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U.S. Army Corps of Engineers
701 San Marco Boulevard
Jacksonville, FL 32207-8175
USACE Contract No. W91278-16-D-0062

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Acronyms

Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
ANOVA	Analysis of Variance
BMP	Biological Monitoring Plan
ERP	Environmental Resource Permit
et al.	and others
FDEP	Florida Department of Environmental Protection
LSJR	Lower St. Johns River
JAXPORT	Jacksonville Port Authority
m	meter
SAV	Submerged Aquatic Vegetation
SJRWMD	St. Johns River Water Management District
USACE	United States Army Corps of Engineers

1.0 Introduction

In accordance with the State permit, Florida Department of Environmental Protection (FDEP) Environmental Resource Permit No. 0129277-017-BI (2016), for the U.S. Army Corps of Engineers (USACE) project Jacksonville Harbor Federal Channel Expansion, a Biological Monitoring Plan (BMP) for Submerged Aquatic Vegetation (SAV) Monitoring must be submitted. The following is the BMP that describes SAV monitoring at and data analysis for seven locations within the Lower St. Johns River (LSJR).

2.0 Background

Jacksonville's federal navigation channel is a 21-mile reach of the LSJR extending from the Atlantic Ocean at Mayport, Florida to the Jacksonville Port Authority (JAXPORT) Talleyrand Marine Terminal just north of downtown Jacksonville, Florida. In accordance with the Water Resources Reform Development Act of 2014, USACE has been authorized to deepen the channel from 40 to 47 feet between river miles 0 and 13. This will allow Post-Panamax vessels to access the JAXPORT marine terminals near Blount Island.

Hydrodynamic modeling conducted by the USACE indicates the proposed deepening would result in a minor upstream shift in salinity. The authorized deepening plan, as well as the State permit, requires monitoring of selected SAV or eelgrass (i.e. *Vallisneria americana*), beds and freshwater wetlands within the main stem of the LSJR or its tributaries. Data will also be used to document community trends over time.

3.0 Objectives

The primary objective of this plan is to describe the SAV Monitoring, outlined in USACE Contract No. W91278-16-D-0062 and FDEP Environmental Resource Permit (ERP) Permit No.: 0129277-017-BI, that will be used to identify potential adverse secondary impacts that may occur due to salinity stress to the SAV, including, but not limited to eelgrass (*Vallisneria americana*), due to the deepening of the LSJR as identified above. The SAV monitoring results will be used to support the results of the hydrodynamic and ecological modeling performed by the USACE. This BMP describes the methods that will be used to assess SAV beds within the LSJR to document the pre-dredge status and post-dredge status site conditions.

4.0 Methodology

4.1 SAV Monitoring Station Locations

The SAV monitoring locations for this project will be in the same locations as established during an earlier study conducted by SJRWMD. The seven SAV sites are shown on Figure 1, and are identified, in latitudinal order, as:

- Groundtruth site GT002,
- Groundtruth site GT006,
- Bolles School,
- Buckman Bridge,
- Moccasin Slough,
- Orangedale, and
- Scratch Ankle.

4.2 Monitoring Station Descriptions: Historical Species Composition and Bed Length

Groundtruthing Site GT002

The site is located in front of a private, residential property in a highly urbanized section of Duval County on the western bank of the river just downstream of Fishweir Creek and corresponding approximately to river mile 26.5. The shoreline consists of a bulkhead and concrete rip-rap. SAV data collection at this site began in 1998. Species, when present, that have been observed at the site include *Ruppia maritima*, and *Zannichellia palustris*; the bed length at this site has ranged from 0 to 73 meters (m) from shore (Sagan 2007). Stock photographs of representative SAV species at this site and throughout the LSJR can be found in Appendix 1.

Groundtruthing Site GT006

The site is located in front of a private, residential property in a highly urbanized section of Duval County on the eastern bank of the river corresponding approximately to river mile 28. The shoreline consists of a bulkhead. SAV data collection at this site began in 1998. The only species observed at the site, if any were present, has been *Ruppia maritima*; the bed length at this site has ranged from 0 m to 65 m from shore (Sagan 2007).

Bolles High School

The site is located in front of a private school in a highly urbanized section of Duval County on the eastern bank of the river (7400 San Jose Blvd., Jacksonville, Florida 32217) corresponding approximately to river mile 30. The shoreline consists of concrete rip-rap. SAV data collection at this site began in 1995. Species that have been observed with regular frequency at the site include *Najas guadalupensis*, *Ruppia maritima*, *Vallisneria americana*, and *Zannichellia palustris*; the mean bed length at this site has ranged from 17 to 94 m from shore (Sagan 2007).

Buckman Bridge

The site is located in a highly urbanized section of Duval County. It is located on the eastern bank of the river, upstream from the Buckman Bridge (Interstate 295), corresponding approximately to river mile 35. The study plot shoreline is bisected by an undeveloped property upstream and a developed residential property downstream (11138 Scott Mill Rd., Jacksonville, Florida 32223). The shoreline consists of a bulkhead that runs the entire length of the study plot. Data collection associated with this site began in 1996. Species that have been observed with regular frequency at the site include *Najas guadalupensis*, *Ruppia maritima*, *Vallisneria americana*, and *Zannichellia palustris*; the mean bed length at this site has ranged from 45 to 86 m from shore (Sagan 2007).

Moccasin Slough

The site is located in front of Moccasin Slough Park, a 255-acre conservation park in Clay County. It is located on the western bank of the river, upstream from Doctors Lake Inlet and across from Julington Creek corresponding approximately to river mile 38.

SAV data collection at this site began in 1995. Species that have been observed with regular frequency at the site include charophytes, *Najas guadalupensis*, *Ruppia maritima*, *Vallisneria americana*, and *Zannichellia palustris*; the mean bed length at this site has ranged from 143 to 170 m from shore (Sagan 2007).

Orangedale

The site is located on the eastern shore of St. Johns County, north of the Shands Bridge (State Road 16) and one dock upstream of the old Shands Bridge Fishing Pier, corresponding approximately to river mile 49. The shoreline abuts low density, rural residential property and consists of rip rap.

SAV data collection at this site began in 1995. Species that have been observed with regular frequency at the site include *Ceratophyllum demersum*, charophytes, *Eleocharis sp.*, *Micranthemum sp.*, *Najas guadalupensis*, *Potamogeton pusillus*, *Ruppia maritima Sagittaria subulata*, *Vallisneria americana*, and *Zannichellia palustris; t*he mean bed length at this site has ranged from 57 to 76 m from shore (Sagan 2007).

Scratch Ankle

The site is located in front of private residential property in a low density rural section of the Clay and Putnam County border and corresponds approximately to river mile 62. It is located on the western bank of the river, abutting swampland and naturalized residential shoreline.

SAV data collection at this site began in 1995. Species that have been observed with regular frequency at the site include *Ceratophyllum demersum*, charophytes (i.e. Chara sp. and Nitella sp.), *Eleocharis sp.*, *Hydrilla verticillata*, *Micranthemum sp.*, *Najas guadalupensis*, *Potamogeton pusillus*, *Ruppia maritima Sagittaria subulata*, *Vallisneria americana*, and *Zannichellia palustris; t*he mean bed length at this site has ranged from 138 to 217 m from shore (Sagan 2007).

4.3 SAV Monitoring Timeline

All SAV stations will be monitored one time prior to the commencement of dredging (within one year of commencement of dredging) during the peak growing season. SAV surveys will be conducted quarterly throughout the duration of dredging, including once during the peak growing season (between June 1 to August 1) and in (or as soon as practicable, but no more than 30 days from) November, February, and May. Quarterly SAV monitoring will continue for at least 10 years after the completion date of the last construction contract. Monitoring will occur at the same time of year for all surveys (i.e., pre-, during and post-construction) to reduce seasonal variation between surveys.

Data will be collected at SAV monitoring stations starting in calendar year 2017 as follows:

- July 2017 - the monitoring event during the peak growing season and prior to commencement of the deepening, providing baseline data.
- November 2017 – the monitoring event during duration of dredging (deepening of Contract A) which is scheduled to commence during November 2017.

4.4 Data Collection Method

Data Collection Methodology - Rationale

Methodology used for SAV Monitoring was stipulated by, and will be performed in accordance with, the USACE Contract No. W91278-16-D-0062, and FDEP permit (ERP Permit No.: 0129277-017-BI). Methodology reflects previous methods employed during SJRWMD data collection at these locations.

Collection Method

At each monitoring location, five transects will be placed perpendicular to the shore starting from the shoreline and extended towards the river channel. Transects will be positioned parallel to each other at a distance of 0, 12, 25, 38, or 50 m from a stationary benchmark located at each monitoring location. Transect nearshore points have been obtained for each monitoring location (Table 1) and are shown in Figures 2 through 8.

Table 1. Submerged Aquatic Vegetation Locations, Nearshore Transect Coordinates

Location	Monitoring Location Name	Transect	Coordinates for Transect (Decimal Degrees) Latitude	Longitude
Groundtruth 002	GT002	GT00200	30.28822814	-81.70599232
		GT00212	30.28812747	-81.70605015
		GT00225	30.28804521	-81.70610505
		GT00238	30.28790150	-81.70614964
		GT00250	30.28783038	-81.70621854
Groundtruth 006	GT006	GT00600	30.27056542	-81.65392662
		GT00612	30.27064165	-81.65400323
		GT00625	30.27072782	-81.65404061
		GT00638	30.27083938	-81.65413759
		GT00650	30.27091545	-81.65422132
Bolles School	BOL	BOL00	30.24158587	-81.63045888
		BOL12	30.24149262	-81.63037003
		BOL25	30.24138391	-81.63034069
		BOL38	30.24128010	-81.63023802
		BOL50	30.24119510	-81.63015724
Buckman Bridge	BUC	BUC00	30.17340726	-81.64465053
		BUC 12	30.17349129	-81.64462731
		BUC 25	30.17358248	-81.64458071
		BUC 38	30.17370922	-81.64452019
		BUC 50	30.17379869	-81.64449547
Moccasin Slough	MOC	MOC00	30.12913761	-81.69408859
		MOC12	30.12907981	-81.69408239
		MOC25	30.12896666	-81.69406504
		MOC38	30.12885283	-81.69399387
		MOC50	30.12876101	-81.69395775
Orangedale	ORG	ORG00	30.00480725	-81.61272327
		ORG12	30.00485448	-81.61279377
		ORG25	30.00494731	-81.61288949
		ORG 38	30.00507161	-81.61299242
		ORG 50	30.00513678	-81.61308001
Scratch Ankle	SCA	SCA00	29.83708419	-81.60278267
		SCA12	29.83699132	-81.60273833
		SCA25	29.83726712	-81.60286951
		SCA38	29.83716026	-81.60283950
		SCA50	29.83688210	-81.60268662

Created by: JJS Checked by: DLA

Data collection methods along each transect are described below and will provide SAV parameters such as cover, species composition, and bed length.

1. At each station, 5 transects will be positioned perpendicular to the St. Johns River shoreline as described above. Transects will extend from the shoreline to the deep-water edge of the SAV bed. The entire extent of the SAV bed will be sampled. A visual assessment will be conducted 10 m beyond the last "bare" quadrat to ensure that no plants are present along each transect.
2. Line-intercept surveys will be conducted to document the linear extent (recorded to the nearest 0.1 m) of each SAV taxon present along each transect.
3. Data will be collected at regular intervals along each transect, using a 0.25 m x 0.25 m quadrat. Quadrats will be placed at intervals equal to 10% of the measured bed length (determined using the line-intercept survey results). Quadrats will be separated by at least one meter and spaced no more than 20 m apart from one another. The last quadrat will always be sampled at the deep-water edge of the SAV bed. The exact position of each quadrat (i.e., distance along transect) will be reported, as per Statement of Work requirements.
4. Within each quadrat, the presence/absence of vegetation will be recorded.
5. If SAV is present, the canopy height of each plant taxon will be measured using a representative individual, and data will be reported.
6. The condition / health of all plants within each plot will be assessed by qualified staff. Any visually conspicuous signs of salt stress will be noted during each survey.
7. All floating and emergent taxa present within quadrats will be identified and reported.
8. Total percent cover of SAV will be estimated within each quadrat. Cover will be reported using standard categories developed by SJRWMD, as follows: 0 = bare (0% cover), 1 = sparse (1 – 32% cover), 2 = moderate (33 – 65% cover), 3 = heavy (66 – 100% cover).
9. If eelgrass (i.e. *Vallisneria americana*) inflorescence is present in a quadrat, it will be reported. The percentage of quadrats along each transect containing eelgrass with visible inflorescence will be reported.
10. Within each quadrat, sediment will be qualitatively assessed and assigned to one of three categories: 1 = sandy, 2 = mucky-sand, 3 = muck. All other substrates will be denoted as 0, i.e., rock or clay, as per Statement of Work requirements.
11. Representative photographs will be taken along each transect at all stations when possible; however, the dark, turbid waters of the LSJR generally do not make it possible to produce underwater photographs.

4.5 Data Analysis

The primary goal of SAV monitoring is to determine changes in condition of the SAV within each site through time. Changes in condition will primarily be defined as changes in taxonomic composition or abundance. The primary null hypotheses to be tested are that no long-term changes occur in condition of the SAV communities at each site, in excess of natural variation, beginning with pre-construction and early construction data. Changes will be assessed by comparing species richness, the extent of SAV beds (bed length), species composition, total densities, and the densities of individual taxa.

Data Analysis Methodology - Rationale

The use of non-parametric (distribution-free) statistical methods is preferred because the great majority of the monitoring data (percentages and ratios of percentages) will not be normally distributed. Further, environmental data frequently contain outliers due to uncontrolled factors such as weather. Distribution-free methods are powerful and less sensitive to outliers, and they avoid the problems associated with transforming data to meet normality requirements of parametric methods.

The following statistical methods will be employed: Multiple-site Sørensen similarity metric (Jost *et al*. 2011), the Kruskal-Wallis test (Sokal & Rohlf 1995), and the Seasonal Kendall test (Helsel & Hirsch 2002). The Sørensen similarity metric will highlight sites where long-term changes in species richness were unusually large or small. The Kruskal-Wallis test will show significant differences in overall SAV species cover over time. The Seasonal Kendal tests will provide slopes (rate of change) for significant, monotonic trends.

Statistical Analyses

- The Sørensen similarity metric will be used to quantify variation in species richness for each site across sampling years. Annual aggregate species data are used for this calculation to avoid effects of seasonality. At least two samples are needed for comparison, but two full years of sampling are needed to avoid effects of seasonality.
- Significant effects of season and year will be tested for SAV variables at each site using the Scheirer-Ray-Hare extension of the Kruskal-Wallis non-parametric analysis of variance (ANOVA). At least two samples are needed for comparison, and two full years of data are needed to test seasonal effects. Variables to be evaluated are the following:
  - Distance to deep-water edge of SAV.
  - Percent cover and percent composition of major SAV taxa. Percent Cover will be calculated by dividing total linear extent for each taxon by the transect length. Percent composition will be calculated by dividing percent cover for each taxon by the sum of percent cover for all taxa.
  - Simpson's diversity (D1) index. This index is one of the most widely-used of the so-called compound diversity indices that combine both richness and abundance. It states the probability that two individuals chosen at random belong to different species (Morris *et al.* 2014).
- Tests for significant temporal trends and calculations of slopes for the following variables at each site using the non-parametric regression Seasonal Kendall Test. If this test shows significant seasonal effects, then trends will be evaluated separately for each season. A minimum of two full years of data are needed for this test, and three years are needed to test seasonal effects.
  - Distance to deep-water edge of SAV
  - Percent cover and percent composition of major SAV taxa
  - Simpson's diversity (D1) index

4.6 Tabular and Graphical Representations

Results from statistical analyses will be presented in tabular or graphic formats. Graphical representations of the data, the non-parametric ANOVA, and the trend analyses will be complementary in examination of changes in SAV through time. Time-series graphs will illustrate the degree and direction of changes and the variability in the data.

Summary tables will include a matrix of SAV species present for each site by year aggregated across transects and quadrats. Summary graphs will include annual box plots by site for the following metrics:

- Distance to deep-water edge of SAV (bed length),
- Simpson's diversity (D1) index,
- Percent cover of major SAV taxa, and
- Percent composition of major SAV taxa.

4.7 Data Reporting

Raw SAV monitoring data will be provided to the USACE in Excel format and as copies of scanned field sheets no later than 3 days after each SAV monitoring event. Upon completion of annual surveys, a draft and final Annual SAV Report will be submitted that will contain:

- Detailed descriptions of the methods used to collect and analyze data
- Summary of all biological data collected
- Descriptions of current condition of the biological communities
- Statistical comparisons as described in Section 4.5 (Data Analysis)
- Representative photos from each SAV transect
- A statement that the monitoring results indicate, or do not indicate, a change in the condition of SAV that exceeds the natural variation in these systems.

The draft report submittal shall include draft electronic files in native Microsoft Word format, three (3) hard copies, and three (3) CDs. The final report submittal shall include a final electronic document in PDF format, three (3) hard copies, and three (3) CDs. The Contractor shall provide the draft and final submittals to the USACE Technical Point of Contact.

5.0 References

Amec Foster Wheeler. 2017. Task Order for Submerged Aquatic Vegetation (SAV) and Freshwater Wetlands Monitoring In Support of Jacksonville Harbor Deepening Project, St. Johns River, Florida. USACE Contract No. W91278-16-D-0062. May 1, 2017.

FDEP. 2016. Environmental Resource Permit No. 0129277-017-BI, Permit issued to USACE for the Jacksonville Harbor Federal Channel Expansion project.

Helsel, D.R. and R. M. Hirsch. 2002. *Statistical Methods in Water Resources. Techniques of Water Resources Investigations*, Book 4, chapter A3. U.S. Geological Survey. 522 pages.

Jost, L., Chao, A. & R.L. Chazdon. 2011. Compositional similarity and β (beta) diversity. In: Magurran, A.E. & B.J. McGill, Eds. *Biological Diversity: Frontiers in Measurement and Assessment.* Oxford University Press. 345 p.

Morris, E.K., T. Caruso, F. Buscot, M. Fische, C. Hancock, T.S. Maier, T. Meiners, C. Müller, E. Obermaier, D. Prati, S.A. Socher, I. Sonnemann, N. Wäschke, T. Wubet, S. Wurst & M.C. Rillig. 2014. Choosing and using diversity indices: insights for ecological applications from the German Biodiversity Exploratories. Ecology and Evolution 4(18): 3514–3524.

Sagan, J.J. 2007. A Summary of Submerged Aquatic Vegetation (SAV) Status within the Lower St. Johns River: 1996 - 2007. Final Report to the St. Johns River Water Management District, Palatka, FL. Special Publication SJ2009-SP6.

Sokal, R.R. & F.J. Rohlf. 1995. *Biometry: The Principles and Practice of Statistics in Biological Research*, Third Edition. W.H. Freeman and Co., New York. 887 p.

Figures

Source: DeLorme 2014; NRCS 2014

N

1 inch = 4 miles

0 2 4 8 Miles

USACE SAV and Wetlands Monitoring Project

SAV Monitoring Location Map

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida Project No. 6063170288

amec foster wheeler

Figure 1

Path: P:\EAT\2017\Projects\USACE_SAV_Wetlands\GIS\MXD\SAV Location Map v2.mxd dustin.atwater Date Saved: 6/21/2017 5:09:07 PM

Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Groundtruth 002

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida
Project No. 6063170288

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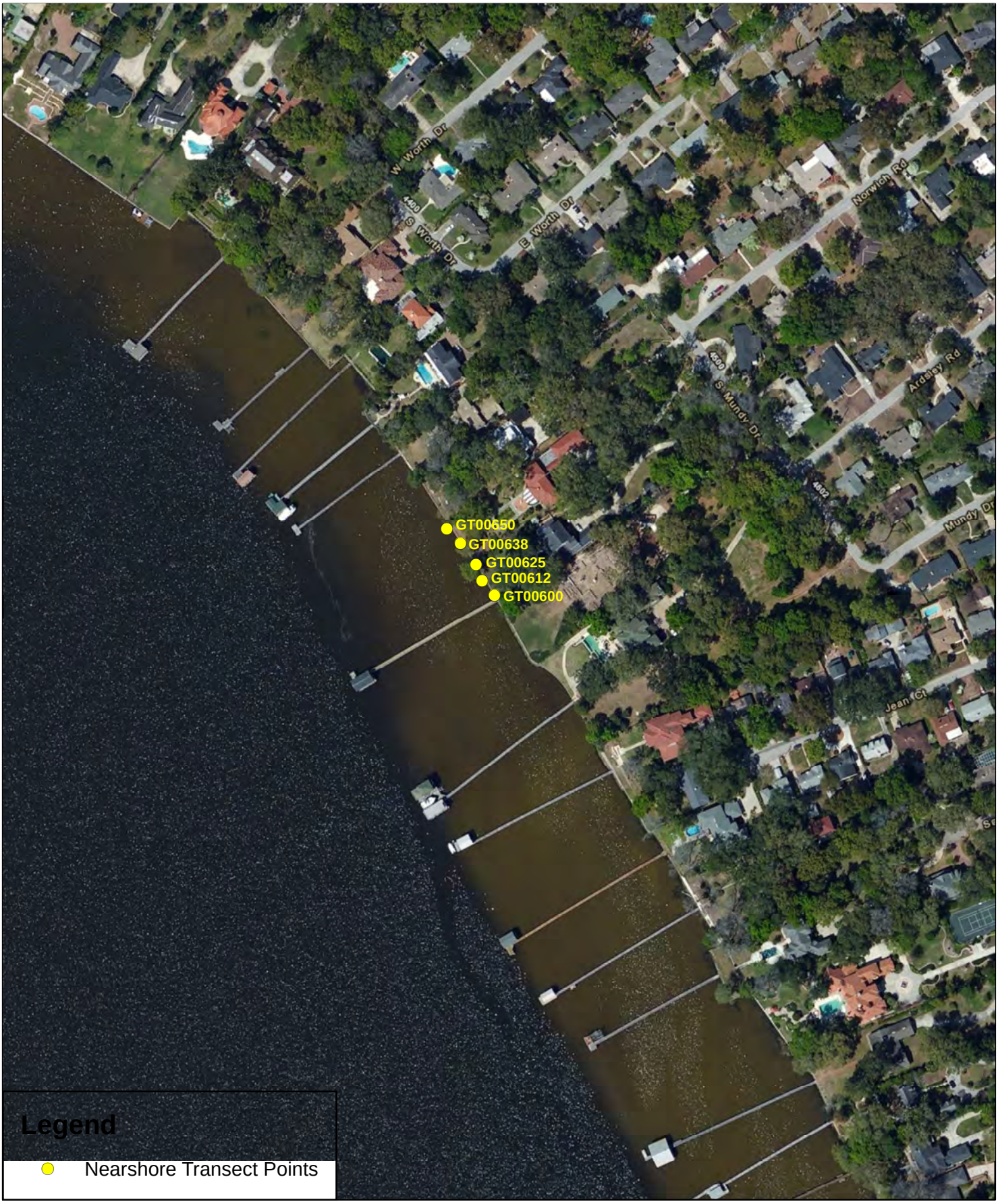
Figure 2

Path: P:\EAT\2017\Projects\USACE_SAV_Wetlands\GIS\MXD\SAV Transect Map.mxd dustin.atwater Date Saved: 6/23/2017 1:24:45 PM



Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Groundtruth 006

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida Project No. 6063170288

amec foster wheeler

Figure 3

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Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Bolles School

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida
Project No. 6063170288

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Figure 4

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Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Buckman Bridge

Drawn	Date	Gainesville Florida Project No. 6063170288	amec foster wheeler	Figure 5
DLA	6/23/2017			
Checked	Date			
JJS	6/23/2017			

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Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Moccasin Slough

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida
Project No. 6063170288

amec foster wheeler

Figure 6

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Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Orangedale

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida
Project No. 6063170288

amec foster wheeler

Figure 7

Path: P:\EAT\2017\Projects\USACE_SAV_Wetlands\GIS\MXD\SAV Transect Map.mxd dustin.atwater Date Saved: 6/23/2017 1:24:45 PM

Source: ESRI 2014; AMECFW 2017

N

1 inch = 250 feet

0 125 250 500 Feet

USACE - SAV and Wetlands Monitoring

SAV Transect Map - Scratch Ankle

Drawn	Date
DLA	6/23/2017
Checked	Date
JJS	6/23/2017

Gainesville Florida
Project No. 6063170288

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Figure 8

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Appendix 1

SAV Photographs

Representative Species of the Lower St. Johns River

Appendix 1

SAV Photographs

Representative Species of the Lower St. Johns River

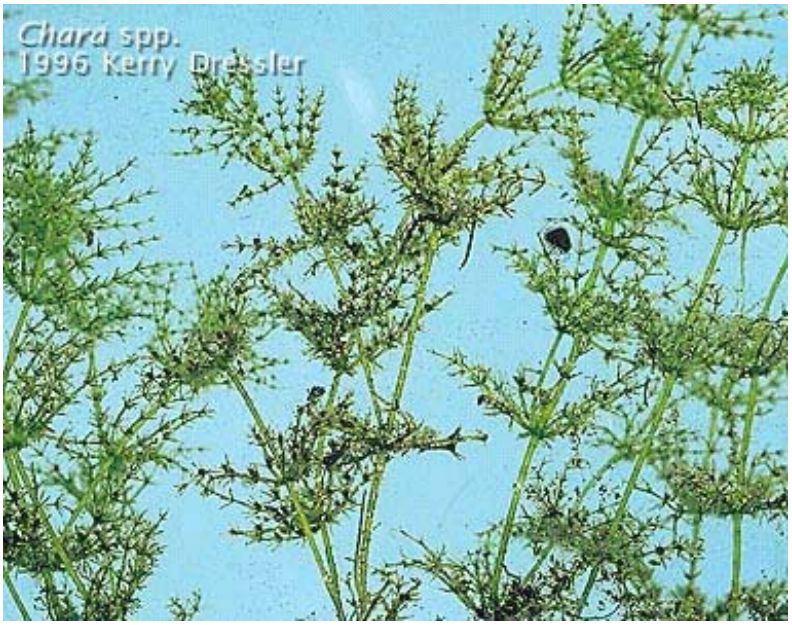
Ceratophyllum demersum

Coontail

Courtesy of St. Johns River Water Management District

Chara sp.

Muskweed



Courtesy of Kerry Dressler

Eleocharis sp.

Spikerush

Courtesy of St. Johns River Water Management District

Hydrilla verticillata

Hydrilla

Courtesy of Kerry Dressler

Micranthemum sp.

Baby tears

Courtesy of St. Johns River Water Management District

Najas guadalupensis

Southern Naiad

Courtesy of St. Johns River Water Management District

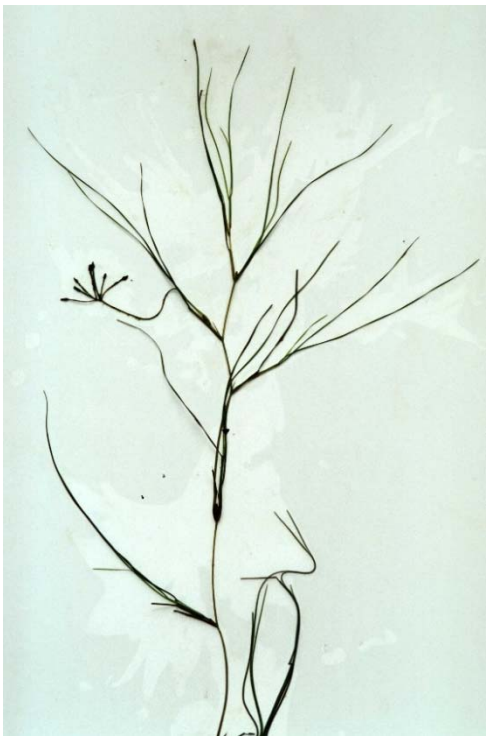
Potamogeton pusillus

Slender Pondweed

Courtesy of St. Johns River Water Management District

Ruppia maritima

Widgeon grass



Courtesy of St. Johns River Water Management District

Sagittaria subulata

Dwarf arrowhead

Courtesy of St. Johns River Water Management District

Vallisneria americana

Eel Grass
Tape grass

Courtesy of St. Johns River Water Management District

Zannichellia palustris

Horned
pondweed

Courtesy of St. Johns River Water Management District