Lake Vegetation Index

2021 Team Proficiency Report

Division of Environmental Assessment and Restoration

Aquatic Ecology and Quality Assurance Section

2021

Executive Summary

Thirty-four teams participated in the 2021 Lake Vegetation Index (LVI) Team Proficiency exercise conducted at Lake Stanley (7 teams), Little Lake Santa Fe (7 teams), and Lake Rosalie (20 teams). Thirty-two teams were within the acceptable score ranges (±12 points of the expert median) within the initial sampling period. Variability in the results was associated primarily with two factors: plant identification errors in specific groups (grasses, several submersed and emergent genera), and length of taxa lists/level of effort. The total number of taxa identified was highly variable at Little Lake Santa Fe and Lake Rosalie, but did not always affect differences in scores. The total number of taxa identified at Lake Stanley was less variable than the other lakes, and less variable than previous years' exercises in the region. Consistency in overall scores was variable among the three lakes. Lakes Stanley and Rosalie had less consistency among LVI scores compared to previous exercises, but Little Lake Santa Fe had improved consistency compared to that region's previous years, and identification of submersed taxa were similar to the 2019 proficiency exercise and improved compared to older proficiency exercises. Dominance selection was very consistent and improved over all previous years.

Introduction

The Lake Vegetation Index (LVI) is a rapid assessment of lake health based upon the lake's aquatic and littoral zone plant community. To submit LVI data to the Florida Department of Environmental Protection (DEP), sampling teams must demonstrate proficiency in the LVI method by generating an LVI score that is within the acceptance criteria (± 12 points of median expert score), per DEP Standard Operating Procedure (SOP) LVI 1200. Expert teams used for setting the central tendency for 2021 were those teams that passed the 2019 LVI proficiency demonstration. Three lakes were sampled for LVI proficiency demonstration in 2021: Lake Stanley in Walton County, Little Lake Santa Fe in Alachua County, and Lake Rosalie in Polk County (Figure 1). The sampling time window for all lakes was June 1-June 30, 2021.

To "pass" the proficiency demonstration, the LVI score generated from the data collected by each team (expert or non-expert) was required to be within 12 points (+/-) of the median expert LVI score. Each participating team conducted the LVI at one lake, following the sampling SOP LVI 1100 (effective January 2017, https://floridadep.gov/dear/quality-assurance/content/dep-sops). SOP LVI 1100 also requires that at least one person on an LVI sampling team be proficient in plant identification, by annually taking and passing the DEP test of the most common lake plants for the LVI. Sampling maps were provided by DEP, but the teams followed a random procedure to choose their starting section and subsequent sections, as directed by the SOP. Teams recorded the observed vegetation in each of the four lake sections. Plants that could not be identified with confidence in the field were collected and later identified in the lab, and when necessary verified by an expert botanist. Teams then calculated their LVI scores per SOP LVI 2200, either by using the Statewide Biological Database (SBIO2) (DEP teams) or the LVI calculator provided by DEP (version based on LVI 2200, https://floridadep.gov/dear/bioassessment/content/bioassessment-training-evaluation-and-quality-assurance).

This report describes the results of the 2021 LVI Proficiency Demonstration, with a comparison of team determinations of the LVI score and component metrics for each lake. Expert and non-expert teams should compare their scores to the expert scores to determine which elements may not be consistent with others' assessments. Teams should use this exercise as a method to correct any observed methodological deficiencies or deviations from the LVI SOP. Additionally, issues that arise during these exercises may prompt DEP to revise the LVI SOP to enhance clarity and consistency. Demonstration of proficiency by being within the expert range for this exercise provides DEP with assurance that various sampling entities are producing comparable data.

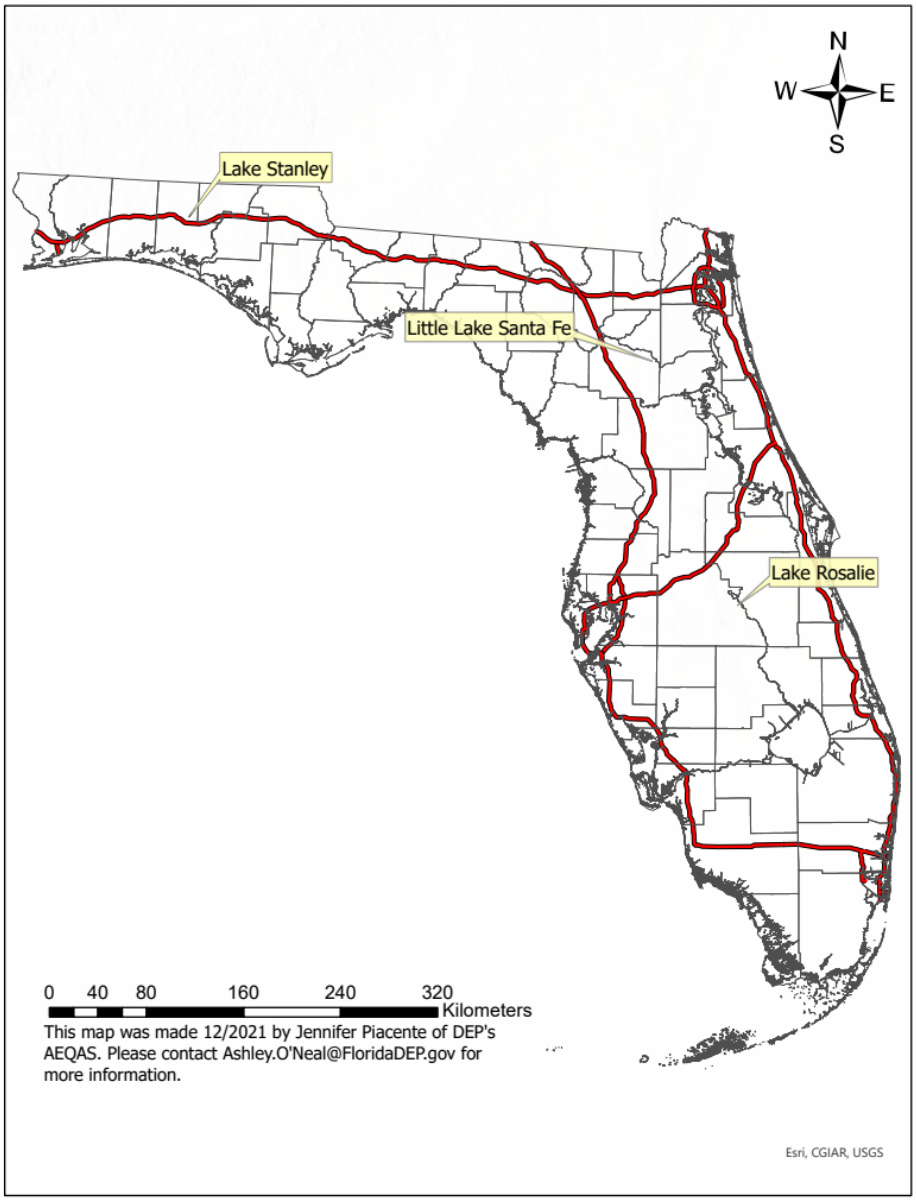

Figure 1. Location of lakes sampled for the LVI Proficiency Demonstration 2021.

Data Analysis

LVI scores were calculated per DEP SOP LVI 2200 and submitted to the DEP Aquatic Ecology and Quality Assurance Section (AEQAS). DEP sampling teams entered the data into SBIO2, and AEQAS staff retrieved those data. Most non-DEP teams used the Excel LVI calculator available on the FDEP website and sent completed files to AEQAS. The LVI score is calculated for each lake section for each team. The overall LVI score is the average of the four individual lake section scores. The LVI scores for each section are derived from four metrics: Percent Native Taxa (% Native), Percent Category I Invasive Exotic Taxa from the Florida Invasive Species Council (FISC), previously known as the Florida Exotic Pest Plant Council (FLEPPC) list (% FLEPPC I), Percent Sensitive Taxa (% Sensitive), and the Coefficient of Conservatism (CC) of Dominant/Co-dominant Taxa (CC_Dom_Codom). The median score of the expert teams was calculated for each lake. Per SOP LVI 1200, LVI scores that were within ±12 points of the expert median were considered acceptable. Mean metric data for each team are provided to help teams determine why their scores might have been different from the median; however, in the actual calculation of the LVI, metric scores are not averaged among sections.

Quality control measures for proficiency exercise samples submitted via the LVI calculator include checks for the selection of the correct region and use of "1" for present, "C" for co-dominant and "D" for dominant. Quality control protocols are in place for SBIO2-entered samples, so additional checks are not performed. For all samples, taxa that appear to be data entry errors or inappropriately entered (e.g. upland species) and scores that don't appear to reflect the taxa lists or dominance choices, are flagged. If a major QC issue is evident, samples are returned to submitters for review and correction if needed.

Overall Results

Scores

Thirty-two teams conducted LVI assessments for the 2021 LVI Proficiency exercise during the June 1-30, 2021 testing window, and two teams completed a portion of their exercise during the testing window, but had to complete the exercise after the testing window, due to poor weather. Thirty-two teams successfully scored within ±12 points of the expert median. All teams that sampled Lake Stanley and Little Lake Santa Fe were within the passing range, while two teams that sampled Lake Rosalie were out of range. The two teams who were out of range at Lake Rosalie both completed a re-test at Little Lake Santa Fe after the testing window and scored within the passing range. All thirty-four teams are thus eligible to submit LVI data to DEP. Table 1 contains summary statistics for all LVI scores. Errors/inconsistencies with the SOP made by teams during the sampling or analysis phases are described below.

Table 1. Summary statistics of all LVI assessments conducted for the 2021 LVI Proficiency exercise.

Lake	Expert N	Expert Median	Passing Range	Total N	Median (all)	Mean (all)	Standard deviation (all)	Range (all)
Lake Stanley	7	82	70-94	7	82	81	5.7	73-87

Little Lake Santa Fe	7	65	53-77	7	64	65	4.7	58-73
Lake Rosalie	16	49	37-61	20	49	48	9.1	30-61

Selection of Dominant/Co-dominant Taxa

The CC score of the dominant taxon or the average CC score of two co-dominant taxa is one of the four LVI metrics. Previous LVI variability exercises have shown that the selection of the dominant or co-dominant taxa is one of the most important decisions made by a team conducting the LVI. The LVI SOP directs samplers to default to two co-dominants rather than a single dominant species if there is not one species that is clearly dominant. The choice of *no* dominant taxon or co-dominant taxa should be made *only* when 3 or more taxa are equally abundant or when plants are so sparse that no taxon is abundant.

Among the 34 initial LVI Proficiency samples, there were a total of 136 sections assessed. Teams assigned a single dominant for 63 lake sections, two co-dominants for 72 lake sections, and did not assign any dominant for only one lake section. In most lake sections, there was strong consistency among teams in dominance selection, and when a single dominant was selected, it appeared to be appropriate. At Lake Stanley, for example, *Mayaca* was identified as the single dominant by four teams (9 of 28 sampling sections) (Table 4), and photographic evidence indicates it was abundant in many areas of the lake. In other cases, it appears that there was not a single obvious dominant species and the assignment of two co-dominants was the more appropriate choice. At Little Lake Santa Fe, for example, *Panicum hemitomon* plus either *Taxodium* or *Nuphar*, were chosen as co-dominants in 18 of 28 sections. There was noticeable improvement in consistency in dominance/co-dominance selection in 2021, compared to previous years' exercises.

Taxonomic Verifications

Most LVI samplers agree that taxonomic identification is the most difficult part of the LVI method, and that is why taxonomic verification by outside experts is an important part of the method. Overall, taxa lists were comparable, but additional plant training is needed in some taxonomic areas. Groups for which there were noticeable differences among teams were the genera *Myriophyllum, Eleocharis* (robust emergent and submersed viviparous taxa), *Utricularia*, *Persicaria*, as well as multiple grass species. Although some variability in these taxa is likely due to their patchiness throughout the lake and the differing chances of retrieving taxa with the frotus, the data suggest there were several incorrect identifications. Teams should review the discussions in the lake-specific sections below regarding which plants varied in ID at each lake and review the full taxa lists in Appendix A. It is important that all teams have an outside expert available for consultation for difficult identifications. The SOP requires either sample collection or photo documentation of the dominant or co-dominant taxa, so verification is possible.

Determination of Lake Boundary and Taxa Inclusion Decisions

Determining the assessment area for the LVI and deciding which taxa are appropriate to include is an important part of the LVI method. There was notably high variability in the number of taxa identified by teams, especially at Lake Rosalie. The range in number of total taxa for Lake Stanley, Little Lake Santa

Fe, and Lake Rosalie was 12, 29, and 64, respectively. This variability generally can be due to differences in determining the lake boundary, decisions about inclusion or exclusion of specific plants, and variable levels of effort. During the 2021 testing, there were few cases of upland plants included in assessments, so the likely reasons for the high range of taxa are related to shoreline accessibility and level of effort. In lakes that are shallow or have gradual shoreline slopes (*e.g*., Rosalie), the shoreline may be accessible for small boats but not larger ones. A team with a smaller boat may identify more taxa in the emergent zone (which can be species rich). Alternatively, if the shoreline is not accessible by boat, some teams may make more effort than others to get out of the boat and find additional taxa. Per LVI SOP 1100 section 3.2.4, additional effort to access the shore should generally be limited to the transect within each lake section:

> 3.2.4. Identify a location within the sampling unit to set up a transect 5 m in width. Choose a location where you will be able to navigate the boat approximately perpendicular to the shoreline. Where possible, choose a location that is species rich and/or contains species which were not identified in section 3.2.3 above. At the shoreline, estimate 5 m for transect width. Orient the transect perpendicular to the shoreline, using the boat as the transect centerline. Record the presence of all aquatic and wetland plant species within the 5 m transect landward to the estimated seasonal high water mark of the lake (as practical, see Section 3.5 of LVI Primer). If practical, get out of the boat and wade to identify plants that are small, hidden or in areas too shallow to reach by boat. Record the presence of new species in the transect (species not already recorded in the "drive-by" portion described in 3.2.3 above)

The high variability *among* lakes is also notable and may be due to lake size (testing lakes increased considerably in size from north to south), accessibility of shoreline areas, overall increase in number of taxa moving from north to south, and variation in the number of teams that assessed each lake.

The determination of the assessment area is covered in section 3.5 of the LVI Primer. Here are key guidelines for determining the assessment area:

- The assessment area should be to the seasonal high water level, defined as "the elevation to which the groundwater and surface water can be expected to rise in a normal wet season"
- The following hydrologic indicators, used with reasonable scientific judgment, can be used to estimate the seasonal high water level: algal mats, aquatic mosses and liverworts, aquatic plants, rafted debris lines, elevated lichen lines, morphological plant adaptations, and water marks. These indicators are useful in determining if plants are indeed "in the lake."
- Do not include plants in woods or lawns above the seasonal high water level.
- Plants at the shoreline in saturated soil should be included.
- In the case of sites with extensive fringe wetlands (swamps or marshes), do not include plants in those areas (even though they are within seasonal high water), if they are inaccessible from the boat.

Only *aquatic and wetland* plant taxa should be included in the LVI assessment. Here are key guidelines:

- Aquatic plants include all floating and submersed taxa (any plant which typically floats on water or requires water for structural support).
- For most emergents, and all woody taxa, you must determine the wetland status, and include only taxa which have a wetland status of obligate (OBL), facultative wetland (FACW), or facultative (FAC).
- Do NOT include upland taxa. *Pinus elliottii* (slash pine) is the exception.
- Vines should be included ONLY if they are rooted in saturated soils, creeping out onto the water, growing intermixed with emergent vegetation, or covering a large portion of shoreline shrubs or trees that are part of the assessment. In addition to using the appropriate lake boundary and including only aquatic and wetland taxa, it is important to maintain consistency among teams in the level of effort. In the "drive-by" portion of the method, "you should not leave the boat or spend effort on difficult to access areas" (LVI SOP 3.2.3). Only during the transect portion of sampling each section should you spend additional effort: "if practical, get out of the boat and wade to identify plants that are small, hidden or in areas too shallow to reach by boat." (LVI SOP 3.2.4).

Figure 2. Shoreline of Lake Stanley on 6/29/2019, with emergent, floating, and submersed taxa visible (photo: DEP AEQAS).

Figure 3. Boat launch area at Lake Stanley (photo: DEP WQSP/WQMP)

Results by Lake

Lake Stanley Results

Lake Stanley is a clear lake in the city of DeFuniak Springs, Florida. The primary land use surrounding the lake is low density residential development. There are also mixed wetland forests, a city park, and churches adjacent to Lake Stanley. The lake is characterized by a shoreline of woody, emergent, and floating taxa, as well as abundant submersed vegetation in much of the lake. The teams who sampled Lake Stanley identified between 83% and 100% native taxa in the 4 sections each team sampled. The submersed plant community was characterized by *Mayaca fluviatilis, Utricularia floridana*, and *Bacopa caroliniana*. Common floating taxa included *Nymphaea odorata, Nymphoides aquatica,* and *Brasenia schreberi*. Common emergent taxa included *Pontederia cordata*, *Panicum hemitomon*, and *Eleocharis interstincta*. Common shoreline woody taxa were *Cyrilla racemiflora* and *Hypercium fasciculatum*. Other woody taxa included *Cliftonia monophylla*, *Acer rubrum*, *Lyonia lucida*, *Magnolia virginiana*, and *Leucothoe racemosa*. There were two FLEPPC 1 taxa observed at Lake Stanley, *Panicum repens* and *Triadica sebifera* (syn. *Sapium sebiferum*) but neither were abundant. Water levels at Lake Stanley were higher than normal during the proficiency testing window.

Seven teams, all expert from 2019, sampled Lake Stanley in 2021 (Table 2) using the sampling map provided by DEP (Figure 4). Team LVI and metric scores and dominant taxa selections are shown in Tables 3 and 4. The median LVI score for Stanley teams was 83, and the acceptable range was 71-95. All teams were within the acceptable range. The total number of taxa observed at Lake Stanley ranged

from 25 to 37 taxa, while the overall average number (± 1 standard deviation) of taxa per section was 16.4 (± 4.7). The average metric values (± 1 standard deviation) per lake section across all teams were as follows: 88.7 (± 3.5) % Native, 3.0 (± 2.6) % FLEPPC Category 1, 13.0 (± 3.9) % Sensitive, and dominant/co-dominant C of C of 6.9 (± 0.1) (Table 3). See Appendix A for team taxa lists.

Table 2. Teams, team abbreviations, team members, expert status, and sampling date for Lake Stanley 2021 LVI Proficiency demonstration.

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP-Tallahassee ROC	DEP TLH ROC	Expert	6/2/2021	Jon Woods, Jade Burtchett, Paul Blair
DEP-Northwest ROC	DEP NW ROC	Expert	6/23/2021	Frank Butera, Mike King, Christopher Slade, Nathan Mulkey, Heather Schmuki, Myranda Butler
DEP–Water Quality Standards/ Water Quality Monitoring Programs	DEP WQSP/WQMP	Expert	6/9/2021	Joy Jackson, Nia Wellendorf, Avril Wood-McGrath
Frydenborg Ecologic	FRY ECO	Expert	6/10/2021	Russ Frydenborg, Beck Frydenborg
City of Tallahassee	City of TAL	Expert	6/30/2021	Ken Espy, Keith Lawhon
DEP-Watershed Assessment Section	DEP WAS	Expert	6/1/2021	Curtis Musson, Blake Spencer, Evelyn Becerra
DEP-Aquatic Ecology and Quality Assurance Section	DEP AEQAS 1	Expert	6/29/2021	Sarah Noble, Kara Sprague, Chandler Hammond, Ashley O'Neal

Table 3. Summary results for each team at Lake Stanley, including final LVI score and total number of taxa observed, and the average of metric scores and number of taxa per sampling section. The acceptable LVI score range was 70-94.

Team	Sections	LVI	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC 1	Mean % Sens.	Mean CC_ Dom_Codom
DEP NW ROC	1, 4, 7, 10	81	37	22.8	89.1	6.6	22.7	8.5
DEP TLH ROC	1, 4, 7, 10	87	25	15.8	96.4	3.6	24.5	7
DEP AEQAS 1	2, 5, 8, 11	83	36	20	97.4	2.6	19.2	6.6
FRY ECO	2, 5, 8, 11	86	34	19	95.9	2.9	20.4	7.5

City of TAL	2, 5, 8, 11	73	37	20.8	92	6.8	21	5.1
DEP WAS	2, 5, 8, 11	73	28	19.5	89.9	6.3	21.9	4.8
DEP WQSP/WQMP	3, 6, 9, 12	82	38	22.5	96.8	3.3	23.8	5.4

Table 4. Selected dominant or codominant taxa per lake section for each team at Lake Stanley.

Team	Sections	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10,11,12 Dominants
DEP NWROC	1, 4, 7, 10	*Mayaca fluviatilis*	*Mayaca fluviatilis*	*Mayaca fluviatilis*	*Mayaca fluviatilis*
DEP TLH ROC	1, 4, 7, 10	*Bacopa caroliniana*	*Cyrilla racemiflora/Mayaca fluviatilis*	*Mayaca fluviatilis*	*Mayaca fluviatilis*
DEP AEQAS 1	2, 5, 8, 11	*Mayaca fluviatilis/ Bacopa caroliniana*	*Mayaca fluviatilis*	*Bacopa caroliniana/Panicum hemitomon*	*Mayaca fluviatilis/ Bacopa caroliniana*
FRY ECO	2, 5, 8, 11	*Mayaca fluviatilis*	*Mayaca fluviatilis*	*Mayaca fluviatilis/Nymphaea odorata*	*Mayaca fluviatilis/Bacopa caroliniana*
City of TAL	2, 5, 8, 11	*Myriophyllum native/Bacopa caroliniana*	*Myriophyllum native*	*Myriophyllum native/Nymphoides aquatica*	*Cliftonia monophylla*
DEP WAS	2, 5, 8, 11	*Mayaca fluviatilis/Bacopa caroliniana*	*Bacopa caroliniana*	*Bacopa caroliniana/Submersed viviparous Eleocharis*	*Bacopa caroliniana*
DEP WQSP/WQMP	3, 6, 9, 12	*Bacopa caroliniana/Utricularia floridana*	*Bacopa caroliniana/Nymphaea odorata*	*Cyrilla racemiflora/Mayaca fluviatilis*	*Bacopa caroliniana/Nymphaea odorata*

Lake Stanley Dominance Selection

Dominance selection was generally very consistent at Lake Stanley. Six of seven teams selected *Mayaca fluviatilis* as a dominant or codominant taxon in at least one section, and four teams selected *M. fluviatilis* as a dominant or codominant in three or four sections. One team selected one dominant (*M. fluviatilis*) for all four lake sections, and one team selected two co-dominants for all four sections. The

remaining five teams selected a mix of co-dominants and dominants for all four sections. In addition to *Mayaca*, other dominants chosen were *Bacopa caroliniana*, native *Myriophyllum* (likely misidentified), and *Cliftonia monophylla*. Co-dominants, in addition to *Mayaca*, included *Bacopa caroliniana*, *Nymphaea odorata*, *Panicum hemitomon*, *Cyrilla racemiflora*, *Utricularia floridana*, *Nymphoides aquatica*, submersed viviparous *Eleocharis*, and native *Myriophyllum*. Of the 28 total sections assessed, *Mayaca* (CC=8.45) was dominant or codominant for 16, *Bacopa caroliniana* (CC=4.5) was dominant or co-dominant for thirteen, and *Nymphaea odorata* (CC=5) was co-dominant for three. The other six dominant or co-dominant taxa were selected fewer than 3 times. All strata were represented in Lake Stanley. The woody stratum was clearly dominated by *Cyrilla racemiflora* (CC=5); other observed woody taxa were *Hypericum fasciculatum* (7 teams, CC=8), *Nyssa biflora* (7 teams, CC=7), S*apium sebiferum* (6 teams, CC=0), *Cliftonia monophylla* (6 teams, CC=5.63), *Lyonia lucida* (5 teams, CC=6), *Magnolia virginiana* (4 teams, CC=7), and *Acer rubrum* (4 teams, CC=4.65). In addition to the frequently dominant *Mayaca fluviatilis and Bacopa caroliniana*, taxa commonly observed in the submersed community were *Utricularia floridana* (6 teams, CC=6.34), submersed viviparous *Eleocharis*/*Eleocharis baldwinii* (5 teams, CC=3/2.82), and *Utricularia gibba* (2 teams, CC=6.37). Commonly identified floating taxa included *Brasenia schreberi* (7 teams, CC=8.79), *Nymphaea odorata* (7 teams, CC=5), and *Nymphoides aquatica* (7 teams, CC= 6.09). Commonly observed taxa in the emergent stratum included *Panicum hemitomon* (7 teams, CC=5.82) and *Pontederia cordata* (7 teams, CC=5.38).

The length of taxa lists at Lake Stanley was variable, but was the least variable of all three testing lakes. There were many taxa identified by all, or nearly all, teams. There was some patchiness in the distribution of plants, due to variously developed and undeveloped areas of lake shoreline. The lake sections being variable in terms of species richness, and different levels of effort or expertise in species-rich areas, may contribute to the variability in taxa lists.

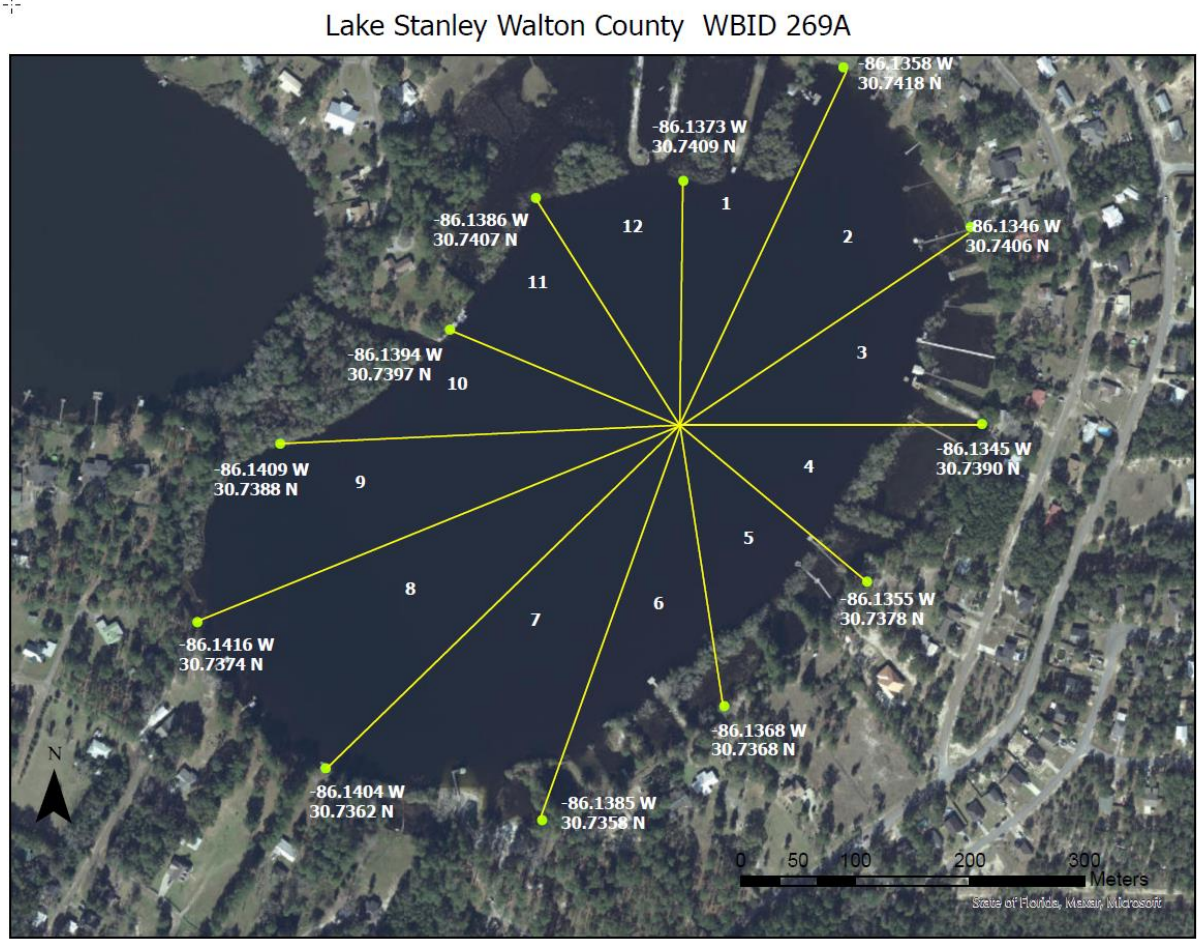

Figure 4. Lake Vegetation Index sampling map of Lake Stanley.

Lake Stanley Plant ID Discussion

All teams were within the acceptable scoring range, and the range was 15 points. In general, there was good accuracy and consistency in plant identification, but there were a few differences that are important to note. Twelve taxa were identified by all seven teams: *Bacopa caroliniana, Brasenia schreberi, Cyrilla racemiflora, Hydrocotyle sp., Hypericum fasciculatum, Mayaca fluviatilis, Nymphaea odorata, Nymphoides aquatica, Nyssa biflora, Panicum hemitomon, Panicum repens, and Pontederia cordata*. An additional five taxa were identified by six teams: *Cliftonia monophylla, Lachnanthes caroliana, Myrica cerifera, Sapium sebiferum, and Utricularia floridana.* Other frequently identified taxa were *Acer rubrum, Bidens mitis, Cephalanthus occidentalis,* submersed viviparous *Eleocharis, Juncus marginatus,* and *Xyris*. Although taxa lists varied among teams in the number of taxa and the composition, there were many commonly identified species, particularly those that were encountered in multiple sampling units.

Submersed macrophytes can be challenging to identify because it is difficult to observe them in their underwater habitat, plant material gets tangled and fragmented on the frotus, and there are several similar-looking species. All seven teams identified *Mayaca fluviatilis*, and 6 of 7 teams selected *Mayaca*

as a dominant or co-dominant in at least one section. Only one team, however, identified native *Myriophyllum*, and selected it as codominant or dominant in multiple sections, leading to the presumption that in this case *Mayaca* may have been misidentified as native *Myriophyllum*. *Mayaca* is often emergent or mat-forming (Figure 5). In many instances (including at Lake Stanley), it has a submersed form with long stems and finely textured leaves that can, in overall habit, resemble native *Myriophyllum* (Figures 6 and 7). There are differences, however, that allow them to be readily separated: *Mayaca* leaves are whorled and simple and stems are green, while native *Myriophyllum* leaves are whorled and pinnately divided and stems are typically red (or reddish) and scaly (Figure 8).

Bacopa caroliniana was a frequent codominant and dominant taxon. This species typically grows as a mat-forming emergent in saturated or shallowly inundated lake margins or wetlands. It can also be primarily submersed when growing in clear, shallow lakes, as was the case at Lake Stanley (Figure 9). It has succulent or sub-succulent clasping leaves, which have a lemony scent when crushed. The emergent portions are typically hairy and velvety, while submersed portions are hairless, or nearly so. The flowers are on emergent stalks and are bright blue to light purple (Figure 9).

Identification of *Utricularia*, a group which can be challenging to identify and speciate, was fairly consistent at Lake Stanley. *Utricularia floridana* (Figure 10) was identified in all four lake sections by six of seven teams. *U. floridana* is robust and has cylindrical, foxtail-like branches. Leafy and bladder branches are separate. The plant floats, but stems are rooted. It has a yellow, 2-lipped flower on an emergent stalk. Two teams also identified *Utricularia gibba*, a species with fine, thread-like strands that are often found tangled with larger plants on the frotus. *U. gibba* was identified in only one section by each of the two teams who observed it.

Two common woody taxa identified along the shoreline at Lake Stanley that are related, and similar in appearance, are *Cyrilla racemiflora* (seven teams) and *Cliftonia monophylla* (six teams). Both species are commonly known as “titi” and occupy similar habitats, although *Cliftonia* tends to be more restricted to saturated conditions, while *Cyrilla* can occur in wetland or drier conditions. In the absence of fire, these two species encroach and can shade out groundcover species in a variety of wetlands in northwest (both species) and central (*Cyrilla* only) Florida. *Cyrilla* and *Cliftonia* are readily distinguished. *Cliftonia* flowers in early spring, so it would be unlikely to see it flowering during LVI season. Its flowers are in erect, short racemes, while *Cyrilla*’s are in longer, pendulous racemes (Figure 11). *Cliftonia* has evergreen leaves, with veins that are not visible, while *Cyrilla’s* leaves are late deciduous, and veins are obvious on both leaf surfaces. *Cyrilla*’s stem tips are flattened, while *Cliftonia*’s are not.

Figure 5. Emergent, mat-forming habit of Mayaca fluviatilis (photo: DEP AEQAS).

Figure 6. Submersed views of (LEFT) Mayaca fluviatilis at Lake Stanley, June 2021 (photo: DEP WQMP), and (RIGHT) native Myriophyllum at Camel Lake in Leon County (photo: DEP AEQAS).

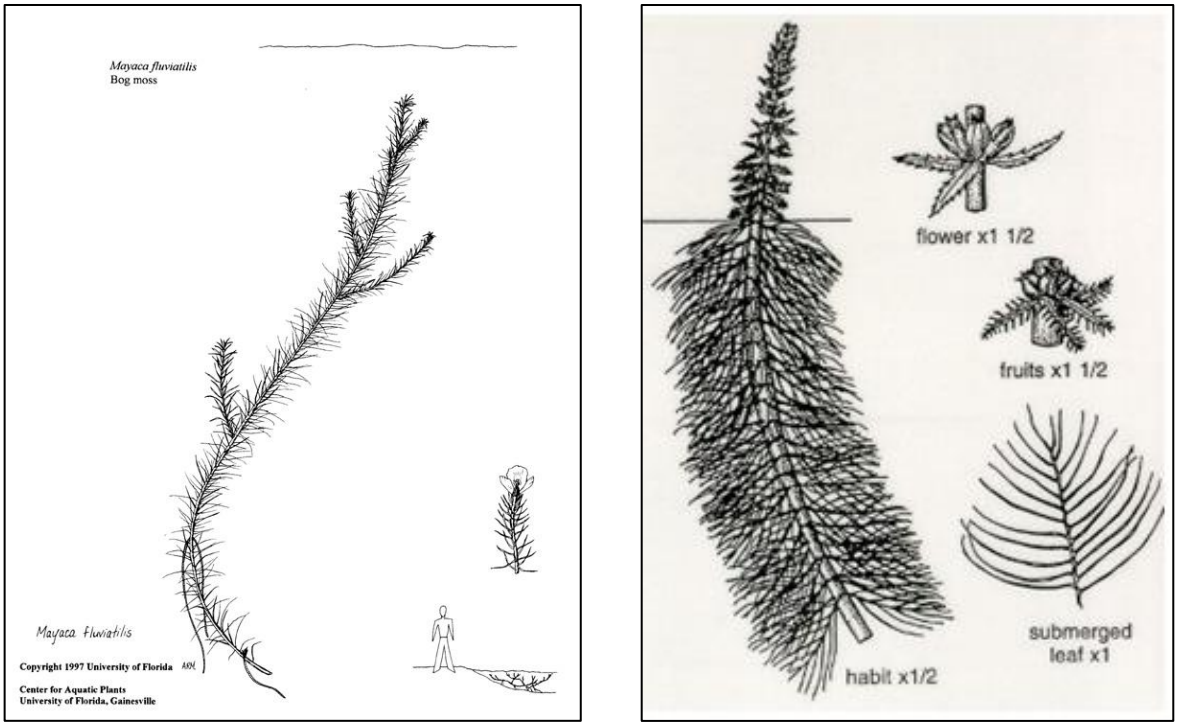

Figure 7. (LEFT) Mayaca fluviatilis line drawing, and (RIGHT) Myriophyllum heterophyllum line drawing (both images: University of Florida IFAS Center for Invasive and Aquatic Plants).

Figure 8. (LEFT) Habit of Mayaca fluviatilis (photo: DEP AEQAS) and (RIGHT) Myriophyllum heterophyllum (photo: gobotany.nativeplanttrust.org).

Figure 9. (LEFT) Submersed Bacopa caroliniana and (RIGHT) emergent flowering B. caroliniana at Lake Stanley (photos: DEP WQMP/WQSP).

Figure 10. (LEFT) Utricularia floridana on frotus (lighter green) with Bacopa caroliniana at Lake Stanley (photo: DEP WQMP/WQSP) and (RIGHT) Utricularia floridana with emergent flowering stalks (photo: Randy Zerr, Institute for Systematic Botany).

Figure 11. Cyrilla racemiflora (left) and Cliftonia monophylla (right) **(photos: Gil Nelson, on Institute for Systematic Botany website).**

Little Lake Santa Fe Results

Little Lake Santa Fe is an approximately 1100 acre lake in Alachua County, and is a high color, low alkalinity, and low to moderate nutrient lake in the Upper Santa Fe Flatwoods lake region (Figure 12). The lake is surrounded by Santa Fe Swamp, residential development (on the lake), and is connected to the approximately 3800 acre Santa Fe Lake. There is a public boat ramp on the east side of the lake, off of Alachua County Road 21B. The plant community at Little Lake Santa Fe is characterized by a shoreline fringe of *Taxodium* and *Panicum hemitomon*, with other emergent herbaceous taxa, a few other woody taxa, and a few floating taxa mixed in. Submersed viviparous *Eleocharis* was also common in some areas of the lake. Common shoreline emergents included *Cladium jamicense, Pontederia cordata, Alternanthera philoxeroides*, and *Bidens laevis*. In addition to the *Taxodium*, frequent woody taxa were *Acer rubrum, Cephalanthus occidentalis, Liquidambar styraciflua*, and *Myrica cerifera*. The floating community was characterized by *Nuphar, Nelumbo lutea, Nymphoides aquatica*, and *Salivinia minima*.

Seven teams (all expert) sampled Little Lake Santa Fe within the proficiency sampling period, although one team had to make a second visit outside of the proficiency window to collect the fourth rep, due to storms during the initial visit (Table 5). Two additional teams sampled the lake after the proficiency sampling period, as re-testing exercises. Their scores were not included in establishing the central tendency. Team LVI and metric scores and dominant/co-selections from Little Lake Santa Fe are shown in Tables 6 and 7. The median LVI score for Little Lake Santa Fe expert teams was 65, and the acceptable range was 53-77. All teams were within the acceptable range. The total number of taxa observed at Little Lake Santa Fe ranged from 38 to 67 taxa, while the overall average number of taxa (± 1 standard

deviation) per section was 29.4 (± 6.5). The average metric values (± 1 standard deviation) per lake section across all teams were as follows: 86.0 (± 4.5) % Native, 10.4 (± 3.4) % FLEPPC Category 1, 15.4 (± 5.6) % Sensitive, and dominant/co-dominant C of C of 6.1 (± 0.6) (Table 6). See Appendix A for team taxa lists.

There was variability among teams at Little Lake Santa Fe in the total number of plants identified at the lake, ranging from 38-67 taxa. It does not appear that an entire stratum of taxa (*e.g.* floating, or woody shoreline plants) was overlooked by some teams with shorter taxa lists, or that upland taxa were erroneously included by teams with longer taxa lists. The large size of the lake, patchiness in the distribution of plants, lake sections with more species, or different levels of effort or expertise in species-rich areas were likely responsible for the difference.

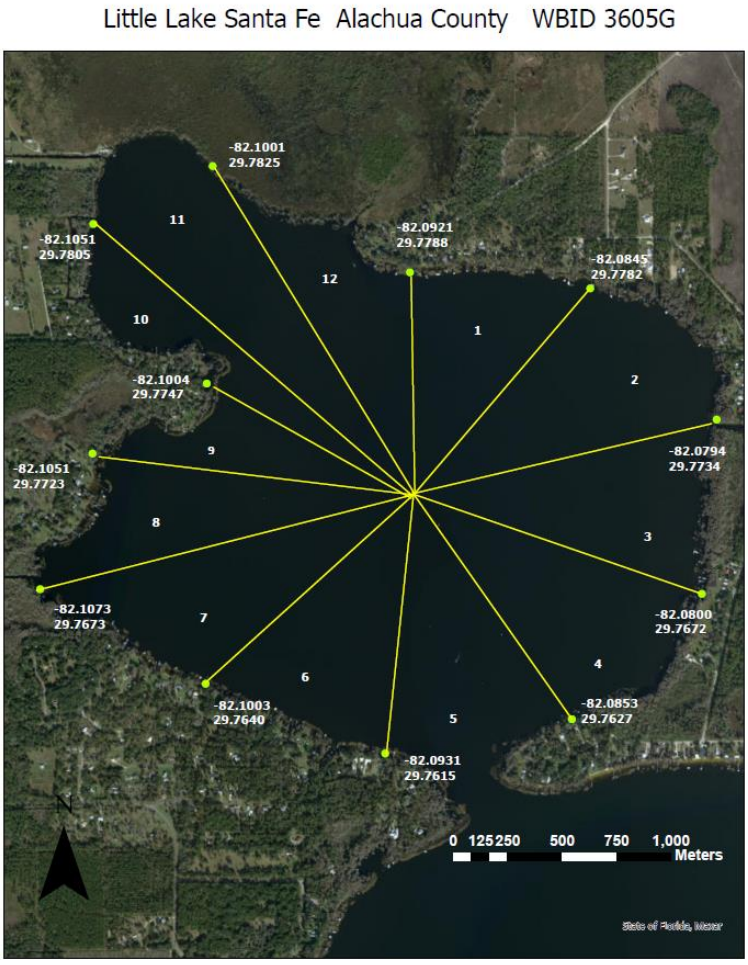

Figure 12. Lake Vegetation Index sampling map of Little Lake Santa Fe.

Table 5. Teams, team abbreviations, team members, expert status, and sampling date for Little Lake Santa Fe 2021 LVI Proficiency Demonstration

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP – Northeast 1	DEP NE ROC 1	Expert	6/10/2021	Jeremy Parrish, Kimberly Appleby, Jessica Lee
DEP – Northeast 2	DEP NE ROC 2	Expert	6/10/2021	Brian Davis, Kelly McDonald
DEP – Aquatic Ecology and Quality Assurance 2	DEP AEQAS 2	Expert	6/23/2021 (1 section completed in revisit 8/25/21)	Jessica Patronis, Ashley O'Neal, Jennifer Piacente
Cardno	Cardno	Expert	6/16/2021	Sheri Huelster, Jay Stodghill, Brandon Wanner, Brad Hampson, Hunter Hajaistron
St. Johns River Water Management District	SJRWMD	Expert	6/11/2021	Dianne Hall, Kimberli Ponzio, Jodi Slater
Wood, Inc. 1	Wood 1	Expert	6/22/2021	Shannon McMorrow, Andrea Ditto, Joe Mansuetti, Craig Duxbury
Noel Cawley	Cawley	Expert	6/1/2021	Noel Cawley
Flatwoods Consulting 2*	Flatwoods 2	Retest	9/21/2021	Michael Grzywacz, Eesa Ali, Mike Pshar, Cole Palmer, Joe Brooker
Breedlove Dennis Associates*	BDA	Retest	9/30/2021	Jennifer Rosinski, Ginger Soumar, Jake Lyons, Jonathan McCurry, Tarah Parish

**teams sampled outside of testing window as re-test*

Table 6. Summary results for each team at Little Lake Santa Fe, including final LVI score, total taxa observed, the average of each metric score, and the average number of taxa in the 4 sampling sections. The acceptable LVI score range was 53-77.

Team	Sections Sampled	LVI score	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC	Mean % Sensitive	Mean CC dom/cod om
CARDNO	1, 4, 7, 10	58	53	30.8	84	12.3	11.9	5.9
FLATWOODS 2*	1,4,7,10	57	53	30.8	80.8	14.6	15.4	5.8
DEP AEQAS 2	2, 5, 8, 11	63	49	27.8	85.7	11.5	14.2	6.0
DEP NE ROC 1	2, 5, 8, 11	62	42	25.5	83.1	13	16.7	6.0
DEP NE ROC 2	3, 6, 9, 12	66	38	23.3	85	11.3	19.7	6.0
SJRWMD	3, 6, 9, 12	73	67	38.3	91.3	5.7	16.6	6.0
WOOD 1	3, 6, 9, 12	64	57	32.8	87.2	9.2	11.6	6.4
CAWLEY	3, 6, 9, 12	67	49	27.8	85.7	10	17.1	6.3
BDA*	3,6,9,12	60	58	33.8	82.0	12.9	15.6	6.0

teams sampled outside of testing window as re-test exercise

Table 7. Selected dominant or codominant taxa per lake section for each team at Little Lake Santa Fe.

Team	Sections Sampled	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10, 11, 12 Dominants
CARDNO	1, 4, 7, 10	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/* submersed viviparous *Eleocharis*
FLATWOODS 2*	1,4,7,10	*Panicum hemitomon/Taxodium*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*
DEP AEQAS 2	2, 5, 8, 11	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Nuphar*
DEP NE ROC 1	2, 5, 8, 11	*Panicum hemitomon/*	*Panicum hemitomon/*	*Panicum hemitomon/*	*Panicum hemitomon/ Nuphar*

		Taxodium	*Taxodium*	*Taxodium*	
DEP NE ROC 2	3, 6, 9, 12	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*
SJRWMD	3, 6, 9, 12	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*
WOOD 1	3, 6, 9, 12	*Taxodium*	*Panicum hemitomon*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*
CAWLEY	3, 6, 9, 12	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon/ Taxodium*	*Panicum hemitomon*	*Panicum hemitomon/ Taxodium*
BDA*	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*

**teams sampled outside of testing window as re-test exercise*

Little Lake Santa Fe Dominance Selection

There was excellent consistency in dominance selection among teams at Little Lake Santa Fe. There were four taxa selected as dominant or co-dominant: *Panicum hemitomon* (CC=5.82), *Taxodium* (CC=7), *Nuphar* sp. (CC=3.5), and submersed viviparous *Eleocharis* (CC=3). All seven expert teams selected *Panicum hemitomon* as dominant or codominant in three or four sections, and it was selected as dominant or codominant in 27 sections out of a total of 28 sections. All seven expert teams also selected *Taxodium* as a dominant or co-dominant in at least one section, and it was selected as dominant or co-dominant in 17 sections (Figure 13). Two teams selected *Nuphar* as a codominant in one section, and one team selected submersed viviparous *Eleocharis* as a codominant in one section.

Two codominant taxa were chosen for 19 of 28 sections, and one dominant taxon was chosen for 9 sections. Dominance was assigned for all 28 sections. The emergent and woody taxa zones were extensive throughout Little Lake Santa Fe (Figure 14). There were several floating species present, but only *Nuphar* was abundant enough to be chosen as a codominant. A few submersed taxa were present, but only one, submersed viviparous *Eleocharis*, was chosen as a codominant in one section.

Figure 13. The two most commonly selected dominant/co-dominant taxa at Little Lake Santa Fe, Panicum hemitomon and Taxodium (photo: FDEP AEQAS).

Figure 14. Photo of Little Lake Santa Fe, showing mixed emergents and Taxodium along shoreline (photo: FDEP AEQAS).

Little Lake Santa Fe Plant ID Discussion

Plant identification was generally consistent for Little Lake Santa Fe. All seven teams identified the woody taxa *Acer rubrum*, *Cephalanthus occidentalis*, *Liquidambar styraciflua*, *Myrica cerifera*, and *Taxodium*. Additionally, *Magnolia virginiana, Nyssa biflora, and Sapium sebiferum* were identified by five or six teams. In the emergent stratum, all seven teams identified *Alternanthera philoxeroides, Cladium jamaicense, Panicum hemitomon, Panicum repens,* and *Pontederia cordata.* Additionally, five

or six teams identified *Bidens laevis*, *Colocasia esculenta*, *Eupatorum capillifolium*, *Hydrocotyle*, *Sagittaria lancifolia* and *Woodwardia virginica*. There were many emergent species that were identified by only one or two teams, and were infrequent across sections. This is not surprising in a large lake with a high taxa count, and doesn't typically have a significant impact on the variation in LVI scores. The LVI is not intended to be a complete plant inventory, and differences due to patchy distribution and the different sections assessed are expected. The floating plants most commonly identified were *Nuphar, Nelumbo lutea, Nymphoides aquatica* and *Salvinia minima* (all seven teams). Six teams identified the small floating grass *Luziola fluitans*. Submersed taxa were not abundant and were patchy in their distribution. Five teams identified *Ceratophyllum demersum,* submersed viviparous *Eleocharis* and *Utricularia gibba,* three teams identified *Najas guadalupensis*, *Potamogeton diversifolius*, and *Utricularia inflata*, and two teams identified *Eleocharis baldwinii*, *Utricularia purpurea*, and *Utricularia radiata*.

One plant group that was variably identified was *Eleocharis*. Five teams identified "submersed viviparous *Eleocharis*" and two teams identified *Eleocharis baldwinii*. These wispy *Eleocharis* species are challenging to identify, with significant morphological plasticity, depending on where they are growing. Although submersed viviparous *Eleocharis* was chosen as a co-dominant in just one section, it is still important to identify these taxa correctly. Here are some tips:

- Wiry, delicate specimens that have a **submersed habit** and produce new plantlets at the tips of their stems (vivipary) should be identified for the LVI as "submersed viviparous *Eleocharis*." This includes *Eleocharis baldwinii*, *Eleocharis vivipara*, and *Eleocharis acicularis*. These species don't produce flowers or fruits in their submersed habit.
- Wiry, delicate specimens that have an **emergent mat-forming habit** and short stems (<20 cm) are tricky to identify. If spikes are present, the specimen should be collected and identified in the lab. If no spikes are present, it should be left as a genus-level identification.

Another plant group at Little Lake Santa Fe that was variably identified was the genus *Utricularia*. There are 9 species of *Utricularia* that commonly occur in Florida lakes, and because their structure is not clearly separated into roots, stems, and leaves, they can be challenging to identify. Their dissected "branches" do take different forms, however, usually allowing for species level identification. Five teams identified *Utricularia gibba*. Three teams identified *U. inflata* and 2 teams identified *U. radiata*, two species which are similar and may have been confused (Figure 15). A specimen of *U. inflata* was collected from Little Lake Santa Fe but it is unknown if *U. radiata* was confirmed. Two teams identified *U. purpurea*, one team identified *U. foliosa*, and one team identified *U. olivacea*. To separate *U. inflata* from *U. radiata*, both of which produce a whorl of floating branchlets that supports the flowering stalk, you must look at the lateral branches and determine whether they are symmetrical. They are symmetrical in *U. radiata*, but unequal in *U. inflata*. There are also other size and flower characteristics that are different among the two species. For a thorough comparison of the two species, please see: ***AQUATIC PLANT NOTES Utricularia inflata and radiata.*** For help in identifying the nine species of *Utricularia* common in Florida lakes, please see the ***Key to Utricularia in Florida Lakes.***

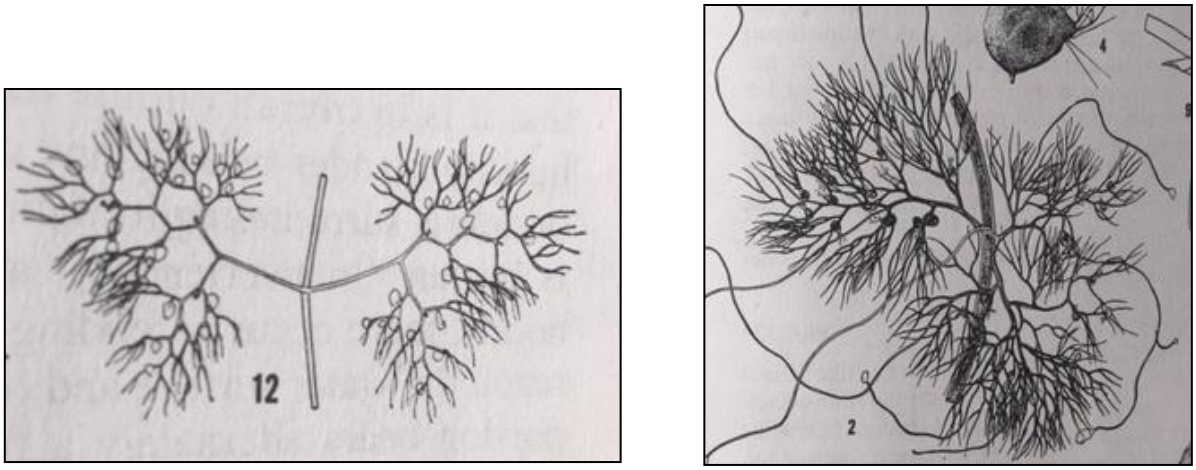

Figure 15. Submersed branching section of Utricularia radiata, showing symmetrical structure (left) and submersed branching section of Utricularia inflata, showing asymmetrical structure (right) (both images: Godfrey and Wooten's Aquatic and Wetland Plants of Southeastern United States).

Lake Rosalie Results

Lake Rosalie is a large lake in Polk County that borders Lake Kissimmee State Park. In addition to the park to the east, land uses around the lake include low density residential development, freshwater marshes, and pasture lands (Figure 16). Woody, emergent, floating, and submersed strata were all represented, although neither submersed taxa nor woody taxa were abundant enough to be selected as dominants or co-dominants. The shoreline emergent community (Figure 17) included the grasses *Panicum hemitomon*, *Panicum repens*, *Paspalidium geminatum*, and *Phragmites australis*. Other frequent emergents were *Sagittaria lancifolia*, *Pontederia cordata*, *Schoenoplectus californicus*, *Typha latifolia*, and *Hibiscus grandiflorus*. The woody zone was characterized by *Cephalanthus occidentalis, Salix caroliniana, Ludwigia peruviana, Acer rubrum*, and *Taxodium*. Floating species included *Nuphar*, *Eichhornia crassipes*, and *Pistia stratiotes*. Submersed taxa were occasional, and included *Vallisneria americana*, submersed viviparous *Eleocharis*, *Hydrilla verticillata*, *Najas guadalupensis* and *Nitella*.

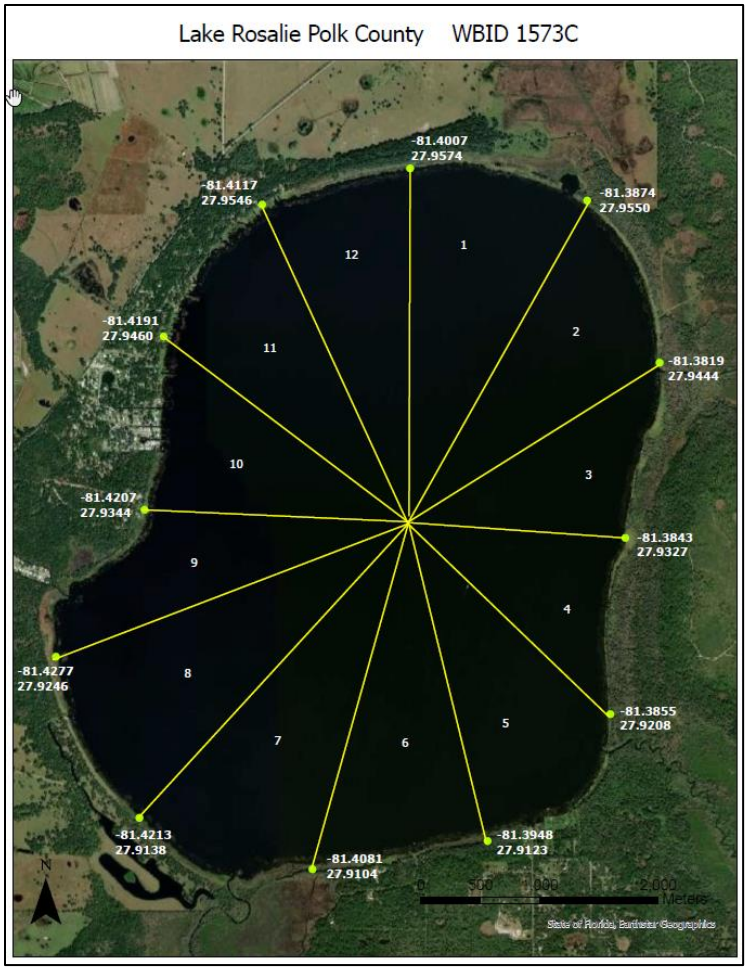

Figure 16. Lake Vegetation Index sampling map of Lake Rosalie.

Figure 17. Shoreline of Lake Rosalie on 6/29/2021, Section 11. **(photo: DEP Central ROC).**

Twenty teams (sixteen expert and four non-expert) sampled Lake Rosalie within the sampling period (Table 8). Team LVI and metric scores and dominant selections from Lake Rosalie are shown in Tables 9 and 10. The median LVI score for Lake Rosalie expert teams was 49 and the acceptable range of LVI was 37-61. Eighteen teams were within the acceptable range (15 expert and 3 non-expert), and 2 teams were below the acceptable range (1 expert, 1 non-expert) by four and seven points. The total number of taxa observed at Lake Rosalie ranged from to 22 to 86 taxa, while the overall average number of taxa per section was 28.5. The average (± 1 standard deviation) metric values per lake section across all teams were as follows: 78.8 (± 4.8) % Native, 14.4 (± 3.7) % FLEPPC Category 1, 4.0 (± 1.5) % Sensitive, and dominant/co-dominant C of C of 5.4 (± 0.5) (Table 9). See Appendix A for team taxa lists.

Table 8. Teams, team abbreviations, team members, expert status, and sampling date for Lake Rosalie 2021 LVI Proficiency demonstration.

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP Central ROC 1	CROC 1	Expert	6/29/2021 (2 sections completed in revisit 7/8/2021)	Matt Bearden, Kalina Warren, Terry Riordan, Victoria Schwartz
DEP Central ROC 2	CROC 2	Expert	6/24/2021	Leif Boman, Katie March, Liz Bates
DEP Southwest ROC 1	SWROC 1	Expert	6/16/2021	Ben Paswater, Francisco Faria, Kevin Grace
DEP Southwest ROC 2	SWROC 2	Expert	6/16/2021	Sarah Meyer, Natalie Abdo
DEP South ROC	SROC	Expert	6/21/2021	Kirby Wolfe, Nicole Reistad, Gary Snorek, John Barrington
DEP Southeast ROC	SEROC	Expert	6/28/2021	Jordan Skaggs, Drew Liddick, Andrew Luering, Sabrina Fischer
Breedlove Dennis Associates	BDA	Expert	6/16/2021	Ginger Soumar, Jake Lyons, Jonathan McCurry, Jennifer Rosinski
Flatwoods Consulting 1	FLATWOODS 1	Non-expert	6/25/2021	Camille Knight, Jessica Sirois, Paige Jaffe, Robert Wiwi
Flatwoods Consulting 2	FLATWOODS 2	Non-expert	6/7/2021	Eesa Ali, Michael Grzywacz, Mike Pshar, Cole Palmer, Joe Brooker
Highlands County	HIGHLANDS	Expert	6/28/2021	Michael McMillian, JD Foster, Dawn Ritter
City of Lakeland Wetlands	LAKE WET	Expert	6/9/2021	Julie Vogel, Sarah Malone, Vance James, Jessalyn Aretz
City of Lakeland Lakes and Stormwater	LAKE STORM	Expert	6/28/2021	Sandra Pope, Jessica Schilling, Sean Rogers, Cody O'Gorman
Orange County	ORANGE	Non-expert	6/24/2021	Mike Drennan, Marcia Anderson Clark, Michael Linger, Rob Renk
City of Orlando	ORLANDO	Expert	6/14/2021	Kari Lara-Murabito, Lisa Lotti, John Masters
Pinellas County	PINELLAS	Expert	6/9/2021	Peggy Morgan, Alexandra Mauer, Robin Barnes, Robert Burnes
Polk County	POLK	Non-expert	6/28/2021	Emily McPartlin, Chris Bolin

Seminole County	SEMINOLE	Expert	6/17/2021	Gloria Eby, Joseph Cordell, Thomas Calhoun, Anthony Cintron
Southwest Florida Water Management District	SWFWMD	Expert	6/16/2021	Kym Rouse Holzwart, Mark Hurst, TJ Venning
University of South Florida Water Institute	USF	Expert	6/22/2021	David Eilers
Wood PLC 2	WOOD 2	Expert	6/24/2021	Erik Oij, Mary Szafraniec, Kevin Shelton, Francesca Lauterman

Table 9. Summary results for each team at Lake Rosalie, including final LVI score and total taxa observed, and the average of metric scores and average number of taxa in each of the 4 sampling units. The acceptable LVI score range was 37-61.

Team	Sections	LVI	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC	Mean % Sensitive	Mean CC_Dom_Codom
SEROC	1,4,7,10	58	22	12.5	85.3	8.8	2.5	5.4
BDA	1,4,7,10	33	39	21.3	73.7	23	3.8	4.4
FLATWOODS 2	1,4,7,10	30	47	22.5	70.8	22.2	2	3.9
LAKE WET	1,4,7,10	61	62	33.8	84	12.3	5.1	5.8
ORANGE	1,4,7,10	55	41	24	82.1	12.5	5.1	5.4
SEMINOLE	1,4,7,10	47	52	32.3	78.5	9.9	2.9	5.5
CROC 1	2,5,8,11	43	63	37	75.6	14.4	3.5	4.9
CROC 2	2,5,8,11	48	46	26.3	77.8	13.7	2.9	5.7
SWROC 2	2,5,8,11	38	52	31.3	69.6	19.6	4.8	5.7
SROC	2,5,8,11	39	38	21	70.6	16.2	3.3	5.8*
FLATWOODS 1	2,5,8,11	49	42	25.5	81	15	2.7	5.3
POLK	2,5,8,11	52	49	28	78.5	14.4	6.4	5.7
WOOD 2	2,5,8,11	60	86	43	82.5	11.7	7	5.7

SWROC 1	3,6,9,12	49	66	40.5	77.1	14.3	5.2	5.4
HIGHLANDS	3,6,9,12	53	47	31.8	81	11.2	3.2	5.5
LAKE STORM	3,6,9,12	54	62	39.3	82.1	14.1	5.2	5.4
ORLANDO	3,6,9,12	50	36	21	83.5	12.5	3.8	5.8
PINELLAS	3,6,9,12	56	48	31	82.3	12.9	4.9	5.7
SWFWMD	3,6,9,12	41	29	19.5	76.2	16.3	1.4	5.2
USF	3,6,9,12	56	54	29.3	84.2	12.8	3.4	5.7

*mean CC calculated with fewer than 4 CC scores (dominance assigned in fewer than 4 sections)

Table 10. Dominant and co-dominant taxa selected at Lake Rosalie.

Team	Sections	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10,11,12 Dominants
SEROC	1,4,7,10	*Panicum hemitomon*	*Panicum hemitomon*	*Paspalidium geminatum/Nuphar*	*Paspalidium geminatum*
BDA	1,4,7,10	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum repens*
FLATWOODS 2	1,4,7,10	*Paspalidium geminatum/Hymenachne amplexicaulis*	*Paspalidium geminatum/Hymenachne amplexicaulis*	*Paspalidium geminatum/Nuphar*	*Panicum hemitomon/Paspalidium geminatum*
LAKE WET	1,4,7,10	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon/Paspalidium geminatum*
ORANGE	1,4,7,10	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon*	*Panicum hemitomon/Nuphar*	*Paspalidium geminatum*
SEMINOLE	1,4,7,10	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon/Nuphar*	*Panicum hemitomon/Pasp*

					alidium geminatum
CROC 1	2,5,8,11	*Panicum hemitomon/Urochloa mutica*	*Paspalidium geminatum*	*Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
CROC 2	2,5,8,11	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemtiomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
SWROC 2	2,5,8,11	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon/Paspalidium geminatum*	*Paspalidium geminatum*
SROC	2,5,8,11	*Panicum hemitomon*	*Panicum hemitomon*	*	*Panicum hemitomon/Paspalidium geminatum*
FLATWOODS 1	2,5,8,11	*Panicum hemitomon/Echinochloa walteri*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
POLK	2,5,8,11	*Panicum hemitomon*	*Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
WOOD 2	2,5,8,11	*Panicum hemitomon*	*Panicum hemitomon*	*Paspalidium geminatum*	*Paspalidium geminatum*
SWROC 1	3,6,9,12	*Panicum hemtiomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Nuphar*	*Panicum hemitomon/Paspalidium geminatum*
HIGHLANDS	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon/Nuphar*	*Panicum hemitomon/Paspalidium geminatum*

LAKE STORM	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon/Salix caroliniana*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
ORLANDO	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*	*Panicum hemitomon*
PINELLAS	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon*	*Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*
SWFWMD	3,6,9,12	*Sacciolepis striata*	*Panicum hemitomon/Sacciolepis striata*	*Sacciolepis striata/Nuphar*	*Sacciolepis striata*
USF	3,6,9,12	*Panicum hemitomon*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*	*Panicum hemitomon/Paspalidium geminatum*

*Dominance not assigned for this section

Lake Rosalie Dominance Selection

There are several items to note about the decision-making regarding dominance selection among teams at Lake Rosalie. Lake Rosalie was a challenging lake for the assignment of dominance because there were multiple abundant grass species, several of which are similar looking. Of the 80 total sampling sections, 42 had one dominant taxon assigned and 37 had two co-dominant taxa assigned. No dominance was assigned in one section. There were nine unique taxa chosen as dominant or co-dominant. Seven were emergent grasses, while one was the floater *Nuphar*, and one was the woody *Salix caroliniana*. Teams strongly favored *Panicum hemitomon* (62 of 80 sections, all 20 teams) and *Paspalidium gemnatum* (27 of 64 sections, 17 teams) in selection of dominant and co-dominant taxa. *Nuphar* was also frequently chosen as a co-dominant (seven sections, seven teams). Infrequently selected were *Sacciolepis striata* (four sections, one team) and *Hymenachne amplexicaulis* (two sections, one team). *Urochloa mutica*, *Echinochloa walteri*, *Panicum repens*, and *Salix caroliniana* were each selected as co-dominant in one section by one team. The results of dominance selection at Lake Rosalie indicate that nearly all teams made similar decisions in their assignment of dominant and co-dominant taxa, although there were differences in selection of grass species that were infrequent co-dominants.

Lake Rosalie Plant ID Discussion

Identifications of the most frequently encountered taxa at Lake Rosalie appear correct and consistent. At least 15 teams identified the same 24 taxa, including the six most frequently assigned dominant taxa. Less abundant taxa appear to have been more patchily distributed and/or more variably identified. The variability in the number of total taxa was extremely high, ranging from 22 to 86 taxa, with a standard

deviation of ±14.3 taxa. Teams were divided on how many and which *Eleocharis* species were present. Eight of twenty teams identified large species of *Eleocharis* at Lake Rosalie, with seven teams identifying *Eleocharis interstincta*, and one team identifying *Eleocharis cellulosa*. *E. interstincta* is a robust emergent with conspicuously septate stems (cross partitions that are visible, even on the exterior of the stems) (Figure 18). *E. interstincta* is separated from *E. equisetoides* by perianth bristles if achenes are present but are difficult to speciate otherwise. Contrary to some sources, including Godfrey and Wooten's *Aquatic and Wetland Plants of Southeastern United States*, the Flora of North America (Eleocharis interstincta - FNA (floranorthamerica.org) and Eleocharis equisetoides - FNA (floranorthamerica.org)) states that sectioning the stems of both species shows that the septae are closer together near the spikelet than in the rest of the stem in *both* species. *E. interstincta* is primarily a southern peninsula species, while *E. equisetoides* is primarily a panhandle to central peninsula species, but their ranges do overlap in Polk County. *E. cellulosa* is a robust emergent, with a thick, somewhat spongy, round stem. It would probably not be confused with *E. interstincta* if observed at close range or handled, because of its lack of visible septate stems. *E. cellulosa* occurs throughout much of Florida, except for in the northeast region.

Submersed and small, fine-textured *Eleocharis* were also variably identified. Eight teams identified *Eleocharis baldwinii*, three teams identified "submersed viviparous *Eleocharis*," three teams identified *Eleocharis vivipara*, and two teams identified genus-level *Eleocharis*. These taxa are often patchy and can be inconspicuous, and this may have contributed to the variable observations of this group. These taxa are also challenging to identify, with significant morphological plasticity. Although *Eleocharis* was not a dominant taxon at Lake Rosalie, and did not have a strong influence on scoring, it is still important to identify these taxa correctly. *Tips are shared above in the section on Little Lake Santa Fe*.

Teams sampling Lake Rosalie identified multiple species of *Persicaria*. Five teams identified only *Persicaria punctata*, four teams identified *P. punctata* and *P. glabra*, two teams identified *P. punctata*, *P. glabra* and *P. hydropiperoides*, two teams identified *P. glabra* and *P. hydroperoides*, and 2 teams identified no *Persicaria*. One team identified only *P. glabra*, one team identified only *P. hydropiperoides*, one team identified only genus level *Persicaria*, one team identified genus level *Persicaria* and *P. punctata*, and one team identified genus level *Persicaria* and *P. glabra*. In total, eleven teams identified *P. punctatum*, nine identified *P. glabrum*, 5 identified *P. hydropiperoides*, and 3 identified genus level *Persicaria*. At first glance, the ten different combinations of *Persicaria* identification at Lake Rosalie may suggest a lot of error, but that may not be the case. *Persicaria* can be patchy in its distribution, and it is common for multiple species to occur at a single lake, or even grow side-by-side. Different species or combinations of species may have been present in different sections of the lake, leading to variable results. Although not as common as at Lake Rosalie, *Persciaria* was also present at Little Lake Santa Fe, and was variable in occurrence and identification. Three teams identified *P. hydropiperoides*, two teams identified *P. glabra, and* two teams identified *P. punctata*. Only one team identified more than one species, identifying *P. hydropiperoides* and *P. glabra*. A field key to *Persicaria* is available here: Persicaria Field Key. Tips for identifying the species observed at Lake Rosalie are as follows:

- *Persicaria punctata*—ocreae (sheaths on stems) have bristles; calices (green sepals around white petals) with yellow glandular dots; ~12-30 inches high; leaves lance-shaped, narrow but often wider than 1 cm
- *Persicaria glabra*—ocreae do NOT have bristles; calices (green sepals around white petals) with yellow glandular dots; plant robust compared to other *Persicaria*, to 4 feet; leaves lance shaped, wide
- *Persicaria hydropiperoides*—ocreae have bristles; calices with NO glandular dots; plant small-medium, delicate-looking, ~12-30 inches high; leaves lance-shaped, narrow and usually not wider than 1 cm

Persicaria should be left at genus level only if flowers or fruits are not present, and obvious features of the overall habit are not diagnostic. For example, even without flowers and fruits, if the stems and leaf nodes are densely hairy, it can be determined that the species is *Persicaria hirsuta*.

Overall, consistency was good on the identification of the grass species commonly identified as co-dominant or dominant taxa. There were, however, a few inconsistencies and apparent errors among the grasses most frequently selected as co-dominant or dominant. These grass species can all form extensive stands. From a distance in a boat they can be difficult to identify, whether seedheads are present or not. Another factor that makes them challenging to identify, particularly from a distance, is that they all have a seedhead that is a spike, or an ascending and appressed panicle (appearing spike-like), rather than open and branching like many grasses. It is worth studying the key features and images of these taxa (Table 11) to review identifications from the Lake Rosalie exercise, and to assist with future observations. Although not included in the table, *Urochloa mutica* and *Echinochloa walteri* were frequently observed, and each was chosen once as codominant. For assistance in identification of these two species, please see the presentation *Field Identification of Common Grasses*, here: https://floridadep.gov/dear/bioassessment/content/plant-identification-resources.

Figure 18. Robust species of Eleocharis. Eleocharis cellulosa (left), with smooth stems, and Eleocharis interstincta (right), with visibly jointed stems. (photos: Vic Ramey/University of Florida)

Table 11. Review of Grass species commonly identified as Co-dominant or Dominant at Lake Rosalie

Taxon	***Panicum hemitomon***	***Paspalidium geminatum***	***Sacciolepis striata***	***Hymenachne amplexicaulis***
Inflorescence				
Key Features	Forms open stands; stems erect; roots at nodes, but not decumbent; Panicle appressed, does not "open"	Leaf blades long, v-shaped or folded, appearing thin; drooping or leaning habit; stems decumbent; seedhead branches ascend and stay close to axis, on one side of stem.	Often in dense stands; conspicuous vertical lines on leaves; flowers in dense, appressed spikes	Forms dense stands; leaf blades wide, (much wider than other three taxa treated here); leaf bases strongly heart-shaped; panicle appressed, much denser than either *Sacciolepis* or *Panicum hemitomon*; stems with white pith-NOT hollow like most grasses
# sections/teams identified as C or D (total: 80/20)	62/20	27/17	4/1	2/1

Conclusions

Results for the 2021 LVI Proficiency exercise indicate that thirty-two of the thirty-four participating teams were within the passing range of scores in the initial exercise. The two teams that were not within the range of passing scores in the initial exercise re-tested successfully. All thirty-four participating teams are therefore currently eligible to submit LVI data to DEP. Variability in dominance selection was much improved from previous years. No dominance was assigned in only one of 136 sections sampled,

which was also a major positive shift from previous exercises. Plant identification challenges were comparable to prior years. There continues to be notable variability in plant identification in a few groups of plants. Continued guidance is needed in several areas of identification of species, including within the genera *Eleocharis* and *Utricularia*. Recognition and identification of various grass species is improved over previous years, although more familiarity of the several species with spike-like seedheads at Lake Rosalie is needed. Incorrect plant identifications did not result in significant differences in LVI scores for these test lakes, but teams should always strive to attain correct plant identifications for LVI sampling events and remember to obtain secondary/expert verification of dominant/codominant plants through photos or specimens. There was also notable variability in the number of taxa included in the assessment. Review of the guidance on determination of the lake boundary, inclusion of the appropriate taxa and consistency in level of effort is needed.

LVI sampling teams should use this exercise as a method to correct any observed methodological deficiencies or deviations from the LVI SOP. Team member status has been updated on the FDEP searchable Biological Method Proficiency Registry, Biological Method Proficiency Registry - Qlik Sense.

Appendix A – Taxa Lists for Lake Stanley, Little Lake Santa Fe, and Lake Rosalie during June 2021 LVI Proficiency Testing

Lake Stanley *(For each team, the number of lake sections in which team observed taxon is displayed.)*

Lake Stanley **Taxa Observed**	City of TAL	FRY ECO	DEP WAS	DEP NW ROC	DEP TLH ROC	DEP AEQAS 1	DEP WQSP/ WQMP	# teams that observed taxon
Acer rubrum			2	1	2	1		4
Andropogon				1	1			2
Bacopa caroliniana	4	4	4	4	4	4	4	7
Bacopa inominata	1							1
Bidens mitis		2		1			1	3
Boehmeria cylindrica			1			2		2
Brasenia schreberi	3	3	4	4	4	4	4	7
Carex albolutescens		1						1
Centella asiatica						2	2	2
Cephalanthus occidentalis				1		1	1	3
Cliftonia monophylla	3	3	2	4	1	1		6
Colocasia esculenta	1							1
Cyperus haspan	1	1						2
Cyrilla racemiflora	4	4	3	4	4	4	4	7
Decodon verticillatus	4						1	2
Eleocharis				2	2			2
Eleocharis baldwinii	1				1		1	3
Eleocharis elongata							3	1
Eleocharis interstincta						2	2	2
Eleocharis robbinsii	1						1	2
Eleocharis submersed viviparous (species unknown)			4			2	3	3
Eriocaulon							2	1
Eriocaulon lineare	1			2				2
Eupatorium capillifolium						1		1
Fuirena pumila							1	1
Hydrocotyle	1	1	3	3	3	1	1	7
Hypericum brachyphyllum				2				1
Hypericum fasciculatum	4	4	4	4	4	3	4	7
Itea virginica				1				1
Juncus effusus	1	1						2
Juncus marginatus	2	2			1	2		4
Lachnanthes caroliniana	2	2	2	1		2	3	6

Lake Stanley **Taxa Observed**	City of TAL	FRY ECO	DEP WAS	DEP NW ROC	DEP TLH ROC	DEP AEQAS 1	DEP WQSP/ WQMP	# teams that observed taxon
Lachnocaulon anceps						1		1
Leersia hexandra	1					3		2
Leucothoe racemosa				3			1	2
Liquidambar styraciflua		1	1					2
Ludwigia (native)						2	3	2
Ludwigia (unknown nativity)				3				1
Ludwigia linearis	2		2					2
Ludwigia repens		1						1
Ludwigia suffruticosa	2							1
Lycopus				3			1	2
Lycopus rubellus	3							1
Lycopus virginicus			2			3		2
Lyonia lucida	1	1	4		2		2	5
Magnolia virginiana	1			1	1		2	4
Mayaca fluviatilis	4	4	4	4	4	4	4	7
Myrica cerifera	2	4	3		3	4	3	6
Myriophyllum (unknown nativity)			1					1
Myriophyllum Native	4							1
Nitella					1			1
Nuphar				1				1
Nymphaea odorata	3	4	4	4	4	4	4	7
Nymphoides aquatica	4	4	4	4	4	4	3	7
Nyssa sylvatica biflora	2	2	1	1	2	1	2	7
Panicum hemitomon	4	4	4	4	4	4	4	7
Panicum repens	4	2	3	2	1	1	3	7
Paspalum urvillei	1	1	2	1				4
Pinus elliottii						1		1
Pluchea	1							1
Pluchea odorata		2						1
Pontederia cordata	4	4	4	4	4	4	4	7
Potamogeton diversifolius							1	1
Rhexia				1				1
Rhexia mariana		2				2	3	3
Rhododendron viscosum				3				1
Rhynchospora				2				1
Rhynchospora chalarocephala						1		1
Rhynchospora microcephala	1	1						2

Lake Stanley **Taxa Observed**	City of TAL	FRY ECO	DEP WAS	DEP NW ROC	DEP TLH ROC	DEP AEQAS 1	DEP WQSP/ WQMP	# teams that observed taxon
Rhynchospora rariflora			3					1
Rhynchospora scirpoides							1	1
Rhynchospora tracyi							1	1
Sacciolepis striata		1				1		2
Sagittaria graminea		1						1
Sagittaria isoetiformis			1					1
Sagittaria latifolia				1				1
Sapium sebiferum	1	1	2	4	1	1		6
Solidago	1				1	1		3
Sphagnum		1						1
Triadenum virginicum	3	1					3	3
Utricularia cornuta				2				1
Utricularia floridana		4	4	4	4	3	4	6
Utricularia gibba						1	1	2
Vitis				3				1
Xyris		1		1		2	2	4
TOTAL TAXA PER TEAM	**37**	**34**	**28**	**37**	**25**	**36**	**38**	

Little Lake Santa Fe *(For each team, the number of lake sections in which team observed taxon is displayed.)*

Little Lake Santa Fe **Taxa Observed**	CARDNO	SJRWMD	WOOD 1	CAWLEY	NE ROC 1	NE ROC 2	AEQAS 2	# teams that observed taxon
Acer rubrum	4	4	4	4	2	4	3	7
Alternanthera philoxeroides	3	3	3	3	3	1	3	7
Andropogon		2	1					2
Baccharis	2							1
Baccharis halimifolia		1						1
Bidens laevis	2	2	2	3	2		1	6
Bidens mitis	1					2	1	3
Blechnum serrulatum		1	3					2
Boehmeria cylindrica	2	2	4		4		1	5
Centella asiatica	2	1					1	3
Cephalanthus occidentalis	4	4	4	4	4	4	4	7
Ceratophyllum demersum		2	1	2		1	4	5
Cirsium nuttallii	2							1
Cladium jamaicense	3	3	3	3	3	3	3	7
Cliftonia monophylla				2				1
Colocasia esculenta	4		4	4	4	3	4	6
Cyperus haspan	1							1
Cyperus lecontei					1			1
Cyperus odoratus			2					1
Cyperus polystachyos		1						1
Decodon verticillatus		1					1	2
Echinochloa walteri			4	1				2
Eichhornia crassipes	1	1						2
Eleocharis (submersed viviparous but unable to ID to species)	4	3	1		4		4	5
Eleocharis baldwinii				3		3		2
Erechtites hieracifolia	1	2					1	3
Eriocaulon decangulare			1		2			2
Eupatorium capillifolium	3	3	4	3		2	3	6
Fuirena scirpoidea		1					1	2
Gordonia lasianthus		2			3		1	3
Habenaria repens	1	2	2				1	4
Hydrocotyle	4		3	3	4	3	4	6
Hydrocotyle umbellata		4						1
Hypericum mutilum		1						1

Little Lake Santa Fe **Taxa Observed**	CARDNO	SJRWMD	WOOD 1	CAWLEY	NE ROC 1	NE ROC 2	AEQAS 2	# teams that observed taxon
Ilex cassine		1	4		4		1	4
Itea virginica		3				1	1	3
Juncus effusus		2	1					2
Juncus marginatus		3			1	4		3
Juncus repens							1	1
Juncus scirpoides					1			1
Lachnanthes caroliniana			2					1
Landoltia punctata				1				1
Lemna				1			1	2
Limnobium spongia				1				1
Limnophila sessiliflora			1					1
Liquidambar styraciflua	4	3	1	2	2	3	1	7
Ludwigia (native)							1	1
Ludwigia alata					1			1
Ludwigia alternifolia			1					1
Ludwigia arcuata		3	1	1	2			4
Ludwigia leptocarpa		2			1	2		3
Ludwigia octovalvis	2			1				2
Ludwigia peruviana							1	1
Luziola fluitans	1	3	2	3	1		3	6
Magnolia virginiana	1	4	3	2		2	2	6
Mayaca fluviatilis		1						1
Micranthemum glomeratum		2						1
Mikania scandens	1	2	4			3	3	5
Myrica cerifera	4	4	4	3	3	3	3	7
Najas guadalupensis	2	2					3	3
Nelumbo lutea	3	2	1	2	2	2	2	7
Nitella			3					1
Nuphar	4	4	4	4	4	4	4	7
Nymphaea odorata				1			1	2
Nymphoides aquatica	4	4	4	4	2	4	4	7
Nyssa sylvatica biflora	3		1	4	4	4	4	6
Osmunda cinnamomea			4					1
Osmunda regalis	1	1	1			2		4
Oxycaryum cubense		2		1	1			3
Panicum hemitomon	4	4	4	4	4	4	4	7
Panicum repens	4	4	3	3	4	3	3	7
Parthenocissus quinquefolia		1						1

Little Lake Santa Fe **Taxa Observed**	CARDNO	SJRWMD	WOOD 1	CAWLEY	NE ROC 1	NE ROC 2	AEQAS 2	# teams that observed taxon
Paspalidium geminatum		1		1	1		1	4
Paspalum repens	1							1
Peltandra			1	1				2
Persea palustris		2		4				2
Persicaria glabra			1	1				2
Persicaria hydropiperoides	2	1		1				3
Persicaria punctata					2		1	2
Pinus elliottii				1				1
Pistia stratiotes					1		1	2
Platanus occidentalis			1					1
Pluchea			1					1
Pluchea odorata	3							1
Pontederia cordata	4	4	4	4	4	3	4	7
Potamogeton diversifolius		1	1			1		3
Potamogeton pusillus		1						1
Ptilimnium capillaceum		2						1
Quercus laurifolia		4						1
Rhexia mariana		1	2					2
Rhynchospora inundata	1							1
Sabal palmetto	1							1
Sabatia grandiflora	2							1
Sacciolepis striata		1		1	3			3
Sagittaria filiformis	1							1
Sagittaria graminea				1			3	2
Sagittaria isoetiformis	1	2			1	1		4
Sagittaria kurziana				1				1
Sagittaria lancifolia		3	3	1	3	1	3	6
Sagittaria subulata		1	1					2
Salix caroliniana			1			1		2
Salvinia minima	4	3	3	4	3	4	4	7
Sambucus nigra	1			2	1			3
Sapium sebiferum	2	1	2		1	1		5
Schoenoplectus californicus	2							1
Sesbania herbacea	1	2						2
Sesbania punicea			1			1		2
Solidago							1	1
Sphagneticola trilobata	2					2		2
Taxodium	4	4	4	4	4	4	4	7

Little Lake Santa Fe **Taxa Observed**	CARDNO	SJRWMD	WOOD 1	CAWLEY	NE ROC 1	NE ROC 2	AEQAS 2	# teams that observed taxon
Toxicodendron radicans		4		1				2
Triadenum virginicum	1	2			1			3
Typha	1							1
Utricularia foliosa		3						1
Utricularia gibba			3	3	2	2	1	5
Utricularia inflata					2	1	1	3
Utricularia olivacea		1						1
Utricularia purpurea				2		1		2
Utricularia radiata	3		3					2
Vitis			1					1
Vitis rotundifolia	2	2		1				3
Woodwardia areolata	2		2	1				3
Woodwardia virginica		4	1	3		3	3	5
TOTAL TAXA PER TEAM	**53**	**67**	**56**	**49**	**42**	**38**	**49**	

Lake Rosalie *(For each team, the number of lake sections in which team observed taxon is displayed.)*

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Acer rubrum	2	4	2	2	3	4	2	3	4	4	3	4	4	3	2	4	4	4	2	1	20
Alternanthera philoxeroides	3	3	2	4		4	4	2	1	4	1		2	4	2	3	4	3	4		17
Amaranthus australis						1															1
Ampelopsis arborea											1			1							2
Andropogon	1				2	2	2				1	1		1	1	2	1		4		11
Andropogon glomeratus		1							1												2
Andropogon virginicus													2								1
Arundinaria gigantea																			3		1
Aster											1										1
Azolla caroliniana																			1		1
Baccharis			1		4	3					2			3	1		3	1	1		9
Bacopa caroliniana					1												1				2

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Bacopa monnieri														2							1
Bidens alba							1				1						2				3
Bidens laevis				1		1						2	2	1							5
Bidens mitis						2			1				2				1				4
Blechnum serrulatum											1					1					2
Boehmeria cylindrica									1				1	3							3
Carya aquatica													1								1
Centella asiatica					1					1			1	1							4
Cephalanthus occidentalis	4	3	3	4	4	4	4	4	4	4	4	4	4	3	3	4	4	4	4	2	20
Ceratopteris thalictroides																2					1
Chara			1											1					1	1	4
Cicuta maculata	2			2	3	3	1		3	2	4	3	2	3	2	3	1	2			15
Cirsium nuttallii														1							1
Cladium jamaicense											2										1
Coreopsis leavenworthii														1							1

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Cuphea carthagenensis														1							1
Cyperus haspan	1		1	2	1			1						1		1			1		8
Cyperus lecontei				3	1					1				1	1	3	1	1	2		9
Cyperus odoratus		2		3	3	3	2	2	2	2	4		1	4	1	3	4	1	3		16
Cyperus polystachyos					1		1		1					2			2		1		6
Cyperus retrorsus																	1				1
Cyperus surinamensis														1			2				2
Diodia virginiana	1				1					1			1	1			1				6
Diospyros virginiana													1								1
Echinochloa crusgalli			1	2							3				1						4
Echinochloa walteri	0	1			1	3	3		2	1			1	3		3	2				11
Eclipta prostrata		1		4	1					1	1		1	1				1			8
Eichhornia crassipes	3	4	4	3	4	4	2	2	3	3	2	1	1	3	3	3	4	3	4	1	20
Eleocharis											1				1						2

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Eleocharis (submersed viviparous but unable to ID to species)					1	1	1														3
Eleocharis baldwinii	2			4			1		1		2					2	1		2		8
Eleocharis cellulosa															1						1
Eleocharis interstincta	1	1	1		1	2				1				2							7
Eleocharis vivipara			1					1						1							3
Erechtites hieracifolia			1			3															2
Eupatorium capillifolium		2	2	4	4	4	4	2	4	2	3	1	3	2	2	4	3		3		17
Eupatorium leptophyllum	1	2																			2
Fimbristylis autumnalis		1																			1
Fraxinus																	1	1			2
Fraxinus caroliniana			1		2	1					3			2							5
Fraxinus profunda		2	2																		2
Fuirena		1																			1

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Fuirena pumila														1		2		1	1		4
Fuirena scirpoidea				1								1				1		3	1		5
Galium tinctorium													1								1
Gordonia lasianthus					2								1			1					3
Hibiscus coccineus	1										1										2
Hibiscus grandiflorus	3	4	2	3	3	3	3	3	3		3	3	4	4	3	4	4	4	2	2	19
Hibiscus moscheutos										3											1
Hydrilla verticillata			2		1											1		1		0	5
Hydrocotyle	2	3	3	2	2	4	1	1	2	4	2		2	2	3	4	4	2	4	1	19
Hymenachne amplexicaulis	2	2	2	1										1	2	3	2		2		9
Hypericum mutilum										1				1			2				3
Ilex cassine													1								1
Ipomoea											3										1
Ipomoea alba				1																	1
Ipomoea aquatica			1																		1

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Juncus effusus	1	1	1		1		1			1	2			1	1	1	1	1	2		13
Juncus marginatus														1							1
Juncus megacephalus														1		2	1		1		4
Juncus repens									1												1
Lachnanthes caroliniana						1			1				2	1		1					5
Leersia hexandra																1		1			2
Lemna						2											1				2
Limnophila sessiliflora																1					1
Lindernia grandiflora														2							1
Liquidambar styraciflua																2					1
Ludwigia arcuata					1												3				2
Ludwigia decurrens	1									1											2
Ludwigia grandiflora		1							2							3	2	4	1		6
Ludwigia hexapetala										1			2								2
Ludwigia leptocarpa					2	2		2		1	3		2	2	1	1					9

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Ludwigia octovalvis		1			1	2			2	1											5
Ludwigia palustris				2																	1
Ludwigia peruviana	3		2	3	3	3	1	3	3	3	4	3	3	3	2	3	2	1	3	2	19
Ludwigia repens		2	1					1						2	2				3	1	7
Magnolia virginiana					1	2			3	1				1		2		1			7
Micranthemum glomeratum							1														1
Mikania scandens			2	1	4	3	1	1		1	1		1	2	1	3	1				13
Myrica cerifera		2	2	2	4	4	4	4	4	3	4	3	4	2	1	4	4	4			17
Najas guadalupensis				2									1	1					1		4
Nelumbo						1															1
Nitella							1						1	1					1		4
Nuphar	4	3	4	3	4	3	4	3	4	4	4	3	4	4	4	3	4	4	4	4	20
Nymphoides aquatica			1																		1
Nyssa sylvatica biflora	1		1		1			1		4				3			3				7
Osmunda cinnamomea												1									1

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Oxycaryum cubense			1	4	3	2	1	2	3	2	1	3	2	2		1	2		1		15
Panicum hemitomon	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	20
Panicum repens	4	4	4	3	3	4	3	3	4	4	4	4	4	4	4	4	4	4	4	1	20
Paspalidium geminatum		4	4	4	3	4	4	3	4	4	4		4	4	3	4	4	4	3	4	18
Paspalum urvillei					1																1
Peltandra					1																1
Persicaria											2				3		1				3
Persicaria glabra				2	4	1			1		3	1	1	2		1					9
Persicaria hydropiperoides				1		1				3				2		4					5
Persicaria punctata		3	2		2	2		2	3				1	1			4	2	2		11
Phragmites australis	4	3	2	4	4	4	4	4	4	3	4		4	3	3	4	3	4	3	3	19
Phyla nodiflora														1							1
Pinus elliottii														1		1	1				3
Pistia stratiotes	3	4	1	4		4	2	3	3	3	1		1	4	2	4	4	3	4	1	18
Pluchea			1		1					1	2			2		3		2	1		8

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Pluchea baccharis					1			1					1								3
Pluchea odorata		2							2												2
Pontederia cordata	3	4	3	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	20
Potamogeton diversifolius						1															1
Ptilimnium capillaceum	1	2		3				1		1				2		4	1	1			9
Quercus laurifolia													1	1			1				3
Rhexia									1							1					2
Rhexia cubensis												1									1
Rhexia mariana														2							1
Rhexia nashii						1															1
Rhynchospora corniculata				1	1	2			1					1		2					6
Rhynchospora inundata			1				2														2
Rhynchospora microcephala				1		2		1			1			1		1					6
Ruellia simplex																			1		1
Sabal palmetto		3	2		3	3		1		2		3		3		2	4	2	2		12

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Sacciolepis indica														1							1
Sacciolepis striata				4	2	4			3	1		4	3			1	1	1			10
Sagittaria (native)																		4			1
Sagittaria filiformis							1														1
Sagittaria graminea	1																				1
Sagittaria lancifolia	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	20
Sagittaria latifolia	1		1	2		3			3	1		1				3			1		9
Salix caroliniana	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	20
Salvinia minima	1	1			1	2	1							1		2	2	1	2		10
Sambucus canadensis																	1			1	2
Sambucus nigra						4		1	3		2			1							5
Sapium sebiferum						1						1									2
Schinus terebinthifolius			1		1												1		1		4
Schoenoplectus californicus	3	3		4	2	4	3	4	3	3		4	4	4	4	2	3	4	4	3	18
Schoenoplectus pungens		1		0	1	1	1				3		1	1		1	2		1		11

Lake Rosalie **Taxa Observed**	BDA	Flatwoods 1	Flatwoods 2	Highlands	Lakeland Wet	Lakeland Storm	Orange	Orlando	Pinellas	Polk	Seminole	SWFWMD	USF	WOOD 2	SROC	SWROC 2	CROC 1	CROC 2	SWROC 1	SEROC	# teams that observed taxon
Schoenoplectus tabernaemontani			2	4	4	2			1		4					1					7
Scleria																		1			1
Scleria microcarpa														1							1
Sesbania									2	2	4					3			3		5
Sesbania herbacea		3	1		1		2						3	3	1					1	8
Sesbania punicea												3					2				2
Sesbania vesicaria	3																			0	2
Setaria parviflora														1			2				2
Spartina bakeri						1			2							2					3
Sphagneticola trilobata			1		1						1			1	1		1	1	1		8
Taxodium	1	1			1	2	1	1		2	2		1	2	1	1	2	2	2	1	16
Thelypteris interrupta					1	1			3							1					4
Thelypteris palustris pubescens				2																	1

Lake Rosalie **Taxa Observed**	**BDA**	**Flatwoods 1**	**Flatwoods 2**	**Highlands**	**Lakeland Wet**	**Lakeland Storm**	**Orange**	**Orlando**	**Pinellas**	**Polk**	**Seminole**	**SWFWMD**	**USF**	**WOOD 2**	**SROC**	**SWROC 2**	**CROC 1**	**CROC 2**	**SWROC 1**	**SEROC**	**# teams that observed taxon**
Triadenum virginicum					1								1								2
Tripsacum dactyloides											1										1
Typha	4	4	3	4	4	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	20
Ulmus americana	1													1							2
Urochloa mutica	3		2		3	4	3		3	3	2	4	4	3		3	2	1	3		15
Vallisneria americana		1		4			3		3				1	3	1	4			4		9
Vitis																	2				1
Vitis rotundifolia								1			1			2							3
Woodwardia virginica						1				1			1	2							4
Xyris				1										1		1	1				4
Xyris fimbriata						1															1
Zizania aquatica						1															1
Zizaniopsis miliacea	1									2											2
TOTAL TAXA PER TEAM	**39**	**42**	**47**	**47**	**62**	**62**	**41**	**36**	**48**	**49**	**52**	**29**	**54**	**86**	**38**	**66**	**63**	**44**	**52**	**22**	