Lockheed Martin Corporation Wetlands Monitoring Report July 2014 through June 2015 Tallevast, Florida

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Acronyms, Abbreviations, and Units of Measurement

ABC	American Beryllium Company
AD zone	Adaptive Zone
ags	above ground surface
BECSD	BECSD, LLC
bgs	below ground surface
°C	degrees Celsius
COC	Contaminant of Concern
D zone	Deep Zone
DO	Dissolved Oxygen
°F	degrees Fahrenheit
F.A.C.	Florida Administrative Code
Facility	Lockheed Martin Tallevast Facility
FDEP	Florida Department of Environmental Protection
FGS	Florida Geological Survey
Floridan	Upper Floridan Aquifer
FLUCFCS	Florida Land Use, Cover and Forms Classification System
ft	feet
gpm	gallons per minute
GPS	Global Positioning System
HNP	Historic Normal Pool
HUC	Hydrologic Unit Code
HWE	Historical Wetland Edge
IAS	Intermediate Aquifer System
mg/L	milligrams per liter
msl	mean sea level
mV	millivolts
MW	Monitoring well
NA	Not Applicable
NAVD	North American Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NP	Normal Pool
R625-STA-002274-2	TALLEVAST TREATMENT FACILITY WETLANDS MONITORING REPORT

NTU	Nephelometric Turbidity Unit
OD	Outer Deep Zone
ORP	Oxidation-Reduction Potential
PDSI	Palmer Drought Severity Index
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
RAP	Remedial Action Plan
RAPA	Remedial Action Plan Addendum
report	Wetlands Report
RW	Reference Wetland
SARA	Site Assessment Report Addendum
SAS	Surficial Aquifer System
SG	Staff Gauge
Site	Lockheed Martin Tallevast Site
SRQ	Sarasota-Bradenton International Airport
S.U.	Standard Units
SWFWMD	Southwest Florida Water Management District
T zone	Transitional Zone
Tetra Tech	Tetra Tech, Inc.
TW	Target Wetland
UPL	Uplands
USAS	Upper Surficial Aquifer System
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WAP	Wetlands Assessment Procedure
WMP	Wetlands Monitoring Plan
WPI	WPI Sarasota Division, Inc.

Section 1 Introduction

This Wetlands Monitoring Report – June 2014 through June 2015 report documents the 6th overall monitoring event and the second wetland monitoring event since the start of active groundwater remedial system operations which began on November 18, 2013 (See Section 8.1). Baseline monitoring assessments have been conducted and reports were submitted for four years (through May 2013) prior to groundwater extraction associated with start-up of the remedial system operations. Wetlands were monitored pursuant to the July 2009 Wetlands Monitoring Plan (WMP), which was included as Appendix G of the July 2009 Remedial Action Plan Addendum (RAPA). Background resources used in the development of the WMP include the 1994 United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle, Bradenton, Florida (USGS, 1994), 2003-2009 aerial ortho-photography from the Manatee County Geographic Information System, and Ecosystems of Florida (Myers and Ewel, 1990). The Florida Department of Environmental Protection (FDEP) approved the RAPA in a November 11, 2010 letter.

The WMP provides for the establishment, evaluation, and assessment of wetlands pursuant to agency requirements, including establishment of baseline conditions. The purpose of the WMP is to assist in determining if the RAPA remedy is impacting the wetlands. A summary of annual wetland monitoring activities performed to date and their associated submittals is provided in Table 1-1.

Monitoring Period Event **Submittal** Wetlands July 2009 July 2009 as Appendix G of the RAPA **Monitoring Plan** (Approved November 11, 2010) Baseline - Year 1 June 2009 to June 2010 April 2011 (ARCADIS, 2011a) **Baseline - Year 2** July 2010 to June 2011 December 2011 (ARCADIS, 2011b) **Baseline - Year 3** July 2011 to June 2012 September 2012 (ARCADIS, 2012) **Baseline - Year 4** July 2012 to June 2013 August 2013 (ARCADIS, 2013) Operational July 2013 to June 2014 August 2014 (AECOM, 2014) Monitoring Report – Year 1

 TABLE 1-1

 Summary of Wetland Monitoring Activities and Submittals

The fifth report was the first operational monitoring report documenting wetland conditions while RAPA operations are under way.

The subject wetlands were selected prior to the start of monitoring. Each wetland is and will continue to be evaluated using the 2005 Southwest Florida Water Management District (SWFWMD) Wetlands Assessment Procedure (WAP), as amended (SWFWMD, 2005), and in conjunction with the FDEP as part of a June 26, 2008 reconnaissance of the wetland areas (see Section 2.1 of the WMP and Figure 1-1). The first four wetland monitoring events were used to establish baseline characteristics against which subsequent annual monitoring is and will continue to be compared. Annual wetland monitoring data is currently being collected to assess whether ongoing RAPA operation has the potential to impact wetland hydrology in the vicinity of the former American Beryllium Company (ABC) Facility, now known as the Lockheed Martin Tallevast Treatment Facility (Site). The Site consists of two parts. The first is the Tallevast Treatment Facility (referred to as the "Facility" or "on-facility" portion of the Site) located at 1600 Tallevast Road in Tallevast, Manatee County, Florida. The second is the groundwater and surface water resources in the surrounding area as defined by the extent of

groundwater impacted by contaminants of concern (COC), which is referred to as the "off-facility" portion of the Site.

A site location map is presented as Figure 1-1. Tallevast, Florida is a small, unincorporated community situated between Sarasota and Bradenton, immediately northeast of the Sarasota-Bradenton International Airport (SRQ), in southwestern Manatee County. Additional detail regarding the project and site history is provided in Section 2 of this report.

The locations for monitoring well and staff gauge installation were determined during preliminary visits to wetland areas and during field assessments conducted in June 2008 and June 2009. Following establishment of access agreements with appropriate landowners in the Tallevast area, wetland monitoring transects were formally established, and water level monitoring instruments were installed from November 2009 through February 2010. As stipulated by the FDEP, the activities detailed in the WMP will be conducted over five years after RAPA system startup, following establishment of a baseline composed of a minimum of two years, resulting in a minimum program length of seven years. The actual program length will be longer than seven years because the baseline data collection spanned an approximately four-year period from November 2009 to June 2013. As described in the RAPA, after five years of system operation and wetland assessments, the monitoring plan will be re-evaluated with the FDEP and SWFWMD to determine whether it needs to continue or be modified. If monitoring demonstrates that wetland impacts are occurring due to groundwater withdrawals, then a mitigation plan will be developed and submitted to FDEP. The observations presented in this report include the following:

- Field observations of vegetative growth, recruitment, and mortality, as well as evidence of changes in land use, disturbance, and indicators of surface hydrology along the established wetland monitoring transects;
- Evidence of changes in land use, abandonment, disturbance, or other activities within areas adjacent to the WMP wetlands that may potentially affect surface hydrology;
- Water level data gathered using staff gauges and transducers in WMP monitoring wells, and annual and monthly rainfall data gathered from a monitoring station located at the SRQ.

Section 2 Project History

Lockheed Martin acquired ownership of the former ABC Facility through its 1996 acquisition of Loral Corporation, the parent company of ABC. Plant operations ended in late 1996. Between 1997 and 2000, Lockheed Martin prepared the property for sale and began site investigations. In early 2000, Lockheed Martin sold the property and its improvements to BECSD, LLC (BECSD), which in turn leased the Facility to WPI Sarasota Division, Inc. (WPI), a privately owned manufacturer. In March 2007, WPI was sold to Cooper Industries, Inc., which assumed the Facility lease and continued the same manufacturing processes until ceasing operations in June 2007. Beginning in July 2007, Lockheed Martin leased the Facility from BECSD, ultimately purchasing it back from BECSD in June 2009.

From 1962 until 1996, the Facility was owned by Loral Corporation and operated by ABC as an ultra-precision machine parts manufacturing plant where metals were milled, lathed, and drilled into various components. Some components were finished by electroplating, anodizing, and ultrasonic cleaning. Chemicals used and wastes generated at the Facility included oils, fuels, solvents, acids, and metals. Facility operations are described in the Phase I Environmental Assessment Report (Tetra Tech, Inc. [Tetra Tech], 1997). Additional information is provided in the Site Assessment Report Addendum (SARA; Tetra Tech, 2005). The RAPA was submitted to FDEP by ARCADIS in 2009, and subsequently approved by FDEP in a November 11, 2010 letter. Wetlands were monitored pursuant to the July 2009 WMP, which was included as Appendix G of the RAPA. RAPA system construction began in February 2011 and was completed in July 2013. Startup and testing occurred in October and November 2013. The Tallevast Treatment Facility began operation on November 18, 2013. The purpose of the RAPA treatment facility is to address COC concentrations in groundwater at the Site.

Section 3 Monitoring Objectives

The RAPA was prepared to satisfy the requirement of a March 16, 2009 FDEP request for submission of a final revised RAP that would incorporate Lockheed Martin's February 11, 2009 responses to third-party comments on the September 2008 RAP. As part of the selected remedy, the July 2009 RAPA scope incorporates removal of contaminated groundwater through a series of extraction wells/trenches, treatment of the extracted groundwater, and discharge of the treated groundwater using a combination of different disposal options. These options include the following:

- Recharging on the on-facility portion of the Site through a series of injection wells operating in tandem with on-facility extraction wells in the surficial aquifer;
- Discharging to the county wastewater collection and treatment system; and
- Recharging the local surficial aquifer in infiltration systems designed to maintain water levels within designated wetland areas, as explained below.

The RAPA remedy includes the likelihood that multiple treated-groundwater discharge methods will occur simultaneously. Implementation of the proposed RAPA groundwater extraction system was expected to cause drawdown in the local surficial aquifer to achieve capture. Because depression of the water level was predicted to occur in the surficial aquifer at nearby wetlands, the FDEP prescribed the use of the WAP (SWFWMD, 2005). The WAP specifies the process and technical methods for monitoring groundwater extraction effects on Target Wetlands (TWs) and for identifying whether mitigation is needed to offset the effects (if any) of such extraction, via comparison to Reference Wetlands (RWs).

Implementation of the WMP was based on this WAP-defined process. Field visits and consultation with the FDEP led to identification of four TWs within the area of anticipated hydrologic influence of the RAPA system, as defined by being within or in close proximity to the predicted extent of drawdown in the upper surficial aquifer system (USAS) from the

implemented RAPA system (Figure 3-1). Initially, four nearby RWs were identified for monitoring because they represent similar wetland resources that are outside the area of anticipated hydrologic influence of the RAPA system. As described in Section 7.1 of this report, one RW (RW-5) was later permitted for development and was subsequently removed from the monitoring program. In selecting the TWs and RWs for this evaluation, proximity and similarity of classification under the Florida Land Use, Cover, and Forms Classification System (FLUCFCS) (FDOT 1999) codes for wetlands were considered. These codes were developed to classify land use, cover, and forms to provide a uniform standard for description of natural and urban land cover types, including the characteristic vegetative cover types associated with the wetlands at the focus of this assessment.

Section 4 Southwest Florida Water Management District Wetland Assessment Procedure

The WAP is generally required as a condition for the issuance of consumptive groundwater well authorization, which is required due to water extraction and disposal incorporated within the RAPA. The objective of the WAP (SWFWMD, 2005) is to collect information on vegetation, hydrology, soils, and other pertinent variables in isolated wetlands to accurately characterize the biological condition and health of each monitored wetland at the time of investigation. This information may be used for a variety of water management purposes, including well field management, development of minimum flows and levels in the wetlands, and assessment of recovery in areas that have experienced historical hydrologic and biologic impacts due to groundwater withdrawals.

As presented in the WAP, the following steps are taken to establish the monitoring points and their characteristics and then to initiate the baseline monitoring process. The first step consists of a 10-meter-wide monitoring transect established in each wetland. Transects are positioned to provide a representative cross-section from the outermost identified historical wetland edge (HWE) to the innermost portion of the wetland interior (deep zone). Upon establishment of the monitoring transect, estimated benchmark elevations are also field-identified. They include the historic normal pool (HNP), as well as elevations 6 inches (NP-6) and 12 inches (NP-12) below the HNP.

Outside the HWE is an area generally referred to as the uplands (UPL). The area between the HWE and NP-6 elevation are referred to as the Transitional Zone (T). The area between the NP-6 and NP-12 is referred to as the Outer Deep Zone (OD), and the zone below the NP-12 elevation, to the lowest point within the wetland, is simply referred to as the Deep Zone (D). A general representation of some of these locations is illustrated on Figure 4-1 below.

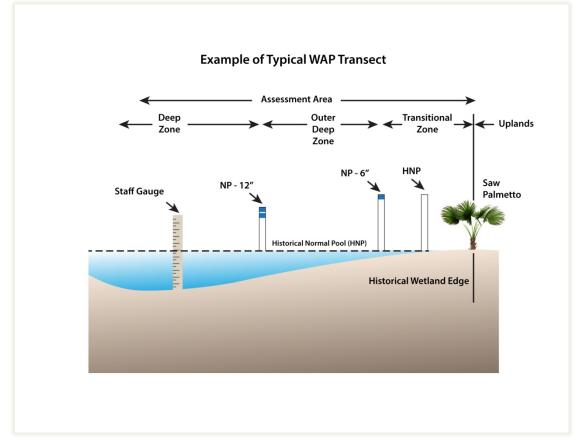


FIGURE 4-1 Example of Typical WAP Transect

Source: SWFWMD, 2009

The location of each transect is based on factors such as minimal disturbance to existing vegetation, clear line of sight, ability to assess characteristics that are representative of the T zone along a straight line, as well as wetland accessibility. Each transect is established with the placement of a monument at the HNP, NP-6, and NP-12 elevations. The innermost transect point within the deepest portion of the wetland pool is identified by the placement of a staff gauge and

surficial aquifer monitoring well, installed to a depth of approximately 8 feet (ft) below ground surface (bgs) per the SWFWMD WAP.

Vegetative, hydrologic, and soil data are collected from each transect and photographs are taken at each monument in all four cardinal directions north (N), east (E), south (S), and west (W). Each monitoring well has been located and surveyed for horizontal and vertical coordinates by a professional surveyor and mapper registered in Florida. During initial and subsequent monitoring events, the provisions of the WAP prescribe that those individuals evaluating the resource should conduct annual assessments by remaining within the established transect as much as possible, while avoiding unnecessary damage to characteristic vegetation. However, the WAP also incorporates provisions to potentially walk throughout the wetland when critical for accurate evaluation of the assessed area.

Section 5 Basis for Wetlands Assessment Procedure Deployment

The results of the WMP will be used to compare changes from baseline conditions to those that may develop during the initial RAP implementation. These comparisons will assess changes in water elevation (surface water or groundwater), periodic inundation, and vegetation, if any, in each wetland zone. As discussed below, changes in wetland conditions due to regional climatic conditions, including persistent drought, will also be considered in the analysis to determine actual impacts of the groundwater remediation on wetland areas, if any. The WAP contains provisions to document and monitor biologic indicators of hydrologic change (more specifically, groundwater withdrawals). SWFWMD established the WAP to provide data that supplements hydrologic data for water use permitting, minimum flows and levels development and assessment, and recovery assessment.

This assessment also includes documenting and evaluating other factors that may affect the TWs and RWs included in this assessment. These factors include encroachment on wetlands by land development and/or areas where land management and drainage activities are occurring, historical and current cattle/livestock operations, disease, introduction of exotic plant species, and other anthropogenic variables that may affect the biological indicators of hydrologic change that occur in the TWs and RWs.

The extent to which historical and current land use and vegetative cover variables affect baseline conditions may not be entirely discernible given the localized nature of this assessment. However, wherever feasible, regional climate and land use variables (including floods, drought, and irrigation use) are reflected in the establishment of baseline conditions in each wetland. New information collected during ongoing assessments will consider any apparent individual or

locally occurring changes as well as the regional conditions that may be affecting (and are subsequently observed in) TW and RW resources.

As determined during consultation with the FDEP, monitoring results will be evaluated for the assessment of effects from the operational RAPA system. The RAPA includes recharging the water table aquifer to mitigate drawdown in wetland areas predicted to be within or in close proximity to USAS drawdown resultant from proposed RAPA extraction pumping. Therefore, it is anticipated that there will be no loss of functions or acreage within the identified TWs. Other variables that could affect wetland hydrology include land-use changes resulting in increased impervious surfaces, which preclude the infiltration of stormwater runoff; the excavation of borrow pits and ponds; the establishment or maintenance of drainage canals; and extreme climatic events such as heightened tropical weather activity or prolonged drought.

Section 6 Project Area Setting and Site Conditions

This section describes the physical environment, ecology, and water resources influencing the wetlands that were assessed from June 8 through 10, 2015 in the Tallevast area.

6.1 SITE LOCATION

The facility is located in the northwest quarter of Section 31, Township 35 South, Range 18 East, as shown on the Bradenton, Florida USGS 7.5-minute quadrangle (USGS, 1994) shown in Figure 6-1.

6.2 CLIMATE

The Tallevast area is located within the subtropical zone in southwest Florida. Average daytime high temperatures in June and July are 91 degrees Fahrenheit (°F; 32 degrees Celsius [°C]). The average daytime temperatures during the winter months are in the low to mid-70s °F (22 °C). As shown on Historical Temperature Trends Figure 6-2 (below), extreme temperature records in the area range from 100 °F (38 °C) in July (1998) to 20 °F (-6 °C) in December (1983).

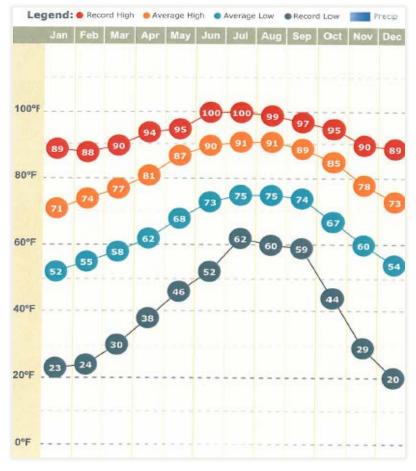


FIGURE 6-2 Historical Temperature Trends in the Tallevast Area

Source: The Weather Channel, 2015, Sarasota, Fl

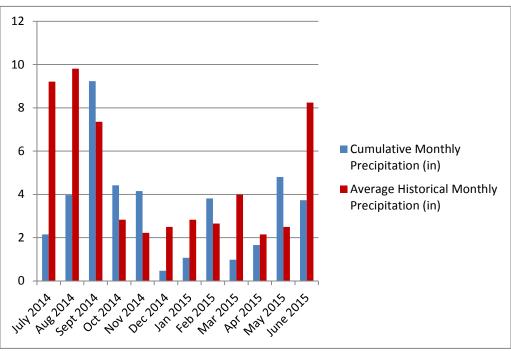
Annual rainfall totals average 54 inches (1.37 meters). The rainy season generally occurs in the summer in the Tallevast area, with frequent afternoon thunderstorms of short duration. As shown on Figure 6-3 (below), August is usually the wettest month of the year, with an average of 9.81 inches of rain (approximately 24 centimeters). April is generally the driest month of the year, with an average of 1.83 inches of rain (approximately 4.5 centimeters). Hurricane season in Florida occurs from June through the end of November. Figure 6-4 (below) shows the cumulative monthly precipitation occurring from July 2014 to June 2015 compared to the historical monthly precipitation trend for each month.



FIGURE 6-3 Historical Precipitation Trends in the Tallevast Area

Source: The Weather Channel, 2015

FIGURE 6-4 Cumulative Monthly Precipitation 2014 - 2015 vs Historical Monthly Average Sarasota-Bradenton International Airport (SRQ)



Source: North Carolina State University, 2015

The following local weather details are pertinent to the wetlands assessments performed to date.

- Initial Assessments A period of drought preceded the 2008 and 2009 initial assessments of wetlands in the Tallevast area, including a relative lull in tropical weather events. A measure of drought conditions known as the Palmer Drought Severity Index (PDSI) is published by the National Oceanic and Atmospheric Administration (NOAA). Published PDSI values (see Appendix A) for a 2- to 3-year period prior to the initial assessment also indicate an extended period of drought.
- 2010 WMP Assessment A more typical precipitation cycle, still without tropical weather, appeared to have resumed during the months preceding the 2010 WMP transect assessment.
- 2011 WMP Assessment Precipitation in the six months preceding the 2011 WMP assessment was less than 2010, except for the month of March.
- 2012 WMP Assessment Precipitation in the three months preceding the 2012 WMP assessment (March, April, and May) was higher than the same 3-month period prior to the 2011 assessment, except for March. In the two weeks prior to the 2012 assessment, more than seven inches of total precipitation were recorded at the SRQ.
- 2013 Assessment Precipitation in the quarter preceding the 2013 WMP transect assessment was comparable to the 2012 event; however, there was no significant rainfall immediately prior to the assessment as there was in 2012.
- 2014 Assessment Precipitation in the quarter preceding the 2014 WMP transect assessment was comparable to the 2013 event. Precipitation in the year preceding the 2014 monitoring event was approximately 61 inches (approximately 155 centimeters) which is slightly above average.
- 2015 Assessment Precipitation in the quarter preceding the 2015 WMP transect assessment was slightly less compared to the 2014 event. Precipitation in the year preceding the 2015 monitoring event was approximately 41 inches (approximately 104 centimeters) which is below average. Average annual rainfalls at the SRQ from 2003 through 2014 are presented in Table 6-1 (below).

TABLE 6-1 Annual Precipitation Totals at Sarasota-Bradenton International Airport (SRQ), 2003-2013

	Annual Precipitation Totals at Sarasota-Bradenton International Airport (50-Year Annual Average – 54.12 inches)										
2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
50.42 inches	47.27 inches	51.67 inches	48.07 inches	33.47 inches	34.88 inches	32.77 inches	42.80 inches	40.10 inches	42.77 inches	56.20 inches	49.78 inches

Source: North Carolina State University, 2015

6.3 PHYSICAL ENVIRONMENT

The Tallevast community is located on the Gulf Coastal Lowlands, a gently sloping plain ranging from approximate elevations as high as 32 ft above mean sea level (msl) to 15 ft msl. The area is approximately 1.5 to 2 miles east (inland) of Sarasota Bay and approximately six miles from the Gulf of Mexico. The land surface of the Tallevast Site has very little relief and slopes gently toward the south and east.

The Gulf Coastal Lowlands are situated in the Southwestern Flatwoods physiographic region and consist of rock and sediment ranging from the Miocene to Pleistocene eras (23.8 million to 11,000 years ago). Landforms are characterized by low plateaus and ridges, flatwoods, prairies, rockland/marl plains, and various relict coastal features. Surface materials are dominated by sand with clayey substrata, limestone, and sumps of accumulated organic deposits.

The Gulf Coastal Lowlands region and flatwoods soils are moderately to poorly drained, finegrained, acidic sands with low reserves of available nutrients; low organic matter; and low clay content (often less than 2 percent). These soils may contain a spodic (organic) horizon when organic matter is translocated downward by water percolation. Clay hardpans may also result from transport and accumulation of clays. Many of the soils supporting flatwoods are spodosols, but some variation exists. Soil types in upland areas of the Tallevast Site are largely composed of Eau Gallie fine-grained sand, while soil types in mapped wetlands include complexes of Canova, Anclote, and Okeelanta soils, as well as fine-grained sands of the Floridana-Immokalee-Okeelanta association.

6.4 AQUIFER SYSTEMS

The three aquifer systems, which vary in depth, that underlie the Tallevast site are as follows: Surficial Aquifer System (SAS), Intermediate Aquifer System (IAS), and Floridan Aquifer (Floridan). These aquifer systems are described in detail in the RAPA report, and in the investigative reports that preceded the RAPA. The SAS is recharged locally, and the water table contained in this formation fluctuates due to seasonal and climatic variations in rainfall. In addition, artificial factors have produced impacts on groundwater levels in each of the three aquifer systems, including the water table in the SAS. Artificial factors include:

- Pumping of wells in aquifers beneath the SAS for the irrigation of fields, lawns, and golf course turf or maintenance of pond levels for aesthetic purposes; and
- The presence of drainage canals that, in most cases, lead to lowered surficial groundwater elevations in their immediate vicinity, but can sometimes have the opposite effect in backing up positive drainage during periods of excessive runoff.

6.5 SURFACE WATER RESOURCES/WATERSHED

The United States is divided and sub-divided into successively smaller hydrologic units which are classified by the USGS into four levels: regions, sub-regions, accounting units, and cataloging units. These hydrologic units are nested within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified with a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system. The Tallevast Site is located along the drainage divide between two stream/canal systems, Bowlees Creek and Pearce Canal, within the eight-digit Sarasota Bay watershed, HUC 03100201. Bowlees Creek, a major tributary of Sarasota Bay, is located approximately 1.25 miles northwest of Tallevast. The Pearce Canal trends at an angle to the Tallevast Site and is located southeast (0.75 mile) and east (1 mile) of Tallevast. A ridge (topographical high ground) runs approximately north-south through the Facility. Surface water on the western portion of the Facility flows west toward Bowlees Creek and the improved drainage features around the SRQ, both of which drain to Sarasota Bay. Surface water on the sarasota Bay watershed and north into the Manatee River watershed (HUC 03100202). The

drainage divide along Pearce Canal is located approximately 1 mile north of the Manatee/Sarasota County line, where the canal crosses U.S. Highway 301, and 1 mile southeast of the Facility.

In addition to drainage facilities (such as Pearce Canal) and consumptive use, groundwater depletion due to other impacts remains an ongoing concern throughout much of west-central Florida, according to the USGS. To the north of the Tallevast area, saltwater intrusion and subsidence in the form of sinkhole development, land subsidence, and surface water depletion from lakes are issues of concern. However, Florida Geological Survey (FGS) poster number 11 (Rupert and Spencer, 2004) indicates that Sarasota and Manatee Counties lie in a region where sinkholes are uncommon. Throughout Florida, broad concerns exist for the reduction of surface water flows, deterioration of wetland water quality, and increased costs to pump needed water resources. Several small surface water bodies (e.g., decorative ponds, stormwater ponds) are located within a 0.5-mile radius of the Facility. Shallow ditches and swales throughout the Tallevast area also convey stormwater runoff to roadside and regional drainage channels.

6.6 ECOLOGY

The dominant historical habitat of the project area is pine (*Pinus spp.*) flatwoods. According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (formerly the Soil Conservation Service), such habitats in southwest Florida are characterized by savannas, an ecotone spanning grasslands to forests. The ecosystem in the vicinity of the assessed wetlands is now used extensively as rangeland for cattle grazing.

Once the most extensive terrestrial ecosystem in Florida, these historical pine flatwoods evolved under frequent lightning and human-induced fire, seasonal drought, and flooded conditions. Flatwoods are characterized by low, flat topography, relatively poorly drained, acidic, sandy soil, and pine woodlands. This ecosystem historically had open, park-like understories managed by frequent fires.

The dominant tree species of flatwoods in the Tallevast area are limited to South Florida slash pine (*P. elliottii* var. *densa*) and longleaf pine (*P. palustris*). Other infrequently occurring trees

include cabbage palm (*Sabal palmetto*) and hardwoods including live oak (*Quercus virginiana*), water oak (*Q. nigra*), laurel oak (*Q. laurifolia*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and ash (*Fraxinus* spp.). Commonly occurring understory shrub species include saw palmetto (*Serenoa repens*), wax myrtle (*Myrica cerifera*), blueberries (*Vaccinium* spp.), and American beautyberry (*Callicarpa americana*).

The invasive Brazilian pepper (*Schinus terebinthofolia*) is identified as locally dominant in both the forest understory and open rangeland scrub strata. Distribution of Brazilian pepper occurs throughout the Tallevast Site. It is an aggressive invader of disturbed habitats, a characteristic that has led to its placement on the Florida Exotic Pest Plant Council list of invasive species as a Category I species. Other nonnative and escaped plant species identified in the Tallevast WMP area include camphor tree (*Cinnamonum camphora*), punk tree (*Melaleuca quinquenervia*), primrose willow (*Ludwigia peruviana*), tropical soda apple (*Solanum viarum*), and Caesar's weed (*Urena lobata*).

Section 7 Wetlands Assessment Procedure Implementation

7.1 TRANSECT AND MONITORING LOCATION SELECTION

Four RWs (RW-1, RW-2, RW-3, and RW-5) and four TWs (TW-1, TW-2, TW-6, and TW-18) were originally identified and selected for monitoring based on initial June 26, 2008 Site visits with representatives from the FDEP, CDM, ARCADIS, and Lockheed Martin. The TWs were selected based on their locations within or in close proximity to the area of the SAS predicted to have drawdown due to implementation of the RAP groundwater extraction system. The RWs were also selected based on proximity to the Site, as well as the similarity of FLUCFCS characteristics to those associated with the TWs. However, RWs are anticipated to be beyond the area of groundwater elevation influence from the operational RAPA system.

Following the June 2009 field assessment to establish WMP monitoring transects locations, RW-5 was eliminated as a reference wetland from the RAPA system performance monitoring. The SWFWMD permitted RW-5 for development after adequate mitigation in the form of wetland credits were provided. The removal of RW-5 from monitoring was documented in the first baseline monitoring report.

Pursuant to the WAP, one transect was established in each of the remaining RWs (RW-1, RW-2, and RW-3), as well as in each of the four TWs. Transects were positioned within a representative 10-meter-wide area in each wetland, from the HWE to the wetland interior. Estimated HNP elevations were also field-identified during transect establishment. The location of each transect was based on factors including minimizing disturbance to existing vegetation, clear line of sight, ability to assess all aspects representative of each zone along a straight line, and access to the assessment area.

Permanent monuments were placed in the field to identify these transects during baseline monitoring of wetland conditions. Monuments composed of steel rebar fitted with a sleeve of polyvinyl chloride (PVC) pipe were installed at the HNP and at elevations of 6 and 12 inches below the HNP and were labeled HNP, NP-6, and NP-12, respectively. Monuments marking the HWE have not been installed to date, however, the WAP recommends installing it if possible. During a June 2008 Site visit with the FDEP, vegetative, hydrologic, and soil indicators were used to establish the HNP elevation within the TWs. These same factors were used during transect placement in both TWs and RWs during the subsequent 2009 field season. Subsequent to monument placement and monitoring well installation, the HNP, NP-6, NP-12, staff gauge, and monitoring well locations were professionally surveyed (March 2010). Transect access locations are shown in Figure 7-1.

Pursuant to the WAP, the area to be assessed along each transect will subsequently be referred to as the assessment area. The assessment area is approximately 10 meters wide and extends 10 meters beyond the wetland interior. Subsequent monitoring will be conducted on the established transect as much as possible to avoid unnecessary damage to vegetation, but may be conducted throughout the wetland if critical for an accurate evaluation of the assessment area.

7.2 STAFF GAUGES AND MONITORING WELL INSTALLATION

Groundwater monitoring wells and staff gauges were installed in the TWs and RWs during the 2009 and 2010 field efforts. One monitoring well and one staff gauge were installed in the D zone of each wetland and placed along the WAP transect, or within the assessment area. While an upland monitoring well is traditionally recommended under WAP procedures, it is not required. Under direction from the FDEP, because of the relatively small size of the wetlands, an upland monitoring well was not installed at the HWE in any of the wetlands. The ground elevation was surveyed at the wells and staff gauge locations by a professional surveyor and mapper registered in Florida. An initial water level reading was obtained manually, and interim water elevation data were obtained from data logger downloads.

One well (Stilling Well-3) and one staff gauge (Staff Gauge-8) were found to already exist in TW-2. Per WAP guidelines (3.2 WAP Transect Selection and Setup; SWFWMD, 2005), these

locations were considered in the initial selection process for the monitoring transect and assessment area at TW-2. These devices are located in the outer T zone or HWE. Therefore, while included in the assessment area of the monitoring transect, per SWFWMD guidance, the stilling well and staff gauge are not being monitored under WAP protocols and are not expected to provide valuable data in monitoring the long-term wetland response to RAP system implementation. Similar existing wells and staff gauges were not found at the other wetlands.

7.3 GROUNDWATER MONITORING WELL INSTALLATION

The SWFWMD well construction standards, promulgated in Florida Administrative Code (F.A.C.) Chapter 40D-3, were followed for all monitoring well installations in 2009 and 2010. All monitoring wells are constructed using 2-inch Schedule 40 PVC and installed to a depth of 8 ft bgs using the mud rotary method (ASTM International Method D-5092), except for the monitoring well in TW-1, which was installed to approximately 10 ft bgs. Monitoring well installation in TW-1, TW-2, TW-6, TW-18, RW-1, RW-2, and RW-3 was managed by a qualified wetland scientist and geotechnical well development specialist. Monitoring well installation at TW-2, TW-6, RW-1, RW-2, and RW-3 was accomplished in November 2009 using a skid-mounted mud rotary auger. Due to landowner access restrictions, monitoring well MW-TW-18 was installed in February 2010 using a track-mounted mud rotary auger. Monitoring well installation at TW-1 was accomplished in February 2010 with a tripod-mounted manual mud rotary auger due to shallow water conditions.

The screened interval in the monitoring wells is 5 ft long and placed at 3 to 8 ft bgs (5 to 10 ft bgs in MW-TW-1) and consists of 0.010-slot, 2-inch PVC screen. A 20/30 sand filter pack was placed in the annular space from the bottom of the well to the surface (MW-TW-1) or from the bottom of the well to approximately 1-foot below the surface (all other wells) where a bentonite seal was installed. After well construction was complete, the land surface and top of casing elevations were surveyed by a professional surveyor, using horizontal and vertical control. Survey data are shown in Table 7-1.

As shown on Figure 7-2 (below), wellhead completion consisted of a 2-ft by 2-ft, 4-inch-thick concrete pad with a 2.5-ft-high riser with a lockable well cover. All development water from the

monitoring wells was contained and disposed of via the former on-facility interim remedial action treatment plant. All wells were developed according to United States Environmental Protection Agency (USEPA) guidance to meet the following standards: pH \pm 0.1 standard units (S.U.), specific conductivity \pm 3 percent, oxidation-reduction potential (ORP) \pm 10 millivolt (mV), turbidity <10 nephelometric turbidity units (NTUs), and dissolved oxygen (DO) \pm 0.3 milligrams per liter (mg/L), for three consecutive readings conducted no less than one minute apart. If a well became dry during purging, development continued after the well recharged. Development was considered complete when the turbidity was less than 10 NTUs and the above criteria were met. Lithologic logs, permits, and well completion reports were prepared for each monitoring well (well development logs were included as Appendix A of the Wetlands Monitoring Report – July 2010 Through June 2011; borehole logs and well completion diagrams were included as Appendix C of the Wetlands Monitoring Report for July 2011 Through June 2012 [ARCADIS, 2012]).

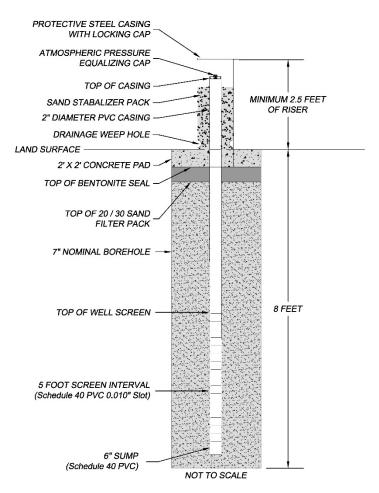


FIGURE 7-2 Typical Well Installation Cross-Section

7.4 STAFF GAUGE INSTALLATION

Staff gauges were installed adjacent to each monitoring well during 2009 and 2010 field efforts. As shown on Figure 7-2, at each staff gauge location, a porcelain-enameled iron Style C staff gauge was attached to a 2- by 4-inch by 8-ft long pressure-treated post. The staff gauges enable measuring stage heights in feet and tenths of feet. A hand level was used to ensure that the post and gauge were plumb. The pressure-treated post was driven into the mud line to the point of refusal or suitable stability. Each post was embedded at least two ft below the base of the surface water feature. After the monitoring well and staff gauge were installed, they were located by a professional surveyor and mapper registered in Florida. Survey data are included in Table 7-1.

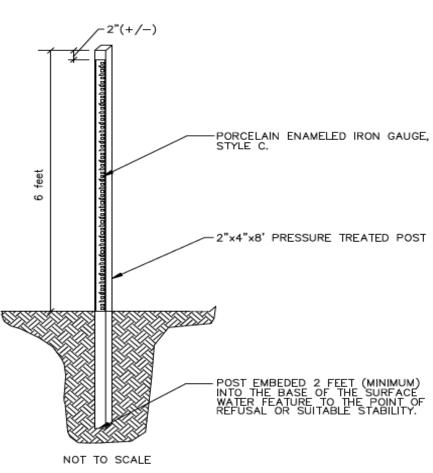


FIGURE 7-3 Typical Staff Gauge Installation Cross-Section

7.5 DATA LOGGER DEPLOYMENT

To facilitate monitoring frequency and accuracy, automatic water level measurement devices (Solinst[®] brand pressure transducers) with data loggers were installed to collect real-time water level data in each of the TW and RW monitoring wells. Data loggers were programmed to collect hourly water level readings. Transducers were installed in five of the seven locations (MW-RW-1, MW-RW-2, MW-RW-3, MW-TW-2, and MW-TW-6) on November 6, 2009. Transducers were installed in the remaining two locations (MW-TW-1 and MW-TW-18) on February 23, 2010. Approximately seven days after installation, the data loggers were checked and data downloaded to verify that they were working correctly. Replacement transducers have since been installed in MW-TW-1 (March 8, 2010), MW-RW-1 (November 19, 2009), MW-RW-3 (January 15, 2014), MW-TW-6 (June 8, 2015), and MW-TW-18 (June 8, 2015). Data

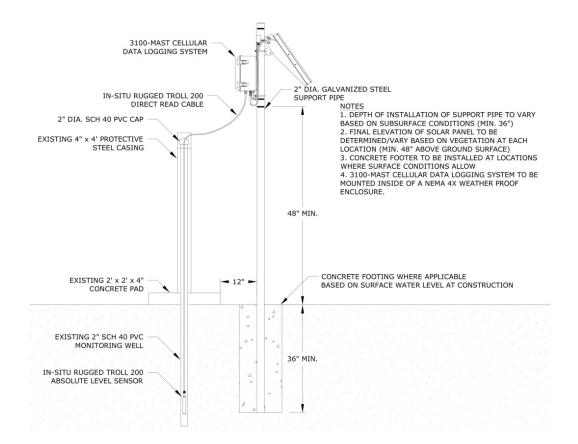
from the data loggers were then downloaded after approximately 90 days and continued to be downloaded on a quarterly schedule until December 2014, after which the schedule changed to a semi-annual frequency with download events in March and September. Battery life and data storage space are routinely confirmed before redeploying the equipment each event. While data are downloaded, groundwater levels are measured manually to confirm the accuracy of the data collected by the automatic water level recorders.

Data are transferred to an Excel spreadsheet as soon as possible after quality assurance/quality control (QA/QC) and validation with day-of-download measurements. In addition, precipitation data are obtained from the NOAA climate history and transferred to the Excel spreadsheet. During any replacement of the transducer, the manual water level data are used to calibrate continuous recording. Manual water level results are compared with calculations to identify and investigate discrepancies and resolve issues with transducer performance prior to redeployment.

7.6 WETLAND TELEMETRY SYSTEM

Wetland telemetry monitoring systems were installed adjacent to each monitoring well during the 2014 Annual Wetland Assessment event. The telemetry systems enable real-time collection of water levels at each of the reference and target wetlands. Water level data is transmitted via cellular signal to a centralized server housed at the main facility. As shown in Figure 7-4, each telemetry system consists of an In-Situ[®] brand pressure transducer, solar panel, power box, and cellular modem mounted on a steel 2" galvanized steel post installed approximately 3 feet bgs. Data will continue to be collected from the original (non-telemetered) instruments until it is shown that the new instruments are adequately replicating the data collected by the original instruments. The original instruments will be taken out of operation once the telemetry system data accuracy and reliability have been confirmed. The telemetry system is beneficial because it allows quick access to water level instrumentation to determine status and functionality and allows for the use of real time data for continuous optimization and modification of the RAPA treatment system and discharge.

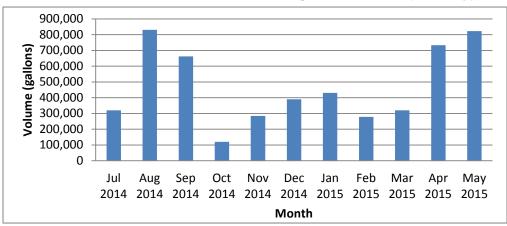
FIGURE 7-4 Wetlands Telemetry System



Section 8 Description of System Startup and Operations

8.1 REMEDIAL SYSTEM STARTUP AND OPERATION

Remedial actions as described in the RAPA (Arcadis, 2009) began on November 18, 2013. The remedial system consists of 77 vertical extraction wells, 4 extraction trenches, 5 onsite injection wells, and 3 infiltration galleries. A general layout of the remedial system is provided in Figure 3-1. The 77 vertical extraction wells and 4 extraction trenches have operated at a combined extraction rate of approximately 180 gallons per minute (gpm) since startup. The 5 onsite injection wells and 2 of the 3 infiltration galleries were not in operation during the current monitoring period. One infiltration gallery (RC-7002) has been operational since July 2014 to provide additional water in the vicinity of TW-6 and help offset any potential drawdown affects that may be caused by the nearby horizontal extraction wells (EW-2103 and EW-2104). Figure 8-1 shows the total volume of treated water discharged to RC-7002 per month from July 2014 to May 2015. A total of 5,194,500 gallons of treated effluent water have been discharged through RC-7002.





Section 9 Description of Monitored Wetlands and Evaluation of Operational Conditions

9.1 METHODOLOGY FOR DATA COLLECTION AND ASSESSMENT

Findings and observations for the monitored wetlands are presented below. Specific details of each project wetland, such as observations of habitat conditions along the selected transects, are presented on the completed field data sheets in Appendix B. Other characteristics of these wetlands are provided in Table 9-1 below. The WAP requires a thorough assessment of soil conditions every five years. Soil conditions were previously evaluated for all wetlands during the 2014 monitoring event and will be evaluated again in 2019. Observations are described for each wetland in the following sections. Photographic documentation of conditions at each wetland for the 2015 assessment is provided in Appendix C. Graphic display of transducer data is provided in Appendix D. Manual water level elevations and staff gauge measurements collected during wetland transducer downloads between July 2014 and June 2015 are summarized in Table 9-2. Included in the analysis of wetland conditions is a rationale for assignment of WAP zonation scoring for the vegetative stratum. Zonation scoring for conditions in each transect are based on a prescribed range from 1 to 5 points that are detailed in SWFWMD's WAP protocol and the revised ranking scale provided by SWFWMD (SWFWMD, 2008). A score of "1" represents a vegetation community that lacks constituent species considered appropriate for survival in a functioning wetland ecosystem. A score of "5" represents a fully functioning wetland vegetation assemblage. A score of "0" represents conditions or species composition that does not lend itself to a wetland habitat assessment consistent with the definitions under the WAP.

Wetland ID	TW-1	TW-2	TW-6	TW-18	RW-1	RW-2	RW-3
Wetland Type	Emergent	Emergent/ Forested	Emergent/ Forested	Forested	Emergent/ Forested	Forested	Emergent
Estimated * Historical Acreage	15.15	1.87	3.04	4.08	8.22	8.20	10.45
June 2009** Field Verified Acreage	11.4***	1.66	1.1	0.39	3.42	4.9	6.3
Historically Inundated	Yes	Yes	Partially	Unknown	Yes	Partially	Yes
Inundated (week of June 8, 2015)	Yes	Yes	Partially	No	Yes	Yes	Yes
Degree of Upland Transition (week of June 8, 2015)	Low	Moderate	Moderate	High	Moderate	Moderate	Low
Evidence of Groundwater at the Surface Comparing Transducer Data To Ground Surface Elevation	Yes	Yes	Yes	Yes, of short duration in heavy rain events only	Yes	Yes	Yes

TABLE 9-1 Summary of Project Wetland Characteristics

Notes: * Photo-interpreted using 2003 aerial photographs

** Photo-interpreted during 2009 agency site visit. Shown on wetland monitoring transect maps.

*** Difference between the estimated historical acreage (2003 aerial interpretation) and the June 2009 Field Verified Acreage appears to demonstrate a pre-baseline trend of wetland diminishment and may be a result of long term surficial aquifer drawdown that resulted from residential water wells, agricultural consumptive use, and excavation of regional canals and local ditches.

Wetland	Location	Ground Surface Elevation	Water Level Elevation (ft NAVD)						
		(ft msl)	Sept 2014	Dec 2014 ³	Mar 2015	June 2015			
RW-1	SG-RW-1	13.90	14.16	NA	14.24	14.14			
K VV-1	MW-RW-1	14.06	14.34	14.36	14.27	14.21			
RW-2	SG-RW-2 ²	17.40	17.65	NA	17.79	17.59			
R W-2	MW-RW-2	17.36	17.87	17.98	18.06	17.57			
RW-3	SG-RW-3	20.77	Damaged ²	NA	22.05	20.99			
	MW-RW-3	20.78	21.41	22.05	21.89	20.30			
TW-1	SG-TW-1	22.40	23.99	NA	23.96	24.06			
1 **-1	MW-TW-1	22.82	24.02	23.85	23.92	24.04			
TW-2	SG-TW-2	21.65	23.15	NA	NA ^{**}	23.59			
1 **-2	MW-TW-2	22.37	23.17	22.65	24.59	23.48			
TW-6	SG-TW-6	21.05	21.93	NA	22.99	22.60			
	MW-TW-6	21.34	21.87	22.95	22.72	22.47			
TW-18	SG-TW-18	25.89	Dry	NA	Dry	Dry			
	MW-TW-18	26.16	23.04	24.04	24.27	23.77			

 TABLE 9-2

 Summary of Manual Water Level Elevations and Staff Gauge Measurements

Notes:

¹ SG-RW-2 resurveyed on 11/28/11 after it had been disturbed by cattle. Previous survey elevation was 21.12.

² Staff gauge is damaged and was replaced and resurveyed in October 2014

³ December 2014 Event - DTW measurements provided from telemetry system data collected on December 30, 2014 at 13:00

*Monitoring well DTW data indicates water level is above ground surface, but observations indicate ground surface to be dry/ ** SG-TW-2 was submerged during the March 2015 event – no measurement was taken.

ft – feet

msl – mean sea level

NAVD - North American Vertical Datum

NA – Not available

Blue shading - water level above ground surface (ags)

 $Brown\ shading-water\ level\ below\ ground\ surface\ (bgs)$

Horizontal: NAD 1983 State Plane Florida West (ft)

Vertical: NAVD88

Vegetation Type	Event Period	Year	TW-1	TW-2	TW-6	TW- 18*	RW-1	RW-2	RW-3
	в	2009	3	4	4	NA	2	3	2
		2010	5	3	4	NA	4	3	3
		2011	3	4	4	NA	4	3	4
Ground		2012	3	4	4	NA	4	3	4
Cover		2013	3	4	4	NA	4	3	3
	0	2014	3	4	3	2	3	3	5
	0	2015	3	5	3	2	4	3	5
	В	2009	4	3	4	NA	2	3	NA
		2010	5	3	4	NA	2	3	NA
		2011	3	3	4	NA	2	3	3
Shrubs		2012	4	3	4	NA	2	3	3
		2013	4	4	4	NA	2	3	3
	ο	2014	4	4	4	3	2	3	5
		2015	4	4	4	3	2	3	5
	В	2009	NA	3	NA	2	4	4	NA
Trees		2010	2	3	NA	2	4	3	NA
		2011	4	4	NA	2	4	3	NA
		2012	3	4	4	2	4	3	NA
		2013	4	4	4	2	4	3	NA
	0	2014	4	4	4	3	4	3	NA
		2015	4	4	4	3	4	3	NA

TABLE 9-3 Summary of Wetland Zonation Scoring – Baseline to Current Assessment Period

Note: Assessment scoring is based on a qualitative assessment of vegetation coverage; Qualitative assessments may vary based on the individual assessor.

NA = No score assigned due to lack of vegetation meeting strata requirements.

B = Baseline Period; O = Operational Period

*TW-18 scoring strategy changed for the Groundcover and Shrub strata (see text).

Ranking Scale

1. Species with an **upland** classification have moved into the **deep zone** in high numbers and distribution.

2. Species have moved in two **zones** in high numbers and distribution, and/or some species with an **upland** classification have moved into the deep zone.

3. Species have moved in one **zone** in high numbers and distribution, and/or some plants have moved in two **zones**.

4. Species have moved in one **zone** in enough numbers and distribution to be of concern, and/or species with an **adaptive** classification are extensive in numbers and distribution in the **transition zone**.

5. Normal zonation. Some species may have migrated inward one zone, but they are small in number and/or right along the zone edge.

9.2 GENERAL HABITAT CONDITIONS

The freshwater wetlands on Site are similar to those that occur throughout the southwest Florida landscape in concert with pine flatwoods. These shallow marshes (less than 1 meter deep) occur as slight depressions ranging from 10 to a few hundred meters in diameter in the otherwise flat landscape. The most studied and best-preserved example of these wetlands occurs in the Myakka River State Park in eastern Sarasota County. Flatwood marshes provide an important function as groundwater recharge areas (Myers and Ewel, 1990). The flat topography, soils, and seasonal precipitation of the pine flatwoods strongly influence hydrology in these wetland systems.

During the rainy season, minimal water runoff results in waterlogged and poorly aerated soils and standing water may be present for varying periods of time. During the dry season, high evapotranspiration draws water from upper soil horizons. Water often cannot move upward from lower horizons where there is a natural impermeable hardpan, frequently resulting in drought conditions. While occurring in various stages of succession and land use disturbance, all TWs and RWs subject to monitoring under the WMP are relict flatwood marshes.

A colder-than-normal winter in early 2010 decreased the observed prevalence of some previously reported dominant herbaceous vegetation in the assessment areas. These effects were most pronounced in non-native species including primrose willow, Caesar's weed, and tropical soda apple. This observation of decreased prevalence appeared to be reversing as of the June 2012 assessment and recovery of these species continued to be observed during the May 2013, June 2014, and June 2015 assessments. Other species continuing to exhibit rebound from the winter 2010 freezing temperatures include Elliott's aster (*Symphiotrichum elliottii*). Findings for 2015 discussed below indicate precipitation totals that have resulted in reduced seasonal soil saturation and inundation. The reduced seasonal soil saturation and inundation has allowed for seasonal reestablishment of dominant 2009-2010 species associated with dryer conditions, including Caesar's weed (*Urena lobata*) and dogfennel (*Eupatorium capillifolium*).

Observed evidence of wildlife during the June 2015 assessment was consistent with observations made during the baseline monitoring events and was limited to animals typically found in flatwoods such as armadillo (*Dasypus novemcinctus*), white-tailed deer (*Odecoileus virginianus*),

wild hog (*Sus scrofa*), and raccoon (*Procyon lotor*). Avian species observed during the June 2015 assessment included Northern cardinal (*Cardinalis cardinalis*), mockingbird (*Mimus polyglottos*), Carolina wren (*Thryothorus ludovicianuss*), snowy egret (*Egretta thula*), White ibis (*Eudocimus albus*), Great blue heron (*Ardea Herodias*), Florida mottled duck (*Anas fulvigula*) and red-winged blackbird (*Agelaius phoeniceus*). Amphibians observed included green anole (*Anolis carolinensis*), brown anole (*Anolis sagrei*), green tree frog (*Hyla cinerea*), and southern leopard frog (*Lithobates sphenocephalus*).

9.3 TARGET WETLAND 1

9.3.1 Transect Location

Beginning at the collocated monitoring well/staff gauge (installed February 22, 2010) and extending to the HWE, the monitoring transect at TW-1 is oriented from east to west in the northern section of the three contiguous depressional areas in the wetland (Figure 9-1).

9.3.2 Habitat Description

The northernmost depressional area was selected for WMP transect deployment due to favorable accessibility and representative landscape position within an emergent habitat that exhibits minimal encroachment by non-native invasive vegetation. Until timbering activities occurred between the 2011 and 2012 annual assessments, dominant vegetation surrounding TW-1 consisted of planted slash and longleaf pine trees, with a hardwood forest along the southern border. During the June 2015 assessment, the majority of uplands surrounding TW-1 consisted of native shrub and brushland.

9.3.3 Monitoring well TW-1 Data Assessment

The transducer for well MW-TW-1 was installed on February 23, 2010 and was subsequently replaced on March 8, 2010 due to a sensor malfunction. Elevations at MW-TW-1 indicate that groundwater levels ranged from about 3.5 ft bgs to about 2.5 ft above ground surface (ags) since monitoring began. During the current monitoring period (June 2014 to June 2015), groundwater elevations fluctuated between 2.0 ft. ags and 0.6 ft ags from June through August 2014, followed by a steady increase to 2.5 ft ags in September 2014 due to heavy rainfall. Water levels then

dropped to the normal pool elevation where it remained until April 2015, when it fell to approximately 0.5 ft bgs. Moderate rainfall throughout May 2015 increased groundwater elevation to approximately 1.6 ft ags observed at the time of the June 2015 assessment. Staff gauge measurements collected during wetland transducer downloads in September 2014, March 2015 and June 2015 indicated standing surface water at this location (see Table 9-2). Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.3.4 June 2015 Field Observations

In June 2015, the northern interior sector of the TW-1 transect continued to be dominated by rice cutgrass (*Leersia hexandra*), Carolina willow (*Salix caroliniana*), field paspalum (*Paspalum laeve*) and maidencane (*Panicum hemitomon*). As discussed above, previously dominant planted pines and upland hardwood and shrub vegetation surrounding the west, south, and east sides of TW-1 was reduced to a native shrub habitat with some minor slash (i.e., woody debris generated by timber harvesting); see Attachment C field data sheets.

As during all previous monitoring events for TW-1, the herbaceous/groundcover zonation score of 3 for the 2015 assessment continues to apply due the diversity of T zone groundcover species present in the D zone. This meets the WAP qualification where "species have moved in one zone in high numbers and distribution, and/or some plants have moved in two zones." The previous year's shrub/sapling zonation score of 4 also continues to apply due to species having moved in one zone in enough numbers (i.e., \geq 5 percent) and distribution to be of concern for the long-term viability of the wetland habitat. The tree zonation score for the 2015 assessment of 4 was assigned due to the persistent occurrence of vigorous OD Carolina willow species having moved in one zone in enough numbers (i.e., \geq 5 percent) and distribution in the D zone to be of concern for the long-term viability of the wetland habitat.

During the June 2015 assessment, the majority of the wetland was inundated. Except for the alteration of the adjacent timber-forested wetland and upland edge noted in the May 2013 assessment, no conspicuous hydrologic alterations were observed along the surface area in or near the TW-1 transect during the June 2015 assessment. The previously reported 5.25-acre

stormwater retention pond, associated with an industrial facility adjacent to the northern boundary of TW-1, continues to exhibit surface-water elevation changes similar to TW-1.

9.4 TARGET WETLAND 2

9.4.1 Transect Location

Initial field investigations identified one well (Stilling Well-3) and one staff gauge (Staff Gauge-8), which were incorporated into the original proposed transect as prescribed by the WAP manual. However, since these devices are located in the outer transition zone, rather than the wetlands deep zone, they are not included in the monitoring transect. As a result, a new collocated monitoring well and staff gauge (MW-TW-2 and SG-TW-2) were installed in the deep zone to the north of the monitoring transect in November 2009. The TW-2 monitoring transect is oriented from west to northeast, beginning at the wetland interior and extending to the HWE (Figure 9-2). Although MW-TW-2 and SG-TW-2 are not considered part of the monitoring transect, photographs are taken in all four cardinal directions at this location and water level data is collected and used for assessment purposes.

9.4.2 Habitat Description

A review of 2003 aerial photography indicated that TW-2 once contained a conveyance that appeared to drain stormwater from Tallevast Road and from a commercial/industrial facility located immediately southwest of the wetland. Vegetation in TW-2 consisted of shrub vegetation in the interior of the wetland and herbaceous wetland vegetation in and near the periphery of the wetland. A parcel of disturbed upland and a commercial/industrial facility bordered TW-2 to the west, with upland pasture surrounding the remaining areas of TW-2 with the exception of the area east of the access road. The pasture east of the access road is currently being developed and a master stormwater system is being installed. Historical hydrological indicators of TW-2 suggest that this wetland was hydrated both by surficial stormwater sheet flow and groundwater.

9.4.3 Monitoring well TW-2 Data Assessment

The transducer for the new well MW-TW-2 was installed on November 6, 2009. During the current monitoring period (June 2014 through June 2015), groundwater elevations were at about

3 ft ags in June 2014. Due to failure of the manual transducer and improper deployment of the telemetric transducer, no data was collected from June 27, 2014 to September 30, 2014, when the telemetric transducer was properly deployed. Groundwater elevations fluctuated between approximately 3 ft ags and 2 ft ags from October 2014 through March 2015, followed by a steady decrease to approximately 0.5 ft ags between March and May 2015. By the time of the June 2015 assessment, groundwater elevation had increased to just above the normal pool elevation (1 ft ags). Staff gauge measurements collected during wetland transducer downloads in September 2014, March 2015 and June 2015 indicated standing surface water at this location (see Table 9-2). Standing surface water was observed in TW-2 (Appendix B) during the annual wetland assessment conducted on June 10, 2015. Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.4.4 June 2015 Field Observations

No major alteration or conversion of previously reported land use or vegetative cover types in TW-2 was observed between the June 2009 preliminary investigation and the subsequent June 2010, 2011, 2012, May 2013, June 2014, and June 2015 transect assessments. TW-2 was historically an herbaceous wetland but continues to display signs of ongoing transition to forest and prairie habitats. A dense stand of Carolina willow trees and shrubs occurs in the area presumed to have been the deepest portion of the wetland based on interpolated aerial photography. This wooded wetland area was dominated by OD zone species. Both the D and OD zones were inundated with *Salvinia minima* observed floating on the surface throughout. Adventitious roots were observed approximately 18-24 inches above the observed water level, indicating wet season water level is at least 18-24 inches higher than the current water level.

TW-2 was assigned an herbaceous/groundcover zonation score of 5 for the 2015 assessment, due to normal zonation observed within the transition zone. OD and D zones were NA for scoring due to lack of WAP species observed. This represents a slight improvement from previous years' assessments and reflects seasonally high standing water levels that persisted for long enough to reverse the trend of colonization by species with AD, T, and UPL indicator classifications. The shrub/sapling zonation score remained a 4 for the 2015 assessment due to OD species having moved in one zone in enough numbers and distribution to be of concern. The tree zonation score

of 4 continued to be assigned in the 2015 assessment due to OD species having moved in one zone in enough numbers and distribution to be of concern.

9.5 TARGET WETLAND 6

9.5.1 Transect Location

The TW-6 monitoring transect is oriented from southeast to northwest, beginning at the collocated monitoring well/staff gauge (installed November 2, 2009) and extending to the HWE, in the north-central portion of the wetland (Figure 9-3). The monitoring well/staff gauge was installed in a portion of TW-6 that was confirmed to have been historically excavated. The elevation of the ground surface outside of the excavated area (north along the transect) is approximately three feet higher than at the location of the monitoring well/staff gauge. Due to historical disturbance within the wetland, definitive surface hydrology and vegetative evidence of an HNP elevation was not observed outside of the excavated pond within TW-6, during the initial 2009 field review.

9.5.2 Habitat Description

A review of available 1970, 1980, and 2003 aerial photography indicated that TW-6 contained an inundated area in its southern sector. This inundated portion of TW-6 was field-verified and confirmed with the long-term landowner to be an excavated cattle pond. Historical aerial photographs show that the excavation of this cattle pond occurred between 1951 and 1962. During the June 2009 site visit to select an appropriate transect location for the assessment area the wetland was dry, including the excavated portion. During the 2009 site visit, vegetation types in TW-6 consisted of emergent/shrub species in the excavated area and a thick stand of trees/shrubs north of the excavated area. Historical hydrological indicators of TW-6 suggest that this wetland is hydrated by stormwater sheet flow as well as by a groundwater interface within the excavated area. This wetland appears to receive stormwater drainage from Tallevast Road to the north, the residential property to the west, and from the pastureland to the east and south. Additionally, treated effluent water from the RAPA system has been discharged through an injection gallery (RC-7002) located along the south and east sides of the wetland since July 2014. A total of 5,194,500 gallons of treated effluent water have been discharged through RC- 7002. This wetland discharges to the east through a drainage ditch along the south side of Tallevast road. A high point in this roadside ditch, approximately 0.25 miles east of TW-6 appears to control high water levels in this wetland. The four baseline reports indicate that the section of TW-6 north of the historically excavated cattle pond displays evidence of conversion to an upland forested/shrub habitat type and that soils in this area are composed of sand and loamy sand, with marginal hydric soil indicators.

9.5.3 Monitoring well TW-6 Data Assessment

The transducer for well MW-TW-6 was installed on November 6, 2009. Groundwater elevations at MW-TW-6 were generally above ground surface for all monitoring periods except for short periods from November to December 2009 and March 2012 through June 2012. Groundwater elevations were at about 3 ft ags within the excavated pond portion of TW-6 during July 2012 and stayed at these levels until starting to fall in late October 2012 to the ground surface until June 2013. During the current monitoring period (July 2014 through June 2015), water elevations fluctuated between 1 ft ags and 1 ft bgs from June 2014 to September 2014. Water elevations quickly increased to approximately 3 ft ags in September 2014 due to heavy rainfall, followed by a gradual decrease to the normal pool elevation from October 2014 through January 2015, where it remained until the June 2015 assessment event. Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.5.4 June 2015 Field Observations

As during all previous monitoring events, no major alteration or conversion of previously reported land use or vegetative cover types in TW-6 was observed between the June 2009 preliminary investigation and the June 2010, June 2011, June 2012, May 2013, and June 2014 transect monitoring assessments. Conditions during the November 2009 monitoring well and staff gauge installation, as well as during the June 2010, 2011, 2012, and May 2013 baseline monitoring assessments, included normal inundation that was sufficient to submerge most of the excavated pond. This area was holding up to a 2-foot water column at the time of the June 2010, 2011, 2012, and May 2013 observations. The previous annual report noted observations indicating dry conditions with no evidence of recent inundation other than the inundation in the deepest portion of the wetland. Observed hydrology during previous monitoring events suggest

that groundwater is a partial source to the pond, but it is also fed by stormwater runoff from nearby Tallevast Road. Rust, stains, and residues on the staff gauge continue to indicate persistent water volumes in the excavated pond. It was noted in the June 2014 assessment event that water levels in this wetland appeared to have been reduced as a result of the initiation of the RAPA extraction wells and trenches. Installation of injection gallery (RC-7002) to the south and east sides of the wetland was completed mid-2013. RC-7002 was designed and installed to augment groundwater in the area and to buffer TW-6 from drawdown associated with the RAPA system.

Conditions observed during the June 2015 assessment event were similar to those observed during the 2014 event, indicating that the wetland was experiencing dry conditions, with no evidence of recent inundation other than the inundation in the deepest portion of the wetland. Rainfall data indicates seasonal events that occurred prior to the 2015 assessment yielded less rainfall than those observed prior to the 2014 assessment event. Recharge to RC-7002 began on July 9, 2014, subsequent to the First Operational Monitoring event. A total of 5,194,500 gallons of treated effluent water have been discharged through RC-7002 since infiltration began. Water level data indicates that groundwater elevations have not dropped bgs since August of 2014. Conditions in TW-6 during the June 2015 monitoring event are similar to conditions that would be expected during an average spring dry season, as noted in the previous assessment. Based on water level data collected during this monitoring period, RC-7002 appears to be effectively augmenting groundwater recharge and buffering TW-6 from drawdown associated with the RAPA system. The effect of the groundwater extraction and recharge on TW-6 groundwater and surface water elevations will continue to be evaluated. Based on this, the water flow from the extraction wells and to the RC-7002 infiltration gallery will be adjusted as needed during the 2015-2016 monitoring period.

During the June 2015 assessment, the vegetation in the excavated portion of TW-6 continued to consist of predominantly OD and D zone species. Vegetation of the wetland area north of the pond continued to be dominated by OD zone and T zone species. AD and T species have historically been noted in the D zone and were noted during the 2015 event. Additionally, Caesar weed (*Urena lobata*), an upland species, was observed in small numbers within the D zone

during this monitoring event. Caesar weed is an opportunistic vegetative species, with seeds that cling to wildlife, thereby easily spreading the seed source. Caesar weed does not persist in areas of saturated or inundated soils and areas shaded by canopy. Therefore, it is anticipated that the Caesar weed observed during the 2015 monitoring event will not persist due to seasonal inundation. Despite the observation of Caesar weed, the herbaceous/groundcover zonation score for the 2015 monitoring event has remained a 3, since the upland species was not observed in enough numbers (>5%) to be of concern as described in the revised scoring guidance provided by the SWFWMD (SWFWMD, 2008). The shrub/small tree and tree zonation scores for the 2015 event continued to be a 4 compared to the last monitoring report, due to species having moved in one zone in enough numbers and distribution to be of concern, and species with an AD classification (i.e., Brazilian pepper) are extensive in numbers and distribution in the T zone.

9.6 TARGET WETLAND 18

9.6.1 Transect Location

The TW-18 monitoring transect is oriented from south to north, beginning at the collocated monitoring well/staff gauge (installed February 22, 2010) and extending to the HWE in the northern portion of the historical wetland (Figure 9-4).

9.6.2 Habitat Description

Review of 2003 aerial photography during the 2009 site review indicated that the TW-18 area appeared to have been consistently dry. Vegetation shown on the 2003 aerial photograph of TW-18 consisted of a chiefly hardwood forested hammock, bounded on the west side by a railroad, on the south side by a single family residence, on the east side by the unimproved extension of 19th Street, and on the north side by upland pine silviculture. The baseline monitoring reports indicated that the historical hydrological indicators of TW-18 suggest that this habitat was likely once a persistent wetland that was fed both by surficial stormwater sheet flow as well as a groundwater interface that is no longer conspicuous. The baseline reports indicated that up to 12 inches of wetland soil subsidence caused by oxidation and gasification of carbon that result from drought and drying conditions continued to be observed within TW-18 and relict wetland vegetation remained restricted to hummocks that protrude above the historical wetland floor.

Baseline reports for TW-18 indicate soils consist of a loamy sand matrix typical of upland forested habitats in this region of Florida, and that TW-18 no longer contains hydrological indicators consistent with a functional wetland. The baseline reports determined that based on the maturity of transitional and upland trees present, the wetland habitat at TW-18 likely began transitioning to upland more than 20 years ago and is now devoid of all but relict wetland characteristics. During the June 2015 monitoring event, soil core profiles collected within the D, OD, and T zones indicated that hydric soil indicators were present. A stripped matrix (Munsell color 10YR (4/1 dark gray to 5/1 gray)) starting within the top 6 inches of soil was observed during the 2015 monitoring event. Vegetation and above ground hydrologic indicators generally transition more rapidly than soils. We will continue to assess the soils in all three zones to document changes during the requisite monitoring period.

9.6.3 Monitoring well TW-18 Data Assessment

The transducer for well MW-TW-18 was installed on February 23, 2010. Groundwater elevations at MW-TW-18 were approximately 2 ft or more bgs since monitoring began in February 2010, except for a brief period in late August/early September 2010 and a more extended period of time in late August/early September 2012, where groundwater elevations were at or slightly above ground surface after heavy precipitation events. Groundwater elevations during the first operational monitoring period (June 2013 to June 2014) were consistent with historical trends, influenced primarily by seasonal rainfall. During the current monitoring period (June 2014 through June 2015), groundwater elevations decreased from 1 ft bgs to 4.5 bgs from June 2014 to August 2014, followed by a rapid increase to the normal pool elevation a few inches above ground surface. Between September 2014 and February 2015, groundwater elevations fluctuated between ground surface and approximately 2.5 ft bgs, and then fell gradually to 4 ft bgs through May 2015. Between May and June 2015, groundwater elevations increased steadily to approximately 2 ft bgs. Staff gauge measurements during wetland transducer downloads in September 2014, March 2015, and June 2015 as well as observations made during the annual assessment conducted in June 2015, indicated no standing surface water at this location (see Table 9-2 and Appendix B). Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.6.4 June 2015 Field Observations

No major alteration or conversion of previously reported land use or vegetative cover types in TW-18 was observed between the June 2009 preliminary investigation and the June 2010, 2011, 2012, May 2013, June 2014, and June 2015 transect monitoring assessments. The interior of TW-18 continues to consist of a mix of primarily adaptive and transitional oaks/hardwoods and introduced mature punk trees. Relict obligate-wetland ferns, including royal fern (*Osmunda regalis*) and Virginia chain fern (*Woodwardia virginica*); continue to occur on hummocks within the historical wetland interior. A dense saw palmetto fringe continues to encroach along the northern, western, and southern borders of the HWE.

The herbaceous/groundcover zonation score assigned to TW-18 for the 2015 assessment continues to be a 2, due to species having moved in two zones in high numbers and distribution, and/or some species with an upland classification having moved into the deep zone. The ground surface throughout TW-18 continues to be blanketed by laurel and live oak leaf litter. Both the shrub/small tree and tree zonation score for the 2015 assessment remains at 3, due to species having moved in one zone in high numbers and distribution, and/or some plants have moved in two zones. However, while the WAP prescribes that AD zone species should be regarded as T zone species when occurring in the D or OD zones, it is a prevalence of T zone species (name them) that continues to dominate the historic D or OD zones.

9.7 REFERENCE WETLAND 1

9.7.1 Transect Location

The RW-1 monitoring transect is oriented from west to east beginning at the collocated monitoring well/staff gauge (installed November 3, 2009) and extending to the HWE in the eastern portion of the wetland (Figure 9-5).

9.7.2 Habitat Description

A review of 2003 aerial photography indicated that RW-1 consisted of a historically inundated area, with a shrub and emergent wetland D zone. During the May 13, 2013 assessment, the northern upland edge of the area was actively undergoing clearing, grubbing, and windrowing to

maintain the adjacent pasture and prevent livestock from accessing the wetland. As of the June 2015 monitoring assessment, upland pasture habitat continues to border the historical wetland boundary. Dense thickets of invasive Brazilian pepper tree are ubiquitous throughout the historical T, OD, and D zones of RW-1.

This wetland historically received surface flow from a relatively small drainage basin in the surrounding pine flatwoods. The surrounding uplands were converted to agricultural land uses prior to 1941 and RW-1 continues to receive stormwater runoff from adjacent agricultural lands. The USGS 7.5-minute topographic quadrangle mapping (USGS, 1994) and historical aerial photographs depict the presence of a surface conveyance draining southeast to the Pearce Canal.

9.7.3 Monitoring well RW-1 Data Assessment

The transducer for well MW-RW-1 was installed on November 6, 2009 and was subsequently replaced on November 19, 2009 due to a malfunction. Groundwater elevations at MW-RW-1 varied from about 4 ft bgs to about 1-ft ags since monitoring began in November 2009. Wetland transducer data collected since the start of the monitoring program indicates a drainage feature controlling maximum water elevations in this wetland. In general, this wetland appears to experience shallow inundation in response to rainfall events during the wet season.

During the current monitoring period (July 2014 through June 2015), groundwater elevations decreased from a few inches ags to approximately 2 ft bgs from July 2014 through August 2014, followed by an increase from 2 ft bgs back up to the normal pool elevation, where it remained until April 2015. Groundwater elevations between April and June 2015 fluctuated rapidly with precipitation events between the normal pool elevation and approximately 2 ft bgs. Observation during the annual assessment conducted on June 9, 2015 also indicated shallow inundation at this location (see Appendix B). Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.7.4 June 2015 Field Observations

No major alteration or conversion of previously reported land use or vegetative cover types in RW-1 was observed between the June 2009 preliminary investigation and the June 2010, 2011, 2012, May 2013, June 2014, and June 2015 transect monitoring assessments (except clearing of

Brazilian pepper around the wetland as reported in the last baseline monitoring report). Vegetation of RW-1 is dominated by dense stands of Brazilian pepper (AD species) shrubs and small trees. Within the historical wetland interior, only relict OD zone species occur, which are limited to a few mature Carolina willow and red maple trees.

All previous monitoring events for RW-1 indicated an herbaceous/groundcover zonation score of 3 due to species having moved in one zone in high numbers and distribution, and/or some plants having moved in two zones. However, observations made during the 2015 monitoring event indicate that the score increased from 3 to 4 due to species having moved in one zone in enough numbers and distribution to be of concern and/or species with an adaptive classification are extensive in numbers and distribution in the transition zone. The shrub/sapling zonation score for the 2015 assessment continued to be 3 due to species having moved in one zone in high numbers and distribution, and/or some plants having moved in two zones. The tree zonation score for the 2015 assessment continued to be 4 due to species having moved in one zone in enough numbers and distribution to be of concern for the long-term viability of the wetland habitat.

Relict herbaceous wetland vegetation (i.e., Virginia chain fern) continues to grow on hummocks that protrude above the historical wetland floor possibly indicating soil subsidence. Much of the original wetland habitat has been invaded by dense Brazilian pepper and the perimeter of the wetland appears to be transitioning to a dryer habitat due to drainage and surrounding agricultural activities.

9.8 REFERENCE WETLAND 2

9.8.1 Transect Location

The RW-2 monitoring transect is generally oriented from east to west beginning at the collocated monitoring well/staff gauge (installed November 3, 2009) and extending to the HWE on the western portion of the wetland (Figure 9-6).

9.8.2 Habitat Description

A review of 2003 aerial photography indicated that RW-2 consisted of a thick canopy of trees, with small areas of shrubby and emergent vegetation scattered inside of the eastern and southern boundaries. Active pastureland surrounds the historical wetland boundaries.

Historical aerial photographs of RW-2 suggest that this wetland receives stormwater runoff from two linear drainage features to the north and northwest of the wetland and surface water flow from the surrounding pastures. The historical aerial photographs indicate that between 1951 and 1962 a rim ditch was excavated around the east side, a cattle pond was excavated in the southern lobe, and a ditch was excavated through the natural outfall marsh to the south. This ditch connected RW-2 to the Pearce Canal. A notched cement control weir at the south end of the wetland historically controlled water elevations in RW-2. This cement control structure was collapsed during the baseline assessments.

9.8.3 Monitoring well RW-2 Data Assessment

The transducer for well MW-RW-2 was installed on November 6, 2009. Groundwater elevations ranged from about 4 ft bgs to about 2 ft ags since monitoring began in November 2009. During the current monitoring period (July 2014 to June 2015), groundwater elevations ranged from the normal pool elevation (1 ft ags) to approximately 1 to 1.5 ft bgs from July 2014 through September 2014. Between September 2014 and March 2015, groundwater elevations remained at the normal pool elevation, followed by a gradual decrease to ground surface between March and May 2015. Water levels fluctuated between at grade ground elevations and 0.5 ft ags until June 2015. Observations during the June 2015 assessment indicated standing surface water in RW-2 (Appendix C). Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.8.4 June 2015 Field Observations

No major alteration or conversion of previously reported land use or vegetative cover types in RW-2 was observed between the June 2009 preliminary investigation and the June 2010, 2011, 2012, May 2013, and June 2014 monitoring assessments. Evidence of prior transition of RW-2 to drier conditions, observed during the initial June 2009 field investigation, continued to be

observed during the baseline monitoring events, as well as the 2014 and 2015 monitoring events. This wetland appears to be a moderately functional wetland which has been impacted by historical drainage and surrounding agricultural land uses. The perimeter of the wetland shows signs of reduced hydroperiods resulting from the drainage feature to the south. Evidence of trampling by cattle was observed throughout the drier portions of the wetland (T and OD zones) during the June 2015 assessment. Hydrologic indictors observed during the 2015 monitoring event include vegetation growing on hummocks, along with moss and lichen lines that appear to correspond with normal pool elevations.

Several D zone and aquatic floral species continued to occur in the interior of RW-2, but vegetation within the monitoring transect of this wetland is increasingly dominated by OD zone and T zone species. As during all previous monitoring events for RW-2, the herbaceous/groundcover zonation score for the 2015 assessment is a 3 due to species having moved in one zone in high numbers and distribution, and/or some plants having moved in two zones. The shrub/sapling and tree zonation score for the 2015 assessment also continued to be 3 due to species having moved in one zone in high numbers and distribution, and/or some plants having moved in two zones.

9.9 REFERENCE WETLAND 3

9.9.1 Transect Location

The RW-3 monitoring transect is generally oriented from east to west beginning at the collocated monitoring well/staff gauge (installed November 2, 2009) and extending to the HWE in the northwestern portion of the wetland (Figure 9-7).

9.9.2 Habitat Description

A review of 2003 aerial photography indicated that RW-3 primarily consisted of an emergent wetland that was frequently inundated. Upland pasture and shrub habitat bordered the wetland boundary of RW-3. The outer perimeter of the southern half of RW-3 was bordered by thick shrub and tree vegetation. Hydrological indicators from the 2003 aerial photograph of RW-3 suggested that the water source for this wetland was primarily groundwater and surface flow from the surrounding drainage basin. The 2003 aerial photograph showed that three quarters of

the wetland area was inundated, and the interior of the northern boundary displayed obvious hydrology and vegetative patterns of a shrub wetland. Floating vegetation was prevalent within the upper portion of RW-3 in the 2003 aerial photograph, and rooted vegetation appeared to be depressed or absent within the lower sections, indicating that this wetland was historically inundated throughout much of the growing season. The historical aerial photographs indicate that no significant drainage features exist around this wetland. The northern portion of this wetland was excavated for a cattle pond prior to 1995 as indicated in aerial photography.

9.9.3 Monitoring well RW-3 Data Assessment

The transducer for well MW-RW-3 was installed on November 6, 2009. Groundwater elevations varied between 4 ft bgs to 3 ft ags since monitoring began in November 2009. No data was collected by the transducer between May 2013 and January 2014 due to a low transducer battery. In addition, staff gauge data was not collected between May 2013 and December 2014 due to the staff gauge being damaged. A new transducer was installed on January 15, 2014 and a new staff gauge was installed and surveyed in October 2014. During the current monitoring period (June 2014 through June 2015), groundwater elevations decreased from 1 ft ags to approximately 1.5 ft bgs in June 2014, followed by several rapid fluctuations between ground surface and 1.5 ft bgs in August and September 2014. In late September, groundwater elevations rapidly increased to the normal pool elevation (approximately 2 ft ags), followed by a slow decrease to ground surface between October 2014 and April 2015. Between April and June 2015, groundwater elevations fluctuated rapidly from 0.5 ft ags to approximately 1.5 - 2.0 ft bgs. Observations made during the semi-annual transducer download events in September 2014 and March 2015, as well as during annual wetland assessment conducted in June 2015, indicated standing surface water at this location (see Appendix B). Groundwater and surface water responses to precipitation events are evident throughout the data collected to date (Appendix D).

9.9.4 June 2015 Field Observations

No major alteration or conversion of previously reported land use or vegetative cover types in RW-3 was observed between the June 2009 preliminary investigation and the June 2010, 2011, 2012, May 2013, June 2014, and June 2015 transect monitoring assessments. Evidence of prior conversion of RW-3 to upland prairie, as previously reported in the baseline reports, was not

observed. The 2013 baseline report indicated that the lower half of RW-3 was rapidly transitioning to upland. This conclusion may have been due to hydrologic and vegetative evidence resulting from drought conditions preceding the monitoring event. Similar to the 2014 monitoring event, water levels were at or above normal pool elevations for several months prior to the 2015 monitoring event resulting in a diverse assemblage of hydrophytic vegetation in each zone especially in the southern herbaceous fringe. As during the previous monitoring event for RW-3, the herbaceous/groundcover zonation score for RW-3 remains a 5 indicating a normal zonation pattern. While there was an absence of woody vegetation in the OD and D zones, the shrub/sapling zonation score for the 2015 assessment was S, indicating a normal zonation pattern. The tree zonation score for the 2015 assessment was NA due to the absence of trees in the T, OD, and D zones.

During the 2015 assessment, the monitoring transect established in the northwestern quadrant of RW-3 was dominated by OD and D zone floral species, but two adaptive upland ruderal species (*Phyla nodiflora and Ptillimnium capillifolium*) were observed in the T zone of the wetland. The high water levels prior to the 2015 monitoring event appear to have eliminated most of the opportunistic ruderal (adaptive) upland species which had dominated the prairie vegetation observed during previous baseline monitoring events.

Section 10 Conclusions

Implementation of the July 2009 WMP is conducted in accordance with an FDEP requirement for wetlands monitoring associated with the anticipated installation and activation of the RAPA (groundwater remediation system) for the site. Staff gauges and monitoring wells were installed between November 2009 and February 2010. Annual baseline assessments were conducted for four years (through May 2013) prior to groundwater extraction associated with the RAPA implementation. Data collected from 2009 to May 2013 was used to establish a baseline of groundwater and surficial wetland hydrology information to document local fluctuations in groundwater elevations and the corresponding effect on wetland function. These data were used to establish thresholds that determine whether TWs will require hydraulic maintenance or compensatory mitigation as a result of RAPA system operation. The RAPA system startup occurred on November 18, 2013. The June 2014 annual assessment marked the first monitoring event conducted during RAPA operations. This 2015 operational monitoring event was conducted in each of the WMP wetlands (TWs nearer the Facility and RWs in the greater Tallevast area). Data collected during the current monitoring was evaluated against the established baseline conditions.

Precipitation in the quarter preceding the 2015 WMP transect assessment was slightly less compared to the 2014 event. Precipitation in the year preceding the 2015 monitoring event was approximately 41 inches, which is below average. All of the TWs and RWs showed evidence of normal water level fluctuation given the average rainfall for the region.

As noted in the June 2014 assessment event, water levels in TW-6 appeared to have been reduced as a result of the initiation of the RAPA extraction wells and trenches. In response to this observation, the infiltration gallery (RC-7002) located south and southeast of TW-6 was placed into operation in July 2014 and has remained operational to date. A total of 5,194,500 gallons of treated effluent water have been discharged through RC-7002 since it was started. Water level

data indicates that groundwater elevations have not dropped bgs since August of 2014. Groundwater elevations observed at TW-6 during the 2015 monitoring event appear to have been maintained at a higher elevation when compared to the previous monitoring event, indicating that RC-7002 is augmenting groundwater recharge and effectively buffering TW-6 from drawdown associated with the RAPA system. The effect of the groundwater extraction and recharge on TW-6 groundwater and surface water elevations will continue to be evaluated. Groundwater levels and water flow to EW-2103, EW-2104, and RC-7002 will be monitored and adjusted as needed during the 2015-2016 monitoring period. The vegetation in TW-6 continues to be similar to that recorded in the baseline monitoring reports and has not been affected by the drawdown noted in the 2014 monitoring report.

The WAP vegetative score in TW-6 remained the same in all categories. One upland species (Caesar weed) was observed at 5% coverage within the D zone. However, this upland species is not present in enough numbers to be of concern and it is anticipated that the presence and subsequent absence of this species is commensurate with seasonal rainfall. The vegetative scores for TW-2 and RW-1 were increased in groundcover, from 4 to 5 and 3 to 4, respectively. The WAP scores of the rest of the TWs and RWs have not changed from those assigned for the previous monitoring period.

The telemetry system installed in June 2014 continues to operate normally, allowing quick access to water level instrumentation to determine status and functionality. Data provided by the telemetry system continues to be used for continuous RAPA system optimization, specifically for monitoring and adjusting groundwater extraction and recharge in the vicinity of TW-6. Groundwater elevation data in wetlands will continue to be manually verified to confirm telemetry system operation and manual transducers will be downloaded on a semi-annual basis. Groundwater elevation data will continue to be collected hourly and will be transmitted on a weekly basis. Manual transducers will remain deployed in the monitoring wells until the accuracy and reliability of the telemetry system has been verified. Annual WMP investigations will continue to occur in May/June of each successive year of the active monitoring 5 year period. A subsequent Wetlands Monitoring Report and comparative analysis with local climate

and previously collected data will be submitted to the SWFWMD by September 1 annually until year 2018.

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TABLES

[Tables 1-1, 6-1, 9-1, 9-2, and 9-3 are within Report text]

TABLE 7-1 WETLANDS MONITORING REPORT SURVEY DATA

Wetlands Monitoring Report July 2014 through June 2015 Lockheed Martin Tallevast Site

Tallevast, Florida

MW-RV-I 1114696 58 442219 52 18.44 14.09 13.90 NA NA NA SG-RW-1 1114070.45 442213.75 NA NA NA NA NA NA NP-12-R.W-1 1114070.36 442231.78 NA NA NA NA NA NA NP-12-R.W-1 1114070.36 442231.78 NA	Description	State Plane North	State Plane East	Casing/Gauge Elevation (ft msl)	Concrete Pad Elevation (ft msl)	Ground Elevation (ft msl)	3' Mark Elevation (ft msl)	1' Mark Elevation (ft msl)	0' Mark Elevation (ft msl)
SiG.RW-I 1114070.45 482818.27 17.31 NA 13.90 16.98 14.98 NA NP-12.RW-I 1114073.56 48283.78 NA	RW-1							<u> </u>	
NP-12RW-1 111407436 482833.78 NA	MW-RW-1	1114069.58	482819.52	18.44	14.09	13.90	NA	NA	NA
NP-6-RW-1 1114083.95 482871.81 NA NA NA NA NA NA NA RW-2 1113508.03 481763.66 21.19 17.40 17.40 NA NA NA SG-RW-2 1111367.17 481763.66 20.45 NA 17.40 21.12 182.1 NA NP-12-RW-2 11113467.82 481743.02 NA	SG-RW-1	1114070.45	482818.27	17.31	NA	13.90	16.98	14.98	NA
RW-2 III 3508 03 48176.66 21.19 17.40 17.40 NA NA MW-RW-2 III 3507.17 481765.54 20.45 NA 17.40 21.12 18.21 NA NP-5.RW-2 III 3457.82 481743.02 NA NA<	NP-12-RW-1	1114074.36	482833.78	NA	NA	NA	NA	NA	
MW.RW-2 1113508.03 481763.66 21.19 17.40 NA NA NA SG-RW-2 1113507.17 481765.54 20.45 NA 17.40 21.12 182.1 NA NP-12-RW-2 1113467.82 481743.02 NA NA </td <td>NP-6-RW-1</td> <td>1114083.95</td> <td>482871.81</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td>	NP-6-RW-1	1114083.95	482871.81	NA	NA	NA	NA	NA	NA
SG-RW-2 1113507.17 481765.54 20.45 NA 17.40 21.12 18.21 NA NP-12-RW-2 1113467.04 481724.32 NA <	RW-2								
NP-12-RW-2 1113487.82 481743.02 NA	MW-RW-2	1113508.03	481763.66	21.19	17.40	17.40	NA	NA	NA
NP-6-RW-2 1113467.04 481724.38 NA NA NA NA NA NA NA NA RW-3 1113699.69 480440.25 25.31 20.89 20.75 NA NA NA SG-RW-3* 1113704.76 480439.51 24.77 NA 20.77 NA NA NA NP-12-RW-3 1113744.98 480428.18 NA	SG-RW-2	1113507.17		20.45	NA	17.40	21.12	18.21	NA
RW-3 Illigop.69 48040.25 25.31 20.89 20.75 NA NA NA NP-12-RW-3 Illigop.69 480439.51 24.77 NA 20.75 NA NA NA NP-12-RW-3 Illigop.69 480439.51 24.77 NA 20.77 NA NA NA NP-12-RW-3 Illigop.69 480439.51 24.77 NA 20.77 NA NA NA NP-4-RW-3 Illigop.69 480428.18 NA						NA		NA	
MW-RW-3 1113699.69 480440.25 25.31 20.89 20.75 NA NA NA SG-RW-3* 1113704.76 480439.51 24.77 NA 20.77 NA NA NA NP-12-RW-3 1113770.16 480439.51 24.77 NA 20.77 NA NA NA NP-12-RW-3 111377.01 480439.51 NA NA NA NA NA NA MW-RW-3 111374.98 480397.51 NA NA NA NA NA NA MW-TW-1 1118667.53 480476.65 26.72 23.02 22.44 NA NA NA SG-TW-1 1118667.57 480478.55 25.80 NA NA NA NA NA NP-12-TW-1 1118667.77 480439.58 NA NA NA NA NA NA MW-TW-2 1116668.18 481552.76 26.29 22.22 21.65 NA NA NA NP	NP-6-RW-2	1113467.04	481724.38	NA	NA	NA	NA	NA	NA
SG-RW-3* 1113704.76 480439.51 24.77 NA 20.77 NA NA NA NPI-2.RW-3 1113717.61 480428.18 NA	RW-3								
NP-12-RW-3 1113717.61 480428.18 NA	MW-RW-3	1113699.69	480440.25	25.31	20.89	20.75	NA	NA	NA
NP-6-RW-3 1113744.98 480397.51 NA NA NA NA NA NA NA NA TW-1 1118667.53 480476.65 26.72 23.02 22.44 NA NA NA NA SG-TW-1 1118666.21 480478.55 25.80 NA 22.40 25.47 NA NA NP-12-TW-1 1118657.97 480452.50 NA NP-12-TW-1 1118657.97 480452.50 NA NP-12-TW-1 1118658.70 480395.88 NA	SG-RW-3*	1113704.76	480439.51	24.77	NA	20.77	NA	NA	NA
TW-1 1118667.53 480476.65 26.72 23.02 22.44 NA NA NA SG-TW-1 1118667.53 480478.55 25.80 NA 22.40 25.47 NA NA SG-TW-1 1118657.97 480432.50 NA NA NA NA NA NP-12-TW-1 1118657.97 480432.50 NA NA NA NA NA NP-6-TW-1 1118658.70 480395.88 NA NA NA NA NA MW-TW-2 1116668.18 481552.76 26.29 22.22 21.65 NA NA NA SG-TW-2 1116663.81 481556.47 24.52 NA 21.65 24.19 22.19 NA NP-12-TW-2 1116642.28 481576.79 NA NA NA NA NA NA NA MW-TW-2 1116636.16 481576.79 NA NA NA NA NA NA NA MW-TW-6 111	NP-12-RW-3	1113717.61	480428.18	NA	NA	NA	NA	NA	
MW-TW-1 1118667.53 480476.65 26.72 23.02 22.44 NA NA NA SG-TW-1 1118666.21 480478.55 25.80 NA 22.40 25.47 NA NA NP-12-TW-1 1118657.97 480452.50 NA NA </td <td>NP-6-RW-3</td> <td>1113744.98</td> <td>480397.51</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td> <td>NA</td>	NP-6-RW-3	1113744.98	480397.51	NA	NA	NA	NA	NA	NA
SG-TW-1 111866.21 480478.55 25.80 NA 22.40 25.47 NA NA NP-12-TW-1 1118657.97 480452.50 NA	TW-1								
NP-12-TW-1 1118657.97 480452.50 NA	MW-TW-1	1118667.53	480476.65	26.72	23.02	22.44	NA	NA	NA
NP-6-TW-1 1118658.70 480395.88 NA N	SG-TW-1	1118666.21	480478.55	25.80	NA	22.40	25.47	NA	NA
TW-2 MW-TW-2 1116668.18 481552.76 26.29 22.22 21.65 NA NA NA SG-TW-2 1116663.81 481546.47 24.52 NA 21.65 24.19 22.19 NA NP-12-TW-2 1116642.28 481579.62 NA NA NA NA NA NP-6-TW-2 1116661.6 481570.9 NA NA NA NA NA MW-TW-2 1116661.6 481570.9 NA NA NA NA MW-TW-2 1116661.6 481570.9 NA NA NA NA MW-TW-6 1115977.75 480939.06 25.11 21.25 21.05 NA NA SG-TW-6 1115975.49 480938.40 24.28 NA 21.05 23.95 NA NA NP-12-TW-6 1115980.54 480935.18 NA NA NA NA NA NP-6-TW-6 1115984.11 480933.62 NA NA NA NA		1118657.97					NA	NA	
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SG-TW-2 111663.81 481546.47 24.52 NA 21.65 24.19 22.19 NA NP-12-TW-2 1116642.28 481579.62 NA NA NA NA NA NP-6-TW-2 1116636.16 481576.79 NA NA NA NA NA TW-6 1116977.75 480939.06 25.11 21.25 21.05 NA NA NA MW-TW-6 1115977.75 480938.40 24.28 NA 21.05 NA NA NA SG-TW-6 1115975.49 480938.40 24.28 NA 21.05 NA NA NA NP-6-TW-6 1115975.49 480935.18 NA NA NA NA NA NA NP-6-TW-6 1115980.54 480935.18 NA NA NA NA NA NA NP-6-TW-6 1115984.11 48093.62 NA NA NA NA NA MW-TW-18 1117379.14 480524.02	TW-2								
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NP-6-TW-2 1116636.16 481576.79 NA NA NA NA NA NA TW-6 1115977.75 480939.06 25.11 21.25 21.05 NA NA NA SG-TW-6 111597.49 480938.40 24.28 NA 21.05 23.95 NA NA NP-12-TW-6 1115980.54 480935.18 NA NA NA NA NA NP-6-TW-6 1115984.11 480935.20 NA NA NA NA NA NA NP-6-TW-6 1115984.11 48093.62 NA NA NA NA NA NA NP-6-TW-6 1115984.11 48093.62 NA NA NA NA NA NP-6-TW-18 1117379.14 480524.02 29.15 26.28 25.89 NA NA NA MW-TW-18 1117379.81 480526.54 29.38 NA 25.89 29.05 27.05 26.05 NP-12-TW-18 1117386.41 </td <td>SG-TW-2</td> <td>1116663.81</td> <td>481546.47</td> <td>24.52</td> <td>NA</td> <td>21.65</td> <td>24.19</td> <td>22.19</td> <td>NA</td>	SG-TW-2	1116663.81	481546.47	24.52	NA	21.65	24.19	22.19	NA
TW-6 1115977.75 480939.06 25.11 21.25 21.05 NA NA NA SG-TW-6 1115975.49 480938.40 24.28 NA 21.05 23.95 NA NA NA NP-12-TW-6 1115980.54 480935.18 NA NA NA NA NA NP-6-TW-6 1115984.11 480933.62 NA NA NA NA NA NP-6-TW-6 1115984.11 480933.62 NA NA NA NA NA NA MW-TW-18 1117379.14 480524.02 29.15 26.28 25.89 NA NA NA SG-TW-18 1117379.81 480526.54 29.38 NA 25.89 NA NA NA NP-12-TW-18 11117386.41 480523.16 NA NA NA NA NA									
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SG-TW-6 1115975.49 480938.40 24.28 NA 21.05 23.95 NA NA NP-12-TW-6 1115980.54 480935.18 NA NA NA NA NA NA NP-6-TW-6 1115984.11 480933.62 NA NA NA NA NA TW-6 1115984.11 480933.62 NA NA NA NA NA NA MW-TW-6 1117379.14 480524.02 29.15 26.28 25.89 NA NA NA SG-TW-18 1117379.81 480526.54 29.38 NA 25.89 29.05 27.05 26.05 NP-12-TW-18 1117386.41 480523.16 NA NA NA NA NA NA	TW-6								
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NP-6-TW-6 1115984.11 480933.62 NA NA NA NA NA TW-18 1117379.14 480524.02 29.15 26.28 25.89 NA NA NA SG-TW-18 1117379.81 480526.54 29.38 NA 25.89 29.05 27.05 26.05 NP-12-TW-18 1117386.41 480523.16 NA NA NA NA	SG-TW-6	1115975.49	480938.40	24.28	NA	21.05	23.95	NA	
TW-18 MW-TW-18 1117379.14 480524.02 29.15 26.28 25.89 NA NA NA SG-TW-18 1117379.81 480526.54 29.38 NA 25.89 29.05 27.05 26.05 NP-12-TW-18 1117386.41 480523.16 NA NA NA NA									
MW-TW-181117379.14480524.0229.1526.2825.89NANANASG-TW-181117379.81480526.5429.38NA25.8929.0527.0526.05NP-12-TW-181117386.41480523.16NANANANANA	NP-6-TW-6	1115984.11	480933.62	NA	NA	NA	NA	NA	NA
SG-TW-18 1117379.81 480526.54 29.38 NA 25.89 29.05 27.05 26.05 NP-12-TW-18 1117386.41 480523.16 NA NA NA NA NA	TW-18								
NP-12-TW-18 1117386.41 480523.16 NA NA NA NA NA NA NA				29.15	26.28	25.89	NA	NA	NA
									26.05
NP-6-TW-18 1117397.32 480519.94 NA NA NA NA NA NA NA	NP-12-TW-18			NA		NA	NA	NA	
	NP-6-TW-18	1117397.32	480519.94	NA	NA	NA	NA	NA	NA

Footnotes:

NA - Not applicable RW - Reference Wetland TW - Target Wetland NP - Normal Pool

SG - Staff Gauge

ft msl - feet mean sea level

MW - Monitoring Well

Data Source: ARCADIS, Wetlands Monitoring Report; April 29, 2011

Horizontal: NAD 1983 State Plane Florida West (Feet)

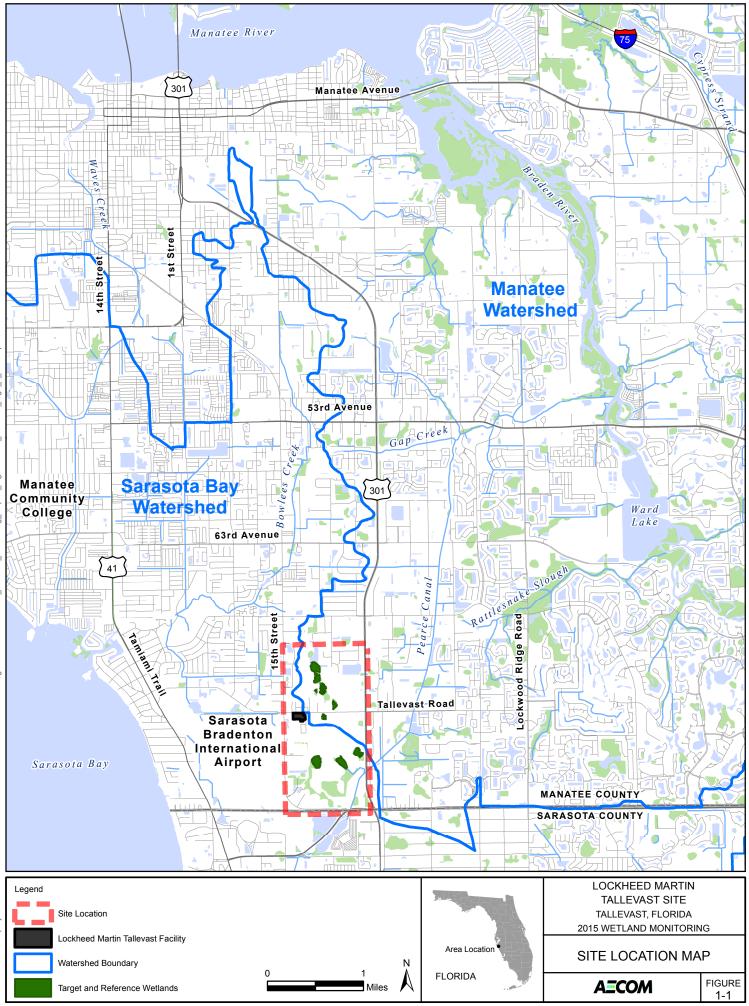
Vertical: NAVD88 (Feet)

*SG-RW-3 was replaced with a new staff gauge on Nov. 11, 2014. The Top Gauge Elevation of 24.52 ft msl was measured at the 8' Mark on the Staff Gauge. This survey data was collected and presented by Palmer Land Surveying, L.L.C. in the Professional Land Survey Report, dated Dec. 5, 2014.

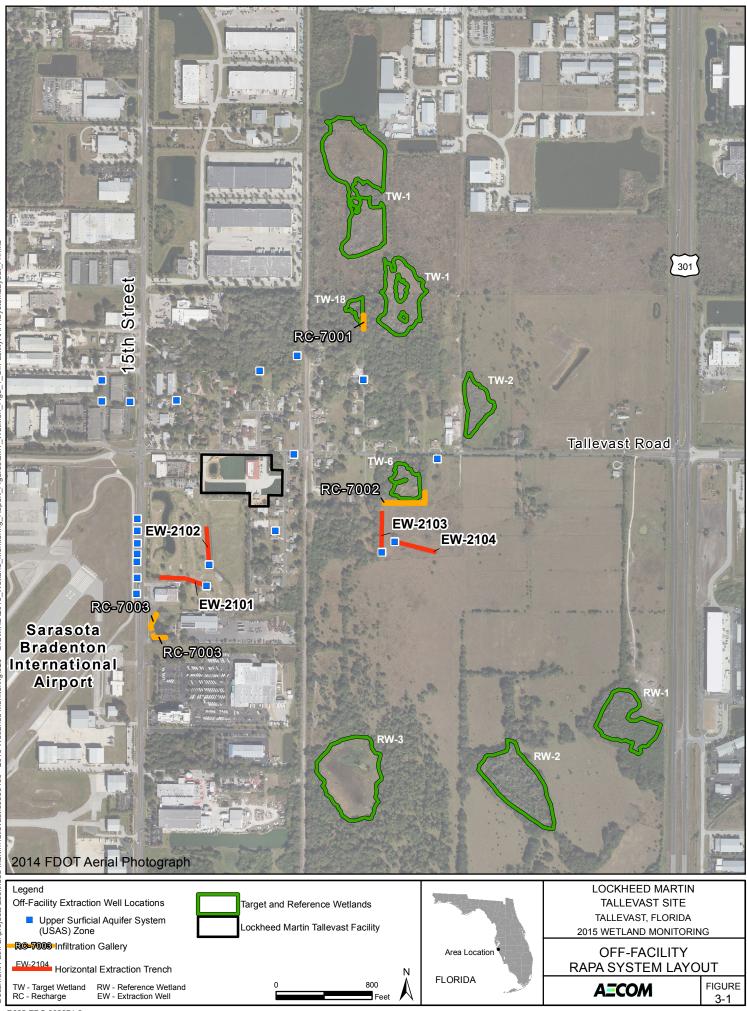
AECOM

FIGURES

[Figures 4-1, 6-2, 6-3, 6-4, 7-2, 7-3, 7-4 and 8-1 are within Report text]

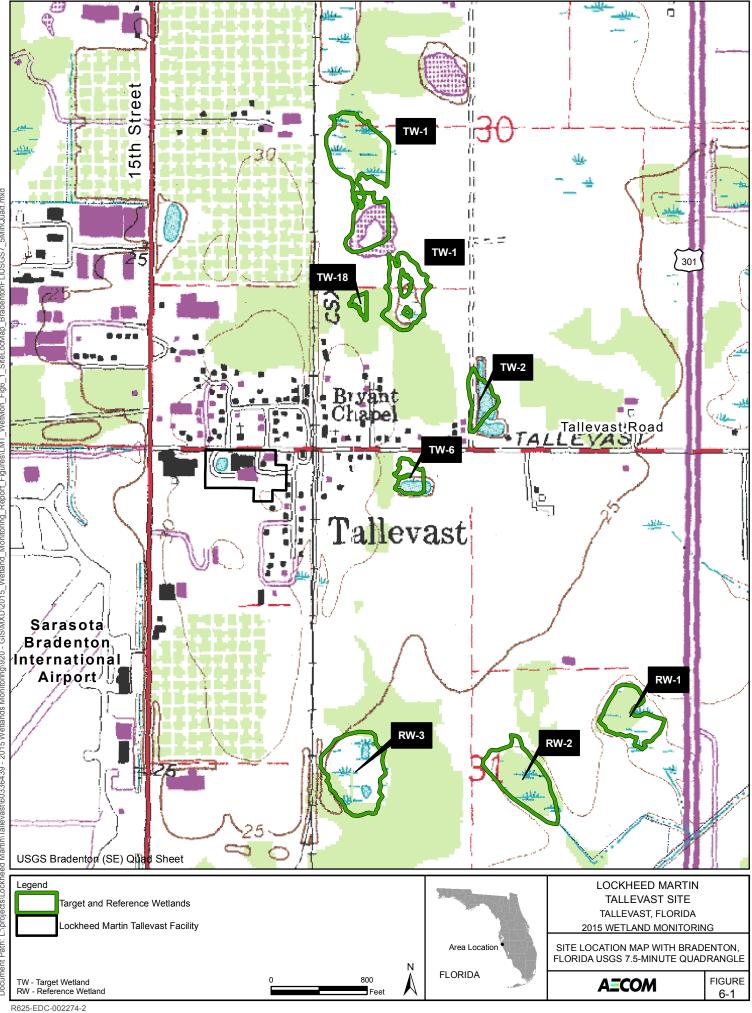


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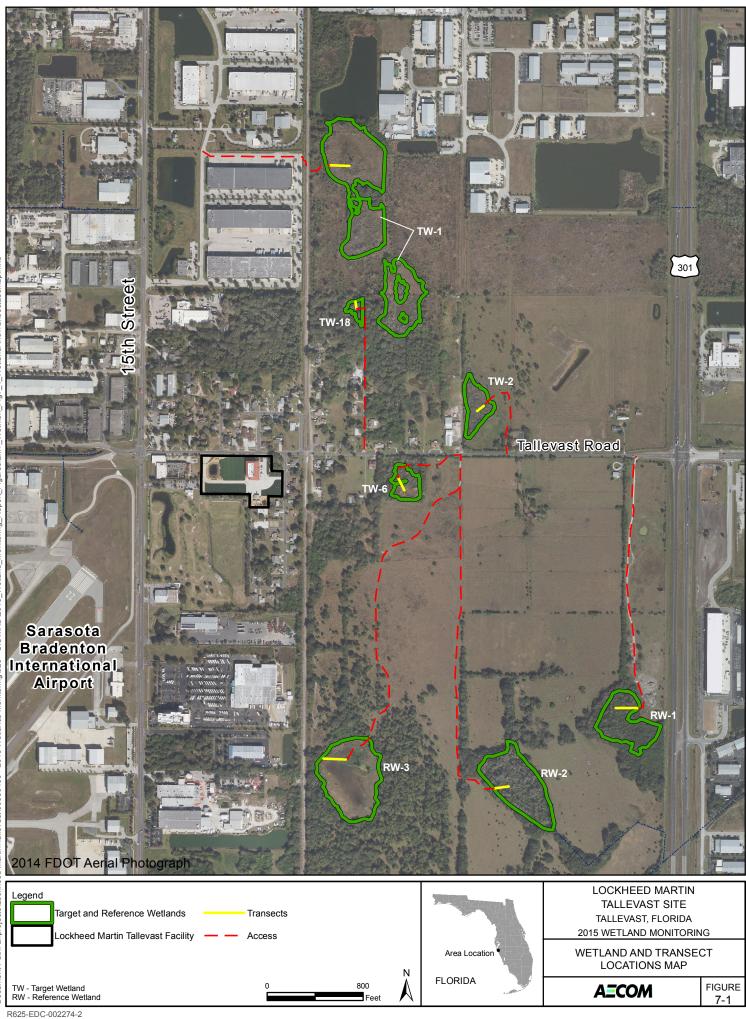


Document Path: L:/projects/Lockheed Martin/Tallevast/60336439 - 2015 Wetlands Monitoring/920 - GIS/MXD/2015 Wetland. Monitoring. Report. Figures/LMT. WetMon. Fig3. 1. OffFacility/RAPASystemLayout. r1.mxd

R625-EDC-002274-2



Document Path: L/projects/Lockheed Martin/Tallevast/60336439 - 2015 Wetlands Monitoring(920 - GIS/MXD/2015, Wetland, Monitoring, Report, Figures/LMT, WetMon, Fig. 1, SiteLodMap, BradentonFLUDSGS7, 5MinQuad.mxd







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Document Path: L:/projects/Lockheed Martiin/Tallevast/60336439 - 2015 Wetlands Monitoring/920 - GIS/MXD/2015. Wetland. Monitoring. Report. Figures/LMT. WetMon. Fig9. 4. Target/Wetland. 18. TransectMap.mxd



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APPENDIX A

PALMER DROUGHT SEVERITY INDEX GRAPHS

Production Version

<u>DOC</u> > <u>NOAA</u> > <u>NESDIS</u> > <u>NCDC</u>

National Climatic NOAA Satellite and Information Service Data Center National Environmental Satellite, Data, and Information Service (NESDIS) U.S. Department of Commerce Search Field: Search NCDC



Land-Based Data / NNDC CDO / Product Search / Help FL Everglades and SW Coast - PDSI 201006 - 201507 2.00 1.75 1.50 1.25 1.00 0.75 0.50 0.25 0.00 -0.25 -0.50 -0.75 PDSI -1.00 -1.25 -1.50 -1.75 -2.00 -2.25 -2.50 -2.75 -3.00 -3.25 -3.50 -3.75 -4.00 Jul-2010 Jan-2011 Jul-2011 Jan-2012 Jul-2012 Jan-2013 Jul-2013 Jan-2014 Jul-2014 Jan-2015 Date USA.gov Privacy Policy Disclaimer

Page 1 of 1

http://www7.ncdc.noaa.gov/CDO/cdodivisionalselect.cmd?nationSelect=110&stateSelect=... 7/15/2015

APPENDIX B

FIELD DATA SHEETS

			V	VETLAN	ND ASSESS	MENT P	ROCED	UF	RE				
Wellfield	l / Proper	rty			Wetlan	d Name				We	tland Ty	ре	
H. Boo	othe (P-52)				Target V	Vetland 1					Emergent		
Wetland ID	Data O	wner	Personnel Date Start/End June 9, 2015 1430 1600 DOCUMENTATION WATER LEVEL INFORMATION 1430 1600 Ion Photo Pt. Direction N. K. S. W. Description 1430 1600 No 24.06 SG SG-TW-1 Description N. K. S. W. Description Well/Gage ID No 24.06 SG SG-TW-1 Mell/Gage ID SG SG-TW-1 Ves (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations. MW = 2.68; SG = 1.59' above ground surface Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations. METLAND DRAINAGE Augmentation equipment in place? Yes No No nwetland? No Other drainage activities in area? No No Clear evidence of direct drainage from wetland? No No No No Cludes bicycles)? No No No No No No No No No No No No No No No No No N										
TW-1						M. N	artin & K. Pete	erma	an	June 9, 2015	143	30 1600	
	РНОТ	O-DOC	UMENTA	TION			WA	TE	R LEVEL I	NFORMAT	ION		
Frame	I/ Property Wetland Name Wetland Type Target Weland 1 Emergent Data Owner Data Source Personnel Date Start/End Markin & K. Peterman June 9, 2015 1430 1600 PHOTO-DOCUMENTATION Markin & K. Peterman June 9, 2015 1430 1600 MW N.E.S.W WATER LEVEL INFORMATION 1000 1000 1000 MW N.E.S.W No 24.06 SG SG-TW-1 NP-12 N.E.S.W No 24.06 SG SG-TW-1 NP-12 N.E.S.W Description MW 24.06 SG SG-TW-1 Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations. WEILAND DRAINAGE MW WETLAND IMPACTS Vestand Cear evidence of direct drainage from wetland? No Augmentation occurring at time of WAP? No cat from cattle (trampling)? No Augmentation equipment in place? No No No obs of unit had been timbered and nnfirmed). Industrial development around des of unit had been timbered and nnfirmed). Industrial development around des of unit had been timbered and (existing condition).												
3281-3284	Boothe (P-52) Target Wetland 1 Emergent Data Source Personnel Jute 9, 2015 Start/End Jute 9, 2015 PHOTO-DOCUMENTATION WATER LEVEL INFORMATION Description Photo Pt. Direction MW N.E.S.W NP-12 N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W MW N.E.S.W NP-8 N.E.S.W NP-8 N.E.S.W WETLAND IMPACTS WETLAND DRAINAGE Jage Place Verstance Augmentation equipment in place? Augmentation equipment in place? Augmentation cocurring at time of WAP? No Clear evidence of direct stormwater inflow? Yes Ough wetland (includes bicycles)? No No Ough wetland (includes bicycles)? No <t< td=""><td>G-TW-1</td></t<>					G-TW-1							
3286-3289									Descri	otion			
3291-3294						M	$N = 2.68^{\circ}$	S	G = 1.59'	above arc	und su	rface	
3300-3303						L				•		naoo	
					e (NS) for the fo	llowing ques	tions and p			-			
	WE	ETLAN	D IMPAC	IS				W	ETLAND D	RAINAGE			
Wetland edges	s filled or di	isturbed	?		Yes	Augment	ation equip	me	nt in place?		Yes		
Excessive dum	ping or tra	ish in we	etland?		No	Augment	ation occur	ring	g at time of \	NAP?	No		
Hog disturband	ce?			Ī	No	Clear evi	dence of dir	ect	t stormwater	inflow?	Yes		
		g or trash in wetland? No Augmentation occurring at time of WAP? No from cattle (trampling)? No Clear evidence of direct stormwater inflow? Yes wetland (includes bicycles)? No Other drainage activities in area? No No No Other drainage activities in area? No No No No Yes No No No No No No No No No No No No No No No No No S baseline report noted that the south s of unit had been timbered and rmed). Industrial development around es of wetland (existing condition). Yes - Excavated/impounded pond is located immediately north of TW-1 with overflow to adjacent railroad ditch (as stated in previous baseline reports but not confirmed). Stormwater treatment pond on northeast corner of wetland discharges through control structure into TW-1.											
Vehicles throug	gh wetland	l (includ	es bicycles)	?	No	Other dra	ainage activ	itie	es in area?		No		
Insect damage	?			No Augmentation occurring at time of WAP? No No Clear evidence of direct stormwater inflow? Yes Clear evidence of direct drainage from wetland? No No Clear evidence of direct drainage from wetland? No No Other drainage activities in area? No No Borrow pit/retention pond in wetland vicinity? Yes Yes No Yes Explanation(s) Yes Deted that the south timbered and evelopment around ting condition). Yes - Excavated/impounded pond is located immediately north of TW-1 with overflow to adjacent railroad ditch (as stated in previous baseline reports but not confirmed). Stormwater treatment pond on northeast corner of wetland discharges through control structure into TW-1. Lakes / Docks Docks completely out of water Docks touching water or with <50% of dock over water									
Disease?			Image: Second state of the source of the										
Explanation(<u>s)</u>			No Yes No Borrow pit/retention pond in wetland vicinity? Yes Explanation(s) Yes - Excavated/impounded pond is located immediately north of									
northeast e	edges of v	wetlan	d (existin Fire			northeas into TW- Docks co Docks to Docks >	t corner of v 1. ompletely o ouching wat 50% out of	ut o	Lakes / of water or with <500	ges through Docks	control st	ructure	
						C Not App		th	e littoral zo	one strando	ed?		
						<u>Comme</u>	nts						
	9	Soil Su	bsidence	1									
New signs of	f oxidatio	n/subs	idence?	No									
Explanation													
_													
							Gene	era	al Comment	s/Observa	ations		
						Thie M	etland a	nn	ears to h	ave relati	ivelv bi	ah	
								• •	with relati			•	
L			-			zonati			miniciali		Spriate	•	
Future users compare this						201141							
level of:													
non-c	groundwate	er withd	rawal-relate	ed disturba	ince								
-	ubsidence												
						DLIFE		1					
Wildlif			Evidence		Wildlife	Count	Evidence		Wild	llife	Count	Evidence	
Quiscalus n Anolis carolir		1 Several											
Agelaius phoe		Several											

				W	ETLAND ASSESS	SMEN	IT P	ROO	CEDU	RE				
Wellfield /	Prop	erty			W	etlanc	l Nan	ne			Wet	land T	уре	
H. Booth	e (P-52)					Target W	etland '				E	mergent		
Wetland ID A	rea A	ssess	ed				Zo	ne As	ssessm	ent Notes				
TW-1														
					GROUI									
			-	-	document the followi of 10%), count (1-4), a					• •			hout).
TRANSIT										-	DEEP ZC			
transition zon			- √]	outer deep zone a			-			ep zone a		1?	✓
check if no]	check if no gro						k if no gro		Ē	
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	ZON	IE %	#	DIST
Hydrocotle unbellata	OD	Ind		Т	Andropogon muhlenbergianum	OD	10		Т	Paspalum laev	e T	10		
Mikania scandens	Т	5		Т	Ludwigia peruviana	OD	30		Т	Polygonum hydropipe				Т
					Juncus effusus		20		Т	Juncus effusus		10	-	
Panicum hemitomon		30		Т	Leersia hexandra	OD	5		Т	Leersia hexand		-		Т
Spartina bakeri		40		Т						Ludwigia peruvia		-		E
Saggittaria subulata		5		Т	Panicum hemitomon		30			Panicum hemitor	-	20		Т
Polygonum hydropiperoides	OD	5		Т	Polygonum hydropiperoides	OD	15		Т	Salvinia minim	-	10		
Ludwigia repens		5		Т	Mikania scandens	Т	5		Т	Cyperus lecont	ei	5		
Ludwigia peruviana		5			Ptilimnium capillaceum	Т	Ind		Т					
Cephalanthus occidentalis		5												
Utricularia floridana		5			Salvinia minima		10							
Thelypteris palustris		5			Spartina bakeri		10		E					
Eleocharis baldwinii		5												
Groundcover Comm	<u>ents</u>													
					ZON	ATIO	Ν							
Zonation Score: 3		Please	assig	n a scor	e of 1 - 5 or 0 and provide	an exp	lanatio	n.						
Zonation Score Exp			5		·	·								
Species have m	oved	in oi	ne z	one ir	n enough number	s to b	e of	con	cern a	and one spec	ies has	move	d in	two
zones.														

				W	ETLAND ASSES	SME	NT P	RO	CEDU	RE					
Wellfield Swift-Richardso	-		68)		V	Vetlan Target V						Wetla	nd T nergent		
	Area A		,			Target			ssessm	ent Notes		EII	lergent		
TW-1															
					SHRUB / S	SMAL	L TR	EES							
					se document the followi of 10%), count (1-50 or '								=throu	Ighout	:).
TRANSI	TION	ZONE	E		OUTER I	DEEP	ZONE				DEE	P ZON	E		
transition check if no s				✓ □	outer deep zo check if no shru	one ass	essed'	? √]	che		ep zone shrubs			 ✓
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIE	S	ZONE	%	#	DIST
Cephalanthus occidentalis		10		T	Ludwigia peruviana	OD	60		E						
Schinus terebinthifolius	AD	Ind		Т	Cephalanthus occidentalis	D	10		Т	Salix carol	-	OD	90		Т
										Ludwigia peru	iviana	OD	10		E
					ZON	ATIO	N								
Zonation Score: 4		Please	assig	n a score	e of 1 - 5 or 0 and provide	an exp	lanatio	n.							
Zonation Score Ex	plana	<u>tion</u>													
					in enough numbe extensive in num									ecie	S
					ST	RESS									
<u> </u>															
Noticeable Noticeable Not Applicable	appro	priate	<u>shru</u>	ibs and	i small trees (includ	e deac	<u>i spec</u>	<u>ies)</u>							
Signs of stress of Few/None Noticeable Significant Not Applicable	inappı	ropria	te sh	rubs a	nd small trees (inclu	ıde de	ad sp	ecies	•)						

					W	ETL/	AND AS	SSES	SMEN	IT P	ROO	CEDL	JRE					
	llfield / chardson			38)				V	/etlanc Target W							and 1		
Wetland ID		rea As							Target w			ssessr	nent N	otes		merger	11	
TW-1																		
								T	REES									
														e (U, AD, T,				
-	over (5%				ements	of 10%			">50"), a DEEP 2			tion (E=	edge, B	=beyond a f	ew feet, or DEEP ZO		oughou	t).
trai	nsition zo				✓ ✓			leep zoi	ne asses	sed?					deep zone			
SPECIE	-	neck if ZONE		es #	DIST		SPECIE		ZONE		#	DIST		SPECIES	ZON		trees	DIST
Schinus tterebin	othifolius		5											Salix caroliniar	na OD	50		Т
Tree Comme	ents																	
								<u>201</u>	<u>IATIO</u>	N								
Zonation Sco	ore: 4	Ρ	lease	assigr	n a scor	e of 1 -	5 or 0 and	provide	an expla	anation	l.							
Zonation Sco	ore Exp	lanati	ion															
Species h	ave m	oved	l in o	ne z	zone	in en	ough ni	umbe	rs to I	be of	cor	ncern						
		_	_	_		_		C 1		_	_	_				_	_	
				-					RESS									
Signs of stre																		
Noticeable Significant		o su	DSIQ	ea s	ons o	bser	ved in c	contra	IST TO	orevi	ous	base	eiine r	eport.				
Not Applicable	2																	
Signs of stre	ess of in	appro	opriat	e tre	es (in	clude	dead spe	ecies)										
Noticeable																		
Significant	2																	
								REC	OVER	<u>Y</u>								
Dead or lean	ning tre	es (in	clude	e stai	nding	dead	trees and	l dead	trees	on gro	ound	that a	are ap	propriate)				
Few/None Noticeable																		
Significant																		
Signs of tree Yes	e recove	ery																
No Not Sure																		
Inappropriat	te vine	death	sugg	jesti	ng rec	overy												
Yes																		
Not Sure																		

	H. Boothe (P-35) Target Wetland 2 Emergent Data Owner Data Source Personnel Date Start/End MID Data Owner Data Source Martin & K. Peterman Date Start/End PHOTO-DOCUMENTATION Minartin & K. Peterman Device Well/Gage ID MW Photo Pt. Direction No 23.59 SG SG-TW-2 MW NP-12 east South MW DTW = 2.81; Water depth from SG = 2.40' NP-6 south MW DTW = 2.81; Water depth from SG = 2.40' Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations. WETLAND IMPACTS Magmentation equipment in place? No edges filled or disturbed? Yes No Augmentation occurring at time of WAP? No												
Wel		ty								W			ре
Wetland TW-2	Itiand ID TW-2 Data Owner Data Source Personnel Date Start/End TW-2 0 0.00 0.00 0.00 0.00 0.00 PHOTO-DOCUMENTATION WATER LEVEL INFORMATION Water Level INFORMATION Description Photo Pt. Direction 5:3420 MW north 0.00 0.00 0.00 0.00 0.00 7:3400 MW north Description Photo Pt. Direction Dry? Elevation (ft) Device Well/Gage ID 3:3407 NP-6 south west 0.00 <t< th=""></t<>												
	РНОТ	O-DOCU	MENTAT	ION			WA	TER LE	VEL	INFORM/		N	
Frame	PHOTO-DOCUMENTATION WATER LEVEL INFORMATION Imme Description Photo Pt. Direction 3400 MW north 0 23.59 56 SG-TW-2 3400 MP-12 deast SG-TW-2 Description 3402 NP-6 south MW DTW = 2.81; Water depth from SG = 2.40' MW DTW = 2.81; Water depth from SG = 2.40' WETLAND IMPACTS WETLAND IMPACTS WETLAND DRAINAGE Augmentation equipment in place? Augmentation occurring at time of WAP? No Optical distribution of disturbance? No No No Optical distribution occurring at time of WAP? No Optical distribution occurring at time of direct stormwater inflow? No No No Obstructure No No No No No No Optical distribution No No No No No No Optical distribution No No No No No No No No No </th												
3415-3420	Weilfield / Property H Boothe (P-36) Wetland Name Target Wetland 2 Wetland Type Emergent Target Wetland 2 Date Source Emergent Two 2 Data Source Data Source Emergent PHOTO-DOCUMENTATION WATER LEVEL INFORMATION Estart/End 10.3 um 2015 Estart/End 8:30 ame soard NP-4 0.3 um 2015 Source Well/Gage ID 100 ame soard NP-4 0.3 um 2015 Source Well/Gage ID 100 ame soard NP-4 0.3 um 2015 Source Well/Gage ID 100 Prove NP-4 0.3 um 2015 Source Well/Gage ID 100 Prove NP-4 0.3 um 2015 Source Well/Gage ID 100 Prove NP-4 0.3 um 2015 Source No WETLAND IMPACTS Well/Gage ID 100 No No Wetland recerver (Vs. No (N), or Not Sure (NS) for the following questions and provide commentively explanations. Wetland Recerver (No No glasubarce? No Queenetion occurring at time of WAP? No cest damage? No Queenetion occurring at time of WAP? No Glaturbarce? No					G-TW-2							
3397-3402	No 23.59 SG SG-TW-2 Pradic NP-12 east Description NO 23.59 SG SG-TW-2 Please NP-6 south MW DTW = 2.81; Water depth from SG = 2.40' WETLAND IMPACTS WETLAND IMPACTS WETLAND DRAINAGE No Clear evidence of direct stormwater inflow? Q disturbance? No nficant impact from cattle (trampling)? No No No ease? No Planation(s) No estorical aerials show that the west half of this etland was filled for an industrial land use etween 1951 and 1962. Explanation(s)												
3408-3411			1			MW	/ DTW =	2.81; \	Nate	r depth fr	om S	6G =	= 2.40'
					(NS) for the fol	lowing ques	tions and p			-			
	WE	TLAND	IMPACT	S				WETL	AND	DRAINAG	GE		
Wetland	edges filled or di	isturbed?		Y	es	Augment	ation equip	ment in	place	?		No	
	NoNoAugmentation occurring at time of WAP?Nodisturbance?NoClear evidence of direct stormwater inflow?Yesficant impact from cattle (trampling)?NoClear evidence of direct drainage from wetland?Nocles through wetland (includes bicycles)?NoOther drainage activities in area?Noct damage?NoBorrow pit/retention pond in wetland vicinity?No												
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wetlan	Augmentation occurring at time of WAP? Clear evidence of direct stormwater inflow? Clear evidence of direct drainage from wetland? Clear evidence of direct drainage from wetland? No Clear evidence of direct drainage from wetland? Clear evidence of direct drainage from wetland? No Clear evidence of direct drainage from wetland? No Other drainage activities in area? Borrow pit/retention pond in wetland vicinity? No Explanation(s) Wetland receives direct stormwater from filled industrial land use west of wetland and surficial stormwater flow from pasture north and east of wetland.												
betwee	Index of data construction Inficant impact from cattle (trampling)? No No <td< td=""></td<>												
		Fir	e					La	kes /	Docks			
-		panse, int	<u>tensity)</u>			Docks to Docks >	uching wat 50% out of	er or wi		0% of dock	over v	water	-
						<u>Comme</u>		the litt	oral z	one stran	ded?		
	(Soil Subs	sidence			Adven	titious ro	nots of	serv	red 18-24	4 incl	hes	above
-	Ins of oxidation			No]								
No sig	n of soil sub	sidence	9				Gen	eral Co	mmer	nts/Observ	vatior	າຣ	
						assessr 18-24 ir	d hydrolog ment appe nches of w	y is ver ared to ater in	ry dyr acco the w	namic and ommodate vet season	during an ac as ev	g the dditic vider	onal nced by
compare level of:	e this data with	n other w	etlands d	lue to the	e extensive	approx. evident	6 inches outfall fro	above t m this v	the ac wetlar	dventitious	roots ppear	s. Th rs to	ere is no stage up
	non-groundwate soil subsidence	er withdrav	wai-related	disturban	ce	into the	adjacent	pasture	durir	ng high wa	ater le	vels	•
													1
					WILD			1					
		Count E	vidence		Wildlife	Count	Evidence		Wi	ldlife	Со	unt	Evidence
	ibulcus ibis nolis sagrei	Several 1											

aural

Agelaius phoeniceus

Weiting // Property Weiting // Noil Weitin					W	ETLAND ASSES	SME	NT P	ROO	CEDU	RE				
Wetland ID Area Assessed Zone Assessment Notes GROUNDCOVER For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), is cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E-edge, B-beyond a few feet, or T=throughout). TANSITION ZONE UTER DEEP ZONE DEEP ZONE Image: Increments of 10%, count (1-4), and distribution (E-edge, B-beyond a few feet, or T=throughout). DEEP ZONE DEEP ZONE SPECIES ZONE % # DIST SPECIES ZONE % # DIST Pagaalom serve T 10 T SPECIES ZONE % # DIST SPECIES ZONE % # DIST SPECIES ZONE % # DIST Pagaalom serve T 10 T SPECIES ZONE % # DIST Set/origin addition a cossignes 50 T Set/origin addition			erty											ре	
TW2 GROUNDCOVER Sover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout). TRANSITION ZONE UIT RELET ZONE OUTER DEEP ZONE Deep colspan="2">deep zone a few feet, or T=throughout). OUTER DEEP ZONE DEPCIES Torkek if no groundcover PECIES 20NE % # DIST		, ,					Target W					Em	ergent		
Secure cases determine the following: species abbreviation, WAP zone (U, AD, T, OD, or D), to cont (1-4), and distribution (E-edge, B-beyond a few feet, or T-throughout). TRANSTION ZONE DUTER DEEP ZONE DEP ZONE Transition zone assessed? Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">DUTER DEEP ZONE Transition zone assessed? Image: Colspan="2">Image: Colspan="2">Colspan="2">DUTER DEEP ZONE SPECIES ZONE Image: Colspan="2">Image: Colspan="2">Colspan="2">DEP ZONE SPECIES ZONE Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan="2">Colspan= 200 SPECIES ZONE Image: Colspan="2">Image: Colspan="2">Image: Colspan="2">Colspan="2" Panetoria Tol		Area A	ssesse	ea				20	ne As	ssessm					
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TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE transition zone assessed?				-							-		-	hout)	
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Zonation Score Explanation	Zonation Score: 5		Please	assign	a scor	e of 1 - 5 or 0 and provid	e an exp	lanatio	n.						
Species exhibit normal zonation in transition zone; No WAP species were observed in OD and D zones	L			Ū											
	Species exhibit	norm	al zo	natic	n in	transition zone: N	No WA	∖P sr	beci	es wei	re observed in (DD and	d D z	one	S
						, -		- r					_		

					V	ETLAND ASSE	SSME	NT P	RO	CEDU	IRE				
Well	field /	Prop	erty				Wetlan	d Nan	ne			Wetla	and T	ype	
Swift-Rich	nardson	Holdin	igs (P-	68)			Target V	Vetland 2	2			Er	nergent		
Wetland ID	A	rea A	ssess	sed				Zo	ne A	ssessn	nent Notes				
TW-2															
						SHRUB /	SMAL	LTR	EES						
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				W	ETLAND ASSES	SME	NT F	RO	CEDU	IRE					
Wellfield	l / Prop	perty			V	Vetlan	d Nai	ne				Wetla	nd Ty	уре	
W. Sch	nmid (P-66	6)				Target V	Vetland	6				Emerge	ent/Fore	sted	
Wetland ID	Area A	lsses	sed				Z	one A	ssessn	nent Notes					
TW-6															
					SHRUB / S	SMAL	L TR	EES							
					se document the follow of 10%), count (1-50 or								=throu	ghout	:) .
TRANSI	TION	ZON	E		OUTER	DEEP	ZON	2			DEE	P ZON	E		
transitio				√	outer deep zo]			ep zone		sed?	√
check if no s	shrubs/s	small t	rees		check if no shr	ubs/sma	all tree	s]	ch		shrubs			
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECI	ES	ZONE	%	#	DIST
Myrica cerifera	AD	5		Т	Salix caroliniana	OD	20		Т	Ludwigia per	/uviana	OD	Ind		Т
Schinus terrebinthifolius	AD	50		Т	Schinus terebinthifolius	AD	20		Т	Typha lati	folia		50		
Baccharis halimifolia	AD	5		Т	Typha latifolia	D	20		В						
Sambucus nigra	AD	5		Т											
Salix caroliniana	OD	10		В											
Acer rubrum	OD	5		В											
Ludwigia peruviana	OD	Ind		Т											
Shrub/Small Tree	Comm	<u>ents</u>													
					701										
					<u>201</u>	IATIO	<u>N</u>								
Zonation Score:	4	Please	assig	n a score	e of 1 - 5 or 0 and provide	e an exp	lanatio	n.							
Zonation Score Ex			0												
	-										_				
Species have	move	d in o	one	zone	in high numbers	and d	listrik	outio	n, and	d/or some p	lants	have	mov	ed ir	וו
two zones.															
						DECC									
					<u>SI</u>	RESS									
Sians of stress of	appro	priate	shru	ıbs and	l small trees (includ	e dead	l spec	ies)							
ew/None															
Noticeable															
Significant															
Not Applicable															
Signs of stress of	inann	onria	to ch	ruhe a	nd small trees (inclu	ide de	ad er	ecier	3]
Few/None	mappi	opila	ICC 311	aus d		aue ue	aa sp	50163	'/						
Noticeable															
Significant															
Not Applicable															

Wellfield	/ Prop	erty				Wetland	Nam	е			Wetla	nd Ty	pe	
	nid (P-66)					Target We	etland 6	;			Emerger		-	
etland ID	Area As	sess	ed				Zo	ne A	ssessme	nt Notes				
TW-6								1	No tree	es				
						TREES								
					document the follo 10%), count (1-50 o							throu	ghout	t).
TRANSI						DEEP Z					DEEP ZON	_		
transition .	zone as check if			✓	outer deep z c	one asses heck if no					deep zone a check			
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIE	S ZONE	%	#	D
Schinus terebinthifolius	AD	30		т	Salix caroliniana	OD	40		Т					
Salix caroliniana	OD	20		Т										
Acer rubrum	OD	10		E										
Quercus virginiana	U	5		E										
														_
<u>ee Comments</u> Il coverage wa	as col	unteo	d fro	m mult	i-stemmed Bra	azilian p	epp	er o	ver plo	t.				
														_

Zonation Score Explanation

Species have moved in one zone in enough numbers to be of concern.

	<u>STRESS</u>
Signs of stres	s of appropriate trees (do not include dead species)
ew/None	
Noticeable	
Significant	
Not Applicable	
	s of inappropriate trees (include dead species)
Few/None	
Noticeable	
Significant	
Not Applicable	
	RECOVERY
Dead or leani	ng trees (include standing dead trees and dead trees on ground that are appropriate)
Few/None	
Noticeable	
Significant	
Signs of tree	recovery
Yes	
Not Sure	
	e vine death suggesting recovery
Yes	
No Not Sure	

WETLAND ASSESSMENT PROCEDURE												
	/ Property		I	Wetland I			We	etland Type				
Wetland ID	d Thomas Data Owner	Data	Source	Target Wetla		Personnel	Date	Forested Start/End				
TW-18	Data Owner	Dala	Source			artin & K. Peterman	8 June 2015					
	PHOTO-DOCU	MENTATION				WATER LE	VEL INFORMA	TION				
Frame	Description	Photo	Pt. Dire	ection	Dry?	Elevation (ft)	Device	Well/Gage ID				
3217-3224	MW			,S,W	No	23.77	MW	MW-SG-1				
3226-3232 3235-3240	NP-12 NP-6			E,S,W E,S,W		<u> </u>	<u>Description</u>					
3242-3247	NP			E,S,W		SG = Dry; V	Vell DTW = 5.3	88 BTC				
LI	Please enter Yes (Y) No (N) or Not 9				tions and provide o	ommente/explanat	ions				
	WETLAND		Sule (NS) 10		wing ques		ND DRAINAG					
			NI-									
-	filled or disturbed?	an dD	No No		-	ation equipment in		Yes				
-	ping or trash in wetla	and?			-	ation occurring at ti		No				
Hog disturbance		nling)?	No		0.00. 01.0	lence of direct storr		No No				
	ict from cattle (tramp		No			lence of direct drain	-	I? No No				
-	h wetland (includes	DICYCIES)?	No			inage activities in a						
Insect damage? Disease?	ſ		No		borrow pl	it/retention pond in	wettand vicinity?	No				
	-)		NU		E							
Explanation(s	5) its were dug in each				<u>Explanat</u>							
hydric soil indi	cators were observe	ed landward of th	ne wetland.									
	Eir	•				1 -	kas / Docks					
Signs of Fire?	Fire No	e				mpletely out of wa						
-					Docks to	mpletely out of war uching water or wit 50% out of water	ter	over water				
-	No				Docks to Docks >	ompletely out of war uching water or wit 50% out of water icable	ter					
-	No				Docks to Docks >	ompletely out of war uching water or wit 50% out of water icable Is the litte	ter h <50% of dock of					
-	No	<u>tensity)</u>			Docks to Docks > Not Appl	ompletely out of war uching water or wit 50% out of water icable Is the litte	ter h <50% of dock of					
Explanation (No Year, expanse, int	<u>tensity)</u> sidence			Docks to Docks > Not Appl	ompletely out of war uching water or wit 50% out of water icable Is the litte	ter h <50% of dock of					
Explanation (year, expanse, int Soil Subs	tensity) sidence			Docks to Docks > Not Appl	ompletely out of war uching water or wit 50% out of water icable Is the litte	ter h <50% of dock of					
Explanation (year, expanse, int Soil Subs	tensity) sidence			Docks to Docks > Not Appl	ompletely out of wai uching water or wit 50% out of water icable Is the litte	ter h <50% of dock of	led?				
Explanation (year, expanse, int Soil Subs	tensity) sidence			Docks to Docks > Not Appl	ompletely out of wat uching water or wit 50% out of water icable Is the littents General Cor	ter h <50% of dock o oral zone strand	led?				
Explanation (year, expanse, int Soil Subs	tensity) sidence			Docks to Docks > Not Appl	mpletely out of war uching water or wit 50% out of water icable Is the littents General Cor al aerials dating b	ter th <50% of dock of oral zone strand mments/Observ back to 1940 do	Ied?				
Explanation (year, expanse, int Soil Subs	tensity) sidence			Docks to Docks > Not Appl	mpletely out of war uching water or wit 50% out of water icable Is the littents General Cor al aerials dating to in this area. No	ter th <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog	Ied?				
Explanation (year, expanse, int Soil Subs	tensity) sidence ence? No			Docks to Docks > Not Appl	General Cor al aerials dating k in this area. No to indicate inund	ter th <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a	Ied?				
Explanation (Explanation (New signs of Explanation Future users of compare this of	year, expanse, int Soil Subs oxidation/subside	tensity) sidence ence? No		ensive	Commer Historica wetland present through suggest	General Cor al aerials dating k in this area. No to indicate inund out the year. How is that brief inund	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur	ations ations not show a ical evidence any time ater elevation data within the deep				
Explanation (Explanation (New signs of Explanation Future users of compare this of level of:	No Year, expanse, int Soil Subs oxidation/subside of this data may no data with other w	sidence ence? No ot want to ana retlands due to	the exte	ensive	Docks to Docks > 1 Not Appl Commer Historic: wetland present through suggest zone. T	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha	ations not show a ical evidence any time ater elevation data within the deep allow depression				
Explanation (Explanation (New signs of Explanation Future users of compare this of level of:	year, expanse, int Soil Subs oxidation/subside	sidence ence? No ot want to ana retlands due to	the exte	ensive	Commer Not Appl Commer Historica wetland present through suggest zone. T with no	General Cor al aerials dating k in this area. No to indicate inund out the year. How is that brief inund	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha	ations ations not show a ical evidence any time ater elevation data within the deep allow depression				
Explanation (Explanation (New signs of Explanation Future users of compare this level of:	No Year, expanse, int Soil Subs oxidation/subside of this data may no data with other w	sidence ence? No ot want to ana retlands due to	the exte	ensive	Docks to Docks > 1 Not Appl Commer Historic: wetland present through suggest zone. T	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha	ations ations not show a ical evidence any time ater elevation data within the deep allow depression				
Explanation (Explanation (New signs of Explanation Future users of compare this level of:	No Year, expanse, int Soil Subs oxidation/subside of this data may no data with other w roundwater withdrav	sidence ence? No ot want to ana retlands due to	the exte		Docks to Docks > Not Appl Commer Historic: wetland present through suggest zone. T with no NP-12.	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha	led?				
Explanation (Explanation (New signs of Explanation Explanation	No year, expanse, int Soil Subs oxidation/subside of this data may no data with other w roundwater withdraw ibsidence	sidence ence? No ot want to ana retlands due to wal-related distu	rbance	WILDL	Docks to Docks > Not Appl Commer Historica wetland present through suggest zone. T with no NP-12.	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of apparent elevatio	ter th <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha on change betwe	led?				
Explanation (Explanation (New signs of Explanation Explanation Future users of compare this level of: non-gr non-gr soil su Wildlift	No year, expanse, int Soil Subs oxidation/subside of this data may ne data with other w roundwater withdraw ubsidence e Count E	sidence ence? No ot want to ana retlands due to wal-related distu	the exte	WILDL	Docks to Docks > Not Appl Commer Historica wetland present through suggest zone. T with no NP-12.	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of	ter h <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha	led?				
Explanation (Explanation (New signs of Explanation Explanation	No year, expanse, int Soil Subs oxidation/subside of this data may no data with other w roundwater withdraw ibsidence e Count e Count e Count e Count	sidence ence? No ot want to ana retlands due to wal-related distu	rbance	WILDL	Docks to Docks > Not Appl Commer Historica wetland present through suggest zone. T with no NP-12.	General Cor al aerials dating k in this area. No to indicate inund out the year. How w-18 consists of apparent elevatio	ter th <50% of dock of oral zone strand mments/Observ back to 1940 do visible hydrolog ation occurs at a vever, groundwa ation may occur a very small sha on change betwe	led?				

WETLAND ASSESSMENT PROCEDURE															
Wellfield , Howard	/ Prop Thomas	erty				etland arget We						Wetla For	nd Ty ested	ре	
Wetland ID	Area As	ssess	ed				Zo	ne As	ssessm	nent Notes					
TW-18															
	GROUNDCOVER														
	For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout).														
TRANSI	TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE transition zone concered? Guiter doep zone concered? Guiter doep zone concered?														
transition zone assessed? Image: Constraint of the const														,]]	
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPEC	ES	ZONE	%	#	DIST
					Erechtites hieraciifolius	AD	<5		В	Vitis rotun	difolia	AD	10		В
Eriehtites heiraciifolius	AD	Ind		В	Quercus laurifolia (seedling)	Т	5		Т	Osmunda	regalis		10		Т
					Woodwardia virginiana		30			Woodwardia	•		15		Т
Urena lobata	U	5		T	Blechnum serrulatum		10			Blechnum se			10		Т
Woodwardia virginica		20		T					+	Quercus laurifoli		T	Ind		-
Osmunda regalis		5		T	Cobol solution		-		+	Smilax bor		AD	5		Т
Smilax bona-nox	AD	15 Ind		T E	Sabal palmetto		5		+	Urena lo Sobol pol		U	Ind 5		т
Serenoa repens		Ind 10		E T	Vitis rotundifolia	AD AD	5 5			Sabal pal		AD	-		1
Blechnum serrulatum Rubus sp.	AD	5		T	Smilax bona-nox Shinus terebinthifolius	AD	5 Ind			Andropogon Eupitorium ca	-	AD	Ind Ind		
Eupitorium capillifolium	AD	Ind		T	Juncus marginatus	7.0	Ind			Erechtites hie		AD	Ind		
Magnolia virginiana	OD	Ind			Schinus terebinthifolius	AD	5		т	Schinus tereb		AD	5		т
Sabal palmetto	NL	5			UNK Runner		5			Dichantheli			0		
Juncus marginatus	NL	Ind			Oracitation		0			Bionantinoi	un op.				
Lachnanthes caroliniana	NL	5													
Eclipta prostrata		5													
Groundcover Comm	nents														
dioundcover comm															
					ZON	ATIO	N								
					_911										
Zonation Score: 2 Zonation Score Exp			assign	a scor	e of 1 - 5 or 0 and provide	an exp	lanatio	n.							
Chapter have		lun ti				- جا ممیں		· ا- اه	، -السلم						
					in high enough nu		rs ar	a di	stribu	ition, and/o	r some	e spec	cies	with	an
upland classifica	ation I	have	mov	ed ir	nto the deep zone										

WETLAND ASSESSMENT PROCEDURE															
	ld / Prop					Wetlan					V	Vetla		уре	
Swift-Richard	son Holdir Area A		,			Target W			ccoccn	nent Notes		Fo	rested		
TW-18	Alca P	19969:	seu				20		5565511	ient notes					
100-10															
					SHRUB	B / SMAL	LTR	EES							
For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10-100% in increments of 10%), count (1-50 or ">50"), and distribution (E=edge, B=beyond a few feet, or T=throughout).															
TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE															
transition zone assessed? Image: Context plan plan plan plan plan plan plan plan												✓			
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	Z	ZONE	%	#	DIST
Cinnamomum campho	ra U	5		Т						Q. laurifolia		т	Ind		Т
Myrica cerifera	AD	5		Т						Sabal palmett	0		Ind		Е
Q. laurifolia	Т	50		Т						Schinus terebinthi	folius	AD	Ind		Е
llex glabra	AD	5		Т											
<u>Shrub/Small Tre</u>															
					2	ZONATIO	N								
Zonation Score:	2	Ploase		n a 600	ore of 1 - 5 or 0 and pr	ovide an exp	lanatio	n							
Zonation Score: Zonation Score			, 49919	11 a 300			anatio								
	-														
					e in high numbe folia) has move				n, and	d/or some spe	eceis	have	e mo	oved	in
						STRESS									
Signs of stress of	f appro	oriate	e shri	ıbs an	nd small trees (ind	clude dead	l spec	ies)							
Eew/None Noticeable Significant Not Applicable								<u></u> ,							
Signs of stress of Few/None Noticeable Significant Not Applicable	of inappr	opria	ite sh	nubs a	and small trees (i	nclude de	ad sp	ecies)						

WETLAND ASSESSMENT PROCEDURE														
Wellfield					W	/etlan	d Nan	ne				Wetla	nd Type	
Swift-Richardso	n Holdin	gs (P-6	8)		1	arget W						For	rested	
Wetland ID	Area A	ssesse	ed				Zo	ne A	ssessn	nent Notes				
TW-18	TW-18													
					<u>TI</u>	REES								
	For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10-100% in increments of 10%), count (1-50 or ">50"), and distribution (E=edge, B=beyond a few feet, or T=throughout).													
	percent cover (5% or 10-100% in increments of 10%), count (1-50 or ">50"), and distribution (E=edge, B=beyond a few feet, or T=throughout). TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE													
transition			l? √		outer deep zon			•					 assessed?	
	check if					ck if no			DIOT	00501			if no trees	
Q. laurifolia		% 60	# DIS		SPECIES Quercus virginiana	ZONE	% 30	#	DIST	Q. laurifo	-	ZONE T	% # 60	B B
Cinnamomum camphora	U	30	E		Melaleuca quinqueveria	AD	40		В	Q. Iddino	ind ind		00	
					ZON	ATIO	N							
Zonation Score: 3	F	Please	assign a so	ore	of 1 - 5 or 0 and provide	an expl	anatior	1						
Zonation Score Ex														
Species have n	noved	in or	ne zone	e in	high numbers an	d dis	tribut	ion,	and/	or some spe	ceis l	have n	noved in	two
zones.														
					<u>ST</u>	RESS								
	approp	riate	trees (do	o no	ot include dead spec	cies)								
ew/None														
Noticeable Significant														
Not Applicable														
Signs of stress of	nappr	opriat	e trees (inc	lude dead species)									
Few/None														
Noticeable Significant														
ot Applicable														
					DEC	OVER	Y							
	ees (in	clude	standin	g d	ead trees and dead	trees	on gr	ound	that a	are appropriat	e)			
Few/None Noticeable														
Significant														
Signs of tree recov	/ery													
Yes														
No Not Sure														
Inappropriate vine	e death	n suaa	estina ro	eco	very									
Yes	_ /2 3													
No Not Sure														

		W	ETLAN	D ASSESS	SMENT PR		RE							
Wellfield	d / Property			Wetlan	d Name			We	etland Type					
	son Holdings (P-68)				e Wetland 1				ed/Shrub/Emergent					
Wetland ID	Data Owner		Data Sou	rce	D	ersonnel		Date	Start/End					
RW-1		-				tin & K. Peterma	an	9 June 2015						
	PHOTO-DOO		ION			WATE	R LEVE		TION					
Frame	Description		hoto Pt.	Direction	Dry2	Elevation	(f+)	Device	Well/Gage ID					
	Description				Dry?	Elevation	(11)							
3360-3365	MW			N,E,S,W	No	14.14		SG	SG-RW-1					
3366-3371	NP-12			N,E,S,W			Des	<u>scription</u>						
3377-3383 3385-3392	NP-6 HNP			N,E,S,W N,E,S,W	SG = 0.1	6 above or	ound sur	face (14.14); [DTW = 4.23 (14.2 ⁻					
3363-3392		i						. ,						
		(Y), No (N), or D IMPACTS		(NS) for the fo	following questions and provide comments/explanations. WETLAND DRAINAGE									
	WEILAN	DIMACI						DIAINAG						
Wetland edge	s filled or disturbed	1?	Y	es	Augmental	ion equipme	nt in pla	ce?	No					
Excessive durr	nping or trash in we	etland?	N	C	Augmental	ion occurring	g at time	of WAP?	No					
Hog disturban	ce?		N	C	Clear evide	ence of direct	t stormw	ater inflow?	Yes					
Signficant imp	act from cattle (tra	ampling)?	Ye	es	Clear evide	ence of direct	t drainag	e from wetland	? No					
Vehicles throu	igh wetland (includ	es bicycles)?	N	0	Other drai	nage activitie	s in area	1?	Yes					
Insect damage	e?		No)	Borrow pit	/retention pc	ond in we	etland vicinity?	No					
Disease?			No)										
Explanation	<u>(s)</u>				<u>Explanati</u>	<u>on(s)</u>								
pepper cleared from Wetland completel Consideration - Pre		pepper noted that outer m potential to affect hy	argin along th	e north side of	nearby/o US 301	offsite surf ditch into	ace dra the Pea nt past	arce Canal. I ures surrour	veyance) along Receives storm nding wetland.					
		Fire			Lakes / Docks									
Signs of Fire Explanation	? No (year, expanse,	<u>intensity)</u>			Docks completely out of water Docks touching water or with <50% of dock over water Docks >50% out of water Not Applicable									
					Comment		e littora	al zone strand	led?					
	Soil Su	Ibsidence												
New signs of Explanation	f oxidation/subs	idence?	No]	J									
	of some Brazili					Genera	l Comm	nents/Observa	ations					
	vever, it is uncle xidized soils or				This we	tland har	0//2 0	ionood mod	loroto to cover					
				wale 3			•		lerate to sever					
which occu	ur frequently in	uns weuar	iu.			•		due to histo						
	of this data may data with other				modification as a livestock pond and the provision of a discrete drainage swale to the Pearce Canal, which is depicted on USGS 7.5 minute									
	groundwater withd	rawal_ralated	dicturban	<u></u>	topographic quadrangle. Observed impacts									
	ubsidence	awar eldleu	uistui Dd[]				•	agricultural						
				14/71										
					DLIFE									
Wildli Thryothorus luc		Evidence		Wildlife rocyon lotor	Count E	tracks		Wildlife	Count Evidence					

Mimus polyglottos

Dasypus novemcinctus

call

burrow

Wellfield / Property Wetland Name Wetland Typ Swift-Richardson Holdings (P-68) Reference Wetland 1 Forested/Shrub/Eme Wetland ID Area Assessed Zone Assessment Notes Forested/Shrub/Eme RW-1 This wetland is shallow and gently sloping without any substantial hydrological, vegetative, or elevation differences between the For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughed transition zone assessed? OUTER DEEP ZONE DEEP ZONE transition zone assessed? outer deep zone assessed? deep zone assessed? deep zone assessed? check if no groundcover outer deep zone assessed? Check if no groundcover check if no groundcover	ergent he three zones
Wetland ID Area Assessed Zone Assessment Notes RW-1 This wetland is shallow and gently sloping without any substantial hydrological, vegetative, or elevation differences between th GROUNDCOVER For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=through transition zone assessed? OUTER DEEP ZONE DEEP ZONE transition zone assessed? outer deep zone assessed? deep zone assessed?	he three zones
RW-1 This wetland is shallow and gently sloping without any substantial hydrological, vegetative, or elevation differences between the GROUNDCOVER For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=through transition zone assessed? Image: Content of the provided set of the provided s	iout).
This wetland is shallow and gently sloping without any substantial hydrological, vegetative, or elevation differences between the GROUNDCOVER For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=through DUTER DEEP ZONE DEEP ZONE transition zone assessed? outer deep zone assessed?	iout).
For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=through TRANSITION ZONE OUTER DEEP ZONE transition zone assessed? ✓ outer deep zone assessed? ✓	2
% cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=through TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE transition zone assessed? outer deep zone assessed?	2
transition zone assessed?	
SPECIES ZONE % # DIST ZONE % # ZONE % # ZONE % # ZONE %<	# DIST
Acer rubrum seedlings OD 5 B Saururus cernuus 5 E Ludwigia peruviana OD 20	E
Toxicodendron radicans AD 20 T Acer rubrum OD 10 T Salix carolinana OD 5 T	
Salix carolinana OD 5 T Salix carolinana OD 5 T Saururus cernuus 70	т
Saluars certains 10 Blechnum serrulatum Ind	E
Acer rubrum OD Ind	T
Image: Constraint of the second sec	Т
Groundcover Comments	
Woodwardia virginica (20%) FACW and Saururus cernuus (70%) OBL round-out the dominant spe	cies in
the Deep Zone	
ZONATION	
Zonation Score: 4 Please assign a score of 1 - 5 or 0 and provide an explanation. Zonation Score Explanation	
Species have moved in one zone in enough numbers to be of concern.	

					WE1	FLAND ASSE	SSME	NT P	RO	CEDU	IRE				
	lfield / P						Wetlan					Wetla	and T	уре	
	hardson H	olding	gs (P-6	68)			Reference					orested/S	Shrub/Ei	mergen	t
Wetland ID	Are	a As	sesse	ed				Zo	one A	ssessm	nent Notes				
RW-1					This w	vetland is gently sloping	without any s	substantia	al or cle	ar hydrolog	jical, vegetative, or elevation d	ifferences	betweer	the thre	ee zones
						SHRUB	/ SMAL	L TR	EES	5					
percent co											AP zone (U, AD, T, OD, edge, B=beyond a few f		=throu	ıghout	t).
TR	ANSITIC	DN Z	ONE			OUTE	R DEEP	ZON	E		DEE	P ZON	E		
	nsition zo			-	✓	outer deep						ep zone			√
	if no shru					check if no s					check if no				
SPECIES	s zc	NE	%	# [DIST	SPECIES	ZONE	%	#	DIST	SPECIES Schinus terbinthifolius	ZONE	% 45	#	DIST
Schinus terebinth	nifolius A	D	25		Т						Salix caroliniana	OD	40		T
Acer rubrun	n (D	Ind		Т						Ludwigia peruviana	OD	5		Т
											Acer rubrum	OD	10		Т
Shrub/Small															
classificatio	ore Expla ve move on have	natio ed in mov	on two red ir	zone	es and i ne deep	f 1 - 5 or 0 and prov in high numbe zone in enoug	rs and o gh numl	distrib	utior and c	distribu	or some species v ition to be of conc d in the Outer Dee	ern. F	or so	oring	
						5	STRESS	5							
Eew/None Noticeable Significant Not Applicable						mall trees (inclusion of the second				5)					

		WETLAND ASSESSMENT PROCEDURE	
	field / Property hardson Holdings (P-68)	Wetland Name Reference Wetland 1	Wetland Type Forested/Shrub/Emergent
Wetland ID RW-1	Area Assessed	Zone Assessment Notes	

TREES

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10-100% in increments of 10%), count (1-50 or ">50"), and distribution (E=edge, B=beyond a few feet, or T=throughout).

TRANSI	TION 2	ZON	<u>E</u>		<u>OUTER I</u>	DEEP Z	ZONE			DEE	P ZON	<u>E</u>		
transition	zone as	sesse	d?	✓	outer deep zor		dee	ep zone a	issess	ed?				
(check if	no tre	es	\checkmark	che	eck if no	trees				check	if no t	rees	
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST
Schinus terebinthifolius	AD	60		Т	Schinus terebinthifolius	AD	60		Т	Acer rubrum	OD	10		В
					Salix caroliniana	OD	40		Т	Salix caroliniana	OD	80		В

Tree Comments

Score remained a 4 and is based on the aerial coverage of OD in the D zone which is consistent with previous reports, but the number of tree specimens was not recorded. Check the number of specimens next year since that is the only thing that differentiates between a 3 and 4.

ZONATION

Zonation Score: 4

Please assign a score of 1 - 5 or 0 and provide an explanation.

Zonation Score Explanation

Species have moved in one zone in enough numbers to be of concern.

	<u>STRESS</u>
Signs of stress	s of appropriate trees (do not include dead species)
ew/None Noticeable Significant Not Applicable	
	of inappropriate trees (include dead species)
Eew/None Noticeable Significant Not Applicable	
	RECOVERY
Dead or leaning	ig trees (include standing dead trees and dead trees on ground that are appropriate)
Few/None Noticeable Significant	
Signs of tree r	ecovery
Yes No Not Sure	
Inappropriate	vine death suggesting recovery
Yes No Not Sure	

WETLAND ASSESSMENT PROCEDURE															
	llfield / Prope	erty			Wetlan						land Ty				
	W. Schmid (P-69)	_			Reference	e Wetlar	-				ested/scrul				
Wetland RW-2	ID Data	Owner		Data Sou	irce			Personnel lartin & K.Pete		10 June 2015	9:3	tart/End 30 12:00			
100 2												12.00			
	PHO1	ro-doc	UMENTA	TION	1			WA ⁻	FER LEVI	EL INFORMAT	ION				
Frame	Dese	cription		Photo Pt.	Direction		Dry?	Elevatio	on (ft)	Device	Well/	Gage ID			
3354-3358		MW			N,E,S,W		No	17.5		SG	SG	S-RW-2			
3346-3351 3341-3344		NP-12 NP-6			N,E,S,W N,E,S,W				<u>De</u>	<u>scription</u>					
3333-3336		HNP			N,E,S,W	Water depth from SG = 0.56'; MW DTW = 3.62' BTOC									
L	Please	enter Yes	(Y), No (N),	or Not Sure	(NS) for the fo	following questions and provide comments/explanations.									
			D IMPAC		. ,		• 1			ID DRAINAGE					
Wetland	edges filled or a	disturbed	?	Y	es	Au	Jament	ation equip	ment in pla	ace?	No				
	e dumping or tr			N	0		-	ation occuri	-		No				
Hog distu	urbance?			N	0	Cle	ear evid	lence of dir	ect stormv	vater inflow?	Yes				
-	t impact from c	-			es				-	ge from wetland?	Yes				
	through wetlan	d (include	es bicycles)	r				inage activ			No				
Insect da Disease?	image?			N		BO	prrow p	it/retention	pona in w	etland vicinity?	No				
Explana	tion(s)				0	Fx	nlana	tion(s)							
	arge rim ditch a	ad liveste	ock pond w	oro historico	llv				ock pond d	rain to the south ir	ato a dita	•b			
	ed around the S									e concrete weir wh					
	from rim ditch d						elevations of RW-2 is now collapsed. The current control elevation is a high spot in the outfall ditch, approximately 200' south of RW-2								
of the we	ditch were contr etland.	olled by a	l concrete v	weir at the so	outhern tip	IS	a nign	spot in the		i, approximately 2	.00 Souli				
		F	ire						Lake	es / Docks					
 Signs of	Fire? No							mpletely o		•					
-	tion (year, ex		ntoncity)			Docks completely out of water Docks touching water or with <50% of dock over water									
			<u>Intensity j</u>			Docks >50% out of water									
							ot Appl	icable							
								Is	the littor	al zone strande	d?				
						Co	ommei	<u>nts</u>							
		Soil Su	bsidence							red during the 20					
New sia	ns of oxidatio	on/subsi	dence?	Yes]					ns that appear to jetation growing					
<u>Explana</u>		-					onnar		ions. veg	jetation growing	on num	moons.			
12" - 1	8" of soil ox	idation/	eubeider		nt in this			_							
	d apparently					_		Gene	eral Com	nents/Observat	tions				
	h ditch to so					Т	his we	etland has	s experie	enced moderate	e hydro	ological			
	ete control w								•	al agricultural	-	•			
Future u	sers of this d	ata mav	not want	to analyz	e /					rim ditch and		•			
compare	this data wit							•		the south to the south term in the south term is a south term is					
level of:										S 7.5 minute T nage swale (18					
	non-groundwat		awal-relate	ed disturban	ice					nd from the nor					
\checkmark	soil subsidence														
					WILI	VILDLIFE									
N	Vildlife	Count	Evidence		Wildlife	С	Count	Evidence		Wildlife	Count	Evidence			
	alis Cardinalis		call	-	Aix sponsa		2	Observed	Lithoba	tes sphenocephala					
Butec	o jamaicensis		Flyover	Gr	us canadensis		2	Observed							

Call

Mimus polyglottos

Plestiodon fasciatus

observed

Wellfield / Property Wetland Name Wetland Type Reference Veland 2 Forestediscula Forestediscula RW-2 Zone Assessment Notes Forestediscula RW-2 Cone (5% or 10-100% in increments of 10%), count (1-4), and distribution (E-edge, B-beyond a few feet, or T-throughout). TRANSTICIN ZONE OUTER DEEP ZONE dege prone assesses(1 / check if no groundcover PSPCIES Cone in assesseed Secondary and assesseed Secondary and assesseed Pagadum copuents 5 F Bechneary and assesseed Secondary and assesseed Pagadum copuents 5 F Bechneary and assesseed F Pagadum copuents 5 F Bechn					W	ETLAND ASSES	SMEN	IT P	ROO	CEDU	IRE						
Wetland ID Area Assessed Zone Assessment Notes GROUNDCOVER For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), % cover (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout). TRANSITION ZONE UTER transition zone assessed? OUT dep zone assessed? Colspan="2">deck if no groundcover PECIES Neptrolegic availata 00 T Pagadum conjugatum 5 10 T Paragulum conjugatum 5 10 T Paragulum conjugatum 5 10 T Paragulum conjugatum 5 10 T Magnola wigninan 00 5 Commention diffuse T Paragulum conjugatum 5 T Acer rubrum 10 Acer rubrum 6 T Acer rubrum (septings) 00 Ind Parathencoscus quinquefitia 5 E Ritheroclosus quinquefit	•																
RW-2 CROUNDCOVER Sere ach zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), 's cover (5% or 10-100% in increments of 10%), cover (3% or 10-100% in increments of 10%). OUTER DEEP ZONE DEP ZONE TARNSITION ZONE OUTER DEEP ZONE DEP ZONE DEP ZONE Tansition zone assessed? Colspan="2">Caler deep zone assessed? Caler deep zone assessed? Caled to tone to tone to to to to to to tone to to tone t		· ,		-		Re	eference						Forest	ed/scru	b		
Control C	Wetland ID A	rea A	ssess	ed				Zo	ne As	ssessn	nent Notes						
Service service set and severation and the severation of 10%, count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout). TRANSITION ZONE DUTER DEEP ZONE DEEP ZONE Transition zone assessed? Colspan="2">Colspan="2" SPECIES ZONE % # DIST SPECIES ZONE % # DIST Nephrologie scalata Colspan="2" Colspan="2" Colspan="2" SPECIES ZONE % # DIST SPECIES ZONE % # DIST Nephrologie scalata Colspan="2" Colspan="2" Partmenologie scalata Colspan="2" Colspan="2" Partmenologie scalata Colspan="2" Colspan="2" Partmenologie scalata <th colsp<="" th=""><th>RW-2</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th>	<th>RW-2</th> <th></th>	RW-2															
Sever (5% or 10-100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout). TRANSITION ZONE OUTER DEEP ZONE DEEP ZONE transition zone assessed?						GROUI	NDCO	VER									
OUTER DEEP ZONE DEEP ZONE transition zone assessed? check if no groundcover cleap zone zone zone zone zone zone zone zone				-							-			-			
Itransition zone assessed? check if no groundcover Image: Content of the processes of the proces	-				nents					=edge,	B=beyond a f				hout)	•	
check if no groundcover check if no groundcover check if no groundcover check if no groundcover SPECIES ZONE % # DIST Nephrolepis exaltata 30 T Thelypteris kunthii 30 T Beschum scrutulatum 10 T Paspalum Sp. 10 T Mignola virginiana 00 5 Thelypteris kunthii 30 T Magnola virginiana 00 5 Mignola virginiana 00 5 Mignola virginiana 00 5 Commelina diffusa 110 T Acer rubrum (sapilings) 00 1nd Nysen synama wittice (septing) D 1nd Acer rubrum (sapilings) 00 1nd Thelypteris synama wittice (septing) D 1nd Parthenocissus quinquelolia 5 F Stabal partetic 1nd H Thelypteris palustris 10 T Toxicodentori radicani AD 5<															? \	7	
Nephrolepis exaltata Dota Dota <thdota< th=""> Dota Dota<!--</th--><th></th><th></th><th></th><th></th><th></th><th>•</th><th></th><th>-</th><th></th><th></th><th>(</th><th>•</th><th></th><th></th><th>-</th><th></th></thdota<>						•		-			(•			-		
Thelypteris kunthil 30 T Paspalum conjugatum 5 T Paspalum Sp. 10 T Rhynchospora miliacea 5 T Blechnum serulatum 10 T Magnolia viginiana 00 5 T Magnolia viginiana 00 5 T Magnolia viginiana 00 5 T Urena lobata U 10 T Hydrocotyle umbulleta 00 5 T Commelina diffusa T Ind D Acer rubrum 00 5 T Acer rubrum (saplings) 00 Ind Dryopteris erythrosora 5 Smilax bona-nox 5 T Sabal palmeto Ind Taklynchospera miliacea 5 Milania scandens T 5 Parthenocissus quinquefolia 5 T T Hydrocotyle umbelleta 00 20 T Takleypteris palustris 10 T T T	SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPEC	IES	ZONE	%	#	DIST	
Magnolia virginiana OD S T Paspalum Sp. 10 T Rhynchospora miliacea 5 T Urena lobata U 10 T Hydrocotje umbulleta OD 5 T Commelina diffusa T Ind Quercus laurifolia T Acer rubrum (seplings) DD Ind D T Brahanonox 5 C E Smilax bona-nox 5 C E Pathenocissus quinquefolia 5 C C Imagnolia virginiana No 5 C Imagnolia virginiana No 5 C Smilax bona-nox 5 C Magnolia virginiana No Imagnolia virginiana 5 C Magnolia virginiana S C Imagnolia virginiana 5 C Magnolia virginiana S C T Pathenocissus quinquefolia 5 C C C C C	Nephrolepis exaltata		30		Т	Nephrolepis exaltata		60		Т							
Paspalum Sp. 10 T Rhynchospora miliacea 5 T Urena lobata U 10 T Hydrocotyle umbulleta OD 5 T Cormelina diffusa T Ind E Acer rubrum (seplings) OD Ind D T Boehmeria cylindrica Ind D T T Aper rubrum (seplings) OD Ind Dryopteris erythrosora 5 E Smilax bona-nox 5 Parthenocissus quinquefolia 5 T T F Smilax bona-nox 5 Parthenocissus quinquefolia 5 T T F Cormelina diffusa 10 T T S E Mikania scandens T 5 E Parthenocissus quinquefolia 5 T S E Mikania scandens T 5 E Image:	Thelypteris kunthii				Т	Blechnum serrulatum		10		Т	Erechtites hie	raciifolius	AD	5			
Rhynchospora miliacea 5 T Urena lobata U 10 T Hydrocotyle umbulleta OD 5 T Quercus laurifolia T Ind E Acer rubrum 00 5 T Commelina diffusa T Ind E Acer rubrum 00 5 T Acer rubrum (saplings) OD Ind T Parthenocissus quinquefolia 5 Commelina diffusa T 5 E Parthenocissus quinquefolia 5 T Sabal palmetto Ind T Toxicodendron radicans AD 5 T Milkania scandens T 5 E Parthenocissus quinquefolia 5 T Toxicodendron radicans AD 5 T Mydrocotyle umbelleta 0 0 0 0 0 0 0 Inductoryle umbelleta 0 0 0 0 0 0 0 0 Inductoryle umbelleta 0 0 0 0 0 0	Paspalum conjugatum		5		Т	Magnolia virginiana	OD	5		Т	Thalia gen	iculata		5		Е	
Urra lobata U 10 T Urra lobata U 10 T Hydrocotyle umbulleta OD 5 T Commelina diffusa T Ind E Acer rubrum 00 5 T Beahmeria cylindrica Ind E C T Myras gylinds wir. billiosa (saplings) D Ind E E Smilas hona-nox 5 C Beahmeria cylindrica 5 E Parthenocissus quinquefolia 5 Commelina diffusa T 5 E Commelina diffusa 5 Commelina diffusa T 5 E Parthenocissus quinquefolia 5 T Sabal palmetto Ind T Toxicodendron radicans AD 5 T T Hydrocotyle umbelleta OD 20 Ind Ind Ind Ind Ind Ind Ind Ind Ind Ind Ind Ind Ind I	Paspalum Sp.		10		Т	Saururus cernuus		10		Т	Saururus d	ernuus		30		Т	
Under Note No	Rhynchospora miliacea		5		Т	Urena lobata	U	5			Blechnum se	errulatum		30		Т	
Commelina diffusa T Ind Ind Acer rubrum (saplings) OD Ind Ind Dryopteris erythrosora 5 Mysas synatica var. bittora (saplings) D Ind Dryopteris erythrosora 5 Ind Smilax bona-nox 5 Parthenocissus quinquefolia 5 Ind Ind Ind Parthenocissus quinquefolia 5 Ind Ind Ind Ind Ind Image: Index of the index of	Urena lobata	U	10		Т	Quercus laurifolia	т	Ind		Е	Ludwigia pe	eruviana	OD	30		Е	
Acer rubrum (saplings) OD Ind Dyopteris erythrosora 5 E Nyssa syhatica var. billora (saplings) D Ind Bhynchospora miliacea 5 Mikania scandens T 5 E Parthenocissus quinquefolia 5 Babel palmetto Ind Mikania scandens T 5 T Parthenocissus quinquefolia 5 Mikania scandens T 5 T Parthenocissus quinquefolia 5 Mikania scandens T 5 T Parthenocissus quinquefolia 5 Mikania scandens T 5 T Thelypteris palustris 10 Toxicodendron radicans AD 5 T Hydrocotyle umbelleta OD 20 T Toxicodendron radicans AD 5 T<	Hydrocotyle umbulleta	OD	5		Т	Acer rubrum	OD	5								Т	
Nysa syvatica var. billora (sopingr) D Ind R	Commelina diffusa	Т	Ind			Boehmeria cylindrica		Ind								Т	
Smilax bona-nox 5 Image: manual constraint of the constrain	Acer rubrum (saplings)	OD	Ind			Dryopteris erythrosora		5			Pontedaria	cordata		5		Е	
Sabal palmetto Ind Hydrocotyle umbelleta OD 20 Ind Image: Sabal palmetto Ind Image: Sabal palmetto Ind Image: Sabal palmetto Imag	Nyssa sylvatica var. bilflora (saplings)	D	Ind			Rhynchospora miliacea		5			Mikania sc	andens	т	5		Е	
Consistence of the period Consistence of the period Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period Image: Consistence of the period	Smilax bona-nox		5			Parthenocissus quinquefolia		5			Commelina	diffusa	т	5		Т	
Image: Sector of the sector	Parthenocissus guinguefolia		5			Sabal palmetto		Ind			Hydrocotyle	umbelleta	OD	20			
Image: Sector of the sector			-														
Image: Sector of the sector							AD										
						Toxicodendron radicans	AD	5									
													_				
	Groundcover Comm	ente															
Cround sover in each zone encours to indicate that this wetland has experienced historical drainage	SI DUNUCUVET CUITIT	CIILS															
	Ground cover in	aanh	1 70r	a on	hear	s to indicate that t	hiew	otlar	hd b	20 04	nerienced	histori	cal dr	ainar	ar		
						ZON	ATIO	Ν									
ZONATION							-										
ZONATION	Zonation Score: 3		Please	assign	a scor	e of 1 - 5 or 0 and provide	an exp	lanatio	n.								
	Zonation Score Exp	anati	on														
						. 1. 2. 1											
Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation. Zonation Score Explanation	Species have m	oved	in o	ne zo	ne ir	n high numbers ai	nd dis	stribu	ition	, and	/or some s	peceis	have	mo۱	/ed i	In	
Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation.	two zones.																
Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation. Zonation Score Explanation Species have moved in one zone in high numbers and distribution, and/or some speceis have moved in																	
Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation. Zonation Score Explanation Species have moved in one zone in high numbers and distribution, and/or some speceis have moved in																	
Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation. Zonation Score Explanation Species have moved in one zone in high numbers and distribution, and/or some speceis have moved in																	

				VV	ETLAND ASSES	SME	NT F	RO	CEDU	JRE				
Wellfie	ld / Prop	perty			V	Vetlan	d Nar	ne			Wetla	and T	уре	
W. S	chmid (P-66	6)			F	Reference	Wetlar	d 2			Fore	sted/scr	ub	
Wetland ID	Area A	lsses	sed				Zo	one A	ssessn	nent Notes				
RW-2														
					SHRUB / S	SMAL	LTR	EES	5					
percent cover					se document the follow of 10%), count (1-50 or							=throu	ughout).
TRANS	SITION	ZON	E		OUTER	DEEP	ZONI	Ε		DE	EP ZON	E		
transit check if no	ion zone a shrubs/s			✓	outer deep zo check if no shru				✓ deep zone asset ✓ check if no shrubs/sma					✓
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST
Callicarpa americana	U	15		т	Schinus terebinthifolius	AD	50		т	Cephelanthus occidenta	is D	35		т
Sabal palmetto		5		Е	Myrica cerifera	AD	15		Т		AD			т
Urena lobata	U	25		Е	Magnolia virginiana	OD	15			Ludwigia peruviana	OD	40		Т
Myrica cerifera	AD	10		Т						Quercus laurifolia	т	10		E
Ludwigia pervuviana	OD	5		Т						Schinus terebinthifolius	AD	10		Е
					mocks in the Dee		ne: S	iani	ficant	Sweet Bay rece	nerati		oted	in
Quercus lauri	folia gr	owin	g or	hum	mocks in the Dee	•	-	Signi	ficant	Sweet Bay rege	enerati	on n	oted	in
Quercus lauri	folia gr	owin	g or	hum		p Zor	-	igni	ficant	Sweet Bay rege	enerati	on n	oted	in
Quercus lauri the Outer Dee Zonation Score :	folia gro ep Zone	Owin 2. Please				ATIO	N		ficant	Sweet Bay rege	enerati	on n	oted	in
Quercus lauri the Outer Dee Zonation Score :	folia gro ep Zone	Owin 2. Please			<u>ZON</u>	ATIO	N		ficant	Sweet Bay rege	enerati	on n	oted	in
Quercus lauri the Outer Dee Zonation Score: Zonation Score	folia gro ep Zone 3 Explanat	owin Ə. Please tion	e assig	ın a scor	ZON e of 1 - 5 or 0 and provide	• ATIO • an exp	<u>N</u> Ianatio	n.						
the Outer Dee Zonation Score: Zonation Score	folia gro ep Zone 3 Explanat	owin Ə. Please tion	e assig	ın a scor	<u>ZON</u>	• ATIO • an exp	<u>N</u> Ianatio	n.						
Quercus lauri the Outer Dee Zonation Score: <u>Zonation Score</u>	folia gro ep Zone 3 Explanat	owin Ə. Please tion	e assig	ın a scor	ZON e of 1 - 5 or 0 and provide in high numbers a	an exp	<u>N</u> Ianatio İstrik	n.						
Quercus lauri the Outer Dee Zonation Score: Zonation Score I Species have two zones.	folia gro ep Zone <u>3</u> Explanat e move	owin e. ^{Please} tion d in d	e assig	in a scor ZONE	<u>ZON</u> e of 1 - 5 or 0 and provide in high numbers a <u>ST</u>	an exp and d	<u>N</u> Ianatio Istrik	n. Dutio						
Quercus lauri the Outer Dee Zonation Score: Zonation Score Species have two zones. Signs of stress of ew/None Noticeable Significant	folia gro ep Zone <u>3</u> Explanat e move	owin e. ^{Please} tion d in d	e assig	in a scor ZONE	ZON e of 1 - 5 or 0 and provide in high numbers a	an exp and d	<u>N</u> Ianatio Istrik	n. Dutio						
Quercus lauri the Outer Dee Zonation Score: Zonation Score: Zonation Score Species have two zones. Signs of stress of Even Noticeable Significant Not Applicable	folia gro p Zone <u>3</u> Explanat e move	owin e. Please tion d in o	e assiç Dne	n a scor ZONE	<u>ZON</u> e of 1 - 5 or 0 and provide in high numbers a <u>ST</u>	an exp and d	N Ianatio Istrik	n. outio	n, and					
Quercus lauri the Outer Dee Zonation Score: Zonation Score: Species have two zones. Signs of stress of Noticeable Significant Not Applicable Significant Noticeable Significant	folia gro p Zone <u>3</u> Explanat e move	owin e. Please tion d in o	e assiç Dne	n a scor ZONE	<u>ZON</u> e of 1 - 5 or 0 and provide in high numbers a <u>ST</u> d small trees (includ	an exp and d	N Ianatio Istrik	n. outio	n, and					
Quercus lauri the Outer Dee Zonation Score: Zonation Score: Species have two zones. Signs of stress of Noticeable Significant Not Applicable Significant Not Applicable Significant Not Applicable	folia gro p Zone <u>3</u> Explanat e move	owin e. Please tion d in o	e assiç Dne	n a scor ZONE	<u>ZON</u> e of 1 - 5 or 0 and provide in high numbers a <u>ST</u> d small trees (includ	an exp and d	N Ianatio Istrik	n. outio	n, and					

	WETLAND ASSESSMENT PROCEDURE											
Wellf	ield / Property	Wetland Name	Wetland Type									
W	. Schmid (P-66)	Reference Wetland 2	Forested/scrub									
Wetland ID	Area Assessed	Zone Assessment Notes										
RW-2												

TREES

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10-100% in increments of 10%), count (1-50 or ">50"), and distribution (E=edge, B=beyond a few feet, or T=throughout).

TRANSI	<u>FION :</u>	ZONI	<u>E</u>		OUTER	DEEP Z	ZONE			DEEF	<u> ZONI</u>	<u>E</u>		
transition a	zone as	sesse	d?	✓	outer deep zoi	ne asses	sed?			deep	o zone a	ssess	ed?	
с	heck if	no tre	es	\checkmark	che	eck if no	trees				check i	if no ti	rees	
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	ZONE % #			DIST
Acer rubrum	OD	5		Т	Ulmus americana	Т	15		Е	Ulmus americana	Т	15		Т
Nyssa sylvatica var. biflora	D	40		Т	Magnolia virginiana	OD	60		Т	Nyssa sylvatica var. biflora	D	30		Т
Quercus laurifolia	Т	5		Т						Schinus terebinthifolius	AD	10		Е
Ulmus americana	Т	15		Т										

Tree Comments

Observed tree species appear to either be relic species from before wetland was drained or dryer species appear be recruiting into deeper zones due to historical agricultural drainage.

ZONATION

Zonation Score: 3 Please assign a score of 1 - 5 or 0 and provide an explanation.

Zonation Score Explanation

Species have moved in one zone in high numbers and distribution, and/or some speceis have moved in two zones.

	STRESS
Signs of stres	s of appropriate trees (do not include dead species)
Few/None	
Moticeable Significant	
Not Applicable	
	s of inappropriate trees (include dead species)
Few/None	
Noticeable	
Significant	
	RECOVERY
Dead or leani	ng trees (include standing dead trees and dead trees on ground that are appropriate)
Few/None	
Noticeable	
Signs of tree Yes	
No	
Not Sure	
	e vine death suggesting recovery
Yes	
No Not Sure	

		١	VETLAN	D ASSESS	SMENT P	ROCED	URE						
	/ Property mid (P-66)				d Name Wetland 3				tland Type Emergent				
Wetland ID RW-3	Data Owne	r	Data Sou	irce	M. N	Personne		Date 9 June 2015	Start/En 10:30 1	nd 2:00			
	PHOTO-DO	DCUMENT	TION			WA	TER LEVE	EL INFORMAT	TION				
Frame	Descriptio	n	Photo Pt.	Direction	Dry?	Elevati	on (ft)	Device	Well/Gage 1	ID			
3315-3318	MW			N,E,S,W	No	20.	99	SG	SG-RW-3				
3319-3322	NP-12			N,E,S,W			De	scription					
3323-3326	NP-6			N,E,S,W			SG = 4.2	2'; DTW - 5.0)1				
3327-3330				N,E,S,W									
		es (Y), No (N) ND IMPAC		(NS) for the fo	llowing ques	tions and p		ments/explanation ID DRAINAGE					
								DRAINAGE	-				
-	filled or disturb		N		-	ation equip	•		No				
-	oing or trash in	wetland?	N	-	-	ation occur	-		No				
Hog disturbanc				es				vater inflow?	Yes				
	ict from cattle (h wetland (inclu			es		inage activ	-	ge from wetland	? No No				
Insect damage	•	Jues Dicycles): <u>N</u>			-		etland vicinity?	Yes				
Disease?	•		N			GICCHUON			100				
Explanation(s	5)				Explana	tion(s)							
	nd; Excavated p emna minor; 50					ompletely o	Lake	rce for cattle.					
-	year, expanse	e, intensity)	1		Docks to	ouching wat 50% out of	er or with	<50% of dock o	ver water				
					Comme		the littor	al zone strande	ed?				
	Soil S	Subsidence	9										
New signs of <u>Explanation</u>	oxidation/sul	osidence?	No]									
No subside	ence observ	ed			General Comments/Observations								
					This wetland appears to continue to exhibit a relatively high functional value as indicated by								
Future users of compare this level of:	data with oth	er wetlands	due to the	e extensive	 high species diversity in the appropriate zones and limited hydrological and topographical impacts. This wetland appears to be most closely 								
-	roundwater witl Ibsidence	ndrawal-relat	ed disturban	ce	matched to TW 1.								
				WILI	DLIFE								
Wildlif	e Cour	t Evidence		Wildlife		Evidence		Wildlife	Count Evide	nce			
Sandhill Crane n		nest	-	rdea herodias	1								
Anas fulvio	ula 2		-	oretta thula	1		1						

Eudocimus albus

4

RW-3	(P-66) ea Ass	sesse	ed			eference					Wetlar Eme		ре					
Wetland ID RW-3 For each 3 % cover (5% or 10	zone		ed	De			Reference Wetland 3 Emergent											
RW-3 For each a % cover (5% or 10	zone			De	Zone Assessment Notes Deepwater herbaceous marsh with significant topographic relief and relatively obvious zonation.													
For each % cover (5% or 10		255.05																
% cover (5% or 10		25505			eepwater herbaceous i	narsh v	vith si	gnific	ant topc	graphic relief and rela	tively o	bviou	s zon	ation.				
% cover (5% or 10		2000			GROU													
TRANSITIO			-		document the follow of 10%), count (1-4), a							-	nout)).				
	ON Z	ONE			OUTER I	DEEP 2	ZONE			DEEI	ZON	E						
transition zone a check if no gro			✓		outer deep zone a check if no gro		ľ	✓		deep zo check if n	one asse o groun		-	/				
SPECIES ZO	ONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST				
	OD	5		T	Polygonum hydropiperoides	-	35		Т	Polygonum hydropiperoides	OD	25		E				
Juncus effusus		45		Т	Paspalum distichum		10		т					Т				
Paspalum distichum		5		Т			5		Е	Salvinia minima		5		т				
Polygonum hydropiperoides	OD	15		т			Ind		т	Lemna minor		5		Т				
, g	AD	5		E			Ind		T	Paspalum distichum		25		T				
· timman capinonan	AD	5		T	Ludwigia peruviana	OD	8		Т	,		25 5		T				
i nyia noamora	AD			-		OD				open water								
Cyperus haspens		5		Т	Juncus effusus		Ind		Т	Cyperus lecontei		10		В				
	OD	15		Т	Ludwigia decurrens		5		E									
Spartina bakerii		10		Т														
Setaria geniculata		5			Echinochloa walteri		Ind		Т									
Amphicarpum muhlenbergium		20			Eleocharis baldwinii		10											
Eleocharis baldwinii		20			Amphicarpum muhlenbergium		50											
Urena lobata		5			Eclipta prostrata		5											
Eclipta prostrata		5												-				
Diodia virginiana		5																
Groundcover Commen	<u>nts</u>																	
	_																	
					ZON	ATIO	N											
Zonation Score: 5 Zonation Score Explan			assign	a scor	re of 1 - 5 or 0 and provide	e an exp	anatio	n.										
•		_																
Deep zone flora sp	peci	es w	vhich	are	on the WAP form	do n	ot od	ccur	within	deep zone/wetla	and in	terio	r (e	xcept				
Polygonum hydrop	•									•			``					
appropriate to a de																		

				V	VETLAND ASSE	SSMEI	NT F	RO	CEDI	JRE				
Wellfield W. Sch	I / Prop nmid (P-66					Wetlan Reference					Wetla	and T nergent		
Wetland ID	Area A	<i>.</i>	sed						ssess	ment Notes		- 3 -		
RW-3														
					SHRUB /	SMAL	L TR	EES	I					
					ease document the follo is of 10%), count (1-50 o							=throu	ughout	t).
TRANSI	TION	ZON	E		OUTER	DEEP	ZON	E			DEEP ZON	IE		
transitio check if no s				√	outer deep check if no sh]	ch	deep zone eck if no shrubs			
SPECIES	ZONE	%	#	DIST	SPECIES	ZONE	%	#	DIST	SPECI	ES ZONE	%	#	DIST
Ludwigia pervuviana	OD	40		Т										
Shrub/Small Tree	Comm	ents												
					<u>zo</u>	NATIO	N							
Zonation Score:	5	Please	e assig	n a sco	pre of 1 - 5 or 0 and provi	de an exp	lanatio	n.						
Zonation Score Ex					•	•								
Normal zonati	on - al	ll ide	entifi	ed sp	ecies are within	their a	opro	priat	e zor	ne				
						TRESS								
Signs of stress of	appro	priate	e shr	ubs an	nd small trees (inclu	de dead	l spec	cies)						
Noticeable Significant														
Not Applicable														
	inappr	opria	nte sl	nrubs	and small trees (inc	lude de	ad sp	ecies	;)					
Few/None Noticeable														
Significant Not Applicable														

			W	/ETLAND ASSES	SMEN [.]	T PRO	CEDU	RE			
	eld / Prope Schmid (P-66)	rty			/etland eference W					nd Type	
Wetland ID	Area Ass	sessed			elerence w		ssessm	ent Notes	Em	ergent	
RW-3					Herb	aceou	s Wet	land. No	trees		
				I	<u>REES</u>						
nercent cover				ase document the follow s of 10%), count (1-50 or						throughou	+)
_	ISITION Z		ement	<u>OUTER</u>				age, B-beyond	DEEP ZON	-	<i>.</i>
transit	ion zone ass check if n		✓ ✓	outer deep zoi che	ne assess eck if no t	=			deep zone a check	issessed? if no trees	
SPECIES		% #	DIST	SPECIES	ZONE		DIST	SPEC			DIST
Tree Comments											
	•										
				<u>Z01</u>		<u>[</u>					
Zonation Score	NA Ple	ease assigi	n a scor	re of 1 - 5 or 0 and provide	an explar	nation.					
Zonation Score	Explanatio	<u>on</u>									
STRESS											
Signs of stress of appropriate trees (do not include dead species)											
ew/None			5 (uo 1	not include dead spe							
Noticeable Significant											
Not Applicable Signs of stress of inappropriate trees (include dead species)											
Few/None			(11	iciaue deau species)							
Noticeable Significant											
Not Applicable											
					OVERY						
Dead or leaning	j trees (inc	lude sta	nding	dead trees and dead	trees o	n ground	that a	re appropria	te)		
Noticeable Significant											
Signs of tree re	covery										
No Not Sure											
Inappropriate v Yes	vine death s	suggesti	ng rec	covery							
No Not Sure											

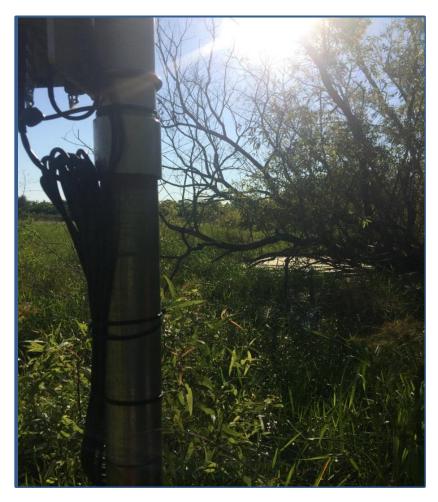
APPENDIX C

PHOTOGRAPHIC DOCUMENTATION



North











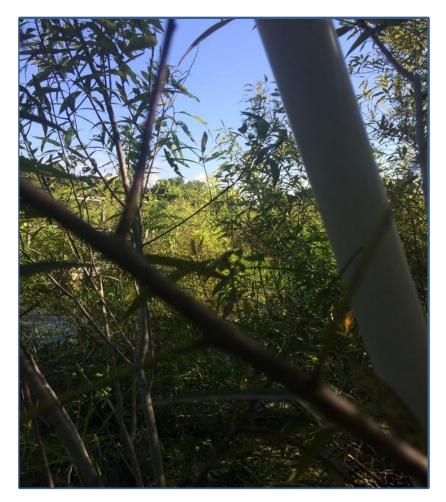


West

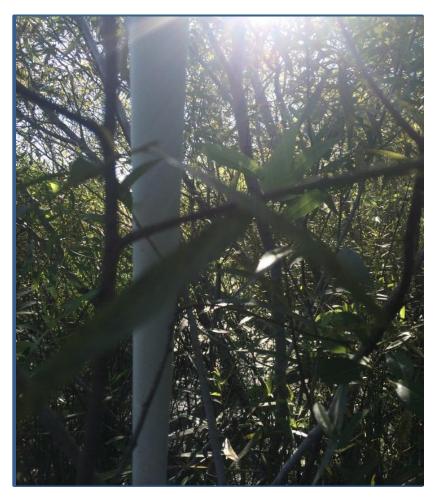
Target Wetland (TW) 1 – Monitoring Well (MW) 1 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2



AECOM Project #60336439 June 2015







East







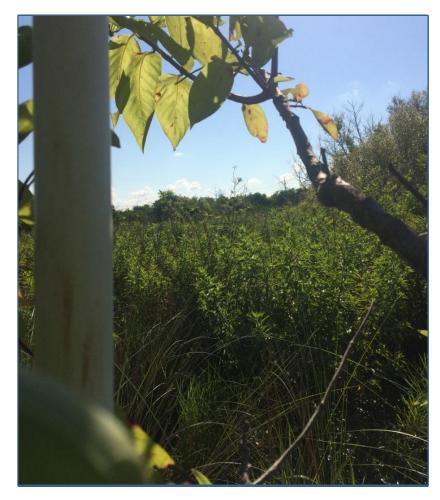
Target Wetland (TW) 1 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

















South

Target Wetland (TW) 1 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

















West

Target Wetland (TW) 1 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

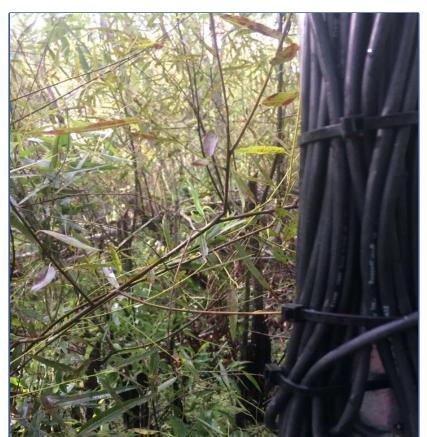












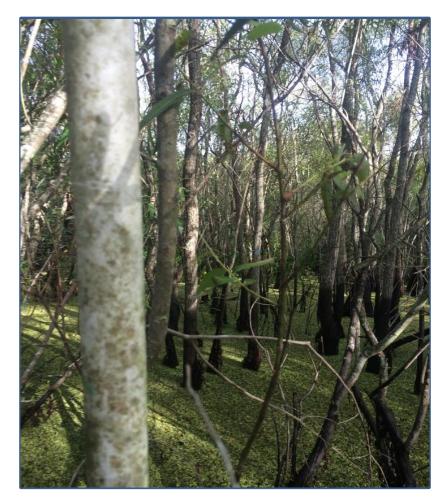


South



Target Wetland (TW) 2 - Monitoring Well (MW) 2 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2



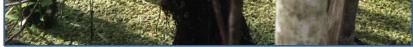














Target Wetland (TW) 2 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West















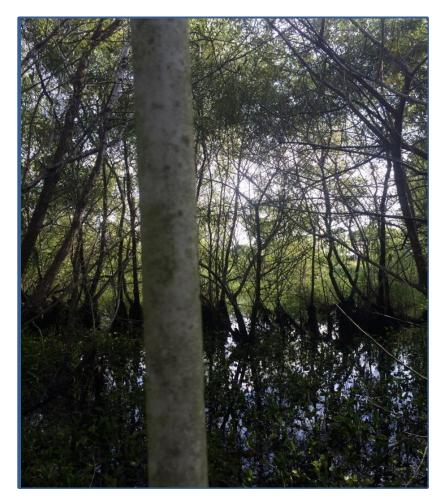
South

Target Wetland (TW) 2 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

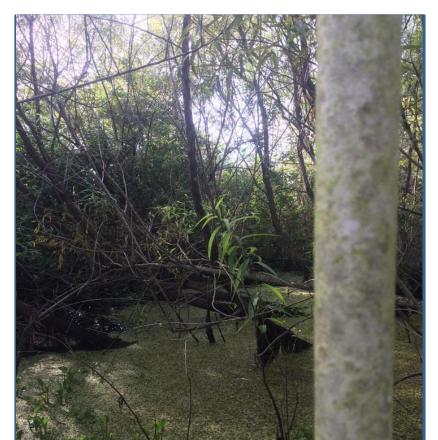












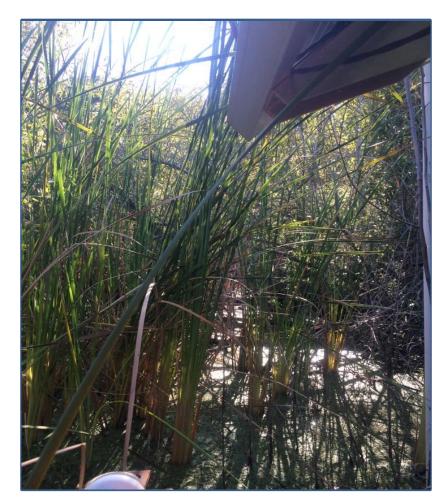




Target Wetland (TW) 2 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West



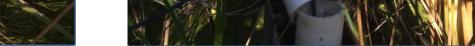






East







West

Target Wetland (TW) 6 - Monitoring Well (MW) 6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2









East







Target Wetland (TW) 6 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

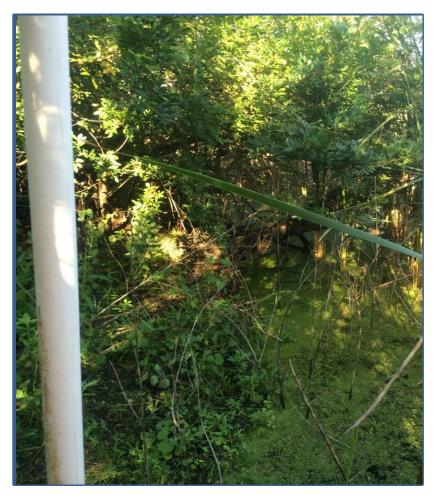


West









East







Target Wetland (TW) 6 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West

















Target Wetland (TW) 6 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2



AECOM Project #60336439 June 2015 West

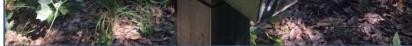






East







West

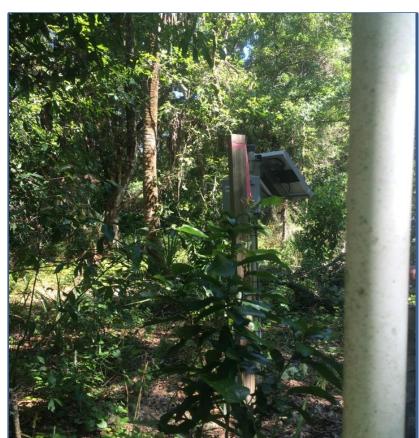
Target Wetland (TW) 18 - Monitoring Well (MW) 18 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2





West





East



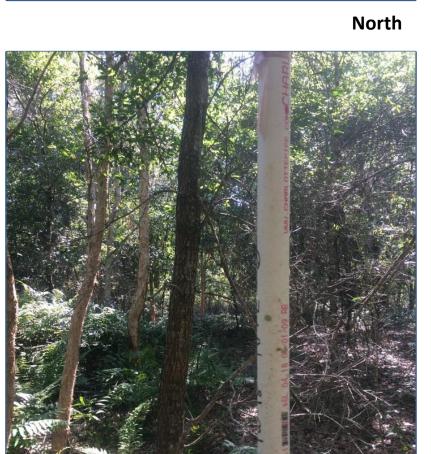


South

Target Wetland (TW) 18 NP–12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2









East





South

Target Wetland (TW) 18 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2



West













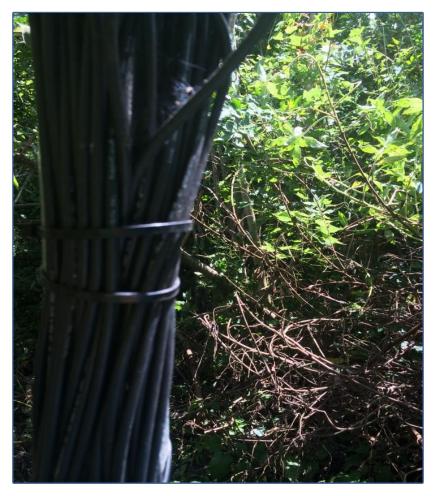


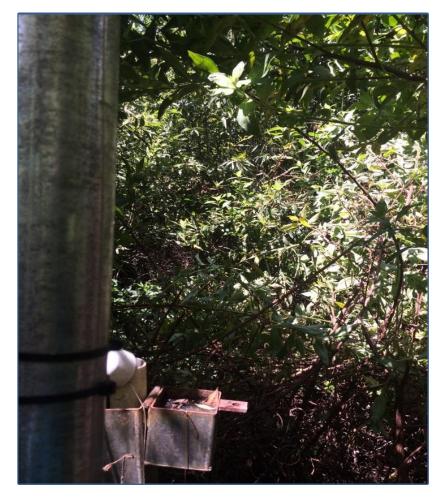
South

Target Wetland (TW) 18 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2









East





South



Reference Wetland (RW) 1 - Monitoring Well (MW) 1 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2















Reference Wetland (RW) 1 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West













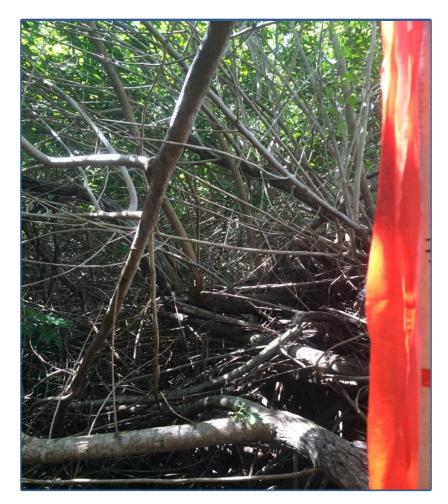


South

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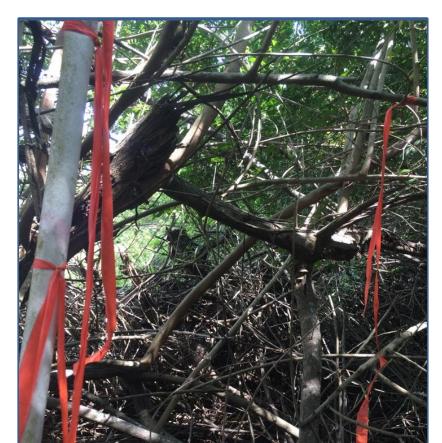














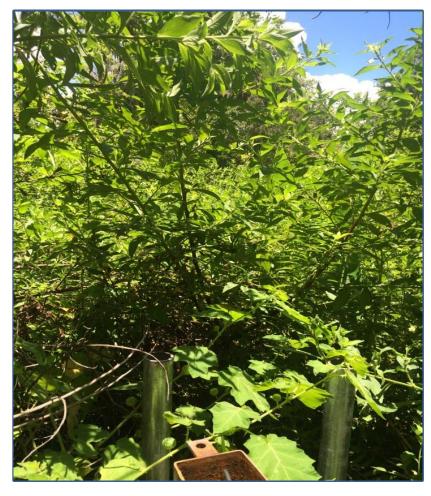
South

Reference Wetland (RW) 1 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2









East







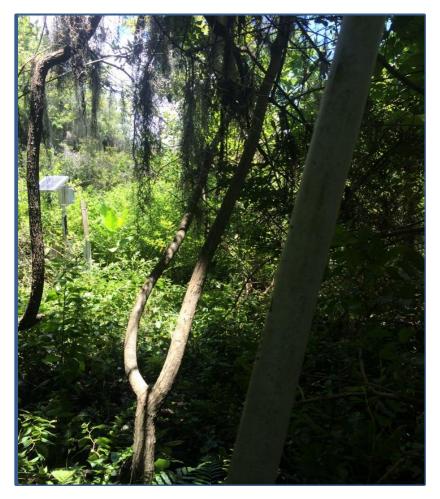
West

Reference Wetland (RW) 2 - Monitoring Well (MW) 2 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

















Reference Wetland (RW) 2 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West





West





East







South

Reference Wetland (RW) 2 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2









East





South

Reference Wetland (RW) 2 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2







East







West

Reference Wetland (RW) 3 - Monitoring Well (MW) 3 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2











South

Reference Wetland (RW) 3 – NP-12 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2

West





West





East







South

Reference Wetland (RW) 1 – NP-6 Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2





West













South

Reference Wetland (RW) 3 – HNP Photostation Tallevast Site 2015 Wetlands Monitoring Tallevast, Manatee County, Florida R625-STA-002274-2



APPENDIX D

HYDROPERIOD GRAPHS

