Biological Monitoring of Aquatic and Terrestrial Fauna for the Picayune Strand Restoration Project (2005-2007)

CONSERVANCY
Of Southwest Florida

Biological Monitoring of Aquatic and Terrestrial Fauna for the Picayune Strand Restoration Project (2005-2007)

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LIST OF ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition/Description
ACCELER8	State-Federal program to expedite 8 Everglades Restoration Projects
C	Cypress strand community
CARL	Conservation and Restoration Lands
CERP	Comprehensive Everglades Restoration Plan
Cg	Cypress with graminoid understory community
CPUE	Catch Per Unit Effort
CSSP	Collier Seminole State Park
E/W	East/West
FP	Florida Panther reference sites
FPNWR	Florida Panther National Wildlife Refuge
FS	Fakahatchee Strand reference sites
FSSP	Fakahatchee Strand State Preserve
G	Graminoid dominated wet prairie community
GAC	Gulf America Corporation
GPS	Global Positioning System
Hh	Hardwood hammock community
Hm	Mesic hammock community
ITIS	Integrated Taxonomic Information System
MDS	Multi Dimensional Scaling
Mf	Freshwater marsh community
Ms	Saltwater marsh community
N/A	Not Available
N/S	North/South
NGGE	Northern Golden Gate Estates
NGVD	National Geodetic Vertical Datum
OTU	Operational Taxonomic Unit
Ph	Hydric pine flatwoods community
Pm	Mesic pine flatwoods community
PSRP	Picayune Strand Restoration Project
PSSF	Picayune Strand State Forest
PVC	Poly-vinyl chloride
SFWMD	South Florida Water Management District
SG	Picayune Strand restoration sites
SGGE	Southern Golden Gate Estates
TT	Ten Thousand Islands restoration sites
TTINWR	Ten Thousand Islands National Wildlife Refuge
USACOE	United States Army Corps of Engineers

EXECUTIVE SUMMARY

Historically, the central region of Collier County, Florida was innundated for several months during the wet season and sustained wetland vegetative communities. In the late 1950's a development scheme purchased thousands of acres of this undeveloped land. An extensive canal system was excavated which altered the drainage patterns in the western Big Cypress Basin. Studies were undertaken to address the extent of the hydrological and ecological impacts on the landscape. An extensive land acquisition effort ensued which resulted in the designation of the Picayune Strand State Forest (PSSF). Plans for hydrologic restoration were developed, which included the removal of the road network and the filling of major portions of the canal system. The plan also addressed the need for determining ecological change as a measure of success for the restoration effort.

The purpose of this study was to develop baseline data on a suite of taxa that can serve as indicators of ecosystem change in response to the hydrologic restoration of the PSSF. This was accomplished by conducting repeatable surveys of anurans, aquatic and terrestrial macroinvetebrates and fishes in major plant communities at restoration sites in PSSF (n=27) and in downstream habitats of the Ten Thousand Islands National Wildlife Refuge (TTINWR; n=2). In addition, baseline data was collected at reference sites in the Fakahatchee Strand State Preserve (FSSP; n=6) and Florida Panther National Wildlife Refuge (FPNWR; n=6).

Hydrologic data were used to estimate flooding frequency and duration at restoration sites. Physical water quality parameters were measured during each aquatic sampling event. Treefrogs were sampled via artificial refugia, identified to species, measured and weighed. Arboreal ants and orthopterans (grasshoppers, crickets and katydids) were collected using sweep

nets, preserved and identified to the lowest taxonomic level. Ground-dwelling ants were sampled using baited vials, preserved and identified. Aquatic macro-invertebrates were sampled using dip nets, field sorted, and preserved for identification. Fish were sampled using Breder traps, identified, enumerated and measured. Each of the aforementioned indicator groups were analyzed using species compositions, relative abundances, diversity measures, and graphical multivariate methods.

Data analysis was inherently constrained by the study design and meteorological conditions. Local rainfall and overland sheet flow varies seasonally and annually, which made temporal and spatial comparisons between individual sites difficult. Restoration sites in PSSF that were closer in proximity to adjacent reference areas had a tendency to retain standing surface water for longer periods of time. Whereas, more hydrologically altered restoration sites situated in the interior of PSSF had a tendency to be drier. Freshwater sites in PSSF, FSSP and FPNWR exhibited physical water quality parameters within ranges typical of isolated freshwater water bodies, while sites located south of U.S. 41 including TTINWR showed physical water quality parameters more typical of that found in a saline influenced environment. Data indicated that physical water quality parameters varied seasonally, amongst sites, and among locations during sampling events.

A total of 1,732 anurans consisting of three species of treefrog, *Osteopilus septentrionalis* (Cuban treefrog), *Hyla squirella* (Squirrel treefrog) and *Hyla cinerea* (Green treefrog) were sampled. *Osteopilus septentrionalis* was the most abundant species and accounted for 64% of all individuals captured. *Hyla squirella* accounted for 20% of all individuals captured and *Hyla cinerea* accounted for 16% of the total. Community analysis of treefrogs indicated two Primary groupings corresponding to 1) all restoration sites in the PSSF and reference site FS5-G in the

FSSP that had a higher percent composition of *Osteopilus septentrionalis* and 2) all reference sites, (with the exception of site FS5-G) and including saltwater marsh sites that had a higher percent composition of *Hyla squirella* and *Hyla cinerea*. The introduced species *Osteopilus septentrionalis* was clearly more abundant in the restoration sites of PSSF while the native *Hyla cinerea* and *Hyla squirella* were dominant at the reference sites. This suggests that hydrological restoration of PSSF could result in an increase in the population of green and squirrel treefrogs, contingent on their ability to compete with a well established population of Cuban treefrogs.

A total of 41 species of ants were documented. Community analysis of ants collected using the baited vial method indicated two Primary groupings corresponding to 1) sites with a high percent composition of fire ants (*Solenopsis invicta*) and 2) sites that were not dominated by fire ants or had a high composition of the genus *Pheidole*. Community analysis of ants collected using the sweep net method indicated two Primary groupings corresponding to 1) sites with a high percent composition of *Crematogaster atkinsoni* and 2) sites with a high percent composition of *Camponotus floridanus* and/or the *Pseudomyrmex* complex. Hydrologic restoration should result in successional changes in plant community structure that should be reflected in the abundance and distribution of ant species.

A total of 685 orthopterans were collected and represented 5 families, at least 26 genera and at least 24 species. Community analysis of orthopterans indicated two Primary groupings corresponding to 1) sites with a high percent composition of family Gryllidae and 2) sites with a high percent composition of family Acrididae. Certain families of orthopterans seemed to prefer distinct plant communities. Acrididae preferred open fields or other grass dominated plant communities, whereas arboreal representatives of family Gryllidae seemed to prefer shaded, forested habitats. If restoration increases the canopy cover, shifting to a more cypress strand

community, a subsequent shift in increased numbers of arboreal crickets may occur. Additionally, as restoration is anticipated in resulting in an increase in freshwater wetlands, orthopterans that favor these conditions should dominate. The abundance of the more broadly tolerant species of grasshoppers documented during the pre-restoration monitoring should also diminish once restoration is completed.

A total of 6,230 fishes were collected representing 9 families, 18 genera and at least 24 species. Overall, *Gambusia holbrooki* (eastern mosquitofish) was the most abundant species and accounted for 62% of the total fish collected in addition to dominating the restoration sites in PSSF. *Poecilia latipinna* (sailfin molly) and/or Cyprinodon variegates (sheepshead minnow) dominated salt marsh study sites. Community analysis of fish indicated two primary groupings corresponding to 1) sites with a high percent composition of *P. latipinna* and 2) sites with a high composition of *G. holbrooki*. Secondary groupings corresponded to 1) sites with a relatively high species richness and 2) sites with relatively low species richness. Localized variation in fish species abundance is most likely a result of anthropogenic activities that have interrupted natural hydrologic connections that affect fish dispersal. Reduced hydroperiod within the restoration area results in a lower aquatic fauna biomass. Thus, if a projected increase in hydroperiod occurs post-restoration, it follows that a general increase in the relative abundances of fishes and a greater composition of long hydroperiod fish species should occur.

INTRODUCTION

Project Background

Historically, the central region of Collier County, Florida was innundated for several months during the wet season and sustained wetland vegetative communities that consisted of a mosaic of bald cypress swamps, short grass prairies, hydric pine flatwoods, and scattered mesic hammocks (Leighty, et. al. 1954). The Gulf America Corporation (GAC) began purchasing thousands of acres of undeveloped land in the Big Cypress Swamp during the late 1950's in what would become one of the largest land sale schemes ever undertaken in the nation's wetlands (Carter, 1974). During the period of 1963 through 1971, GAC excavated a network of canals to drain the extensive system of wetlands for residential development and constructed a grid of primarily unpaved roads to access parcels (Fig. 1). The tract was named Golden Gate Estates and was divided into northern and southern areas by Alligator Alley (formally State Road 84, currently Interstate 75). Despite the canal system, areas in Southern Golden Gate Estates (SGGE) still flooded during the summer wet season owing in part to the diking effects of the roads (Ramsey and Addison, 1996). Consequently, Northern Golden Gate Estates (NGGE) morphed into a fast-growing, predominately middle class community, while SGGE remained essentially undeveloped.

The canal system for the Golden Gate Estates altered the drainage patterns in the western Big Cypress Basin by lowering surface and sub-surface water levels and diverting this water to point-source discharges into estuaries (Abbot and Nath, 1996). The extent of hydrological alteration became apparent not long after the completion of road and canal construction and a series of studies during the 1970's and 1980's documented the extent of the ecological impacts resulting from the over-drainage (summarized in Abbott and Nath, 1996 and Addison et al.,

2006). Hydrologic restoration of this area was first suggested in the Golden Gate Redevelopment Study (Golden Gate Estates Study Committee, 1977), which proposed creating conservation areas, the use of control structures, and the placement of solid earthen plugs to create flowways that resembled historical patterns of water flow. The United States Army Corps of Engineers (USACOE) later evaluated multiple alternatives for modifying the canal system and three possible plans were suggested; however, the USACOE report (1986) concluded that none of the options qualified for Federal implementation. Interestingly, one of the options (Plan C) reiterated the recommendations from the Golden Gate Redevelopment Study (Golden Gate Estates Study Committee, 1977) that included the plugging or filling portions of the canal system and this was later used as a reference in developing restoration plans for SGGE (Abbott and Nath, 1996).

Initial plans for restoration were complicated by the fact that any hydrologic changes in the Golden Gate Estates would impact thousands of parcels of privately owned land. In 1985, SGGE was added to the acquisition list under the Save Our Everglades component of Florida's Conservation and Recreation Lands Program (CARL; Ramsey and Addison, 1996). This would become one of the most convoluted and difficult land acquisitions ever attempted, since there were over 17,000 landowners from all over the world. Acquisition of the properties was further complicated by litigation on behalf of the landowners over the appraisal values. Nonetheless, the last significant acquisition was completed in early 2006 and an estimated 125 million dollars was spent to acquire nearly 20,000 individual parcels. The adjacent South Belle Meade CARL project was combined with the SGGE project and designated as the Picayune Strand State Forest (PSSF), which placed the land under public ownership under management by the Florida Division of Forestry.

In 1996, South Florida Water Management District (SFWMD) developed a conceptual plan for the hydrologic restoration of SGGE that would serve as the model for future efforts. Its principal objectives included the installation of pump stations, spreader channels and, most importantly, plugging the canals and grading the roads. In 1998, SGGE was identified as an essential part of the efforts to restore the western Everglades and therefore qualified for funding as part of the Comprehensive Everglades Restoration Plan (CERP). Per the requirements for CERP projects, an Integrated Project Implementation Report and an Environmental Impact Statement were drafted and the name was changed to the Picayune Strand Restoration Project (PSRP) in reference to the wetland ecosystem that existed prior to development (USACOE and SFWMD, 2004). The restoration of PSSF is vital to the ecological connectivity of adjacent state and federal conservation lands: Florida Panther National Wildlife Refuge (FPNWR) to the northeast; Fakahatchee Strand State Preserve (FSSP) to the east; Ten Thousand Islands National Wildlife Refuge (TTINWR) to the south; and Collier Seminole State Park (CSSP) to the southeast (Fig. 2).

Study Goals and Objectives

Goals of the PSRP include the reestablishment of historic freshwater sheet-flow, natural wetland hydroperiods and increased water table levels, and also to restore seasonal salinity patterns in the downstream coastal marshes and estuaries. Expected results of this restoration include the return to a more natural wetland vegetative landscape and improved utilization of these habitats by native avian, mammalian, anuran, reptilian and fish species. During the planning phase of the project, it was concluded that a necessary component for determining the success of the restoration effort would be to assemble measurable baseline biological data in the

project area both before and after restoration. It was assumed that certain wildlife species respond to hydrological change and would therefore be useful indicators for assessing the success of restoration efforts.

The purpose of the present study was to conduct standardized surveys of anurans, fish, aquatic macroinvetebrates and terrestrial macroinvertebrates in PSSF to establish pre-restoration baselines. As a reference, surveys were also conducted on adjacent, relatively undisturbed wetlands in the FSSP, FPNWR and TTINWR. The study objectives were to analyze each of the aforementioned wildlife groups in the study area using species compositions, relative abundances, diversity measures, and graphical multivariate methods.

Biological Indicators

Amphibians

Three groups of amphibians represented by: salamanders, toads and frogs (Anurans), and caecilians, are currently recognized. Since their life cycles are tied directly to hydrologic cycles, the vitality of amphibian populations are a reflection of water quality parameters and water levels, either naturally fluctuating or anthropomorphically altered, in these biologic systems (Muths et. al., 2006). Global amphibian declines are becoming a focus for many researchers especially in the New World, (South America, Mesoamerica, Caribbean and North America) where 53% of all amphibian species are found (Stuart, et. al., 2004; Young et. al., 2004). There are many factors contributing to global amphibian declines. These include: disease and malformation, parasitism, invasive species, toxic chemicals along with possible UV-b light and changing climate conditions (Zacharow et. al., 2003). However, the most critical threats to

amphibian populations in the United States are habitat loss and degradation (Dodd and Smith, 2003).

According to Ashton and Ashton (1988) there are currently 17 species of anurans found in southwest Florida. These species represent 6 family groups and include Bufonidae, Hylidae, Leptodactylidae, Microhylidae, Pelobatidae and Ranidae. The family Hylidae is the focus of this study. Hylidae present in southwest Florida include the barking treefrog (*Hyla gratiosa*), chorus frog (*Pseudacris nigrita*), cricket frog (*Acris gryllus*), green treefrog (*Hyla cinerea*), little grass frog (*Pseudacris ocularis*), pinewoods treefrog (*Hyla femoralis*), squirrel treefrog (*Hyla squirella*) and the introduced Cuban treefrog (*Osteopilus septentrionalis*).

Only green, squirrel and Cuban treefrogs were captured during this study. The green treefrog may reach a maximum of 5.7 cm from snout to vent. For identification purposes, these frogs are typically bright green in color along with white stripes on either side, with some individuals also having yellow spots on their backs (Ashton and Ashton, 1988). The squirrel treefrog may reach a maximum length of 4.4 cm from snout to vent. Color can vary from green to brown, which can change rapidly when the animal is stressed, and typically a dark line is present on the upper lip. The largest treefrog in the United States is the Cuban treefrog, an exotic species that can reach a maximum snout to vent length of 14 cm. Generally, their comparatively larger toe pads are more obvious than those of green and squirrel treefrogs, which can assist in identification (Ashton and Ashton, 1988). Coloration of Cuban treefrogs can vary from shades of gray, brown, yellow and green that can make distinguishing them from native treefrogs more difficult.

Terrestrial Invertebrates

Insects and other invertebrates are integral components of the biological landscape, not only due to their sheer numbers, but also because they have important roles in ecological processes. Ants and grasshoppers may be effective indicators of ecosystem change. These taxa have high diversity, significant functional importance, respond to disturbance, are relatively easy to sample, and show affinities for specific habitats and substrates (Kaspari and Majer, 2000). Grasshoppers are responsive to changes in plant communities, while ants show affinities to specific substrates and plant communities. Consequently, these two groups were used as surrogates for terrestrial invertebrate community diversity and as indicators of changes in plant communities and hydrologic conditions.

Florida contains the largest known assemblage of ant species in eastern North America. The most recent available information reports that there are at least 218 species of ants known in Florida (Deyrup, 2003). Of these, over 50 are considered to be non-native species (Deyrup et. al., 2000). It is also reasonable to expect that more native species will be documented in the future and that additional exotic ants will become established over time (Deyrup, 2003). Previous surveys for ants in PSSF conducted from 2002-2004 identified 39 species of which 11 were non-native (Addison et. al., 2006).

Ants are considered to be good indicator species of environmental change (Kaspari and Majer, 2000). Many species have narrow tolerances and thus respond quickly to shifts in environmental conditions. As reference species, ants meet three of Noss' criteria as a biological indicator taxa; they are sensitive enough to serve as early warnings of change, distributed over a broad geographical area, and able to provide long-term assessment over a range of stressors (Noss, 1990). Their utility as indicator species has been applied in a variety of ways. For

example, they have been used to assess habitat quality in conservation areas (Yeatman and Greenslade, 1980), delineate environmental gradients (Lynch et. al., 1988; Majer and Camer-Pesci, 1991) and evaluate the condition of agroecosystems (Peck et. al., 1998). The abundance and species diversity of ants in Florida suggests that their use as indicator species is a viable means of assessing the ecosystem shifts that should occur as a result of the ecological restoration of PSSF.

While the distribution of ant species in any given biotope is typically a function of habitat suitability, ant communities are frequently influenced by competitive interactions among species (Holldobler and Wilson, 1990). Ant communities have been divided into tiers. At the bottom, are those species that defend only the nest; in the middle are those that defend the nest and the food sources they find; and at the top those that are dominant species with large colonies and well-defined territories (Savolainen and Vepsalainen, 1988). Those behavioral traits allow the dominant species to displace some of the other species and determine which species can coexist with them, where the other species live, and where they can safely forage (Rosengren, 1986). The temporal and spatial distribution of ant colonies is typically a function of these factors. This in turn is influenced by the habitat requirements of individual ant species as it relates to the ability of a particular species to establish colonies in a given habitat.

Two hundred and forty-one species of Orthoptera (grasshoppers, katydids, crickets and relatives) are currently known to occur in Florida. The southern more “tropical” fauna of the state contains 129 species (Peck et. al., 1992). The most familiar members of the order Orthoptera belong to the suborder, Caelifera, and are commonly called “grasshoppers”. The majority of grasshoppers in Florida belong to the family Acrididae and approximately 72 species representing 5 subfamilies of this group are known to inhabit the state (Peck et. al., 1992; Smith

et. al., 2004). Currently, there are no known exotic or introduced species of grasshopper (Acrididae) in Florida.

On the basis of biomass, grasshoppers are usually the dominant aboveground invertebrate in grassland habitats. All grasshoppers are primarily plant feeders, but some will occasionally feed on dead insects, leaf litter or dung. They are central to the conversion of plant matter into animal matter and nutrient cycling and are also important components of the food supply of many birds and mammals (Capinera et. al., 1997). Mammals such as: skunks, raccoons, foxes and mice also feed on grasshoppers, which provide them with high levels of protein and lipids. Birds such as meadow larks and cattle egrets often utilize grasshoppers as their primary food source.

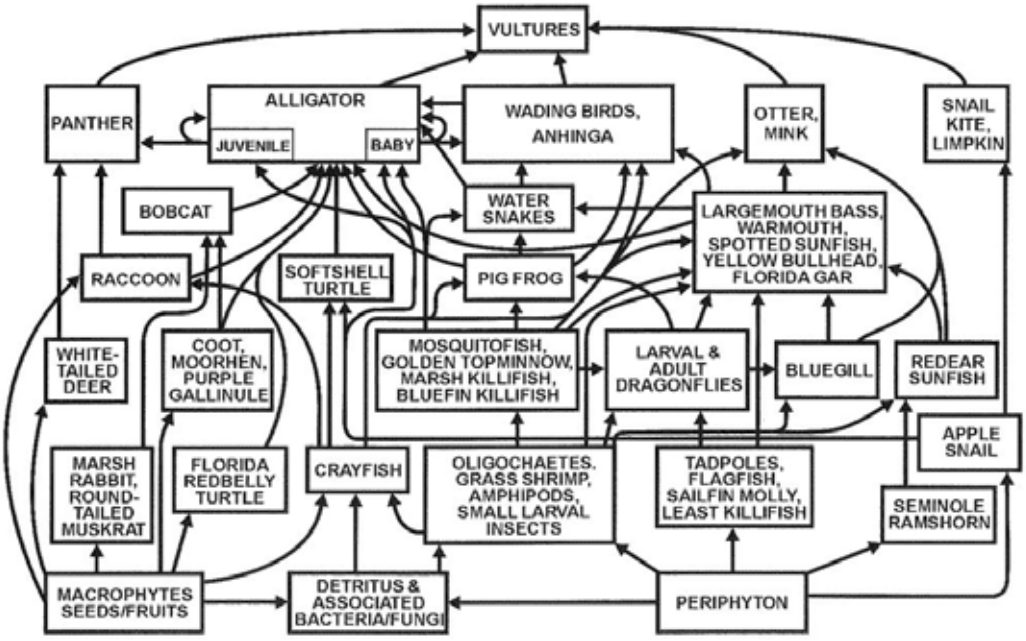
The family, Tetrigidae, represents an unusual group of grasshoppers known as groundhoppers or pygmy grasshoppers. They are small, no greater than 16 mm, found in a variety of habitats, and feed on leaf debris and algae associated with the soil (Blatchley, 1920). Currently 13 species are described from Florida (Peck et. al., 1992). An additional family of grasshopper, Tridactylidae, are known as pygmy mole “crickets”. They are less than 10 mm in length, have front legs adapted for digging in soil and feed on organic matter such as algae. Only 2 species of pygmy mole crickets are known to occur in Florida.

The second orthopteran suborder, Ensifera, includes katydids, crickets and their relatives. The katydids are in the family, Tettigoniidae and 64 species are known to occur in Florida. The diet of tettigoniids includes flowers, bark, leaves and seeds, but many species are exclusively predatory, feeding on other insects, snails or even small vertebrates. Crickets are in the family Gryllidae and 74 species are represented in Florida. Crickets are omnivores and scavengers that feed on organic materials, as well as decaying plant material and fungi. Some genera of crickets

are arboreal and spend most of their life cycle on plants or in the canopy of trees (Peck et. al., 1992).

Aquatic Fauna

The critical trophic linkages that fish and aquatic invertebrates provide in the wetland food webs, their life history dependence on natural hydrological cycles, and their sensitivity to environmental perturbation make these resident organisms important indicators of wetland ecosystem health (Stansly et. al., 1997; Main et. al., 1997; Ceilley et. al., 1999). These aquatic organisms can also serve as indicators of hydroperiod, habitat type and quality, and wetland function (Kushlan 1976, 1980; Kushlan and Lodge, 1974; Loftus and Kushlan, 1987; Dunson et. al., 1997; Main et. al., 2007; Bartoszek et. al., 2007). Lodge (2005) provides a simplified food web matrix that clearly illustrates the complexity of trophic linkages and the importance of wetland macroinvertebrates and fishes in the Everglades.



Source: The Everglades Handbook: Understanding the Ecosystem, Lodge 2005

Previous surveys within the Everglades south of U.S. 41 documented 30 species of fish utilizing freshwater marshes and wet prairie habitats (Loftus and Kushlan, 1987). Surveys in the Big Cypress National Preserve documented 64 species of fish, including 9 introduced species, occurring in freshwater habitats (Ellis et. al., 2004). Additional surveys of freshwater fish assemblages have also occurred in isolated south Florida wetlands (Main et. al., 2007). Prior studies within the PSRP study area recorded fish assemblages at hydrologically altered cypress, wet prairie, pine flatwoods and marsh biotopes (Addison et. al., 2006). An additional study recorded fish assemblages in longer hydroperiod habitats including: canals, artificial ponds and willow ponds in the PSSF and tram ditches and popash ponds in the FSSP (Bartoszek et. al., 2007).

Materials and Methods

Study Area

The current study was conducted in conservation areas (PSSF, FSSP, FPNWR and TTINWR) located in Collier County, Florida (Fig. 2). PSSF encompasses approximately 70,000 acres (28, 328 ha.), and includes cypress forests (23,685 ac.; 9,585 ha.), pine flatwoods (14,362 ac.; 5812 ha.), prairie (9,236 ac.; 3738 ha.), hammock (7,975 ac.; 3,227.4 ha.) and freshwater and salt marsh habitats (6,575.1 ac.; 2,661 ha.); Chuirazzi and Duever, 2007). Logging of the Picayune Strand occurred from the 1940's to 1950's and effectively removed virtually all of the old growth cypress from the PSSF, with at least one spectacular tree known to remain. Drainage canals from the GAC development have severely altered the hydrology of the PSSF. The main canals in PSSF located from east to west are; Prairie, Merritt, Faka Union and Miller canals (Fig. 1). The seven mile, north-south portion of Prairie Canal was filled with earthen plugs starting October 2003, continuing through the current study, and ending March 2007. A residual series of artificial ponds of various dimensions remain in the footprint of the former canal.

FSSP is a long-hydroperiod swamp forest with a deeper central slough that is bordered on each side by a mosaic of shallower cypress strands, wet prairies, pine flatwoods and hardwood hammock communities. FSSP is approximately 19 miles long by 3.5 miles wide and contains 84,000 ac. (33,994 ha.). It is currently managed by the Florida Department of Environmental Protection as a limited-access State Park due to its rare and unique plant and animal communities and relatively pristine condition. However, prior to becoming a preserve, FSSP was intensively logged for cypress trees from approximately 1944 through 1954. The logging activities required a dredge and fill operation to build railroad tram roads for removal of the harvested trees. For the most part these tram roads remain along with a main east-west public access road, Janes Scenic

Drive, which bisects the main cypress strand. The hydrology of FSSP has been affected by drainage, mainly on the western side, given the proximity of Prairie Canal in PSSF (Swayze and Mc Pherson, 1977). Overland sheetflow of freshwater occurs more naturally due to installation of numerous culverts under the logging trams and Janes Scenic Drive.

FPNWR encompasses approximately 26,401 ac (10,684 ha.), including approximately 15,000 ac (6,070 ha.) of uplands and 11,399 ac (4,613 ha.) of mixed hardwood swamps, wet prairies and freshwater marshes. The refuge is managed by the U.S. Fish and Wildlife Service to create optimum habitat conditions for the endangered Florida panther (*Puma concolor coryi*). FPNWR is partitioned with a network of secondary dirt roads maintained as prescribed-burn unit boundaries (Shindle and Kelly, 2007). The FPNWR contains the northern portion of the cypress slough and mixed-swamp forest habitat which continues in the FSSP to the south.

TTINWR encompasses approximately 35,000 ac. (14,164 ha.) and is located south of U.S. 41 and extends along the Gulf coast from Goodland to Everglades City, directly south of PSSF and FSSP. The TTINWR was established in 1996 under the provisions of the Arizona-Florida Land Exchange Act of 1988 and is managed by the U.S. Fish and Wildlife Service. This refuge is part of one of the largest contiguous expanses of mangroves in North America. TTINWR consists of an estimated 8,000 ac. (3,237 ha.) of mangrove forest, 16,000 ac. (6,475 ha.) of marine water, and 11,000 ac. (4,452 ha.) of marshland and other habitat. The southern sections of the refuge are dominated by mangrove forests along the tidal fringe and islands, while the northern section is comprised primarily of brackish marshes, coastal hammocks and tropical hardwood hammocks.

Study Sites

Study sites were established in representative major habitats and designated as either restoration or reference sites (Fig. 3; Table 1). The study area was arbitratily divided into north and south sectors with U.S.41 as the dividing line. Each sector had restoration and adjacent reference areas. The restoration sites north of U.S.41 were located within PSSF (n=27) and the adjacent reference sites were located in FSSP (n=5) and FPNWR (n=6). The restoration sites south of U.S.41 were located within TTINWR (n=2) and the adjacent reference site was located south of U.S.41 in FSSP (n=1). Restoration sites in PSSF were located in the immediate vicinity of the SFWMD ground water wells (Fig. 4).

Permanent, circular sites of 20 m radius were established in the field. These study sites were surveyed and the center point marked a with re-bar stake to ensure that the same sites could be monitored over time. Each aquatic and terrestrial fauna site was coordinated with other monitoring efforts in the region to avoid impacts to other monitoring efforts (i.e. vegetation transects). Sample sites corresponded to major plant communities as identified by Burch (1998) and Barry (2006).

Plant Communities

The cypress slough (C) is a forested community dominated by bald cypress *(Taxodium distichum*) and contains occasional hardwoods such as red maple (*Acer rubrum*), pop ash (*Fraxinus caroliniana*) or pond apple (*Annona glabra*). These hardwoods comprised less than 30% of the canopy cover. The groundcover in this community is usually sparse, and often emergent in standing water. Epiphytic bromeliads and orchids are common in trees, and ferns are common in the understory. Reference sites corresponding to this plant community were sites FP4-C in the FPNWR and FS4-C in the FSSP. Six restoration sites in the PSSF were classified

as cypress slough communities, which included: SG10-C, SG12-C, SG15-C, SG19-C, SG24-C and SG26-C.

The cypress with graminoid understory habitat (Cg) ranges from moderately dense forest to open scrubby “dwarf cypress” so as to distinguish strand swamp areas from the more prairie-like cypress forests with a shorter hydroperiod (Barry, 2006). Reference sites corresponding to this habitat were sites FP1-Cg in the FPNWR and FS1-Cg in the FSSP. Five restoration sites in the PSSF were also classified as the cypress with a graminoid understory community, which included: SG1-Cg, SG14-Cg, SG17-Cg, SG20-Cg and SG23-Cg.

The wet prairie (G) is an open community dominated with graminoids and occasional herbs. This habitat includes prairies with occasional slash pine (*Pinus elliottii*) or bald cypress where these trees provide less than 30% of the canopy cover. Epiphytes are not likely to occur. Reference sites corresponding to this plant community were sites FP2-G and FP5-G in the FPNWR and sites FS2-G and FS5-G in the FSSP. Seven restoration sites in the PSSF were also classified as prairie communities dominated by graminoids, which included: SG3-G, SG7-G, SG11-G, SG13-G, SG22-G, SG25-G and SG27-G.

Mesic pine flatwoods (Pm) are a woodland community with an open canopy dominated by slash pine. The understory is usually dominated by saw palmetto (*Serenoa repens*) and contains little groundcover. Epiphytes are not common. Four restoration sites in the PSSF corresponded to this plant community, which included: SG4-Pm, SG6-Pm, SG8-Pm and SG9-Pm. No reference sites were located in mesic pine flatwood communities.

Hydric pine flatwoods (Ph) are a woodland community with an open canopy dominated by slash pine, bald cypress may also be common or even co-dominant. The understory is open. The groundcover is usually dense and dominated by graminoids. Epiphytes are not common, but

may occur in cypress or hardwood trees. Reference sites classified as this community were sites FP3-Ph and FP6-Ph in the FPNWR and site FS3-Ph in the FSSP. Restoration site SG21-Ph in the PSSF also corresponded to the hydric pine flatwoods community.

Hydric hammocks (Hh) are a forested community dominated by hardwoods such as red maple, sabal palm (*Sabal palmetto*), and laurel oak (*Quercus laurifolia*). Bald cypress occurs, but is not common. The understory is sparse to moderate and usually made up of small hardwoods including mysine (*Rapanea punctata*) or dahoon holly (*Ilex cassine*). The groundcover is variable and often dominated by ferns. Epiphytic bromeliads are common in trees, and ferns are common on palm trunks. Restoration site SG16-Hh in the PSSF corresponded to this community. No reference sites were located in hydric hammock communities.

Mesic hammocks (Hm) are forested communities usually dominated by live oaks *(Quercus virginiana*) and sabal palm. The understory is moderate to dense and made up of small hardwoods such as myrsine, wild coffee (*Psychotria nervosa*), or indigo berry (*Randia aculeata*). Saw palmetto is common, but usually does not dominate. The groundcover is usually sparse. Epiphytic bromeliads are common in the oaks and ferns are common on sabal palm trunks. Restoration sites in the PSSF corresponding to this community, which included sites SG2-Hm and SG18-Hm. No reference sites were located in mesic hammock communities.

Freshwater marshes (Mf) are communities with a prolonged freshwater hydroperiod. They are dominated by emergent graminoids or herbs that are commonly associated with wetlands, which are often obligate wetland species. Restoration site SG5-Mf in the PSSF was consistent with this community. No reference sites were located in freshwater marshes.

Saltwater marshes (Ms) are communities with prolonged hydroperiods affected by maritime tides. These communities are dominated by graminoids (e.g., *Spartina bakeri* and

Eleocharis cellulosa) that tolerate occasional influence by coastal marine waters. Mangroves occur but are not common. Reference site FS6-Ms located in the southern portion of the FSSP corresponded to this community. Two restoration sites in the TTINWR, TT1-Ms and TT2-Ms, were also characterized as saltwater marsh communities.

Hydrology

The South Florida Water Management District has an established network of permanent groundwater wells distributed along four east-west transects extending throughout the PSSF (Fig. 4). Data for 24 permanent wells located primarily within PSSF were provided by SFWMD along with average elevation derived from 14 survey points along each of two vegetative transects. Data from an additional, southernmost transect of wells located south of U.S.41 (SGT5W1, SGT5W2 and SGT5W3) were not available for analyses. Precipitation data recorded by SFWMD weather station (NWPSSF) located in PSSF was used to estimate rainfall amounts within the area. Water levels were measured on a daily basis at all wells. Hydrologic data from the period from May 1, 2005 – April 30, 2007 were used to estimate surface inundation at 28 study sites within and adjacent to PSSF. Periods when water was retained above ground were estimated based upon individual site topography. In instances when wells were offline, surface water levels were approximated as either “site wet” or “site dry” based upon individual site seasonal trending. Flooding duration and frequency were determined on an annual basis from May 1, 2005 – April 30, 2007. Surface water level data were grouped according to the length of time surface water was retained. Mean surface water retention (length of time well head levels were retained above ground prior to recession underground) was also estimated on an annual basis by site. Means were used to reflect surface water inundation periods since the use of means removed diurnal fluctuations

(Whelan, et. al., 2005). Any surface water that was not present for more than one day was not considered retained, but rather the result of normal precipitation and/or other fluctuations.

Water Quality

Water quality field parameter data were collected at all sites using a pre-calibrated YSI™ Model 85 datalogger and a Hach SensION 1 pH meter (Fig. 5a). Physical water parameters including water temperature, salinity, conductivity, dissolved oxygen and pH were measured and recorded during each sampling event when water levels were sufficient for probe submersion.

Water Quality Parameter Instrumentation Specifications:

Parameter	Equipment or Standard Method (SM)	Range	Accuracy
Water Temperature	YSI Model 85 Water Quality Meter	-5 to +65 ºC	+/- 0.1 ºC
Dissolved Oxygen	YSI Model 85 Water Quality Meter	0 to 20 mg/l	+/- 0.3 mg/l
Salinity	YSI Model 85 Water Quality Meter	0 to 80 ppt	+/- 0.1 ppt
Conductance	YSI Model 85 Water Quality Meter	0 to 200.0 mS/cm	+/- 0.5% full scale
pH	Hach SensION 1 pH Meter	-2.00 to 19.99 Standard Units	+/- 0.002 Standard Units

Biological Monitoring

Anuran Sampling

Treefrogs were sampled using polyvinyl chloride (PVC) pipes as artificial refugia (Zacharow et. al., 2003; Bartareau, 2004; Fig. 5b). Two sets of three 1 m lengths of pipe, each with different inner diameters (1.3, 2.5, and 3.8 cm), were placed randomly at each of the study

sites. Three pipes were attached at arms reach on a tree trunk and when trees were not present, attached to tall grass stems. Additionally, three pipes were stuck a few inches into the ground. Pipes were checked monthly from August 2005 – December 2005, and bimonthly thereafter throughout the remainder of the study. Frogs were carefully extracted from the pipes and collected in mesh bags using a dowel rod plunger and a section of sponge pushed gently through each pipe. Captured frogs were identified to species, measured (snout-vent/urostyle length) to the nearest 1.0 mm, weighed to the nearest 1.00 gram, and then released on site.

Terrestrial Invertebrate Sampling

Sweeps for orthopterans and ants were conducted in August 2005 and again in August 2006. Orthopterans are difficult to identify to either genus or species level during the immature nymph phase of their development. Sampling during August increased the probability of capturing mature adults. Additionally, sweeping for ants during the wet season increased the probability of collecting arboreal species as well as terrestrial species foraging in the vegetation.

Sweep netting involved twenty 180 degree sweeps with a 30 cm diameter aerial insect net along a specified transect at each site (Fig. 6a). This procedure was performed five times along separate transects, each radiating out from the center post at the north, south, east, west and southeast cardinal directions, so that a total of five sample sets were collected from each site. Orthopterans and ants were field sorted, preserved in 70% ethanol and returned to the laboratory for identification. Conservancy biologists conducted the initial taxonomic identifications of orthopterans and ants. Specimen identification was verified by Dr. Mark Deyrup (Entomologist) at Archbold Biological Station's Entomology Laboratory located in Lake Placid, Florida.

Ground-dwelling ant species were sampled using baited vials (Fig. 6b). Sampling was conducted during January-February and May-June in 2006 and 2007. Due to prolonged

hydroperiods, baited vials were not set at reference site FS6-Ms and restoration sites TT1-Ms and TT2-Ms. The sampling array at each site consisted of nine 45 ml plastic snap-cap vials arranged in a circular pattern similar to the spokes of a wheel. One vial served as the center-point while the other eight vials were placed approximately 20 m from the center at compass bearings of 45 degrees. Each vial was baited with a piece of cookie (Keebler Pecan Sandies) according to the methods of Kaspari et. al. (2000). The fats, carbohydrates, and proteins contained in these shortbread cookies make them excellent bait for ants. Vials were deployed for approximately 2 hours before being collected. Vials containing ants were filled with 70% isopropyl alcohol for later sorting and taxonomic identification.

Aquatic Macroinvertebrate Sampling

Sampling for freshwater macro-invertebrates was conducted three times each year during July-August, October-November, and January-February 2005-2007, when standing water was present. Sampling utilized standard dip net sweeps until the peak (asymptote) of the taxa accumulation curve was reached or no additional taxa were observed in replicate dip net samples for 10 minutes. Samples were field-sorted using forceps, eyedroppers and sorting pans along with hand-picking of natural substrates (Fig. 7). Sorted field samples were preserved in 80% ethanol and delivered to Mr. David Ceilley (Research Associate) at Florida Gulf Coast University. Information concerning aquatic invertebrates collected during this study will be discussed in a separate report prepared by Mr. Ceilley.

Fish Sampling

Fish were sampled during July-August, October-November, and January–February from 2005-2007. Ten clear plastic Breder traps were placed in those study sites flooded to a sufficient depth to permit effective sampling (Breder, 1960; Fig. 8). Fish traps were placed so as to sample

all available microhabitats and to maximize capture efficiency. Submergence time was one hour. Captured fish were identified to species and their total lengths measured. Only the first 30 fish of a given species were measured and the remainder enumerated. The data collected during the fish sampling was also provided to Mr. Ceilley.

Data Analysis

Water Quality

Water quality data was screened for outliers and other data errors, which were either included or excluded from analysis of the data set. Extreme values that could not be validated were excluded from the data set. If the reported value failed to meet established quality control criteria or was questionable that value was eliminated from analysis.

Data were grouped by sampling event and were analyzed by site and location (PSSF, FSSP, FPNWR and TTINWR). Criteria for evaluating water quality parameters were based upon Florida State Water Quality Standards for Class III Predominately Fresh or Predominately Marine Waters (dependant upon salinity classification) for the following parameters:

Florida State Standard for Class III Waters

Parameter	**Predominately Fresh Waters**	**Predominately Marine Waters**
Specific Conductance	Not elevated above more than 50% of background or 1275 µm/cm	N/A
Dissolved Oxygen	Not depressed below 5.0 mg/l and normal daily and seasonal fluctuations above this level should be maintained	Not less than 4 mg/l and normal daily and seasonal fluctuations above this level should be maintained
pH	pH shall not vary more than one unit above or below natural background provided that the pH is not lower than 6 units or raised above 8.5 units.	pH shall not vary more than one unit above or below natural background provided that the pH is not lower than 6.5 units or raised above 8.5 units.

As salinity varies primarily due to saltwater intrusion, sites were classified based on their average salinity.

Salinity Modifiers (Mitsch and Gosselink, 2000)		
Salinity (ppt)	**Descriptor**	**Category**
<0.5	Fresh Water	Fresh Water
0.5-5	Oligohaline	Brackish
5.0-18	Mesohaline	Brackish
18-30	Polyhaline	Brackish
30-40	Euhaline	Marine
>40	Hyperhaline	Marine

Statistical analyses were performed using SPSSPC (Lead Tech. Inc., 2002). Data were tested for assumptions of homogeneity of variance and normality using the Shapiro-Wilks and Kolmogorov-Smirnov tests, respectively. ANOVA was used to test for differences in water quality parameters when parametric assumptions were satisfied and Kruskal-Wallis tests were used when assumptions were violated.

Faunal Communities

Taxonomic nomenclature is presented in accordance with the Integrated Taxonomic Information System on-line database (ITIS; http://www.itis.gov) unless noted otherwise. We recognize that there may have been changes in the nomenclature that are not yet reflected by ITIS; however, the database is readily accessible and serves as a single reference. Faunal species richness was calculated as the total number of species and abundance was based upon the total number of individuals. Since ants were not enumerated, their abundance was determined by the number of times a species occurred within the total number of baited vials or transects sampled

for a given site (i.e. catch per unit effort; CPUE). Species richness of ants was calculated based on the presence/absence for the combined collecting techniques. Percent compositions of faunal taxa were calculated from cumulative abundance or, in the case of ants, CPUE.

Diversity indices were calculated for orthopteran OTU's (operational taxonomic units) and fish species using PRIMER statistical software (PRIMER-E Ltd., Plymouth, UK; Clarke and Gorley, 2001). These indices include: Margalef richness index (*d*), Pielou evenness index (*J'*), Shannon diversity index (*H'*), and Simpson's evenness index (1-λ). PRIMER was used to calculate a Bray-Curtis similarity matrix for anuran, orthopteran, and fish abundances and ant CPUE. With the exception of the anuran and ant sweep net data, the square root transformation was used to down-weight the importance of highly abundant taxa. Hierarchical clustering with group-avarage linking and multi-dimensional scaling (MDS) were applied to the similarity indices to evaluate faunal compositions among study sites.

RESULTS

General Hydrology

During the period of May 1, 2005 to April 30, 2006, surface water levels in PSSF were absent at 9 of the restoration sites, with a maximum depth of 2.11 ft recorded at site SG5-Mf in August 2005 (Appendix A). Peak wet season water levels for 2005 generally occurred from June through August of 2005. During the period of May 1, 2006 to April 30, 2007, surface water levels ranged from sites being dry at 6 of the restoration sites to a maximum depth of 2.7 ft in depth at site SG5-Mf during August of 2006. Peak wet season water levels for 2006 generally occurred in August with the deepest surface water levels occurring in September as a result of substantial amounts of precipitation from Tropical Storm Ernesto (Fig. 9). Discounting this storm event, water levels were above ground more frequently during the 2005 wet season. Dry seasons extended until the end of May and the beginning of June for both years. Sites SG2-Hm, SG3-G, SG4-Pm, SG9-Pm, SG11-G and SG18-Hm had no surface water levels during the entire two year period. Results indicated that surface water had a tendency to be retained for a longer period of time near the edges of the PSRP boundary, with the exception of the southeastern, northeastern and northwestern peripheries. Sites located in northeastern, northwestern and central areas had lower water retention periods. Overall, sites FS5-G, SG12-C, SG14-Cg, SG5-Mf, SG26-C, SG27-G and SG20-Cg had the highest total number of days for above ground water levels although the actual number of days fluctuated among sites per year (Table 2).

Water Quality

The following water quality results are prefaced with the understanding that any inferences from the data are meant to be in the context of a screening tool to point out possible

anomalies or trends that might require future investigation. During the 246 site visits water quality parameters were measured only 31.3% of the time (77 site visits). Conversely, 67.42% of the time sites were dry or water levels were too shallow to allow for proper submersion of water quality probes for accurate measurements of physical parameters (168 site visits). Water quality values from 1.12% (3 site visits) of the sites were not included in this analysis due to questionable accuracy. Due to dry conditions, water quality could not be measured at 11 of the 41 sites throughout the course of this study (Appendix A). Water Quality parameters were only measured during one sampling event at sites: FS3-Ph, SG1-Cg, SG6-Pm, SG7-G, SG8-Pm, SG15-C, SG19-C, SG22-G, SG24-C, and SG25-G. Therefore these stations were excluded from individual statistical analysis including computations of minimum, mean, median, maximum and 25^{th} and 75^{th} percentile. Results that exceeded State Standards may be indicative of possible water quality problems that might warrant more intensive scrutiny or were the result of isolated spikes that occurred over time.

Overall physical water quality parameters were within ranges typical of isolated freshwater water bodies at sites located in PSSF, FSSF and FPNWR**,** while study sites located south of U.S. 41 in TTINWR are more typical of water found in a saline influenced environment. Water temperature ranged between 17.1°C to 39.2° C (mean 28.1°C); salinity ranged between 0 ppt to 17.8 ppt (mean 1.7 ppt); conductance ranged between 6.2 µs to 28510 µs (mean 2862.3 µs); dissolved oxygen ranged between 0.06 mg/l to 9.41 mg/l (mean 3.61 mg/l); and pH (standard units) ranged between 4.73 to 8.27 (mean 6.9; Appendix B).

Within the PSSF, overall salinity values indicated that restoration sites were indicitive of fresh water. Dissolved oxygen and pH values were below State Standards 88% and 21% of the times sampled respectively. Of the 16 sites where physical water quality data was collected, all

were below State Standards for dissolved oxygen during 100% of the sampling events with the exception of sites SG27-G and SG21-Ph. Site SG27-G was below State Standards 50% of the two times that this site was sampled. Only site SG21-Ph did not have dissolved oxygen levels below State Standards during the two times this site was sampled. PH values at sites SG8-Pm, SG12-C, SG14-Cg, SG15-C and SG20-Cg were slightly more acidic than the other sites located in PSSF. There were no recorded instances where pH values exceeded State Standards or dissolved oxygen values revealed instances of supersaturation (Appendix B).

Within the FSSP, overall salinity values indicated that reference sites were fresh water with the exception of site FS6 which was classified as oligohaline or slightly brackish. Dissolved oxygen and pH values were below State Standards 64% and 5% of the times sampled respectively. Of the 6 sites where physical water quality data was collected, all were below State Standards for dissolved oxygen 100% of the times measured at reference sites FS3-Ph and FS4-C. Site FS5-G was below State Standards for dissolved oxygen during 67% of the sampling events, FS1-Cg and FS2-G were below State Standards during approximately 50% of the sampling events, while FS6-Ms was below State Standards 40% of the time. Mean pH at site FS5-G was slightly more acidic than the other sites located in FSSP; however, it was slightly below State Standards during only one of the sampling events. There were no recorded instances where pH values exceeded State Standards or instances of supersaturation (Appendix B).

Within the FPNWR, overall salinity measurements indicated that reference sites were fresh water. Dissolved oxygen and pH values were below State Standards 68% and 5% of the times sampled respectively. Of the 6 sites where physical water quality data was collected, all sites were below State Standards for dissolved oxygen 100% of the times measured at reference sites FP3-Ph, FP4-C and FP5-G. Reference site FP2-G was below State Standards for dissolved

oxygen during 50% of the sampling events and FP1-Cg was below State Standards 40% of the time. Reference site FP6-Ph was the only site in FPNWR where dissolved oxygen levels were within State Standards both times it was sampled. PH values at reference site FP6-Ph were slightly more alkaline than the other sites located in FPNWR. Reference site FP4-C was slightly below State Standards once during the five times it was sampled. All other FPNWR sites were within State Standards for pH. There were no recorded instances where pH values exceeded State Standards and there were no instances of supersaturation (Appendix B).

Within the TTINWR, overall salinity levels indicated that restoration sites were mesohaline or brackish. Dissolved oxygen and pH values were below State Standards 42% and 8% of the times sampled respectively. Of the 2 restoration sites where physical water quality data was collected, site TT1-Ms was below State Standards for dissolved oxygen 50% of the time, while TT2-Ms was below State Standards during 33% of the sampling events. Site TT2-Ms was slightly below State Standards for pH once during the six times it was sampled. Site TT1-Ms was within State Standards for pH during all of the times sampled. There were no recorded instances where pH values exceeded State Standards and one instance where site TT1-Ms exhibited slight supersaturation (Appendix B).

The water quality data collected during this study, though minimal, indicated that there were significant differences amongst locations (PSSF, FSSP, FPNWR and TTINWR) for water temperature (p=.039), salinity (p=.000) and pH (p=.008). Generally, PSSF had higher median water temperature values than the other locations with site SG21-Ph recording the highest mean (37.2°C) (Appendix B). FSSP tended to have slightly lower mean water temperature values than at the other locations (FPNWR, TTINWR, and PSSF), although site FP4-C exhibited the lowest individual site mean (23.8°C) (Fig. 10; Appendix B). Median salinity and conductivity

concentrations were higher in TTINWR with sites TT1-Ms and TT2-Ms recording the highest locational individual site mean values (Fig. 11). TTINWR sites were the only sites classified as mesohaline, while site FS6-Ms in FSSP was the only site which was classified as oligohaline. All remaining sites in FSSP, FPNWR and PSSF were classified as fresh (Appendix B). Median dissolved oxygen levels were higher at TTINWR with only 2 incidents of values greater than 8 mg/l (Fig. 12). TTINWR also had the lowest incidences of mean location dissolved oxygen concentrations below State Standards, while PSSF had highest instances of dissolved oxygen concentrations that were below State Standards (Appendix B). In general, median pH concentrations were higher at TTINWR and lower at PSSF (Fig. 13). Overall, PSSF had the highest instances where the pH was below State Standards (Appendix B).

Anurans

Three species of treefrog, the introduced Cuban treefrog (*Osteopilus septentrionalis*) and the native green treefrog (*Hyla cinerea*) and squirrel treefrog (*Hyla squirella*) were collected using PVC pipes (Tables 3 and 4). Reference site FS1-Cg had the highest cumulative abundance of squirrel treefrogs (n=69). The highest percent composition of squirrel treefrogs was at reference site FS2-G (94%; Table 5) followed by reference site FP3-Ph (86%). The highest cumulative abundance of green treefrogs was at reference site FP2-G (n=39 individuals; 91% composition) followed closely by TT2-Ms (n=38 individuals; 88% composition). The anuran community at reference site FS6-Ms was composed entirely of green treefrogs.

Cuban treefrogs dominated the collections at the PSSF restoration sites. Fifteen of the 27 sites were composed entirely of Cuban treefrogs (Table 6). The remaining 12 restoration sites in the PSSF were also dominated by Cuban treefrogs; however, sites SG5-Mf and SG7-G also had a

relatively high composition of green treefrogs (48.84% and 19.51%) and site SG26-C had a relatively high composition of squirrel treefrogs (24.49%). The highest cumulative abundance of Cuban treefrogs was recorded at restoration site SG13-G (n=65 individuals).

There were two primary groupings of study sites at the 12% similarity level (Fig. 14). Primary 1 grouping included all of the restoration sites in the PSSF, as well as reference site FS5-G in the FSSP. Primary 2 grouping contained all of the reference sites, with the exception of the FSSP site mentioned previously, as well as the saltwater marsh restoration sites in TTINWR. Primary 1 grouping corresponded to sites with a higher percent composition of Cuban treefrogs and Primary 2 grouping corresponded to sites with higher percent composition of green and squirrel treefrogs (Tables 5 and 6). The group relationships were illustrated by superimposing the percent composition of each species on the MDS ordination of anuran communities (Fig. 15 and 16).

Within Primary 2 grouping, there were secondary groupings at the 26% similarity level (Fig. 14). Secondary 1 grouping corresponded to reference sites with a higher percent composition of squirrel treefrogs (Table 5; FS1-Cg, FS2-G and FS3-Ph in the FSSP and sites FP3-Ph, FP5-G and FP6-Ph in the FPNWR). Secondary 2 grouping corresponded to sites with a higher percent composition of green treefrogs, with the exception of reference site FP1-Cg, which was dominated by squirrel treefrogs, and included the remaining reference sites (FS6-Ms, FS4-C, FP4-C and FP2-G) as well as the saltmarsh restoration sites (TT1-Ms, TT2-Ms).

Ants

Forty-one species of ants (28 native and 13 introduced species) were documented during the study. Sweep net sampling accounted for 34 species, while the baited vial method resulted in

24 species. Seventeen species were collected in both of the sampling methods. A total of 27 species were collected from the 11 reference sites using both sweep nets and baited vials. Of these, seven (26%) were introduced species. A total of 39 species of ants were collected from the 29 restoration sites and fourteen (36%) of these were introduced species.

Using baited vials, fire ants (*Solenopsis invicta*) were the dominant species at half of the reference sites (FP2-G, 100%; FP5-G, 88.89%; FS2-G, 74.19%; FS5-G, 68.42%; FP3-Ph, 56.25%; and FS3-Ph, 46.88%; Table 7). Of interest was the absence of fire ants at reference sites FP1-Cg and FS4-C and the relatively low composition of this species at sites FP4-C (4.76%) and FP6-Ph (3.33%). An additional exotic species, *Pheidole moerens*, was the dominant species at three reference sites (FS1-Cg, 56.67%; FS4-C, 54.17% and FP1-Cg, 38.10%). The native ants, *Pheidole floridana* and *Pheidole dentata* accounted for the highest percent composition at sites FP4-C (57.14%) and FP6-Ph (43.33%), respectively.

Fire ants were also the dominant species (37-96 % of the composition; Table 8) at the majority of the restoration sites (n=16; 59%). Fire ants were absent from baited vials at restoration sites SG12-C, SG26-C and SG4-Pm and had a relatively low percent composition at SG8-Pm (2.86%), SG19-C (2.78%), SG18-Hm (5.00%), SG16-Hh (6.25%), SG15-C (6.90%) and SG7-G (7.69%). The introduced species, *Pheidole moerens*, was dominant at four restoration sites (SG19-C, 44.44%; SG26-C, 40%; SG20-Cg, 37.50%; and SG16-Hh, 31.25%). Other abundant ant species, excluding fire ants, included: *Aphaenogaster miamiana* at SG18-Hm (45%), SG17-Cg (39.13%) and SG24-C (37.93%), and *Forelius pruinosus* at SG8-Pm (40%), SG7-G (38.46%) and SG9-Pm (24.14%). *Pheidole dentata* had the highest percent composition at sites SG12-C (38.46%), SG2-Hm (36.67%) and SG4-Pm (30%), while *Pheidole floridana* was highest at sites SG15-C (48.28%) and secondarily at SG8-Pm (37.14%).

Using sweep nets, *Crematogaster atkinsoni* was the dominant ant species at seven reference sites (FP2-G, 100%; FS6-Ms, 83.33%; FS2-G, 72.73%; FP5-G, 64.29%; FP3-Ph, 41.18%; FS5-G, 41.18% and FP6-Ph, 25%; Table 9). Other dominant species at individual reference sites included *Paratrechina concinna* at FP1-Cg (100%), *Pseudomyrmex pallidus* at FS3-Ph (25.00%) and *Pseudomyrmex ejectus* and *pallidus* at FS1-Cg (23.53% each). *Camponotus floridanus* and *Odontomachus brunneus* were co-dominant at site FS4-C (18.18% each).

The *Pseudomyrmex* complex, representing *P. ejectus, P. gracilis, P. pallidus, P. seminole* and *P. simplex,* accounted for the highest percent composition of ants at 18 of the 27 restoration sites in PSSF (Table 10). *Crematogaster atkinsoni* dominated sweep net collections at 4 locations in the PSSF and at site TT1-Ms in the TTINWR. *Dorymyrmex bureni* had highest composition at sites SG3-G (33.33%), SG4-Pm (30.77%) and SG1-Cg (25%).

Combining both sampling methods, ant species richness at reference sites was highest at site FP6-Ph (n=17 species; Table 11) followed by sites FS3-Ph and FS4-C (n=13 species each). Twelve out of 27 species (44%) collected at reference sites were considered to be more arboreal with respect to their foraging or nesting preferences. Ant species richness at restoration sites, was highest at SG10-C (n=15 species; Table 12) followed by SG26-C (n=14 species). Seventeen out of 38 species (44%) collected at restoration sites were considered to be more arboreal.

For baited vials, site FS4-C diverged from the other sites at the 22% similarity level (Fig. 17), probably due to the high percent composition of *Odontomachus brunneus* relative to the other sites (Table 7). For the remaining sites, there were two primary groupings at the 33% similarity level. The Primary 1 grouping corresponded to sites with relatively high percent compositions of fire ants (41-100%), while the Primary 2 grouping corresponded to sites with

lower percent compositions of fire ants (0-47%) and higher percent compositions of either a single *Pheidole* species or a combination of these species. The relationship of primary groupings was illustrated by superimposing percent composition of fire ants (Fig. 18a), *P. moerens* (Fig. 18b), *P. dentata* (Fig. 19a) and *P. floridana* (Fig. 19b) on the MDS ordination of ant communites.

For sweep nets, site FP1-Cg diverged from the other sites at the 4% similarity level (Fig. 20) and the ant community at this site was composed entirely of *Paratrechina concinna* compared to the relatively low percent composition for this species at the other sites (< 18%; Table 10). There were 2 primary groupings at the 19% similarity level for the remaining sites; the Primary 1 grouping corresponded to sites with relatively high percent compositions of *Crematogaster atkinsoni* (30-100%), whereas sites in the Primary 2 grouping had lower percent compositions for this species (0-25%). Sites in the Primary 2 grouping also had relatively high percent compositions for ant species in a *Pseudomyrmex* complex (*P. ejectus*, *P. gracilis*, and *P. pallidus*) and *Camponotus floridanus*, although there was overlap in values for some sites in the Primary 1 grouping. The relationships of primary groupings was illustrated by superimposing the percent compositions of *C. atkinsoni* (Fig. 21a), the *Pseudomyrmex* complex (Fig. 21b), and *C. floridanus* (Fig. 22) on the MDS ordination of ant communities captured with sweep nets.

Orthopterans

A total of 685 orthopterans were collected by sweep nets and represented 5 families, at least 26 genera and at least 24 species. The most abundant group of orthoptera collected was from the family Acrididae, short-horned grasshoppers, which accounted for 60% (n=411) of the total. Immature specimens of Acrididae represented 18.69% of the total specimens collected

(n=128; Table 13 and 14). Overall, relatively common species from this family included: *Dichromorpha elegans* (n=74; 10.8%), *Aptenopedes sphenaroides* (n=53; 7.74%), *Achurum carinatum* (n=44; 6.42%) and *Leptysma marginicollis* (n=41; 5.99%). Specimens representing the family Gryllidae, crickets, accounted for 15.33% of the total orthopterans collected (n=105). Representatives from the family Tetrigidae, pygmy grasshoppers, accounted for 57 specimens or 8.32% of the total. One specimen representing the family Tridactyloidea, pygmy mole crickets, was only collected at reference site FS4-C and identified as *Ellipes minutus*.

Family Acrididae was dominant at ten of the twelve reference sites (60-100%; Table 15). Immature nymphs of this family accounted for a high composition at site FP1-Cg (71.43%) and site FS1-Cg (30%). *Dichromorpha elegans* was the dominant orthopteran collected at sites: FP3-Ph (45%), FP6-Ph (44%), FS3-Ph (43.75%) and co-dominant at site FS5-G (33.33%). A high composition of *Leptysma marginicollis* was recorded at reference site FS6-Ms (64.58%). Site FP4-C documented high compositions of the family Tettigonidae represented by the genus *Orchelimum* (60%). Gryllids were the dominant orthopteran collected at reference site FS4-C (78.57%).

Family Acrididae was dominant at thirteen of the twenty-seven restoration sites in the PSSF (50-100%) and immature nymphs of this family accounted for a high composition at four of these locations (42-67%; Table 16). Family Gryllidae dominated six restoration sites including: SG2-Hm, SG12-C, SG15-C, SG16-Hh, SG18-Hm and SG19-C (100%). Restoration sites SG11-G and SG24-C also had relatively high composition of family Gryllidae at 66.67% and 71.43% respectively. Family Tetrigidae represented a high percentage of the composition at six sites in the PSSF (25-64%).

Orthopteran richness was highest at restoration sites SG3-G and SG5-Mf (n=13; Table 17). Six additional locations in the PSSF had relatively high richness values with greater than 9 OTU's recorded; however, eleven restoration sites had 3 or less OTU's recorded. The greatest orthopteran richness recorded at a reference site was at location FP2-G (n=8).

There were two primary groupings of orthopterans at the 10% similarity level (Fig. 23). The relationship of the Primary 1 group was illustrated by superimposing the percent composition of Gryllidae on the MDS ordination of orthopteran communities (Fig. 24a). The relationship of the Primary 2 group was illustrated by superimposing the percent composition of Acrididae on the MDS ordination of orthopteran communities (Fig. 24b). Within the Primary 2 grouping, sites TT1-Ms and TT2-Ms cluster at the 82% similarity level. This relationship is shown by superimposing the percent composition of Tettigonidae on the MDS ordination of orthopteran communities (Fig. 25a). Within the Primary 2 grouping, sites SG3-G, SG21-Ph, SG25-G, SG9-Pm, SG1-Cg, SG6-Pm and SG8-Pm cluster at the 32% similarity level and this relationship was illustrated by overlaying the percent composition of Tetrigidae on the MDS ordination of orthopteran communities (Fig. 25b). Relatively high percent compositions of *Dichromorpha elegans* and/or *Aptenopedes sphenarioides* cluster select sites within the Primary 2 grouping (Fig. 26a and 26b).

Fishes

There were unequal aquatic sampling events between and among reference and restoration sites owing to the hydrologic variability in the landscape (Table 18 and 19). All six reference sites in the FPNWR were sampled, ranging from one event (FP6-Ph) to five events (FP4-C). Sampling was conducted at four of the five reference sites in the FSSP north of U.S. 41

and all three sites located in the saltwater marsh habitat south of U.S. 41. Only fourteen restoration sites in the PSSF were sampled for fishes as the remaining thirteen sites did not have sufficient water depths or were completely dry during sampling events. Of the PSSF sites sampled, four (SG5-Mf, SG12-C, SG14-Cg and SG20-Cg) had two sampling events and the remaining ten sites had a single sampling event.

A total of 6,230 fishes were collected using Breder traps and represented 9 families, 18 genera and at least 24 species of fish. Four non-native species were documented including: *Belonesox belizanus* (pike killifish), *Astronotus ocellatus* (oscar), *Cichlasoma bimaculatum* (black acara) and *Cichlasoma urophthalama* (Mayan cichlid). The most abundant species collected was *Gambusia holbrooki* (eastern mosquitofish), accounting for 62.28% of the total for all sites, followed by *Poecilia latipinna* (sailfin molly; 14.70%), *Cyprinodon variegates* (sheepshead minnow; 7.75%), and *Jordanella floridae* (flagfish; 5.83%). These four species combined accounted for over 90% of the total fish collected during the study.

In the FPNWR, *Gambusia holbrooki* accounted for the highest composition at all sites; however, *Jordanella floridae* was relatively abundant and accounted for a substantial contribution to the composition at five of the six sites (FP1-Cg, 7.07%; FP2-G, 38.06%; FP3-Ph, 33.33%; FP5-G, 11.49% and FP6-Ph, 11.86%; Table 20). *Heterandria formosa* was the second most abundant species at site FP4-C and accounted for 6.21% of the composition. *Elassoma evergladei* (Everglades pygmy sunfish), were only collected at site FP4-C in the FPNWR (n=2).

At sites in the FSSP located north of U.S. 41, *Gambusia holbrooki* was the most abundant species collected and accounted for the highest composition at sites FS1-Cg, FS2-G, FS4-C and FS5-G (Table 24). *Jordanella floridae* accounted for a large percentage of species composition at sites FS2-G (11.69%) and FS5-G (9.93%). An assemblage of *Cyprinodon variegates*, *Poecilia*

latipinna and *Gambusia holbrooki* were present at all of the salt marsh sites south of U.S. 41. At site TT1-Ms, *Poecilia latipinna* was dominant (39.31%) while *Cyprinodon variegates* accounted for 28.43% and *Gambusia holbrooki* for 16.53% of the composition. *Lucania parva* (rainwater killifish) also represented 8.06% of the species composition at site TT1-Ms. At site TT2-Ms, *Cyprinodon variegates* was dominant (34.78%) while *Poecilia latipinna* accounted for 30.57% and *Gambusia holbrooki* represented 25.42% of the species composition. The dominant species at site FS6-Ms was *Poecilia latipinna* (53.37%) followed by *Gambusia holbrooki* (31.20%) and *Cyprinodon variegates* (9.40%).

At restoration sites in the PSSF, *Gambusia holbrooki* was the most abundant species collected (Table 21). Compositions of *Gambusia holbrooki* were very high at sites: SG15-C (100%), SG24-C (98.61%), SG12-C (98.53%), SG1-Cg (97.89%), SG19-C (94.74%), SG5-Mf (90.47%) and SG14-Cg (88.71%; Table 25). *Jordanella floridae* were relatively abundant and accounted for a measurable addition to the composition at sites: SG6-Pm (28.57%), SG20-Cg (19.72%), SG25-G (18.58%), SG7-G (13.33%) and SG14-Pm (6.45%). *Fundulus confluentus* (marsh killifish) accounted for 14.29% composition at site SG6-Pm, the only site in PSSF to record this species. *Lucania goodei* accounted for 15.83% composition at site SG25-G and 14.75% at site SG27-G. *Heterandria formosa* represented 24.54% of the species composition at site SG25-G and *Fundulus chrysotus* (golden topminnow) represented 26.23% of the composition at site SG27-G.

The highest species richness was documented at site FS6-Ms with 13 species (Table 22). The remaining sites in the saltwater marsh habitat, TT2 and TT1 had relatively high species richness with 11 and 12 species, respectively. Five sites in the PSSF had relatively low species diversity (SG15-C, 1; SG12-C, 2; SG24-C, 2; SG19-C, 3 and SG1-Cg, 3). The highest species

richness observed in the PSSF were at sites, SG5-Mf, SG6-Pm, SG26-C and SG27-G all recording 7 species of fish. FSSP and the FPNWR reference sites located in cypress strand habitats had relatively higher diversity measures as compared to sites with the same habitat designations in the PSSF.

Site SG15-C diverged from the other sites at the 14% similarity level (Fig. 27) and the fish community at this site was composed entirely of *Gambusia holbrooki* (n=2). There were 2 primary groupings at the 31% similarity level for the remaining sites. The Primary 1 grouping corresponded to the saltmarsh sites with high percent compositions of *Poecilia latipinna* (31-53%; Table 20 and 21), low percent compositions of *Gambusia holbrooki* (16-31%), and the only sites with *Cyprinodon variegatus*. Sites in the Primary 2 grouping had low percent compositions for *Poecilia latipinna* (0-9%) and high percent compositions for *Gambusia holbrooki* (41-99%).

The relationship of the primary groupings can be illustrated by superimposing the percent composition of *Poecilia latipinna* (Fig. 28a) and *Gambusia holbrooki* (Fig. 28b) on the MDS ordination of fish communities. Within the Primary 2 grouping, sites SG26-C and SG27-G diverged at the 39% similarity level (Fig. 27) and this divergence was probably due to the relatively high percent compositions of a *Lepomis* complex (*L. marginatus*, *L. microlophus*, and *L. punctatus*) at these sites as indicated in Fig. 29. Sites FP4-C and SG25-G diverged at the 45% similarity level (Fig. 27). There was a high abundance of *Heterandria formosa* at these sites (Table 18 and 19) that was not reflected in their respective percent compositions (Table 20 and 21). For the remaining sites in Primary 2 grouping, two secondary groupings at the 56% similarity level were evident and these may have resulted from differences in species richness (sites in Secondary 1 grouping had 6-10 species and sites in Secondary 2 had 2-6 species).

CONCLUSIONS

Sampling Overview

The freshwater aquatic communities of southern Florida depend upon local rainfall and overland water flow for their existence, both of which are seasonally and annually variable (Loftus and Kushlan, 1987). Combining this variability with the varying degrees of hydrologic disturbance and sampling effort found at each of the study sites proved difficult in making temporal and spatial comparisons of aquatic faunal communities. Inconsistent numbers of restoration and reference sites, as well as their representative habitat types, may have further complicated interpretation of patterns in faunal compositions. A range of habitat types were sampled during the present study, some of which may have more utility for a post-restoration comparison. In these regards, pre-restoration faunal data were summarized for each of the study sites (Appendix C).

General Hydrology

Shifts in the vegetative composition within a landscape are often the result of rapid environmental alterations. In Florida, the chief cause is this is often the result of alterations in historic hydrological conditions. When roads and canals are built adjacent to or bisect vegetative communities, normal hydrologic flow can be altered by diversion of stormwater and associated runoff. The construction of structural impediments can interfere with natural sheetflow and flow direction in both the surface water and groundwater (Menon et. al., 2000; Trombulak and Frissell, 2000). Since roads are usually at a higher elevation than the surrounding vegetation, precipitation and stormwater runoff tends to be impounded in areas that are lower in elevation within the grid of roads during the wet season, contributing to slightly higher floodwaters and

longer water retention times within the road grid. Canals can drain the landscape by serving as a conduit to remove water quickly from one site to another and lowering ground water levels in the surrounding area (Chuirazzi and Duever, 2007). Since canals tend to drain surface waters, vegetative communities that are adapted to shorter hydroperiods and extended periods of drydown are apt to be more prevalent.

Surface water levels and sheetflow are sensitive to slight changes in topography due to southwest Florida's extremely flat landscape. Therefore, small changes in elevation can produce large fluctuations in water level inundation patterns and substantial differences in water level retention (Ball and Schaffranek, 2002; Desmond, 2002). Hydrologic data suggested that there was a tendency for longer surface water retention in the eastern, northern, western, southern and southwestern edges of PSSF than sites located in the northwest, northeast or central areas within PSSF. Sites located in the western, southern and southwestern edges of PSSF (SG14-Cg, SG20-Cg, SG26-C and SG27-G) were lower in elevation and had a tendency to retain standing surface water for longer periods of time than sites that were higher in elevation (Fig. 30). Sites SG12-C, SG13-G, and FS5-G were all situated near the border between PSSF and FSSP and also had a tendency to retain surface water for a longer period of time. These sites had mid-level elevations in comparison to the other sites. There is a possibility that the water levels at these sites were exhibiting a response to the filling of Prairie canal, which was completed during the study period. This allowed for more surface water sheet flow in these areas. Alternatively, these sites were not as boxed in by canals as sites, which had lower water retention periods. Site SG5-Mf was the only site located with in the northern section of PSSF that had a tendency to retain surface water for longer periods. This site had mid-level elevations in comparison to the remaining sites and was the only site located in PSSF that was a freshwater marsh, which

probably explains its ability to retain surface water on site for longer periods of time. It is interesting that all of the sites that had higher flooding duration and retention periods were located near the edges of the forest and not within PSSF proper. It follows that the areas with longer water retention periods have the potential to support more water dependant species than the dryer area within the forest. Sites northwest, northeast or central areas were among the driest sites in PSSF. These areas tended to have higher surface topography and were the most disturbed, since they are surrounded by roads and situated adjacent to or between one to two canals that drain the surrounding areas.

The hydrology of natural wetlands is complex and is further complicated by alterations resulting from human impacts to the landscape. A combination of various factors influence the ground and surface water hydrology including: local topography; the proximity of a site to manmade canals and ditches and/or natural tributaries; proximity to the presence or absence of impediments to sheetflow such as roads and/or development; normal seasonal variation; variability in volume, intensity, duration of episodic and localized precipitation and subsequent stormwater runoff events; and metereological conditions. Available hydrologic data suggested that roads and canals within PSSF have altered the natural hydrologic regime. This hydrologic alteration, attendant drier conditions and shorter water retention times have resulted in changes in the historic composition of the vegetative communities. This in turn affects the abundance and diversity of aquatic faunal communities within PSSF and the terrestrial wildlife whose survival depends upon them.

Water Quality

Factors that typically influence water quality parameters in sheetflow systems in southwest Florida include: elevated concentrations of physical parameters during drydowns;

fluctuations in pH associated with an increase in biological activity during the early dry and dry seasons; and higher concentrations of nutrients associated with depressional areas (Beever and Thomas, 2006). The two primary factors that cause variation in physical water quality data are the effects of season and runoff (Lietz, 2000). Data collected during this study are comparable with previous studies performed in PSSF and FSSP (Bartoszek, et. al., 2007; Chuirazzi and Duever, 2007).

Preliminary screening indicated that physical water quality parameters varied seasonally, amongst sites, and amongst locations. The limited data set suggested that anthropogenic disturbances within PSSF could have had a slight effect on physical water quality parameters within PSSF. Mean water temperature values were elevated in comparison to reference locations, which could be an artifact of depleted canopy cover and/or possible lower water levels and shorter water retention above ground. Conversely, FSSP had slightly lower mean water temperature values than the other locations, which could be in part due to increased canopy cover in this forest in relation to the other locations in this study. As expected, due to the inverse relationship between water temperature and dissolved oxygen, PSSF had lower mean dissolved oxygen levels than the reference locations and the highest incidences of levels below State Standards. This again could be due to the anthropogenic disturbances within PSSF that has led to abnormally dryer and shallower water depths than expected in a natural sheetflow system. PSSF also had a tendency to be slightly more acidic than the reference locations.

Since dissolved oxygen levels were not recorded over a 24-hour period, interpretation of these data is limited. Surface water dissolved oxygen typical of wet prairies and sloughs usually exhibit a strong diel cycle with concentrations ranging from 0 mg/l in the early morning to 12 mg/l in the late afternoon (U.S. EPA, 2000). However, some insight can be inferred from the

data collected during this study. Low dissolved oxygen concentrations that were below State Standards could be indicative of shallow water and/or higher water temperatures typical to the area and, therefore, may not be indicative of impaired water quality. Alternatively, instances of low dissolved oxygen readings during the wet season could be indicative of heavy algal concentrations or vegetative decomposition of plants.

The screen of physical water quality parameters "spot checked" during this project served as an overview of conditions during the actual sampling, which indicated the need for a long-term seasonal water quality investigation to identify environmental variables associated with these biotic communities and to validate possible trends. Slightly divergent water quality characteristics between PSSF and reference locations during this project raises several questions, such as how hydrologic restoration projects will affect the water quality within PSSF that has been hydrologically disturbed for a long period of time. Additionally, will northern areas within TTINWR become less brackish and have vegetative and biological shifts overtime due to an expected higher influx of freshwater as a result of the downstream effects of the PSRP?

Anurans

Cuban treefrogs were the dominant species collected at the PSSF restoration sites, while green and squirrel treefrogs where the most abundant species captured at 11 of the reference sites (FSSP and FPNWR). The exception being site FS5-G which may be considered hydrologically altered due to its close proximity to PSSF. Dodd and Smith (2003) and Muths et. al. (2006) indicate that hydrological perturbations in wetlands can result in population changes in previously stable populations of native amphibians. As Cuban treefrogs are capable of utilizing disturbed areas, it is not surprising that this species has been able to exploit the altered landscape

in PSSF. This inference is supported by the considerable body of evidence indicating an increase in Cuban treefrog populations in areas with disturbed lands and altered hydrology when compared to less disturbed areas (AmphibiaWeb, 2007; Meshaka, 1994, 1996, 2001).

The reproductive biology of Cuban treefrogs is likely a factor in their ability to out compete native species of treefrogs in south Florida. All three species captured in the present study oviposit in water. Female body size is positively correlated with clutch size. Meshaka (2001) found that the largest egg clutches of native hylid species were found to be at best, only equal to the minimum clutch size of the Cuban treefrogs. On average the green treefrog egg clutches were only 70% of that of Cuban treefrogs. Squirrel treefrogs also produced smaller clutches. For the most part, the males of all three species remain fertile throughout the year. Female Cuban treefrogs have the potential to be gravid throughout the year however are most frequently found to be gravid during the wet season; however, continuous fertility has not been shown in the native female treefrogs. Female green treefrogs are fertile from approximately April to September while female squirrel treefrogs range from April to September/October (Meshaka, 2001). The potential of a longer reproductive period may in part explain why Cuban treefrogs are able to exploit disturbed areas.

The reference sites, although less hydrologically altered than the restoration sites in PSSF were not devoid of Cuban treefrogs. Higher abundances of Cuban treefrogs in FSSP could be attributed to the close proximity to PSSF and the resulting altered hydrology. Furthermore, many exotic species utilize roads as a means for dispersal and Janes' Scenic Drive connects the PSSF with FSSP. Cuban treefrogs could be transported over long distances in the frames of cars, swamp buggies, or ATVs, however further investigation would be needed to determine the potential for their dispersal as "hitchhikers".

Of the three species collected during this study, green treefrogs were more frequently documented at the three salt water marsh sites (FS6, TT1 and TT2). Since Cuban and squirrel treefrogs tend to tolerate more brackish waters than green treefrogs, it was less expected that green treefrogs would be found in salt water marshes. However, none of these sites exceeded mesohaline salinity limits and were oligohaline during 38% of the sampling events. Therefore, these sites provided habitat for green treefrogs where it might not have otherwise been expected. The limited ability of most anurans to osmoregulate in saltwater is a contributing factor to their distribution; however, few anuran surveys have been conducted in marine, and low salinity estuarine communities. Research on the green treefrogs tolerance of saline conditions is limited, though they have been found in brackish water (Ashton and Ashton, 1988; Hardy, 1972).

During an earlier study (Addison et. al., 2006) audible anuran surveys in PSSF documented the presence of pinewoods treefrogs (*Hyla femoralis*) and barking treefrogs (*Hyla gratiosa*) at select locations. These species were not recorded during the current study and may not have a preference for artifical refugia; however, hydrologic restoration of PSSF may influence their population distributions and post-restoration monitoring may provide insight into this question.

There was an apparent difference in the distribution and abundance of green and squirrel treefrogs and Cuban treefrogs between the reference sites and restoration sites. Hydrological restoration of PSSF may create conditions more favorable to green and squirrel treefrogs in this area; however, any shift in the populations of these two native species will probably be contingent on their ability to compete with a well-established population of Cuban treefrogs. Post-restoration anuran monitoring may provide a means of determining the success of the PSSF

restoration project with respect to an increase in the abundance and distribution of green and squirrel treefrogs or a decline in the prevalence of Cuban treefrogs.

Ants

Ants have proven to be good indicator taxa because many species have narrow tolerances and often respond quickly to environmental changes (Kaspari and Majer, 2000). Previous terrestrial macroinvertebrate surveys in PSSF indicated that approximately half of the ant species sampled were associated with specific biotopes (Addison et. al., 2006). Of the 41 species of ants documented during this study, certain taxa were clearly more abundant than others. These species are likely to be better indicators of hydrologic change rather than those that were collected only occasionally.

The hydrologic restoration and the expected successional changes in plant community structure should result in changes in the abundance and distribution of the species of ants in PSSF. The availability of nest sites for individual species of ants is likely to change, a factor that has a significant role in ant community structure (Anderson 2000). If higher water tables and longer hydroperiods result from the restoration, nests of ground dwelling species would likely be inundated, reducing habitat availability. The abundance of ground nesting species in these areas may shift towards more upland areas on the fringe of the restored wetlands. Conversely, species that are more tolerant of wet conditions could immigrate into previously over-drained wetlands. Arboreal nesting species may not be affected by higher water levels unless their food sources are impacted (Bentley, 1976). Food sources may become more or less available depending upon the nutritional needs of an individual species of ant, if the composition of the plant communities shift in response to hydrological change.

Scale is another factor that should be considered when assessing ant species preference for specific biotopes within PSSF. These small, colonial, nesting invertebrates, utilize a variety of microhabitats (e.g. rotting logs or twigs) at different frequencies within the landscape. Scale may influence the distribution of some ant species more than others. Fire ants are an excellent example of a species with a landscape-wide presence, whereas other species may occupy more specific microhabitats.

Fire ants are a ground nesting species so areas with a prolonged, natural hydroperiod could be expected to support fewer fire ant colonies and would, therefore, be expected to be more abundant at the restoration sites than the reference sites. However, they proved to be the dominant species in the prairie and cypress with graminoids communities at reference sites in FPNWR and FSSP. Results indicated there was a lack of fire ants within the longer hydroperiod and densely vegetated cypress strand communities at the reference sites. To a lesser extent, the same was true in the restoration sites. Fire ants prefer open grassy areas with a relatively high water table (Tschinkel, 2006), which likely explains their dominance in these open, grassy communities (i.e. prairie habitat). Therefore, they are not a reliable indicator of ecosystem change in these wetlands. In PSSF, most hammock communities tend to support fewer fire ants. Because of their elevation, hammocks would be less likely to experience reduced impacts from drainage. These former and current islands of topographic relief should support similar assemblages of ants pre-drainage or as least offer less available niches for exploitation by exotic species such as fire ants. Site SG2-Hm appears to be an exception, since both fire ants and native species were present during sampling. The compounding effect of Hurricane Wilma (2005) and adjacent fire disturbance opened up the canopy at this site allowing for opportunistic immigration by ant species.

Species diversity in the restoration sites was highest at SG10-C, a severely drained former cypress strand. Numerous unoccupied niches may have become available within this degraded forest habitat. SG4-Pm also had a high diversity of ants. It was located near the northern entrance to PSSF, was very xeric, and was control burned during the study period, which may have opened up previously unoccupied niches for immigration. Pine habitat reference sites had a relatively high diversity of ants including site FS3-Ph which recorded the highest diversity of ants during the study with 17 species identified.

Ant assemblages in open wetland environments, such as wet prairie reference sites, were dominated by fire ants on the ground, but often included an arboreal component species, such as *Crematogaster atkinsoni*. This native ant constructs elevated paper-like nests on grass and plant stems. *Crematogaster atkinsoni* was present to a high degree at most reference sites with the exception of the cypress strand habitats. This could be due to sampling bias, since sweep nets were not adept at collecting this ant from individual cypress trees, which they were likely associated. However, *Crematogaster atkinsoni* was the dominant ant collected with sweep nets in more open salt marsh sites in the TTINWR and the FSSP. While a few restoration sites in the PSSF harbored *Crematogaster atkinsoni* as a common arboreal component, the most abundant arboreal ants appeared to be from the genus *Pseudomyrmex*.

Community differences of ants between restoration and reference sites are subtle. A reduction in the abundance of fire ants may occur after restoration. There should also be a reduction in the abundance of other ground nesting species such as *Pheidole dentata.* Arboreal nesting species such as *Crematogaster atkinsoni* could increase in abundance in the restored freshwater wetlands and remain similar to abundances found in reference sites.

Orthopterans

The utility of Orthopterans as indicators of ecosystem change is based on the assumptions that they are well represented by both individuals and species across almost every terrestrial ecosystem (Samways and Sergeev, 1997), ecologically sensitive to landscape level disturbance (Samways, 1989; Rentz, 1993) and relatively easy to sample (Evans and Bailey, 1993). In addition, the response of Orthoptera to landscape disturbance is rapid due in part to their high degree of mobility, prolific rate of reproduction and short generation time (Samways, 1989; Parmenter et. al., 1991).

Within the assemblage of orthopterans collected at study sites there appears to be a preference for certain habitats at the taxonomic family level. Grasshoppers were most often represented in this study by the family Acrididae. They prefer open fields or other grass dominated plant communities such as prairie and cypress with graminoid habitats. Conversely, crickets in the family Gryllidae were overwhelmingly represented in shaded, forested habitats such as cypress strand and hammock communities that contain a higher percentage of herbaceous understory plants. Hydroperiod itself does not appear to influence this separation as indicated by the similar assemblage of crickets observed at short hydroperiod elevated hammocks and in long hydroperiod depressional cypress strands. However, if cypress with graminoid habitat in PSSF is a reflection of overdrainage then it is plausible that an increased hydroperiod should alter the understory herbaceous cover in some of these locations, shifting to a more cypress strand community, and attracting increased numbers of crickets instead of grasshoppers.

The grasshoppers collected at in the reference sites were predominantly species which are typically found in freshwater wetlands (Squitier and Capinera, 2002). For example, *Leptysma*

marginicollis, *Dichromorpha elegans*, *Paroxya atlantica*, and *Paroxya clavuliger* were collected in select reference wetland sites. Conversely, species such as *Achunum carinatum*, *Aptenopedes sphenarioides*, and *Arphia granulate*, which are tolerant of both wet and dry conditions were collected more often in the over-drained PSSF sites. When the hydrological restoration of PSSF is completed a shift towards species more commonly found in freshwater wetlands should be expected. Species abundance of these species should more closely resemble that found in the reference wetland sites. The abundance of the more broadly tolerant species of grasshoppers documented during the pre-restoration monitoring should also diminish once the restoration is completed. The taxonomic composition and abundance of these invertebrates is largely a function of plant community characteristics. Therefore, it is expected that they will respond more slowly than the aquatic fauna, to the restoration of PSSF, because of the time required for development of the plant communities following restoration.

Fishes

Geographic location, drainage patterns, and minor disturbances from road runoff and other anthropogenic activities may explain localized variations in fish communities. Field observations of high water events and fish dispersement suggest that hydrologic connection determines fish movements and community structure. Fish have preferred ranges of water quality physical parameters where growth and reproductive capabilities are optimum. Levels outside of these ranges can potentially stress the physiological systems of the organism and limit their distribution. For example, if ambient pH is outside of the preferred range of a particular fish, growth rates could diminish since pH affects the ability of fish and other aquatic organisms to regulate basic life-sustaining processes, principally the exchange of respiratory gas and salts

(Robertson-Bryan, Inc., 2004). Most fish also have preferred survival ranges for dissolved oxygen, water temperature and salinity that often dictate the species that are found in a particular waterbody. In PSSF it appears that higher water temperature and lower dissolved oxygen and/or pH could be affecting the distribution and/or abundances of the following fish species: *Chaenobryttus gulosus, Elassoma evergladei, Fundulus confluentus* and *Heterandria formosa*. These species optimal water temperature and pH ranges are slightly lower and slightly higher respectively than mean water temperature and pH ranges measured at PSSF during this study. Interestingly, *Elassoma evergladei* and *Chaenobryttus gulosus* were not caught in PSSF during this study and *Heterandria formosa* and *Fundulus confluentus* had lesser abundance in PSSF. Previous studies, conducted from 2002-2005 also reported that *Elassoma evergladei* were not caught using Breder traps in PSSF; however they were found in FSSP; and *Chaenobryttus gulosus* and *Fundulus confluentus* had a lower composition in PSSF than FSSP (Bartoszek et. al., 2007). Factors other than physical water quality most likely influenced the lack of or lesser abundance of these fishes in PSSF, but it is an interesting artifact that the water temperature and pH were outside of these fishes optimal range.

As expected, the community of fishes captured within the saltwater marsh habitat at sites FS6, TT1 and TT2 were similar to one another. A large number of aquatic sampling events at these sites and greater abundance and species richness values indicated that these locations were highly productive environments for aquatic fauna. Species such as *Adinia xenica, Cyprinodon variegates, Cichlasoma urophthalama, Fundulus grandis, Labidesthes sicculus, Lucania parva, Menidia beryllina, Microgobius gulosus* and *Poecilia latipinna* favored the brackish environments found in TTINWR. *Poecilia latipinna* was more abundant and accounted for a much greater species composition than *Gambusia* recorded at remaining freshwater sites.

Remaining canals in the PSSF may be acting as corridors for the dispersal of and other euryhaline fishes from southern salt marshes into the interior habitats of PSSF during high water events. Previous studies have indicated that high numbers of *Poecilia latippina* were collected at long hydroperiod willow ponds in the PSSF that had an associated hydrologic connection to canals during high water events (Bartoszek et. al., 2007).

Proximity to permanent aquatic refugia, a habitat that retains water throughout the dry season, including canals, artificial ponds and willow ponds have implications for the survival and dispersal of fishes documented at individual restoration study sites. For example, site SG6-Pm experienced one aquatic sampling event throughout the study during August 2005. This site is located a few hundred meters from an artificial pond that is of sufficient depth to avoid a complete drydown. This aquatic feature supports a high diversity of fishes and connects hydrologically with adjacent habitats during extreme high water events, if for only relatively brief periods of time, which allows fish to recolonize these areas. In addition, site SG25-G may owe its single recorded aquatic sampling event during August 2005 and resulting fish assemblages to a hydrologic connectivity with the remaining portions of Prairie canal, the southern portion yet unfilled at that time. The extremely high abundance values of fishes collected incluiding large numbers of bluefin killifish (a species which favors deep water conditions) lends evidence to this assumption. The wetland habitats adjacent to the former Prairie Canal should increase the production of aquatic fauna rapidly; however, the composition of the fish community may take some time to stabilize itself.

Restoration sites SG26-C and SG27-G, located immediately adjacent to one another, occupy a position in the southern portion of the PSSF and occur at lower elevations than other restoration sites. Fishes collected here accounted for a higher diversity and greater abundance

than captured fishes at other sites in the PSSF including juvenile sunfishes from the family Centrarchidae. The hydroperiod is greater at these aforementioned sites and connectivity to the canal system through swales along the roads was observed during high water events.

Reference site FP4-C was located along the edge of a cypress dome which held surface water longer into the dry season. This cypress dome was observed to drydown completely in the dry season during each year of the study. Of note were the observations of native fishes including mosquitofish, flagfish and marsh killifish that reappeared at this site, as well as at the immediately adjacent site FP5-G, during the first heavy rain events. Openings to numerous crayfish burrows were observed under water and with a slight degree of excavation underlying fissures in the bedrock could be felt. With hydrologic connectivity to above ground aquatic refugia a less likely option, it is possible that subterranean aquatic refugia in either crayfish burrows or at the base of hollow cypress root cavities could support the dry season survivors of livebearing fish species collected at these sites. Further investigation would be necessary to determine if this is indeed a possibility.

Of possible greater significance than comparing fish community assemblages between restoration versus reference sites is the simple observation regarding the reduced hydroperiod and resulting lowered potential for aquatic fauna biomass at restoration sites. For example, field sampling for fishes at reference sites FS4-C and FP4-C occurred during five separate events at each site during the course of the study. Whereas restoration sites SG12–C, SG14-Cg and SG20-Cg recorded two events and the remaining restoration sites in cypress communities recorded only one or zero events. Most reference sites in wet prairie habitat captured fish during three or more events over the study period, while restoration sites at this habitat recorded fishes at one or zero

sampling events at each site. Cumulative abundance values for fishes caught at these locations clearly reflect the reduced aquatic biological potential of sites in PSSF.

In regards to Everglades restoration, Trexler et. al. (2003) proposed performance measures and goals for fish communities which included abundance, size distribution, relative abundance, non-indigenous species, and contaminants. According to the authors the range in fish body lengths for some species should increase due to increased frequency of larger fish. The relative abundance of Centrarchids should also increase in response to lengthened hydroperiods. There was a size base bias in the use of Breder traps as they favor the collection of smaller fish (< 8cm; Trexler et. al., 2001). In PSSF this may be problematic in documenting changes to the size classes of some species in future studies; however, the Breder traps did catch a variety of fishes (poeciliids, fundulids, cyprinodontids, and juvenile centrarchids and cichlids). This should prove useful in documenting possible changes in relative abundances of the fish communities.

Eastern mosquitofish and flagfish are able to rapidly colonize hydrated areas and are better adapted at surviving in poor water quality conditions during drought (Trexler et al., 2003; Ruetz et al., 2005). These characteristics may explain their dominance in the drained wetlands of PSSF. A similar dominance of mosquitofish and flagfish has been previously reported for the surrounding areas in the Corkscrew Swamp Sanctuary (Carlson and Duever, 1979) and recently in the Big Cypress National Preserve (Ellis et al., 2004). When hydrologic conditions are restored, it is reasonable to expect an increase in the relative abundances of other small fish species such as bluefin killifish, golden topminnow, and least killifish, as well as juvenile sunfishes. These fish would be better able to disperse to the marshes and prairies during the wet season and retreat to the alligator ponds and remnants of the canal system in PSSF when waters recede in the dry season.

LITERATURE CITED

Abbott G.C. and Nath, A.K. 1996. Hydrological restoration of Southern Golden Gate Estates conceptual plan. Final Report. Big Cypress Basin Board, South Florida Water Management District. Naples, FL. 206 p.

Addison, D., M. Barry, I. Bartoszek, D. Ceilley, J. Schmid and M. Schuman. 2006. Pre-restoration wildlife surveys in the Southern Golden Gate Estates (2001-2004). Final Report for South Florida Water Management District. July 2006. Contract nr C-13259. 98 pp.

AmphibiaWeb: Information on amphibian biology and conservation. [web application]. 2007. Berkeley, California: AmphibiaWeb. Available: http://amphibiaweb.org/.

Anderson, A.N. 2000. Global ecology of rainforest ants: functional groups in relation to environmental stress and disturbance. Pp. 25-34 *in*: Agosti, D., Majer, J.D., Alonso, L.E., and Schultz, T.R. (eds.), Ants: Standard Methods for Measuring and Monitoring Biodiversity. Smithsonian Institution Press, Washington, DC.

Ashton, R.E. and P.S. Ashton. 1988. Handbook of Reptiles and Amphibians of Florida, Part Three: The Amphibians.

Ball, M.H. and Schaffranek, R.W. 2002. Regional Simulation of Inundation Patterns in the South Everglades.Available from: http://sofia.usgs.gov/projects/dynamics/regsimabgeer00.html.

Barry, M.J. and S.W. Woodmansee. 2006. Vegatation sampling at Picayune Strand State Forest: Task 2c, PSRA vegetation monitoring 2005-2006. December 18, 2006. Final report submitted to the South Florida Water Management District, Fort Myers, Florida by The Institute for Regional Conservation.

Bartareau, T. M. 2004. PVC pipe diameter influences the species and sizes of treefrogs captured in a Florida coastal oak scrub community. Herpetol. Rev. 35(2):150-152.

Bartoszek, I., D. Ceilley, J. Schmid, R. Schroeder, M. Schuman and K. Worley. 2007. Enhancing the Recovery of Threatened and Endangered Species in the South Florida Ecosystem through Aquatic Refugia. Technical Rpt for the U.S. Department of the Interior Fish and Wildlife Service. Conservancy of Southwest Florida. 111 pp.

Beever, J. and Thomas, D. 2006. Immokalee Rise/Pine Flatwoods Conceptual Ecological Model. FFWC and USFWS Report. 76 pp.

Bentley, B.L. 1976. Plants bearing extrafloral nectaries and the associated ant community: interhabitat differences in the reduction of herbivore damage. Ecology 57:815-820.

Blatchley, W.S. 1920. Orthoptera of northeastern America. The Nature Publishing Company, Indianapolis. 784 pp.

Breder, C.M. 1960. Design for a fish fry trap. Zoologica 45:155-160.

Burch, J.N., H. Yamataki, and G. Hendricks. 1998. Inventory and analysis of biological communities in Southern Golden Gate Estates, a watershed for the Ten Thousand Islands.

Carlson, J.E. and Duever, M.J. 1979. Seasonal fish population fluctuations in a south Florida swamp. Proc. Annual Conf. S.E. Assoc. Fish & Wildlife Agencies 31:603-611.

Carter, L.J., 1974. The Florida Experience: Land and Water Policy in a Growth State. Johns Hopkins Univ. Press. Baltimore, MD. 355 p.

Capinear, J.L., C.W. Scherer and J.B. Simkins. 1997. Habitat Associations of Grasshoppers at the Macarthur Agro-Ecology Research Center, Lake Placid, Florida. Florida Entomologist 80(2).

Ceilley, D.W., D. E. Ceilley, and S. A. Bortone. 1999. A Survey of Freshwater Fishes in the Hydric Flatwoods of Flint Pen Strand, Lee County, FL. CES/FAU Research Contract DSR#95-360E, South Florida Water Management District, West Palm Bch, FL.

Chuirazzi, K.J. and Duever, M.J. 2007. 2008 South Florida Environmental Report. Appendix 7A-2: Picayune Strand Restoration Project Baseline. SLWMD Environmental Report. 1-64.

Clarke, K.R. and Gorley, R.N. 2001. PRIMER User Manual/Tutorial. Version 5. PRIMER-E Ltd., Plymouth, UK. 91 p.

Desmond, G. 2002. Measuring and Mapping the Topography of the Florida Everglades for Ecosystem Restoration. U.S. Geological Survey Greater Everglades Science Program: 2002 Biennial Report. USGS. Open File Report 03-54: 31-32.

Deyrup, M. 2003. An updated list of Florida ants (Hymenoptera: Formicidae). Florida Entomol. 86:43-48.

Deyrup, M., Davis, L., and Cover, S. 2000. Exotic ants in Florida. Trans. American Entomol. Soc. 126: 293-326.

Dodd, C.K., Jr., and Smith, L.L., 2003, Habitat destruction and alteration – Historical trends and future prospects for amphibians, *in* Smlitsch, R.D., ed., Amphibian conservation: Washington, D.C., Smithsonian Institute Press, p. 94-112.

Dunson, W. A., C. J. Paradise, and R. L. Van Fleet. 1997. Patterns of water chemistry on fish occurrence in wetlands of hydric pine flatwoods. Journal of Freshwater Ecology 12(4): 553-565.

Ellis, G., Zokan, M., Loftus, W. F., and Lorenz, J. 2004. Inventory of freshwater fishes in Big Cypress National Preserve. Final Project Report to USGS Greater Everglades Priority Ecosystems Science Program, National Audubon Society Tavernier Science Center. Tavernier, FL. 117 p. http://sofia.usgs.gov/publications/reports/fish_bcnp/FinalPBS_BICYreport.pdf

Evans, E.W. and K.W. Bailey. 1993. Sampling grasshoppers (Orthoptera: Acrididae in Utah grasslands: pan trapping versus sweep trapping. *Journal of the Kansas Entomological Society* 66: 214-222

Felley, J.D. and Felley, S.M. 1986. Habitat Partitioning of Fishes in an Urban, Estuarine Bayou. Estuaries 9(3):208-218.

Froese, R. and Pauly, D.. Editors. 2007. FishBase. World Wide Web electronic publication. www.fishbase.org, version (08/2007).

Golden Gate Estates Study Committee. 1977. Phase I, Golden Gate Estates Redevelopment Study, Collier County Florida. Connell Assoc. 178 p.

Hardy, J.D. 1972. Tentative Outline for Inventory of Amphibians: Hyla cinerea (Green Tree Frog) *Chesapeake Science*, Vol. 13, Supplement: Biota of the Chesapeake Bay (Dec., 1972), pp. S186-S190 doi:10.2307/1350682

Hölldobler, B. and Wilson, E.O. 1990. The Ants. Belknap Press of Harvard University Press, Cambridge, MA. 732 p.

Huber, J.H., 1996. Killi-Data 1996. Updated checklist of taxonomic names, collecting localities and bibliographic references of oviparous Cyprinodont fishes (Atherinomorpha, Pisces). Société Française d'Ichtyologie, Muséum National d'Histoire Naturelle, Paris, France, 399 pp.

Kaspari, M. and Majer, J.D. 2000. Using ants to monitor environmental change. Pages 89-98 *in*: Agosti, D., Majer, J.D., Alonso, L.E., and Schultz, T.R. (eds.), Ants: Standard Methods for Measuring and Monitoring Biodiversity. Smithsonian Institution Press, Washington, DC.

Kaspari, M., O'Donnell S., and Kercher J.R. 2000. Energy, density, and constraints so species richness: Ant assemblages along a productivity gradient. Am. Nat. 155(2): 280-293.

Kullander, S.O. and Nijssen, H. 1989. The cichlids of Surinam: Teleostei, Labroidei. E.J. Brill, Leiden, The Netherlands. 256 pp.

Kushlan, J. A. 1976. Environmental stability and fish community diversity. Ecology 57:821-825.

Kushlan, J. A. 1980. Population fluctuations in Everglades fishes. Copeia 4:870-874.

Kushlan, J. A. and T. E. Lodge. 1974. Ecological and distributional note on the freshwater fish of southern Florida. Florida Scientist. 37:110-128.

Lead Tech. Inc., 2002. The SPSS System for Windows. Version 11.5. Lead Technologies Inc. SPSS Inc., Chicago, Illinois, USA.

Lee, D.S., C.R. Gilbert, C.H. Hocutt, R.E. Jenkins, D.E. McAllister, and J. R. Stauffer, Jr. 1980. Atlas of North American fresh water fishes. North Carolina State Museum of Natural History, NC, USA.

Leighty, R.G., M.B. Marco, G.A. Swenson, R.E. Caldwell. J.R. Henderson, O.C. Olson, and G.C. Wilson. 1954. Soil Survey (detailed-reconnaissance) of Collier Country, Florida. U.S. Dept. of Agriculture., Soil Conservation. Service. Washington D.C.

Lietz, A.C., 2000. Analysis of water quality trends at two discharge stations – one within the Big Cypress National Preserve and one near Biscayne Bay – Southern Florida, 1966-94. In:Analysis of Water-Quality Trends at the Miami and Tamiami Canal. USGS WRI Report 00-4099. pp. 1-36.

Lodge, T.E. 2005. The Everglades Handbook: Understanding the Ecosystem. 2nd Edition. CRC Press. LLC. 302 pp.

Loftus, W. F., and J. A. Kushlan. 1987 Freshwater fishes of southern Florida. Bulletin of the Florida State Museum Biological Sciences 31: 1-344.

Lynch, J.F. Johnson, A.K., E.C. Balinsky. 1988. Spatial and temporal variation in the abundance and diversity of ants (Hymenoptera: Formicidae) in the soil and leaf litter layers of a Maryland forest. Am. Mid. Nat. 119: 31-44.

Main, M.B., D.W. Ceilley, and P.A. Stansly. 1997. Bionventory of Freshwater Fish: Research Contract C# 7950 Technical Report to the South Florida Water Management District-Isolated Wetland Monitoring Program. West Palm Bch., FL.

Main, M.B., D.W. Ceilley, and P.A. Stansly. 2007. Freshwater fish assemblages in Isolated South Florida Wetlands. Southeastern Naturalist 6(2): 343-350.

Majer, J.D. and Camer-Pesci, P. 1991. Ant species in tropical Australian tree crops and native ecosystems-is there a mosaic? Biotropica.23:173-181.

Menon, N.N., Balchand, A.N. and Menon, N.R. 2000. Hydrobiology of the Cochin backwater system – a review. Hydrobiologia. 430:149-183

Meshaka, W.E. Jr. 1994. Ecological correlates of successful colonization in the life history of the Cuban treefrog, Osteopilus septentrionalis (Anura: Hylidae). Florida International University. 140 pages; AAT 9731915

Meshaka, W.E. Jr. 1996. Retreat Use by the Cuban Treefrog (Osteopilus septentrionalis): Implications for Successful Colonization in Florida. *Journal of Herpetology*, Vol. 30, No. 3 pp. 443-445.

Meshaka, W.E., Jr. 2001. The Cuban Treefrog in Florida: Life History of a Successful Colonizing Species. University Press of Florida, Gainesville, Florida.

Mitsch, W.J. and Gosselind, J.G. 2000. Wetlands Third Edition. John Wiley and Sons, Inc. New York. 725-758.

Muths, Erin, Gallant, Alisa L., Campbell Grant, Evan H., Battaglin, William A., Green, David E., Staiger, Jennifer S., Walls, Susan C., Gunzburger, Margaret S., and Kearney, Rick F., 2006, The Amphibian Research and Monitoring Initiative (ARMI): 5-Year Report: U.S. Geological Survey Scientific Investigations Report 2006-5224, 77 pp.

Noss, R.L. 1990. Indicators for monitoring biodiversity: a hierarchical approach. Science (Wash., D.C.) 263: 1560-1561.

Page, L.M. and Burr, B.M. 1991. A field guide to freshwater fishes of North America north of Mexico. Houghton Mifflin Company, Boston. 432 pp.

Parmenter, R.R., J.A. MacMahon, and C.A.B. Gilbert. 1991. Early succesional patterns of arthropod recolonization on reclaimed Wyoming strip mines: the grasshoppers (Orthoptera: Acridadae) and allied faunas (Orthoptera: Gryllacridadea, Tettigoniidae). *Environmental Entomology* 20: 135-142.

Peck, S.B, T.J. Walker and J.L. Capinera. 1992. Distributional Review of the Orthoptera of Florida. Florida Entomologist 75(3): pp. 329-343.

Peck, S.L., B. Mc Quaid, and C.L. Campbell. 1998. Using ant species (Hymenoptera: Formicidae) as a biological indicator of agroecosystem condition. Community Ecosys. Ecol. 27: 1102-1110.

Ramsey, C. and Addison, D.S. 1996. Multiparcel land acquisition project in the western Big Cypress Region of Florida. Nat. Areas J. 16:36-40.

Rentz, D.C.F. 1993. Orthopteroid insects in threatened habitats in Australia. Gaston K.J., New, T.R. and Samways M.J. (eds.). In Perspectives on Insect Conservation. Andover, UK: Intercept Press. pp. 125–38.

Robertson and Bryan, Inc. 2004. Technical Memorandum PH Requirements of Freshwater Aquatic Life. Robertson and Bryan, Inc. Elk Grove, Ca.

Robins, C.R., Bailey, R.M., Bond, C.E., Brooker, J.R., Lachner, E.A., Lea, R.N., and Scott, W.B. 1991. Common and scientific names of fishes from the United States and Canada. Am. Fish. Soc. Spec. Pub. (20):183 pp.

Robins, C.R. and Ray, G.C. 1986. A field guide to Atlantic coast fishes of North America. Houghton Mifflin Company, Boston, U.S.A. 354 pp.

Rosengren, R. 1986. Competition and coexistence in an insular ant community-a manipulation experiment (Hymenoptera: Formicidae). Ann Zool. Fenn. 23:297-302.

Savolainen, R. and Vepsalainen, K. 1988. A competition hierarchy among boreal ants: impact on resource partitioning and community structure. Oikos 51: 135-155.

Samways, M.J. 1989. Insect conservation and landscape ecology: a case history of bush crickets (Tettigonidae) in southern France. Environmental Conservation 16:216-217.

Samways, M.J. and Sergeev, M.G. 1997. Orthoptera and landscape change. In: The Binomics of Grasshoppers, Katydids and their Kin, pp. 147-162. Gangwere, S.K., Muralirangan, M.C. (eds.0. Wallinford, Oxon: CAB International.

Shindle, D. and B. Kelly. 2007. Scientific and technical support for completion of a two year pre-construction panther prey baseline monitoring survey in the Picayune Strand Restoration Project (PSRP) Area. Draft Report submitted to U.S. Army Corps of Engineers Jacksonville District, Jacksonville, FL.

Smith, T.R., J.G. Froeba, and J.L. Capinera. 2004. Key to the grasshoppers (Orthoptera: Acrididae) of Florida. Florida Entomologist 87: 537-550.

Squitier, J.M. and J.L. Capinera. 2002. Habitat Associations of Florida Grasshoppers (Orthoptera: Acrididae). Florida Entomologist 85(1).

Stansly, P.A., J.A. Gore, D.W. Ceilley, and M.B. Main. 1997. Inventory of Freshwater Macroinvertebrates for the South Florida Water Management District-Isolated Wetland Monitoring Program. Research Contract #C-7949, Technical Report of the South Florida Water Management District, West Palm Beach, FL.

Stuart, S.N., Chanson, J.S., Cox, N.A., Young, B.E., Rodrigues, A.S.L., Fischman, D.L., and Waller, R.W., 2004, Status and trends of amphibian declines and extinctions worldwide: Science, v. 306, p. 1783–1786.

Swayze, L.J. and McPherson, B.F. 1977. The effect of the Faka Union canal system on water levels in the Fakahatchee Strand, Collier County, Florida. Water Resources Investigation 61-77, USGS, U.S. Government Printing Office. 19 p.

Trexler, J.C., Loftus, W.F., Jordan, F., Chick, J.H., Kandl, K.L., McElroy, T.C., and Bass, Jr., O.L. 2001. Ecological scale and its implications for freshwater fishes in the Florida Everglades. Pp. 153-181 *in*: Porter, J.W. and Porter, K.G. (eds.), The Everglades, Florida Bay, and the Coral Reefs of the Florida Keys: An Ecosystem Sourcebook. CRC Press, Boca Raton, FL.

Trexler, J.C., Loftus, W.F., and Chick, J.H. 2003. Setting and monitoring restoration goals in the absence of historical data: the case of fishes in the Florida Everglades. Pp. 351-376 *in*: Busch, D.E. and Trexler, J.C. (eds.), Monitoring Ecosystems: Interdisciplinary Approaches for Evaluating Ecoregional Initiatives. Island Press, Washington, D.C.

Trombulak, S.C. and Frissell, C.A. 2000. Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities. Conservation Biology. 14(1):18-30.

Tschinkel, W.B. The Fire Ants. 2006. Belknap Press of Harvard University Press, Cambridge, MA. 723 p.

U.S. Army Corps of Engineers. 1986. Golden Gate Estates, Collier County, Florida Feasibility Study. USACOE, Jacksonville District, Jacksonville, FL.

U.S. Army Corps of Engineers and South Florida Water Management District. 2004. Comprehensive Everglades Restoration Plan Picayune Strand Restoration (Formerly Southern Golden Gate Estates Ecosystem Restoration) Final Integrated Project Implementation Report and Environmental Impact Statement. http://www.evergladesplan.org /pm/projects/docs_30_sgge_pir_final.aspx

U.S. EPA. 2000. Ambient Water Quality Criteria Recommendations Information Supporting the Development of State and Tribal Nutrient Criteria for Wetlands in Ecoregion XIII. 2000. USEPA 822-B-00-023.

Wallus, R. and Baker, J.M. 2006. Family Atherinopsidae: Silversides. In*: Reproductive Biology and Early Life History of Fishes in the Ohio River Drainage.* Wallus, R. and Simon, T. P. (eds) CRC Press LLC. Boca Raton. pp. 89-109.

Whelan, K.R.T., Smith III, T.J., Cahoon, D.R., Lynch, J.C. and Anderson, G.H. 2005. Groundwater Control of Mangrove Surface Elevation: Shrink and Swell Varies with Soil Depth. Estuaries. 28(6): 833-843.

Wiebe, A H. 1931. Notes on the Exposure of Several Species of Pond Fishes to Sudden Changes in pH.Transactions of the American Microscopical Society, Vol. 50 (4):380-393.

Yeatman, E.M. and P.J.M. Greenslade. 1980. Ants as indicators of habitat in three conservation parks in south Australia. South Aust. Nat. 55: 20-26.

Young, B.E., S.N. Stuart, J.S. Chanson, N.A. Cox, and T.M. Boucher. 2004. *Disappearing jewels*: The Status of New World Amphibians. NatureServe, Arlington, Virginia.

Zacharow, M., W.J. Barichivich, and C.K. Dodd, Jr. 2003. Using ground-placed PVC pipes to monitor hylid treefrogs: capture biases. Southeastern Naturalist. 2(4): 575-590.

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Table 1. Site codes, habitat designation, associated wells and GPS coordinates at study sites

New Site Code	Habitat	Former Site Code	Associated Well	GPS Coordinates	
FP1	Cg	FPNWR1-Cg	N/A	26.18530000	-81.37901667
FP2	G	FPNWR1-G	N/A	26.18590000	-81.37875000
FP3	Ph	FPNWR1-Ph	N/A	26.18766667	-81.37791667
FP4	C	FPNWR2-C	N/A	26.17273333	-81.45003333
FP5	G	FPNWR2-G	N/A	26.17260000	-81.44945000
FP6	Ph	FPNWR2-Ph	N/A	26.17245000	-81.44871667
FS1	Cg	FSSP1-Cg	N/A	25.97706667	-81.36783333
FS2	G	FSSP1-G	N/A	25.97565000	-81.36711667
FS3	Ph	FSSP1-Ph	N/A	25.97995000	-81.36340000
FS4	C	FSSP2-C	N/A	25.98026667	-81.39300000
FS5	G	FSSP/SG17-G	SGT3W7	26.04723333	-81.44143333
FS6	Ms	FSSP3-BM3	N/A	25.93878333	-81.48670000
SG1	Cg	SG1-Cg	SGT1W1	26.14621667	-81.57958333
SG2	Hm	SG2-Hm	SGT1W2	26.14728333	-81.56811667
SG3	G	SG2-G	SGT1W2	26.14706667	-81.56943333
SG4	Pm	SG3-Pm	SGT1W3	26.14590000	-81.54415000
SG5	Mf	SG4-Mfw	SGT1W4	26.14638333	-81.51106667
SG6	Pm	SG5-Pm	SGT1W5	26.14343333	-81.46933333
SG7	G	SG6-G	SGT2W1	26.11140000	-81.58641667
SG8	Pm	SG6-Pm	SGT2W1	26.11081667	-81.58623333
SG9	Pm	SG7-Pm	SGT2W2	26.11170000	-81.57158333
SG10	C	SG8-C	SGT2W3	26.10975000	-81.53815000
SG11	G	SG9-G	SGT2W4	26.11008333	-81.49675000
SG12	C	SG10-C	SGT2W5	26.11066667	-81.47641667
SG13	G	SG11-G	SGT2W6	26.09301667	-81.46121667
SG14	Cg	SG12-Cg	SGT3W1	26.05385000	-81.57255000
SG15	C	SG13-C	SGT3W2	26.05483333	-81.56271667
SG16	Hh	SG13-Hh	SGT3W2	26.05475000	-81.56295000
SG17	Cg	SG14-Cg	SGT3W3	26.04953333	-81.54128333
SG18	Hm	SG15-Hm	SGT3W4	26.05585000	-81.49881667
SG19	C	SG16-C	SGT3W5	26.05490000	-81.47190000
SG20	Cg	SG18-Cg	SGT4W1	26.02891667	-81.57286667
SG21	Ph	SG19-Ph	SGT4W2	26.02406667	-81.56475000
SG22	G	SG20-G	SGT4W3	26.01971667	-81.54256667
SG23	Cg	SG21-Cg	SGT4W4	26.02618333	-81.51100000
SG24	C	SG22-C	SGT4W5	26.02728333	-81.47901667
SG25	G	SG23-G	SGT3W6	26.04031667	-81.46343333
SG26	C	SG24-C	SGT4W6	26.00418333	-81.54808333
SG27	G	SG24-G	SGT4W6	26.00448333	-81.54775000
TT1	Ms	TTINWR-BM1	N/A	25.96021667	-81.56668333
TT2	Ms	TTINWR-BM2	N/A	25.95055000	-81.53256667

Table 2. Surface water flooding, duration, frequency and inundation at study sites

				Year 1: May 1, 2005 - April, 1, 2006				Year 2: May 1, 2006 - April, 1, 2007			
Site	Habitat	Elevation	Location	Flooding Duration (Days)	Flooding Frequency	Average Surface Water Retention	% Inundation Per/Year	Flooding Duration (Days)	Flooding Frequency	Average Surface Water Retention	% Inundation Per/Year
SG1	Cg	9.4	NW	21	4	5.3	5.8	32	1	32.0	8.8
SG2	Hm	11.28	NW	0	0	0.0	0.0	0	0	0.0	0.0
SG3	G	11.28	NW	0	0	0.0	0.0	0	0	0.0	0.0
SG4	Pm	13.75	N	0	0	0.0	0.0	0	0	0.0	0.0
SG5	Mf	9.27	N	145	2	72.5	39.7	61	1	61.0	16.7
SG6	Pm	12.3	NE	2	1	2.0	0.5	27	1	27.0	7.4
SG7	G	10.52	W	29	5	5.8	7.9	44	2	22.0	12.1
SG8	Pm	10.52	W	29	5	5.8	7.9	44	2	22.0	12.1
SG9	Pm	10.18	W	0	0	0.0	0.0	0	0	0.0	0.0
SG10	C	9.22	C	0	0	0.0	0.0	7	2	3.5	1.9
SG11	G	10.8	C	0	0	0.0	0.0	0	0	0.0	0.0
SG12	C	8.63	E	157	2	78.5	43.0	79	2	39.5	21.6
SG13	G	9.79	E	0	0	0.0	0.0	44	1	44.0	12.1
SG14	Cg	5.27	W	126	3	42.0	34.5	91	2	45.5	24.9
SG15	C	6.17	C	42	7	6.0	11.5	46	5	9.2	12.6
SG16	Hh	6.57	C	7	2	3.5	1.9	27	2	13.5	7.4
SG17	Cg	6.89	C	0	0	0.0	0.0	20	2	10.0	5.5
SG18	Hm	8.92	C	0	0	0.0	0.0	0	0	0.0	0.0
SG19	C	8.15	E	75	2	37.5	20.5	52	2	26.0	14.2
SG25	Cg	8.29	E	63	4	15.8	17.3	30	1	30.0	8.2
FS5	Ph	8.7	E	198	2	99.0	54.2	81	2	40.5	22.2
SG20	G	5.2	SW	93	4	23.3	25.5	92	2	46.0	25.2
SG21	Cg	5.34	SW	68	5	13.6	18.6	55	3	18.3	15.1
SG22	C	4.45	S	60	4	15.0	16.4	33	1	33.0	9.0
SG23	G	6.25	S	65	7	9.3	17.8	44	4	11.0	12.1
SG24	C	5.17	S	73	4	18.3	20.0	59	5	11.8	16.2
SG26	G	5.59	S	148	4	37.0	40.5	57	3	19.0	15.6
SG27	G	5.59	S	148	4	37.0	40.5	57	3	19.0	15.6

Table 3. Total abundance of treefrogs collected at reference sites and saltwater marsh sites.

		Reference Sites and Habitat													
		FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6	TT1	TT2
Family	Scientific name	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms	Ms	Ms
Hylidae	*Hyla cinerea*	6	39	9	15	29	11	0	3	8	10	4	17	26	38
Hylidae	*Hyla squirella*	8	4	54	7	41	54	69	51	31	1	2	0	0	5
Hylidae	*Osteopilus septentrionalis*	1	0	0	0	1	2	15	0	23	4	13	0	2	0

Table 4. Total abundance of treefrogs collected at restoration sites

		Restoration Sites and Habitat													
		SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Scientific name	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Hylidae	*Hyla cinerea*	0	0	0	0	42	0	8	0	0	0	0	0	1	4
Hylidae	*Hyla squirella*	1	0	0	0	0	0	2	1	0	0	0	0	0	0
Hylidae	*Osteopilus septentrionalis*	29	42	31	13	44	25	31	24	32	41	28	60	65	41

Table 4. cont. Total abundance of treefrogs collected at restoration sites

		Restoration Sites and Habitat												
		SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27
Family	Scientific name	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G
Hylidae	*Hyla cinerea*	1	0	0	0	1	0	0	0	0	0	1	0	3
Hylidae	*Hyla squirella*	0	0	0	0	0	2	0	0	0	0	0	12	1
Hylidae	*Osteopilus septentrionalis*	23	32	44	41	48	56	61	44	56	41	31	37	29

Table 5. Percent composition of treefrogs collected at reference sites and saltwater marsh sites.

		Reference Sites and Habitat													
		FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6	TT1	TT2
Family	Scientific name	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms	Ms	Ms
Hylidae	*Hyla cinerea*	40.00	90.70	14.29	68.18	40.85	16.42	0.00	5.56	12.90	66.67	21.05	100.00	92.86	88.37
Hylidae	*Hyla squirella*	53.33	9.30	85.71	31.82	57.75	80.60	82.14	94.44	50.00	6.67	10.53	0.00	0.00	11.63
Hylidae	*Osteopilus septentrionalis*	6.67	0.00	0.00	0.00	1.41	2.99	17.86	0.00	37.10	26.67	68.42	0.00	7.14	0.00

Table 6. Percent composition of treefrogs collected at restoration sites.

		Restoration Sites and Habitat													
		SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Scientific name	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Hylidae	*Hyla cinerea*	0.00	0.00	0.00	0.00	48.84	0.00	19.51	0.00	0.00	0.00	0.00	0.00	1.52	8.89
Hylidae	*Hyla squirella*	3.33	0.00	0.00	0.00	0.00	0.00	4.88	4.00	0.00	0.00	0.00	0.00	0.00	0.00
Hylidae	*Osteopilus septentrionalis*	96.67	100.00	100.00	100.00	51.16	100.00	75.61	96.00	100.00	100.00	100.00	100.00	98.48	91.11

Table 6. cont. Percent composition of treefrogs collected at restoration sites.

		Restoration Sites and Habitat												
		SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27
Family	Scientific name	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G
Hylidae	*Hyla cinerea*	4.17	0.00	0.00	0.00	2.04	0.00	0.00	0.00	0.00	0.00	3.13	0.00	9.09
Hylidae	*Hyla squirella*	0.00	0.00	0.00	0.00	0.00	3.45	0.00	0.00	0.00	0.00	0.00	24.49	3.03
Hylidae	*Osteopilus septentrionalis*	95.83	100.00	100.00	100.00	97.96	96.55	100.00	100.00	100.00	100.00	96.88	75.51	87.88

Table 7. Percent composition based on CPUE of ant species collected with baited vials at reference sites

	Reference sites and Habitat										
Scientific name	FP1 Cg	FP2 G	FP3 Ph	FP4 C	FP5 G	FP6 Ph	FS1 Cg	FS2 G	FS3 Ph	FS4 C	FS5 G
Aphaenogaster miamiana	0.00	0.00	3.13	0.00	0.00	3.33	0.00	0.00	6.25	0.00	0.00
Camponotus floridanus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	0.00
Cardiocondyla obscurior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondula wroughtonii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster atkinsoni	0.00	0.00	9.38	0.00	5.56	0.00	0.00	16.13	9.38	0.00	10.53
Dorymyrmex bureni	0.00	0.00	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00
Forelius pruinosus	0.00	0.00	0.00	0.00	0.00	26.67	0.00	3.23	3.13	0.00	0.00
Formica archboldi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00
Monomorium viride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus brunneus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.83	0.00
Odontomachus ruginodis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina bourbonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina concinna	4.76	0.00	3.13	0.00	0.00	0.00	3.33	0.00	0.00	4.17	5.26
Paratrechina guatemalensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	0.00
Pheidole dentata	33.33	0.00	0.00	4.76	0.00	43.33	3.33	0.00	25.00	0.00	0.00
Pheidole floridana	23.81	0.00	6.25	57.14	5.56	6.67	0.00	0.00	6.25	4.17	0.00
Pheidole moerens	38.10	0.00	21.88	33.33	0.00	6.67	56.67	3.23	3.13	54.17	15.79
Solenopsis globularia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	0.00	100.00	56.25	4.76	88.89	3.33	33.33	74.19	46.88	0.00	68.42
Tapinoma melanocephalum	0.00	0.00	0.00	0.00	0.00	0.00	3.33	0.00	0.00	4.17	0.00
Tapinoma sessile	0.00	0.00	0.00	0.00	0.00	3.33	0.00	3.23	0.00	0.00	0.00
Wasmannia auropunctata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17	0.00

Table 8. Percent composition based on CPUE of ant species collected with baited vials at restoration sites

	Restoration Sites and Habitat													
Scientific name	SG1 Cg	SG2 Hm	SG3 G	SG4 Pm	SG5 Mf	SG6 Pm	SG7 G	SG8 Pm	SG9 Pm	SG10 C	SG11 G	SG12 C	SG13 G	SG14 Cg
Aphaenogaster miamiana	0.00	0.00	0.00	0.00	0.00	4.76	0.00	0.00	3.45	7.69	0.00	7.69	9.09	0.00
Camponotus floridanus	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.85	0.00	0.00
Cardiocondyla obscurior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondula wroughtonii	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	7.69	18.18	3.45
Crematogaster atkinsoni	0.00	3.33	0.00	0.00	11.11	0.00	0.00	2.86	0.00	0.00	0.00	3.85	22.73	10.34
Dorymyrmex bureni	5.00	0.00	0.00	26.67	0.00	0.00	0.00	0.00	17.24	0.00	0.00	0.00	0.00	0.00
Forelius pruinosus	20.00	0.00	0.00	23.33	0.00	0.00	38.46	40.00	24.14	0.00	0.00	0.00	0.00	0.00
Formica archboldi	0.00	0.00	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	6.67	0.00	4.76	0.00	2.86	0.00	0.00	4.00	0.00	0.00	0.00
Monomorium viride	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus brunneus	0.00	0.00	0.00	3.33	0.00	0.00	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus ruginodis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina bourbonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina concinna	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina guatemalensis	0.00	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole dentata	0.00	36.67	0.00	30.00	0.00	0.00	26.92	5.71	0.00	0.00	0.00	38.46	0.00	3.45
Pheidole floridana	0.00	0.00	0.00	3.33	0.00	0.00	7.69	37.14	0.00	3.85	4.00	11.54	4.55	3.45
Pheidole moerens	5.00	23.33	4.00	0.00	5.56	4.76	0.00	5.71	6.90	3.85	0.00	26.92	0.00	37.93
Solenopsis globularia	0.00	0.00	0.00	0.00	0.00	0.00	7.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	65.00	30.00	96.00	0.00	83.33	85.71	7.69	2.86	44.83	80.77	88.00	0.00	40.91	41.38
Tapinoma melanocephalum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tapinoma sessile	5.00	0.00	0.00	0.00	0.00	0.00	7.69	2.86	3.45	3.85	0.00	0.00	4.55	0.00
Wasmannia auropunctata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 8. cont. Percent composition based on CPUE of ant species collected with baited vials at restoration sites

	Restoration Sites and Habitat												
Scientific name	SG15 C	SG16 Hh	SG17 Cg	SG18 Hm	SG19 C	SG20 Cg	SG21 Ph	SG22 G	SG23 Cg	SG24 C	SG25 G	SG26 C	SG27 G
Aphaenogaster miamiana	0.00	3.13	39.13	45.00	13.89	3.13	0.00	0.00	14.29	37.93	0.00	0.00	0.00
Camponotus floridanus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondyla obscurior	0.00	0.00	0.00	0.00	0.00	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondula wroughtonii	0.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	3.45	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	0.00	0.00	0.00	0.00	3.13	0.00	3.03	0.00	13.79	0.00	4.00	4.76
Crematogaster atkinsoni	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00	0.00	8.00	0.00
Dorymyrmex bureni	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forelius pruinosus	0.00	0.00	4.35	0.00	0.00	3.13	16.22	0.00	0.00	0.00	0.00	8.00	4.76
Formica archboldi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	3.13	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium viride	0.00	0.00	0.00	0.00	0.00	0.00	2.70	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus brunneus	3.45	0.00	0.00	5.00	5.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus ruginodis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.45	0.00	4.00	0.00
Paratrechina bourbonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	0.00
Paratrechina concinna	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina guatemalensis	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole dentata	10.34	28.13	0.00	20.00	19.44	9.38	13.51	3.03	0.00	13.79	0.00	24.00	0.00
Pheidole floridana	48.28	28.13	0.00	0.00	8.33	3.13	0.00	0.00	0.00	6.90	0.00	4.00	0.00
Pheidole moerens	31.03	31.25	8.70	20.00	44.44	37.50	2.70	0.00	14.29	10.34	3.85	40.00	19.05
Solenopsis globularia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	6.90	6.25	43.48	5.00	2.78	37.50	64.86	93.94	66.67	10.34	96.15	0.00	61.90
Tapinoma melanocephalum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tapinoma sessile	0.00	0.00	4.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.76
Wasmannia auropunctata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.76

Table 9. Percent composition based on CPUE of ant species collected by sweep net at reference sites.

	Reference Sites and Habitat											
	FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6
Scientific name	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms
Brachymyrmex obscurior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus decpiens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus floridanus	0.00	0.00	5.88	9.09	0.00	6.25	0.00	0.00	8.33	18.18	5.88	0.00
Camponotus impressus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus planatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondyla emeryi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00
Crematogaster atkinsoni	0.00	100	41.18	18.18	64.29	25.00	17.65	72.73	8.33	0.00	41.18	83.33
Crematogaster pilosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichoderus pustulatus	0.00	0.00	0.00	0.00	0.00	0.00	11.76	18.18	8.33	0.00	0.00	0.00
Dorymyrmex bureni	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00
Forelius pruinosus	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	8.33	0.00	0.00	0.00
Formica archboldi	0.00	0.00	5.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hypoponera opaciceps	0.00	0.00	0.00	0.00	0.00	12.50	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	8.33	0.00	0.00	0.00
Odontomachus brunneus	0.00	0.00	0.00	18.18	0.00	0.00	5.88	0.00	0.00	18.18	0.00	0.00
Paratrechina bourbonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina concinna	100	0.00	11.76	18.18	7.14	6.25	0.00	0.00	0.00	0.00	11.76	0.00
Paratrechina guatemalensis	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	0.00	9.09	0.00	0.00
Paratrechina longicornus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole dentata	0.00	0.00	0.00	0.00	0.00	12.50	0.00	0.00	0.00	0.00	5.88	0.00
Pheidole floridana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole moerens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	5.88	0.00
Platythyrea pustulatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00
Pseudomyrmex elongatus	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex ejectus	0.00	0.00	5.88	9.09	0.00	6.25	23.53	0.00	16.67	9.09	0.00	0.00
Pseudomyrmex gracilis	0.00	0.00	0.00	0.00	0.00	6.25	23.53	0.00	16.67	9.09	0.00	0.00
Pseudomyrmex pallidus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	9.09	0.00	0.00
Pseudomyrmex seminole	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex simplex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00
Solenopsis geminate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.88	0.00
Solenopsis invicta	0.00	0.00	23.53	18.18	21.43	0.00	17.65	9.09	0.00	0.00	11.76	0.00
Tapinoma melanocephalum	0.00	0.00	5.88	9.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tapinoma sessile	0.00	0.00	0.00	0.00	7.14	0.00	0.00	0.00	0.00	0.00	0.00	16.67

Table 10. Percent composition based on CPUE of ant species collected by sweep net at restoration sites.

	Restoration Sites and Habitat									
Scientific name	SG1 Cg	SG2 Hm	SG3 G	SG4 Pm	SG5 Mf	SG6 Pm	SG7 G	SG9 Pm	SG10 C	SG11 G
Brachymyrmex obscurior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus decpiens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus floridanus	0.00	20.00	8.33	7.69	4.76	6.25	0.00	13.04	23.53	30.77
Camponotus impressus	0.00	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus planatus	0.00	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondyla emeryi	6.25	0.00	0.00	7.69	0.00	0.00	0.00	4.35	0.00	0.00
Crematogaster ashmeadi	0.00	5.71	0.00	0.00	0.00	0.00	20.00	0.00	8.82	0.00
Crematogaster atkinsoni	0.00	5.71	8.33	0.00	23.81	18.75	10.00	30.43	5.88	3.85
Crematogaster pilosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichoderus pustulatus	0.00	0.00	0.00	0.00	9.52	0.00	0.00	0.00	0.00	0.00
Dorymyrmex bureni	25.00	2.86	33.33	30.77	0.00	0.00	0.00	13.04	0.00	0.00
Forelius pruinosus	18.75	0.00	8.33	7.69	0.00	0.00	30.00	26.09	0.00	0.00
Formica archboldi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.35	0.00	0.00
Hypoponera opaciceps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus brunneus	0.00	0.00	0.00	7.69	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina bourbonica	6.25	0.00	0.00	7.69	0.00	0.00	0.00	0.00	11.76	3.85
Paratrechina concinna	6.25	0.00	0.00	0.00	0.00	6.25	10.00	0.00	2.94	0.00
Paratrechina guatemalensis	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	11.76	0.00
Paratrechina longicornus	0.00	0.00	0.00	7.69	0.00	6.25	0.00	0.00	0.00	0.00
Pheidole dentata	0.00	8.57	8.33	0.00	4.76	0.00	0.00	0.00	0.00	0.00
Pheidole floridana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole moerens	6.25	2.86	0.00	0.00	4.76	0.00	0.00	0.00	2.94	0.00
Platythyrea pustulatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex elongatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex ejectus	18.75	20.00	12.50	0.00	28.57	6.25	30.00	0.00	5.88	0.00
Pseudomyrmex gracilis	6.25	5.71	0.00	0.00	14.29	25.00	0.00	8.70	11.76	23.08
Pseudomyrmex pallidus	0.00	0.00	0.00	7.69	0.00	25.00	0.00	0.00	11.76	38.46
Pseudomyrmex seminole	0.00	0.00	0.00	0.00	4.76	0.00	0.00	0.00	2.94	0.00
Pseudomyrmex simplex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis geminate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	6.25	0.00	20.83	15.38	4.76	6.25	0.00	0.00	0.00	0.00
Tapinoma melanocephalum	0.00	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tapinoma sessile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 10. cont. Percent composition based on CPUE of ant species collected by sweep net at restoration sites.

	Restoration Sites and Habitat									
Scientific name	SG12 C	SG13 G	SG14 Cg	SG15 C	SG16 Hh	SG17 Cg	SG18 Hm	SG19 C	SG20 Cg	SG21 Ph
Brachymyrmex obscurior	0.00	0.00	0.00	0.00	6.67	0.00	0.00	0.00	0.00	0.00
Camponotus decpiens	0.00	0.00	0.00	0.00	0.00	0.00	6.67	0.00	0.00	0.00
Camponotus floridanus	5.00	7.41	15.79	0.00	26.67	9.09	13.33	0.00	0.00	36.36
Camponotus impressus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus planatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondyla emeryi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	0.00	5.26	0.00	0.00	18.18	0.00	0.00	5.00	0.00
Crematogaster atkinsoni	5.00	22.22	0.00	0.00	0.00	4.55	0.00	0.00	25.00	0.00
Crematogaster pilosa	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichoderus pustulatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorymyrmex bureni	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forelius pruinosus	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.00
Formica archboldi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hypoponera opaciceps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Odontomachus brunneus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina bourbonica	5.00	0.00	10.53	0.00	13.33	0.00	6.67	0.00	0.00	0.00
Paratrechina concinna	5.00	0.00	5.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina guatemalensis	15.00	0.00	10.53	0.00	6.67	0.00	40.00	42.86	0.00	0.00
Paratrechina longicornus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole dentata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole floridana	0.00	0.00	0.00	0.00	0.00	0.00	6.67	0.00	0.00	0.00
Pheidole moerens	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platythyrea pustulatus	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex elongatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex ejectus	20.00	33.33	31.58	66.67	13.33	0.00	0.00	14.29	35.00	0.00
Pseudomyrmex gracilis	30.00	22.22	0.00	33.33	26.67	9.09	20.00	42.86	15.00	0.00
Pseudomyrmex pallidus	0.00	11.11	0.00	0.00	0.00	40.91	0.00	0.00	5.00	45.45
Pseudomyrmex seminole	0.00	3.70	21.05	0.00	0.00	0.00	0.00	0.00	0.00	9.09
Pseudomyrmex simplex	0.00	0.00	0.00	0.00	0.00	4.55	0.00	0.00	0.00	0.00
Solenopsis geminate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	0.00	0.00	0.00	0.00	0.00	4.55	6.67	0.00	10.00	9.09
Tapinoma melanocephalum	0.00	0.00	0.00	0.00	6.67	0.00	0.00	0.00	5.00	0.00
Tapinoma sessile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 10. cont. Percent composition based on CPUE of ant species collected by sweep net at restoration sites.

	Restoration Sites and Habitat							
Scientific name	SG22 G	SG23 Cg	SG24 C	SG25 G	SG26 C	SG27 G	TT1 Ms	TT2 Ms
Brachymyrmex obscurior	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus decpiens	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Camponotus floridanus	28.57	7.69	0.00	0.00	5.00	0.00	0.00	0.00
Camponotus impressus	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00
Camponotus planatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cardiocondyla emeryi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crematogaster ashmeadi	0.00	7.69	22.22	0.00	15.00	0.00	0.00	0.00
Crematogaster atkinsoni	57.14	7.69	11.11	40.00	10.00	40.00	38.10	38.89
Crematogaster pilosa	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Dolichoderus pustulatus	0.00	0.00	0.00	0.00	0.00	6.67	0.00	0.00
Dorymyrmex bureni	0.00	0.00	0.00	30.00	0.00	0.00	0.00	0.00
Forelius pruinosus	0.00	0.00	0.00	0.00	0.00	0.00	4.76	5.56
Formica archboldi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hypoponera opaciceps	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monomorium floricola	0.00	0.00	0.00	0.00	0.00	0.00	4.76	0.00
Odontomachus brunneus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina bourbonica	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina concinna	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paratrechina guatemalensis	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Paratrechina longicornus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole dentata	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole floridana	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pheidole moerens	0.00	0.00	0.00	0.00	5.00	0.00	0.00	0.00
Platythyrea pustulatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex elongatus	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex ejectus	0.00	46.15	44.44	0.00	45.00	6.67	0.00	0.00
Pseudomyrmex gracilis	0.00	30.77	22.22	0.00	10.00	0.00	0.00	0.00
Pseudomyrmex pallidus	0.00	0.00	0.00	0.00	0.00	33.33	33.33	55.56
Pseudomyrmex seminole	7.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pseudomyrmex simplex	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis geminate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Solenopsis invicta	7.14	0.00	0.00	30.00	0.00	0.00	0.00	0.00
Tapinoma melanocephalum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tapinoma sessile	0.00	0.00	0.00	0.00	0.00	13.33	14.29	0.00

Table 11. Combined ant species presence/absence and species richness at reference sites

Scientific name	FP1 Cg	FP2 G	FP3 Ph	FP4 C	FP5 G	FP6 Ph	FS1 Cg	FS2 G	FS3 Ph	FS4 C	FS5 G	FS6 Ms
Aphaenogaster miamiana	0	0	1	0	0	1	0	0	1	0	0	0
Brachymyrmex obscurior	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus decpiens	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus floridanus	0	0	1	1	0	1	0	0	1	1	1	0
Cardiocondyla emeryi	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus impressus	0	0	0	0	0	0	0	0	0	0	0	0
Cardiocondyla obscurior	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus planatus	0	0	0	0	0	0	0	0	0	0	0	0
Cardiocondula wroughtonii	0	0	0	0	0	0	0	0	0	0	0	0
Crematogaster ashmeadi	0	0	0	0	0	0	0	0	0	0	1	0
Crematogaster atkinsoni	0	1	1	1	1	1	1	1	1	0	1	1
Crematogaster pilosa	0	0	0	0	0	0	0	0	0	0	0	0
Dorymyrmex bureni	0	0	0	0	0	1	0	0	0	0	1	0
Dolichoderus pustulatus	0	0	0	0	0	0	1	1	1	0	0	0
Formica archboldi	0	0	1	0	0	0	0	0	0	0	0	0
Forelius pruinosus	0	0	0	0	0	1	0	1	1	0	0	0
Hypoponera opaciceps	0	0	0	0	0	1	0	0	0	0	0	0
Monomorium floricola	0	0	0	0	0	1	0	0	1	0	0	0
Monomorium viride	0	0	0	0	0	0	0	0	0	0	0	0
Odontomachus brunneus	0	0	0	1	0	0	1	0	0	1	0	0
Odontomachus ruginodis	0	0	0	0	0	0	0	0	0	0	0	0
Paratrechina bourbonica	0	0	0	0	0	0	0	0	0	0	0	0
Paratrechina concinna	1	0	1	1	1	1	1	0	0	1	1	0
Paratrechina guatemalensis	0	0	0	0	0	1	0	0	0	1	0	0
Paratrechina longicornus	0	0	0	0	0	0	0	0	0	0	0	0
Pheidole dentata	1	0	0	1	0	1	1	0	1	0	1	0
Pheidole floridana	1	0	1	1	1	1	0	0	1	1	0	0
Pheidole moerens	1	0	1	1	0	1	1	1	1	1	1	0
Platythyrea pustulatus	0	0	0	0	0	0	0	0	0	1	0	0
Pseudomyrmex ejectus	0	0	1	1	0	1	1	0	1	1	0	0
Pseudomyrmex elongatus	0	0	0	0	0	1	0	0	0	0	0	0
Pseudomyrmex gracilis	0	0	0	0	0	1	1	0	1	1	0	0
Pseudomyrmex pallidus	0	0	0	0	0	0	0	0	1	1	0	0
Pseudomyrmex seminole	0	0	0	0	0	0	0	0	0	0	0	0
Pseudomyrmex simplex	0	0	0	0	0	0	0	0	0	1	0	0
Solenopsis geminate	0	0	0	0	0	0	0	0	0	0	1	0
Solenopsis globularia	0	0	0	0	0	0	0	0	0	0	0	0
Solenopsis invicta	0	1	1	1	1	1	1	1	1	0	1	0
Tapinoma melanocephalum	0	0	1	1	0	0	1	0	0	1	0	0
Tapinoma sessile	0	0	0	0	1	1	0	1	0	0	0	1
Wasmannia auropunctata	0	0	0	0	0	0	0	0	0	1	0	0
Species Richness	**4**	**2**	**10**	**10**	**5**	**17**	**10**	**6**	**13**	**13**	**9**	**2**

Table 12. Combined ant species presence/absence and species richness at restoration sites

Scientific name	SG1 Cg	SG2 Hm	SG3 G	SG4 Pm	SG5 Mfw	SG6 Pm	SG7 G	SG8 Pm	SG9 Pm	SG10 C	SG11 G	SG12 C
Aphaenogaster miamiana	0	0	0	0	0	1	0	0	1	1	0	1
Brachymyrmex obscurior	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus decpiens	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus floridanus	0	1	1	1	1	1	0	1	1	1	1	1
Cardiocondyla emeryi	1	0	0	1	0	0	0	0	1	0	0	0
Camponotus impressus	0	1	0	0	0	0	0	0	0	0	0	0
Cardiocondyla obscurior	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus planatus	0	1	0	0	0	0	0	0	0	0	0	0
Cardiocondula wroughtonii	0	0	0	0	0	0	0	0	0	0	0	0
Crematogaster ashmeadi	0	1	0	0	0	0	1	0	0	1	1	1
Crematogaster atkinsoni	0	1	1	0	1	1	1	1	1	1	1	1
Crematogaster pilosa	0	0	0	0	0	0	0	0	0	0	0	0
Dorymyrmex bureni	1	1	1	1	0	0	0	0	1	0	0	0
Dolichoderus pustulatus	0	0	0	0	1	0	0	0	0	0	0	0
Formica archboldi	0	0	0	1	0	0	0	0	1	0	0	0
Forelius pruinosus	1	0	1	1	0	0	1	1	1	0	0	0
Hypoponera opaciceps	0	0	0	0	0	0	0	0	0	0	0	0
Monomorium floricola	0	0	0	1	0	1	0	1	0	0	1	0
Monomorium viride	0	0	0	0	0	0	0	0	0	0	0	0
Odontomachus brunneus	0	0	0	1	0	0	1	0	0	0	0	0
Odontomachus ruginodis	0	0	0	0	0	0	0	0	0	0	0	0
Paratrechina bourbonica	1	0	0	1	0	0	0	0	0	1	1	1
Paratrechina concinna	1	0	0	0	0	1	1	0	0	1	0	1
Paratrechina guatemalensis	0	1	0	0	0	0	0	0	0	1	0	1
Paratrechina longicornus	0	0	0	1	0	1	0	0	0	0	0	0
Pheidole dentata	0	1	1	1	1	0	1	1	0	0	0	1
Pheidole floridana	0	0	0	1	0	0	1	1	0	1	1	1
Pheidole moerens	1	1	1	0	1	1	0	1	1	1	0	1
Platythyrea pustulatus	0	0	0	0	0	0	0	0	0	0	0	1
Pseudomyrmex ejectus	1	1	1	0	1	1	1	0	0	1	0	1
Pseudomyrmex elongatus	0	0	0	0	0	0	0	0	0	0	0	0
Pseudomyrmex gracilis	1	1	0	0	1	1	0	0	1	1	1	1
Pseudomyrmex pallidus	0	0	0	1	0	1	0	1	0	1	1	0
Pseudomyrmex seminole	0	0	0	0	1	0	0	0	0	1	0	0
Pseudomyrmex simplex	0	0	0	0	0	0	0	0	0	0	0	0
Solenopsis geminate	0	0	0	0	0	0	0	0	0	0	0	0
Solenopsis globularia	0	0	0	0	0	0	1	0	0	0	0	0
Solenopsis invicta	1	1	1	1	1	1	1	1	1	1	1	0
Tapinoma melanocephalum	0	1	0	0	0	0	0	0	0	0	0	0
Tapinoma sessile	1	0	0	0	0	0	1	1	1	1	0	0
Wasmannia auropunctata	0	0	0	0	0	0	0	0	0	0	0	0
Species Richness	**10**	**13**	**8**	**13**	**9**	**11**	**11**	**10**	**11**	**15**	**9**	**13**

Table 12. cont. Combined ant species presence/absence and species richness at restoration sites

	SG13	SG14	SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24
Scientific name	G	Cg	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C
Aphaenogaster miamiana	1	0	0	1	1	1	1	1	0	0	1	1
Brachymyrmex obscurior	0	0	0	1	0	0	0	0	0	0	0	0
Camponotus decpiens	0	0	0	0	0	1	0	0	0	0	0	0
Camponotus floridanus	1	1	0	1	1	1	0	0	1	1	1	0
Cardiocondyla emeryi	0	0	0	0	0	0	0	0	0	0	0	0
Camponotus impressus	0	0	0	0	0	0	0	0	0	0	0	0
Cardiocondyla obscurior	0	0	0	0	0	0	0	1	0	0	0	0
Camponotus planatus	0	0	0	0	0	0	0	0	0	0	0	0
Cardiocondula wroughtonii	0	0	0	0	0	1	0	0	0	0	0	1
Crematogaster ashmeadi	1	1	0	0	1	0	0	1	0	1	1	1
Crematogaster atkinsoni	1	1	0	0	1	0	0	1	0	1	1	1
Crematogaster pilosa	0	0	0	0	0	0	0	0	0	0	0	0
Dorymyrmex bureni	0	0	0	0	0	0	0	0	0	0	0	0
Dolichoderus pustulatus	0	0	0	0	0	0	0	0	0	0	0	0
Formica archboldi	0	0	0	0	0	0	0	0	0	0	0	0
Forelius pruinosus	0	0	0	0	1	0	0	1	1	0	0	0
Hypoponera opaciceps	0	0	0	0	0	0	0	0	0	0	0	0
Monomorium floricola	0	0	0	1	0	0	1	0	0	0	0	0
Monomorium viride	0	0	0	0	0	0	0	0	1	0	0	0
Odontomachus brunneus	0	0	1	0	0	1	1	0	0	0	0	0
Odontomachus ruginodis	0	0	0	0	0	0	0	0	0	0	0	1
Paratrechina bourbonica	0	1	0	1	0	1	0	0	0	0	0	0
Paratrechina concinna	0	1	0	0	0	0	1	0	0	0	0	0
Paratrechina guatemalensis	0	1	0	1	0	1	1	0	0	0	0	0
Paratrechina longicornus	0	0	0	0	0	0	0	0	0	0	0	0
Pheidole dentata	0	1	1	1	0	1	1	1	1	1	0	1
Pheidole floridana	1	1	1	1	0	1	1	1	0	0	0	1
Pheidole moerens	0	1	1	1	1	1	1	1	1	0	1	1
Platythyrea pustulatus	0	0	0	0	0	0	0	0	0	0	0	0
Pseudomyrmex ejectus	1	1	1	1	0	0	1	1	0	0	1	1
Pseudomyrmex elongatus	0	0	0	0	0	0	0	0	0	0	0	0
Pseudomyrmex gracilis	1	0	1	1	1	1	1	1	0	0	1	1
Pseudomyrmex pallidus	1	0	0	0	1	0	0	1	1	0	0	0
Pseudomyrmex seminole	1	1	0	0	0	0	0	0	1	1	0	0
Pseudomyrmex simplex	0	0	0	0	1	0	0	0	0	0	0	0
Solenopsis geminate	0	0	0	0	0	0	0	0	0	0	0	0
Solenopsis globularia	0	0	0	0	0	0	0	0	0	0	0	0
Solenopsis invicta	1	1	1	1	1	1	1	1	1	1	1	1
Tapinoma melanocephalum	0	0	0	1	0	0	0	1	0	0	0	0
Tapinoma sessile	1	0	0	0	1	0	0	0	0	0	0	0
Wasmannia auropunctata	0	0	0	0	0	0	0	0	0	0	0	0
Species Richness	**11**	**12**	**7**	**13**	**11**	**12**	**11**	**13**	**8**	**6**	**8**	**11**

Table 12. cont. Combined ant species presence/absence and species richness at restoration sites

Scientific name	SG25 G	SG26 C	SG27 G	TT1 Ms	TT2 Ms
Aphaenogaster miamiana	0	0	0	0	0
Brachymyrmex obscurior	0	0	0	0	0
Camponotus decpiens	0	0	0	0	0
Camponotus floridanus	0	1	0	0	0
Cardiocondyla emeryi	0	0	0	0	0
Camponotus impressus	0	0	0	1	0
Cardiocondyla obscurior	0	0	0	0	0
Camponotus planatus	0	0	0	0	0
Cardiocondula wroughtonii	0	0	0	0	0
Crematogaster ashmeadi	0	1	1	0	0
Crematogaster atkinsoni	1	1	1	1	1
Crematogaster pilosa	0	1	0	0	0
Dorymyrmex bureni	1	0	0	0	0
Dolichoderus pustulatus	0	0	1	0	0
Formica archboldi	0	0	0	0	0
Forelius pruinosus	0	1	1	1	1
Hypoponera opaciceps	0	0	0	0	0
Monomorium floricola	0	0	0	1	0
Monomorium viride	0	0	0	0	0
Odontomachus brunneus	0	0	0	0	0
Odontomachus ruginodis	0	1	0	0	0
Paratrechina bourbonica	0	1	0	0	0
Paratrechina concinna	0	0	0	0	0
Paratrechina guatemalensis	0	1	0	0	0
Paratrechina longicornus	0	0	0	0	0
Pheidole dentata	0	1	0	0	0
Pheidole floridana	0	1	0	0	0
Pheidole moerens	1	1	1	0	0
Platythyrea pustulatus	0	0	0	0	0
Pseudomyrmex ejectus	0	1	1	0	0
Pseudomyrmex elongatus	0	0	0	0	0
Pseudomyrmex gracilis	0	1	0	0	0
Pseudomyrmex pallidus	0	0	1	1	1
Pseudomyrmex seminole	0	0	0	0	0
Pseudomyrmex simplex	0	0	0	0	0
Solenopsis geminate	0	0	0	0	0
Solenopsis globularia	0	0	0	0	0
Solenopsis invicta	1	0	1	0	0
Tapinoma melanocephalum	0	0	0	0	0
Tapinoma sessile	0	1	1	1	0
Wasmannia auropunctata	0	0	1	0	0
Species Richness	**4**	**14**	**10**	**6**	**3**

Table 13. Abundance of Orthopteran OTU's collected at reference sites.

			Reference Sites and Habitat											
			FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6
Family	Genus/OTU	Species/OTU	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms
Acrididae	Acrididae	Acrididae	5	3	2	1	4	4	3	1	3	0	0	5
Acrididae	*Achurum*	*carinatum*	0	3	0	0	18	0	0	2	1	0	0	0
Acrididae	*Aptenopedes*	*sphenarioides*	0	2	3	0	4	6	3	2	2	0	1	0
Acrididae	*Arphia*	*granulata*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Dichromorpha*	*elegans*	1	0	9	0	6	11	0	0	7	0	2	0
Acrididae	*Eotettix*	*signatus*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Leptysma*	*marginicollis*	1	0	0	0	0	1	1	0	0	0	0	31
Acrididae	*Melanoplus*	*keeleri*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Melanoplus*	*puer*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Mermiria*	*intertexta*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Mermiria*	*sp.*	0	0	0	0	0	0	0	0	0	0	1	0
Acrididae	*Metaleptea*	*brevicornis*	0	0	0	1	0	0	0	0	0	0	0	0
Acrididae	*Paroxya*	*atlantica*	0	3	1	0	0	2	0	0	0	0	2	0
Acrididae	*Paroxya*	*clavuliger*	0	0	0	0	0	0	2	11	0	0	0	0
Acrididae	*Paroxya*	*sp.*	0	0	0	0	0	0	0	0	1	0	0	0
Acrididae	*Schistocera*	*americana*	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Schistocera*	*sp.*	0	0	0	0	0	0	0	0	1	0	0	0
Acrididae	*Stenacris*	*vitreipennis*	0	1	0	0	0	0	0	0	0	0	0	0

Table 13. cont. Abundance of Orthopteran OTU's collected at reference sites.

			Reference Sites and Habitat										
			FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6
Family	Genus/OTU	Species/OTU	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms
Gryllidae	Gryllidae	Gryllidae	0	0	1	0	0	0	0	0	0	10	0	0
Gryllidae	*Anaxipha*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Cycloptilum*	*sp.*	0	0	0	0	0	0	0	0	0	1	0	0
Gryllidae	*Cyrtoxipha*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Neomobius*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Pictonemobius*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	4	0	0	2	1	0	4	0	3	0	11
Tettigoniidae	*Belocephalus*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Conocephalus*	*saltans*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Conocephalus*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Odontoxiphidium*	*apterum*	0	0	4	0	0	0	0	0	1	0	0	0
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*agile*	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*militare*	0	2	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*sp.*	0	2	0	1	0	0	0	0	0	0	0	1
Tettigoniidae	*Orchelimum*	*pulchellum*	0	0	0	2	0	0	1	0	0	0	0	0
Tettigoniidae	*Scudderia*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	Tetrigidae	Tetrigidae	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	*Paratettix*	*rugosus*	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	*Paxilla*	*obesa*	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	*Tettigidea*	*lateralis*	0	0	0	0	0	0	0	0	0	0	0	0
Tridactylidae	*Ellipes*	*minutus*	0	0	0	0	0	0	0	0	0	1	0	0

Table 14. Abundance of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat												
			SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Genus/OTU	Species/OTU	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Acrididae	Acrididae	Acrididae	0	0	24	0	4	3	1	3	1	0	1	0	20	2
Acrididae	*Achurum*	*carinatum*	0	0	6	1	0	0	0	0	0	0	0	0	0	1
Acrididae	*Aptenopedes*	*sphenarioides*	0	0	1	0	7	0	0	0	0	0	0	0	5	6
Acrididae	*Arphia*	*granulata*	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Acrididae	*Dichromorpha*	*elegans*	1	0	0	0	2	0	3	0	0	0	0	0	1	6
Acrididae	*Eotettix*	*signatus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Leptysma*	*marginicollis*	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Acrididae	*Melanoplus*	*keeleri*	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Acrididae	*Melanoplus*	*puer*	1	0	6	0	0	0	0	3	1	0	0	0	0	0
Acrididae	*Mermiria*	*intertexta*	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Mermiria*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Metaleptea*	*brevicornis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Paroxya*	*atlantica*	0	0	0	0	1	0	1	0	0	0	0	0	1	1
Acrididae	*Paroxya*	*clavuliger*	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Acrididae	*Paroxya*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Schistocera*	*americana*	0	0	0	0	5	0	0	0	0	0	0	0	0	0
Acrididae	*Schistocera*	*sp.*	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Acrididae	*Stenacris*	*vitreipennis*	0	0	0	0	5	0	0	0	0	0	0	0	0	0

Table 14. cont. Abundance of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat												
			SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Genus/OTU	Species/OTU	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Gryllidae	Gryllidae	Gryllidae	1	7	1	0	1	9	0	0	0	0	2	2	3	2
Gryllidae	*Anaxipha*	*sp.*	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Gryllidae	*Cycloptilum*	*sp.*	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Cyrtoxipha*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Neomobius*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Gryllidae	*Pictonemobius*	*sp.*	0	0	2	0	0	2	0	1	0	0	0	0	0	0
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	0	2	0	0	0	0	0	1	0	0	0	4	2
Tettigoniidae	*Belocephalus*	*sp.*	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Conocephalus*	*saltans*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Conocephalus*	*sp.*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Odontoxiphidium*	*apterum*	1	0	9	0	0	0	0	0	0	0	0	0	0	1
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*agile*	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*militare*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*sp.*	0	0	0	0	4	0	0	0	0	0	0	0	0	1
Tettigoniidae	*Orchelimum*	*pulchellum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Scudderia*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	Tetrigidae	Tetrigidae	8	0	1	0	0	5	0	3	1	0	0	0	2	0
Tetrigidae	*Paratettix*	*rugosus*	1	0	0	0	0	0	2	1	0	0	0	0	0	0
Tetrigidae	*Paxilla*	*obesa*	0	0	0	0	0	0	0	1	0	0	0	0	1	0
Tetrigidae	*Tettigidea*	*lateralis*	0	0	0	0	0	0	2	1	0	0	0	0	0	0
Tridactylidae	*Ellipes*	*minutus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14. cont. Abundance of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat													
			SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27	TT1	TT2
Family	Genus/OTU	Species/OTU	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G	Ms	Ms
Acrididae	Acrididae	Acrididae	0	0	8	0	0	2	7	9	4	0	8	0	0	0	0
Acrididae	*Achurum*	*carinatum*	0	0	0	0	0	0	0	4	0	0	6	0	2	0	0
Acrididae	*Aptenopedes*	*sphenarioides*	0	0	5	0	0	1	0	4	1	0	0	0	0	0	0
Acrididae	*Arphia*	*granulata*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Dichromorpha*	*elegans*	0	0	0	0	0	0	0	14	0	0	10	0	1	0	0
Acrididae	*Eotettix*	*signatus*	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0
Acrididae	*Leptysma*	*marginicollis*	0	0	0	0	0	0	3	0	0	0	0	0	0	1	1
Acrididae	*Melanoplus*	*keeleri*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Melanoplus*	*puer*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Mermiria*	*intertexta*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Mermiria*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Metaleptea*	*brevicornis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Paroxya*	*atlantica*	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
Acrididae	*Paroxya*	*clavuliger*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Paroxya*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Schistocera*	*americana*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acrididae	*Schistocera*	*sp.*	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0
Acrididae	*Stenacris*	*vitreipennis*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14. cont. Abundance of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat														
			SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27	TT1	TT2
Family	Genus/OTU	Species/OTU	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G	Ms	Ms
Gryllidae	Gryllidae	Gryllidae	8	15	2	10	3	0	0	0	1	4	1	2	0	0	0
Gryllidae	*Anaxipha*	*sp.*	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Gryllidae	*Cycloptilum*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Cyrtoxipha*	*sp.*	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Neomobius*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gryllidae	*Pictonemobius*	*sp.*	0	0	0	0	0	0	6	1	0	0	2	0	0	0	0
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	0	0	0	0	5	2	2	0	0	4	3	0	1	3
Tettigoniidae	*Belocephalus*	*sp.*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Conocephalus*	*saltans*	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
Tettigoniidae	*Conocephalus*	*sp.*	0	0	0	0	0	0	1	1	0	0	0	0	1	1	2
Tettigoniidae	*Odontoxiphidium*	*apterum*	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	0	0	0	0	0	1	1	0	2	3	0	0	0	0
Tettigoniidae	*Orchelimum*	*agile*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*militare*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*sp.*	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Orchelimum*	*pulchellum*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tettigoniidae	*Scudderia*	*sp.*	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Tetrigidae	Tetrigidae	Tetrigidae	0	0	0	0	0	0	7	0	0	0	9	0	0	0	0
Tetrigidae	*Paratettix*	*rugosus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetrigidae	*Paxilla*	*obesa*	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Tetrigidae	*Tettigidea*	*lateralis*	0	0	1	0	0	0	5	0	0	0	4	0	0	0	0
Tridactylidae	*Ellipes*	*minutus*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sum	9	15	3	10	3	7	24	7	1	7	26	5	1	3	8

Table 15. Percent composition of Orthopteran OTU's collected at reference sites.

			Reference Sites and Habitats											
Family	Genus/OTU	Species/OTU	FP1 Cg	FP2 G	FP3 Ph	FP4 C	FP5 G	FP6 Ph	FS1 Cg	FS2 G	FS3 Ph	FS4 C	FS5 G	FS6 Ms
Acrididae	Acrididae	Acrididae	71.43	15.00	10.00	20.00	11.76	16.00	30.00	5.00	18.75	0.00	0.00	10.42
Acrididae	*Achurum*	*carinatum*	0.00	15.00	0.00	0.00	52.94	0.00	0.00	10.00	6.25	0.00	0.00	0.00
Acrididae	*Aptenopedes*	*sphenarioides*	0.00	10.00	15.00	0.00	11.76	24.00	30.00	10.00	12.50	0.00	16.67	0.00
Acrididae	*Arphia*	*granulata*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Dichromorpha*	*elegans*	14.29	0.00	45.00	0.00	17.65	44.00	0.00	0.00	43.75	0.00	33.33	0.00
Acrididae	*Eotettix*	*signatus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Leptysma*	*marginicollis*	14.29	0.00	0.00	0.00	0.00	4.00	10.00	0.00	0.00	0.00	0.00	64.58
Acrididae	*Melanoplus*	*keeleri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Melanoplus*	*puer*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*intertexta*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.67	0.00
Acrididae	*Metaleptea*	*brevicornis*	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Paroxya*	*atlantica*	0.00	15.00	5.00	0.00	0.00	8.00	0.00	0.00	0.00	0.00	33.33	0.00
Acrididae	*Paroxya*	*clavuliger*	0.00	0.00	0.00	0.00	0.00	0.00	20.00	55.00	0.00	0.00	0.00	0.00
Acrididae	*Paroxya*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	0.00
Acrididae	*Schistocera*	*americana*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Schistocera*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	0.00
Acrididae	*Stenacris*	*vitreipennis*	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 15. cont. Percent composition of Orthopteran OTU's collected at reference sites.

			Reference Sites and Habitats											
			FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS3	FS4	FS5	FS6
Family	Genus/OTU	Species/OTU	Cg	G	Ph	C	G	Ph	Cg	G	Ph	C	G	Ms
Gryllidae	Gryllidae	Gryllidae	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	71.43	0.00	0.00
Gryllidae	*Anaxipha*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Cycloptilum*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.14	0.00	0.00
Gryllidae	*Cyrtoxipha*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Neomobius*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Pictonemobius*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	Tettigoniidae	Tettigoniidae	0.00	20.00	0.00	0.00	5.88	4.00	0.00	20.00	0.00	21.43	0.00	22.92
Tettigoniidae	*Belocephalus*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Conocephalus*	*saltans*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Conocephalus*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Odontoxiphidium*	*apterum*	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	6.25	0.00	0.00	0.00
Tettigoniidae	*Odontoxiphidium*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*agile*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*militare*	0.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*sp.*	0.00	10.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.08
Tettigoniidae	*Orchelimum*	*pulchellum*	0.00	0.00	0.00	40.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Scudderia*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	Tetrigidae	Tetrigidae	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	*Paratettix*	*rugosus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	*Paxilla*	*obesa*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	*Tettigidea*	*lateralis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tridactylidae	*Ellipes*	*minutus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.14	0.00	0.00

Table 16. Percent composition of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitats												
			SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Genus/OTU	Species/OTU	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Acrididae	Acrididae	Acrididae	0.00	0.00	42.11	0.00	11.76	14.29	11.11	23.08	25.00	0.00	33.33	0.00	51.28	8.33
Acrididae	*Achurum*	*carinatum*	0.00	0.00	10.53	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17
Acrididae	*Aptenopedes*	*sphenarioides*	0.00	0.00	1.75	0.00	20.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.82	25.00
Acrididae	*Arphia*	*granulata*	0.00	0.00	0.00	0.00	2.94	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Dichromorpha*	*elegans*	7.14	0.00	0.00	0.00	5.88	0.00	33.33	0.00	0.00	0.00	0.00	0.00	2.56	25.00
Acrididae	*Eotettix*	*signatus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Leptysma*	*marginicollis*	0.00	0.00	1.75	0.00	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Melanoplus*	*keeleri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	0.00
Acrididae	*Melanoplus*	*puer*	7.14	0.00	10.53	0.00	0.00	0.00	0.00	23.08	25.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*intertexta*	0.00	0.00	3.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Metaleptea*	*brevicornis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Paroxya*	*atlantica*	0.00	0.00	0.00	0.00	2.94	0.00	11.11	0.00	0.00	0.00	0.00	0.00	2.56	4.17
Acrididae	*Paroxya*	*clavuliger*	0.00	0.00	0.00	0.00	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17
Acrididae	*Paroxya*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Schistocera*	*americana*	0.00	0.00	0.00	0.00	14.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Schistocera*	*sp.*	0.00	0.00	1.75	0.00	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17
Acrididae	*Stenacris*	*vitreipennis*	0.00	0.00	0.00	0.00	14.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 16. cont. Percent composition of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitats												
			SG1	SG2	SG3	SG4	SG5	SG6	SG7	SG8	SG9	SG10	SG11	SG12	SG13	SG14
Family	Genus/OTU	Species/OTU	Cg	Hm	G	Pm	Mf	Pm	G	Pm	Pm	C	G	C	G	Cg
Gryllidae	Gryllidae	Gryllidae	7.14	87.50	1.75	0.00	2.94	42.86	0.00	0.00	0.00	0.00	66.67	100.00	7.69	8.33
Gryllidae	*Anaxipha*	*sp.*	0.00	0.00	0.00	0.00	0.00	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Cycloptilum*	*sp.*	0.00	12.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Cyrtoxipha*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Neomobius*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.56	0.00
Gryllidae	*Pictonemobius*	*sp.*	0.00	0.00	3.51	0.00	0.00	9.52	0.00	7.69	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	Tettigoniidae	Tettigoniidae	0.00	0.00	3.51	0.00	0.00	0.00	0.00	0.00	25.00	0.00	0.00	0.00	10.26	8.33
Tettigoniidae	*Belocephalus*	*sp.*	0.00	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Conocephalus*	*saltans*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Conocephalus*	*sp.*	7.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Odontoxiphidium*	*apterum*	7.14	0.00	15.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17
Tettigoniidae	*Odontoxiphidium*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*agile*	0.00	0.00	0.00	0.00	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*militare*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*sp.*	0.00	0.00	0.00	0.00	11.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.17
Tettigoniidae	*Orchelimum*	*pulchellum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Scudderia*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	Tetrigidae	Tetrigidae	57.14	0.00	1.75	0.00	0.00	23.81	0.00	23.08	25.00	0.00	0.00	0.00	5.13	0.00
Tetrigidae	*Paratettix*	*rugosus*	7.14	0.00	0.00	0.00	0.00	0.00	22.22	7.69	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	*Paxilla*	*obesa*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.69	0.00	0.00	0.00	0.00	2.56	0.00
Tetrigidae	*Tettigidea*	*lateralis*	0.00	0.00	0.00	0.00	0.00	0.00	22.22	7.69	0.00	0.00	0.00	0.00	0.00	0.00
Tridactylidae	*Ellipes*	*minutus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 16. cont. Percent composition of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat													
			SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27	TT1	TT2
Family	Genus/OTU	Species/OTU	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G	Ms	Ms
Acrididae	Acrididae	Acrididae	0.00	0.00	44.44	0.00	0.00	20.00	19.44	23.68	66.67	0.00	14.55	0.00	0.00	0.00	0.00
Acrididae	*Achurum*	*carinatum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.53	0.00	0.00	10.91	0.00	40.00	0.00	0.00
Acrididae	*Aptenopedes*	*sphenarioides*	0.00	0.00	27.78	0.00	0.00	10.00	0.00	10.53	16.67	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Arphia*	*granulata*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Dichromorpha*	*elegans*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.84	0.00	0.00	18.18	0.00	20.00	0.00	0.00
Acrididae	*Eotettix*	*signatus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.09	0.00	0.00	0.00	0.00
Acrididae	*Leptysma*	*marginicollis*	0.00	0.00	0.00	0.00	0.00	0.00	8.33	0.00	0.00	0.00	0.00	0.00	0.00	25.00	11.11
Acrididae	*Melanoplus*	*keeleri*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Melanoplus*	*puer*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*intertexta*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Mermiria*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Metaleptea*	*brevicornis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Paroxya*	*atlantica*	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00
Acrididae	*Paroxya*	*clavuliger*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Paroxya*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Schistocera*	*americana*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Schistocera*	*sp.*	0.00	0.00	11.11	0.00	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Acrididae	*Stenacris*	*vitreipennis*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 16. cont. Percent composition of Orthopteran OTU's collected at restoration sites.

			Restoration Sites and Habitat													
			SG15	SG16	SG17	SG18	SG19	SG20	SG21	SG22	SG23	SG24	SG25	SG26	SG27	TT1	TT2
Family	Genus/OTU	Species/OTU	C	Hh	Cg	Hm	C	Cg	Ph	G	Cg	C	G	C	G	Ms	Ms
Gryllidae	Gryllidae	Gryllidae	88.89	100.00	11.11	100.00	100.00	0.00	0.00	0.00	16.67	57.14	1.82	40.00	0.00	0.00	0.00
Gryllidae	*Anaxipha*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Cycloptilum*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Cyrtoxipha*	*sp.*	11.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Neomobius*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gryllidae	*Pictonemobius*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	16.67	2.63	0.00	0.00	3.64	0.00	0.00	0.00	0.00
Tettigoniidae	Tettigoniidae	Tettigoniidae	0.00	0.00	0.00	0.00	0.00	50.00	5.56	5.26	0.00	0.00	7.27	60.00	0.00	25.00	33.33
Tettigoniidae	*Belocephalus*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Conocephalus*	*saltans*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.00	33.33
Tettigoniidae	*Conocephalus*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	2.78	2.63	0.00	0.00	0.00	0.00	20.00	25.00	22.22
Tettigoniidae	*Odontoxiphidium*	*apterum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.26	0.00	0.00	3.64	0.00	0.00	0.00	0.00
Tettigoniidae	*Odontoxiphidium*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	2.78	2.63	0.00	28.57	5.45	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*agile*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*militare*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*sp.*	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Orchelimum*	*pulchellum*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tettigoniidae	*Scudderia*	*sp.*	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	Tetrigidae	Tetrigidae	0.00	0.00	0.00	0.00	0.00	0.00	19.44	0.00	0.00	0.00	16.36	0.00	0.00	0.00	0.00
Tetrigidae	*Paratettix*	*rugosus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrigidae	*Paxilla*	*obesa*	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00
Tetrigidae	*Tettigidea*	*lateralis*	0.00	0.00	5.56	0.00	0.00	0.00	13.89	0.00	0.00	0.00	7.27	0.00	0.00	0.00	0.00
Tridactylidae	*Ellipes*	*minutus*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 17. Values of species richness, abundance, Margalef richness index, Pielou evenness index, Shannon diversity index, and Simpson evenness index for Orthopteran (OTU's) collected at sample sites.

Site	Habitat	Richness	Abundance	Margalef	Pielou	Shannon	Simpson
FP1	Cg	3	7	1.0278	0.7248	0.7963	0.5238
FP2	G	8	20	2.3367	0.9696	2.0162	0.9053
FP3	Ph	6	20	1.6690	0.8347	1.4956	0.7579
FP4	C	4	5	1.8640	0.9610	1.3322	0.9000
FP5	G	5	34	1.1343	0.8158	1.3130	0.6774
FP6	Ph	6	25	1.5533	0.8129	1.4565	0.7433
FS1	Cg	5	10	1.7372	0.9350	1.5048	0.8444
FS2	G	5	20	1.3352	0.7835	1.2610	0.6684
FS3	Ph	7	16	2.1640	0.8370	1.6286	0.7917
FS4	C	4	15	1.1078	0.6876	0.9533	0.5429
FS5	G	4	6	1.6743	0.9592	1.3297	0.8667
FS6	Ms	4	48	0.7750	0.6754	0.9363	0.5301
SG1	Cg	7	14	2.2735	0.7456	1.4508	0.6923
SG2	Hm	2	8	0.4809	0.5436	0.3768	0.2500
SG3	G	13	57	2.9681	0.7438	1.9078	0.7838
SG4	Pm	1	1			0.0000	
SG5	Mf	13	34	3.4029	0.8910	2.2854	0.9037
SG6	Pm	6	21	1.6423	0.8353	1.4967	0.7619
SG7	G	5	9	1.8205	0.9463	1.5230	0.8611
SG8	Pm	7	13	2.3392	0.9273	1.8044	0.8846
SG9	Pm	4	4	2.1640	1.0000	1.3863	1.0000
SG10	C	0	0	0.0000		0.0000	0.0000
SG11	G	2	3	0.9102	0.9183	0.6365	0.6667
SG12	C	1	2	0.0000		0.0000	0.0000
SG13	G	10	39	2.4566	0.7204	1.6587	0.7166
SG14	Cg	11	24	3.1466	0.8795	2.1089	0.8804
SG15	C	2	9	0.4551	0.5033	0.3488	0.2222
SG16	Hh	1	15	0.0000		0.0000	0.0000
SG17	Cg	5	18	1.3839	0.8482	1.3651	0.7386
SG18	Hm	1	10	0.0000		0.0000	0.0000
SG19	C	1	3	0.0000		0.0000	0.0000
SG20	Cg	4	10	1.3029	0.8805	1.2206	0.7333
SG21	Ph	12	36	3.0696	0.8751	2.1746	0.8873
SG22	G	9	38	2.1993	0.8102	1.7801	0.7994
SG23	Cg	3	6	1.1162	0.7897	0.8676	0.6000
SG24	C	3	7	1.0278	0.8699	0.9557	0.6667
SG25	G	12	55	2.7450	0.9147	2.2729	0.8983
SG26	C	2	5	0.6213	0.9710	0.6730	0.6000
SG27	G	4	5	1.8640	0.9610	1.3322	0.9000
TT1	Ms	4	4	2.1640	1.0000	1.3863	1.0000
TT2	Ms	4	9	1.3654	0.9455	1.3108	0.8056

Table 18. Total abundance of fish species collected at reference and saltwater marsh sites. *refers to an introduced species

		Reference or saltwater marsh site, habitat & sampling events												
		FP1	FP2	FP3	FP4	FP5	FP6	FS1	FS2	FS4	FS5	FS6	TT1	TT2
		Cg	G	Ph	C	G	Ph	Cg	G	C	G	Ms	Ms	Ms
Family	Scientific name (common name)	4	2	2	5	3	1	4	4	5	3	5	6	6
Ictaluridae	*Ameiurus nebulosus* (brown bullhead)	1	0	0	0	0	0	0	0	0	0	0	0	0
Fundulidae	*Adinia xenica* (diamond killifish)	0	0	0	0	0	0	0	0	0	0	0	0	3
	Fundulus chrysotus (golden topminnow)	3	7	0	0	3	5	1	1	1	0	1	0	0
	Fundulus confluentus (marsh killifish)	6	7	0	1	2	0	1	4	1	6	13	5	22
	Fundulus grandis (Gulf killifish)	0	0	0	0	0	0	0	0	0	0	1	1	1
	Lucania goodei (bluefin killifish)	0	1	1	5	0	0	7	2	1	0	0	0	0
	Lucania parva (rainwater killifish)	0	0	0	0	0	0	0	0	0	0	1	40	12
Cyprinodontidae	*Cyprinodon variegatus* (sheepshead minnow)	0	0	0	0	0	0	0	0	0	0	78	141	264
	Jordanella floridae (flagfish)	22	59	10	3	20	7	1	18	0	14	18	13	0
Poeciliidae	*Poecilia latipinna* (sailfin molly)	2	3	1	0	1	0	0	2	1	13	443	195	232
	Belonesox belizanus (pike killifish)*	0	0	0	0	0	0	0	0	1	2	4	0	1
	Gambusia holbrooki (mosquitofish)	270	75	15	775	142	47	184	298	224	104	259	82	193
	Heterandria formosa (least killifish)	2	0	3	53	1	0	2	11	3	2	2	0	0
Atherinidae	*Labidesthes sicculus* (brook silverside)	0	0	0	0	0	0	0	0	0	0	0	0	17
	Menidia beryllina (tidewater silverside)	0	0	0	0	0	0	0	0	0	0	1	9	0
Elassomatidae	*Elassoma evergladei* (Everglades pygmy sunfish)	0	0	0	2	0	0	1	0	0	0	1	0	0
Centrarchidae	*Chaenobryttus gulosus* (warmouth)	1	2	0	5	1	0	0	0	2	0	0	0	0
	Lepomis marginatus (dollar sunfish)	2	0	0	0	1	0	0	0	0	0	0	0	0
	Lepomis microlophus (redear sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lepomis punctatus (spotted sunfish)	0	0	0	3	0	0	0	1	1	0	0	0	0
	Lepomis sp. (unidentified juvenile sunfish)	2	0	0	0	0	0	0	0	0	0	0	0	0
Cichlidae	*Astronotus ocellatus* (oscar)*	0	0	0	2	0	0	0	0	0	0	0	0	0
	Cichlasoma bimaculatum (black acara)*	0	1	0	5	3	0	0	0	2	0	0	0	0
	Cichlasoma urophthalama (Mayan cichlid)*	0	0	0	0	0	0	0	0	0	0	8	10	13
Gobiidae	*Microgobius gulosus* (clown goby)	0	0	0	0	0	0	0	0	0	0	0	0	1
	Total	311	155	30	854	174	59	197	337	237	141	830	496	759

Table 19. Total abundance of fish species collected at restoration sites in PSSF. *refers to an introduced species

		Restoration site, habitat & sampling events													
		SG1	SG5	SG6	SG7	SG12	SG14	SG15	SG19	SG20	SG21	SG24	SG25	SG26	SG27
		Cg	Mf	Pm	G	C	Cg	C	C	Cg	Ph	C	G	C	G
Family	Scientific name (common name)	1	2	1	1	2	2	1	1	2	1	1	1	1	1
Ictaluridae	*Ameiurus nebulosus* (brown bullhead)	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Fundulidae	*Adinia xenica* (diamond killifish)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fundulus chrysotus (golden topminnow)	0	1	1	2	0	1	0	0	0	0	0	1	3	16
	Fundulus confluentus (marsh killifish)	0	0	12	0	0	0	0	0	0	0	0	0	0	0
	Fundulus grandis (Gulf killifish)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lucania goodei (bluefin killifish)	0	1	0	4	0	0	0	0	0	0	0	69	1	9
	Lucania parva (rainwater killifish)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cyprinodontidae	*Cyprinodon variegatus* (sheepshead minnow)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Jordanella floridae (flagfish)	1	17	24	6	1	4	0	2	14	0	0	81	0	0
Poeciliidae	*Poecilia latipinna* (sailfin molly)	0	17	1	3	0	0	0	0	2	0	0	0	0	0
	Belonesox belizanus (pike killifish)*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gambusia holbrooki (mosquitofish)	93	408	41	28	67	55	2	90	53	0	142	178	26	29
	Heterandria formosa (least killifish)	1	3	4	2	0	0	0	3	0	0	2	107	0	0
Atherinidae	*Labidesthes sicculus* (brook silverside)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Menidia beryllina (tidewater silverside)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elassomatidae	*Elassoma evergladei* (Everglades pygmy sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Centrarchidae	*Chaenobryttus gulosus* (warmouth)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Lepomis marginatus (dollar sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	1	2
	Lepomis microlophus (redear sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	Lepomis punctatus (spotted sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	1	3
	Lepomis sp. (unidentified juvenile sunfish)	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Cichlidae	*Astronotus ocellatus* (oscar)*	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Cichlasoma bimaculatum (black acara)*	0	4	0	0	0	0	0	0	1	0	0	0	0	0
	Cichlasoma urophthalama (Mayan cichlid)*	0	0	1	0	0	1	0	0	0	0	0	0	0	1
Gobiidae	*Microgobius gulosus* (clown goby)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	95	451	84	45	68	62	2	95	71	0	144	436	36	61

Table 20. Percent composition based on the total abundance of fish collected at reference and saltwater marsh sites. *refers to an introduced species

		Reference or saltwater marsh site, habitat & sampling events												
		FP1 Cg	FP2 G	FP3 Ph	FP4 C	FP5 G	FP6 Ph	FS1 Cg	FS2 G	FS4 C	FS5 G	FS6 Ms	TT1 Ms	TT2 Ms
Family	Species (common name)	4	2	2	5	3	1	4	4	5	3	5	6	6
Ictaluridae	*Ameiurus nebulosus* (brown bullhead)	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fundulidae	*Adinia xenica* (diamond killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40
	Fundulus chrysotus (golden topminnow)	0.96	4.52	0.00	0.00	1.72	8.47	0.51	0.30	0.42	0.00	0.12	0.00	0.00
	Fundulus confluentus (marsh killifish)	1.93	4.52	0.00	0.12	1.15	0.00	0.51	1.19	0.42	4.26	1.57	1.01	2.90
	Fundulus grandis (Gulf killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.20	0.13
	Lucania goodei (bluefin killifish)	0.00	0.65	3.33	0.59	0.00	0.00	3.55	0.59	0.42	0.00	0.00	0.00	0.00
	Lucania parva (rainwater killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	8.06	1.58
Cyprinodontidae	*Cyprinodon variegatus* (sheepshead minnow)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.40	28.43	34.78
	Jordanella floridae (flagfish)	7.07	38.06	33.33	0.35	11.49	11.86	0.51	5.34	0.00	9.93	2.17	2.62	0.00
Poeciliidae	*Poecilia latipinna* (sailfin molly)	0.64	1.94	3.33	0.00	0.57	0.00	0.00	0.59	0.42	9.22	53.37	39.31	30.57
	Belonesox belizanus (pike killifish)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	1.42	0.48	0.00	0.13
	Gambusia holbrooki (mosquitofish)	86.82	48.39	50.00	90.75	81.61	79.66	93.40	88.43	94.51	73.76	31.20	16.53	25.43
	Heterandria formosa (least killifish)	0.64	0.00	10.00	6.21	0.57	0.00	1.02	3.26	1.27	1.42	0.24	0.00	0.00
Atherinidae	*Labidesthes sicculus* (brook silverside)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.24
	Menidia beryllina (tidewater silverside)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	1.81	0.00
Elassomatidae	*Elassoma evergladei* (Everglades pygmy sunfish)	0.00	0.00	0.00	0.23	0.00	0.00	0.51	0.00	0.00	0.00	0.12	0.00	0.00
Centrarchidae	*Chaenobryttus gulosus* (warmouth)	0.32	1.29	0.00	0.59	0.57	0.00	0.00	0.00	0.84	0.00	0.00	0.00	0.00
	Lepomis marginatus (dollar sunfish)	0.64	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lepomis microlophus (redear sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lepomis punctatus (spotted sunfish)	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.30	0.42	0.00	0.00	0.00	0.00
	Lepomis sp. (unidentified juvenile sunfish)	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cichlidae	*Astronotus ocellatus* (oscar)*	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cichlasoma bimaculatum (black acara)*	0.00	0.65	0.00	0.59	1.72	0.00	0.00	0.00	0.84	0.00	0.00	0.00	0.00
	Cichlasoma urophthalama (Mayan cichlid)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	2.02	1.71
Gobiidae	*Microgobius gulosus* (clown goby)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13

Table 21. Percent composition based on the total abundance of fish collected at restoration sites. *refers to an introduced species

		Restoration site, habitat & sampling events													
		SG1	SG5	SG6	SG7	SG12	SG14	SG15	SG19	SG20	SG21	SG24	SG25	SG26	SG27
		Cg	Mf	Pm	G	C	Cg	C	C	Cg	Ph	C	G	C	G
Family	Species (common name)	1	2	1	1	2	2	1	1	2	1	1	1	1	1
Ictaluridae	*Ameiurus nebulosus* (brown bullhead)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00
Fundulidae	*Adinia xenica* (diamond killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fundulus chrysotus (golden topminnow)	0.00	0.22	1.19	4.44	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.23	8.33	26.23
	Fundulus confluentus (marsh killifish)	0.00	0.00	14.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Fundulus grandis (Gulf killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lucania goodei (bluefin killifish)	0.00	0.22	0.00	8.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.83	2.78	14.75
	Lucania parva (rainwater killifish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cyprinodontidae	*Cyprinodon variegatus* (sheepshead minnow)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Jordanella floridae (flagfish)	1.05	3.77	28.57	13.33	1.47	6.45	0.00	2.11	19.72	0.00	0.00	18.58	0.00	0.00
Poeciliidae	*Poecilia latipinna* (sailfin molly)	0.00	3.77	1.19	6.67	0.00	0.00	0.00	0.00	2.82	0.00	0.00	0.00	0.00	0.00
	Belonesox belizanus (pike killifish)*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Gambusia holbrooki (mosquitofish)	97.89	90.47	48.81	62.22	98.53	88.71	100	94.74	74.65	0.00	98.61	40.83	72.22	47.54
	Heterandria formosa (least killifish)	1.05	0.67	4.76	4.44	0.00	0.00	0.00	3.16	0.00	0.00	1.39	24.54	0.00	0.00
Atherinidae	*Labidesthes sicculus* (brook silverside)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Menidia beryllina (tidewater silverside)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Elassomatidae	*Elassoma evergladei* (Everglades pygmy sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Centrarchidae	*Chaenobryttus gulosus* (warmouth)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Lepomis marginatus (dollar sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	3.28
	Lepomis microlophus (redear sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	1.64
	Lepomis punctatus (spotted sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	4.92
	Lepomis sp. (unidentified juvenile sunfish)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33	0.00
Cichlidae	*Astronotus ocellatus* (oscar)*	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cichlasoma bimaculatum (black acara)*	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00
	Cichlasoma urophthalama (Mayan cichlid)*	0.00	0.00	1.19	0.00	0.00	1.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64
Gobiidae	*Microgobius gulosus* (clown goby)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 22. Values of species richness, abundance, Margalef richness index, Pielou evenness index, Shannon diversity index, and Simpson evenness index for fishes collected at sample sites.

Site	Habitat	Richness	Abundance	Margalef	Pieolu	Shannon	Simpson
FP1	Cg	10	311	1.568	0.25961	0.59777	0.24141
FP2	G	8	155	1.38795	0.57528	1.19626	0.62028
FP3	Ph	5	30	1.17606	0.72683	1.16978	0.64828
FP4	Cg	10	854	1.33335	0.18538	0.42686	0.17267
FP5	G	9	174	1.55067	0.32971	0.72446	0.32177
FP6	Ph	3	59	0.49049	0.58547	0.64321	0.35009
FS1	Cg	7	197	1.13567	0.17278	0.33622	0.1268
FS2	G	8	337	1.20273	0.25245	0.52496	0.21455
FS4	Cg	10	237	1.64592	0.1423	0.32765	0.10674
FS5	G	6	141	1.01035	0.51831	0.92868	0.4385
FS6	Ms	13	830	1.78534	0.46566	1.1944	0.60881
TT1	Ms	9	496	1.28896	0.69677	1.53095	0.73073
TT2	Ms	11	759	1.50784	0.60421	1.44884	0.71997
SG1	Cg	3	95	0.43919	0.10623	0.1167	0.04188
SG5	Mf	7	451	0.98176	0.22619	0.44014	0.17902
SG6	Pm	7	84	1.35415	0.66253	1.28922	0.66495
SG7	G	6	45	1.31349	0.69	1.23631	0.59192
SG12	C	2	68	0.23699	0.11058	0.07665	0.02941
SG14	Cg	5	62	0.9692	0.29998	0.4828	0.21153
SG15	C	1	2	0		0	0
SG19	C	3	95	0.43919	0.21993	0.24161	0.10213
SG20	Cg	5	71	0.93838	0.47162	0.75904	0.40845
SG24	C	2	144	0.20121	0.10559	0.07319	0.02758
SG25	G	5	436	0.65815	0.82569	1.32889	0.71517
SG26	C	7	36	1.67433	0.53823	1.04735	0.4746
SG27	G	7	61	1.45954	0.71013	1.38185	0.69071

Table 23. Preferred Physical Water Quality Parameter Ranges of Fish Species Caught during this Study

Scientific name	Environment	Preferred pH Range	Preferred Water Temperature Range	Resilience
Adinia xenica	fresh, brackish,marine	7.5-8.5	27-35	High
Ameiurus nebulosus	demersal, freshwater, brackish	6.5-8	0-37	Medium
Astronotus ocellatus	benthopelagic, freshwater	6.0-8.0	22-25	High
Belonesox belizanus	demersal, freshwater, brackish, marine	6.0-9.0	25-37	Medium
Chaenobryttus gulosis	demersal, freshwater	7-7.5	10-20	Medium
Cichlasoma bimaculatum	benthopelagic, freshwater	6.5-7.0	16-24	Low
Cichlasoma urophthalma	benthopelagic, freshwater, brackish	6-7.5	20-39	Medium
Cyprinodon variegatus	benthopelagic, freshwater, brackish, marine	7-8.0	-2 to 42	Medium
Elassoma evergladei	demersal, freshwater	7-7.5	10-30	Low
Fundulus chrysotus	benthopelagic, freshwater	6.8-8.8	18-25	High
Fundulus confluentus	benthopelagic, freshwater, brackish, marine	6.8-8.8	15-26	High
Fundulus grandis	benthopelagic, freshwater, brackish	6.8- 8.9	22-26	High
Gambusia holbrooki	benthopelagic, freshwater, brackish	6-8.8	15-35	High
Heterandria formosa	benthopelagic, freshwater, brackish	7-8	20-26	High
Jordanella floridae	benthopelagic, freshwater, brackish	6.2-8.2	18-22	Low
Labidesthes sicculus	freshwater	6.5-8.5	5-20	High
Lepomis marginatus	demersal, freshwater	6.5-7.8	15.5-27	Medium
Lepomis microlophus	demersal, freshwater	7-7.5	20-30	Medium
Lepomis punctatus	demersal, freshwater	6.6-7.5	10-25	Medium
Lucania goodei	benthopelagic, freshwater	6.5-6.8	12-22	High
Lucania parva	pelagic,freshwater, brackish, marine	6.4-7.5	10-25	High
Menidia beryllina	pelagic,freshwater, brackish, marine	6.4-8	14.5-30	High
Microgobius gulosus	dimersal, amphidromous, freshwater, brackish, marine	n/a	10-35	High
Poecilia latipinna	benthopelagic, freshwater, brackish	6.5-8.5	20-28	High

Note: High = Population doubles in less than 15 months; **Medium** = Population doubles in 1.4-4.4 years; **Low** = Population doubles in 4.5-14 years

Sources: Robins and Ray, 1986; Page and Burr, 1991; Robins, et. al. 1991; Kullander and Nijssen, 1989; Huber, 1996; Froese and Pauly, 2007;Wallus and Baker, 2006; Wiebe, 1931; Lee, et. al., 1980; Felley and Felley, 1986; Robertson and Bryan, Inc. 2004.

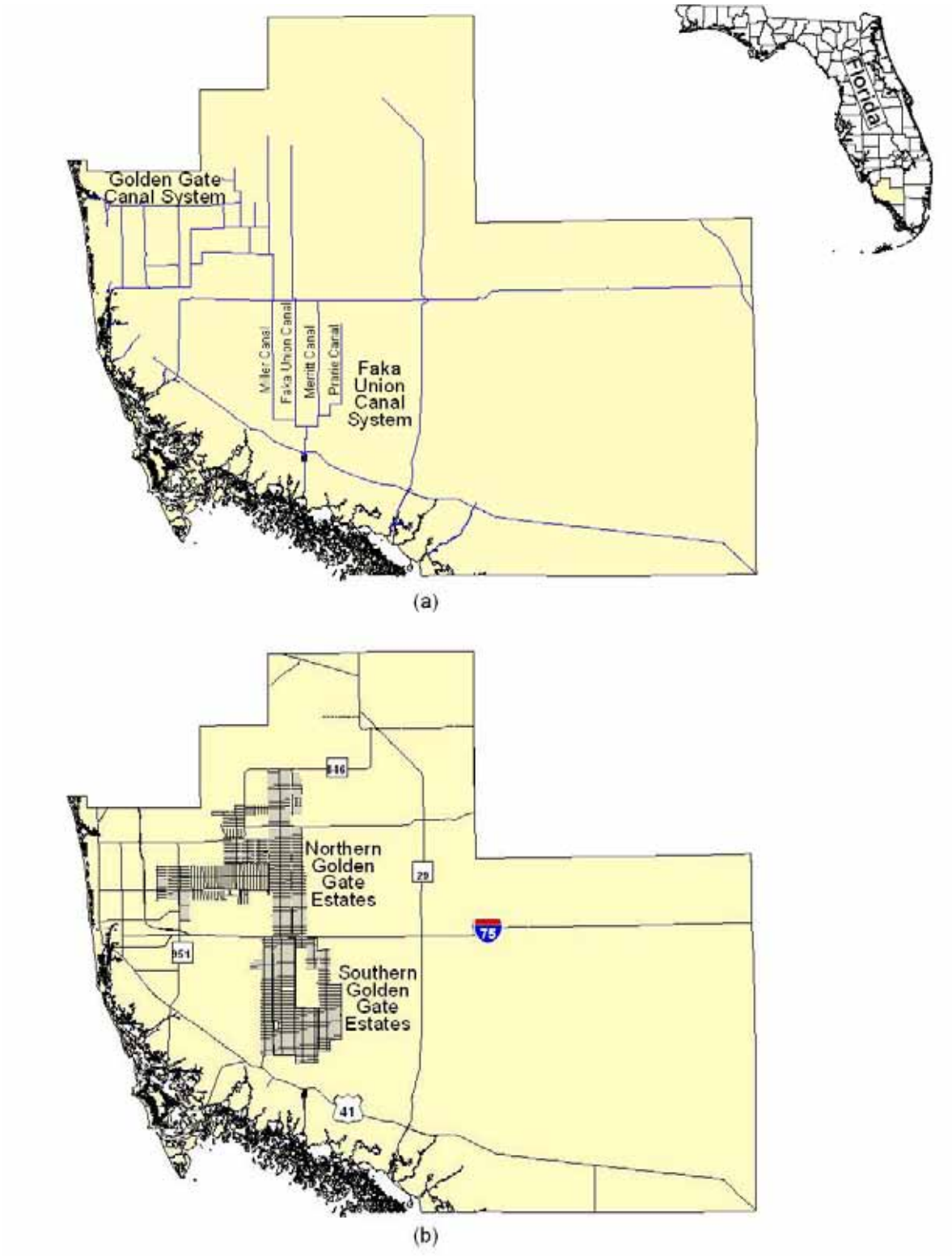


Figure 1. Maps of the Golden Gate Estates (a) canal and (b) road systems in Collier County, Florida.

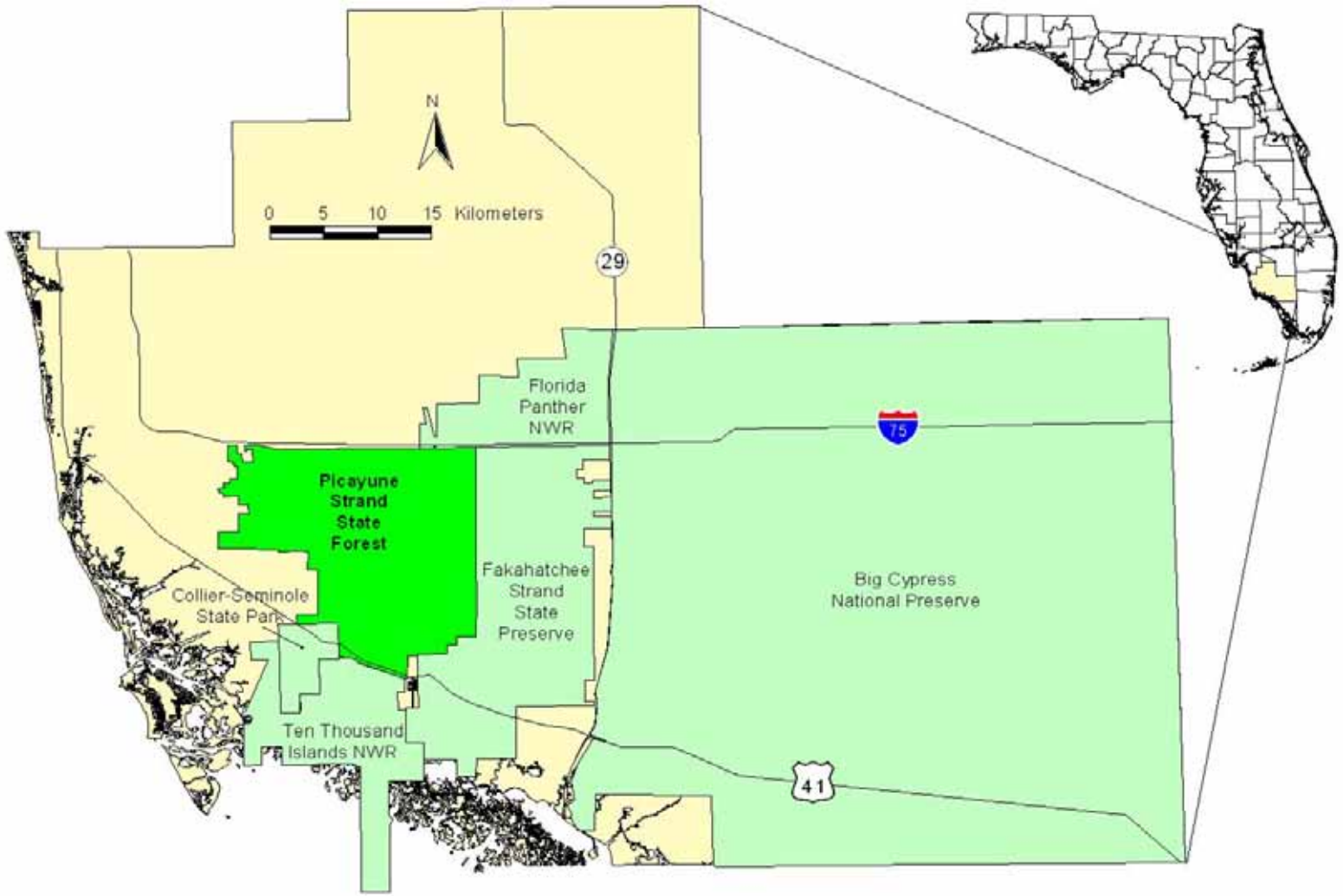


Figure 2. Map of the Picayune Strand State Forest and surrounding conservation lands.

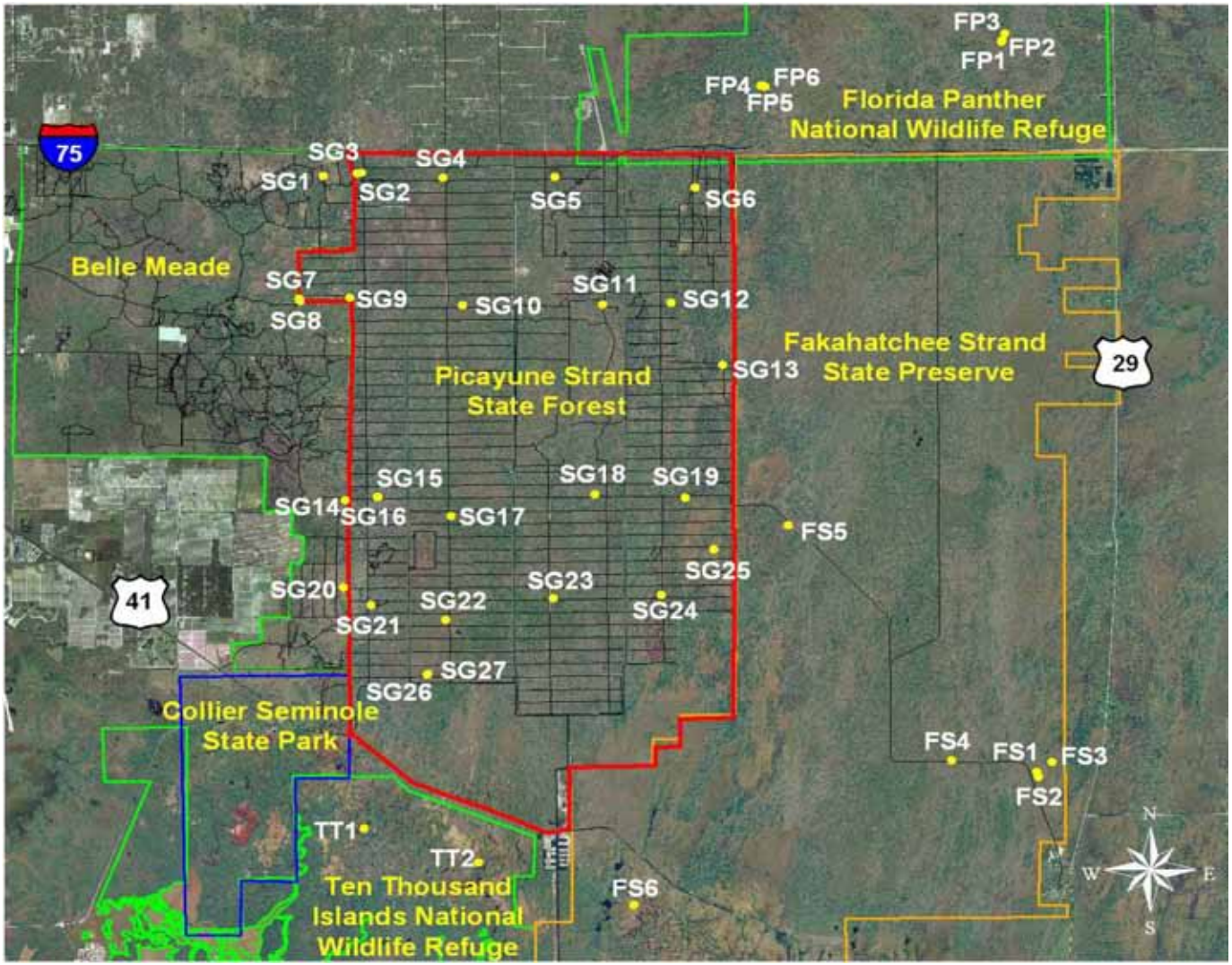


Figure 3. Map of study sites located in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

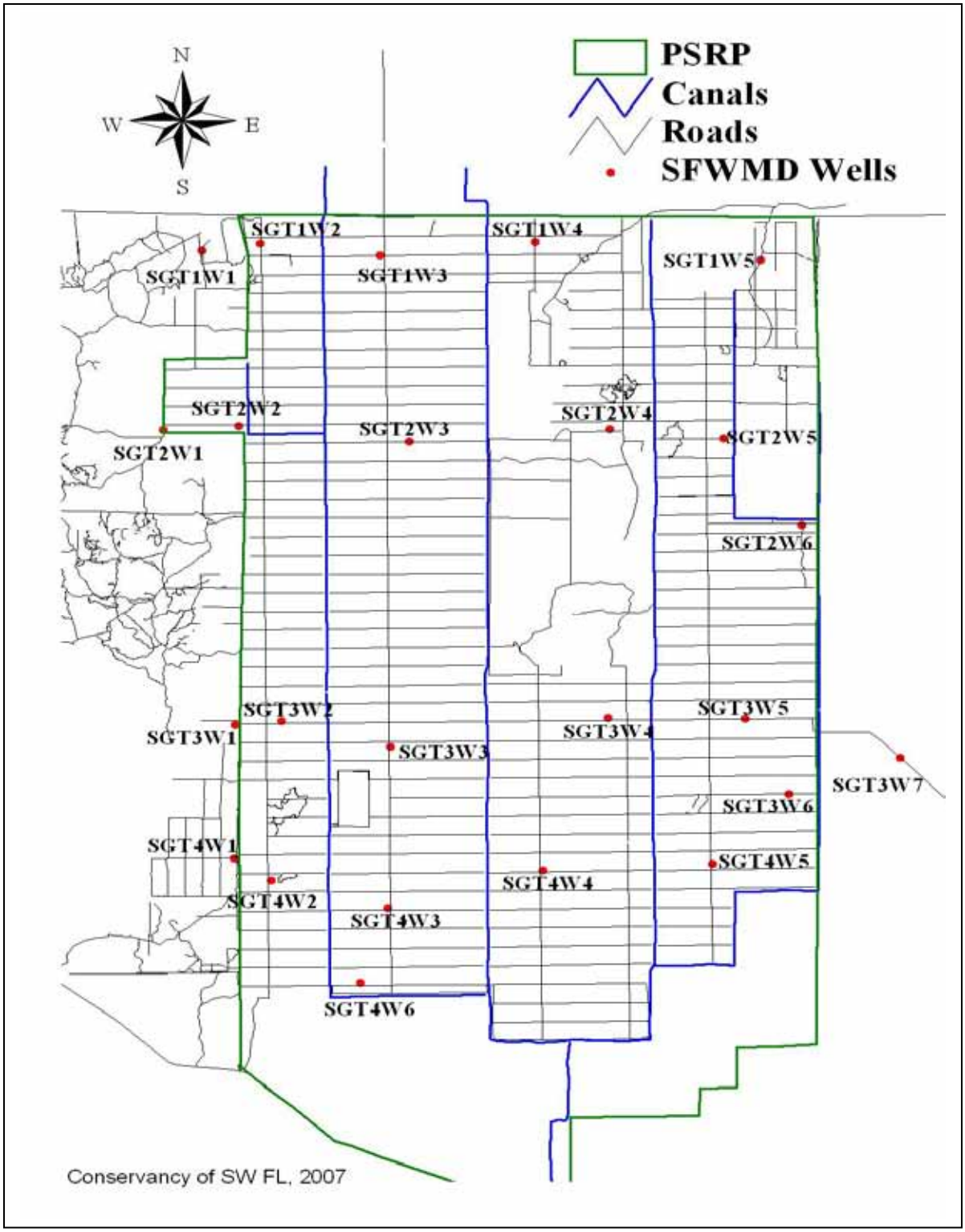


Figure 4. Map of the South Florida Water Management District wells in PSSF and FSSP.

Figure 5. Monitoring (a) water quality physical parameters in the Ten Thousand Islands and (b) native treefrogs in Florida Panther National Wildlife Refuge.

Figure 6. Terrestrial invertebrate sampling using (a) a sweep net and (b) baited vials.

Figure 7. Dip netting for aquatic macroinvertebrates.

Figure 8. Collecting fish with Breder traps.

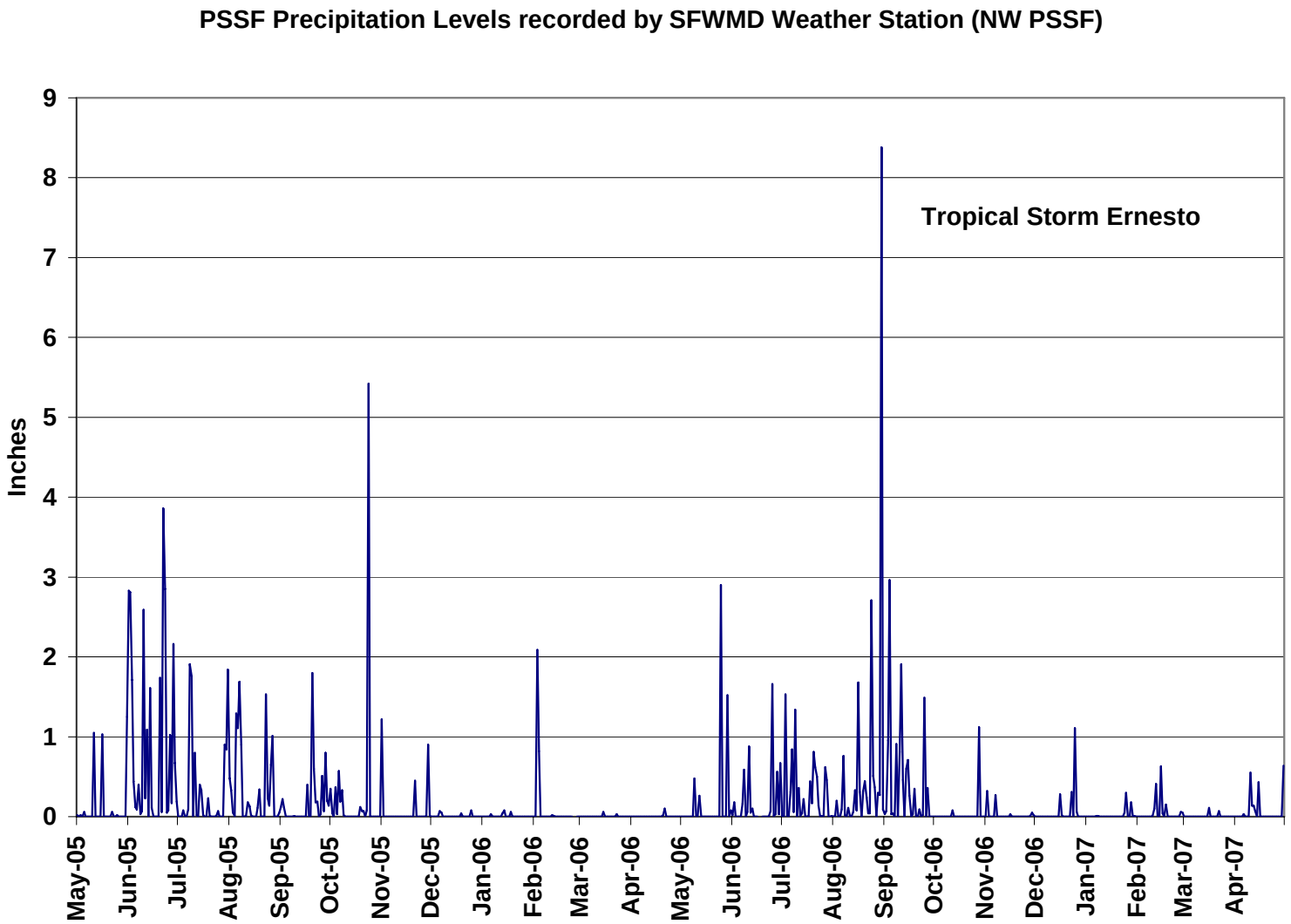
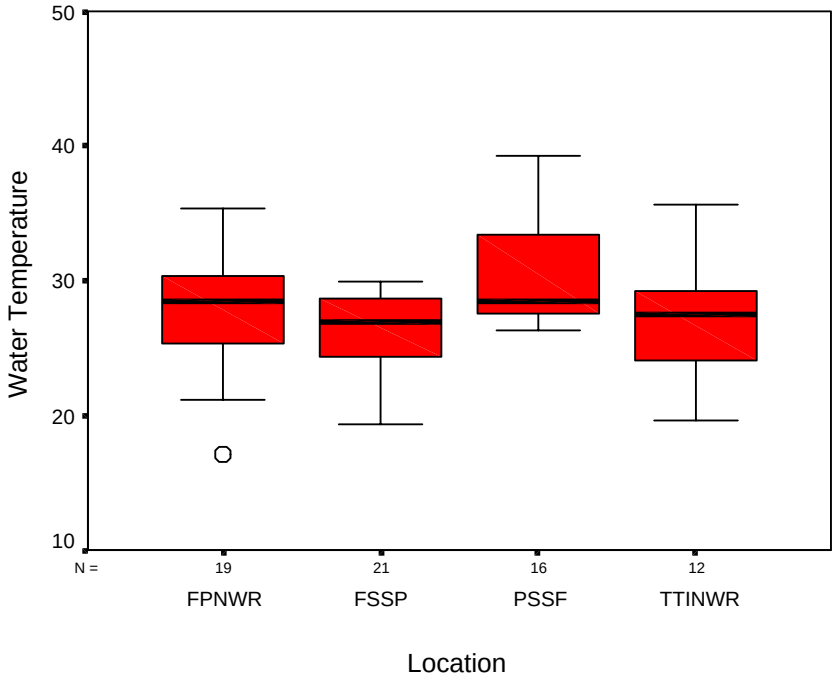


Figure 9. Rainfall data recorded by SFWMD weather station in northwest PSSF from May 2005 thru April 2007

TESTS OF NORMALITY

Parameter	Location	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Water Temperature	FPNWR	.132	19	.200(*)	.948	19	.363
	FSSP	.133	21	.200(*)	.912	21	.061
	PSSF	.223	16	.033	.845	16	.011
	TTINWR	.131	12	.200(*)	.980	12	.983

* This is a lower bound of the true significance.



Test Statistics(a,b)

	Water Temperature
Chi-Square	8.354
df	3
Asymp. Sig.	.039

a Kruskal Wallis Test

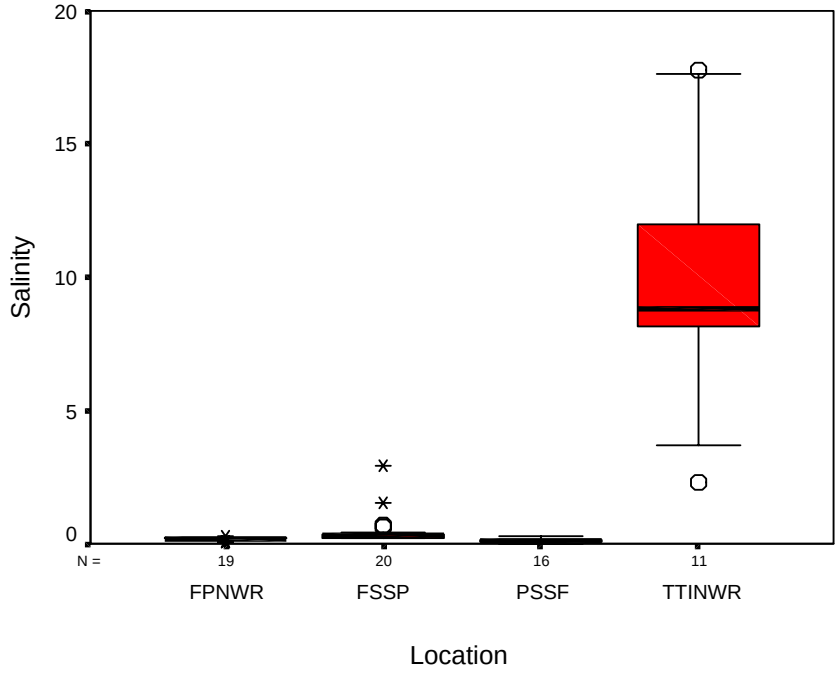
b Grouping Variable: Location

Figure 10. Water Quality Statistics – Water temperature by location.

Tests of Normality

Parameter	Location	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Salinity	FPNWR	.433	19	.000	.626	19	.000
	FSSP	.370	20	.000	.497	20	.000
	PSSF	.279	16	.002	.860	16	.019
	TTINWR	.183	11	.200(*)	.924	11	.354

* This is a lower bound of the true significance.



Test Statistics (a,b)

	Salinity
Chi-Square	48.596
df	3
Asymp. Sig.	.000

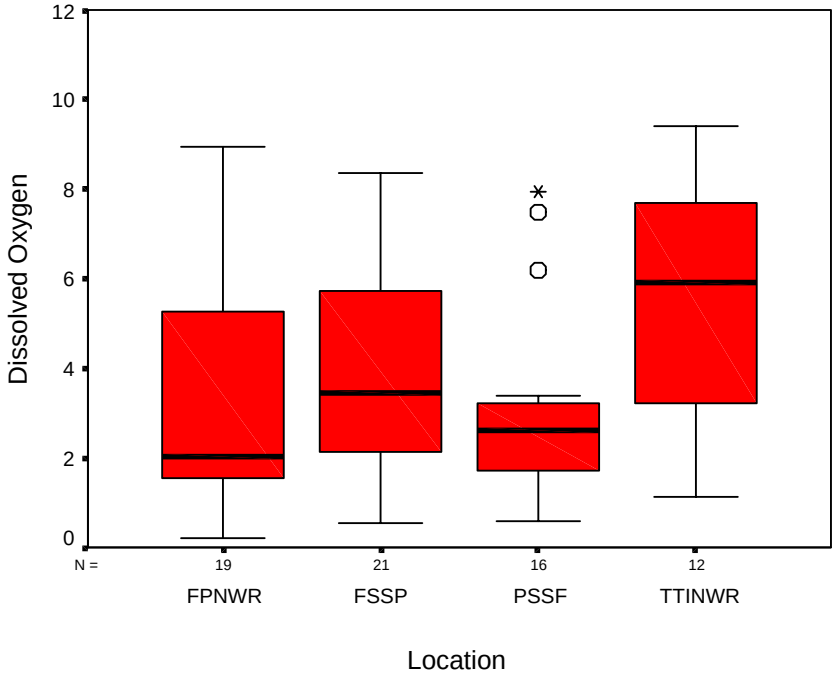
a Kruskal Wallis Test
b Grouping Variable: Location

Figure 11. Water Quality Statistics – Salinity by location.

Tests of Normality

Parameter	Location	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Dissolved Oxygen	FPNWR	.248	19	.003	.882	19	.023
	FSSP	.126	21	.200(*)	.955	21	.426
	PSSF	.261	16	.005	.816	16	.005
	TTINWR	.168	12	.200(*)	.936	12	.452

* This is a lower bound of the true significance.



Test Statistics (a,b)

	Dissolved Oxygen
Chi-Square	7.221
df	3
Asymp. Sig.	.065

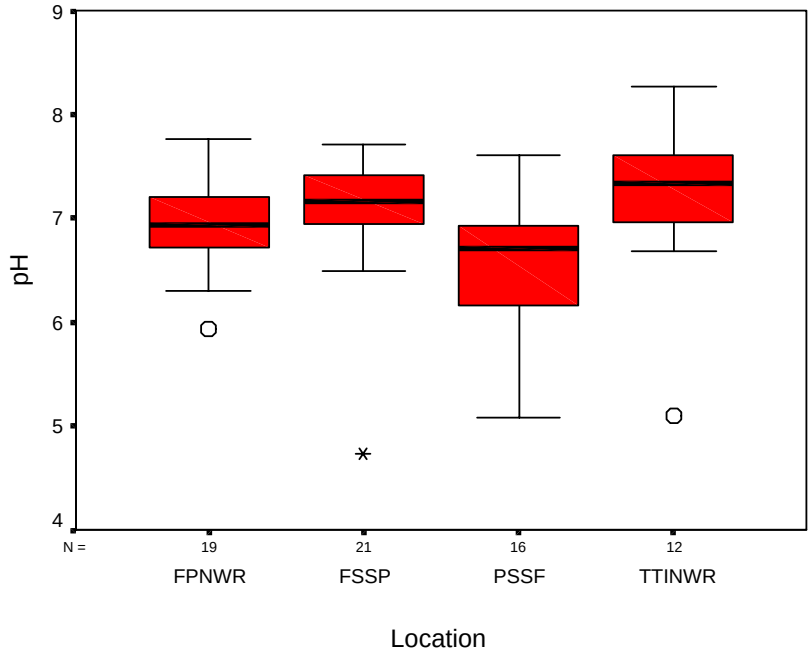
a Kruskal Wallis Test
b Grouping Variable: Location

Figure 12. Water Quality Statistics – Dissolved oxygen by location.

Tests of Normality

Parameter	Location	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
pH	FPNWR	.105	19	.200(*)	.977	19	.895
	FSSP	.249	21	.001	.741	21	.000
	PSSF	.151	16	.200(*)	.960	16	.663
	TTINWR	.217	12	.123	.853	12	.040

* This is a lower bound of the true significance.



Test Statistics (a,b)

	pH
Chi-Square	11.721
df	3
Asymp. Sig.	.008

a Kruskal Wallis Test

b Grouping Variable: Location

Figure 13. Water Quality Statistics – pH by location.

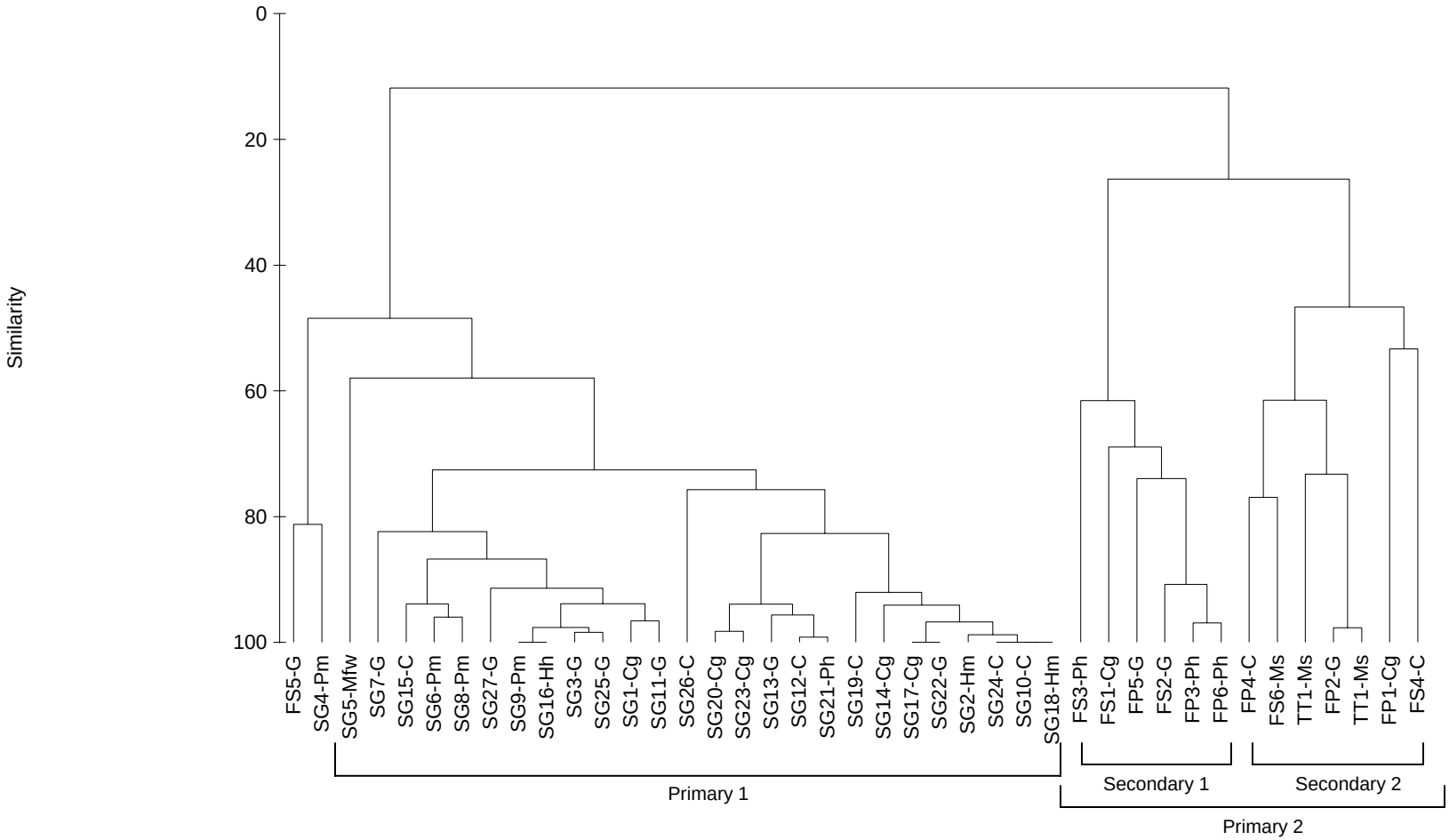


Figure 14. Bray-Curtis similarity dendogram for anuran species collected in artificial refugia at sites in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

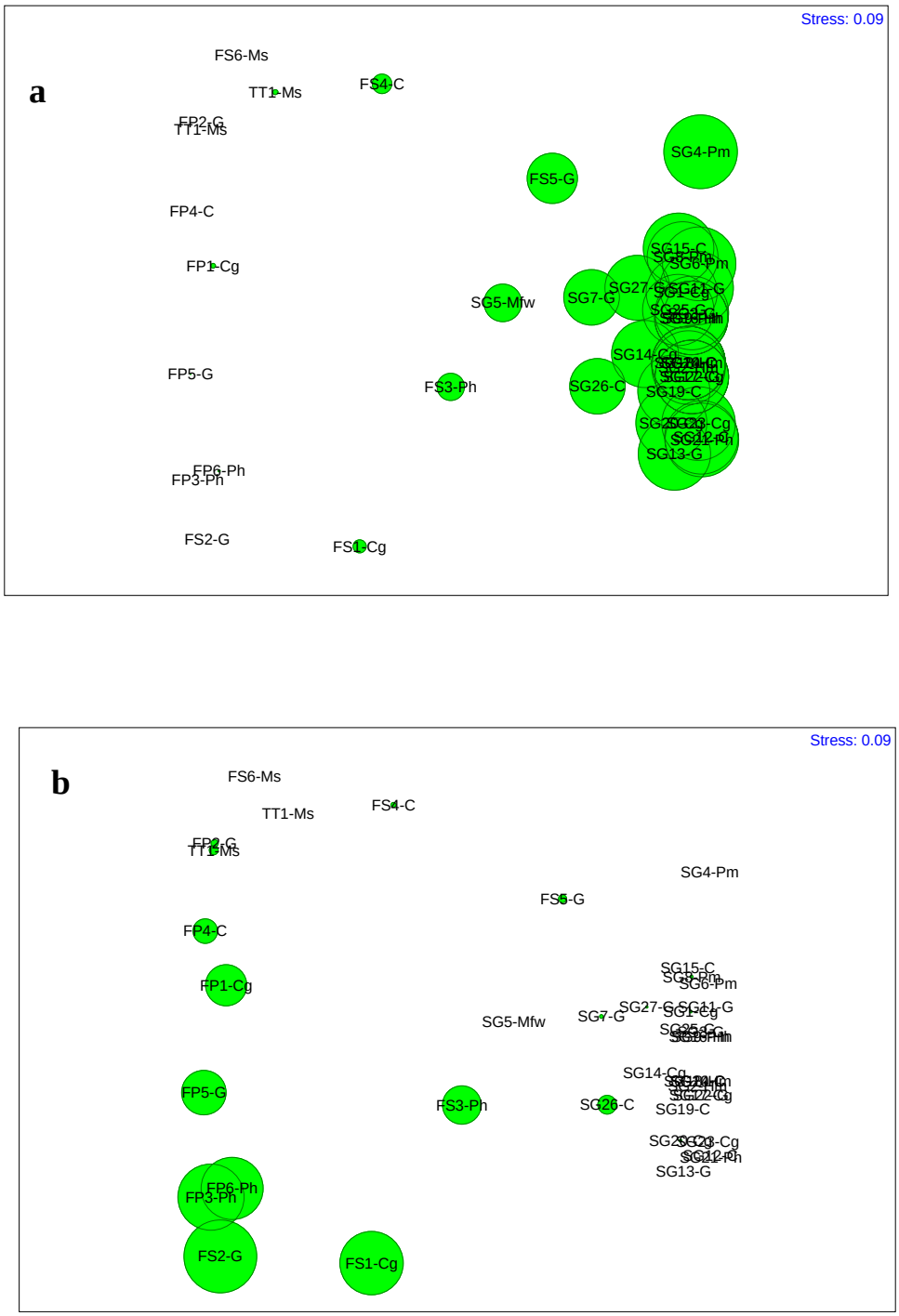


Figure 15. MDS ordination plots of anuran communities at study sites with superimposed percent composition of (a) Cuban treefrog, *Osteopilus septentrionalis* and (b). squirrel treefrog, *Hyla squirella.*

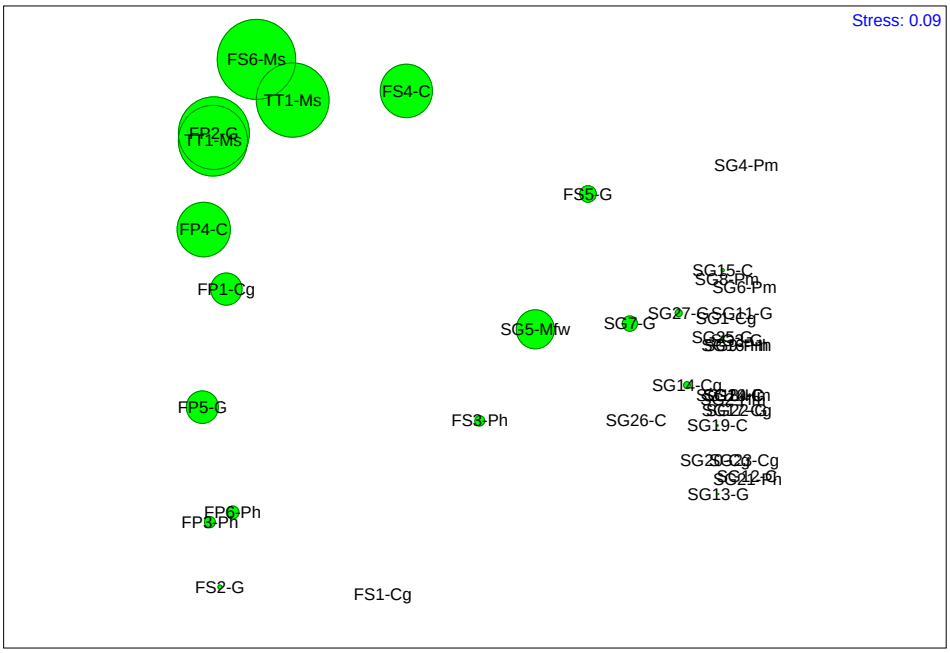


Figure 16. MDS ordination plots of anuran communities at study sites with superimposed percent composition of green treefrog, *Hyla cinerea.*

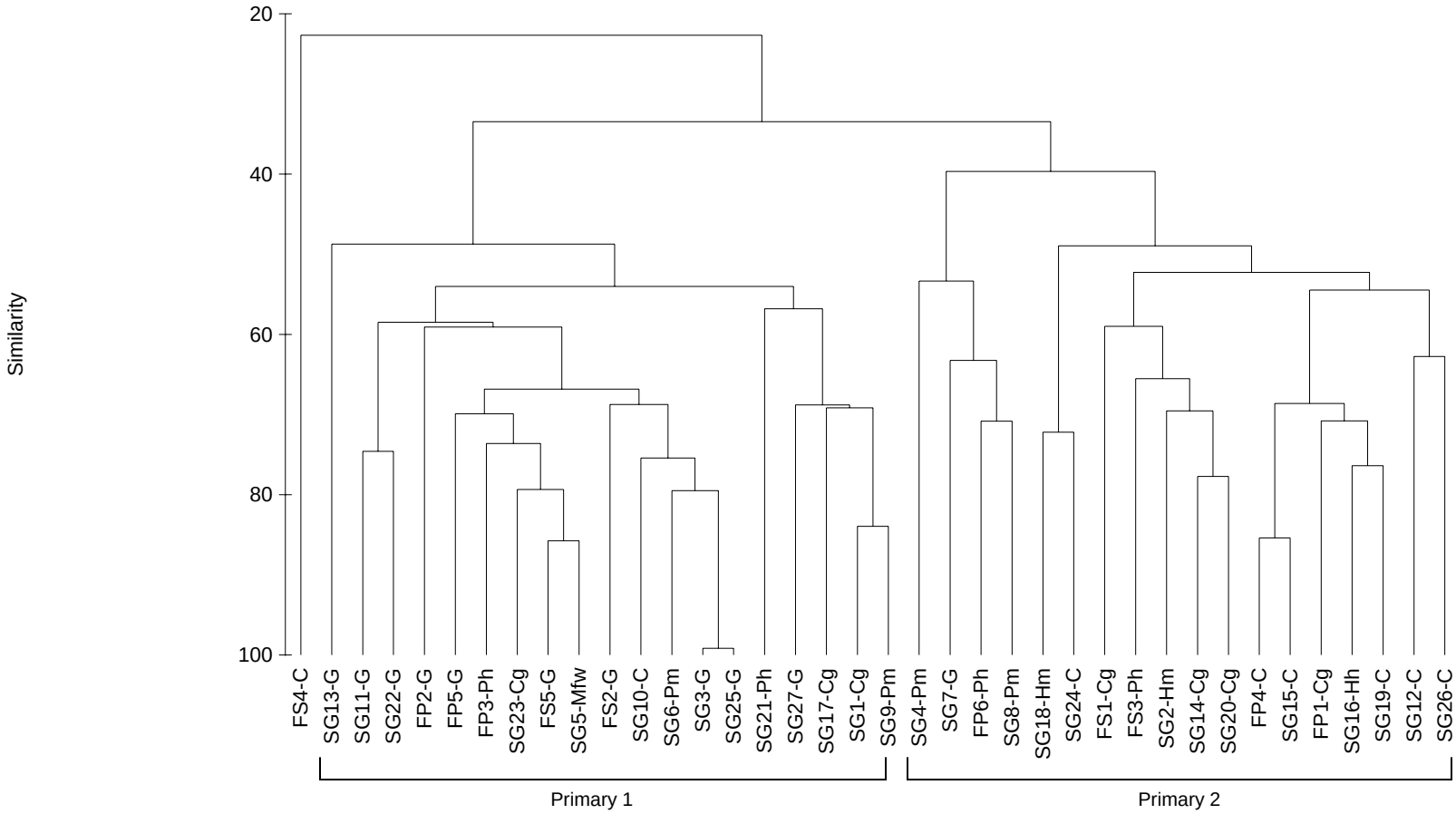


Figure 17. Bray-Curtis similarity dendogram for ant communities collected in baited vials at sites in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

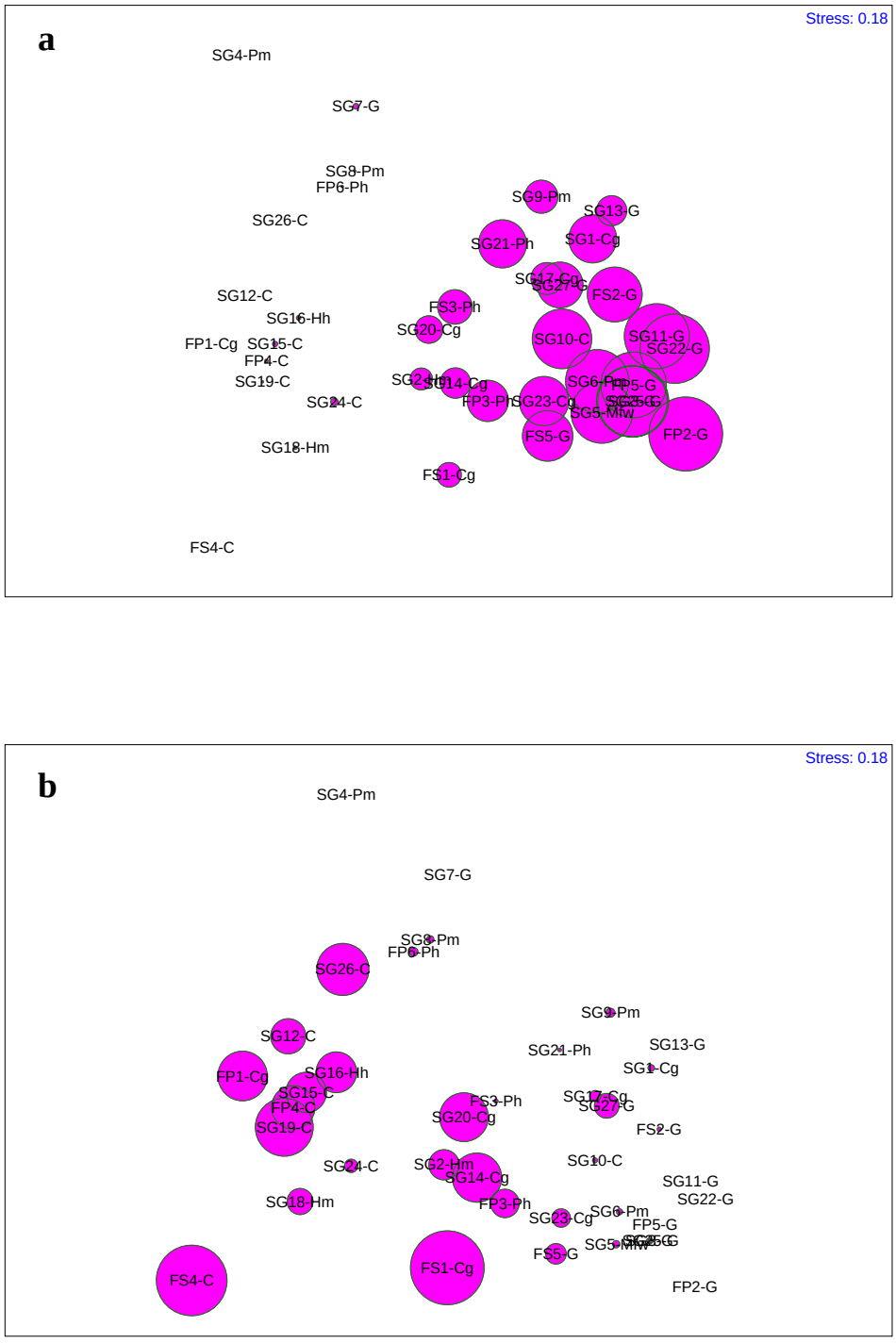


Figure 18. MDS ordination plots of ant communities collected with baited vials at study sites with superimposed percent composition of (a) *Solenopsis invicta* and (b) *Pheidole moerens.*

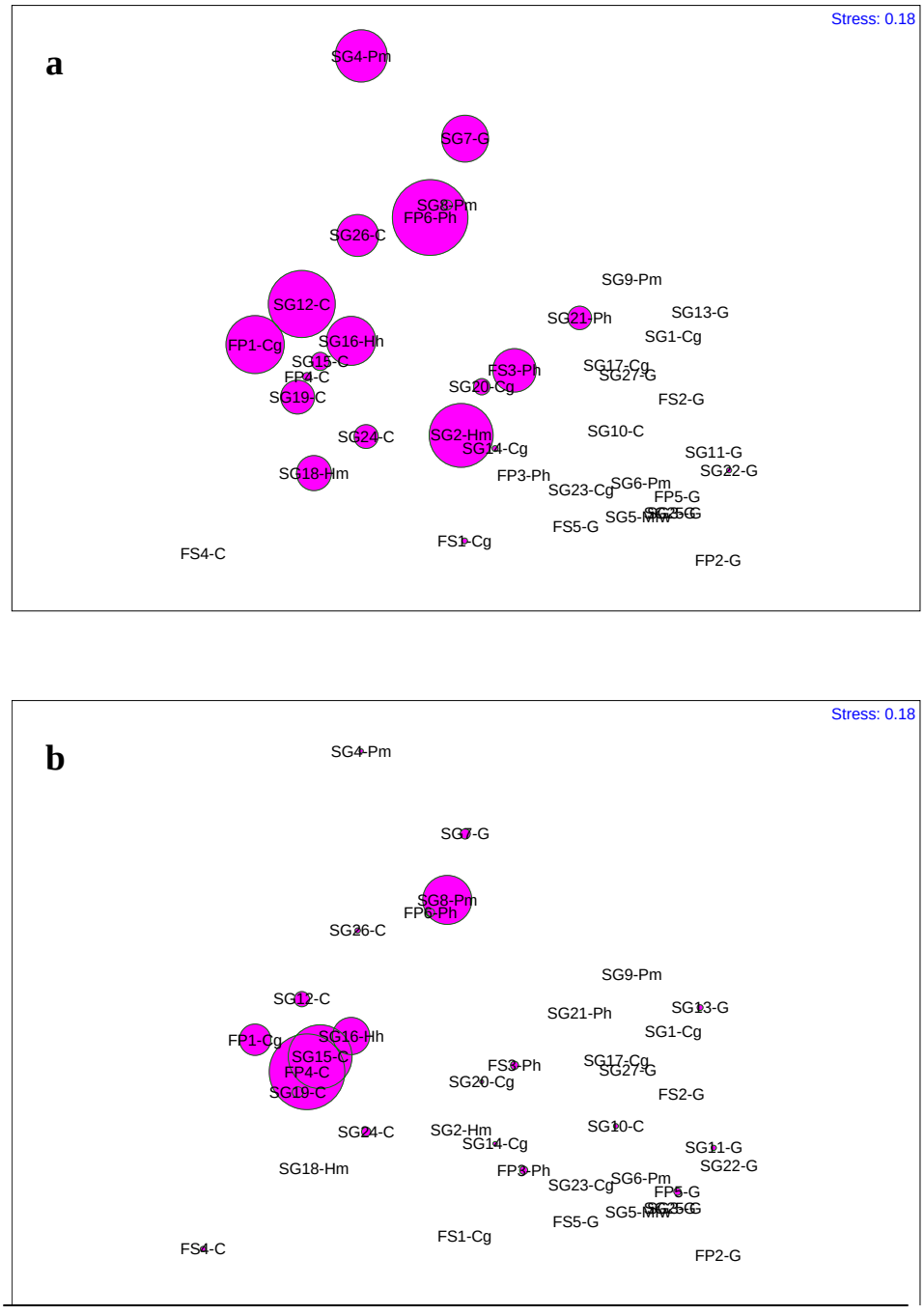


Figure 19. MDS ordination plots of ant communities collected with baited vials at study sites with superimposed percent composition of (a) *Pheidole dentata* and (b) *Pheidole floridana*.

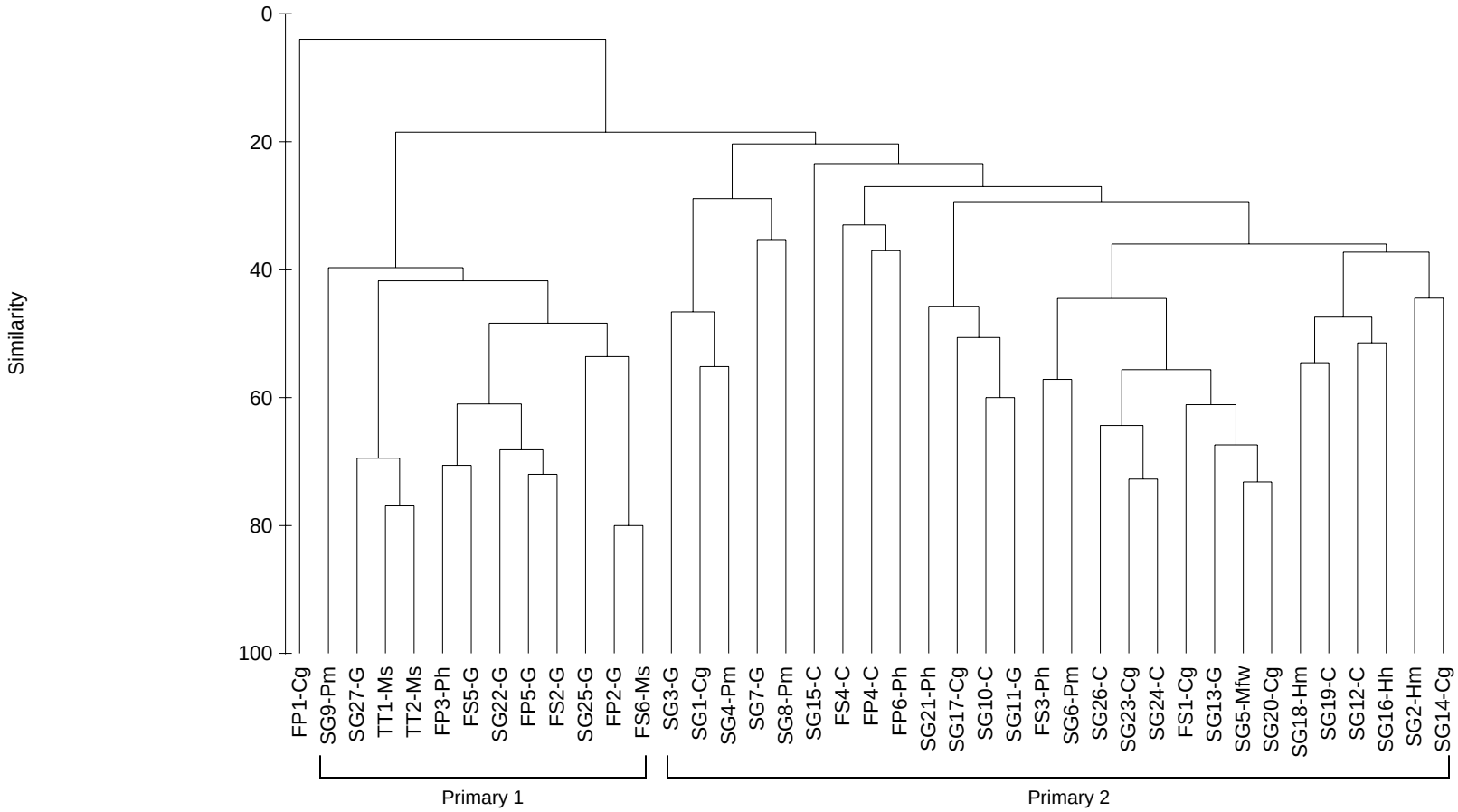


Figure 20. Bray-Curtis similarity dendogram for ant communities collected in sweep nets at sites in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

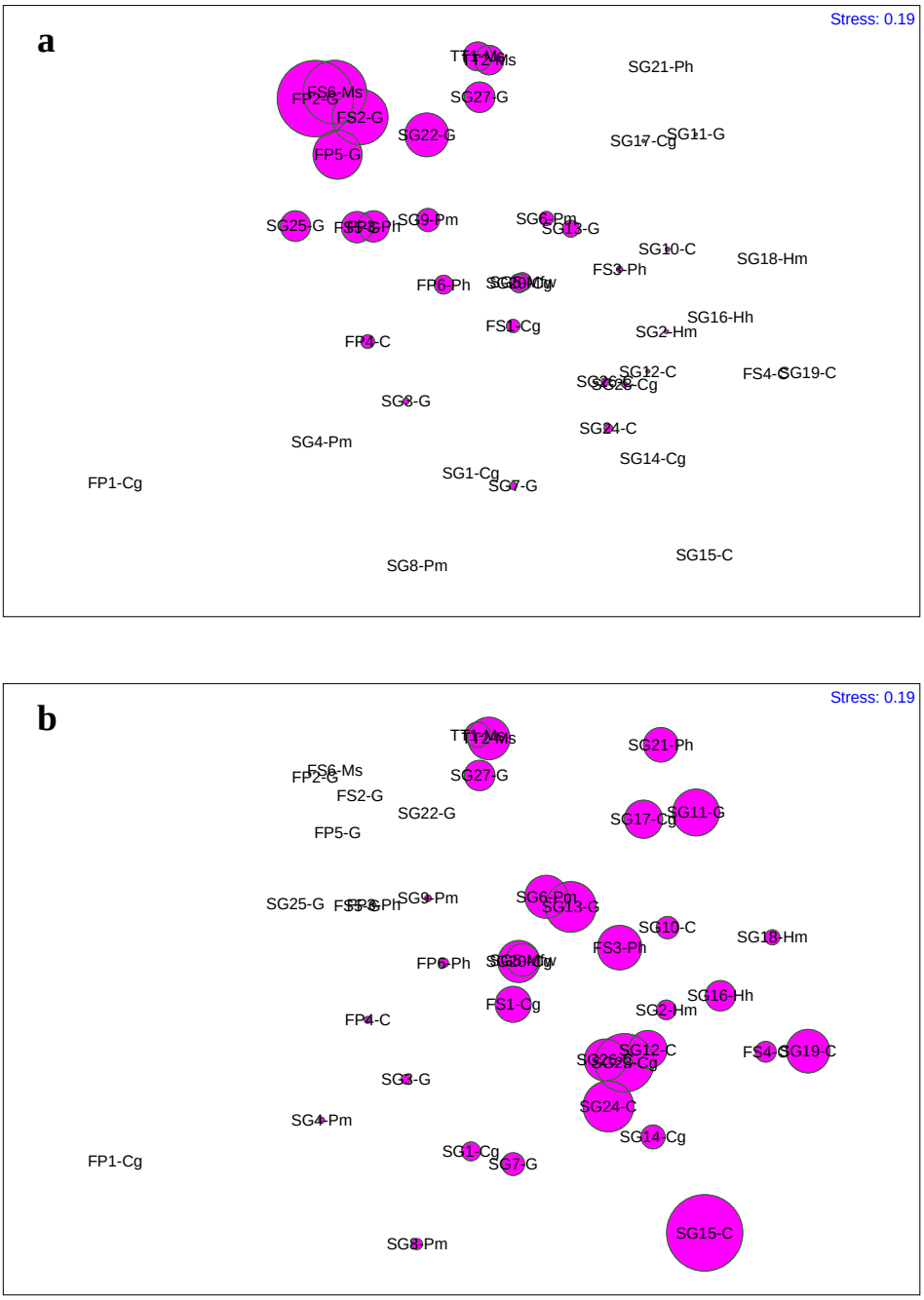


Figure 21. MDS ordination plots of ant communities collected with sweep nets at study sites with superimposed percent composition of (a) *Crematogaster atkinsoni* and (b) *Pseudomyrmex sp*.

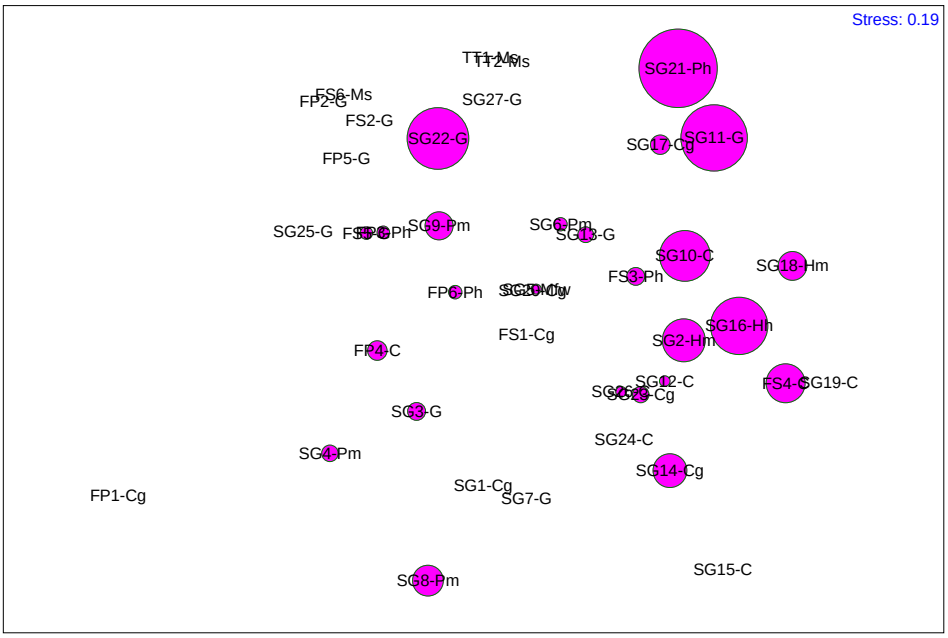


Figure 22. MDS ordination plots of ant communities collected with sweep nets at study sites with superimposed percent composition of *Camponotus floridanus*.

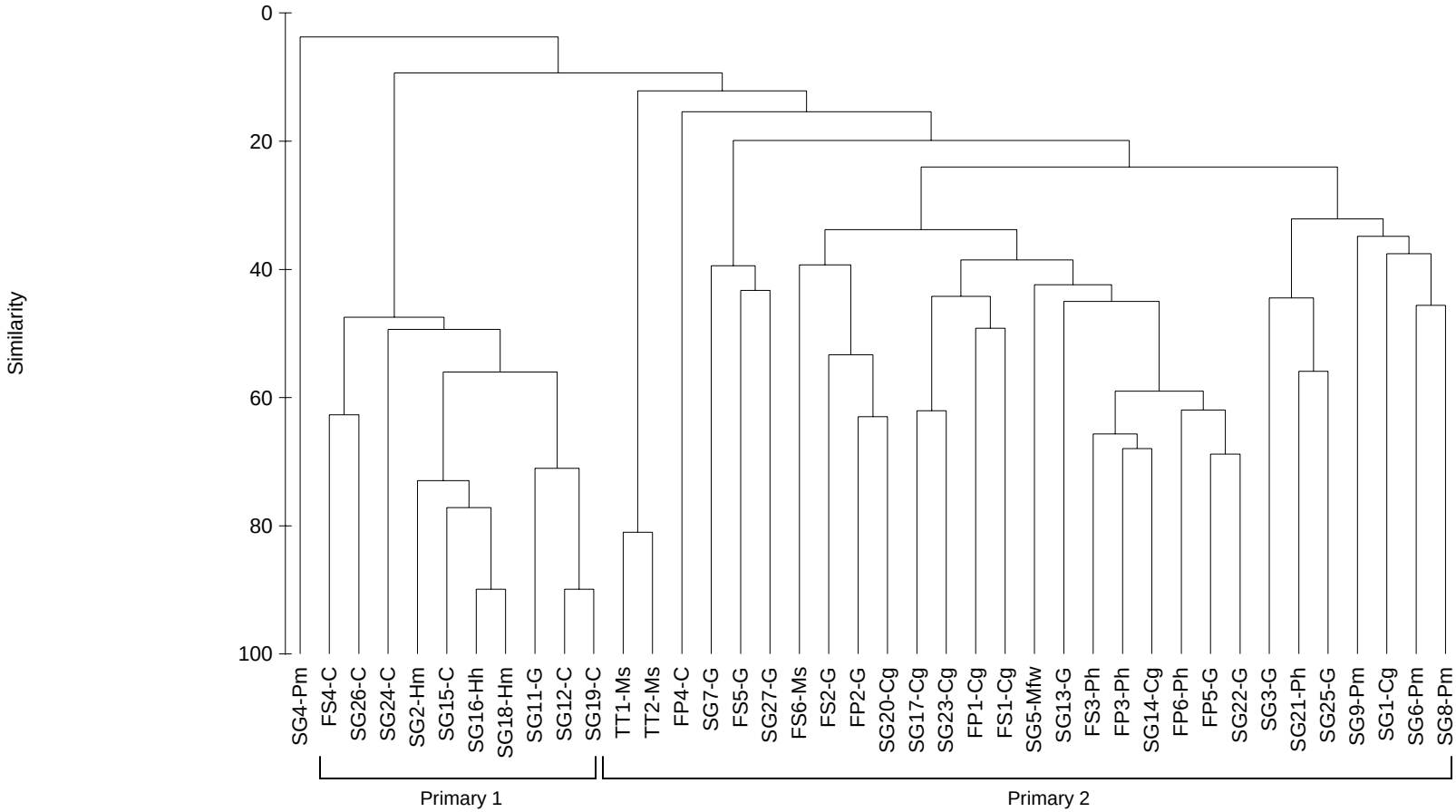


Figure 23. Bray-Curtis similarity dendogram for orthopteran communities collected at sites in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

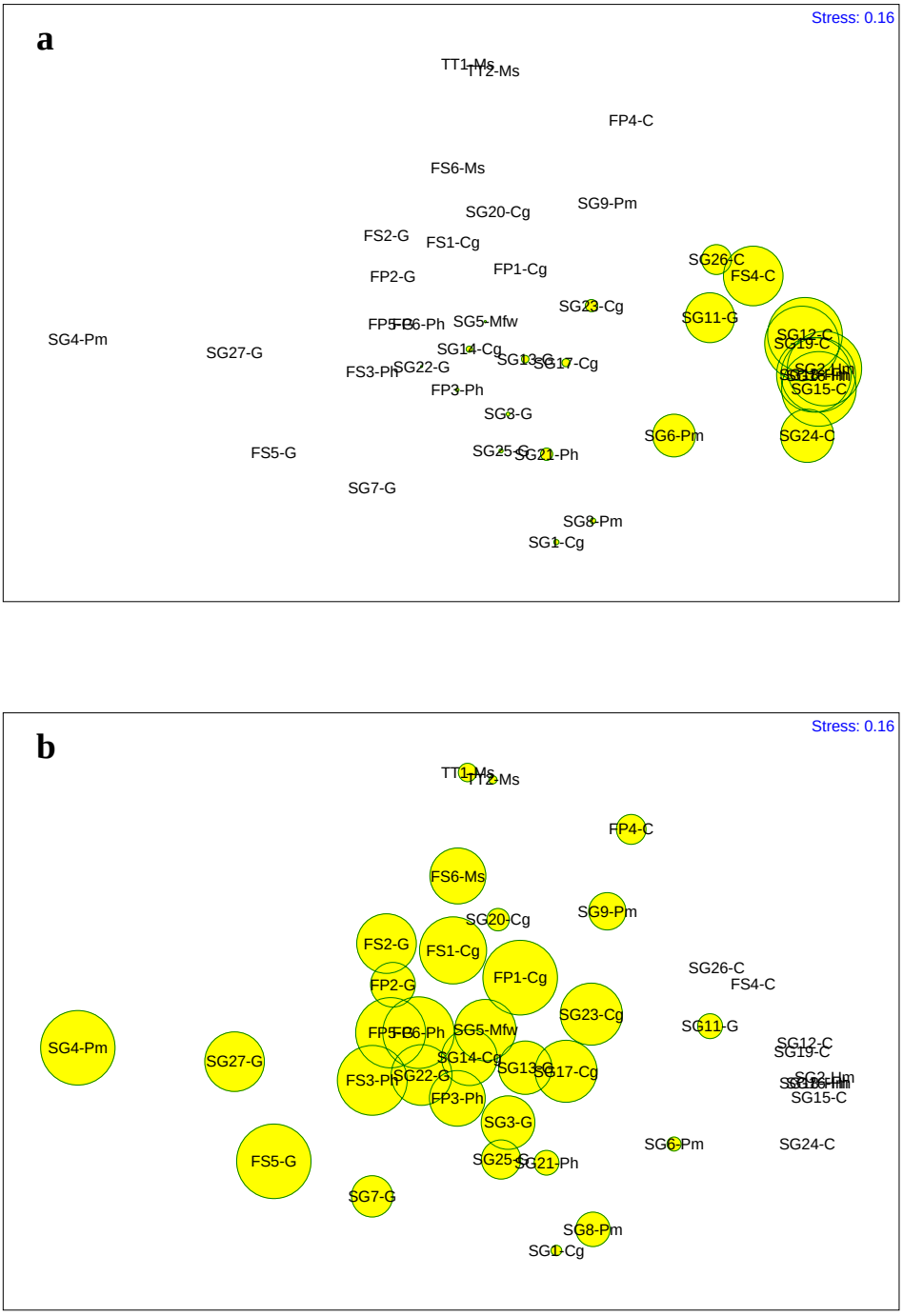


Figure 24. MDS ordination plots of orthopteran communities collected at study sites with superimposed percent composition of families (a) Gryllidae and (b) Acrididae.

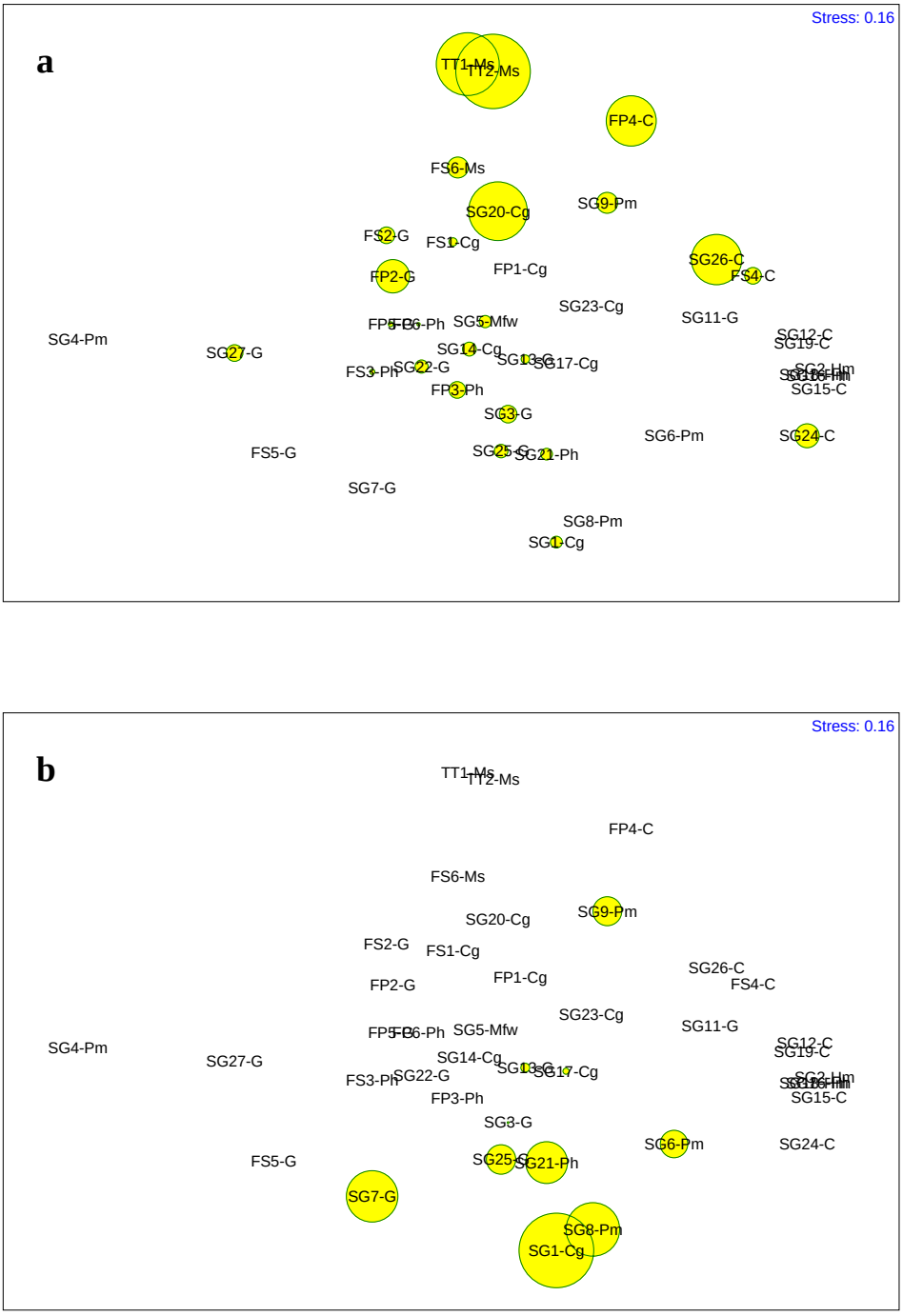


Figure 25. MDS ordination plots of orthopteran communities collected at study sites with superimposed percent composition of families (a) Tettigonidae and (b)Tetrigidae.

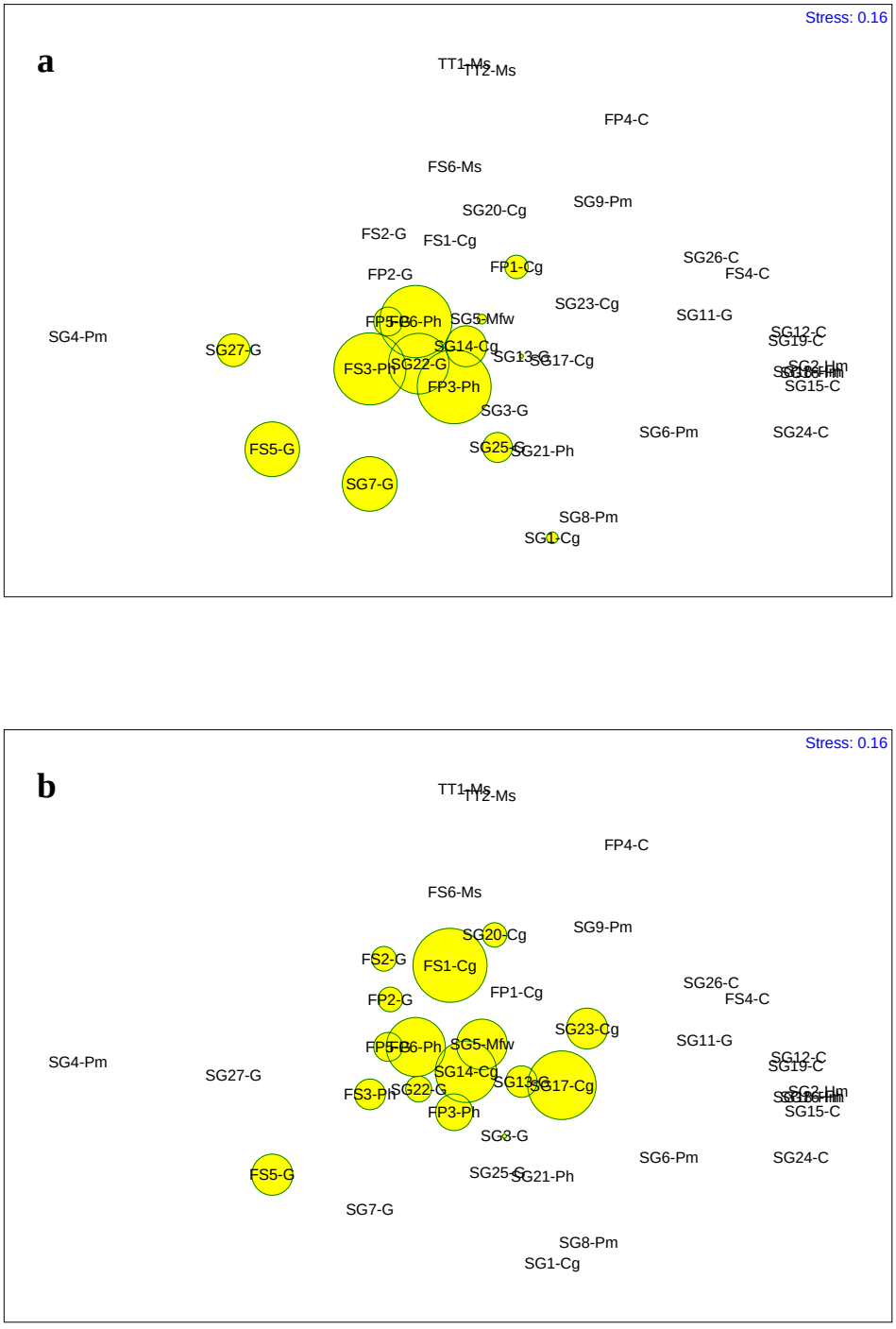


Figure 26. MDS ordination plots of orthopteran communities collected at study sites with superimposed percent composition of (a) *Dichromorpha elegans* and (b) *Aptenopedes sphenarioides*.

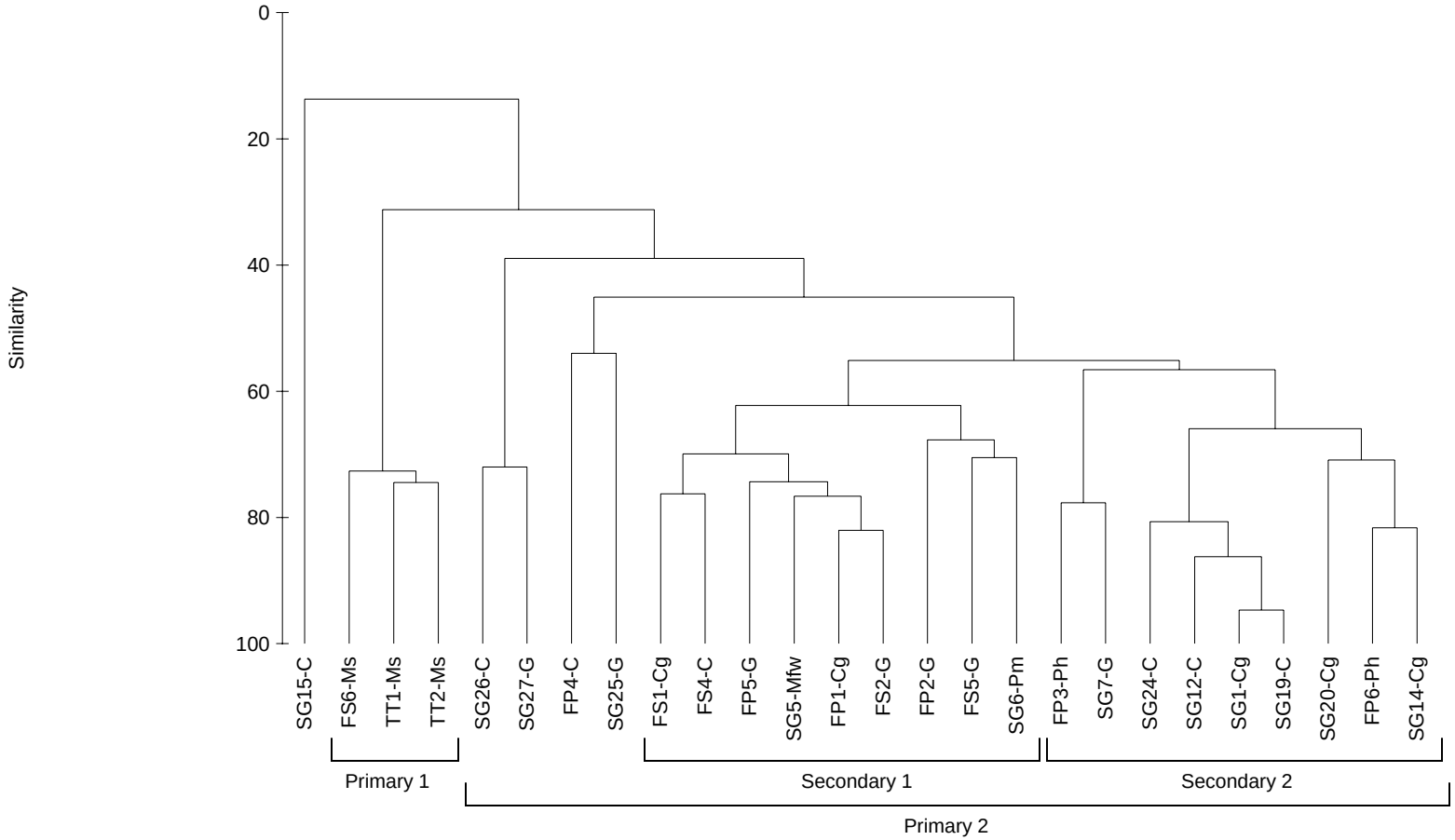


Figure 27. Bray-Curtis similarity dendogram for fish communities collected at sites in the Picayune Strand State Forest (SG), Fakahatchee Strand State Preserve (FS), Florida Panther National Wildlife Refuge (FP) and Ten Thousand Islands National Wildlife Refuge (TT).

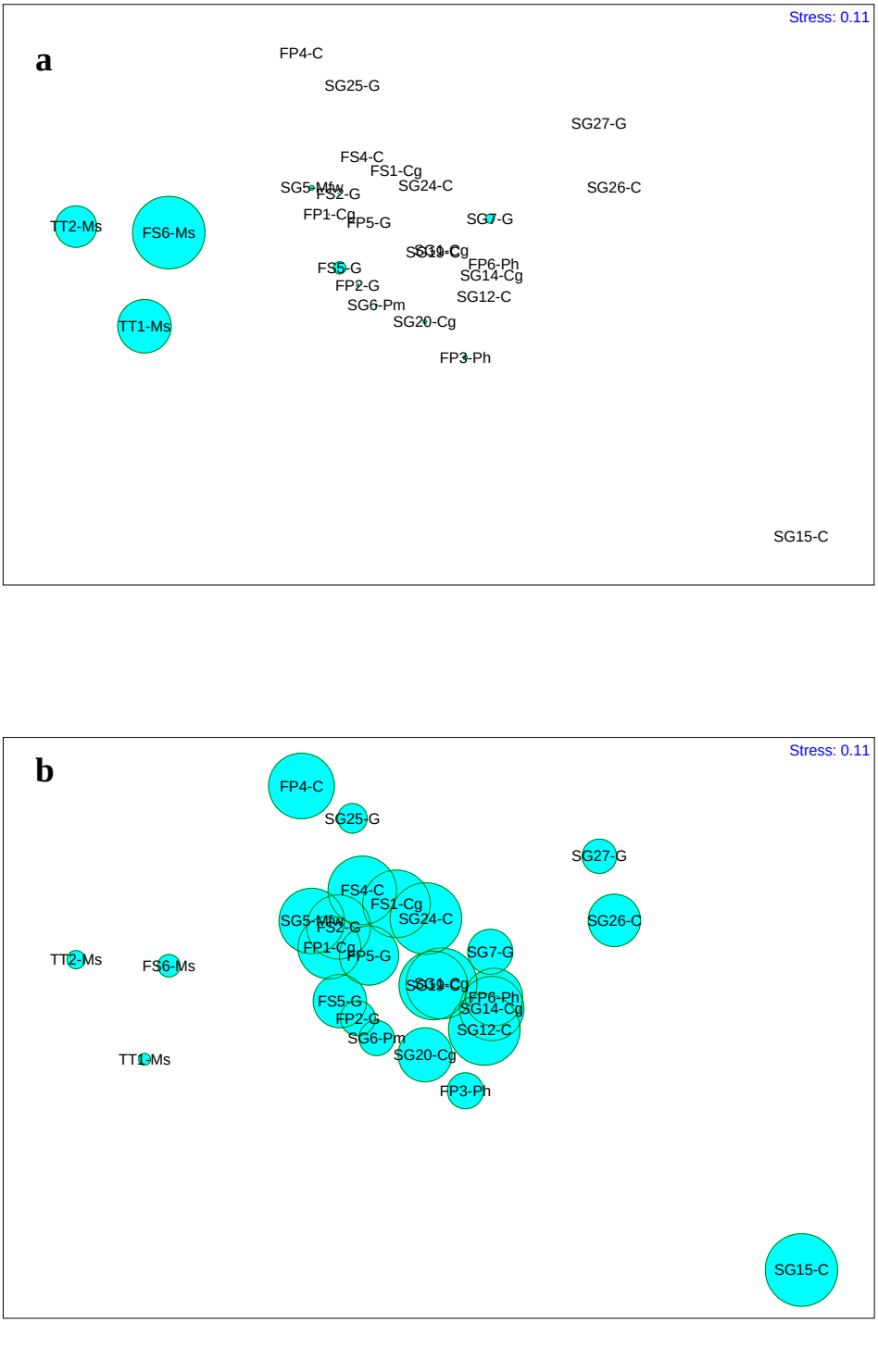


Figure 28. MDS ordination plots of fish communities collected at study sites with superimposed percent composition of (a) *Poecilia latipinna* and (b) *Gambusia holbrooki*

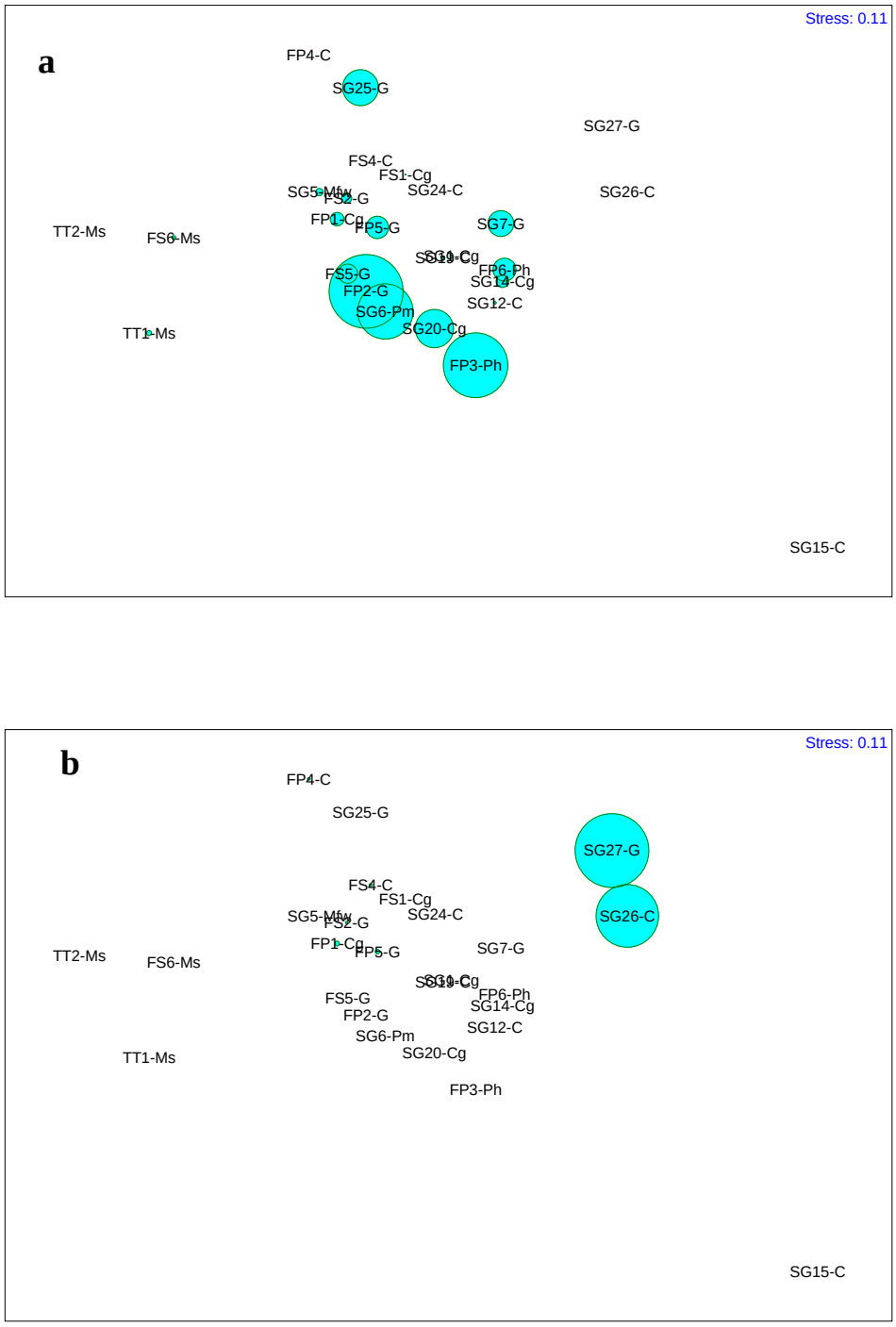


Figure 29. MDS ordination plots of fish communities collected at study sites with superimposed percent composition of (a) *Jordanella floridae* and (b) *Lepomis* complex.

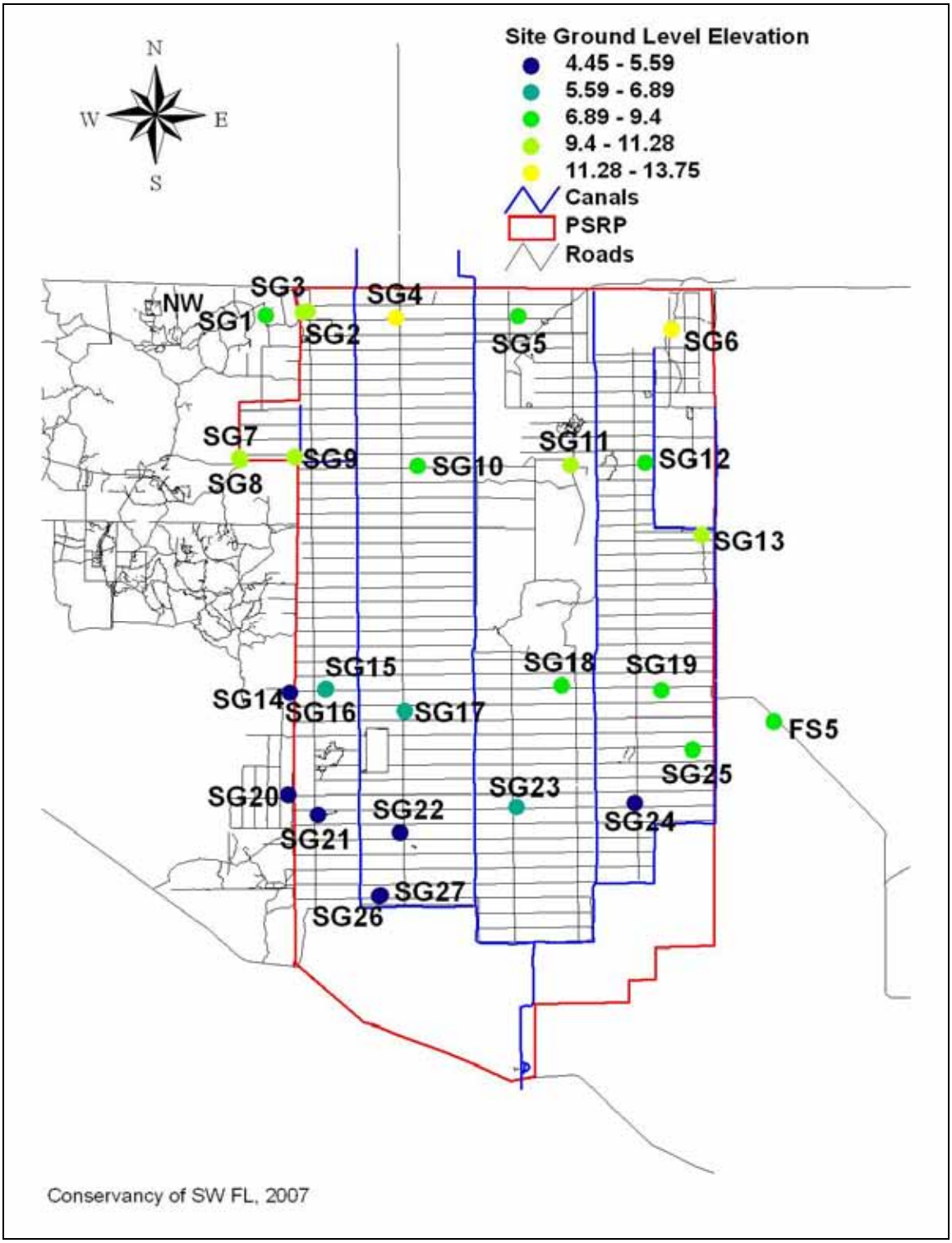
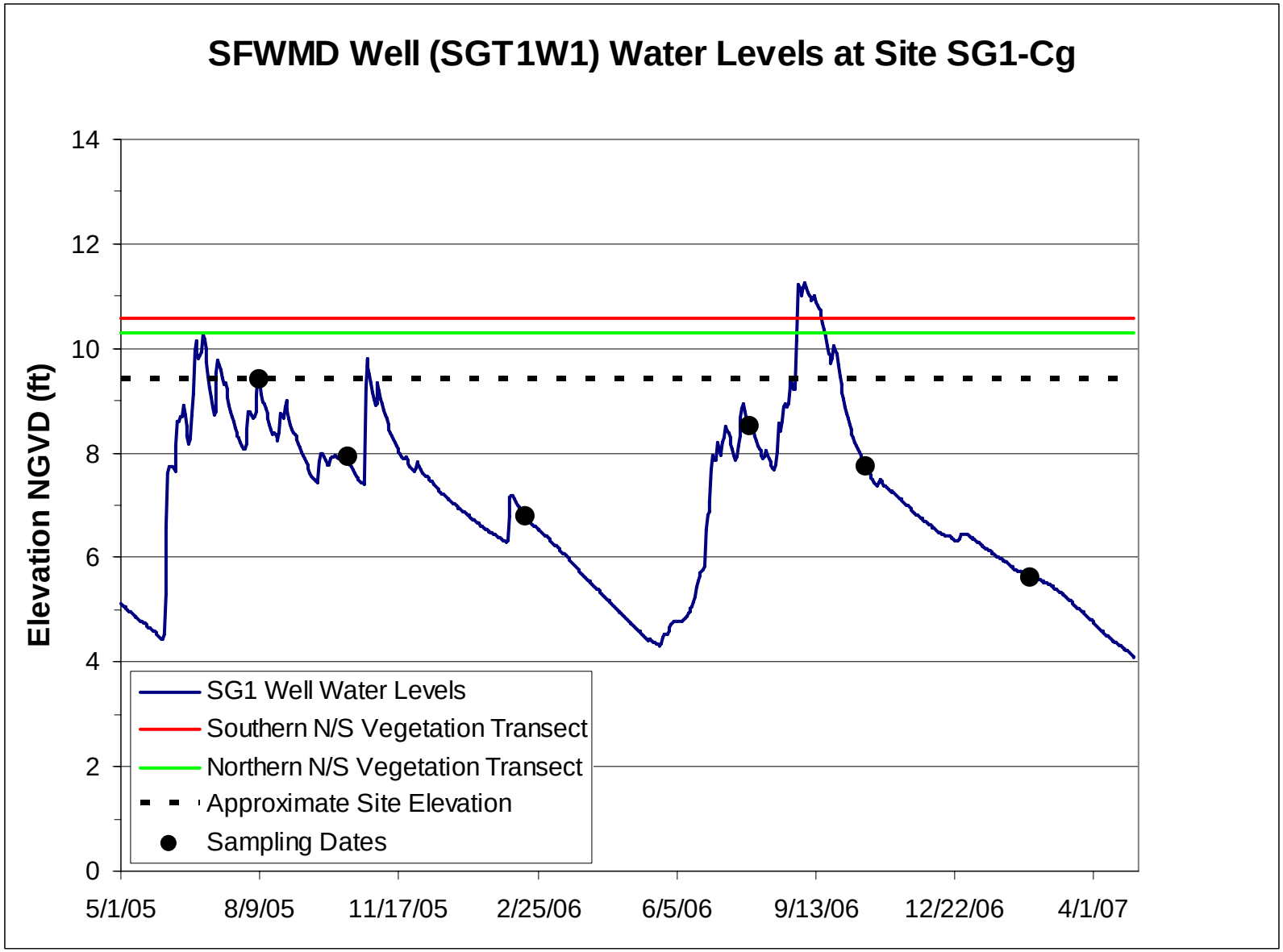


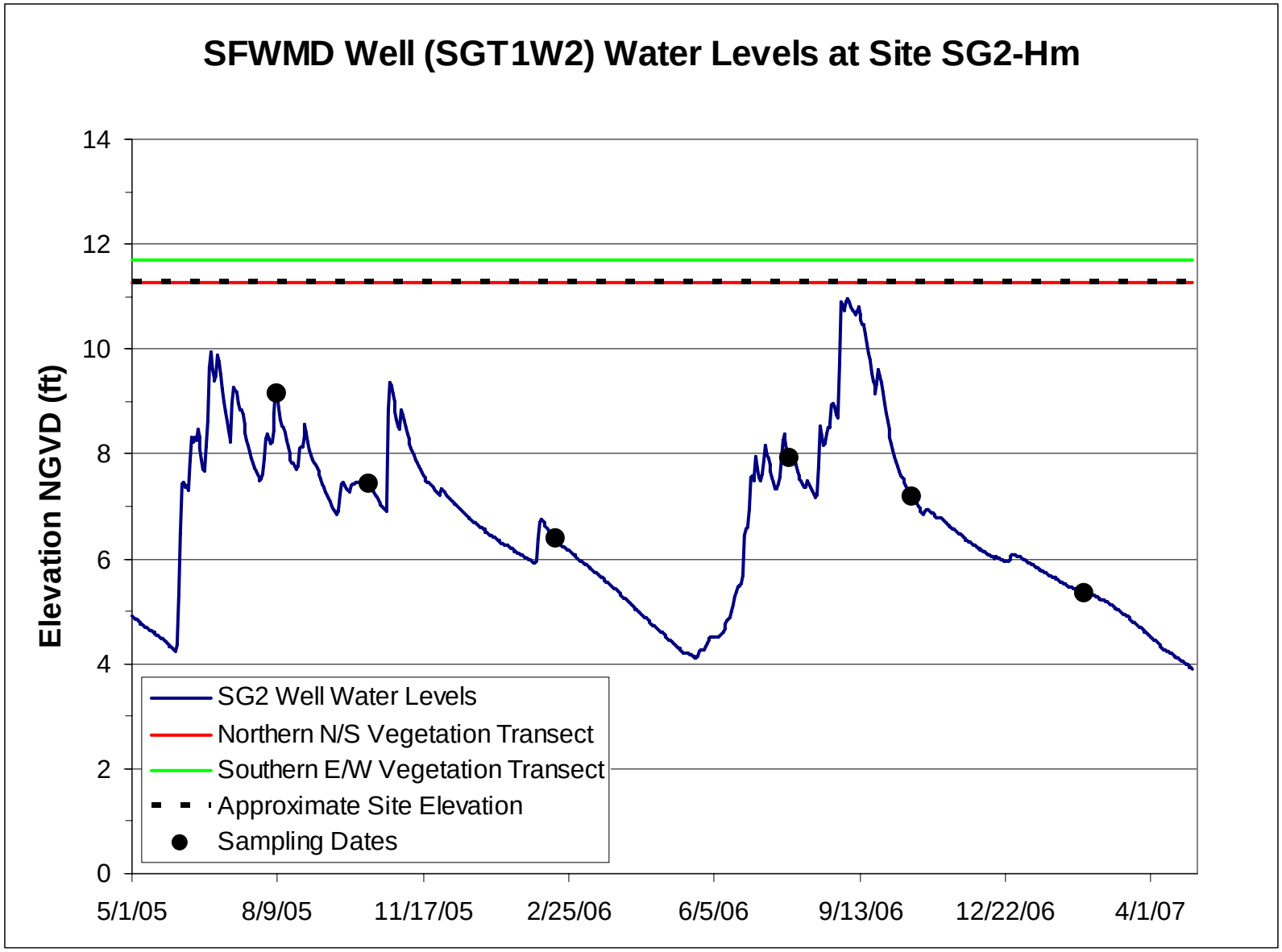
Figure 30. Map of study sites in portions of the study area and associated ground elevations in feet.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

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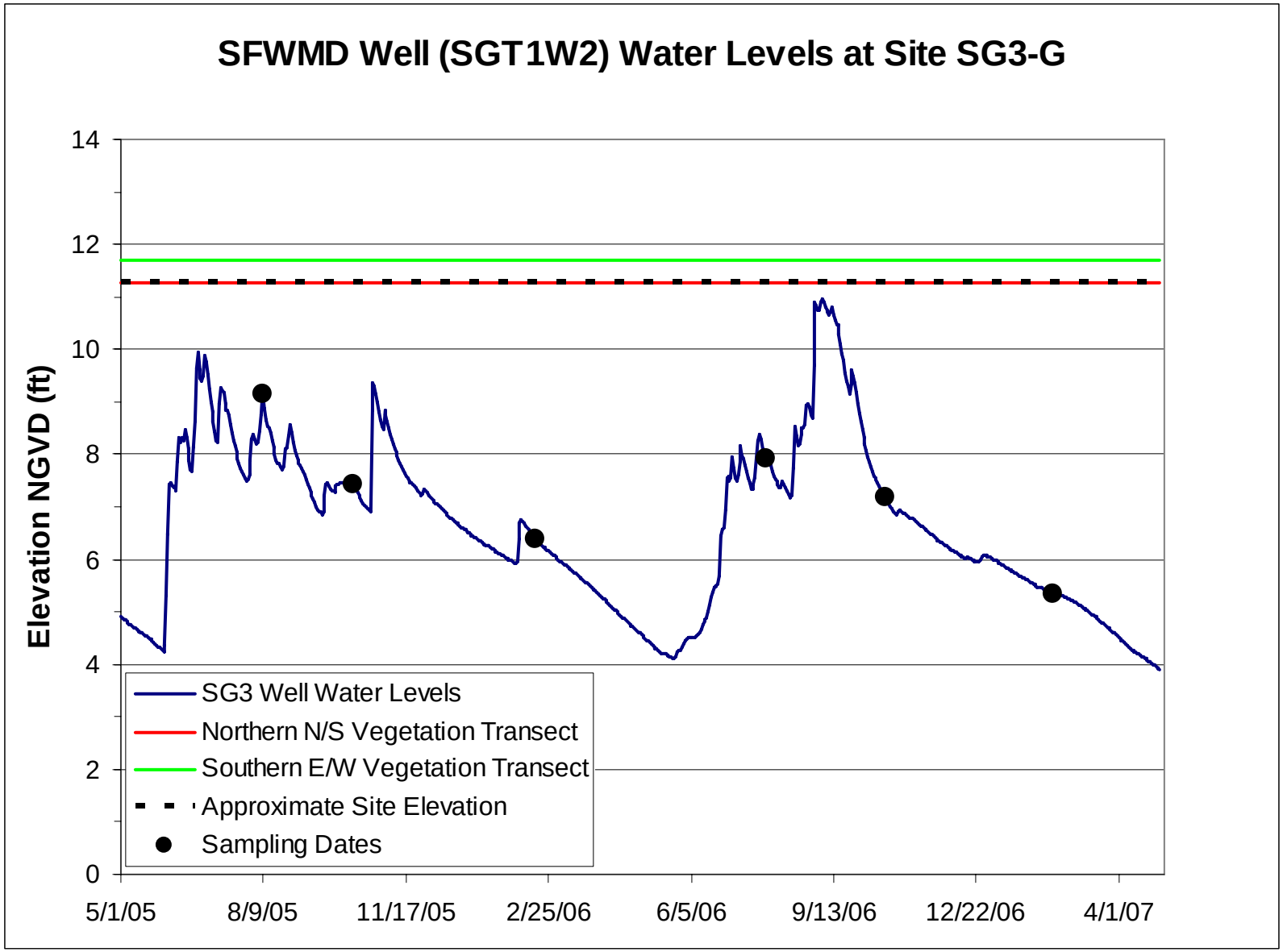

Hydrologic data provided by SFWMD.

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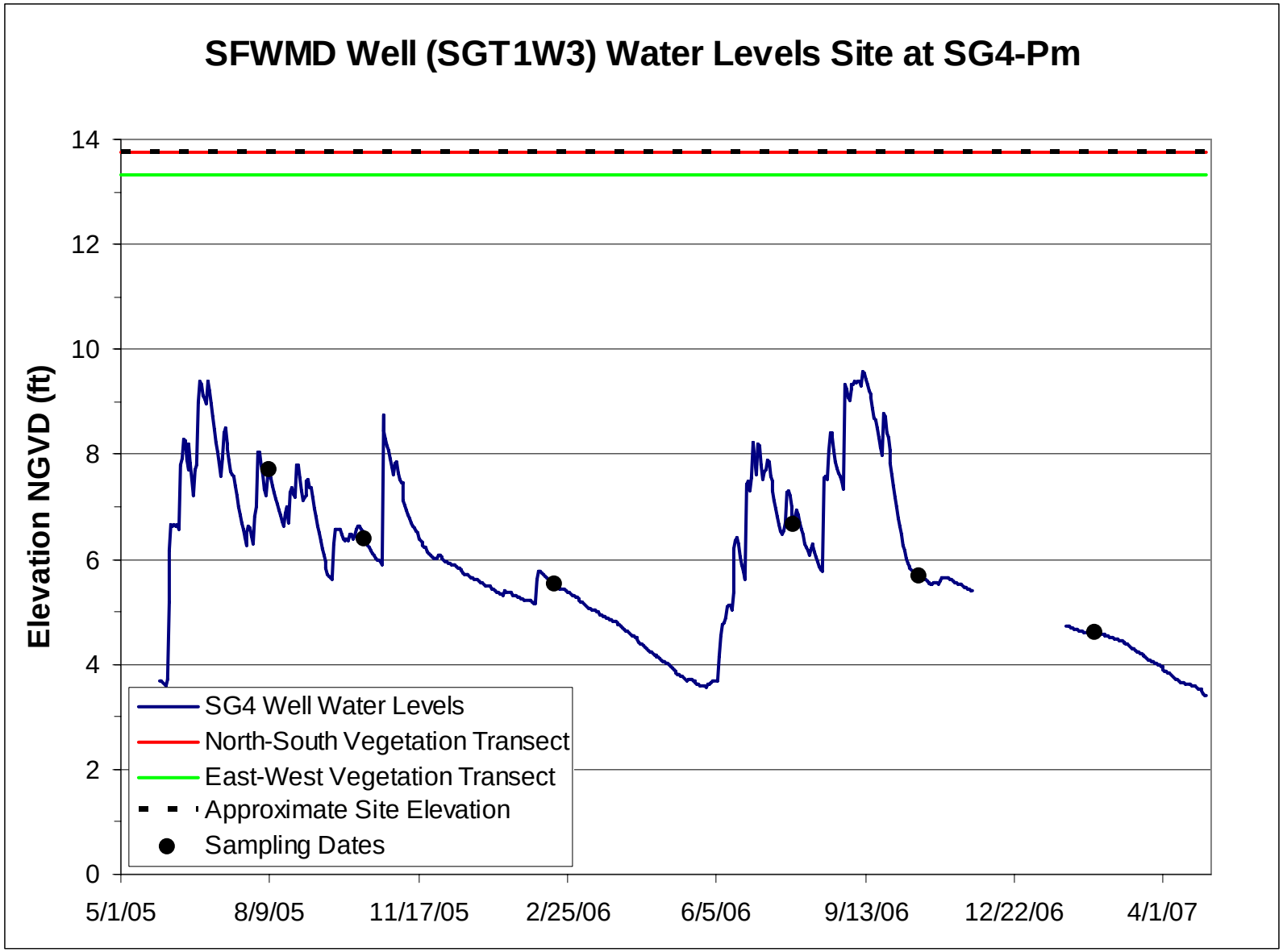
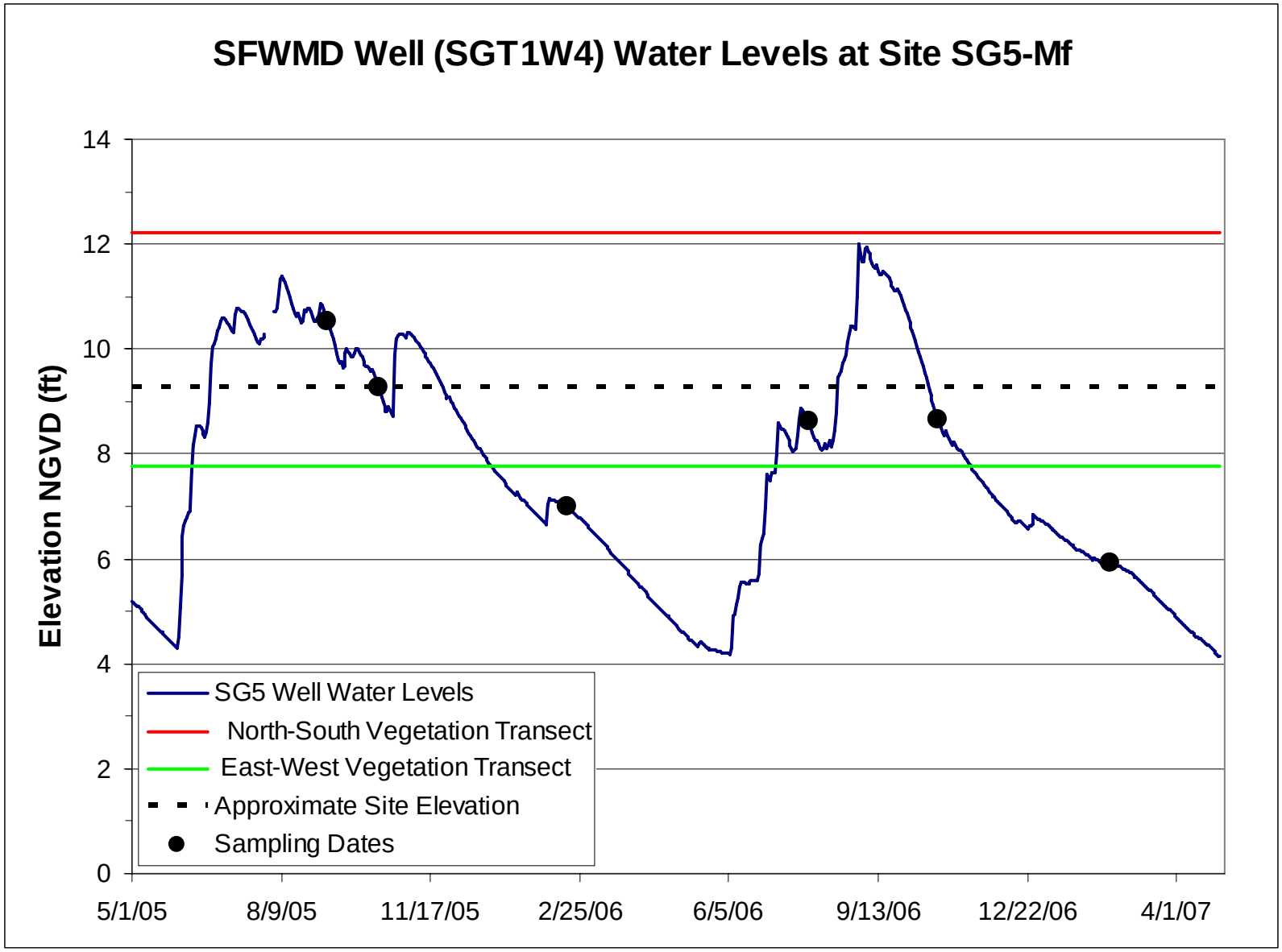


Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



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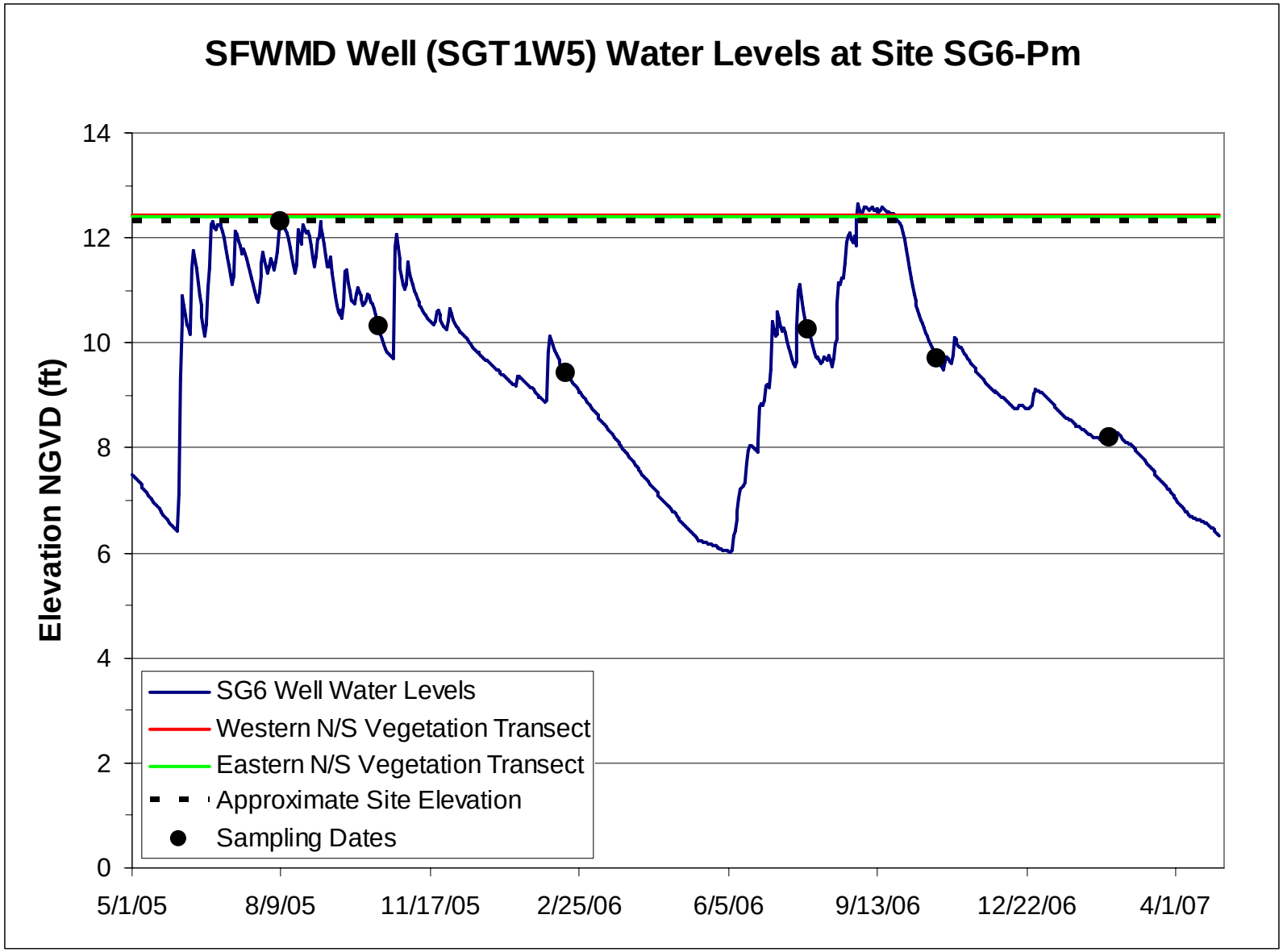
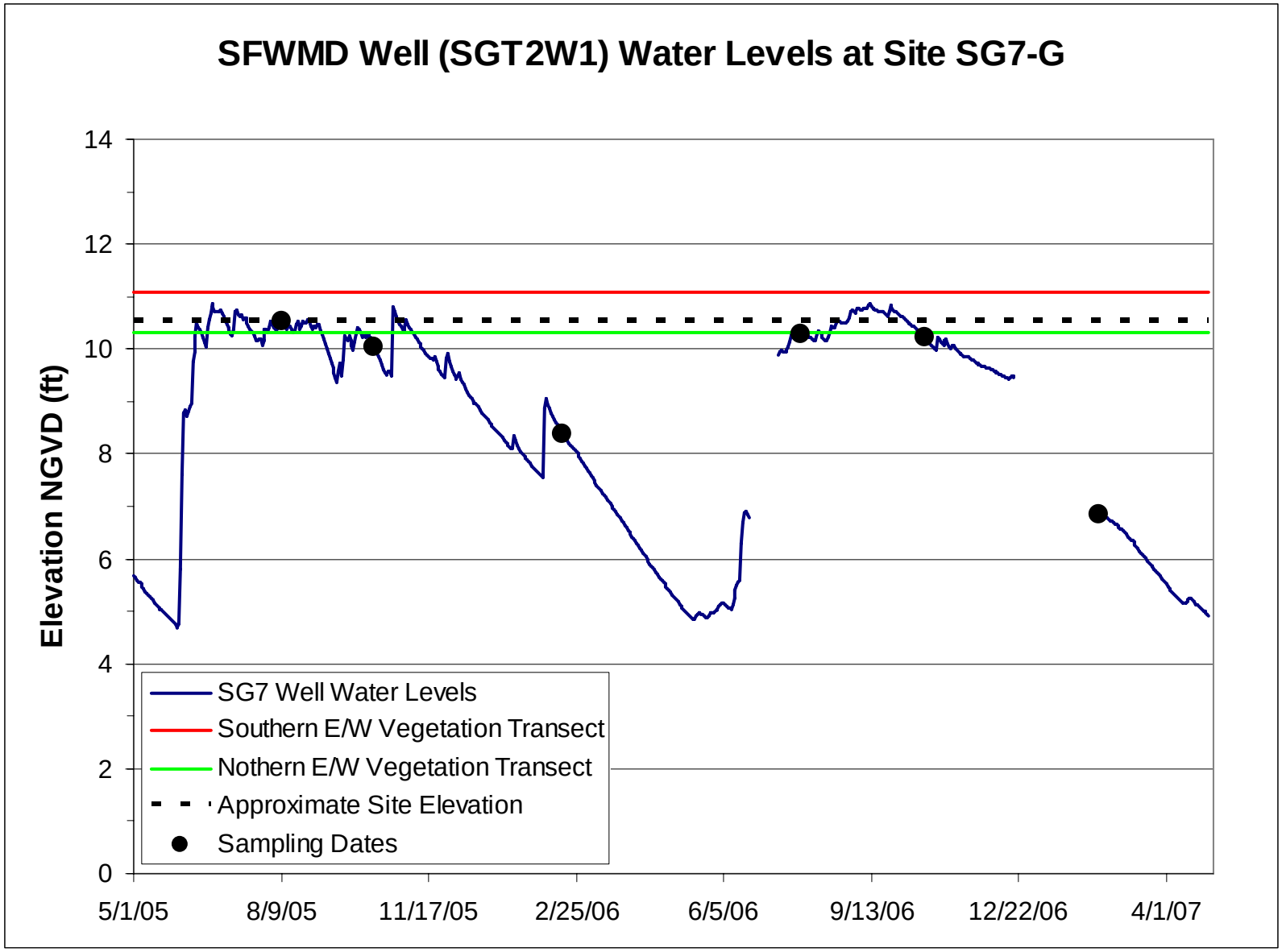


Hydrologic data provided by SFWMD.



Hydrologic data provided by SFWMD.

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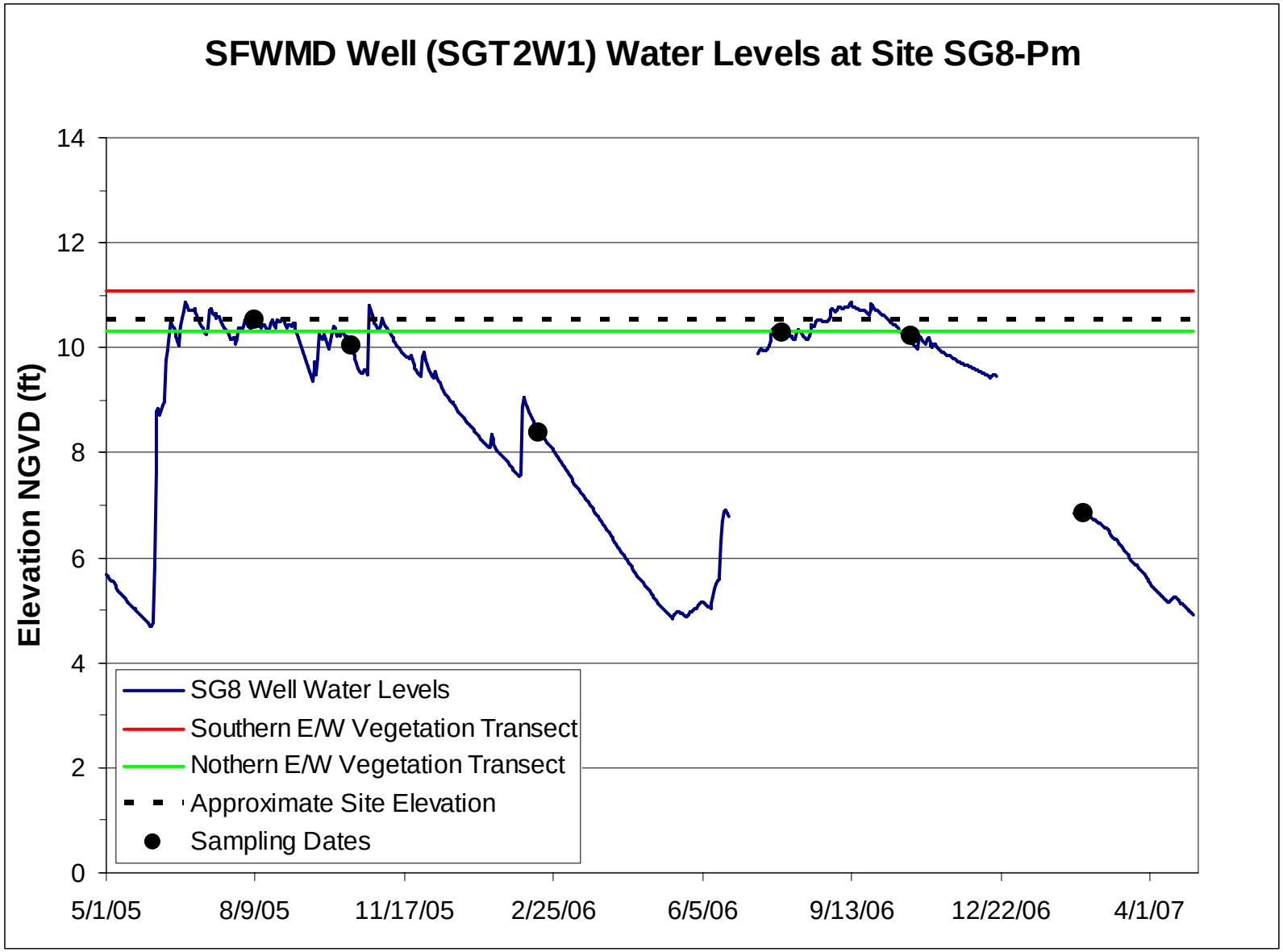
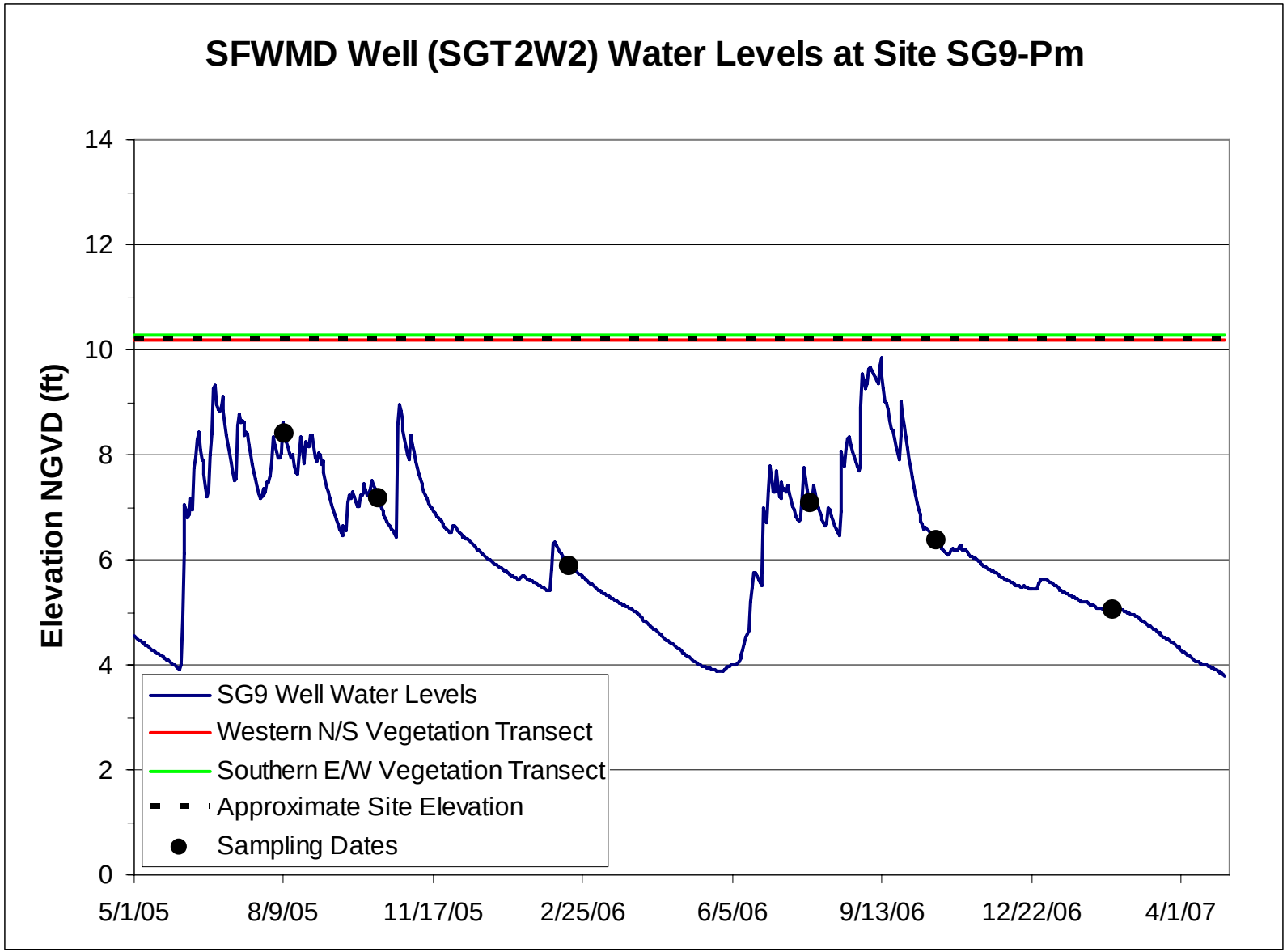
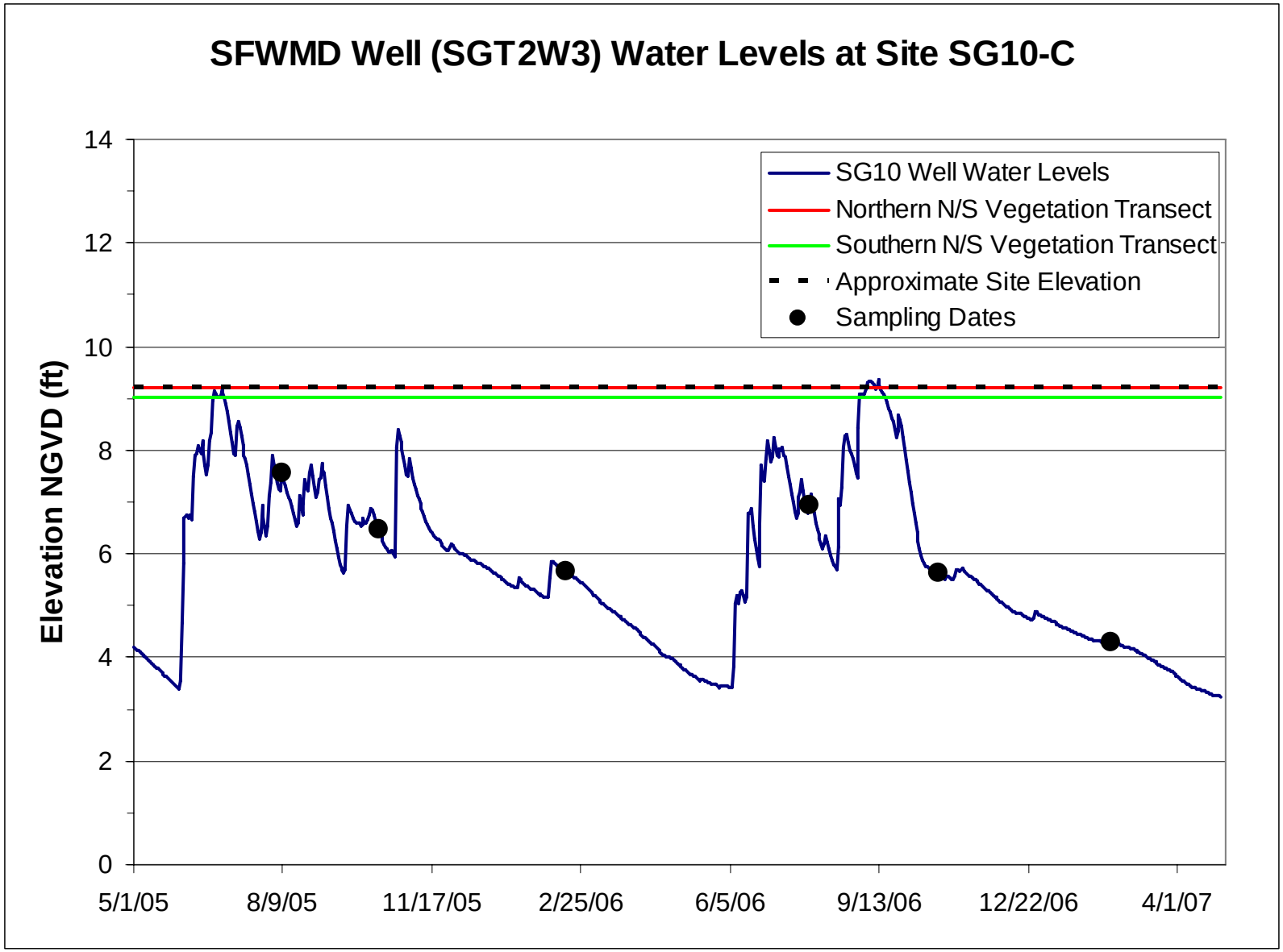


Hydrologic data provided by SFWMD.



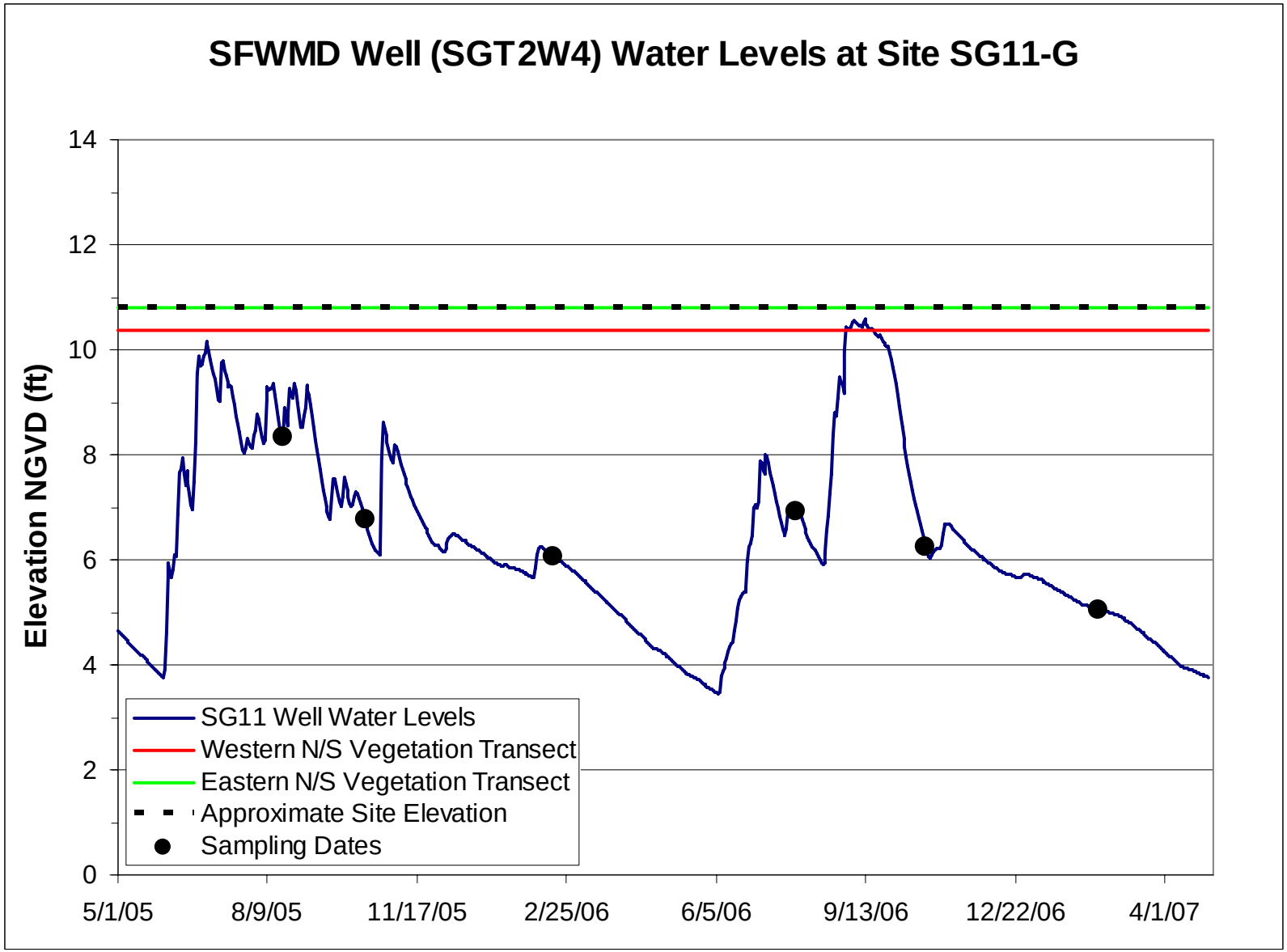
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



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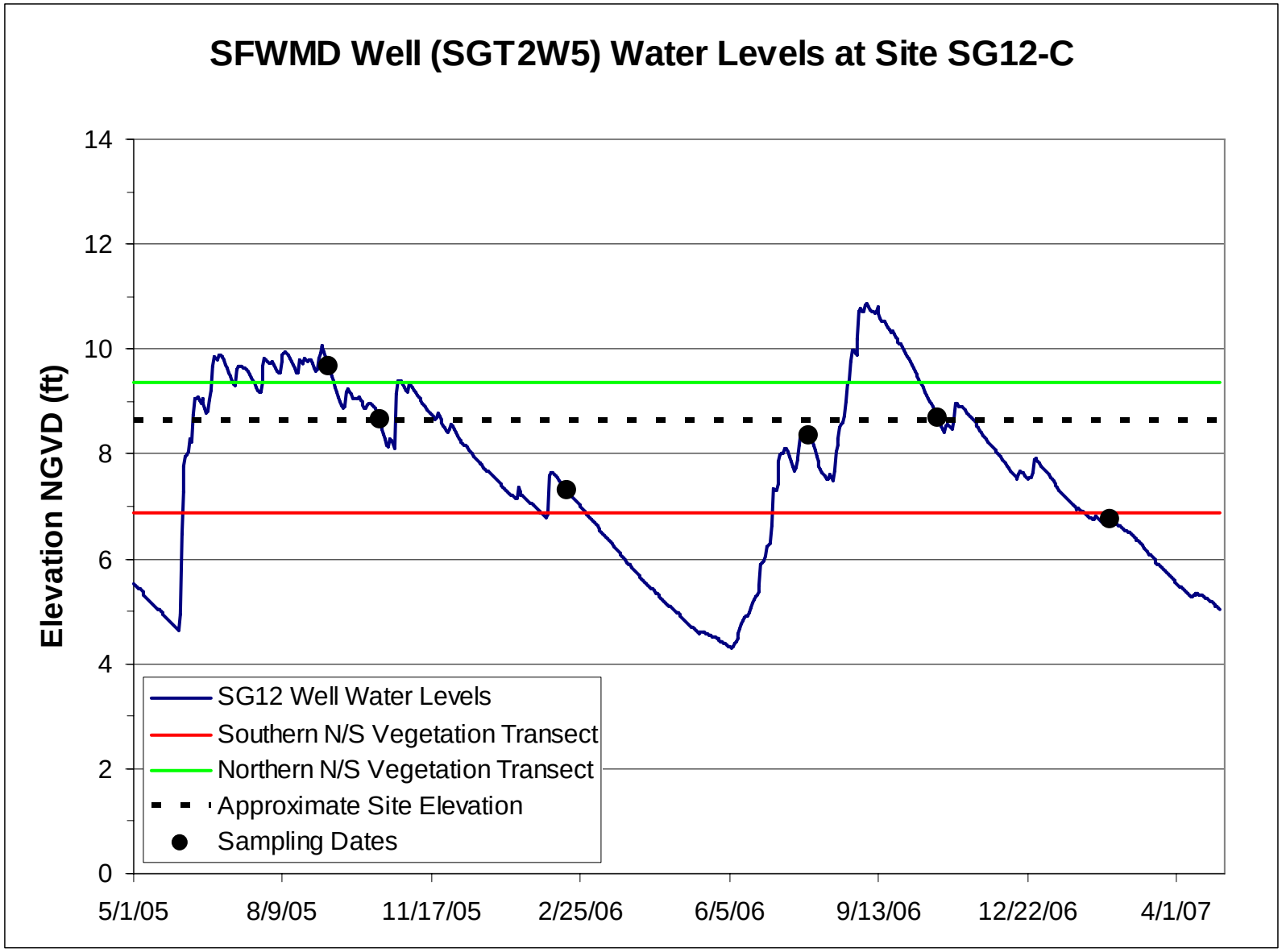
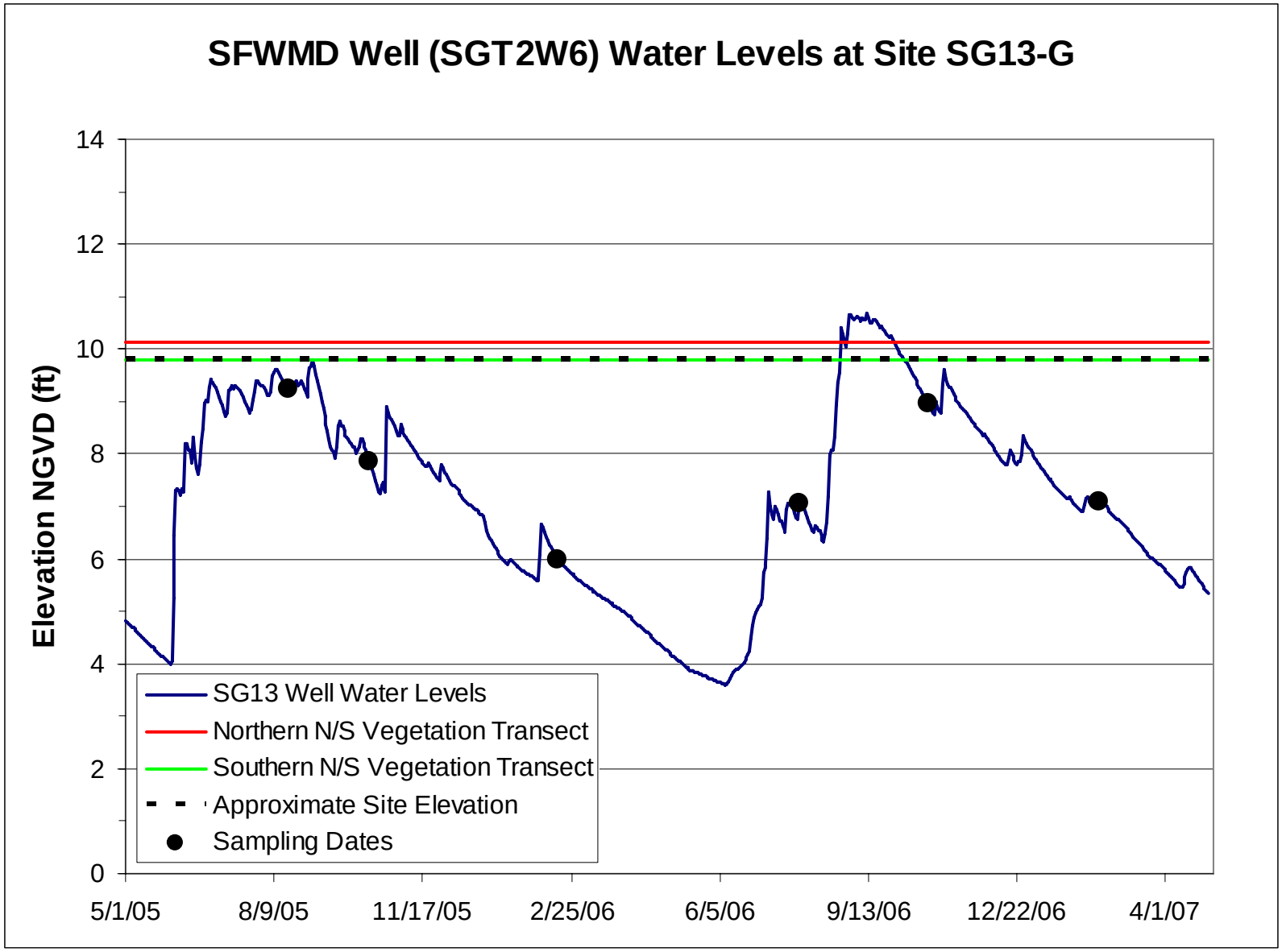


Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

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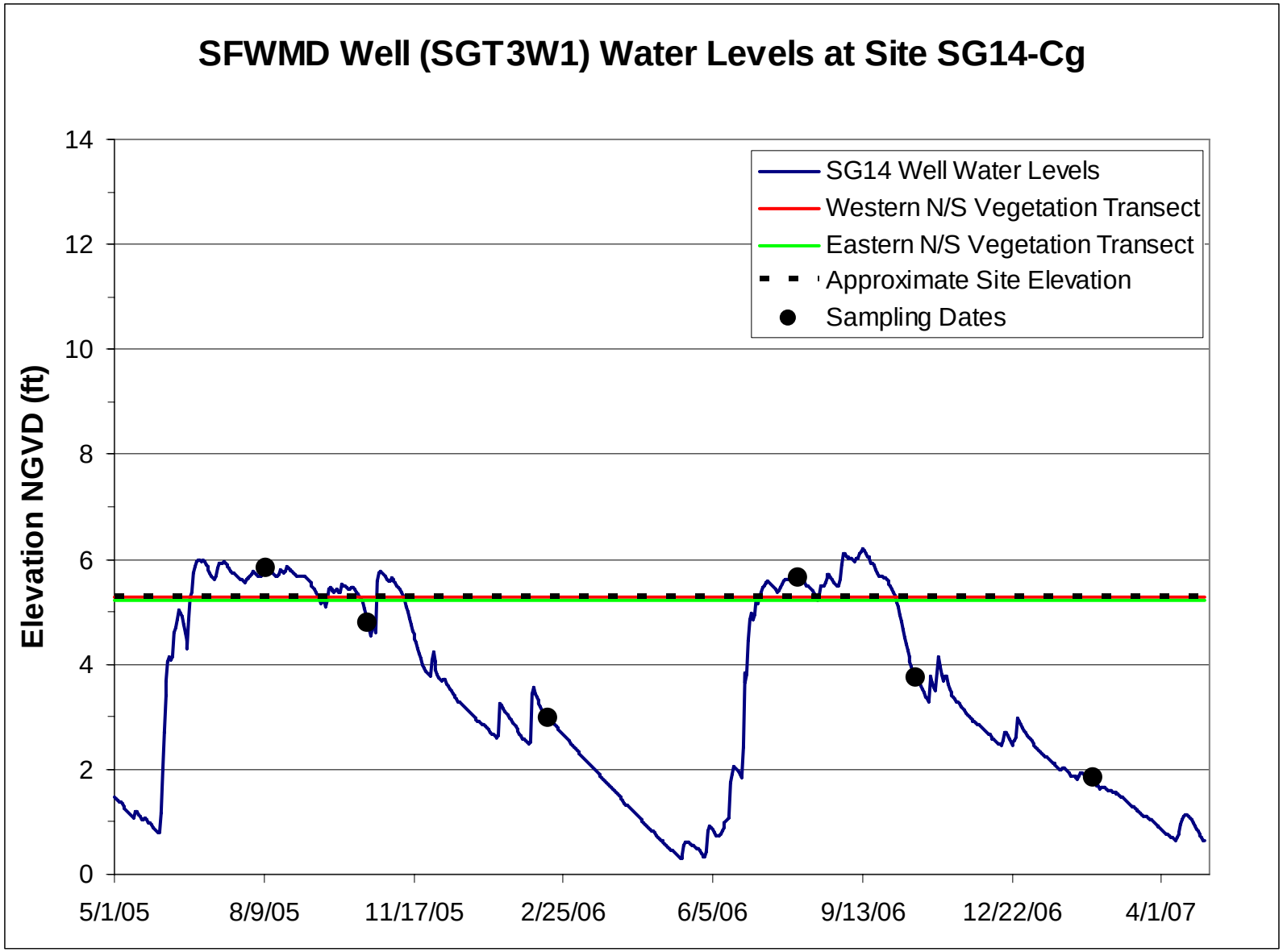

Hydrologic data provided by SFWMD.

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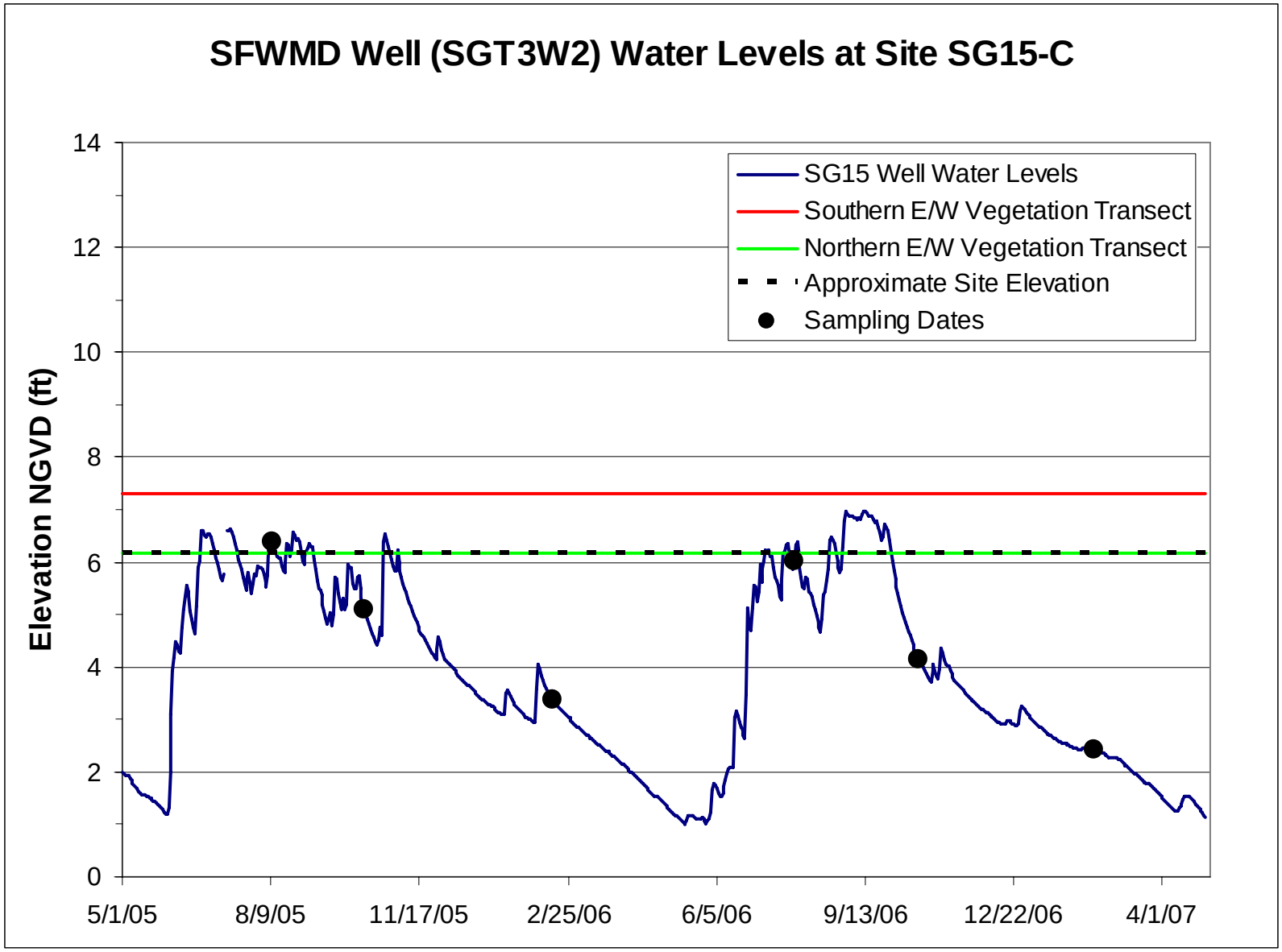

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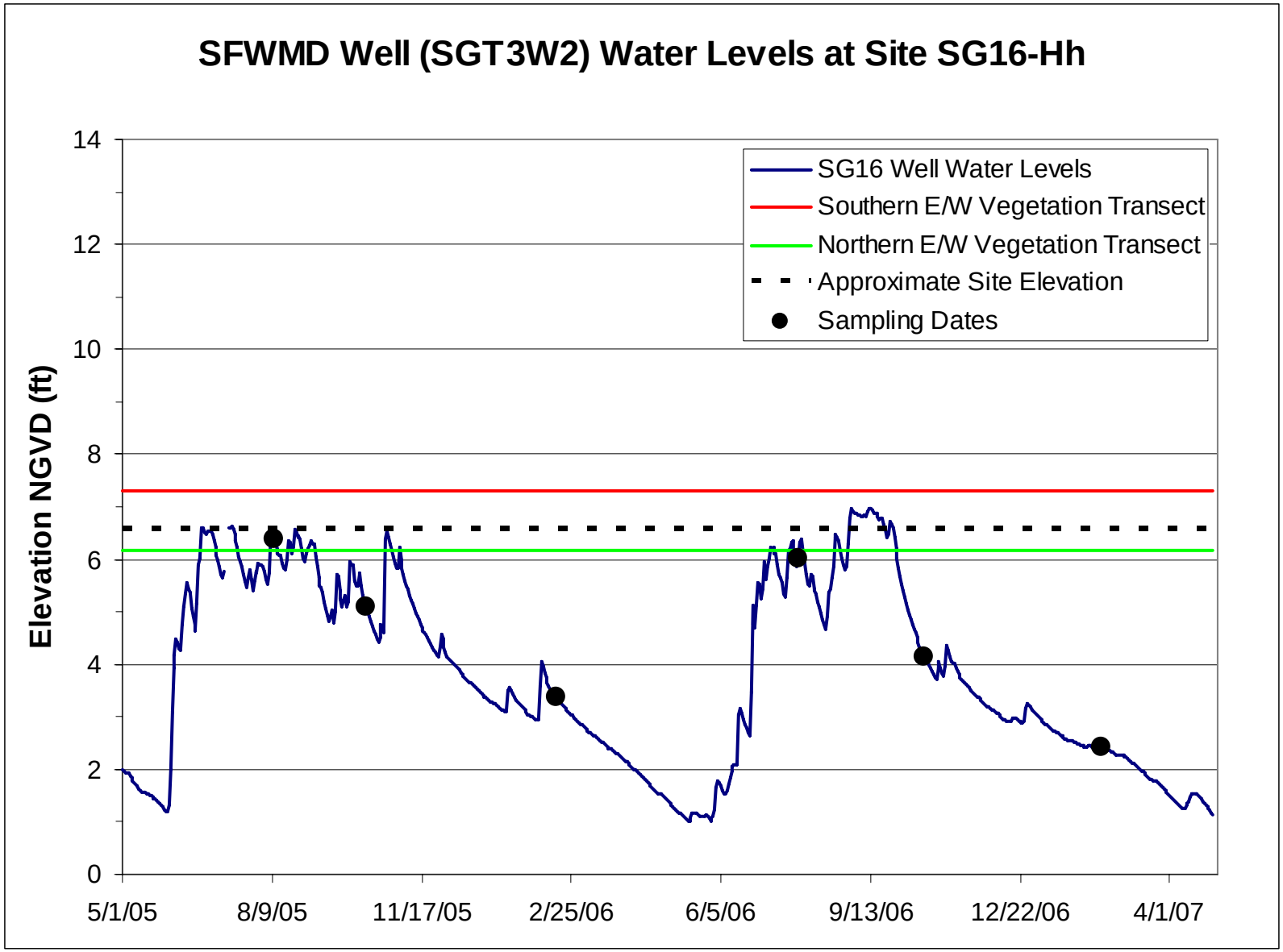

Hydrologic data provided by SFWMD.

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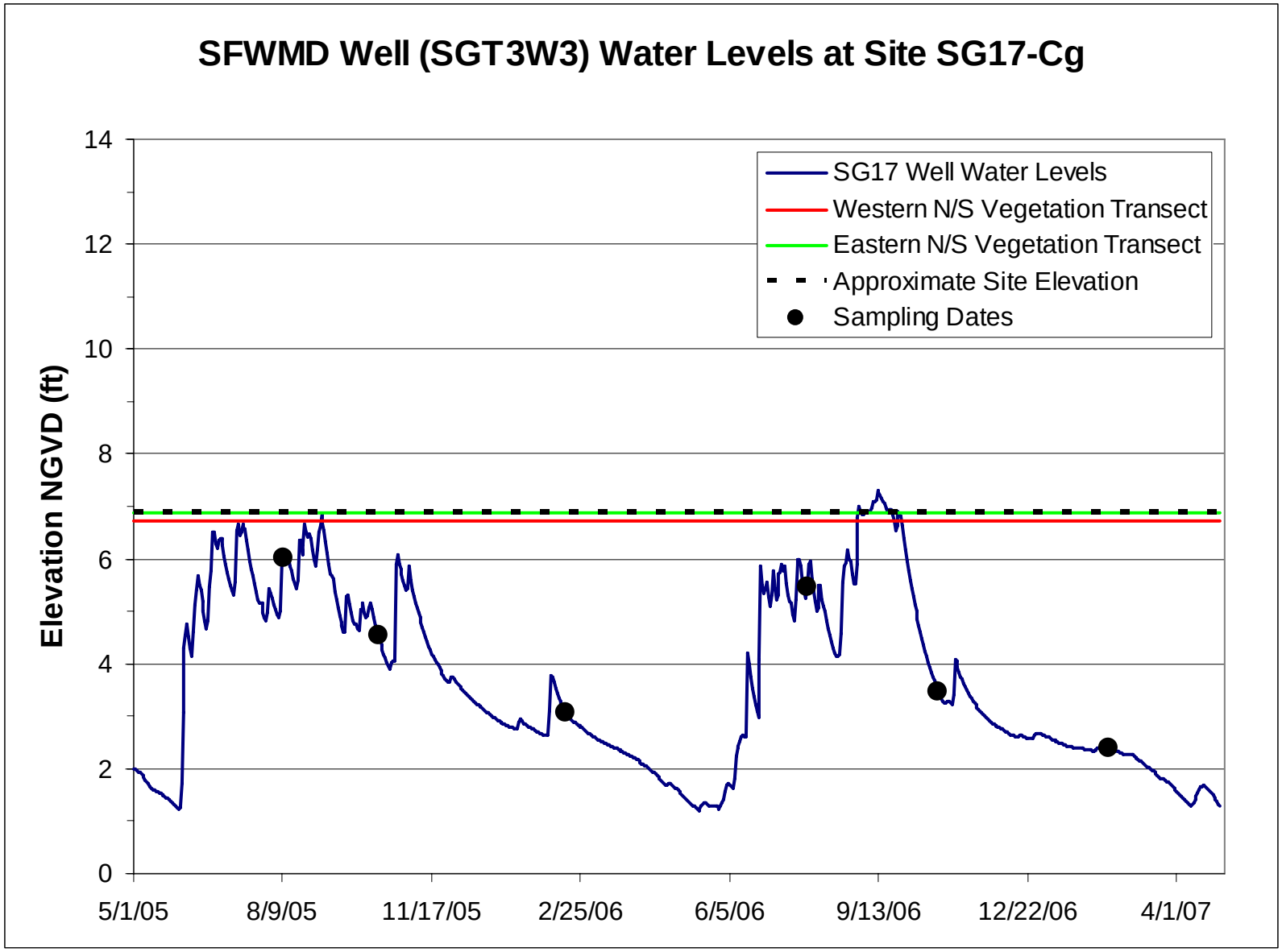
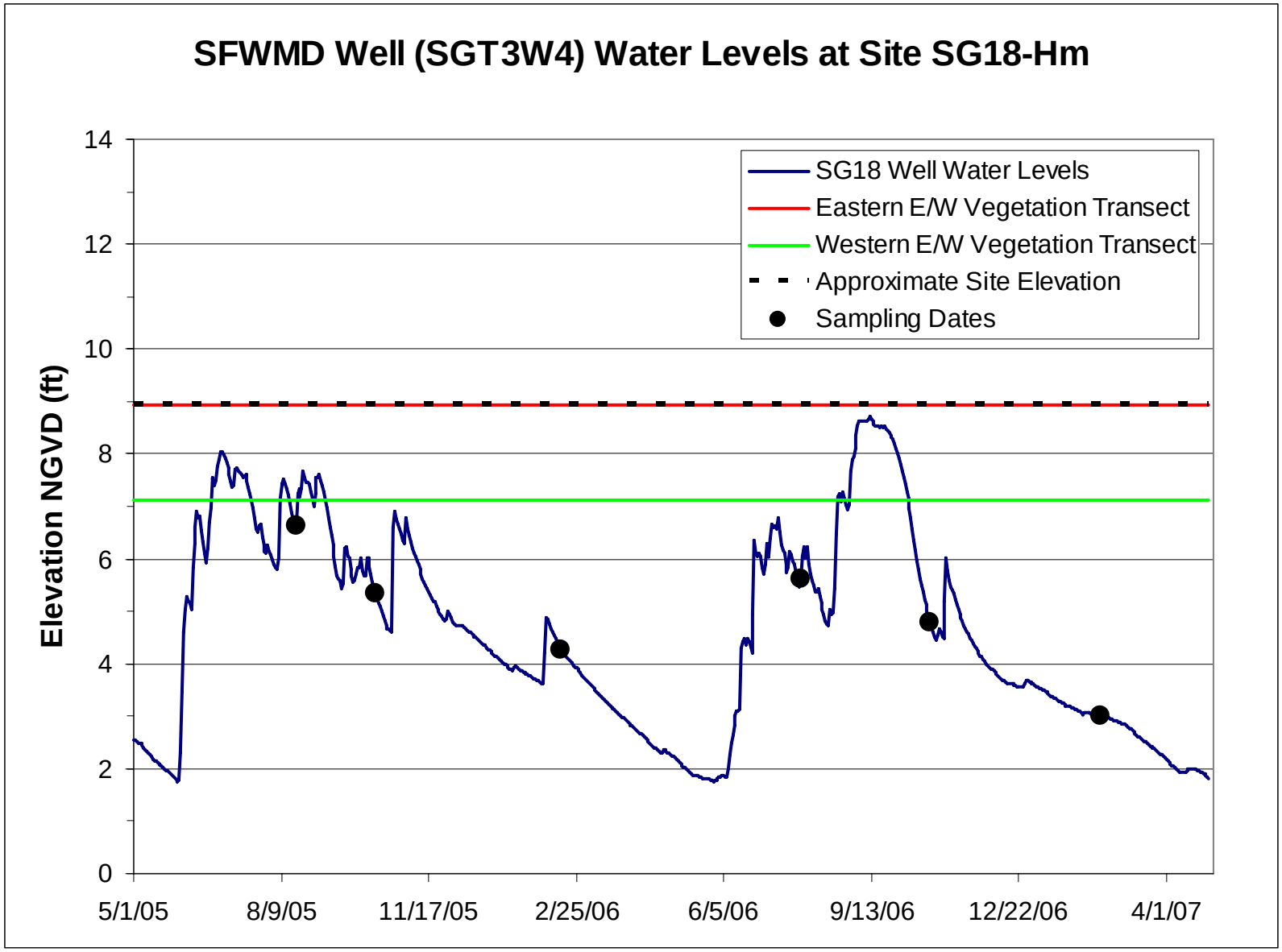


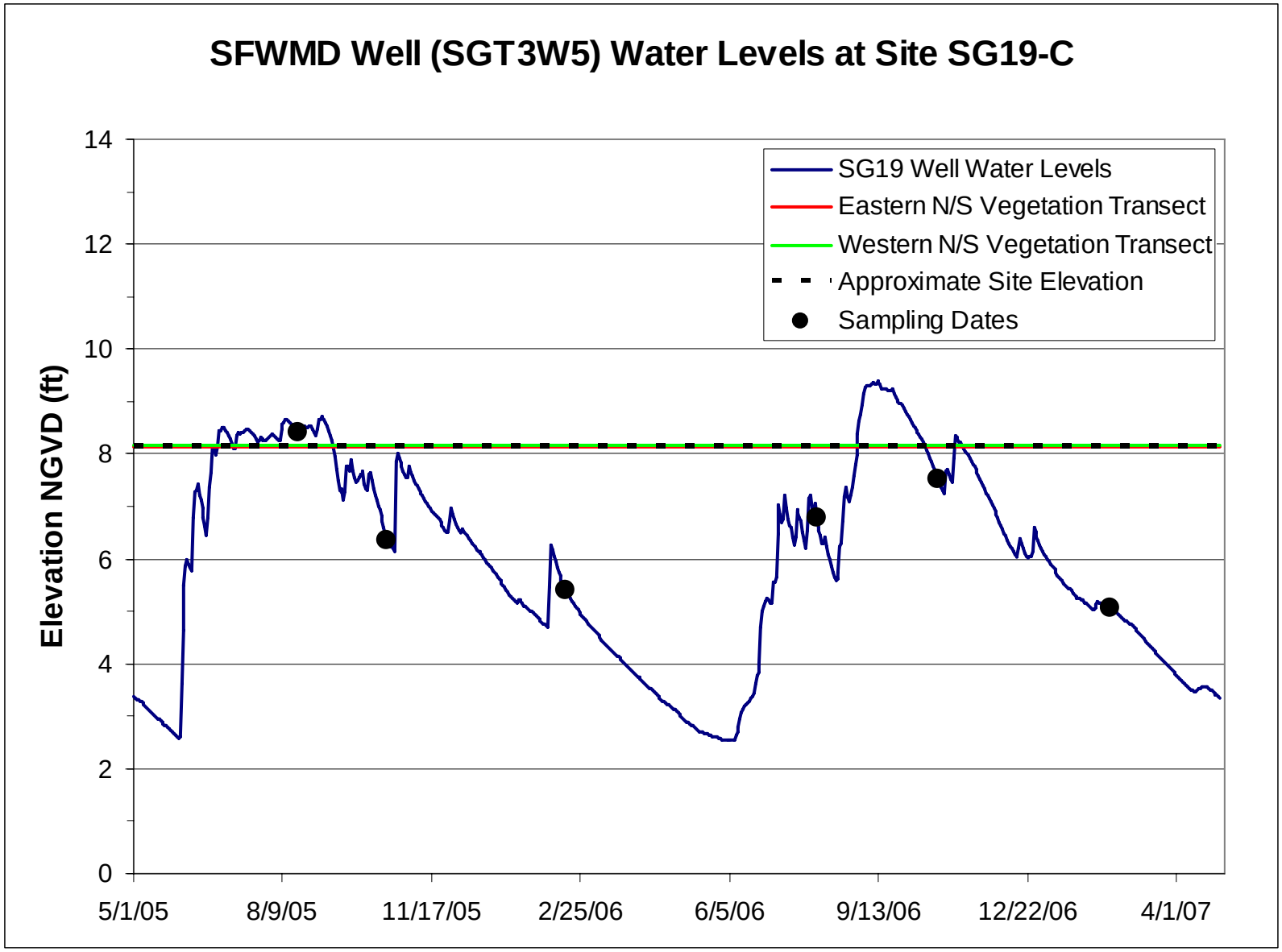
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



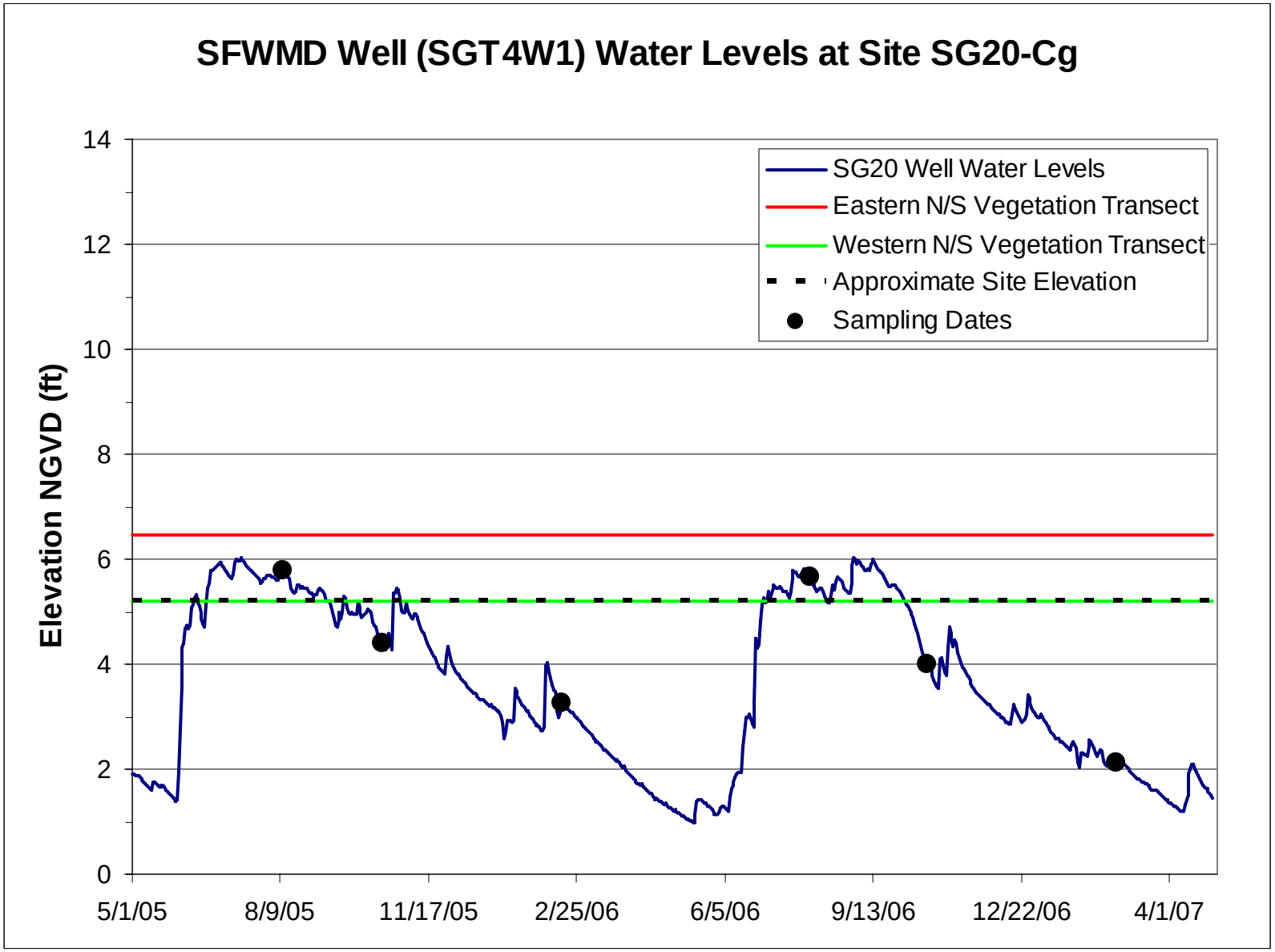
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



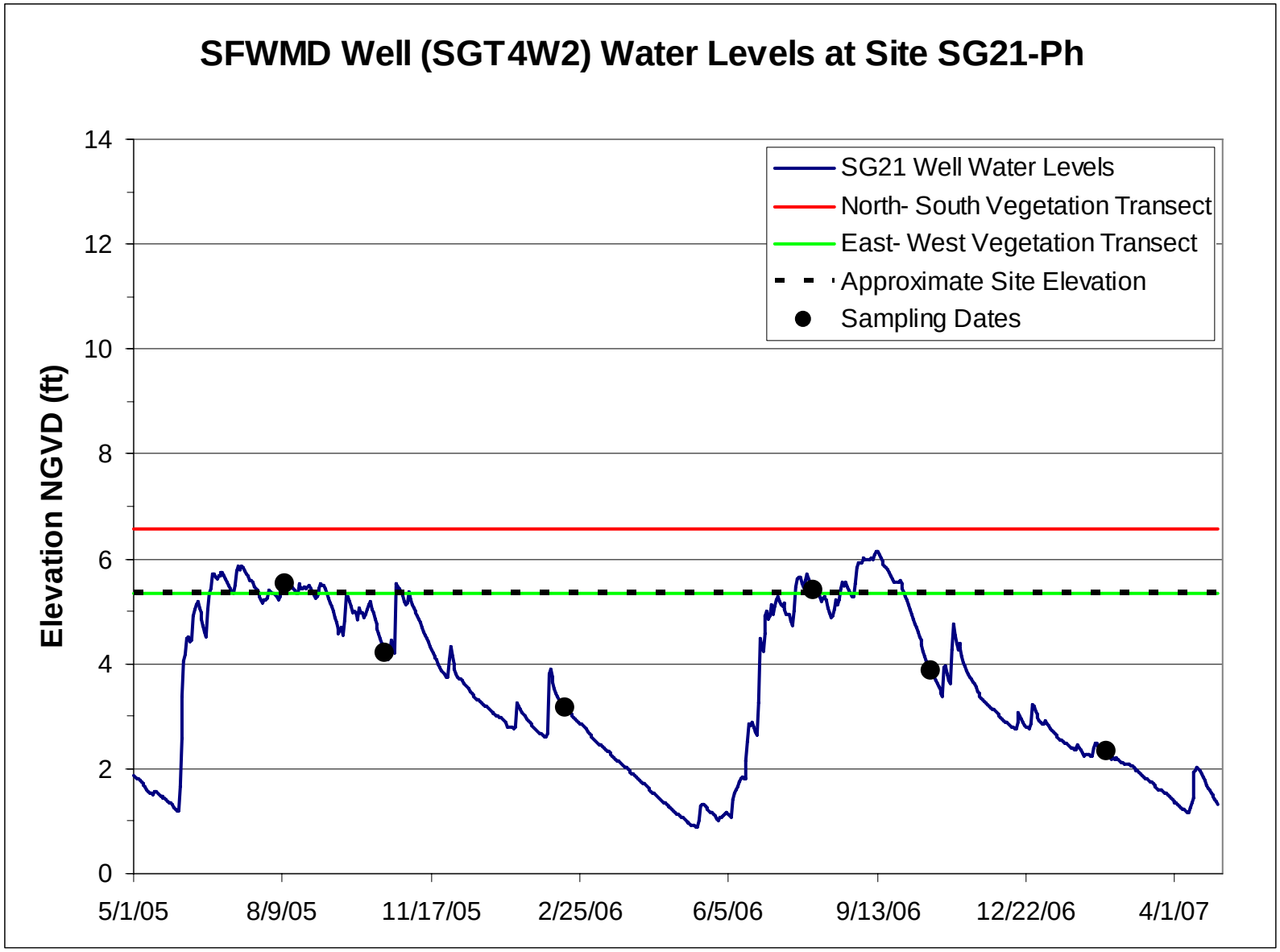
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

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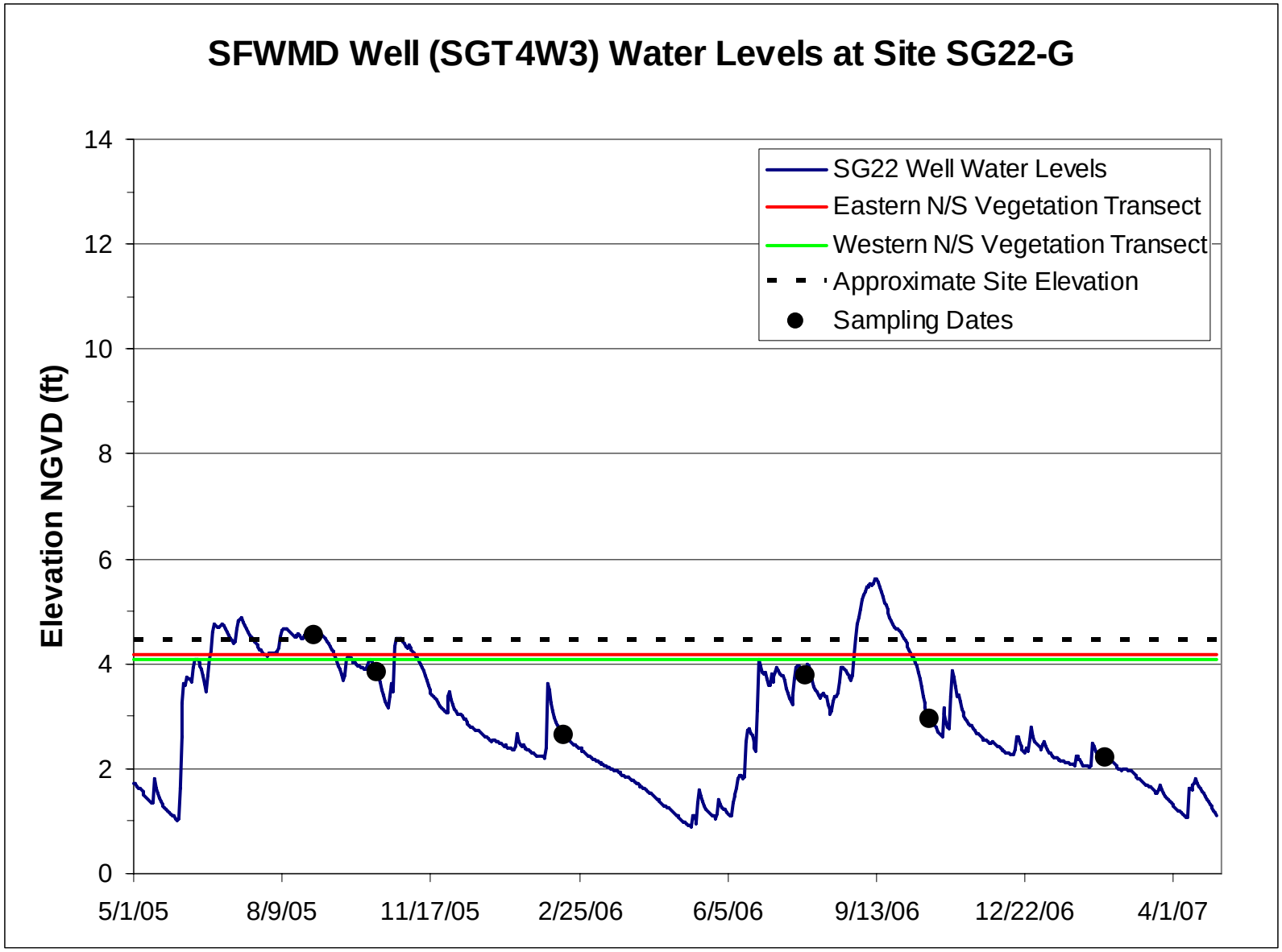
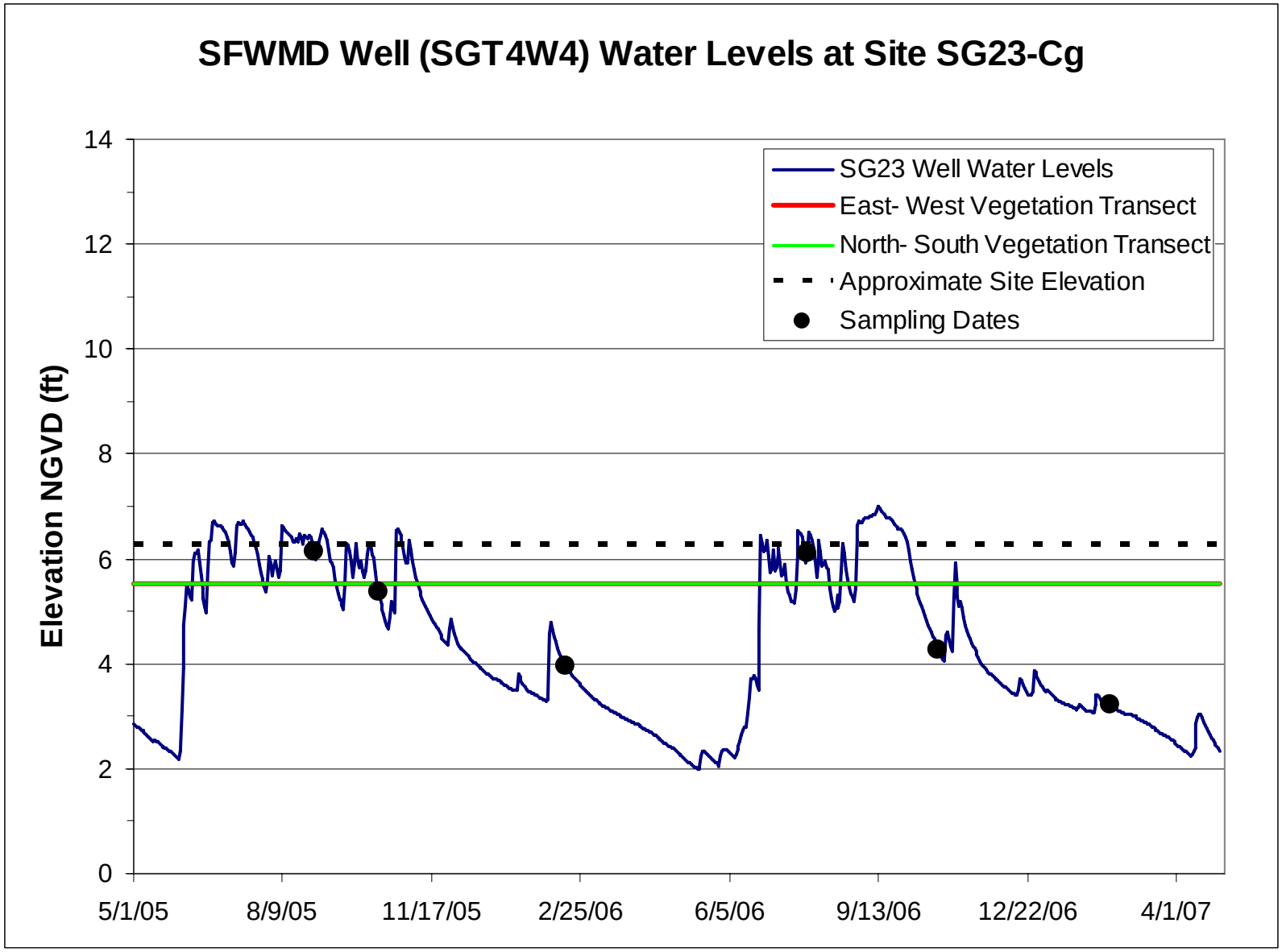


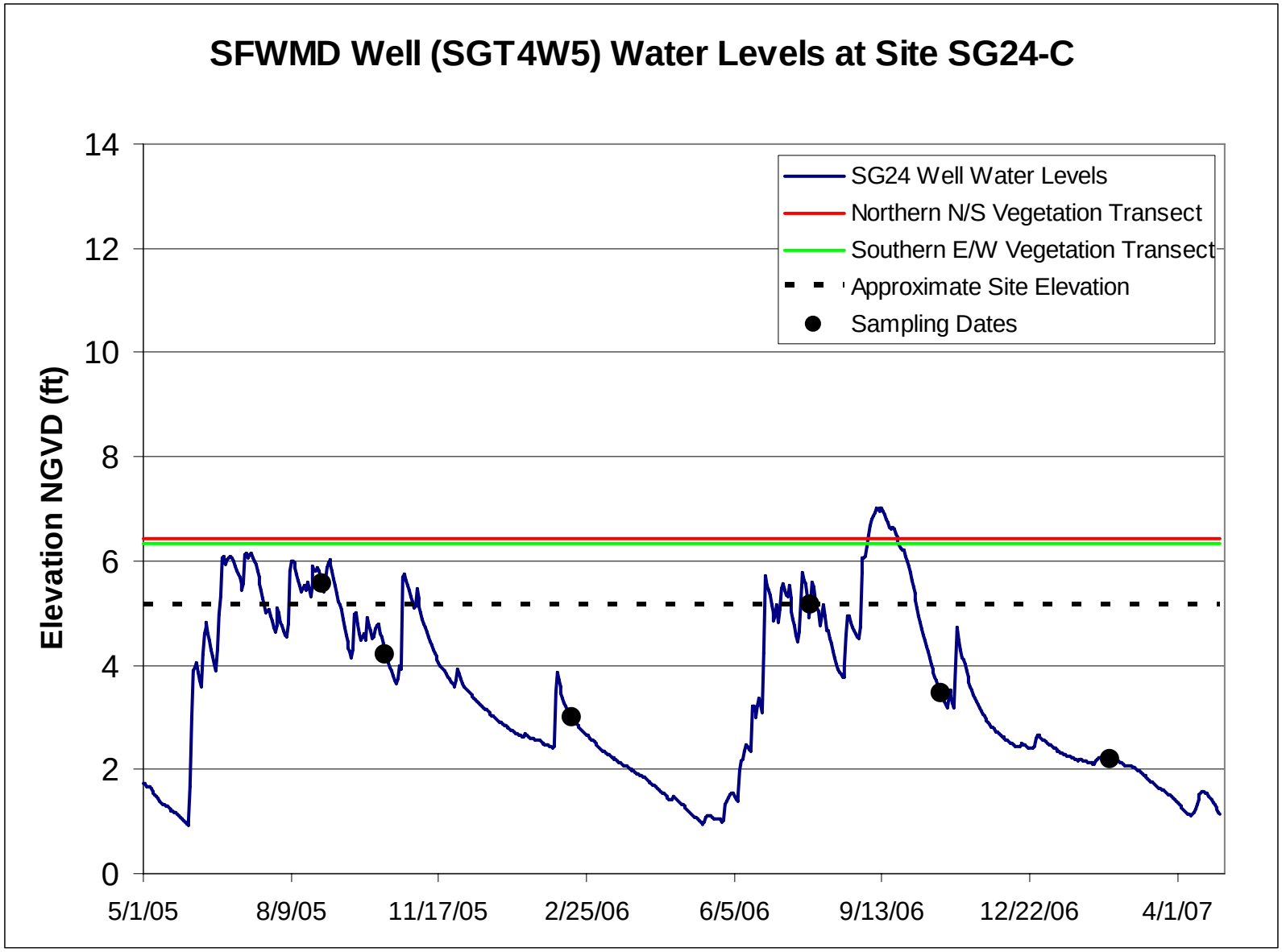
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



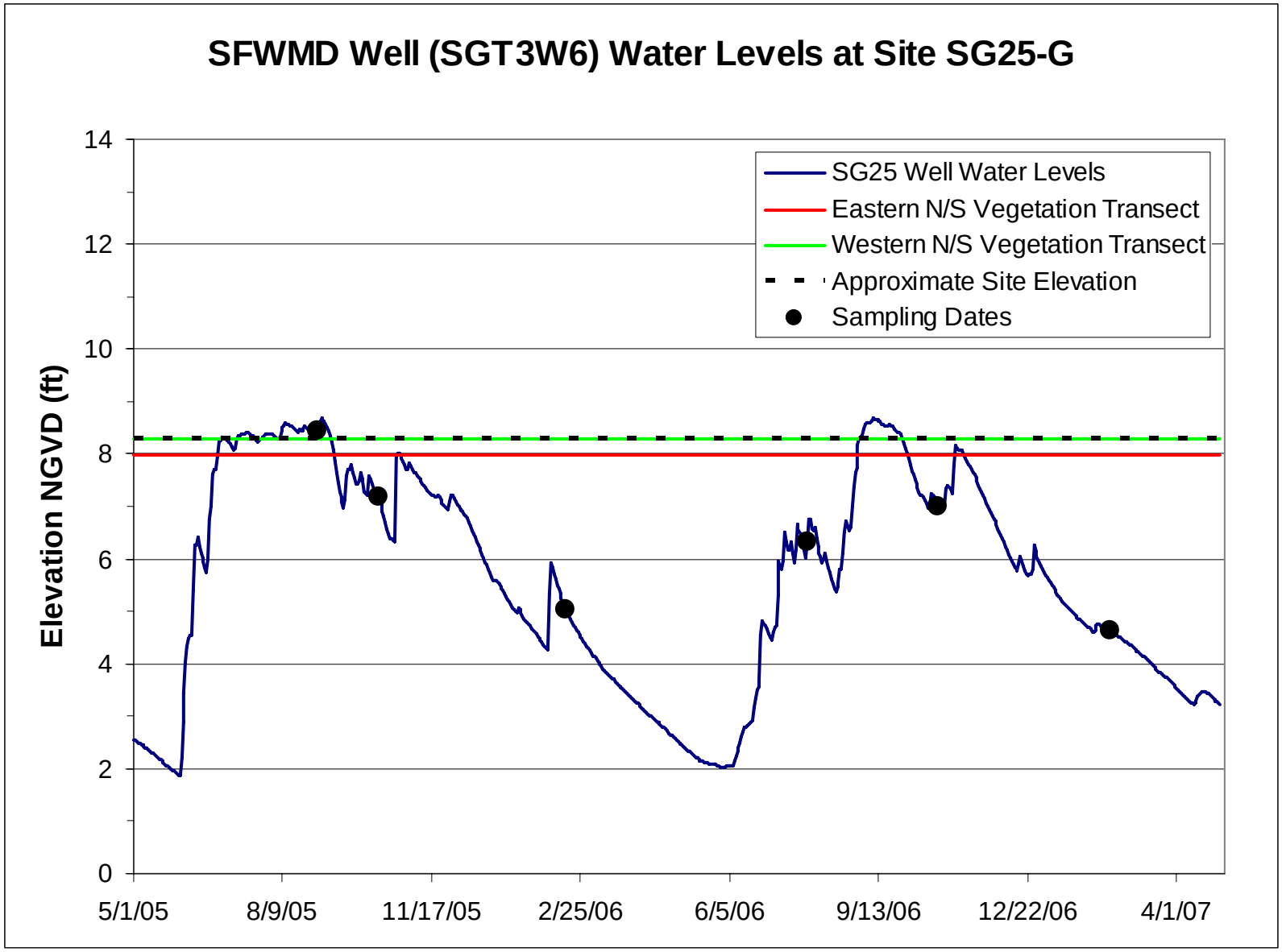
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



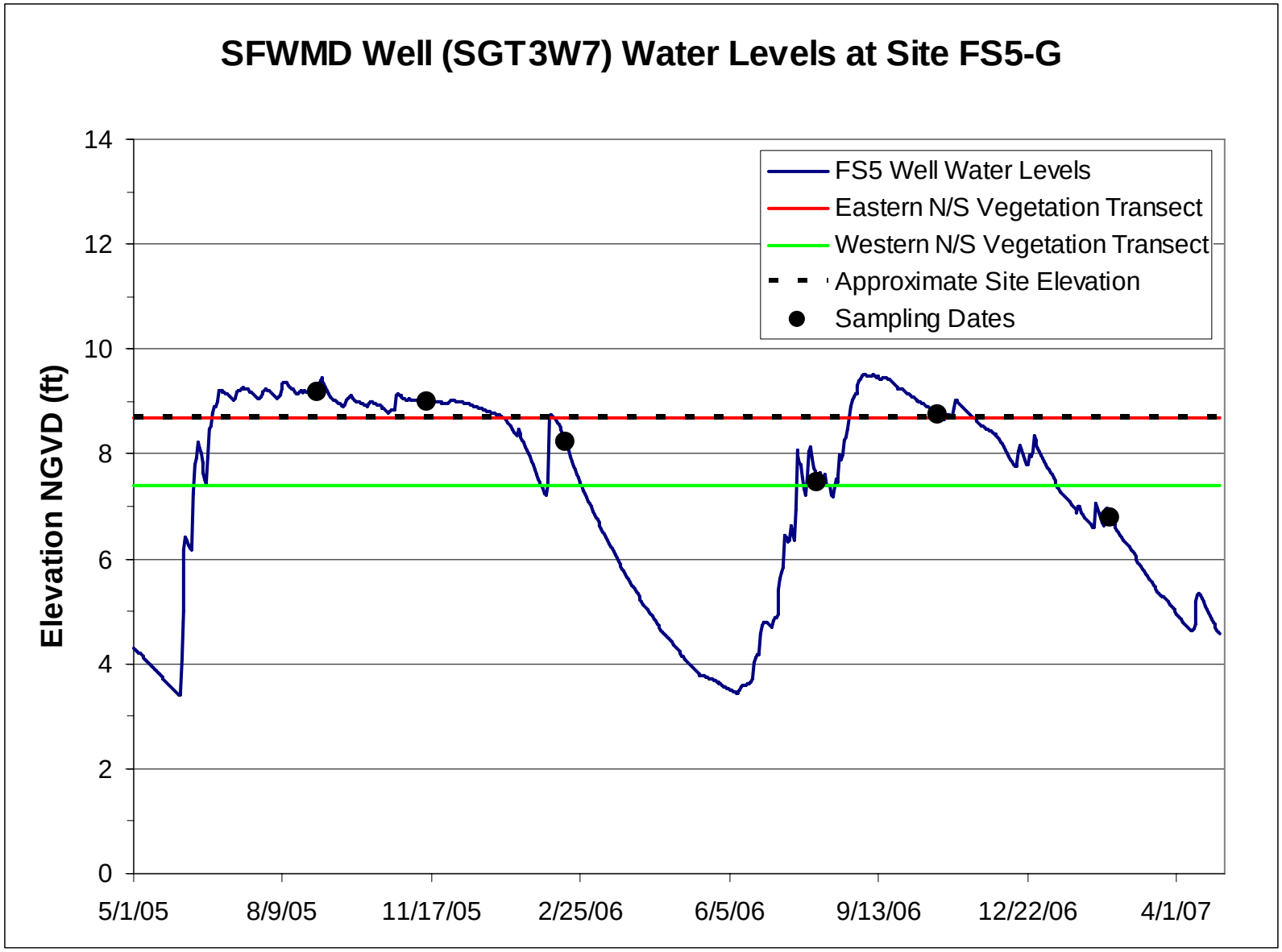
Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

Appendix A. Water level data at restoration sites.



Hydrologic data provided by SFWMD.

Appendix B. Water Quality Physical Parameters

Water Temperature (ºC)

Site	Location	Aug-Sep 05	Oct-Nov 05	Jan-Feb 06	Aug-06	Oct-Nov 06	Feb-07	N	Min	25th%	Mean	Median	75th%	Max
FP1	FPNWR	29.4	27.7	25.3	29.4	24.9		5	24.9	25.3	27.3	27.7	29.4	29.4
FP2	FPNWR	29.9	27.5					2	27.5	28.1	28.7	28.7	29.3	29.9
FP3	FPNWR	32.4	30.4					2	30.4	30.9	31.4	31.4	31.9	32.4
FP4	FPNWR	28.4	25.3	17.1	27.0	21.1		5	17.1	21.1	23.8	25.3	27.0	28.4
FP5	FPNWR	31.3	25.5		30.3			3	25.5	27.9	29.0	30.3	30.8	31.3
FP6	FPNWR	35.3	31.4					2	31.4	32.4	33.4	33.4	34.3	35.3
FS1	FSSP	28.7	25.6		28.9	21.8		4	21.8	24.7	26.3	27.2	28.8	28.9
FS2	FSSP	28.5	24.3		27.9	19.3		4	19.3	23.1	25.0	26.1	28.1	28.5
FS3	FSSP	31.1						1	31.1	na	na	na	na	31.1
FS4	FSSP	29.3	24.4	20.2	27.1	21.1		5	20.2	21.1	24.4	24.4	27.1	29.3
FS5	FSSP	28.7	24.9			26.9		3	24.9	25.9	26.8	26.9	27.8	28.7
FS6	FSSP	29.6	27.2	26.0	30.0	25.9		5	25.9	26.0	27.7	27.2	29.6	30.0
SG1	PSSF	27.6						1	27.6	na	na	na	na	27.6
SG5	PSSF	28.1	26.7					2	26.7	27.1	27.4	27.4	27.8	28.1
SG6	PSSF	30.8						1	30.8	na	na	na	na	30.8
SG7	PSSF	34.5						1	34.5	na	na	na	na	34.5
SG8	PSSF	34.0						1	34.0	na	na	na	na	34.0
SG12	PSSF	26.3	28.9			27.9		3	26.3	27.1	27.7	27.9	28.4	28.9
SG14	PSSF	27.9			27.6			2	27.6	27.7	27.8	27.8	27.8	27.9
SG15	PSSF	25.9						1	25.9	na	na	na	na	25.9
SG19	PSSF	28.5						1	28.5	na	na	na	na	28.5
SG20	PSSF	26.6			30.0			2	26.6	27.5	28.3	28.3	29.2	30.0
SG21	PSSF	35.1			39.2			2	35.1	36.1	37.2	37.2	38.2	39.2
SG22	PSSF	28.7						1	28.7	na	na	na	na	28.7
SG24	PSSF	28.3						1	28.3	na	na	na	na	28.3
SG25	PSSF	32.2						1	32.2	na	na	na	na	32.2
SG26	PSSF	29.3			34.6			2	29.3	30.6	32.0	32.0	33.3	34.6
SG27	PSSF	32.2			36.7			2	32.2	33.3	34.5	34.5	35.6	36.7
TT1	TTINWR	28.6	24.3	23.8	35.7	26.3	23.5	6	23.5	23.9	27.0	25.3	28.0	35.7
TT2	TTINWR	32.6	27.6	27.3	29.6	28.8	19.6	6	19.6	27.4	27.6	28.2	29.4	32.6

Appendix B. Water Quality Physical Parameters

Salinity (ppt)

Site	Location	Aug-Sep 05	Oct-Nov 05	Jan-Feb 06	Aug-06	Oct-Nov 06	Feb-07	N	Min	25th%	Mean	Median	75th%	Max
FP1	FPNWR	0.2	0.2	0.1	0.1	0.1		5	0.1	0.1	0.1	0.1	0.2	0.2
FP2	FPNWR	0.2	0.2					2	0.2	0.2	0.2	0.2	0.2	0.2
FP3	FPNWR	0.2	0.2					2	0.2	0.2	0.2	0.2	0.2	0.2
FP4	FPNWR	0.2	0.2	0.3	0.2	0.2		5	0.2	0.2	0.2	0.2	0.2	0.3
FP5	FPNWR	0.2	0.2		0.2			3	0.2	0.2	0.2	0.2	0.2	0.2
FP6	FPNWR	0.2	0.2					2	0.2	0.2	0.2	0.2	0.2	0.2
FS1	FSSP	0.2	0.3		0.3	0.3		4	0.2	0.3	0.3	0.3	0.3	0.3
FS2	FSSP	0.2	0.2		0.3	0.2		4	0.2	0.2	0.2	0.2	0.2	0.3
FS3	FSSP	0.2						1	0.2	na	na	na	na	0.2
FS4	FSSP	0.2	0.3	0.3	0.3	0.3		5	0.2	0.3	0.3	0.3	0.3	0.3
FS5	FSSP		0.2			0.2		2	0.2	0.2	0.2	0.2	0.2	0.2
FS6	FSSP	0.4	0.6	1.5	2.9	0.7		5	0.4	0.6	1.2	0.7	1.5	2.9
SG1	PSSF	0.0						1	0.0	na	na	na	na	0.0
SG5	PSSF	0.20	0.1					2	0.1	0.1	0.2	0.2	0.2	0.2
SG6	PSSF	0.1						1	0.1	na	na	na	na	0.1
SG7	PSSF	0.3						1	0.3	na	na	na	na	0.3
SG8	PSSF	0.0						1	0.0	na	na	na	na	0.0
SG12	PSSF	0.3	0.2			0.2		3	0.2	0.2	0.2	0.2	0.3	0.3
SG14	PSSF	0.1			0.1			2	0.1	0.1	0.1	0.1	0.1	0.1
SG15	PSSF	0.1						1	0.1	na	na	na	na	0.1
SG19	PSSF	0.3						1	0.3	na	na	na	na	0.3
SG20	PSSF	0.1			0.0			2	0.0	0.0	0.1	0.1	0.1	0.1
SG21	PSSF	0.0			0.0			2	0.0	0.0	0.0	0.0	0.0	0.0
SG22	PSSF	0.1						1	0.1	na	na	na	na	0.1
SG24	PSSF	0.2						1	0.2	na	na	na	na	0.2
SG25	PSSF	0.0						1	0.0	na	na	na	na	0.0
SG26	PSSF	0.1			0.1			2	0.1	0.1	0.1	0.1	0.1	0.1
SG27	PSSF	0.1			0.1			2	0.1	0.1	0.1	0.1	0.1	0.1
TT1	TTINWR		12.0	17.8	9.3	8.7	17.6	5	8.7	9.3	13.1	12.0	17.6	17.8
TT2	TTINWR	2.3	8.0	12.0	8.8	3.7	8.3	6	2.3	4.8	7.2	8.2	8.7	12.0

Appendix B. Water Quality Physical Parameters

Conductivity (µs)

Site	Location	Aug-Sep 05	Oct-Nov 05	Jan-Feb 06	Aug-06	Oct-Nov 06	Feb-07	N	Min	25th%	Mean	Median	75th%	Max
FP1	FPNWR	347.6	347.5	222.0	133.9	162.7		5	133.9	162.7	242.7	222.0	347.5	347.6
FP2	FPNWR	342.0	381.0					2	342.0	351.8	361.5	361.5	371.3	381.0
FP3	FPNWR	344.3	419.7					2	344.3	363.2	382.0	382.0	400.9	419.7
FP4	FPNWR	344.4	491.7	681.0	516.0	503.0		5	344.4	491.7	507.2	503.0	516.0	681.0
FP5	FPNWR	390.7	489.0		320.2			3	320.2	355.5	400.0	390.7	439.9	489.0
FP6	FPNWR	354.8	378.1					2	354.8	360.6	366.5	366.5	372.3	378.1
FS1	FSSP	483.0	529.0		528.0	544.0		4	483.0	516.8	521.0	528.5	532.8	544.0
FS2	FSSP	484.0	469.2		538.0	318.4		4	318.4	431.5	452.4	476.6	497.5	538.0
FS3	FSSP	441.2						1	441.2	na	na	na	na	441.2
FS4	FSSP	433.3	581.0	659.0	629.0	591.0		5	433.3	581.0	578.7	591.0	629.0	659.0
FS5	FSSP		467.8			389.8		2	389.8	409.3	428.8	428.8	448.3	467.8
FS6	FSSP	785.0	1242.0	1884.0	5480.0	1331.0		5	785.0	1242.0	2144.4	1331.0	1884.0	5480.0
SG1	PSSF	46.8						1	46.8	na	na	na	na	46.8
SG5	PSSF	354.7	203.0					2	203.0	240.9	278.9	278.9	316.8	354.7
SG6	PSSF	296.2						1	296.2	na	na	na	na	296.2
SG7	PSSF	566.0						1	566.0	na	na	na	na	566.0
SG8	PSSF	634.0						1	634.0	na	na	na	na	634.0
SG12	PSSF	628.0	392.7			368.4		3	368.4	380.6	463.0	392.7	510.4	628.0
SG14	PSSF	97.8			117.5			2	97.8	102.7	107.7	107.7	112.6	117.5
SG15	PSSF	201.2						1	201.2	na	na	na	na	201.2
SG19	PSSF	548.0						1	548.0	na	na	na	na	548.0
SG20	PSSF	103.8			77.4			2	77.4	84.0	90.6	90.6	97.2	103.8
SG21	PSSF	35.6			33.9			2	33.9	34.3	34.8	34.8	35.2	35.6
SG22	PSSF	129.9						1	129.9	na	na	na	na	129.9
SG24	PSSF	474.0						1	474.0	na	na	na	na	474.0
SG25	PSSF	6.2						1	6.2	na	na	na	na	6.2
SG26	PSSF	202.4			168.1			2	168.1	176.7	185.3	185.3	193.8	202.4
SG27	PSSF	255.4			191.1			2	191.1	207.2	223.3	223.3	239.3	255.4
TT1	TTINWR		20110.0	28220.0	16080.0	15050.0	28510.0	5	15050.0	16080.0	21594.0	20110.0	28220.0	28510.0
TT2	TTINWR	4480.0	12570.0	21150.0	15240.0	6860.0	14290.0	6	4480.0	8287.5	12431.7	13430.0	15002.5	21150.0

Appendix B. Water Quality Physical Parameters

Dissolved Oxygen (mg/l)

Site	Location	Aug-Sep 05	Oct-Nov 05	Jan-Feb 06	Aug-06	Oct-Nov 06	Feb-07	N	Min	25th%	Mean	Median	75th%	Max
FP1	FPNWR	1.54	5.39	3.40	5.84	8.16		5	1.54	3.40	4.87	5.39	5.84	8.16
FP2	FPNWR	2.24	5.21					2	2.24	2.98	3.73	3.73	4.47	5.21
FP3	FPNWR	1.56	2.03					2	1.56	1.68	1.80	1.80	1.91	2.03
FP4	FPNWR	0.21	1.35	2.04	1.88	0.89		5	0.21	0.89	1.27	1.35	1.88	2.04
FP5	FPNWR	1.15	1.94		4.33			3	1.15	1.55	2.47	1.94	3.14	4.33
FP6	FPNWR	5.36	8.95					2	5.36	6.26	7.16	7.16	8.05	8.95
FS1	FSSP	2.15	5.85		4.88	6.78		4	2.15	4.20	4.92	5.37	6.08	6.78
FS2	FSSP	1.21	5.85		3.76	7.13		4	1.21	3.12	4.49	4.81	6.17	7.13
FS3	FSSP	1.11						1	1.11	na	na	na	na	1.11
FS4	FSSP	0.53	1.29	2.69	1.28	2.73		5	0.53	1.28	1.70	1.29	2.69	2.73
FS5	FSSP	2.36	5.73			3.40		3	2.36	2.88	3.83	3.40	4.57	5.73
FS6	FSSP	1.77	3.47	5.24	5.10	8.37		5	1.77	3.47	4.79	5.10	5.24	8.37
SG1	PSSF	2.95						1	2.95	na	na	na	na	2.95
SG5	PSSF	1.72	2.03					2	1.72	1.80	1.88	1.88	1.95	2.03
SG6	PSSF	2.44						1	2.44	na	na	na	na	2.44
SG7	PSSF	2.93						1	2.93	na	na	na	na	2.93
SG8	PSSF	3.72						1	3.72	na	na	na	na	3.72
SG12	PSSF	0.57	2.89			1.07		3	0.57	0.82	1.51	1.07	1.98	2.89
SG14	PSSF	1.70			1.57			2	1.57	1.60	1.64	1.64	1.67	1.70
SG15	PSSF	0.60						1	0.60	na	na	na	na	0.60
SG19	PSSF	0.06						1	0.06	na	na	na	na	0.06
SG20	PSSF	1.82			3.38			2	1.82	2.21	2.60	2.60	2.99	3.38
SG21	PSSF	7.94			7.50			2	7.50	7.61	7.72	7.72	7.83	7.94
SG22	PSSF	0.95						1	0.95	na	na	na	na	0.95
SG24	PSSF	0.64						1	0.64	na	na	na	na	0.64
SG25	PSSF	4.29						1	4.29	na	na	na	na	4.29
SG26	PSSF	2.30			2.90			2	2.30	2.45	2.60	2.60	2.75	2.90
SG27	PSSF	3.04			6.17			2	3.04	3.82	4.61	4.61	5.39	6.17
TT1	TTINWR	1.12	3.39	3.03	9.41	5.07	7.27	6	1.12	3.12	4.88	4.23	6.72	9.41
TT2	TTINWR	3.74	7.84	6.76	2.44	7.58	9.03	6	2.44	4.50	6.23	7.17	7.78	9.03

Appendix B. Water Quality Physical Parameters

pH (Standard Units)

Site	Location	Aug-Sep 05	Oct-Nov 05	Jan-Feb 06	Aug-06	Oct-Nov 06	Feb-07	N	Min	25th%	Mean	Median	75th%	Max
FP1	FPNWR	6.82	7.24	7.23	6.30	6.67		5	6.30	6.7	6.9	6.8	7.2	7.24
FP2	FPNWR	6.88	6.72					2	6.72	6.8	6.8	6.8	6.8	6.88
FP3	FPNWR	7.04	6.93					2	6.93	7.0	7.0	7.0	7.0	7.04
FP4	FPNWR	6.98	7.06	7.18	7.31	5.93		5	5.93	7.0	6.9	7.1	7.2	7.31
FP5	FPNWR	6.57	6.91		6.73			3	6.57	6.7	6.7	6.7	6.8	6.91
FP6	FPNWR	7.44	7.77					2	7.44	7.5	7.6	7.6	7.7	7.77
FS1	FSSP	7.22	7.41		7.26	7.16		4	7.16	7.2	7.3	7.2	7.3	7.41
FS2	FSSP	6.50	7.60		6.95	7.56		4	6.50	6.8	7.2	7.3	7.6	7.60
FS3	FSSP	6.78						1	6.78	na	na	na	na	6.78
FS4	FSSP	7.02	7.00	6.94	6.68	7.41		5	6.68	6.9	7.0	7.0	7.0	7.41
FS5	FSSP	7.17	7.29			4.73		3	4.73	6.0	6.4	7.2	7.2	7.29
FS6	FSSP	6.94	7.52	7.17	6.49	7.71		5	6.49	6.9	7.2	7.2	7.5	7.71
SG1	PSSF	6.20						1	6.20	na	na	na	na	6.20
SG5	PSSF	6.61	6.85					2	6.61	6.7	6.7	6.7	6.8	6.85
SG6	PSSF	6.70						1	6.70	na	na	na	na	6.70
SG7	PSSF	6.55						1	6.55	na	na	na	na	6.55
SG8	PSSF	5.50						1	5.50	na	na	na	na	5.50
SG12	PSSF	6.84	7.01			5.08		3	5.08	6.0	6.3	6.8	6.9	7.01
SG14	PSSF	5.99			6.30			2	5.99	6.1	6.1	6.1	6.2	6.30
SG15	PSSF	5.79						1	5.79	na	na	na	na	5.79
SG19	PSSF	7.13						1	7.13	na	na	na	na	7.13
SG20	PSSF	6.23			6.13			2	6.13	6.2	6.2	6.2	6.2	6.23
SG21	PSSF	5.58			7.60			2	5.58	6.1	6.6	6.6	7.1	7.60
SG22	PSSF	6.73						1	6.73	na	na	na	na	6.73
SG24	PSSF	6.90						1	6.90	na	na	na	na	6.90
SG25	PSSF	6.69						1	6.69	na	na	na	na	6.69
SG26	PSSF	6.81			6.86			2	6.81	6.8	6.8	6.8	6.8	6.86
SG27	PSSF	7.06			7.60			2	7.06	7.2	7.3	7.3	7.5	7.60
TT1	TTINWR	6.97	7.26	7.41	7.16	7.53	7.64	6	6.97	7.2	7.3	7.3	7.5	7.64
TT2	TTINWR	6.69	7.88	7.58	6.97	5.09	8.27	6	5.09	6.8	7.1	7.3	7.8	8.27

Appendix C. Site Summary

Site: **FP1**
Habitat: Cypress with Graminoid (Cg)
General location: Eastern, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.18530000 -81.37901667
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Representative habitat, unique aquatic fauna observed including, Everglades dwarf siren, *Pseudobranchus axanthus belli*

Anuran Data (PVC pipe abundance combined)

Scientific name	25 Aug 05	19 Oct 05	15 Nov 05	20 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	10 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	0	0	0	1	0	3	0	0	0	0	0	1	1	6
Hyla squirrela	0	0	0	0	0	0	0	0	1	3	3	1	0	8
Osteopilus septentrionalis	0	0	0	0	0	0	0	0	1	0	0	0	0	1

Fish Data (Breder trap abundance combined)

Scientific name	17-Aug-05 wet	19-Oct-05 wet	31-Jan-06 invert only	10-Aug-06 wet	25-Oct-06 wet	22-Feb-07 dry	Total
Ameiurus nebulosus	0	0		1	0		1
Chaenobryttus gulosus	1	0		0	0		1
Fundulus chrysotus	1	2		0	0		3
Fundulus confluentus	0	6		0	0		6
Gambusia holbrooki	52	176		21	21		166
Heterandria formosa	1	0		0	1		2
Jordanella floridae	0	12		10	0		22
Lepomis marginatus	2	0		0	0		2
Lepomis sp.	1	0		0	1		2
Poecilia latipinna	0	1		0	1		2

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	4	1	5
Acrididae	Dichromorpha	elegans	0	1	1
Acrididae	Leptysma	marginicollis	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Paratrechina concinna	0	2	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Paratrechina concinna	0	1	0	0	1
Pheidole dentata	1	2	1	3	7
Pheidole floridana	0	1	2	2	5
Pheidole moerens	3	2	0	3	8

Appendix C. Site Summary

Site: **FP2**
Habitat: Prairie (G)
General location: Eastern, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.18590000 -81.37875000
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Surrounded by pine flatwoods and cypress forest, green treefrogs abundant

Anuran Data (PVC pipes)

Scientific name	25 Aug 05	19 Oct 05	15 Nov 05	20 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	10 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	1	3	3	2	2	6	10	2	3	3	2	1	1	39
Hyla squirrela	0	0	0	0	0	0	0	0	0	0	1	2	1	4

Fish Data (Breder trap abundance combined)

Scientific name	17-Aug-05 wet	19-Oct-05 wet	31-Jan-06 dry	10-Aug-06 invert only	25-Oct-06 invert only	22-Feb-07 dry	Total
Chaenobryttus gulosus	2	0					2
Cichlasoma bimaculatum	0	1					1
Fundulus chrysotus	3	4					7
Fundulus confluentus	0	7					7
Gambusia holbrooki	46	29					75
Jordanella floridae	9	50					59
Lucania goodei	1	0					1
Poecilia latipinna	0	3					3

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	3	0	3
Acrididae	*Achurum*	*carinatum*	1	2	3
Acrididae	*Aptenopedes*	*sphenarioides*	0	2	2
Acrididae	*Paroxya*	*atlantica*	0	3	3
Acrididae	*Stenacris*	*vitreipennis*	1	0	1
Gryllidae	Gryllidae	Gryllidae	0	0	0
Tettigoniidae	Tettigoniidae	Tettigoniidae	2	2	4
Tettigoniidae	*Orchelimum*	*militare*	2	0	2
Tettigoniidae	*Orchelimum*	*sp.*	1	1	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	0	4	4

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Solenopsis invicta	0	1	2	7	10

Appendix C. Site Summary

Site: **FP3**
Habitat: Hydric Pine Flatwood (Ph)
General location: Eastern, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.18766667 -81.37791667
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Representative flatwood habitat, prescribed fire schedule, squirrel treefrogs abundant

Anuran Data (PVC pipes)

Scientific name	25 Aug 05	19 Oct 05	15 Nov 05	20 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	10 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	0	1	2	1	1	1	2	1	0	0	0	0	0	9
Hyla squirrela	0	2	1	1	4	1	6	6	7	6	8	5	7	54

Fish Data (Breder trap abundance combined)

Scientific name	17-Aug-05 wet	19-Oct-05 invert only	31-Jan-06 dry	10-Aug-06 dry	25-Oct-06 dry	22-Feb-07 dry	Total
Gambusia holbrooki	15						15
Heterandria formosa	3						3
Jordanella floridae	10						10
Lucania goodei	1						1
Poecilia latipinna	1						1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	2	0	2
Acrididae	*Aptenopedes*	*sphenarioides*	2	1	3
Acrididae	*Dichromorpha*	*elegans*	7	2	9
Acrididae	*Paroxya*	*atlantica*	1	0	1
Gryllidae	Gryllidae	Gryllidae	1	0	1
Tettigoniidae	*Odontoxiphidium*	*apterum*	4	0	4

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster atkinsoni	5	2	7
Formica archboldi	1	0	1
Paratrechina concinna	0	2	2
Pseudomyrmex ejectus	1	0	1
Solenopsis invicta	2	2	4
Tapinoma melanocephalum	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	0	0	1	1
Crematogaster atkinsoni	0	1	1	1	3
Paratrechina concinna	0	0	0	1	1
Pheidole floridana	1	0	1	0	2
Pheidole moerens	3	0	4	0	7
Solenopsis invicta	6	4	3	5	18

Appendix C. Site Summary

Site: **FP4**
Habitat: Cypress (C)
General location: Western, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.17273333 -81.45003333
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Western edge of site includes cypress dome depressional feature, relatively natural hydrology, diverse aquatic fauna

Anuran Data (PVC pipes)

Scientific name	24 Aug 05	20 Oct 05	22 Nov 05	12 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	9 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	0	0	2	5	0	3	1	1	0	0	0	1	2	15
Hyla squirrela	0	0	0	1	0	1	0	0	1	2	1	1	0	7

Fish Data (Breder trap abundance combined)

Scientific name	23-Aug-05 wet	20-Oct-05 wet	1-Feb-06 wet	9-Aug-06 wet	25-Oct-06 wet	22-Feb-07 dry	Total
Astronotus ocellatus	0	0	0	0	2		2
Chaenobryttus gulosus	4	0	1	0	0		5
Cichlasoma bimaculatum	0	1	2	0	2		5
Elassoma evergladei	0	0	2	0	0		2
Fundulus confluentus	0	0	1	0	0		1
Gambusia holbrooki	19	106	566	2	82		775
Heterandria formosa	0	2	50	0	1		53
Jordanella floridae	0	0	2	0	1		3
Lepomis punctatus	0	2	1	0	0		3
Lucania goodei	1	1	2	0	1		5

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	1	1
Acrididae	*Metaleptea*	*brevicornis*	1	0	1
Tettigoniidae	*Orchelimum*	*sp.*	0	1	1
Tettigoniidae	*Orchelimum*	*pulchellum*	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster atkinsoni	1	1	2
Odontomachus brunneus	1	1	2
Paratrechina concinna	0	2	2
Pseudomyrmex ejectus	1	0	1
Solenopsis invicta	0	2	2
Tapinoma melanocephalum	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Pheidole dentata	0	1	0	0	1
Pheidole floridana	1	6	3	2	12
Pheidole moerens	2	0	1	4	7
Solenopsis invicta	0	1	0	0	1

Appendix C. Site Summary

Site: **FP5**
Habitat: Prairie (G)
General location: Western, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.17260000 -81.44945000
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Small praire habitat surrounded by flatwoods and cypress dome located to the north

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	24 Aug 05	20 Oct 05	22 Nov 05	12 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	9 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	2	1	0	8	3	x	1	1	1	3	1	6	2	29
Hyla squirrela	0	0	4	0	4	2	4	4	3	9	7	2	2	41
Osteopilus septentrionalis	0	0	1	0	0	x	0	0	0	0	0	0	0	1

Fish Data (Breder trap abundance combined)

Scientific name	23-Aug-05 wet	20-Oct-05 wet	1-Feb-06 dry	9-Aug-06 wet	25-Oct-06 invert only	22-Feb-07 dry	Total
Chaenobryttus gulosus	1	0		0			1
Cichlasoma bimaculatum	3	0		0			3
Cichlasoma urophthalma	0	0		0			0
Fundulus chrysotus	3	0		0			3
Fundulus confluentus	1	1		0			2
Gambusia holbrooki	105	27		10			142
Heterandria formosa	1	0		0			1
Jordanella floridae	9	4		7			20
Lepomis marginatus	1	0		0			1
Poecilia latipinna	1	0		0			1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	4	4
Acrididae	*Achurum*	*carinatum*	17	1	18
Acrididae	*Aptenopedes*	*sphenarioides*	0	4	4
Acrididae	*Dichromorpha*	*elegans*	2	4	6
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	2	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	4	5	9
Paratrechina concinna	0	1	1
Solenopsis invicta	0	3	3
Tapinoma sessile	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster atkinsoni	1	0	0	0	1
Pheidole floridana	0	1	0	0	1
Solenopsis invicta	0	5	9	2	16

Appendix C. Site Summary

Site: **FP6**
Habitat: Hydric Pine Flatwood (Ph)
General location: Western, Florida Panther National Wildlife Refuge
GPS coordinates (decimal degrees): 26.17245000 -81.44871667
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Representative flatwood habitat, prescribed fire schedule, ant species richness high

Anuran Data (PVC pipes)

Scientific name	24 Aug 05	20 Oct 05	22 Nov 05	12 Dec 05	1 Feb 06	23 Mar 06	1 Jun 06	9 Aug 06	25 Oct 06	27 Dec 06	22 Feb 07	26 Apr 07	21 Jun 07	Total
Hyla cinerea	0	0	0	5	0	1	0	0	0	1	2	1	1	11
Hyla squirrela	0	1	2	4	5	5	3	3	9	9	7	3	3	54
Osteopilus septentrionalis	0	0	0	0	0	0	0	0	1	0	1	0	0	2

Fish Data (Breder trap abundance combined)

Scientific name	23-Aug-05 wet	20-Oct-05 invert only	1-Feb-06 dry	9-Aug-06 dry	25-Oct-06 dry	22-Feb-07 dry	Total
Fundulus chrysotus	5						5
Gambusia holbrooki	47						47
Jordanella floridae	7						7

Orthopteran (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	3	1	4
Acrididae	*Aptenopedes*	*sphenarioides*	4	2	6
Acrididae	*Dichromorpha*	*elegans*	10	1	11
Acrididae	*Leptysma*	*marginicollis*	0	1	1
Acrididae	*Paroxya*	*atlantica*	1	1	2
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster atkinsoni	3	1	4
Forelius pruinosus	0	1	1
Hypoponera opaciceps	0	2	2
Monomorium floricola	0	1	1
Paratrechina concinna	1	0	1
Paratrechina guatemalensis	1	0	1
Pheidole dentata	0	2	2
Pseudomyrmex elongatus	0	1	1
Pseudomyrmex ejectus	1	0	1
Pseudomyrmex gracilis	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	0	0	1	1
Dorymyrmex bureni	1	0	0	0	1
Forelius pruinosus	1	3	2	2	8
Monomorium floricola	1	0	0	0	1
Pheidole dentata	3	3	6	1	13
Pheidole floridana	0	1	1	0	2
Pheidole moerens	1	0	1	0	2
Solenopsis invicta	0	0	1	0	1
Tapinoma sessile	0	0	1	0	1

Appendix C. Site Summary

Site: **FS1**
Habitat: Cypress with Graminoid (Cg)
General location: Southeastern, Fakahatchee Strand State Preserve
GPS coordinates (decimal degrees): 25.97706667 -81.36783333
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Surrounded on both sides by prairie habitat, depressional feature located to the south

Anuran Data (PVC pipes)

Scientific name	17 Aug 05	18 Oct 05	22 Nov 05	12 Dec 05	28 Feb 06	28 Mar 06	2 May 06	8 Aug 06	24 Oct 06	19 Dec 06	21 Feb 07	17 Apr 07	13 Jun 07	Total
Hyla squirrela	0	2	11	11	11	7	5	4	2	5	7	3	1	69
Osteopilus septentrionalis	0	1	1	0	2	0	3	0	3	2	1	2	0	15

Fish Data (Breder trap abundance combined)

Scientific name	25-Aug-05 wet	18-Oct-05 wet	28-Feb-06 dry	8-Aug-06 wet	24-Oct-06 wet	21-Feb-07 dry	Total
Elassoma evergladei	0	0		0	1		1
Fundulus chrysotus	0	0		0	1		1
Fundulus confluentus	0	1		0	0		1
Gambusia holbrooki	66	79		4	35		184
Heterandria formosa	0	2		0	0		2
Jordanella floridae	0	0		0	1		1
Lucania goodei	2	1		0	4		7

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	3	0	3
Acrididae	*Aptenopedes*	*sphenarioides*	0	3	3
Acrididae	*Leptysma*	*marginicollis*	1	0	1
Acrididae	*Paroxya*	*clavuliger*	0	2	2
Tettigoniidae	*Orchelimum*	*pulchellum*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	2	1	3
Dolichoderus pustulatus	0	2	2
Odontomachus brunneus	1	0	1
Pseudomyrmex ejectus	1	3	4
Pseudomyrmex gracilis	1	3	4
Solenopsis invicta	3	0	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Paratrechina concinna	1	0	0	0	1
Pheidole dentata	0	1	0	0	1
Pheidole moerens	4	4	3	6	17
Solenopsis invicta	2	4	1	3	10
Tapinoma melanocephalum	0	1	0	0	1

Appendix C. Site Summary

Site: **FS2**
Habitat: Prairie (G)
General location: Southeastern, Fakahatchee Strand State Preserve
GPS coordinates (decimal degrees): 25.97565000 -81.36711667
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Representative wet prairie site

Anuran Data (PVC pipes)

Scientific name	17 Aug 05	18 Oct 05	22 Nov 05	12 Dec 05	28 Feb 06	28 Mar 06	2 May 06	8 Aug 06	24 Oct 06	19 Dec 06	21 Feb 07	17 Apr 07	13 Jun 07	Total
Hyla cinerea	0	0	0	0	1	1	0	0	0	0	0	0	1	3
Hyla squirrela	0	2	0	12	0	0	0	0	4	6	12	15	0	51

Fish Data (Breder trap abundance combined)

Scientific name	25-Aug-05 wet	18-Oct-05 wet	28-Feb-06 dry	8-Aug-06 wet	24-Oct-06 wet	21-Feb-07 dry	Total
Fundulus chrysotus	0	1		0	0		1
Fundulus confluentus	0	2		0	2		4
Gambusia holbrooki	80	88		2	128		298
Heterandria formosa	0	10		0	1		11
Jordanella floridae	0	17		0	1		18
Lepomis punctatus	0	0		1	0		1
Lucania goodei	1	1		0	0		2
Poecilia latipinna	0	2		0	0		2

Orthopteran (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	1	1
Acrididae	*Achurum*	*carinatum*	1	1	2
Acrididae	*Aptenopedes*	*sphenarioides*	1	1	2
Acrididae	*Paroxya*	*clavuliger*	8	3	11
Tettigoniidae	Tettigoniidae	Tettigoniidae	1	3	4

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	5	3	8
Dolichoderus pustulatus	0	2	2
Solenopsis invicta	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster atkinsoni	0	1	1	3	5
Forelius pruinosus	0	1	0	0	1
Pheidole moerens	1	0	0	0	1
Solenopsis invicta	4	5	8	6	23
Tapinoma sessile	1	0	0	0	1

Appendix C. Site Summary

Site: **FS3**
Habitat: Hydric Pine Flatwood (Ph)
General location: Southeastern, Fakahatchee Strand State Preserve
GPS coordinates (decimal degrees): 25.97995000 -81.36340000
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Small island of pine habitat surrounded by cypress and prairie habitat.

Anuran Data (PVC pipes)

Scientific name	17 Aug 05	18 Oct 05	22 Nov 05	12 Dec 05	28 Feb 06	28 Mar 06	2 May 06	8 Aug 06	24 Oct 06	19 Dec 06	21 Feb 07	17 Apr 07	13 Jun 07	Total
Hyla cinerea	0	0	0	1	2	1	1	0	1	0	1	1	0	8
Hyla squirrela	0	0	5	7	8	5	2	0	1	0	1	2	0	31
Osteopilus septentrionalis	0	1	2	3	4	2	1	2	3	0	3	2	0	23

Fish Data (Breder trap abundance combined)

Scientific name	31-Aug-05 invert only	18-Oct-05 dry	28-Feb-06 dry	8-Aug-06 dry	24-Oct-06 dry	21-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	3	3
Acrididae	*Achurum*	*carinatum*	0	1	1
Acrididae	*Aptenopedes*	*sphenarioides*	0	2	2
Acrididae	*Dichromorpha*	*elegans*	5	2	7
Acrididae	*Paroxya*	*sp.*	1	0	1
Acrididae	*Schistocera*	*sp.*	1	0	1
Tettigoniidae	*Odontoxiphidium*	*apterum*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster atkinsoni	1	0	1
Dolichoderus pustulatus	1	0	1
Forelius pruinosus	0	1	1
Monomorium floricola	0	1	1
Pseudomyrmex ejectus	1	1	2
Pseudomyrmex gracilis	1	1	2
Pseudomyrmex pallidus	2	1	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	0	2	0	2
Crematogaster atkinsoni	0	2	1	0	3
Forelius pruinosus	0	0	0	1	1
Pheidole dentata	2	1	3	2	8
Pheidole floridana	1	1	0	0	2
Pheidole moerens	1	0	0	0	1
Solenopsis invicta	4	4	2	5	15

Appendix C. Site Summary

Site: **FS4**
Habitat: Cypress (C)
General location: Southcentral, Fakahatchee Strand State Preserve
GPS coordinates (decimal degrees): 25.98026667 -81.39300000
Proximity to Well: N/A
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Representative of the deep slough habitat in Fakahatchee

Anuran Data (PVC pipes)

Scientific name	17 Aug 05	14 Nov 05	6 Dec 05	2 Feb 06	28 Mar 06	2 May 06	2 Aug 06	24 Oct 06	19 Dec 06	21 Feb 07	17 Apr 07	13 Jun 07	Total
Hyla cinerea	0	4	2	0	0	1	2	0	1	0	0	0	10
Hyla squirrela	0	0	0	0	0	0	0	0	0	0	0	1	1
Osteopilus septentrionalis	0	0	1	0	1	1	0	0	0	1	0	0	4

Fish Data (Breder trap abundance combined)

Scientific name	31-Aug-05 wet	14-Nov-05 wet	2-Feb-06 wet	2-Aug-06 wet	24-Oct-06 wet	21-Feb-07 dry	Total
Belonesox belizanus	0	1	0	0	0		1
Chaenobryttus gulosus	2	0	0	0	0		2
Cichlasoma bimaculatum	2	0	0	0	0		2
Fundulus chrysotus	0	1	0	0	0		1
Fundulus confluentus	0	1	0	0	0		1
Gambusia holbrooki	2	59	1	2	160		224
Heterandria formosa	0	1	2	0	0		3
Lepomis punctatus	0	1	0	0	0		1
Lucania goodei	0	1	0	0	0		1
Poecilia latipinna	0	1	0	0	0		1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	3	7	10
Gryllidae	*Cycloptilum*	*sp.*	1	0	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	3	3
Tridactyloidea	*Ellipes*	*minutus*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	2	2
Odontomachus brunneus	2	0	2
Paratrechina guatemalensis	1	0	1
Pheidole moerens	0	1	1
Platythyrea pustulatus	0	1	1
Pseudomyrmex ejectus	1	0	1
Pseudomyrmex gracilis	0	1	1
Pseudomyrmex pallidus	1	0	1
Pseudomyrmex simplex	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Camponotus floridanus		1	0	0	1
Odontomachus brunneus		1	0	4	5
Paratrechina concinna		1	0	0	1
Paratrechina guatemalensis				1	1
Pheidole floridana		0	0	1	1
Pheidole moerens		6	2	5	13
Tapinoma melanocephalum		0	0	1	1
Wasmannia auropunctata				1	1

Appendix C. Site Summary

Site: **FS5**
Habitat: Prairie (G), surrounded by cypress strand
General location: Western, Fakahatchee Strand State Preserve
GPS coordinates (decimal degrees): 26.04723333 -81.44143333
Proximity to Well: SGT3W7
Approximate days inundated 5/05-4/06: 198
Approximate days inundated 5/06-4/07: 81
Comments: Adjacent to artificial borrow pit and elevated road

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	17 Aug 05	14 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	2 Aug 06	23 Oct 06	21 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Hyla cinerea	0	0	1	0	x	0	2	0	0	1	0	0	4
Hyla squirrela	1	0	0	0	x	0	0	0	0	1	0	0	2
Osteopilus septentrionalis	0	0	0	0	x	0	0	1	3	5	3	1	13

Fish Data (Breder trap abundance combined)

Scientific name	1-Sep-05 wet	14-Nov-05 wet	15-Feb-06 dry	2-Aug-06 dry	23-Oct-06 wet	15-Feb-07 dry	Total
Belonesox belizanus	2	0			0		2
Fundulus confluentus	2	3			1		6
Gambusia holbrooki	38	27			39		104
Heterandria formosa	0	1			1		2
Jordanella floridae	8	4			2		14
Poecilia latipinna	6	2			5		13

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Aptenopedes*	*sphenarioides*	1	0	1
Acrididae	*Dichromorpha*	*elegans*	2	0	2
Acrididae	*Mermiria*	*sp.*	1	0	1
Acrididae	*Paroxya*	*atlantica*	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster ashmeadi	1	0	1
Crematogaster atkinsoni	4	3	7
Dorymyrmex bureni	0	1	1
Paratrechina concinna	0	2	2
Pheidole dentata	0	1	1
Pheidole moerens	0	1	1
Solenopsis geminate	0	1	1
Solenopsis invicta	0	2	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster atkinsoni	2	0	0	0	2
Paratrechina concinna	1	0	0	0	1
Pheidole moerens	3	0	0	0	3
Solenopsis invicta	2	0	7	4	13

Appendix C. Site Summary

Site: **FS6**
Habitat: Saltwater Marsh (Ms)
General location: Fakahatchee Strand State Preserve South of U.S.41
GPS coordinates (decimal degrees): 25.93878333 -81.48670000
Proximity to Well: SGT5W3
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Logistically challenging location, diverse assortment of aquatic fauna, highly productive environment

Anuran Data (PVC pipes)

Scientific name	13 Sep 05	17 Nov 05	16 Dec 05	7 Feb 06	31 Mar 06	2 May 06	15 Aug 06	31 Oct 06	26 Dec 06	7 Feb 07	30 Apr 07	26 Jun 07	Total
Hyla cinerea	0	0	4	4	2	1	1	3	0	2	0	0	17

Fish Data (Breder trap abundance combined)

Scientific name	13-Sep-05 wet	17-Nov-05 wet	24-Jan-06 wet	15-Aug-06 wet	31-Oct-06 wet	7-Feb-07 invert only	Total
Belonesox belizanus	0	0	0	2	2		4
Cichlasoma urophthalma	2	5	0	0	1		8
Cyprinodon variegatus	13	23	16	21	5		78
Elassoma evergladei	0	0	1	0	0		1
Fundulus chrysotus	0	0	1	0	0		1
Fundulus confluentus	0	3	7	2	1		13
Fundulus grandis	0	0	0	0	1		1
Gambusia holbrooki	93	75	69	18	4		259
Heterandria formosa	0	0	2	0	0		2
Jordanella floridae	0	3	10	5	0		18
Lucania parva	0	0	0	0	1		1
Menidia beryllina	1	0	0	0	0		1
Poecilia latipinna	45	122	2	128	146		443

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	5	5
Acrididae	*Leptysma*	*marginicollis*	29	2	31
Tettigoniidae	*Tettigoniidae*	*Tettigoniidae*	2	9	11
Tettigoniidae	*Orchelimum*	*sp.*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	3	2	5
Tapinoma sessile	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Site not sampled due to high water					

Appendix C. Site Summary

Site: **SG1**
Habitat: Cypress with Graminoid (Cg)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14621667 -81.57958333
Proximity to Well: SGT1W1
Approximate days inundated 5/05-4/06: 21
Approximate days inundated 5/06-4/07: 32
Comments: Very drained and disturbed location, cabbage palms invading site, horse trail cuts through western edge of site

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	4 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla squirrela	0	0	0	0	0	0	0	0	0	0	0	1	x	1
Osteopilus septentrionalis	1	1	0	3	5	3	2	1	4	2	2	5	x	29

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05 wet	11-Oct-05 dry	16-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
Gambusia holbrooki	93						93
Heterandria formosa	1						1
Jordanella floridae	1						1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Dichromorpha*	*elegans*	0	1	1
Acrididae	*Melanoplus*	*puer*	0	1	1
Gryllidae	Gryllidae	Gryllidae	1	0	1
Tettigoniidae	*Conocephalus*	*sp.*	1	0	1
Tettigoniidae	*Odontoxiphidium*	*apterum*	1	0	1
Tetrigidae	Tetrigidae	Tetrigidae	4	4	8
Tetrigidae	*Paratettix*	*rugosus*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Cardiocondyla emeryi	0	1	1
Dorymyrmex bureni	2	2	4
Forelius pruinosus	1	2	3
Paratrechina bourbonica	1	0	1
Paratrechina concinna	0	1	1
Pheidole moerens	0	1	1
Pseudomyrmex ejectus	2	1	3
Pseudomyrmex gracilis	0	1	1
Solenopsis invicta	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Dorymyrmex bureni	0	1	0	0	1
Forelius pruinosus	1	2	0	1	4
Pheidole moerens	0	0	0	1	1
Solenopsis invicta	3	5	4	1	13
Tapinoma sessile	1	0	0	0	1

Appendix C. Site Summary

Site: **SG2**
Habitat: Mesic Hammock (Hm)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14728333 -81.56811667
Proximity to Well: SGT1W2
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments: Disturbed hammock due to wild fire and hurricane damage

Anuran Data (PVC pipes)

Scientific name	4 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	1	2	4	4	3	4	2	1	6	4	6	4	1	42

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05	11-Oct-05	16-Feb-06	27-Jul-06	19-Oct-06	14-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	7	0	7
Gryllidae	*Cycloptilum*	*sp.*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	2	5	7
Camponotus impressus	1	0	1
Camponotus planatus	0	1	1
Crematogaster ashmeadi	1	1	2
Crematogaster atkinsoni	1	1	2
Dorymyrmex bureni	0	1	1
Paratrechina guatemalensis	3	4	7
Pheidole dentata	2	1	3
Pheidole moerens	0	1	1
Pseudomyrmex ejectus	2	5	7
Pseudomyrmex gracilis	1	1	2
Tapinoma melanocephalum	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb	Jun	Feb	Jun	Total
Crematogaster ashmeadi	1	0	0	0	1
Crematogaster atkinsoni	1	0	0	0	1
Paratrechina guatemalensis				1	1
Pheidole dentata	1	5	3	2	11
Pheidole moerens	1	2	2	2	7
Solenopsis invicta	4	2	1	2	9

Appendix C. Site Summary

Site: **SG3**
Habitat: Prairie (G)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14706667 -81.56943333
Proximity to Well: SGT1W2
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments: Dry prairie, orthopteran richness high

Anuran Data (PVC pipes)

Scientific name	4 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	4	4	2	7	4	1	0	0	0	2	3	4	0	31

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05	11-Oct-05	16-Feb-06	27-Jul-06	19-Oct-06	14-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	11	13	24
Acrididae	*Achurum*	*carinatum*	2	4	6
Acrididae	*Aptenopedes*	*sphenarioides*	0	1	1
Acrididae	*Leptysma*	*marginicollis*	1	0	1
Acrididae	*Melanoplus*	*puer*	5	1	6
Acrididae	*Mermiria*	*intertexta*	2	0	2
Acrididae	*Schistocera*	*sp.*	1	0	1
Gryllidae	Gryllidae	Gryllidae	0	1	1
Gryllidae	*Pictonemobius*	*sp.*	0	2	2
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	2	2
Tettigoniidae	*Belocephalus*	*sp.*	1	0	1
Tettigoniidae	*Odontoxiphidium*	*apterum*	6	3	9
Tetrigidae	Tetrigidae	Tetrigidae	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	1	2
Crematogaster atkinsoni	1	1	2
Dorymyrmex bureni	3	5	8
Forelius pruinosus	2	0	2
Pheidole dentata	2	0	2
Pseudomyrmex ejectus	1	2	3
Solenopsis invicta	0	5	5

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Pheidole moerens	0	0	1	0	1
Solenopsis invicta	7	9	6	2	24

Appendix C. Site Summary

Site: **SG4**
Habitat: Mesic Pine Flatwoods (Pm)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14590000 -81.54415000
Proximity to Well: SGT1W3
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments:

Anuran Data (PVC pipes)

Scientific name	5 Aug 05	12 Oct 05	10 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	25 Jun 07	Total
Osteopilus septentrionalis	1	1	2	2	0	0	0	0	0	2	1	1	3	13

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05 dry	12-Oct-05 dry	16-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Achurum*	*carinatum*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	0	1
Cardiocondyla emeryi	0	1	1
Dorymyrmex bureni	4	0	4
Forelius pruinosus	1	0	1
Odontomachus brunneus	0	1	1
Paratrechina bourbonica	1	0	1
Paratrechina longicornus	1	0	1
Pseudomyrmex pallidus	1	0	1
Solenopsis invicta	2	0	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Camponotus floridanus	1	0	0	0	1
Dorymyrmex bureni	3	1	3	1	8
Forelius pruinosus	4	1	1	1	7
Formica archboldi	0	1	0	0	1
Monomorium floricola	0	1	0	1	2
Odontomachus brunneus	0	1	0	0	1
Pheidole dentata	2	5	2	0	9
Pheidole floridana	0	0	1	0	1

Appendix C. Site Summary

Site: **SG5**
Habitat: Freshwater Marsh (Mf)
General location: Northeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14638333 -81.51106667
Proximity to Well: SGT1W4
Approximate days inundated 5/05-4/06: 145
Approximate days inundated 5/06-4/07: 61
Comments: Expansive marsh located just south of interstate 75, Only study site in PSSF recording a high composition of native treefrogs

Anuran Data (PVC pipes)

Scientific name	16 Aug 05	13 Oct 05	10 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	4 Aug 06	23 Oct 06	21 Dec 06	14 Feb 07	18 Apr 07	25 Jun 07	Total
Hyla cinerea	0	9	4	4	11	7	5	1	0	0	0	0	1	42
Osteopilus septentrionalis	1	4	0	2	1	2	1	7	8	8	4	3	3	44

Fish Data (Breder trap abundance combined)

Scientific name	9-Sep-05 wet	13-Oct-05 wet	16-Feb-06 dry	28-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
Cichlasoma bimaculatum	0	4					4
Fundulus chrysotus	0	1					1
Gambusia holbrooki	73	335					408
Heterandria formosa	0	3					3
Jordanella floridae	11	6					17
Lucania goodei	1	0					1
Poecilia latipinna	9	8					17

Orthopteran Data (Sweep net abundance)
OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	3	1	4
Acrididae	*Aptenopedes*	*sphenarioides*	1	6	7
Acrididae	*Arphia*	*granulata*	0	1	1
Acrididae	*Dichromorpha*	*elegans*	0	2	2
Acrididae	*Leptysma*	*marginicollis*	1	0	1
Acrididae	*Paroxya*	*atlantica*	0	1	1
Acrididae	*Paroxya*	*clavuliger*	0	1	1
Acrididae	*Schistocera*	*americana*	0	5	5
Acrididae	*Schistocera*	*sp.*	0	1	1
Acrididae	*Stenacris*	*vitreipennis*	5	0	5
Gryllidae	Gryllidae	Gryllidae	0	1	1
Tettigoniidae	*Orchelimum*	*agile*	1	0	1
Tettigoniidae	*Orchelimum*	*sp.*	2	2	4

Ant (Sweep net CPUE – Catch Per Unit Effort

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	0	1
Crematogaster atkinsoni	5	0	5
Dolichoderus pustulatus	2	0	2
Pheidole dentata	1	0	1
Pheidole moerens	1	0	1
Pseudomyrmex ejectus	4	2	6
Pseudomyrmex gracilis	2	1	3
Pseudomyrmex seminole	1	0	1
Solenopsis invicta	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb	Jun	Feb	Jun	Total
Crematogaster atkinsoni	2	0	0	0	2
Pheidole moerens	1	0	0	0	1
Solenopsis invicta	1	6	7	1	15

Appendix C. Site Summary

Site: **SG6**
Habitat: Mesic Pine Flatwoods (Pm)
General location: Northeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.14343333 -81.46933333
Proximity to Well: SGT1W5
Approximate days inundated 5/05-4/06: 2
Approximate days inundated 5/06-4/07: 27
Comments: Artificial pond located a few hundred meters to the south and adjacent swales may influence fishes collected during flood events

Anuran Data (PVC pipes)

Scientific name	9 Aug 05	13 Oct 05	10 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	4 Aug 06	23 Oct 06	21 Dec 06	14 Feb 07	18 Apr 07	25 Jun 07	Total
Osteopilus septentrionalis	2	1	1	2	1	1	1	1	1	0	6	5	3	25

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05 wet	13-Oct-05 dry	16-Feb-06 dry	28-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
Cichlasoma urophthalma	1						1
Fundulus chrysotus	1						1
Fundulus confluentus	12						12
Gambusia holbrooki	41						41
Heterandria formosa	4						4
Jordanella floridae	24						24
Poecilia latipinna	1						1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	2	1	3
Acrididae	*Arphia*	*granulata*	1	0	1
Gryllidae	Gryllidae	Gryllidae	9	0	9
Gryllidae	*Anaxipha*	*sp.*	1	0	1
Gryllidae	*Pictonemobius*	*sp.*	1	1	2
Tetrigidae	Tetrigidae	Tetrigidae	5	0	5

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	0	1
Crematogaster atkinsoni	2	1	3
Paratrechina concinna	0	1	1
Paratrechina longicornus	0	1	1
Pseudomyrmex ejectus	1	0	1
Pseudomyrmex gracilis	1	3	4
Pseudomyrmex pallidus	3	1	4
Solenopsis invicta	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	1	0	0	0	1
Monomorium floricola	1	0	0	0	1
Pheidole moerens	1	0	0	0	1
Solenopsis invicta	3	4	7	4	18

Appendix C. Site Summary

Site: **SG7**
Habitat: Prairie (G)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.11140000 -81.58641667
Proximity to Well: SGT2W1
Approximate days inundated 5/05-4/06: 29
Approximate days inundated 5/06-4/07: 44
Comments: Located on the edge of the Bellelle Meade tract and is further away from canal influence than most sites in PSSF, component of invasive vegetation-melaleuca present

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	5 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla cinerea	0	0	0	0	3	1	0	2	0	0	1	1	x	8
Hyla squirrela	0	0	0	0	0	0	0	0	0	0	1	1	x	2
Osteopilus septentrionalis	1	4	0	3	3	4	4	2	3	1	2	4	x	31

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05 wet	11-Oct-05 dry	16-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
Fundulus chrysotus	2						2
Gambusia holbrooki	28						28
Heterandria formosa	2						2
Jordanella floridae	6						6
Lucania goodei	4						4
Poecilia latipinna	3						3

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	1	1
Acrididae	*Dichromorpha*	*elegans*	0	3	3
Acrididae	*Paroxya*	*atlantica*	0	1	1
Tetrigidae	*Paratettix*	*rugosus*	2	0	2
Tetrigidae	*Tettigidea*	*lateralis*	0	2	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster ashmeadi	1	1	2
Crematogaster atkinsoni	1	0	1
Forelius pruinosus	1	2	3
Paratrechina concinna	0	1	1
Pseudomyrmex ejectus	3	0	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Forelius pruinosus	0	2	1	7	10
Odontomachus brunneus	1	0	0	0	1
Pheidole dentata	1	3	3	0	7
Pheidole floridana	1	1	0	0	2
Solenopsis globularia	1	1	0	0	2
Solenopsis invicta	1	1	0	0	2
Tapinoma sessile	2	0	0	0	2

Appendix C. Site Summary

Site: **SG8**
Habitat: Mesic Pine Flatwoods (Pm)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.11081667 -81.58623333
Proximity to Well: SGT2W1
Approximate days inundated 5/05-4/06: 29
Approximate days inundated 5/06-4/07: 44
Comments: Located on the edge of the Bellelle Meade tract and is further away from canal influence than most sites in PSSF

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	5 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla squirrela	0	0	0	0	0	0	0	0	0	0	0	1	x	1
Osteopilus septentrionalis	3	5	4	3	3	3	2	0	0	0	0	1	x	24

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05 invert only	11-Oct-05 dry	16-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	1	2	3
Acrididae	*Melanoplus*	*puer*	1	2	3
Gryllidae	*Pictonemobius*	*sp.*	1	0	1
Tetrigidae	Tetrigidae	Tetrigidae	3	0	3
Tetrigidae	*Paratettix*	*rugosus*	1	0	1
Tetrigidae	*Paxilla*	*obesa*	0	1	1
Tetrigidae	*Tettigidea*	*lateralis*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Forelius pruinosus	3	1	4
Pheidole floridana	0	1	1
Pseudomyrmex pallidus	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb	Jun	Feb	Jun	Total
Crematogaster atkinsoni	1	0	0	0	1
Forelius pruinosus	3	1	1	9	14
Monomorium floricola	0	1	0	0	1
Pheidole dentata	0	2	0	0	2
Pheidole floridana	4	2	7	0	13
Pheidole moerens	1	1	0	0	2
Solenopsis invicta	0	1	0	0	1
Tapinoma sessile	0	0	1	0	1

Appendix C. Site Summary

Site: **SG9**
Habitat: Mesic Pine Flatwoods (Pm)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.11170000 -81.57158333
Proximity to Well: SGT2W2
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments: Very dry site

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	5 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	16 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	0	3	0	4	3	3	3	1	5	3	4	3	x	32

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05	11-Oct-05	16-Feb-06	27-Jul-06	19-Oct-06	14-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	1	0	1
Acrididae	*Melanoplus*	*puer*	0	1	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	1	1
Tetrigidae	Tetrigidae	Tetrigidae	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	2	3
Cardiocondyla emeryi	0	1	1
Crematogaster atkinsoni	4	3	7
Dorymyrmex bureni	0	3	3
Forelius pruinosus	5	1	6
Formica archboldi	0	1	1
Pseudomyrmex gracilis	0	2	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	1	0	0	0	1
Dorymyrmex bureni	1	2	1	1	5
Forelius pruinosus	1	2	1	3	7
Pheidole moerens	1	0	1	0	2
Solenopsis invicta	3	3	5	2	13
Tapinoma sessile	0	0	1	0	1

Appendix C. Site Summary

Site: **SG10**
Habitat: Cypress (C)
General location: Northwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.10975000 -81.53815000
Proximity to Well: SGT2W3
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 7
Comments: Very disturbed and drained site, wildfire caused numerous deadfalls

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	5 Aug 05	12 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	4 Aug 06	23 Oct 06	18 Dec 06	15 Feb 07	10 Apr 07	25 Jun 07	Total
Osteopilus septentrionalis	1	5	1	5	4	5	3	1	2	2	8	4	x	41

Fish Data (Breder trap abundance combined)

Scientific name	9-Aug-05	12-Oct-05	15-Feb-06	28-Jul-06	23-Oct-06	15-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
no orthopterans collected					

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	4	4	8
Crematogaster ashmeadi	1	2	3
Crematogaster atkinsoni	2	0	2
Paratrechina bourbonica	1	3	4
Paratrechina concinna	0	1	1
Paratrechina guatemalensis	2	2	4
Pheidole moerens	0	1	1
Pseudomyrmex ejectus	2	0	2
Pseudomyrmex gracilis	1	3	4
Pseudomyrmex pallidus	1	3	4
Pseudomyrmex seminole	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	1	1	0	0	2
Pheidole floridana	0	1	0	0	1
Pheidole moerens	0	1	0	0	1
Solenopsis invicta	7	4	7	3	21
Tapinoma sessile	1	0	0	0	1

Appendix C. Site Summary

Site: **SG11**
Habitat: Prairie (G)
General location: Northeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.11008333 -81.49675000
Proximity to Well: SGT2W4
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments: Prairie invaded by cabbage palms, willow pond located to the west

Anuran Data (PVC pipes) – x denotes pipes melted in prescribed fire.

Scientific name	9 Aug 05	13 Oct 05	10 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	4 Aug 06	23 Oct 06	21 Dec 06	15 Feb 07	18 Apr 07	25 Jun 07	Total
Osteopilus septentrionalis	0	3	1	3	4	1	0	1	0	1	8	6	x	28

Fish Data (Breder trap abundance combined)

Scientific name	19-Aug-05	13-Oct-05	16-Feb-06	28-Jul-06	23-Oct-06	15-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	1	0	1
Gryllidae	Gryllidae	Gryllidae	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	3	5	8
Crematogaster atkinsoni	1	0	1
Paratrechina bourbonica	1	0	1
Pseudomyrmex gracilis	3	3	6
Pseudomyrmex pallidus	5	5	10

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster ashmeadi	1	0	0	0	1
Monomorium floricola	0	1	0	0	1
Pheidole floridana	0	1	0	0	1
Solenopsis invicta	5	5	9	3	22

Appendix C. Site Summary

Site: **SG12**
Habitat: Cypress (C)
General location: Northeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.11066667 -81.47641667
Proximity to Well: SGT2W5
Approximate days inundated 5/05-4/06:157
Approximate days inundated 5/06-4/07: 79
Comments: Wet cypress site for PSSF, old logging trams to the west

Anuran Data (PVC pipes)

Scientific name	16 Aug 05	13 Oct 05	10 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	4 Aug 06	23 Oct 06	21 Dec 06	15 Feb 07	18 Apr 07	25 Jun 07	Total
Osteopilus septentrionalis	2	3	9	5	4	4	4	7	6	1	4	6	5	60

Fish Data (Breder trap abundance combined)

Scientific name	9-Sep-05 wet	13-Oct-05 invert only	16-Feb-06 dry	28-Jul-06 dry	23-Oct-06 wet	15-Feb-07 dry	Total
Gambusia holbrooki	39				28		67
Jordanella floridae	1				0		1

Orthopteran (Sweep net abundance) OTU - Operational Taxanomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	0	1
Crematogaster atkinsoni	1	0	1
Paratrechina bourbonica	0	1	1
Paratrechina concinna	0	1	1
Paratrechina guatemalensis	0	3	3
Pheidole moerens	0	2	2
Platythyrea pustulatus	0	1	1
Pseudomyrmex ejectus	2	2	4
Pseudomyrmex gracilis	3	3	6

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	1	1	0	2
Camponotus floridanus	0	0	0	1	1
Crematogaster ashmeadi	2	0	0	0	2
Crematogaster atkinsoni	1	0	0	0	1
Pheidole dentata	1	6	1	2	10
Pheidole floridana	1	1	1	0	3
Pheidole moerens	0	1	2	4	7

Appendix C. Site Summary

Site: **SG13**
Habitat: Prairie (G)
General location: Northeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.09301667 -81.46121667
Proximity to Well: SGT2W6
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 44
Comments: Located near the former Prairie Canal

Anuran Data (PVC pipes)

Scientific name	9 Aug 05	12 Oct 05	10 Nov 05	6 Dec 05	16 Feb 06	28 Mar 06	2 May 06	4 Aug 06	23 Oct 06	21 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Hyla cinerea	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Osteopilus septentrionalis	3	1	7	8	8	3	4	2	12	5	3	7	2	65

Fish Data (Breder trap abundance combined)

Scientific name	19-Aug-05 dry	12-Oct-05 dry	16-Feb-06 dry	28-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	13	7	20
Acrididae	*Aptenopedes*	*sphenarioides*	2	3	5
Acrididae	*Dichromorpha*	*elegans*	0	1	1
Acrididae	*Melanoplus*	*keeleri*	1	0	1
Acrididae	*Paroxya*	*atlantica*	0	1	1
Gryllidae	Gryllidae	Gryllidae	1	2	3
Gryllidae	*Neomobius*	*sp.*	0	1	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	4	4
Tetrigidae	Tetrigidae	Tetrigidae	2	0	2
Tetrigidae	*Paxilla*	*obesa*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	2	2
Crematogaster atkinsoni	3	3	6
Pseudomyrmex ejectus	4	5	9
Pseudomyrmex gracilis	2	4	6
Pseudomyrmex pallidus	2	1	3
Pseudomyrmex seminole	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	1	1	0	2
Crematogaster ashmeadi	2	0	1	1	4
Crematogaster atkinsoni	1	0	3	1	5
Pheidole floridana	0	1	0	0	1
Solenopsis invicta	0	3	3	3	9
Tapinoma sessile	1	0	0	0	1

Appendix C. Site Summary

Site: **SG14**
Habitat: Cypress with Graminoid (Cg)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.05385000 -81.57255000
Proximity to Well: SGT3W1
Approximate days inundated 5/05-4/06: 126
Approximate days inundated 5/06-4/07: 91
Comments: Furthur away from canal drainage effects than most sites in PSSF, fire break cut through southeast corner of site

Anuran Data (PVC pipes)

Scientific name	11 Aug 05	17 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	1 Aug 06	19 Oct 06	18 Dec 06	15 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla cinerea	0	1	0	2	0	0	0	0	0	0	1	0	0	4
Osteopilus septentrionalis	3	2	2	3	3	2	1	3	5	7	4	4	2	41

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05 wet	17-Oct-05 dry	15-Feb-06 dry	1-Aug-06 wet	19-Oct-06 dry	14-Feb-07 dry	Total
Astronotus ocellatus	1			0			1
Cichlasoma urophthalama	1			0			1
Fundulus chrysotus	1			0			1
Gambusia holbrooki	53			2			55
Jordanella floridae	4			0			4

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	1	1	2
Acrididae	*Achurum*	*carinatum*	1	0	1
Acrididae	*Aptenopedes*	*sphenarioides*	5	1	6
Acrididae	*Dichromorpha*	*elegans*	3	3	6
Acrididae	*Paroxya*	*atlantica*	1	0	1
Acrididae	*Paroxya*	*clavuliger*	0	1	1
Acrididae	*Schistocera*	*sp.*	1	0	1
Gryllidae	Gryllidae	Gryllidae	0	2	2
Tettigoniidae	Tettigoniidae	Tettigoniidae	1	1	2
Tettigoniidae	*Odontoxiphidium*	*apterum*	1	0	1
Tettigoniidae	*Orchelimum*	*sp.*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	2	1	3
Crematogaster ashmeadi	1	0	1
Paratrechina bourbonica	1	1	2
Paratrechina concinna	1	0	1
Paratrechina guatemalensis	2	0	2
Pseudomyrmex ejectus	3	3	6
Pseudomyrmex seminole	1	3	4

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster ashmeadi	1	0	0	0	1
Crematogaster atkinsoni	2	0	0	1	3
Pheidole dentata	0	0	1	0	1
Pheidole floridana	0	1	0	0	1
Pheidole moerens	3	4	2	2	11
Solenopsis invicta	5	1	4	2	12

Appendix C. Site Summary

Site: **SG15**
Habitat: Cypress (C)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.05483333 -81.56271667
Proximity to Well: SGT3W2
Approximate days inundated 5/05-4/06: 42
Approximate days inundated 5/06-4/07: 46
Comments: Very shaded cypress habitat adjacent to hydric hammock
Family Culicidae present in great numbers

Anuran Data (PVC pipes)

Scientific name	11 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	15 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla cinerea	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Osteopilus septentrionalis	1	1	2	3	3	3	1	2	0	3	2	1	1	23

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05 wet	11-Oct-05 dry	15-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
Gambusia holbrooki	2						2

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	6	2	8
Gryllidae	*Cyrtoxipha*	*sp.*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Pseudomyrmex ejectus	2	0	2
Pseudomyrmex gracilis	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Odontomachus brunneus	0	1	0	0	1
Pheidole dentata	0	0	1	2	3
Pheidole floridana	4	2	2	6	14
Pheidole moerens	3	4	1	1	9
Solenopsis invicta	1	0	1	0	2

Appendix C. Site Summary

Site: **SG16**
Habitat: Hydric Hammock (Hh)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.05475000 -81.56295000
Proximity to Well: SGT3W2
Approximate days inundated 5/05-4/06: 7
Approximate days inundated 5/06-4/07: 27
Comments: Adjacent to site SG15 and cypress habitat

Anuran Data (PVC pipes)

Scientific name	10 Aug 05	11 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	15 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	2	4	6	4	2	1	5	0	1	1	2	3	1	32

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05	11-Oct-05	15-Feb-06	27-Jul-06	19-Oct-06	14-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	10	5	15

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Brachymyrmex obscurior	0	1	1
Camponotus floridanus	0	4	4
Paratrechina bourbonica	1	1	2
Paratrechina guatemalensis	1	0	1
Pseudomyrmex ejectus	1	1	2
Pseudomyrmex gracilis	2	2	4
Tapinoma melanocephalum	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	1	0	0	1
Monomorium floricola	0	1	0	0	1
Pheidole dentata	0	5	1	3	9
Pheidole floridana	3	1	2	3	9
Pheidole moerens	4	1	4	1	10
Solenopsis invicta	1	1	0	0	2

Appendix C. Site Summary

Site: **SG17**
Habitat: Cypress with Graminoid (Cg)
General location: South central Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.04953333 -81.54128333
Proximity to Well: SGT3W3
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 20
Comments: Very drained and disturbed site

Anuran Data (PVC pipes)

Scientific name	10 Aug 05	12 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	23 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	2	4	3	4	6	1	2	0	4	5	5	8	0	44

Fish Data (Breder trap abundance combined)

Scientific name	10-Aug-05	12-Oct-05	15-Feb-06	27-Jul-06	23-Oct-06	14-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	3	5	8
Acrididae	*Aptenopedes*	*sphenarioides*	1	4	5
Acrididae	*Schistocera*	*sp.*	1	1	2
Gryllidae	Gryllidae	Gryllidae	1	1	2
Tetrigidae	*Tettigidea*	*lateralis*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	2	2
Crematogaster ashmeadi	2	2	4
Crematogaster atkinsoni	0	1	1
Forelius pruinosus	1	1	2
Pseudomyrmex gracilis	1	1	2
Pseudomyrmex pallidus	5	4	9
Pseudomyrmex simplex	0	1	1
Solenopsis invicta	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	3	4	0	2	9
Forelius pruinosus	0	0	0	1	1
Pheidole moerens	1	0	1	0	2
Solenopsis invicta	0	2	4	4	10
Tapinoma sessile	1	0	0	0	1

Appendix C. Site Summary

Site: **SG18**
Habitat: Mesic Hammock (Hm)
General location: Southeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.05585000 -81.49881667
Proximity to Well: SGT3W4
Approximate days inundated 5/05-4/06: 0
Approximate days inundated 5/06-4/07: 0
Comments: Unique flora

Anuran Data (PVC pipes)

Scientific name	9 Aug 05	12 Oct 05	10 Nov 05	6 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	23 Oct 06	19 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Osteopilus septentrionalis	2	5	2	1	2	1	1	1	7	4	9	5	1	41

Fish Data (Breder trap abundance combined)

Scientific name	19-Aug-05	12-Oct-05	15-Feb-06	27-Jul-06	23-Oct-06	15-Feb-07	Total
	dry	dry	dry	dry	dry	dry	
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	10	0	10

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus decpiens	0	1	1
Camponotus floridanus	1	1	2
Paratrechina bourbonica	0	1	1
Paratrechina guatemalensis	3	3	6
Pheidole floridana	1	0	1
Pseudomyrmex gracilis	0	3	3
Solenopsis invicta	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	1	4	1	3	9
Cardiocondula wroughtonii	0	1	0	0	1
Odontomachus brunneus	0	0	0	1	1
Pheidole dentata	2	2	0	0	4
Pheidole moerens	0	1	1	2	4
Solenopsis invicta	0	0	0	1	1

Appendix C. Site Summary

Site: **SG19**
Habitat: Cypress (C)
General location: Southeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.05490000 -81.47190000
Proximity to Well: SGT3W5
Approximate days inundated 5/05-4/06: 75
Approximate days inundated 5/06-4/07: 52
Comments: Shaded cypress site, Brazilian pepper invading

Anuran Data (PVC pipes)

Scientific name	16 Aug 05	18 Oct 05	10 Nov 05	6 Dec 05	15 Feb 06	27 Mar 06	2 May 06	2 Aug 06	23 Oct 06	19 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Hyla cinerea	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Osteopilus septentrionalis	1	4	3	2	4	5	5	6	2	5	3	6	2	48

Fish Data (Breder trap abundance combined)

Scientific name	19-Aug-05 wet	18-Oct-05 dry	15-Feb-06 dry	2-Aug-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
Gambusia holbrooki	90						90
Heterandria formosa	3						3
Jordanella floridae	2						2

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	1	2	3

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Paratrechina guatemalensis	1	2	3
Pseudomyrmex ejectus	1	0	1
Pseudomyrmex gracilis	1	2	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	1	3	1	0	5
Monomorium floricola	1	0	0	0	1
Odontomachus brunneus	0	0	0	2	2
Paratrechina concinna	0	1	0	0	1
Pheidole dentata	1	2	0	4	7
Pheidole floridana	0	1	1	1	3
Pheidole moerens	2	3	6	5	16
Solenopsis invicta	1	0	0	0	1

Appendix C. Site Summary

Site: **SG20**
Habitat: Cypress with Graminoid (Cg)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.02891667 -81.57286667
Proximity to Well: SGT4W1
Approximate days inundated 5/05-4/06: 93
Approximate days inundated 5/06-4/07: 92
Comments: Site further away from canals in PSSF

Anuran Data (PVC pipes)

Scientific name	16 Aug 05	17 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	1 Aug 06	19 Oct 06	18 Dec 06	15 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla squirrela	0	0	0	0	1	1	0	0	0	0	0	0	0	2
Osteopilus septentrionalis	3	8	2	8	5	5	7	4	2	4	3	5	0	56

Fish Data (Breder trap abundance combined)

Scientific name	11-Aug-05 wet	17-Oct-05 dry	15-Feb-06 dry	1-Aug-06 wet	19-Oct-06 dry	24-Feb-07 dry	Total
Ameriurus nebulosus	0			1			1
Cichlasoma bimaculatum	1			0			1
Gambusia holbrooki	48			5			53
Jordanella floridae	14			0			14
Poecilia latipinna	2			0			2

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	2	2
Acrididae	*Aptenopedes*	*sphenarioides*	1	0	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	4	1	5
Tettigoniidae	*Orchelimum*	*sp.*	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster ashmeadi	1	0	1
Crematogaster atkinsoni	3	2	5
Pseudomyrmex ejectus	4	3	7
Pseudomyrmex gracilis	2	1	3
Pseudomyrmex pallidus	0	1	1
Solenopsis invicta	2	0	2
Tapinoma melanocephalum	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	1	0	0	1
Cardiocondyla obscurior	0	1	0	0	1
Crematogaster ashmeadi	0	1	0	0	1
Forelius pruinosus	0	0	0	1	1
Pheidole dentata	1	1	1	0	3
Pheidole floridana	0	1	0	0	1
Pheidole moerens	4	3	3	2	12
Solenopsis invicta	2	2	3	5	12

Appendix C. Site Summary

Site: **SG21**
Habitat: Hydric Pine Flatwoods (Ph)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.02406667 -81.56475000
Proximity to Well: SGT4W2
Approximate days inundated 5/05-4/06: 68
Approximate days inundated 5/06-4/07: 55
Comments: Prescribed fire, open graminoid dominated understory surrounded by saw palmetto

Anuran Data (PVC pipes)

Scientific name	16 Aug 05	17 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	1 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	0	5	5	3	7	4	3	0	6	7	11	8	2	61

Fish Data (Breder trap abundance combined)

Scientific name	11-Aug-05 wet	17-Oct-05 dry	15-Feb-06 dry	1-Aug-06 invert only	19-Oct-06 dry	14-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	7	0	7
Acrididae	*Leptysma*	*marginicollis*	3	0	3
Acrididae	*Paroxya*	*atlantica*	0	1	1
Acrididae	*Schistocera*	*sp.*	0	1	1
Gryllidae	*Pictonemobius*	*sp.*	5	1	6
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	2	2
Tettigoniidae	*Conocephalus*	*sp.*	1	0	1
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	1	1
Tettigoniidae	*Scudderia*	*sp.*	0	1	1
Tetrigidae	Tetrigidae	Tetrigidae	5	2	7
Tetrigidae	*Paxilla*	*obesa*	1	0	1
Tetrigidae	*Tettigidea*	*lateralis*	4	1	5

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	2	2	4
Pseudomyrmex pallidus	1	4	5
Pseudomyrmex seminole	1	0	1
Solenopsis invicta	1	0	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Forelius pruinosus	5	0	0	1	6
Monomorium viride	1	0	0	0	1
Pheidole dentata	1	2	2	0	5
Pheidole moerens	0	1	0	0	1
Solenopsis invicta	5	6	6	7	24

Appendix C. Site Summary

Site: **SG22**
Habitat: Prairie (G)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.01971667 -81.54256667
Proximity to Well: SGT4W3
Approximate days inundated 5/05-4/06: 60
Approximate days inundated 5/06-4/07: 33
Comments: Expansive prairie habitat, drained

Anuran Data (PVC pipes)

Scientific name	10 Aug 05	12 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	1 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Osteopilus septentrionalis	2	3	0	2	2	0	0	0	11	13	5	5	1	44

Fish Data (Breder trap abundance combined)

Scientific name	30-Aug-05 invert only	12-Oct-05 dry	15-Feb-06 dry	27-Jul-06 dry	19-Oct-06 dry	14-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	0	9	9
Acrididae	*Achurum*	*carinatum*	1	3	4
Acrididae	*Aptenopedes*	*sphenarioides*	3	1	4
Acrididae	*Dichromorpha*	*elegans*	4	10	14
Gryllidae	*Pictonemobius*	*sp.*	1	0	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	2	2
Tettigoniidae	*Conocephalus*	*sp.*	0	1	1
Tettigoniidae	*Odontoxiphidium*	*apterum*	2	0	2
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	1	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	3	1	4
Crematogaster atkinsoni	4	4	8
Pseudomyrmex seminole	1	0	1
Solenopsis invicta	0	1	1

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster ashmeadi	0	0	1	0	1
Pheidole dentata	0	0	1	0	1
Solenopsis invicta	8	9	8	6	31

Appendix C. Site Summary

Site: **SG23**
Habitat: Cypress with Graminoid (Cg)
General location: Southeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.02618333 -81.51100000
Proximity to Well: SGT4W4
Approximate days inundated 5/05-4/06: 65
Approximate days inundated 5/06-4/07: 44
Comments: Disturbed and drained site

Anuran Data (PVC pipes)

Scientific name	11 Aug 05	12 Oct 05	10 Nov 05	6 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	23 Oct 06	19 Dec 06	15 Feb 07	10 Apr 07	20 Jun 07	Total
Osteopilus septentrionalis	0	2	4	5	6	5	3	1	6	6	10	6	2	56

Fish Data (Breder trap abundance combined)

Scientific name	1-Sep-05 dry	12-Oct-05 dry	15-Feb-06 dry	27-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
no fish collected							

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	1	3	4
Acrididae	*Aptenopedes*	*sphenarioides*	1	0	1
Gryllidae	Gryllidae	Gryllidae	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	0	1	1
Crematogaster ashmeadi	0	1	1
Crematogaster atkinsoni	0	1	1
Pseudomyrmex ejectus	1	5	6
Pseudomyrmex gracilis	3	1	4

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	0	2	1	0	3
Crematogaster atkinsoni	0	0	1	0	1
Pheidole moerens	0	2	1	0	3
Solenopsis invicta	3	1	4	6	14

Appendix C. Site Summary

Site: **SG24**
Habitat: Cypress (C)
General location: Southeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.02728333 -81.47901667
Proximity to Well: SGT4W5
Approximate days inundated 5/05-4/06: 73
Approximate days inundated 5/06-4/07: 59
Comments: Shaded site, elevated spoil from adjacent roads influenced hydrology

Anuran Data (PVC pipes)

Scientific name	11 Aug 05	12 Oct 05	10 Nov 05	6 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	23 Oct 06	19 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Osteopilus septentrionalis	2	3	4	2	2	1	1	3	6	2	3	8	4	41

Fish Data (Breder trap abundance combined)

Scientific name	30-Aug-05 wet	12-Oct-05 dry	15-Feb-06 dry	27-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
Gambusia holbrooki	142						142
Heterandria formosa	2						2

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	3	1	4
Gryllidae	*Anaxipha*	*sp.*	0	1	1
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	2	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster ashmeadi	0	2	2
Crematogaster atkinsoni	0	1	1
Pseudomyrmex ejectus	0	4	4
Pseudomyrmex gracilis	1	1	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Aphaenogaster miamiana	2	6	3	0	11
Cardiocondula wroughtonii	0	1	0	0	1
Crematogaster ashmeadi	2	0	2	0	4
Odontomachus ruginodis	0	1	0	0	1
Pheidole dentata	2	1	1	0	4
Pheidole floridana	0	1	0	1	2
Pheidole moerens	2	0	0	1	3
Solenopsis invicta	0	0	1	2	3

Appendix C. Site Summary

Site: **SG25**
Habitat: Prairie (G)
General location: Southeastern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.04031667 -81.46343333
Proximity to Well: SGT3W6
Approximate days inundated 5/05-4/06: 63
Approximate days inundated 5/06-4/07: 30
Comments: Located west of and in proximity to Prairie Canal

Anuran Data (PVC pipes)

Scientific name	11 Aug 05	12 Oct 05	10 Nov 05	6 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	23 Oct 06	21 Dec 06	15 Feb 07	18 Apr 07	20 Jun 07	Total
Hyla cinerea	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Osteopilus septentrionalis	1	2	1	0	1	0	0	0	4	8	9	4	1	31

Fish Data (Breder trap abundance combined)

Scientific name	1-Sep-05 wet	12-Oct-05 dry	15-Feb-06 dry	27-Jul-06 dry	23-Oct-06 dry	15-Feb-07 dry	Total
Fundulus chrysotus	1						1
Gambusia holbrooki	178						178
Heterandria formosa	107						107
Jordanella floridae	81						81
Lucania goodei	69						69

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	Acrididae	Acrididae	6	2	8
Acrididae	*Achurum*	*carinatum*	4	2	6
Acrididae	*Dichromorpha*	*elegans*	1	9	10
Acrididae	*Eotettix*	*signatus*	4	1	5
Gryllidae	Gryllidae	Gryllidae	0	1	1
Gryllidae	*Pictonemobius*	*sp.*	0	2	2
Tettigoniidae	Tettigoniidae	Tettigoniidae	2	2	4
Tettigoniidae	*Odontoxiphidium*	*apterum*	2	0	2
Tettigoniidae	*Odontoxiphidium*	*sp.*	0	3	3
Tetrigidae	Tetrigidae	Tetrigidae	1	8	9
Tetrigidae	*Paxilla*	*obesa*	0	1	1
Tetrigidae	*Tettigidea*	*lateralis*	0	4	4

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	3	1	4
Dorymyrmex bureni	0	3	3
Solenopsis invicta	1	2	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Pheidole moerens	0	1	0	0	1
Solenopsis invicta	9	8	7	1	25

Appendix C. Site Summary

Site: **SG26**
Habitat: Cypress (C)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.00418333 -81.54808333
Proximity to Well: SGT4W6
Approximate days inundated 5/05-4/06: 148
Approximate days inundated 5/06-4/07: 57
Comments: Adjacent to site SG27, lower elevation and wetter conditions than most sites in PSSF

Anuran Data (PVC pipes)

Scientific name	10 Aug 05	17 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla squirrela	0	1	2	1	0	0	0	0	3	2	3	0	0	12
Osteopilus septentrionalis	4	2	0	0	1	3	5	2	2	4	6	6	2	37

Fish Data (Breder trap abundance combined)

Scientific name	30-Aug-05 wet	17-Oct-05 dry	15-Feb-06 dry	1-Aug-06 invert only	19-Oct-06 dry	14-Feb-07 dry	Total
Fundulus chrysotus	3						3
Gambusia holbrooki	26						26
Lepomis marginatus	1						1
Lepomis microlophus	1						1
Lepomis punctatus	1						1
Lepomis sp.	3						3
Lucania goodei	1						1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Gryllidae	Gryllidae	Gryllidae	2	0	2
Tettigoniidae	Tettigoniidae	Tettigoniidae	0	3	3

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus floridanus	1	0	1
Crematogaster ashmeadi	1	2	3
Crematogaster atkinsoni	2	0	2
Crematogaster pilosa	1	0	1
Paratrechina guatemalensis	0	1	1
Pheidole moerens	0	1	1
Pseudomyrmex ejectus	5	4	9
Pseudomyrmex gracilis	0	2	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster ashmeadi	1	0	0	0	1
Crematogaster atkinsoni	1	0	0	1	2
Forelius pruinosus	0	0	2	0	2
Odontomachus ruginodis	0	1	0	0	1
Paratrechina bourbonica	0	0	0	1	1
Pheidole dentata	1	0	4	1	6
Pheidole floridana	0	1	0	0	1
Pheidole moerens	2	7	1	0	10
Tapinoma sessile	0	0	1	0	1

Appendix C. Site Summary

Site: **SG27**
Habitat: Prairie (G)
General location: Southwestern, Picayune Stand State Forest
GPS coordinates (decimal degrees): 26.00448333 -81.54775000
Proximity to Well: SGT4W6
Approximate days inundated 5/05-4/06: 148
Approximate days inundated 5/06-4/07: 57
Comments: Adjacent to site SG26, lower elevation and wetter conditions than most sites in PSSF

Anuran Data (PVC pipes)

Scientific name	10 Aug 05	17 Oct 05	9 Nov 05	5 Dec 05	15 Feb 06	27 Mar 06	1 May 06	3 Aug 06	19 Oct 06	18 Dec 06	14 Feb 07	10 Apr 07	26 Jun 07	Total
Hyla cinerea	0	1	0	0	1	0	0	0	0	0	1	0	0	3
Hyla squirrela	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Osteopilus septentrionalis	3	0	1	0	2	2	3	1	4	5	4	4	0	29

Fish Data (Breder trap abundance combined)

Scientific name	30-Aug-05 wet	17-Oct-05 dry	15-Feb-06 dry	1-Aug-06 invert only	19-Oct-06 dry	14-Feb-07 dry	Total
Cichlasoma urophthalma	1						1
Fundulus chrysotus	16						16
Gambusia holbrooki	29						29
Lepomis marginatus	2						2
Lepomis microlophus	1						1
Lepomis punctatus	3						3
Lucania goodei	9						9

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Achurum*	*carinatum*	0	2	2
Acrididae	*Dichromorpha*	*elegans*	0	1	1
Acrididae	*Paroxya*	*atlantica*	0	1	1
Tettigoniidae	*Conocephalus*	*sp.*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	3	3	6
Dolichoderus pustulatus	0	1	1
Pseudomyrmex ejectus	1	0	1
Pseudomyrmex pallidus	0	5	5
Tapinoma sessile	2	0	2

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Crematogaster ashmeadi	0	0	1	0	1
Forelius pruinosus	0	0	0	1	1
Pheidole moerens	0	1	1	2	4
Solenopsis invicta	2	7	2	2	13
Tapinoma sessile	0	1	0	0	1
Wasmannia auropunctata				1	1

Appendix C. Site Summary

Site: **TT1**
Habitat: Saltwater Marsh (Ms)
General location: Ten Thousand Island National Wildlife Refgue
GPS coordinates (decimal degrees): 25.96021667 -81.56668333
Proximity to Well: SGT5W1
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Located southwest of elevated road into the TTINWR, stagnant water conditions and high salinity

Anuran Data (PVC pipes)

Scientific name	15 Sep 05	16 Nov 05	16 Dec 05	3 Feb 06	31 Mar 06	22 Jun 06	17 Aug 06	1 Nov 06	28 Dec 06	6 Feb 07	30 Apr 07	26 Jun 07	Total
Hyla cinerea	1	1	2	3	3	0	0	2	7	2	4	1	26
Osteopilus septentrionalis	0	0	0	0	0	0	0	2	0	0	0	0	2

Fish Data (Breder trap abundance combined)

Scientific name	15-Sep-05 wet	16-Nov-05 wet	20-Jan-06 wet	17-Aug-06 wet	1-Nov-06 wet	6-Feb-07 wet	Total
Cichlasoma urophthalma	0	0	0	7	3	0	10
Cyprinodon variegatus	8	9	33	18	66	7	141
Fundulus confluentus	0	1	0	2	2	0	5
Fundulus grandis	1	0	0	0	0	0	1
Gambusia holbrooki	0	1	1	35	36	9	82
Jordanella floridae	0	0	0	0	12	1	13
Lucania parva	0	0	29	2	6	3	40
Menidia beryllina	0	0	0	0	1	0	1
Poecilia latipinna	5	43	0	49	97	1	195
Unid. fry	0	0	8	0	0	0	8

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Leptysma*	*marginicollis*	1	0	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	1	0	1
Tettigoniidae	*Conocephalus*	*saltans*	1	0	1
Tettigoniidae	*Conocephalus*	*sp.*	1	0	1

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Camponotus impressus	0	1	1
Crematogaster atkinsoni	4	4	8
Forelius pruinosus	1	0	1
Monomorium floricola	0	1	1
Pseudomyrmex pallidus	4	3	7
Tapinoma sessile	1	2	3

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Site not sampled due to high water					

Appendix C. Site Summary

Site: **TT2**
Habitat: Saltwater Marsh (Ms)
General location: Ten Thousand Islands National Wildlife Refuge
GPS coordinates (decimal degrees): 25.95055000 -81.53256667
Proximity to Well: SGT5W2
Approximate days inundated 5/05-4/06: N/A
Approximate days inundated 5/06-4/07: N/A
Comments: Diverse fishes and high productivity, native treefrogs present

Anuran Data (PVC pipes)

Scientific name	15 Sep 05	16 Nov 05	16 Dec 05	3 Feb 06	21 Mar 06	22 Jun 06	17 Aug 06	30 Oct 06	28 Dec 06	6 Feb 07	30 Apr 07	26 Jun 07	Total
Hyla cinerea	3	2	6	6	5	2	1	2	6	4	1	0	38
Hyla squirrela	0	2	0	0	0	1	1	0	0	0	1	0	5

Fish Data (Breder trap abundance combined)

Scientific name	15-Sep-05 wet	16-Nov-05 wet	20-Jan-06 wet	17-Aug-06 wet	1-Nov-06 wet	6-Feb-07 wet	Total
Adinia xenica	0	1	0	0	2	0	3
Belonesox belizanus	1	0	0	0	0	0	1
Cichlasoma urophthalma	0	8	2	1	2	0	13
Cyprinodon variegatus	6	91	54	35	74	4	264
Fundulus confluentus	0	3	13	1	5	0	22
Fundulus grandis	0	0	0	1	0	0	1
Gambusia holbrooki	16	4	4	61	105	3	193
Labidesthes sicculus	0	0	0	17	0	0	17
Lucania parva	3	1	1	4	3	0	12
Poecilia latipinna	9	44	4	92	80	3	232
Microgobius gulosus	0	0	0	1	0	0	1

Orthopteran Data (Sweep net abundance) OTU - Operational Taxonomic Unit

Family	Genus/OTU	Species/OTU	Aug 2005	Aug 2006	Total
Acrididae	*Leptysma*	*marginicollis*	1	0	1
Tettigoniidae	Tettigoniidae	Tettigoniidae	1	2	3
Tettigoniidae	*Conocephalus*	*saltans*	3	0	3
Tettigoniidae	*Conocephalus*	*sp.*	2	0	2

Ant (Sweep net CPUE - Catch Per Unit Effort)

Scientific name	Aug 2005	Aug 2006	Total
Crematogaster atkinsoni	4	3	7
Forelius pruinosus	1	0	1
Pseudomyrmex pallidus	5	5	10

Ant (Baited vials CPUE combined)

Scientific name	Feb 2006	Jun 2006	Feb 2007	Jun 2007	Total
Site not sampled due to high water					

Appendix C. Site Summary