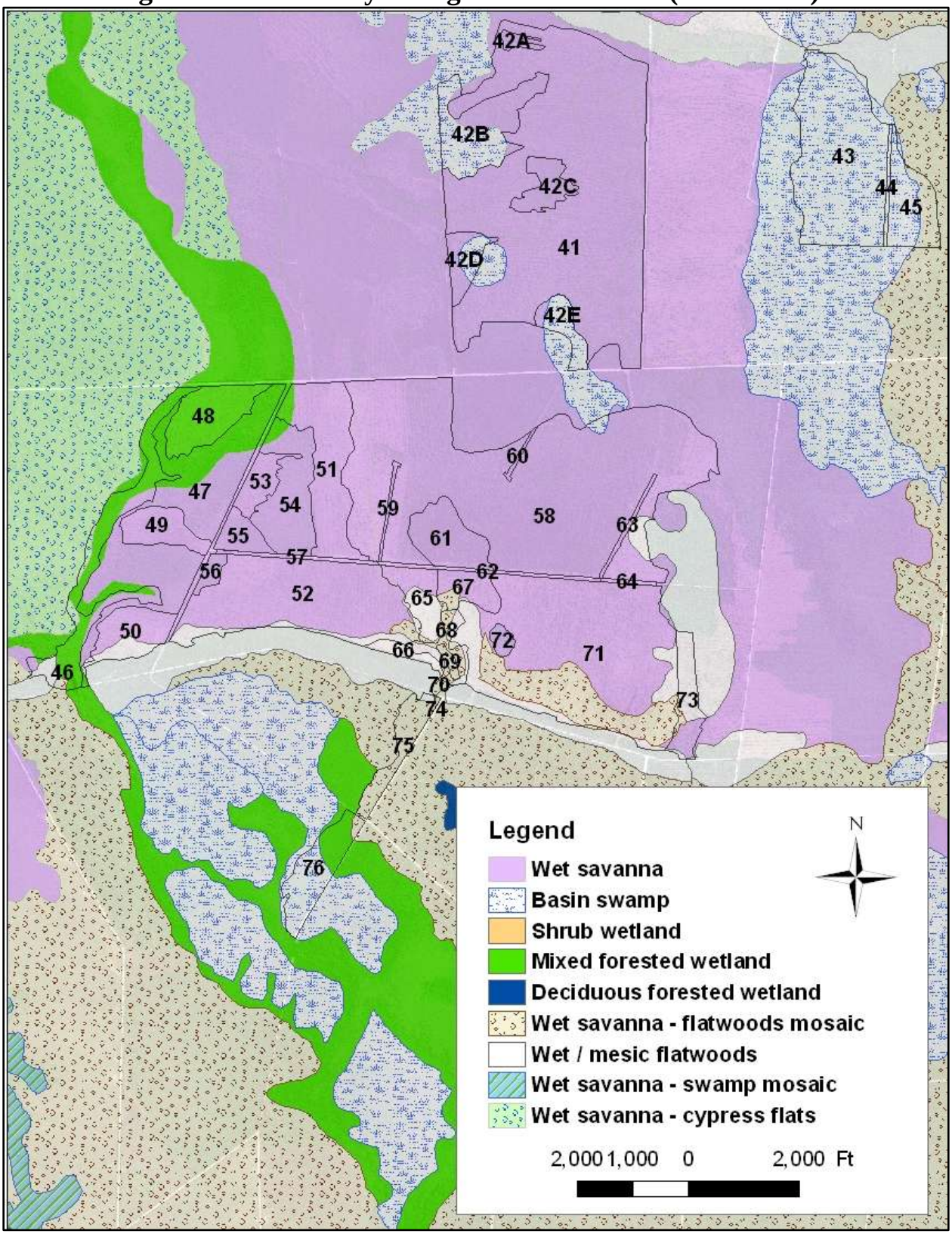
**Mitigation Polygons in Whiskey George Savannas Area (2007 Aerial Photography)**



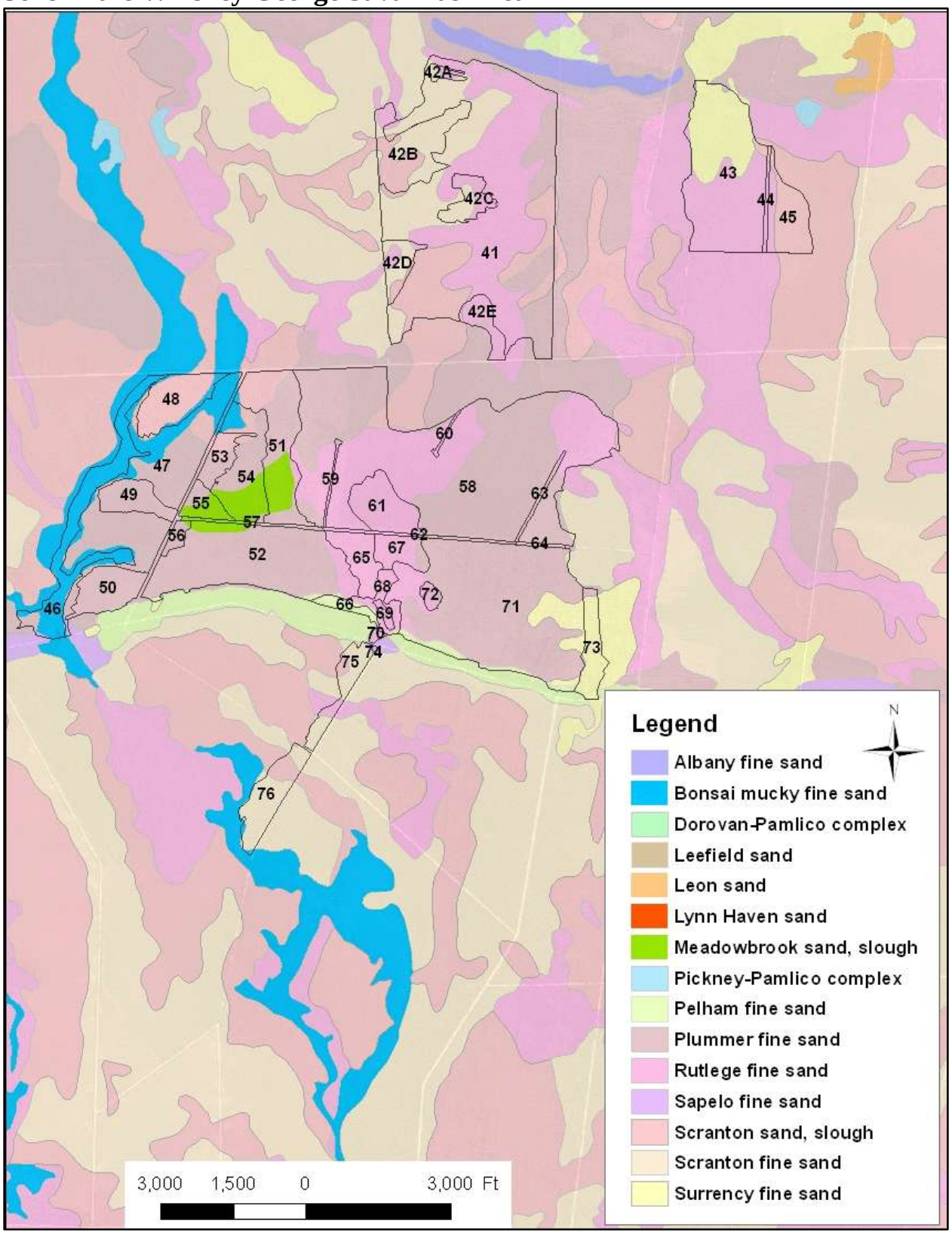
**1953 Black and White Aerial Photography for the Whiskey George Savannas**



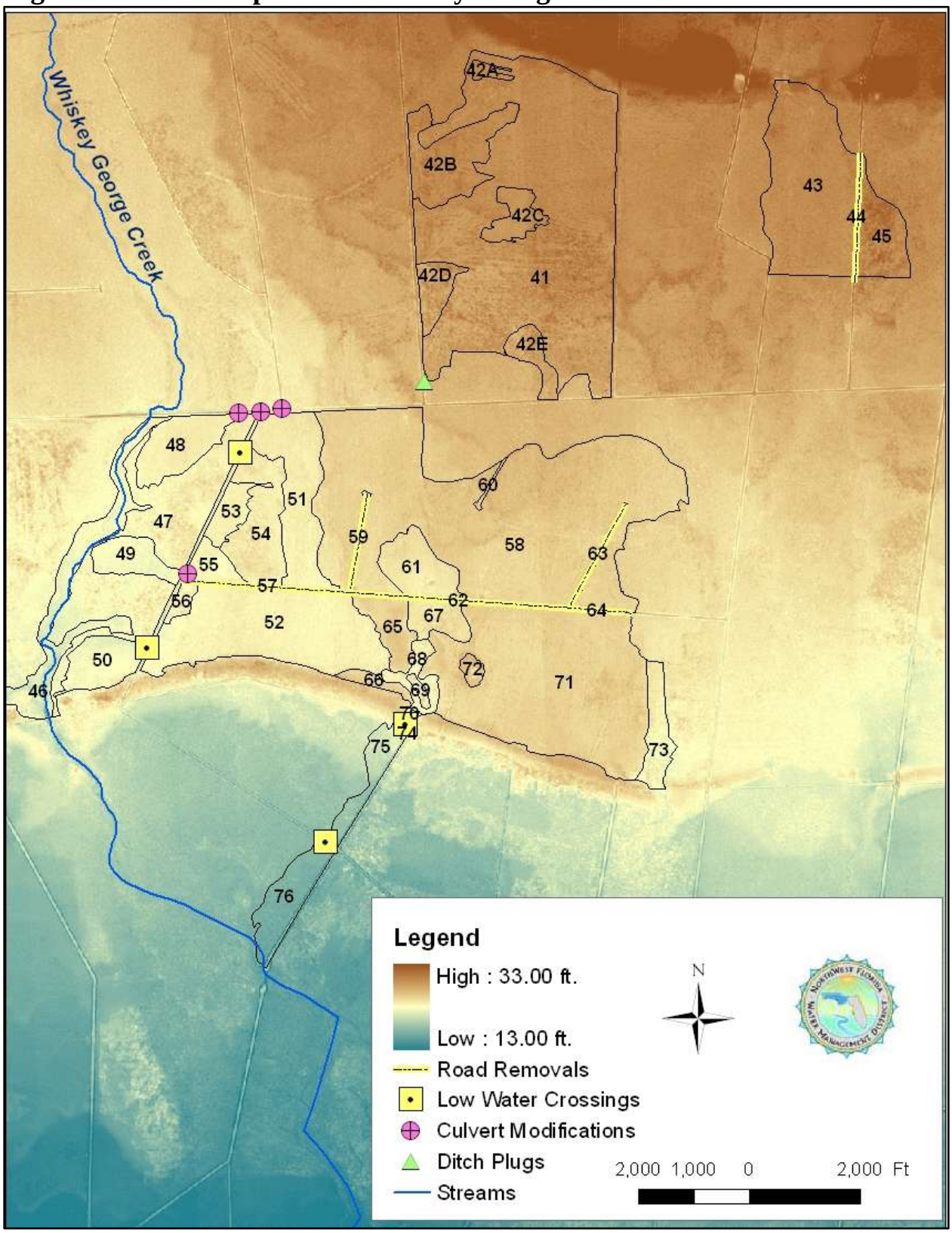
**Historic Vegetation in Whiskey George Savannas Area (FNAI 2000)**



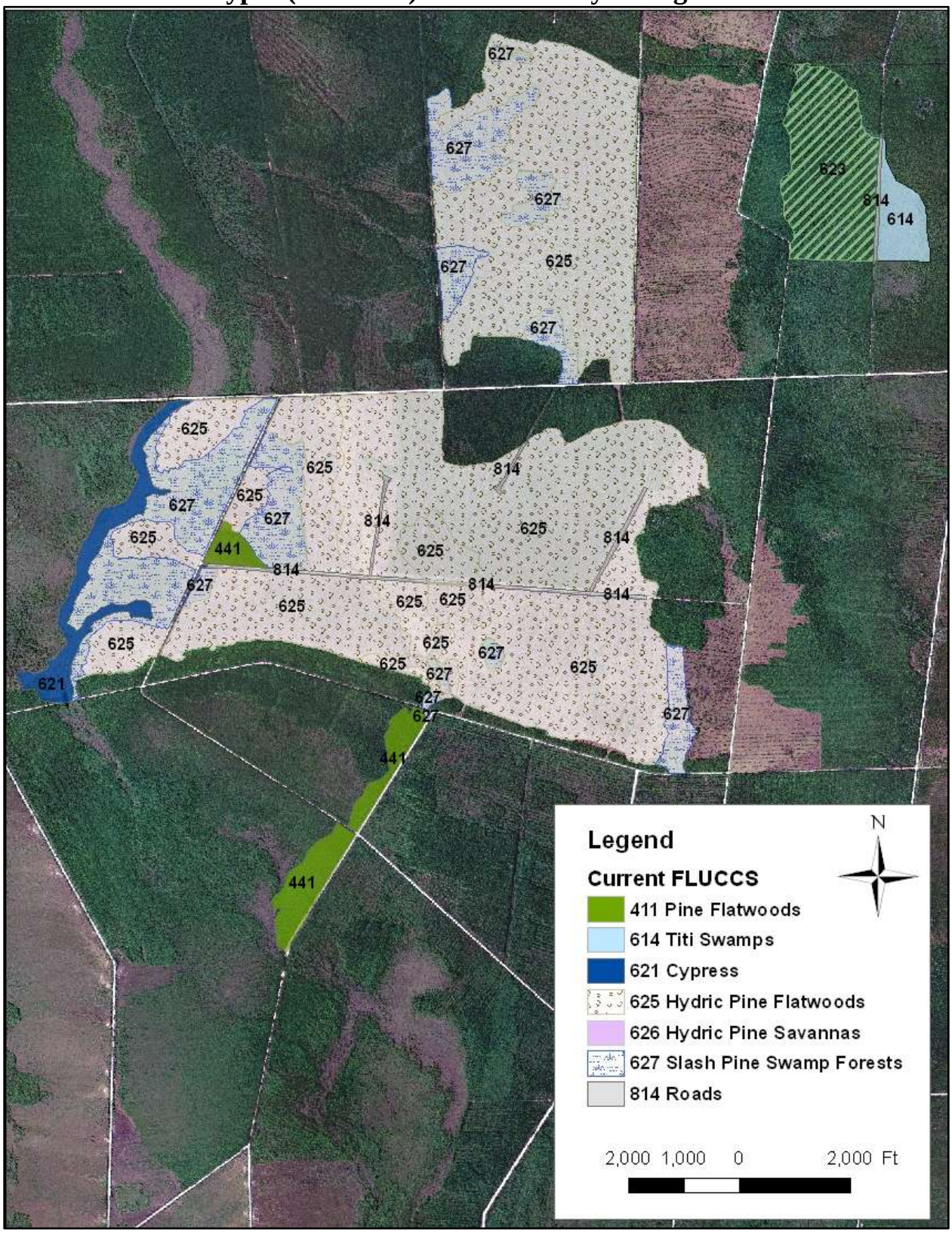
## Soils in the Whiskey George Savannas Area



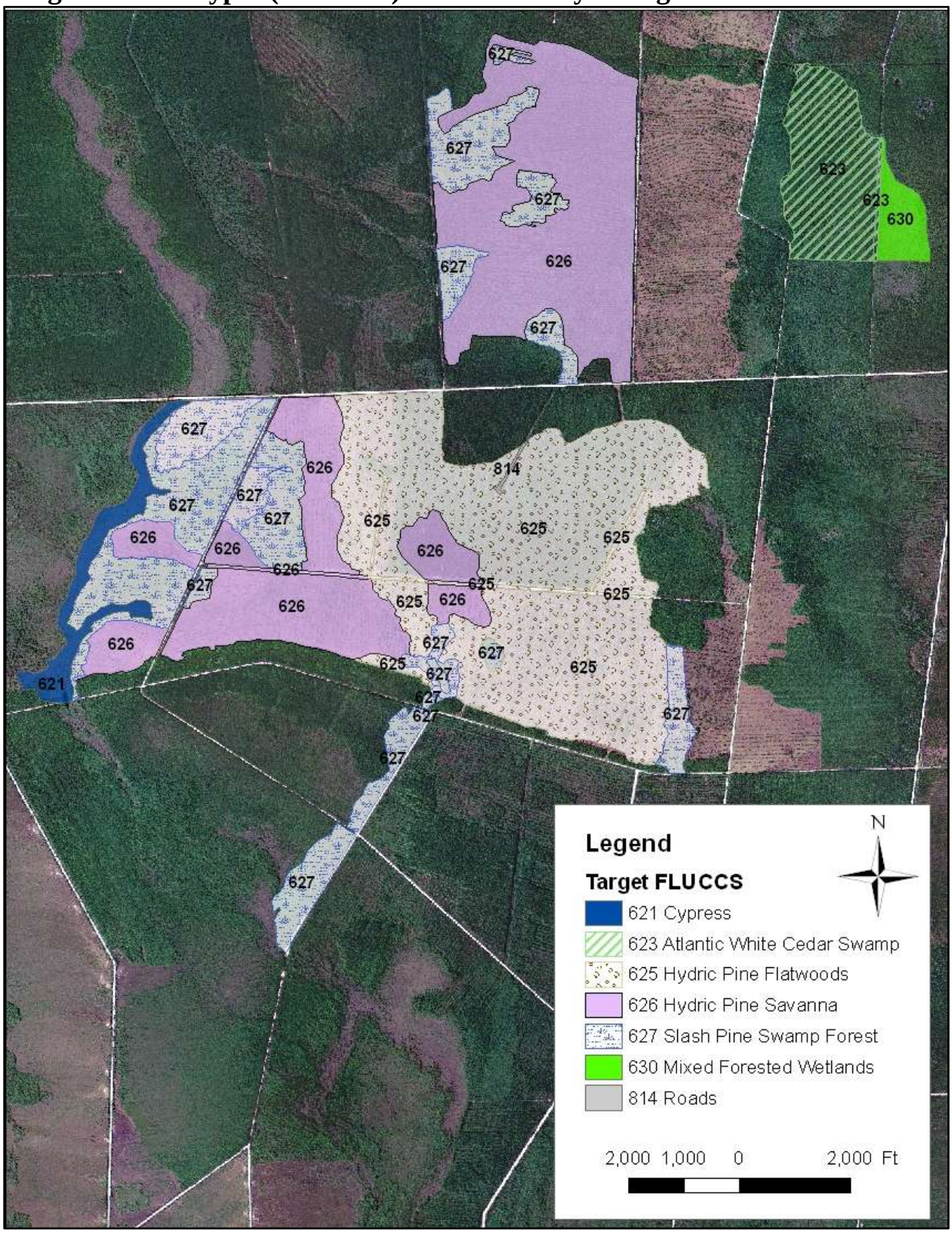
## Digital Elevation Map for the Whiskey George Savannas Area



## Current Habitat Types (FLUCCS) in the Whiskey George Savannas Area



**Target Habitat Types (FLUCCS) in the Whiskey George Savannas Area**



## References

Florida Natural Areas Inventory, 2000. Historic Vegetation of Tate's Hell State Forest.