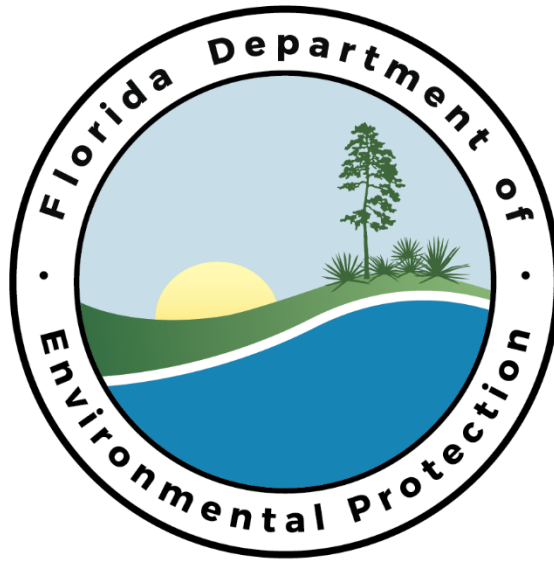


Lake Vegetation Index

2017 Team Proficiency Report



Division of Environmental Assessment and Restoration

Aquatic Ecology and Quality Assurance Section

November 17, 2017

Executive Summary

Thirty-two teams participated in the 2017 Lake Vegetation Index (LVI) Team Proficiency exercise conducted at Carr Lake (8 teams), Wildcat Lake (15 teams), and Little Redwater Lake (9 teams). Thirty-one teams were within the acceptable score ranges (± 12 points of the expert median) within the initial sampling period, and one team was within the acceptable range, outside of the proficiency period, but within the LVI index period. Variability in the results was associated primarily with two factors: the selection of dominant or co-dominant plants and plant identification errors in specific groups (*Eleocharis*, *Utricularia*, and grasses). Improvement in consistency in overall scores, consistency in dominance selection, and identification of submersed taxa, was seen over proficiency exercises in previous years. Those calculating the LVI with the LVI calculator provided by DEP should ensure that they select the appropriate region, “North” or “South,” for the lake they sample, and use “1” to indicate presence of a taxon, rather than “X.”

Introduction

The Lake Vegetation Index (LVI) is a rapid assessment of lake health based upon the associated 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 2017 were those teams that passed the 2015 LVI proficiency demonstration. Three lakes were sampled for LVI proficiency demonstration in 2017: Carr Lake in Leon County, Wildcat Lake in Lake County, and Little Redwater Lake in Highlands County (Figure 1). The sampling time window for all lakes was June 1-30, 2017.

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 (one AEQA team sampled at both Wildcat and Little Redwater), following the sampling SOP LVI 1100 (effective 7/30/2014, <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>).

2017 LVI Proficiency Exercise Results

This report describes the results of the 2017 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.

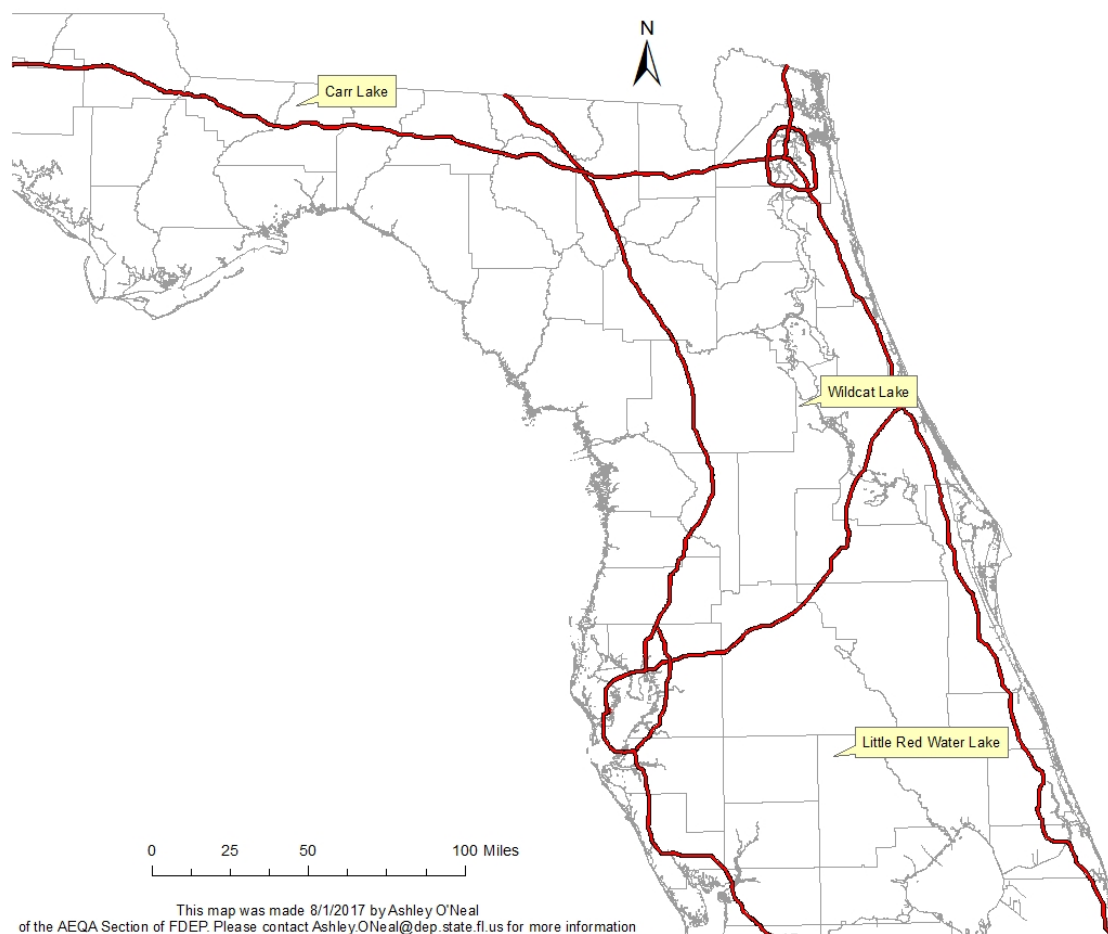


Figure 1. Location of lakes sampled for the LVI Proficiency Demonstration 2017.

Data Analysis

LVI scores were calculated per DEP SOP LVI 2200 and submitted to the DEP Aquatic Ecology and Quality Assurance (AEQA) Section. DEP sampling teams entered the data into Statewide Biological Database (SBIO2), and AEQA staff retrieved those data. Non-DEP teams used the Excel LVI calculator available on the FDEP website, and sent completed files to AEQA. 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

2017 LVI Proficiency Exercise Results

Invasive Exotic Taxa from 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.

Overall Results

Scores

Thirty-one teams conducted LVI assessments for the 2017 LVI Proficiency exercise during June 2017. All thirty-one teams successfully scored within ± 12 points of the expert median. 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 2017 LVI Proficiency exercise.

Lake	Expert N	Expert Median	Passing Range	Total N	Median (all)	Mean (all)	Standard deviation (all)	Range (all)
Carr Lake	8	67	55-79	8	67	68	3.9	63-74
Wildcat Lake	14	84	72-96	15	85	84	5.3	73-90
Little Red Water Lake	9	43	31-55	9	45	44	6.8	32-54

Selection of Dominant/Co-dominant Taxa

The Coefficient of Conservatism (C of C) score of the dominant taxon or the average C of C 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 (see excerpt below from SOP LVI 1100). 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.

3.2.7. Determine one dominant or two co-dominant taxa for the sampling unit as follows:

3.2.7.1. If a single taxon comprises a clear, overwhelming majority of the areal coverage of plants (e.g., if one taxon is twice as abundant as all others), record it as dominant.

3.2.7.2. Assign two co-dominant taxa if there are two taxa that are abundant and it is unclear that one taxon is definitively more abundant than the other.

3.2.7.3. Record dominance or co-dominance on the Lake Vegetation Index Data Sheet. Dominance can be observed for woody, emergent, floating, or submersed species. For woody species, consider the canopy overhanging the lake in the determination of areal coverage. Deploy the frotus additional times if necessary to determine potential dominance of submersed taxa.

2017 LVI Proficiency Exercise Results

3.2.8. If no one dominant or two co-dominant species are present, do not assign a dominance code for that sampling unit and note on the datasheet that no dominant was assigned.

Among the 31 LVI Proficiency samples, teams assigned a single dominant for 73 lake sections, two co-dominants for 49 lake sections, and did not assign any dominant for 2 lake sections. In some lake sections, there was strong consistency among teams in dominance selection, and the selection of a single dominant for multiple sections was appropriate. At Wildcat Lake, for example, *Panicum hemitomom* was identified as the single dominant for 45 of 56 sampling sections (Figure 3), and evidence indicates it was twice as abundant as any other taxon in several 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 Redwater Lake, for example, there were 10 different taxa that were selected as dominants or co-dominants, and yet several teams selected single dominants for one or two lake sections. DEP welcomes suggestions for improving consistency in dominance/co-dominance selection from all LVI samplers.

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 very comparable, but additional plant training is needed in some taxonomic areas. Groups for which there were noticeable differences among teams were the genera *Utricularia* and *Eleocharis*, and the grasses *Leersia hexandra* and *Panicum repens*. 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.

Water Level for 2017 LVI Proficiency

For the 2017 testing, the water levels at all three lakes were not too high or low to impede assessment. The water levels were in the range of a “normal wet season” and supported the expected plant communities. The inundated footprint of the lake at Carr Lake extends beyond the area reachable by boat in many areas, due to the dense vegetation, making it difficult to assess the outer edges of the sections of this lake. The design of the sampling map took this into account, and attempted to restrict the section boundaries to areas that were reachable. Some teams, however, found it not practical or possible to reach the entire delineated area, potentially resulting in differences in taxa lists or dominance assignment. The effects ultimately were not significant because all teams scored within the acceptable range.



Figure 2. Shoreline of Carr Lake, with dense growth of *Nymphaea odorata*, and a mix of emergents.

Excel Calculator Use Errors

All non-DEP staff used the Excel LVI calculator available on the DEP website for their LVI calculations. DEP checked this calculator for accuracy during its development and revision. DEP also compared scores and metrics generated by the DEP Biological database and the Excel calculator for a DEP sample as part of this LVI Proficiency exercise, and both tools generated the same result. Carr and Wildcat Lakes are in the North region, and Little Red Water Lake is in the South region. A few teams who used the LVI calculator applied the incorrect region. Different equations are used for each region, so it is important to assign the correct LVI region. The second error was use of an "X" or other mark, rather than the correct "1" to denote presence of a taxon. Users should designate presence, dominance, and co-dominance by use of "1," "D," and "C," respectively (not case-sensitive). A letter designation for presence will cause an incorrect calculation if no dominant taxon is selected. This error did not result in any incorrect scores in this exercise, but there is a potential for error when a letter is used and a sampling team did not assign dominance. All results presented in this report were generated with the corrected calculations.



Figure 3. Shoreline of Section 2 at Wildcat Lake (photo: SWFWMD).

Results by Lake

Carr Lake Results

Carr Lake is a highly vegetated lake located in Leon County. There is low density residential development, woodland pastures, and pine plantations around much of the lake. The lake is characterized by dense vegetation, including abundant submersed, floating, and emergent taxa (Figure 2). Woody taxa are also present, but not as abundant as the other strata. There were several FLEPPC Category 1 and 2 taxa observed at Carr Lake, including *Alternanthera philoxeroides*, *Eichornia crassipes*, *Hydrilla verticillata*, and *Triadica sebifera* (syn: *Sapium sebiferum*), but none were abundant, and their individual distributions were patchy. The eight teams who sampled Carr Lake identified between 92% and 100% native taxa. The submersed plant community was characterized by *Cabomba caroliniana*, *Myriophyllum heterophyllum*, *Utricularia foliosa*, and *Ceratophyllum demersum*. Each of these taxa was abundant, and occurred in various combinations throughout the lake. Common floating taxa included *Nuphar*, *Nymphaea odorata*, *Nelumbo lutea*, and *Brasenia schreberi*. Common emergent taxa included *Bacopa caroliniana*, *Hydrocotyle*, *Pontederia cordata*, *Panicum hemitomon*, and *Sagittaria latifolia*. Water levels were normal to high during June 2017.

2017 LVI Proficiency Exercise Results

Eight expert teams sampled Lake Carr (Table 2). Team LVI and metric scores and dominant taxa selections are shown in Tables 3 and 4. The median LVI score for Lake Carr expert teams was 67, and the acceptable range was 55-79. All teams were within the acceptable range. The total number of taxa observed at Lake Carr ranged from 37 to 63 taxa, while the overall average number (± 1 standard deviation) of taxa per section was 29.1 (± 7.0). The average metric values (± 1 standard deviation) per lake section across all teams were as follows: 95.1 (± 2.6) % Native, 2.7 (± 1.3) % FLEPPC Category 1, 7.5 (± 2.2) % Sensitive, and dominant/co-dominant C of C of 5.2 (± 0.4) (Table 3). See Appendix A for team taxa lists.

Table 2. Teams, team abbreviations, team members, expert status, and sampling date for Carr Lake 2017 LVI Proficiency demonstration.

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP – Biology/TLH ROC	DEP Bio/ROC	Expert	6/26/2017	Blake Spencer, Jon Woods, Mike Eckles
DEP - Northwest ROC	DEP NWROC	Expert	6/15/2017	Frank Butera, Mike King, Christopher Slade, Nathan Mulkey
DEP – Aquatic Ecology and Quality Assurance	DEP AEQA	Expert	6/15/2017	Joy Jackson, Ashley O’Neal, Jason Storrs
Frydenborg Ecologic	FRECO	Expert	6/24/2017	Russ Frydenborg, Beck Frydenborg
City of Tallahassee	Tallahassee	Expert	6/28/2017	Ken Espy, Keith Lawhon
Leon County	Leon County	Expert	6/28/2017	Johnny Richardson, Kristina Bridger, Edgar Wade
DEP—Watershed Assessment Section	DEP WAS	Expert	6/1/2017	Curtis Musson, Ben Ralys
DEP—Groundwater Section	DEP GW	Expert	6/26/2017	Mike Dalsis, David Huggins

Table 3. Summary results for each team at Carr Lake, 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 55-79.

Team	Sections	LVI	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC 1	Mean % Sensitive	Mean CC_Dom_Codo m
DEP Bio/ROC	3, 6, 9, 12	65	45	34.5	92.8	3.6	6.6	5.2

2017 LVI Proficiency Exercise Results

DEP NWROC	1, 4, 7, 10	66	46	25.3	91.5	4.0	8.5	5.6
DEP AEQA	3, 6, 9, 12	71	51	29.5	95.0	2.6	10.0	5.2
FRECO	2, 5, 8, 11	74	43	23.0	97.0	1.9	10.3	5.8
City of Tal	3, 6, 9, 12	72	38	21.3	100.0	0	5.9	5.3
Leon County	3, 6, 9, 12	63	63	35.5	94.6	4.2	5.7	4.7
DEP WAS	2, 5, 8, 11	68	37	23.3	94.9	2.6	8.9	4.8
DEP GW	3, 6, 9, 12	66	52	40.5	95.1	2.7	4.3	5.2

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

Team	Sections	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10,11,12 Dominants
DEP Bio/ROC	3, 6, 9, 12	<i>Cabomba caroliniana</i>	<i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>
DEP NWROC	1, 4, 7, 10	<i>Myriophyllum heterophyllum</i> / <i>Cabomba caroliniana</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Utricularia foliosa</i>	<i>Nymphaea odorata</i> / <i>Brasenia schreberi</i>
DEP AEQA	3, 6, 9, 12	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>	No dom/codom selected	<i>Cabomba caroliniana</i>
FRECO	2, 5, 8, 11	<i>Cabomba caroliniana</i>	<i>Brasenia schreberi</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Nymphaea odorata</i> / <i>Panicum hemitomon</i>
Tallahassee	3, 6, 9, 12	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>
Leon County	3, 6, 9, 12	<i>Ceratophyllum demersum</i> / <i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>	<i>Ceratophyllum demersum</i>

2017 LVI Proficiency Exercise Results

DEP GW	3, 6, 9, 12	<i>Cabomba caroliniana</i> / <i>Myriophyllum heterophyllum</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>	<i>Cabomba caroliniana</i> / <i>Nymphaea odorata</i>
DEP WAS	2, 5, 8, 11	<i>Ceratophyllum demersum</i>	<i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>	<i>Nymphaea odorata</i>

There are several items to note about the decision making and plant identifications among teams at Carr Lake. Two teams selected two co-dominants for all four lake sections. One team selected one dominant for all four lake sections. Four teams had a mix of two co-dominants and one dominant for various segments, and one team had a mix of two co-dominants, one dominant, and one section with no dominance selected. All eight teams selected *Nymphaea odorata* (CC=5) as a co-dominant or dominant for at least two of the four lake segments. Six of eight teams selected *Cabomba caroliniana* (CC=5.5) as a co-dominant or dominant for at least one lake segment. Of the 32 total sections, *Nymphaea odorata* was co-dominant or dominant for 23. *Cabomba caroliniana* was co-dominant or dominant for 15. Other taxa selected as co-dominants or dominants were *Myriophyllum heterophyllum* (2 teams, CC= 4.77) *Brasenia schreberi* (2 teams, CC=8.79), *Ceratophyllum demersum* (2 teams, CC=4.16), *Panicum hemitomom* (1 team, CC=5.82), and *Utricularia foliosa* (1 team, CC=5). All strata were represented in Carr Lake. The submersed stratum, characterized by *Cabomba caroliniana*, *Myriophyllum heterophyllum*, *Ceratophyllum demersum*, and *Utricularia foliosa* was the most abundant. *Utricularia gibba* (5 teams, CC=6.37) and *Hydrilla verticillata* (3 teams, CC=0), were other commonly observed submersed taxa. In addition to the *Nymphaea odorata* and *Brasenia schreberi*, the floating taxa included *Nelumbo lutea* (8 teams, CC=5.5), *Nuphar* sp. (8 teams, CC=3.5), *Eichornia crassipes* (6 teams, CC=0), *Ricciocarpus natans* (6 teams, no CC**), and *Nymphoides aquatica* (5 teams, CC=5.09). Common emergent taxa were *Bacopa caroliniana* (8 teams, CC=4.5), *Hydrocotyle* (8 teams, CC=2), *Pontederia cordata* (8 teams, CC=5.38), *Panicum hemitomom*, (8 teams, CC=5.82), *Juncus marginatus* (7 teams, CC=1.5), *Limnium spongia* (7 teams, CC=2.5), *Ludwigia arcuata* (7 teams, CC=3.5), *Sagittaria latifolia* (7 teams, CC=3.5), *Typha* (7 teams, CC=1), and *Eupatorium capillifolium* (7 teams, CC=0.83). The most common woody species was the shrub *Cephalanthus occidentalis* (8 teams, CC=5). Other commonly identified woody taxa were the trees *Salix caroliniana* (5 teams, CC=2.95) and *Taxodium* (4 teams, CC=7).

Lake Carr, Leon County (WBID 582C)

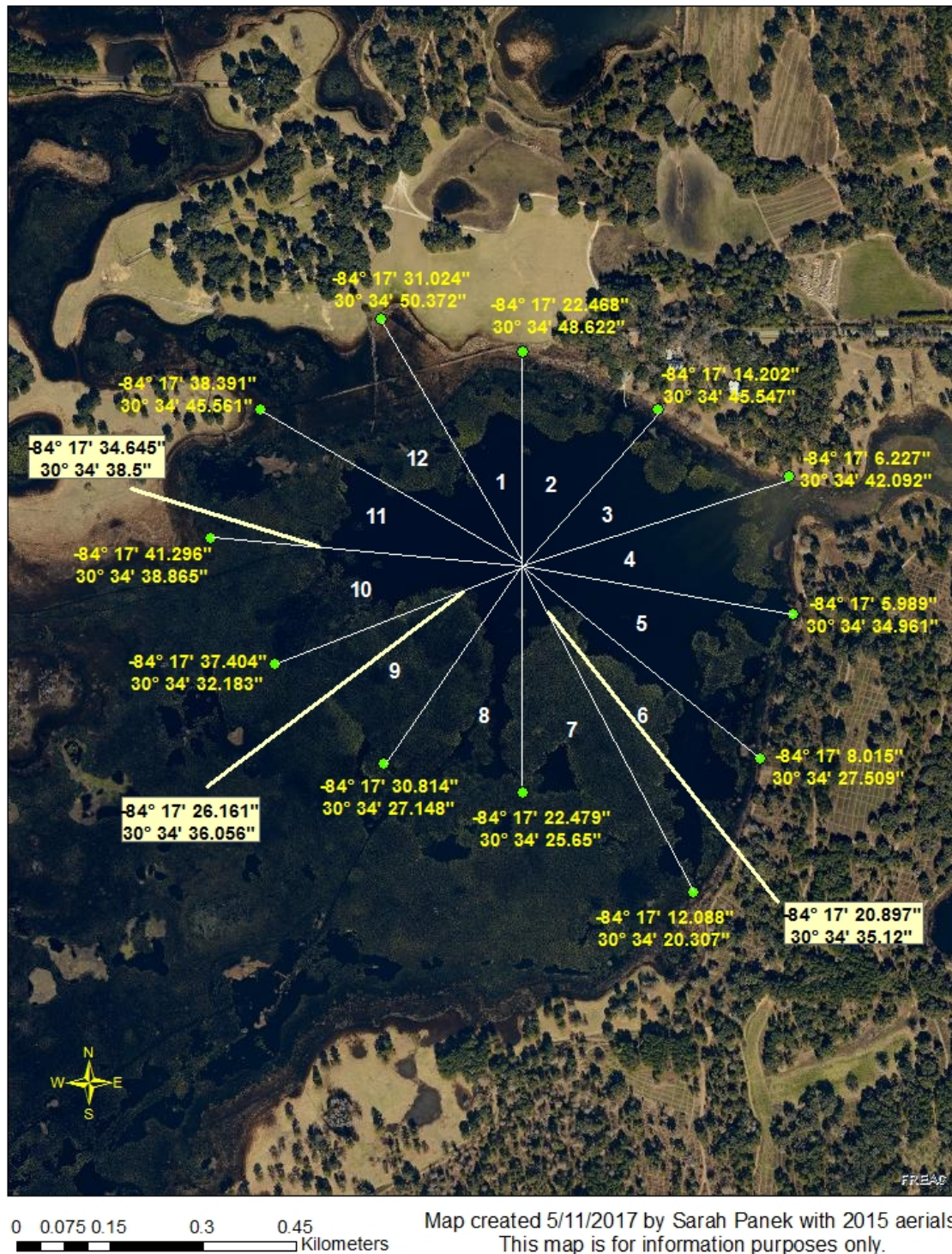


Figure 4. Lake Vegetation Index sampling map of Carr Lake.

Carr Lake Plant ID Discussion

All teams were within the acceptable scoring range, and the range was 11 points. In general, there was good accuracy and consistency in plant identification, but there were a few differences that are important to note. There were twelve taxa that were identified by all eight teams: *Bacopa caroliniana*, *Brasenia schreberi*, *Cabomba caroliniana*, *Cephalanthus occidentalis*, *Hydrocotyle*, *Myriophyllum heterophyllum*, *Nelumbo lutea*, *Nuphar*, *Nymphaea odorata*, *Panicum hemitomon*, *Pontederia cordata*, and *Xyris*. An additional ten taxa were identified by seven teams: *Ceratophyllum demersum*, *Eleocharis baldwinii*, *Eupatorium capillifolium*, *Habenaria repens*, *Juncus marginatus*, *Limnobia spongia*, *Ludwigia arcuata*, *Sagittaria latifolia*, *Typha*, and *Utricularia foliosa*. Other emergent taxa that were identified frequently (5 or 6 teams) were *Alternanthera philoxeroides*, *Decodon verticillatus*, *Juncus effusus*, *Polygonum hydropiperoides*, *Triadenum virginicum*, *Dulichium arundinaceum*, *Eleocharis equisetoides*, *Leersia hexandra*, and *Sagittaria lancifolia*. Other floating and submersed taxa that were identified frequently were *Eichornia crassipes*, *Ricciocarpus natans*, *Nymphoides aquatica*, and *Utricularia gibba*. The woody taxon *Salix caroliniana* also was identified frequently. 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 bottom, and there are several similar-looking species. *Utricularia foliosa* was identified by seven teams, but one team did not observe *Utricularia foliosa*, and did identify *Utricularia floridana* throughout the lake. This may have been only a mix up of the similar-sounding species names, or a true identification error. *Utricularia foliosa* is a free-floating submersed species, with robust, laterally-spreading, triangle-shaped branches and a pale, flat, strap-like main stem (Figure 5, top left). It is described as fern-like because of the triangular shape and thick spreading leaves. It also has separate, narrow, bladder-heavy branches (Figure 5, bottom right). *Utricularia floridana* has cylindrical, foxtail-like branches, that may fork, but do not have a spreading, triangular shape in the water (Figure 5, top right). Both species have a yellow, 2-lipped flower on an emergent stalk.

Polygonum hydropiperoides (6 teams) and *Polygonum punctatum* (3 teams) were both identified at Carr Lake (one team observed both species). These species are very similar-looking, and the best way to distinguish them is to look for punctate glands on the backs of the petals and sepals (this requires magnification, a hand-lens is sufficient), which *Polygonum punctatum* has, but *Polygonum hydropiperoides* does not (Figure 6).

Two taxa at Carr Lake that may have been overlooked by a few teams were *Dulichium arundinaceum* and *Ricciocarpus natans*. Neither of these species is particularly common in general, and both are somewhat small and inconspicuous, so samplers may not be familiar with them. They were patchy in their distributions in Carr Lake, but did occur throughout. *Dulichium* is a sedge, and is unusual for a sedge in that it has a leafy stem, with 3-ranked leaves that are perpendicular to the stem, and flowers are in the leaf axils, rather than terminal (Figure 7, left). *Ricciocarpus natans* is a small floater, and is a liverwort. *Ricciocarpus* has a bright green, deer-foot shaped “leaf,” with many purple scales (root-like)

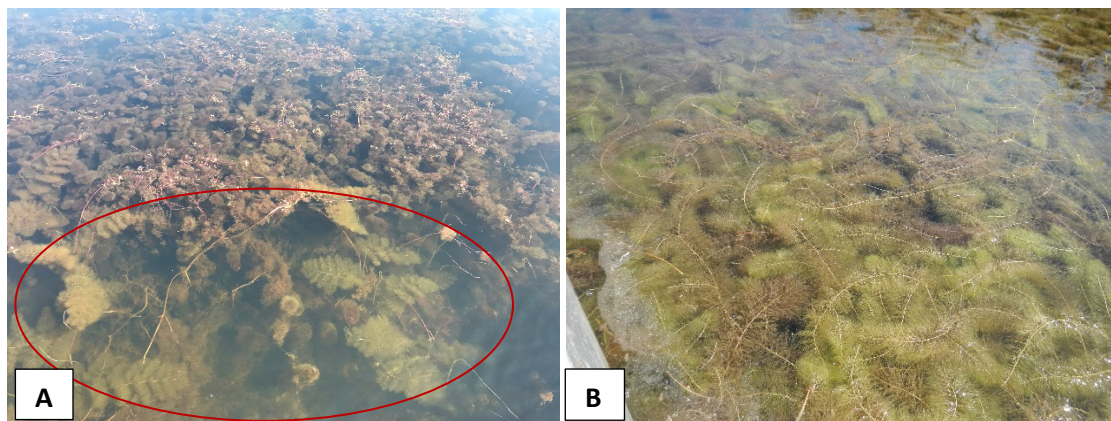
2017 LVI Proficiency Exercise Results

underneath, that aid in floating (Figure 7, right). It could be confused with the small floating ferns *Salvinia minima* or *Azolla filiculoides*.

The thick-stemmed species of emergent *Eleocharis* in Florida include *Eleocharis equisetoides*, *Eleocharis interstincta*, and *Eleocharis cellulosa*. *Eleocharis equisetoides* was identified by 5 teams, *Eleocharis cellulosa* was identified by 2 teams, and *Eleocharis interstincta* was identified by 1 team. All three species are robust, have spongy, aerenchymous tissue in their stems, and have a flowering spike that is not noticeably wider than the stem. Both *E. equisetoides* and *E. interstincta* have cross partitions along the stem, making it appear segmented (Figure 8, left). *Eleocharis cellulosa* does *not* have cross-partitions along the stem. *Eleocharis equisetoides* and *E. interstincta* are separated by their perianth bristles if achenes are present, but are difficult to speciate otherwise. *Eleocharis equisetoides* was verified by AEQAS staff post-sampling.

Decodon verticillatus (Figure 8, right) is a sprawling, shrubby plant that was identified at Carr Lake, but overlooked by a few teams. It has long, arching branches, and opposite lance-shaped leaves, and fuzzy, light colored stems. It has conspicuous pink flowers, but was not flowering during the June proficiency window. It was common on floating islands at Carr Lake. Floating islands are common in Carr Lake, and are variable in their species composition, containing a mix of emergent taxa (Figure 10).

Cyperus blepharoleptos (syn: *Oxycaryum cubense*, *Scirpus cubensis*) is a non-native sedge that may be spreading in north Florida. It is recognized by its slender, glossy, leafy stems (appearing “grassy”), dense growth, and tight, rounded, bur-like heads (Figure 9). In north Florida it has a single head per stem, and in peninsular Florida it has multiple heads. It commonly forms floating mats.



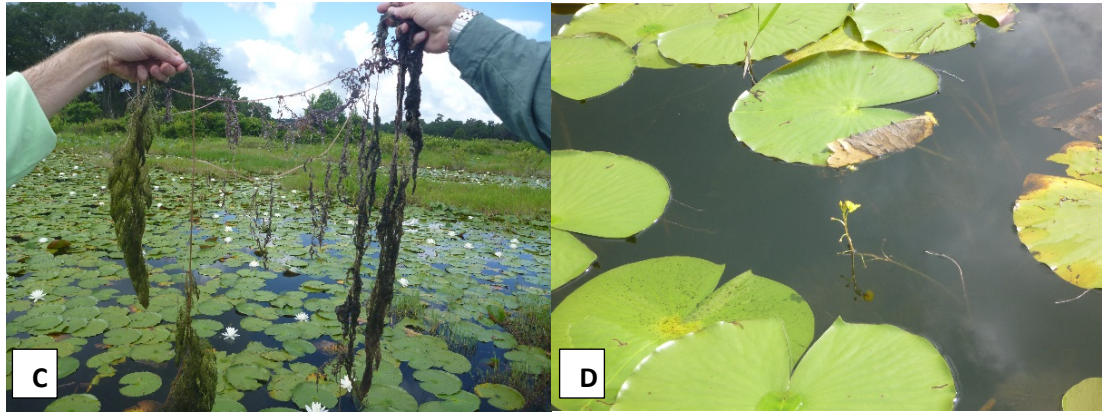


Figure 5.(A) *Utricularia foliosa* habit at Carr Lake, with *Cabomba caroliniana* in the background (top left, M. Dalsis); (B) *U. floridana* habit (top right, FDEP); *U. foliosa*. (C) Note the fern-like, expanded branches on the left, the more cylindric, bladder-bearing branches on the right, and the pale, flattened stem in between (bottom left, N. Mulkey). (D) *U. foliosa* emergent flower among *Nymphaea odorata* (bottom right, N. Mulkey);

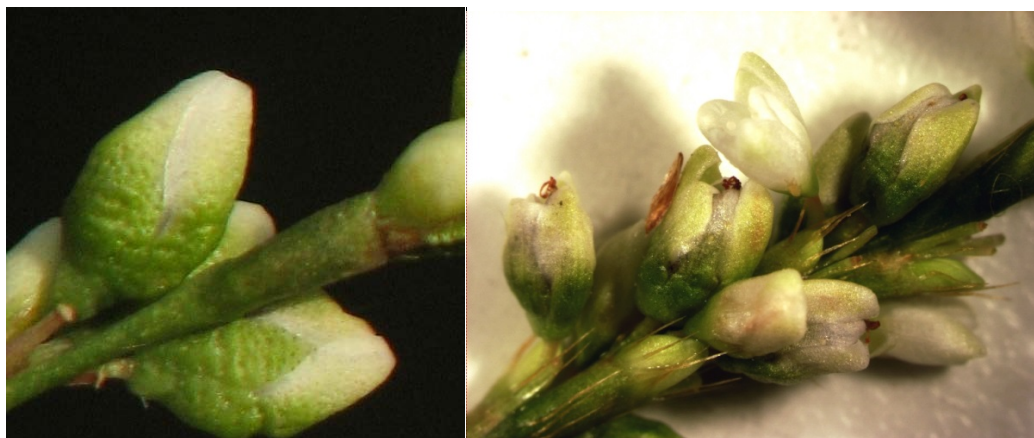


Figure 6. Close-up of punctate glands on *Polygonum punctatum* (left, R. Barth) and close up of *Polygonum hydropiperoides*, without glands (right, FDEP).



Figure 7. *Dulichium arundinaceum* (left, ISB Jean McCollum), and *Ricciocarpos natans* (right, N. Mulkey)



Figure 8. *Eleocharis equisetoides* (left, photo: N. Mulkey), and *Decodon verticillatus* (right, photo: M. Dalsis) at Carr Lake



Figure 9. Stand of *Cyperus blepharoleptos* at Carr Lake (syn. *Oxycaryum cubense*) (photo: N. Mulkey)



Figure 10. A floating island of vegetation at Carr Lake, with *Juncus marginatus*, *Eupatorium capillifolium*, *Bidens laevis*, and *Xyris* (photo: M. Dalsis)

Wildcat Lake Results

Wildcat Lake is a large, low color, low alkalinity lake in Lake County (Figure 11). Wildcat Lake is within a recreation area in the Ocala National Forest, and is surrounded by upland and wetland forests, and silvicultural areas. There is a public boat ramp in the northeastern lobe of the lake. The plant community is characterized by a mix of woody species (*Nyssa sylvatica biflora*, *Pinus elliotii*, *Cephalanthus occidentalis*), a wide band of the grass *Panicum hemitomon* and other emergent and floating taxa, and very few submersed plants.

Thirteen expert teams sampled Wildcat Lake within the proficiency sampling period, one non-expert team sampled one week after the sampling period, and one expert team sampled three months after the sampling period, but within the LVI sampling season (Table 5). Team LVI and metric scores and dominant/co-selections from Wildcat Lake are shown in Tables 6 and 7. The median LVI score for Wildcat Lake expert teams was 84, and the acceptable range was 72 – 96. During and immediately after the proficiency sampling period, all fourteen teams were within the acceptable range. The total number of taxa observed at Wildcat Lake ranged from 23 to 50 taxa, while the overall average number of taxa (± 1 standard deviation) per section was 25.4 (± 4.2). The average metric values (± 1 standard deviation) per lake section across all teams were as follows: 98.0 (± 2.5) % Native, 1.6 (± 2.5) % FLEPPC Category 1, 20.4 (± 2.2) % Sensitive, and dominant/co-dominant C of C of 5.9 (± 0.5) (Table 6). See Appendix A for team taxa lists.

Wildcat Lake, Lake County (WBID 2905C)



Figure 11. Lake Vegetation Index sampling map of Wildcat Lake.

Table 5. Teams, team abbreviations, team members, expert status, and sampling date for Wildcat Lake 2017 LVI Proficiency Demonstration

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP – AEQA	DEP AEQA	Expert	6/20/2017	Nia Wellendorf, Joy Jackson, Ashley O’Neal, Sarah Panek
DEP – Northeast ROC 1	DEP NE ROC 1	Expert	6/1/2017	Jeremy Parrish, Amy Kalmbacher
DEP – Northeast ROC 2	DEP NE ROC 2	Expert	6/1/2017	Pat O’Connor, Brian Davis
DEP – Central ROC	DEP CROC	Expert	6/14/2017	Katie Williams, Kalina Warren, Natalie Ayala, Leif Boman, Michael Linger, Mike Drennan, Terry Riordan
Noel Cawley	Cawley	Expert	6/8/2017	Noel Cawley
St. Johns River Water Management District	SJRWMD	Expert	6/15/2017	Dianne Hall, Kimberli Ponzio, Jodi Slater, Casey Harris
Southwest Florida Water Management District	SWFWMD	Expert	6/16/2017	Kym Rouse Holzwart, Donna Campbell, Mark Hurst, Sky Notestein
Breedlove Dennis and Associates	BDA	Expert	6/26/2017	Jennifer Rosinski, Sthefanny Houghton, Jonathan McCurry, Virginia Soumar
CDM Smith	CDM	Expert	6/13/2017	Brendan Brown, David Morris, Andrew Ryan
City of Orlando	Orlando	Expert	6/21/2017	Lisa Lotti, Steven Hollingsed, John Masters, Thomas Lightbody, Richard Copenhagen

2017 LVI Proficiency Exercise Results

Pinellas County	Pinellas	Expert	6/23/2017	Peggy Morgan, Julie Vogel, Robert Burnes
Orange County	Orange	Expert	6/26/2017	Tina McIntyre, Marson Nance, Tara Urbanik, Carolyn Schultz
Seminole County	Seminole	Expert	6/1/2017	Gloria Eby, Joey Cordell, Thomas Calhoun
Water and Air Research*	WAR	Non-Expert	7/5/2017	Barry Vance, Peter Nesmith
AMEC Foster Wheeler*	AMEC	Expert**	10/20/2017	Mary Szafranec, Shannon McMorrow, Joe Mansuetti, Kevin Shelton

* Team sampled outside of the June testing window. **Team was expert based on 2015 proficiency results, but their 2017 scores were not included in the median expert calculation because they sampled well outside of the June testing window.

Table 6. Summary results for each team at Wildcat Lake, 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 72-96.

Team	Sections Sampled	LVI	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC	Mean % Sensitive	Mean CC dom/codom
DEP AEQA	3, 6, 9, 12	85	44	28	99.0	0	16.8	6.6
DEP NE ROC 1	1, 4, 7, 10	88	31	20.8	98.6	1.4	24.1	5.8
DEP NE ROC 2	2, 5, 8, 11	90	32	22.0	100	0	23.8	5.8
DEP CROC	3, 6, 9, 12	84	48	30.8	97.5	0	17.7	6.4
Cawley	1, 4, 7, 10	84	50	27	98.4	1.6	20.6	5.8
SJRWMD	3, 6, 9, 12	86	44	30	98.2	1.8	21.9	6.1
SWFWMD	2, 5, 8, 11	81	36	24	95.7	3.4	20.0	5.8
BDA	3, 6, 9, 12	90	40	26	100	0	22.5	4.4
CDM	3, 6, 9, 12	87	23	17	100	0	21.2	5.8
Orlando	1, 4, 7, 10	73	31	20	90.9	9.1	20.0	5.8

2017 LVI Proficiency Exercise Results

Pinellas	1, 4, 7, 10	85	41	28	100	0	18.1	5.8
Orange	2, 5, 8, 11	81	35	24	96	4.0	20.9	5.8
Seminole	3, 6, 9, 12	84	38	28	98.3	0	17.6	6.1
WAR*	3, 6, 9, 12	86	41	30	99.3	0.7	19.9	6.1
AMEC*	2, 5, 8, 11	82	46	30	98.6	1.4	16.5	6.1

* Team sampled outside of the June testing window.

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

Team	Sections Sampled	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10, 11, 12 Dominants
DEP AEQA	3, 6, 9, 12	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>
DEP NE ROC 1	1, 4, 7, 10	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
NE ROC 2	2, 5, 8, 11	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
DEP CROC	3, 6, 9, 12	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon</i>
Cawley	1, 4, 7, 10	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
SJRWMD	3, 6, 9, 12	<i>Panicum hemitomon/Gordonia lasianthus</i>	<i>Panicum hemitomon/Gordonia lasianthus</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
SWFWMD	2, 5, 8, 11	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
BDA	3, 6, 9, 12	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	No dom/codom selected	<i>Panicum hemitomon</i>
CDM	3, 6, 9, 12	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>

2017 LVI Proficiency Exercise Results

Team	Sections Sampled	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10, 11, 12 Dominants
Orlando	1, 4, 7, 10	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
Pinellas	1, 4, 7, 10	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
Orange	2, 5, 8, 11	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>
Seminole	3, 6, 9, 12	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
WAR	3, 6, 9, 12	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>
AMEC	2, 5, 8, 11	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon</i>	<i>Panicum hemitomon/Cladium jamaicense</i>

There was excellent consistency in dominance selection among teams at Wildcat Lake. There were only three taxa selected as dominant or co-dominant: *Panicum hemitomon* (CC=5.82), *Cladium jamaicense* (CC=8), and *Gordonia lasianthus* (CC=7). Fourteen teams selected *Panicum hemitomon* as a dominant or co-dominant in all four lake sections. One team selected *P. hemitomon* as dominant in three sections, and did not assign dominance in one section. Seven teams selected *P. hemitomon* as dominant in all four lake sections. Six teams selected *Cladium jamaicense* and *Panicum hemitomon* as codominant in one, two, or three sections, and *Panicum hemitomon* as dominant in the remaining sections. One team selected *Panicum hemitomon* and *Gordonia lasianthus* as co-dominant in two sections and *Panicum hemitomon* as dominant in the remaining two sections.

The emergent and woody taxa zones covered extensive surface area in Wildcat Lake (Figures 13 and 14). Floating taxa were common, but not abundant. Submersed taxa were fairly sparse. Several teams reported no vegetation captured with the frotus. One dominant taxon was chosen for 46 of 56 sampling sections (45 of these were *Panicum hemitomon*), and two co-dominant taxa were chosen for 10 of 56 sampling units, indicating that if teams were following the LVI SOP, they were confident that *Panicum hemitomon* was twice as abundant as any other taxon in many of the sampling units. Photographs do support the selection of *Panicum hemitomon* as dominant in multiple sections (Figure 12).

2017 LVI Proficiency Exercise Results

There was variability among teams at Wildcat Lake in the total number of plants identified at the lake, ranging from 23-50 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. Patchiness in the distribution of plants, lake sections with more species, or different levels of effort in species-rich areas were likely responsible for the difference.



Figure 12. Abundant *Panicum hemitomon* at Wildcat Lake (top photo: Pinellas Co.; bottom photo: Orange Co.)



Figure 13. Photo of Wildcat Lake, showing in the distance an emergent fringe characterized by *Panicum hemitomon*, and a woody stratum with a mixture of *Gordonia lasianthus*, *Nyssa sylvatica* *biflora*, *Cephalanthus occidentalis*, *Magnolia virginiana*, and other woody species (photo: Orange County)

Wildcat Lake Plant ID Discussion

Plant identification was generally very consistent for Wildcat Lake. Between eleven and fifteen teams identified the trees and shrubs *Acer rubrum*, *Cephalanthus occidentalis*, *Gordonia lasianthus*, *Magnolia virginiana*, *Nyssa sylvatica biflora*, and *Pinus elliottii*. Additionally, *Ilex cassine* and *Taxodium* were identified by eight and nine teams, respectively. In the emergent zone, between eleven and fifteen teams identified *Panicum hemitomon*, *Cladium jamaicense*, *Fuirena scirpoidea*, *Pontederia cordata*, *Bidens mitis*, *Blechnum serrulatum*, *Eupatorium capillifolium*, *Leersia hexandra*, *Ludwigia suffruticosa*, *Triadenum virginicum*, *Woodwardia virginica*, and *Xyris*. Additionally, between eight and eleven teams identified *Hydrocotyle*, *Hypericum fasciculatum*, *Lachnanthes caroliana*, *Osmunda regalis*, *Pluchea*, and *Sabatia grandiflora*. The floating plants most commonly identified were *Nuphar* (15 teams) and *Nymphoides aquatica* (14 teams). Four teams identified *Nymphaea odorata* and one team identified *Brasenia schreberi*. Commonly identified submersed taxa were *Utricularia gibba* (7 teams) and *Utricularia purpurea* (4 teams). *Utricularia floridana* was identified by 2 teams. *Nitella*, *Utricularia cornuta*, *Utricularia radiata*, and *Vallisneria americana* were each identified by 1 team.

2017 LVI Proficiency Exercise Results

One plant group that was variably identified was the genus *Eleocharis*. Six teams identified *Eleocharis baldwinii*, two teams identified *Eleocharis elongata*, two teams identified *Eleocharis interstincta*, one team identified “submersed viviparous *Eleocharis*, unable to identify to species,” two teams identified *Eleocharis vivipara*, and four teams observed no *Eleocharis*. These taxa are often patchy and can be inconspicuous, and this may have contributed to the variable observations of this group among teams. This group is also very challenging to identify, with significant morphological plasticity, and this also may have contributed to the variable identifications. No *Eleocharis* was dominant or even abundant at Wildcat Lake, so they did not have a heavy influence on the scoring. It is still important, however, to recognize and identify these taxa correctly. Here are some tips for correctly identifying these taxa:

- Wiry, delicate specimens that have a mat-forming habit and short stems (<20 cm) can be identified as *Eleocharis baldwinii*, even without flowering or fruiting parts, because other wispy species do not form emergent mats like *E. baldwinii*.
- 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.
- Thin and wiry but *long-stemmed* (~20-80 cm) *Eleocharis*, that are typically emergent (sometimes weakly), with no vivipary, and usually red rhizomes, are likely *Eleocharis elongata*. (There is also similar *Eleocharis robbinsii* in the Panhandle)
- *Eleocharis interstincta* is a more robust emergent, with a flowering spike that is not wider than the stem, and stems with cross partitions that are visible without magnification and can be felt by running your fingers along the stem (similar to *Eleocharis equisetoides*). *Eleocharis equisetoides* and *E. interstincta* are separated by their perianth bristles if achenes are present,

but are difficult to speciate otherwise.



Figure 14. Photo of Wildcat Lake showing an emergent zone of *Panicum hemitomon*, followed landward by a zone of *Cladium jamaicense*, and then a mixed woody zone of *Pinus elliotii*, *Gordonia lasianthus*, *Nyssa sylvatica biflora* and other species (photo: SWFWMD)

Another taxon that was challenging for some teams at Wildcat Lake was *Leersia hexandra*. *Leersia* was common throughout the lake. Twelve of fifteen teams identified *Leersia hexandra* in three or four sampling sections. Three teams did not identify *Leersia* at all, but did identify *Panicum repens* in three sampling sections, which bears a resemblance to *Leersia*. Both taxa were likely present, because two teams identified *both taxa* (*Panicum repens* in one or two sections in addition to the *Leersia* in three or four), but it is suspected that the more common *Leersia* was mistakenly identified as *Panicum repens* by those teams that did not identify *Leersia* as well. Both *Leersia hexandra* and *Panicum repens* are slender, short (shorter than *Panicum hemitomon* or *Sacciolepis striata*, for example) light-green grasses (Figure 15). *Leersia* can be distinguished by its stiffly ascending habit, the even height of its leaves (it looks like it has a fresh haircut), the roughness of the leaf margins (sharp enough to cut your skin), a ring of short white hairs at its nodes, and its light peachy-tan inflorescence. *Panicum repens* has a more variable leaf height, leans over in the water, has distinctive torpedo-like white rhizome tips, and when viewed closely, has a bright orange and purple inflorescence (Figure 16).



Figure 15. *Leersia hexandra* at Wildcat Lake (left, photo: City of Orlando) and *Panicum repens* in the Apalachicola National Forest (right, photo: DEP AEQA)



Figure 16. *Leersia hexandra* inflorescence (left, photo: Guy Anglin, ISB) and *Panicum repens* inflorescence in the Apalachicola National Forest (right, photo: DEP AEQA)

Little Redwater Lake Results

Little Redwater Lake is a large lake in Highlands County that is in a mixed land use setting (Figure 17). The land uses around the lake are primarily orange groves and residential development. The plant community is co-dominated by a mixed emergent zone (*Pontederia cordata*, *Ludwigia peruviana*, *Typha latifolia*, *Panicum hemitomon*, *Panicum repens*, and *Fuirena scirpoidea*), floating zone (*Nuphar*), woody zone (*Salix caroliniana*) with an abundance of submersed plants as well (several species of *Utricularia* and submersed *Eleocharis*).

2017 LVI Proficiency Exercise Results

Eight expert teams and one non-expert team sampled Little Redwater Lake within the sampling period (Table 8). Team LVI and metric scores and dominant selections from Little Redwater Lake are shown in Tables 9 and 10. The median LVI score for Little Redwater Lake expert teams was 43 and the acceptable range of LVI was 31-55. All nine teams were within the acceptable range. The total number of taxa (± 1 standard deviation) observed at Little Redwater Lake ranged from 38 to 60 taxa, while the overall average number of taxa per section was 29.3. The average (± 1 standard deviation) metric values per lake section across all teams were as follows: 80.7 (± 2.3) % Native, 11.1 (± 1.7) % FLEPPC Category 1, 2.9 (± 2.2) % Sensitive, and dominant/co-dominant C of C of 3.5 (± 1.7) (Table 9). See Appendix A for team taxa lists.

Little Redwater Lake, Highlands Co. (WBID 1842A)



Figure 17. Lake Vegetation Index sampling map of Little Redwater Lake.

2017 LVI Proficiency Exercise Results

Table 8. Teams, team abbreviations, team members, expert status, and sampling date for Little Red Water Lake 2017 LVI Proficiency demonstration.

Team	Team Abbreviation	Status	Date Sampled	Team Members
DEP Southwest ROC 1	DEP SWROC 1	Expert	6/20/2017	Sarah Meyer, Matt Bearden, Dylan Horning, Hannah Sprinkle
DEP Southwest ROC 2	DEP SWROC 2	Expert	6/26/2017	Judy Ashton, Catie Orr, Laurie Bachler
DEP South ROC	DEP S ROC	Expert	6/22/2017	Kirby Wolfe, Ben Paswater, Chase Conley
DEP Southeast ROC	DEP SE ROC	Expert	6/29/2017	Ashley Hurley, Jordan Skaggs, Matt Sewell, James Pitts, Drew Liddick
Highlands County	Highlands	Expert	6/1/2017	Clell Ford, Mike McMillian, JD Foster
City of Lakeland	Lakeland	Non-Expert	6/26/2017	Sandra Pope, Cody O'Gorman, Jessica Schilling, Jessie Glenn
USF Water Institute	USF	Expert	6/1/2017	David Eilers, Jacqueline Perry Cahanin
Cardno	Cardno	Expert	6/22/2017	Sheri Huelster, Erin Snyder, Brad Morris, J. Lancaster
DEP AEQA	AEQA	Expert	6/20/2017	Joy Jackson, Nia Wellendorf, Sarah Panek, Ashley O'Neal

Table 9. Summary results for each team at Little Redwater Lake, 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 31-55.

Team	Sections	LVI	Total Taxa	Mean # Taxa	Mean % Native	Mean % FLEPPC	Mean % Sensitive	Mean CC_Dom_Co dom
DEP SWROC 1	3, 6, 9, 12	40	45	26	78.1	12.4	2.0	3.2
DEP SWROC 2	1, 4, 7, 10	32	47	29	78.0	9.6	0.9	0.8
DEP S ROC	2, 5, 8, 11	54	58	36	81.7	8.0	7.7	7.0
DEP SE ROC	3, 6, 9, 12	38	60	31	77.7	13.2	3.3	2.5
Highlands	3, 6, 9, 12	47	48	28	81.8	11.9	3.9	3.6
Lakeland	1, 4, 7, 10	51	59	33	82.4	11.8	3.3	4.7
USF	3, 6, 9, 12	45	38	25	79.9	11.9	2.7	3.8
Cardno	2, 5, 8, 11	41	44	26	82.8	11.3	0	2.8

2017 LVI Proficiency Exercise Results

AEQA	1, 4, 7,10	47	49	30	84.0	9.4	2.1	2.9
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Table 10. Dominant and co-dominant taxa selected at Little Redwater Lake.

Team	Sections	Section 1,2,3 Dominants	Section 4,5,6 Dominants	Section 7,8,9 Dominants	Section 10,11,12 Dominants
DEP SWROC 1	3, 6, 9, 12	<i>Salix caroliniana</i>	<i>Ludwigia peruviana</i>	<i>Pontederia cordata/Panicum hemitomom</i>	<i>Pontederia cordata/Nuphar</i>
DEP SWROC 2	1, 4, 7, 10	<i>Ludwigia peruviana</i>	<i>Ludwigia peruviana</i>	<i>Ludwigia peruviana/Typha</i>	<i>Pontederia cordata/Ludwigia peruviana</i>
DEP S ROC	2, 5, 8, 11	<i>Nuphar/Salix caroliniana</i>	<i>Ludwigia (unknown nativity)</i>	<i>Pontederia cordata</i>	<i>Pontederia cordata/Nuphar</i>
DEP SE ROC	3, 6, 9, 12	<i>Salix caroliniana</i>	<i>Ludwigia peruviana</i>	<i>Pontederia cordata/Panicum repens</i>	<i>Pontederia cordata/Nuphar</i>
Highlands	3, 6, 9, 12	<i>Pontederia cordata/Eleocharis baldwinii</i>	<i>Typha/Nuphar</i>	<i>Ludwigia peruviana/Eleocharis baldwinii</i>	<i>Pontederia cordata/Myriophyllum laxum</i>
Lakeland	1, 4, 7, 10	<i>Pontederia cordata</i>	<i>Typha/Panicum hemitomom</i>	<i>Pontederia cordata</i>	<i>Pontederia cordata/Nuphar</i>
USF	3, 6, 9, 12	<i>Panicum hemitomom/Nuphar</i>	<i>Pontederia cordata/Ludwigia peruviana</i>	<i>Pontederia cordata/Nuphar</i>	<i>Nuphar</i>
Cardno	2, 5, 8, 11	<i>Ludwigia peruviana/Salix caroliniana</i>	<i>Ludwigia peruviana</i>	<i>Pontederia cordata</i>	<i>Pontederia cordata/Nuphar</i>
AEQA	1, 4, 7,10	<i>Ludwigia leptocarpa/Nuphar</i>	<i>Typha/Nuphar</i>	<i>Pontederia cordata/Ludwigia peruviana</i>	<i>Nuphar</i>

There are several items to note about the decision-making regarding dominance selection among teams at Little Redwater Lake. All nine teams selected two co-dominants for at least two of their four lake sections. Of the total of 36 sampling units, 22 had two co-dominant taxa assigned and 14 had one dominant taxon assigned. There were no sections with no dominant taxa assigned. Little Redwater was a challenging lake for the assignment of dominance because there were multiple abundant taxa. There were ten different taxa chosen as codominant or dominant. In addition, there were a few other taxa

that also were abundant, including *Fuirena scirpoidea*, *Schoenoplectus californicus*, and *Polygonum glabrum*. There was a strong presence of emergent, floating, and submersed plant strata in the lake. Emergent, floating, and woody taxa were all selected as dominant or codominant taxa. The most frequently selected dominant/co-dominant was *Pontederia cordata* (17 instances), followed by *Nuphar* (13), and *Ludwigia peruviana* (11). All 9 teams chose both *Pontederia* and *Ludwigia peruviana* in at least one section, and 8 teams chose *Nuphar* in at least one section. *Salix caroliniana*, *Panicum hemitomon*, and *Typha* were all chosen by three teams. Four additional taxa were chosen by one team each.

Little Redwater Lake Plant ID Discussion

Identifications of the most frequently encountered taxa at Little Redwater Lake appear correct and consistent. Less abundant and more patchily distributed taxa were more challenging. Teams were divided on how many and which *Eleocharis* and *Utricularia* species were present. Seven of nine teams identified *Eleocharis baldwinii* in more than one section, and one team identified it as a codominant in two sections. *E. baldwinii* has a submersed form that is thin and wiry, and is viviparous (produces plantlets at the tips of the stems). *Eleocharis vivipara* and *E. acicularis* are two other slender, submersed species that are viviparous. When emerged, *E. baldwinii* typically forms compact, dense mats, that are often extensive in area. The other submersed viviparous species do not have the same emergent habit. If only the submersed form is observed, the LVI Primer instructs to choose “submersed viviparous *Eleocharis*” for these taxa, instead of identifying them to the species level. A C of C score has been established for the “submersed viviparous *Eleocharis*” as a group, so no information is lost when this assignment is made. *Eleocharis cellulosa*, *Eleocharis equisetoides*, *Eleocharis interstincta*, and *Eleocharis elongata* were all identified by one or two teams at Little Redwater Lake. None of these taxa were abundant in the lake, and all may have been restricted in their distribution. *Eleocharis cellulosa* is a robust emergent, with a thick, somewhat spongy, round stem. *Eleocharis equisetoides* and *E. interstincta* are also robust emergents, but have septate stems (cross partitions that are visible, even on the exterior of the stems). *Eleocharis equisetoides* and *E. interstincta* are separated by their perianth bristles if achenes are present, but are difficult to speciate otherwise. *Eleocharis elongata* is long, but slender and wiry, and can be submersed or emergent (When it is emergent, it tends to be lax or can even float). It is much longer than any of the submersed viviparous *Eleocharis*, and does not sprout at the tips of the stems.

Eight of nine teams identified *Utricularia gibba* (Figure 18, left). One or two teams identified *U. purpurea*, *U. inflata*, *U. radiata*, *U. foliosa*, *U. floridana*, and *U. subulata*. *Utricularia* species can usually be identified in the field, even without flowers. *Utricularia gibba* is very common and has thin strands with single, thread-like leaves. It is often pulled up on the frotus in a tangled mat. *Utricularia purpurea* floats below the surface and has dissected leaves in whorls of four around the stem, giving it a “puff-ball” appearance (Figure 18, right). *Utricularia inflata* and *U. radiata* have dissected leaves that appear opposite, as well as a whorl of elongated floats that appears before flowering and supports the flower stalk (the whorl is not present early in the growing season). The key differences between *U. inflata* and *U. radiata* are that *U. inflata* is a larger, more robust plant, and its leaves are unequal in their size and divisions, while *U. radiata* is more delicate and has leaves are equal in their size and divisions. *Utricularia foliosa* has a flat main stem and distinctive fern like leaves that have an overall triangular

appearance in the water, while *U. floridana* has cylindric, foxtail-like branches (see Figure 5 above and the discussion in the Carr Lake section). *Utricularia subulata* is one of the smallest species of *Utricularia*, and is rooted in the substrate rather than being free-floating.



Figure 18. *Utricularia gibba* (left) and *Utricularia purpurea* at Little Redwater Lake (right) (photos: DEP)

Conclusions

Results for the 2017 LVI Proficiency exercise indicate that all participating teams are eligible to submit LVI data to DEP. All teams were within the passing range of scores, and variability in dominance selection and plant identification was reduced when compared to prior years. There was, however, notable variability in plant identification in a few groups of plants. Guidance is still needed on the identification of the genera *Eleocharis* and *Utricularia*, and the grasses *Leersia hexandra* and *Panicum repens*. 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.

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 audit registry, <http://fldeploc.dep.state.fl.us/sci/query.asp>.

Appendix A – Taxa Lists for Carr Lake, Wildcat Lake, and Little Redwater Lake during June 2017 LVI Proficiency Testing

Carr Lake

number of lake sections in which team observed taxon

Carr Lake Taxa Observed	Tallahassee	Leon County	FRECO	DEP GW	DEP WAS	DEP NWROC	DEP AEQA	DEP BIO/ROC	# of teams that observed taxon
<i>Acer rubrum</i>		2				1	1		3
<i>Alternanthera philoxeroides</i>		1	1	2	2		1	1	6
<i>Ampelopsis arborea</i>		1		3					2
<i>Andropogon</i>			2				1		2
<i>Andropogon glomeratus</i>						1			1
<i>Andropogon virginicus</i>	1	2							2
<i>Baccharis halimifolia</i>		1							1
<i>Bacopa caroliniana</i>	2	4	4	3	3	3	4	4	8
<i>Bidens laevis</i>					3	4	2	3	4
<i>Bidens mitis</i>	1	2							2
<i>Boehmeria cylindrica</i>		2		4		1		1	4
<i>Brasenia schreberi</i>	3	3	4	4	4	4	4	4	8
<i>Cabomba caroliniana</i>	4	3	4	4	4	4	4	4	8
<i>Campsis radicans</i>		1							1
<i>Carex albolutescens</i>			1						1
<i>Centella asiatica</i>				2					1
<i>Cephalanthus occidentalis</i>	4	4	3	4	3	3	4	4	8
<i>Ceratophyllum demersum</i>	4	3	3	4	4		2	4	7
<i>Chara</i>						2			1
<i>Cladium jamaicense</i>							1		1
<i>Cyperus odoratus</i>	1			4			1	2	4
<i>Decodon verticillatus</i>	4	1		3	3		4	4	6
<i>Diospyros virginiana</i>		3		2					2
<i>Dulichium arundinaceum</i>		2	1			2	3	4	5
<i>Eclipta prostrata</i>				3					1
<i>Eichhornia crassipes</i>		3	1	2		3	1	4	6
<i>Eleocharis</i>	3								1
<i>Eleocharis</i> (submersed viviparous but unable to ID to species)			1						1
<i>Eleocharis baldwinii</i>	1	2	3	3	3	2	3		7
<i>Eleocharis cellulosa</i>		1		2					2

2017 LVI Proficiency Exercise Results

Carr Lake Taxa Observed	Tallahassee	Leon County	FRECO	DEP GW	DEP WAS	DEP NWROC	DEP AEQA	DEP BIO/ROC	# of teams that observed taxon
<i>Eleocharis equisetoides</i>	1	1	2			1		1	5
<i>Eleocharis interstincta</i>							3		1
<i>Eleocharis submersed viviparous (species unknown)</i>							1	4	2
<i>Eleocharis vivipara</i>				1					1
<i>Eriocaulon compressum</i>							1		1
<i>Eupatorium capillifolium</i>	2	2		4	2	3	3	3	7
<i>Eupatorium leptophyllum</i>	2		2						2
<i>Fuirena breviseta</i>								2	1
<i>Fuirena pumila</i>	2	1		4			1		4
<i>Fuirena squarrosa</i>			2						1
<i>Habenaria repens</i>		4	1	4	1	1	1	2	7
<i>Hydrilla verticillata</i>		1		2		2			3
<i>Hydrocotyle</i>	3	3	4	4	3	3	4	4	8
<i>Hypericum tetrapetalum</i>			1						1
<i>Ipomoea</i>						1			1
<i>Juncus effusus</i>	2	2		4	3		2	3	6
<i>Juncus marginatus</i>		4	3	4	3	1	3	4	7
<i>Juncus trigonocarpus</i>						1			1
<i>Leersia hexandra</i>			1	4		2	1	3	5
<i>Lemna</i>				4					1
<i>Limnobiium spongia</i>	1	2		4	1	2	1	2	7
<i>Liquidambar styraciflua</i>		2		3					2
<i>Ludwigia (unknown nativity)</i>						2			2
<i>Ludwigia arcuata</i>	3	3		4	3	2	1	4	7
<i>Ludwigia leptocarpa</i>		4	3		2		2		4
<i>Ludwigia linearis</i>				3				4	2
<i>Ludwigia octovalvis</i>	3								1
<i>Ludwigia suffruticosa</i>							3		1
<i>Ludwigia virgata</i>			1						1
<i>Luziola fluitans</i>					1		1		2
<i>Lycopus</i>						2			1
<i>Lycopus americanus</i>			1						1
<i>Lycopus rubellus</i>		2							1
<i>Mayaca fluviatilis</i>			1						1
<i>Myrica cerifera</i>		1							1
<i>Myriophyllum (unknown nativity)</i>						1			1

2017 LVI Proficiency Exercise Results

<i>Carr Lake</i> Taxa Observed	Tallahassee	Leon County	FRECO	DEP GW	DEP WAS	DEP NWROC	DEP AEQA	DEP BIO/ROC	# of teams that observed taxon
<i>Scirpus cyperinus</i>		1			1		1		3
<i>Solidago fistulosa</i>		1							1
<i>Taxodium</i>	2			1	1				3
<i>Taxodium ascendens</i>		1							1
<i>Teucrium canadense</i>				1					1
<i>Triadenum virginicum</i>	2	4	2			2	4	4	6
<i>Typha</i>	1	2	2	2	2	2		1	7
<i>Utricularia floridana</i>			4						1
<i>Utricularia foliosa</i>	4	4		4	4	4	4	4	7
<i>Utricularia gibba</i>	2	2			3		4	4	5
<i>Utricularia purpurea</i>		3							1
<i>Vitis rotundifolia</i>		1		3					2
<i>Woodwardia virginica</i>				1					1
<i>Xyris</i>	3	4	3	4	2	3	3	4	8
TOTAL TAXA PER TEAM	38	63	43	52	37	46	51	45	

Wildcat Lake*number of lake sections in which team observed taxon*

Wildcat Lake Taxa Observed	BDA	CDM	Pinellas	Cawley	SWFWMD	SLRWMD	WAR	Orange	City of Orlando	Seminole	DEP NE ROC1	DEP CROC	DEP AEQA	DEP NE ROC2	# teams that observed taxon
<i>Acer rubrum</i>	3		4	4		4	3	3	4	3	4	3	3	3	12
<i>Acmella oppositifolia repens</i>					3										1
<i>Alternanthera philoxeroides</i>													1		1
<i>Andropogon</i>					1					2		2			3
<i>Andropogon virginicus</i>						2									1
<i>Baccharis</i>												1			1
<i>Bacopa monnieri</i>			1												1
<i>Bidens alba</i>				1											1
<i>Bidens laevis</i>				4	4										2
<i>Bidens mitis</i>	4		4			4	4	4	3	4	4	4	4	4	11
<i>Blechnum serrulatum</i>	3	4	3	2	2	3	3	2		3		1	3		11
<i>Brasenia schreberi</i>						4									1
<i>Cephalanthus occidentalis</i>	4	3	4	4	4	4	4	4	4	4	4	4	4	4	14
<i>Cladium jamaicense</i>	4	4	4	4	4	4	4	4	4	4	4	4	4	4	14
<i>Cornus foemina</i>									1						1
<i>Cyperus odoratus</i>				1											1
<i>Cyperus polystachyos</i>			1												1
<i>Cyperus surinamensis</i>				1											1
<i>Dioscorea bulbifera</i>							1								1
<i>Drosera brevifolia</i>			1												1
<i>Drosera capillaris</i>				1											1
<i>Echinochloa walteri</i>	1			1											2
<i>Eleocharis baldwinii</i>			2	3	3			1		3					5
<i>Eleocharis elongata</i>												3	3		2

2017 LVI Proficiency Exercise Results

Wildcat Lake	BDA	CDM	Pinellas	Cawley	SWFWMD	SJRWMD	WAR	Orange	City of Orlando	Seminole	DEP NE ROC1	DEP CROC	DEP AEQA	DEP NE ROC2	# teams that observed taxon
Taxa Observed															
<i>Eleocharis interstincta</i>		1					2								2
<i>Eleocharis submersed viviparous (species unknown)</i>												2			1
<i>Eleocharis vivipara</i>														4	1
<i>Erechtites</i>												3			1
<i>Erechtites hieracifolia</i>	2		4	3		3	3						3		6
<i>Eriocaulon compressum</i>			2			2				3			1		4
<i>Eriocaulon decangulare</i>	1						3			1	3	2	1		6
<i>Eupatorium capillifolium</i>		4	4	3	4	4		4	4	4	4	4	4	4	12
<i>Eupatorium leptophyllum</i>	4						4								2
<i>Euthamia caroliniana</i>							1								1
<i>Fraxinus</i>												1			1
<i>Fuirena scirpoidea</i>	3	4	4	4	4	3	4	4	2	3	3	3	4	3	14
<i>Gordonia lasianthus</i>	4	4	4	4	4	4	4	4	4	3	4	4	4	4	14
<i>Habenaria repens</i>						1		1							2
<i>Hydrocotyle</i>	1		3	2			4	1	2	2		4	3	1	10
<i>Hydrocotyle umbellata</i>						2									1
<i>Hypericum</i>				2											1
<i>Hypericum fasciculatum</i>	2	3	2		1	2	2		2	2	1	2	2		11
<i>Ilex cassine</i>	2				4	2	2	4		4				2	7
<i>Itea virginica</i>			1	1								1			3
<i>Lachnanthes caroliniana</i>	1	1	2	1	1	2	3	2		3		1	3		11
<i>Lachnocaulon</i>												2			1
<i>Lachnocaulon anceps</i>									2						1
<i>Lachnocaulon minus</i>				2											1
<i>Leersia hexandra</i>	4	4	4	3		4	4			4	4	4	4	3	11

2017 LVI Proficiency Exercise Results

Wildcat Lake															
Taxa Observed	BDA	CDM	Pinellas	Cawley	SWFWMD	SJRWMD	W/AR	Orange	City of Orlando	Seminole	DEP NE ROC1	DEP CROC	DEP AEQA	DEP NE ROC2	# teams that observed taxon
<i>Leucothoe racemosa</i>													1		1
<i>Limnophila sessiliflora</i>					1										1
<i>Liquidambar styraciflua</i>				1	1			1							3
<i>Ludwigia octovalvis</i>					1										1
<i>Ludwigia peruviana</i>				1				1	1		1				4
<i>Ludwigia repens</i>				2	1	4									3
<i>Ludwigia suffruticosa</i>	4		3	1		3	4	3	2	3		4	4	4	11
<i>Lycopodium appressum</i>				2											1
<i>Lyonia lucida</i>	2			1	2		3				2	2	1		7
<i>Magnolia virginiana</i>	4		3	3	2	3	3	3	2	4	4	4	1	4	13
<i>Mikania scandens</i>					1	1	1			1					4
<i>Myrica cerifera</i>	3	4	4	4	3	4	3	4	4	4	3	4	4		13
<i>Nitella</i>		2													1
<i>Nuphar</i>	4	4	4	4	4	4	4	4	4	4	3	4	4	4	14
<i>Nymphaea odorata</i>	3		2										1		3
<i>Nymphoides aquatica</i>	2	4	2	3	4	3	4	4		4	1	3	4	4	13
<i>Nymphoides cristata</i>									2						1
<i>Nyssa sylvatica biflora</i>	4	1	3	4	4	3	4	4		1	4	3	3	4	13
<i>Oldenlandia uniflora</i>							1								1
<i>Osmunda cinnamomea</i>														1	1
<i>Osmunda regalis</i>	1				2	2	2	2	2	1		1	1	4	10
<i>Panicum hemitomom</i>	4	4	4	4	4	4	4	4	4	4	4	4	4	4	14
<i>Panicum repens</i>				1	3	2		3	3						5
<i>Paspalum repens</i>														1	1
<i>Peltandra</i>	1														1
<i>Persea</i>												1		1	2

2017 LVI Proficiency Exercise Results

[illegible]

2017 LVI Proficiency Exercise Results

Wildcat Lake	BDA	CDM	Pinellas	Cawley	SWFWMD	SJRWMD	W/AR	Orange	City of Orlando	Seminole	DEP NE ROC1	DEP CROC	DEP AEQA	DEP NE ROC2	# teams that observed taxon
Taxa Observed															
<i>Smilax laurifolia</i>						3						3			2
<i>Solidago</i>	1		1												2
<i>Syngonanthus flavidulus</i>							1								1
<i>Taxodium</i>	1	1		1	2	1		2		1		1	1	1	10
<i>Thelypteris palustris pubescens</i>								2							1
<i>Toxicodendron radicans</i>						1									1
<i>Triadenum virginicum</i>	2		3		1	4	4	4	2	4	3	4	4	4	12
<i>Typha</i>			1												1
<i>Urochloa mutica</i>									1						1
<i>Utricularia cornuta</i>								1							1
<i>Utricularia floridana</i>											1		1		2
<i>Utricularia gibba</i>			1	1	3					2		3	2	1	7
<i>Utricularia purpurea</i>				1						3		2	1		4
<i>Utricularia radiata</i>														4	1
<i>Vallisneria americana</i>	1														1
<i>Vitis</i>	4										1	3	2		4
<i>Vitis rotundifolia</i>				4		4	1	4		4					5
<i>Woodwardia areolata</i>								1			1	1			3
<i>Woodwardia virginica</i>	3	3	4	2	4		4	4	2	3	2	3	3		12
<i>Xyris</i>	2	3	2	1	3		2	2	2	4	2	4	2		12
<i>Xyris elliotii</i>				2											1
TOTAL TAXA PER TEAM	40	23	41	50	36	44	41	35	31	38	31	48	44	32	

2017 LVI Proficiency Exercise Results

Little Redwater Lake

number of lake sections in which team observed taxon

Little Redwater Lake Taxa Observed	Highlands	USF	Cardno	Lakeland	DEP AEQA	DEP SWROC 1	DEP SWROC 2	DEP SEROC	DEP SROC	# teams observed taxon
<i>Acer rubrum</i>	1	2	3	1		2	2	2	3	8
<i>Aeschynomene indica</i>			2							1
<i>Alternanthera philoxeroides</i>	3	4	3	4	2	4	3	3	4	9
<i>Andropogon</i>							3			1
<i>Andropogon glomeratus</i>		1								1
<i>Azolla caroliniana</i>	1				2		2	1	3	5
<i>Baccharis</i>								1		1
<i>Bidens alba</i>			1	1		1		2		4
<i>Bidens mitis</i>	1				1	1	1	2		5
<i>Blechnum serrulatum</i>									1	1
<i>Cabomba caroliniana</i>	1								1	2
<i>Centella asiatica</i>					1					1
<i>Cephalanthus occidentalis</i>	3	3	1	4	4	1	4	3	3	9
<i>Ceratopteris pteridoides</i>	1									1
<i>Cladium jamaicense</i>	1				1				1	3
<i>Colocasia esculenta</i>	1			1						2
<i>Cyperus esculentus</i>				1						1
<i>Cyperus haspan</i>			4	2	1	2	1	2	3	7
<i>Cyperus lecontei</i>	2		1	1		2		1	2	6
<i>Cyperus odoratus</i>	1			3	2	4	2	4	2	7
<i>Cyperus polystachyos</i>			2	1						2
<i>Cyperus surinamensis</i>			2	1		1				3

2017 LVI Proficiency Exercise Results

Little Redwater Lake Taxa Observed	Highlands	USF	Cardno	Lakeland	DEP AEQA	DEP SWROC 1	DEP SWROC 2	DEP SEROC	DEP SROC	# teams observed taxon
<i>Diodia virginiana</i>				1	1		1			3
<i>Eclipta prostrata</i>			1				1			2
<i>Eleocharis</i> (submersed viviparous but unable to ID to species)			4							1
<i>Eleocharis baldwinii</i>	4	4			2	2	3	1	4	7
<i>Eleocharis cellulosa</i>					1			1		2
<i>Eleocharis elongata</i>					1					1
<i>Eleocharis equisetoides</i>									3	1
<i>Eleocharis interstincta</i>				2		1				2
<i>Eleocharis submersed viviparous (species unknown)</i>					3				3	2
<i>Eleocharis vivipara</i>						3		2		2
<i>Eupatorium capillifolium</i>	1	1	3	3	3	4	4	3	2	9
<i>Eupatorium leptophyllum</i>			2							1
<i>Fuirena scirpoidea</i>	3	3	2	4	3	3	3	2	3	9
<i>Galium tinctorium</i>					1					1
<i>Gordonia lasianthus</i>		1								1
<i>Habenaria repens</i>	1	1			1					3
<i>Hydrocotyle</i>	4	4	4	4		4	4	4	4	8
<i>Hydrocotyle umbellata</i>					4					1
<i>Ilex cassine</i>		2	1							2
<i>Juncus marginatus</i>				1				2		2
<i>Juncus megacephalus</i>								2		1
<i>Lachnanthes caroliniana</i>	2		1	4	4	3	4	2		7
<i>Landoltia punctata</i>								1		1

2017 LVI Proficiency Exercise Results

Little Redwater Lake Taxa Observed	Highlands	USF	Cardno	Lakeland	DEP AEQA	DEP SWROC 1	DEP SWROC 2	DEP SEROC	DEP SROC	# teams observed taxon
<i>Oxycaryum cubense</i>	4	4	1	2	4					5
<i>Panicum hemitomom</i>	4	4	4	4	4	4	4		4	8
<i>Panicum repens</i>	4	2	3	4	4	4	4	4	4	9
<i>Paspalidium geminatum</i>								4	3	2
<i>Paspalum repens</i>									1	1
<i>Paspalum urvillei</i>				1			2			2
<i>Persea</i>									3	1
<i>Pinus elliottii</i>				3		2	2	3	2	5
<i>Pluchea</i>	1									1
<i>Pluchea odorata</i>	1			1						2
<i>Polygonum</i>							1			1
<i>Polygonum glabrum</i>	3	3	2	3	3	3	2	3	2	9
<i>Polygonum hirsutum</i>	4	3	1	4	3			2	4	7
<i>Polygonum hydropiperoides</i>			3				3			2
<i>Polygonum punctatum</i>				1						1
<i>Pontederia cordata</i>	4	4	4	4	4	4	4	4	4	9
<i>Pteridium aquilinum</i>							1			1
<i>Ptilimnium capillaceum</i>	2	1	2	2	1		1			6
<i>Quercus laurifolia</i>			1							1
<i>Rhexia</i>							3	2		2
<i>Rhexia alifanus</i>		1								1
<i>Rhexia mariana</i>			1		4					2
<i>Rhynchospora cephalantha</i>									1	1
<i>Rhynchospora inundata</i>									1	1
<i>Ricciocarpus natans</i>	2			1	2			2		4
<i>Sabal palmetto</i>				1		1		1	1	4

2017 LVI Proficiency Exercise Results

<i>Little Redwater Lake</i> Taxa Observed	Highlands	USF	Cardno	Lakeland	DEP AEQA	DEP SWROC 1	DEP SWROC 2	DEP SEROC	DEP SROC	# teams observed taxon
<i>Sabatia grandiflora</i>				2					4	2
<i>Saccharum giganteum</i>	1		1							2
<i>Sacciolepis indica</i>									1	1
<i>Sacciolepis striata</i>	3	3			3		3		4	5
<i>Sagittaria filiformis</i>								1		1
<i>Sagittaria lancifolia</i>	2	2	4	3	2	4	2	4	3	9
<i>Sagittaria latifolia</i>									1	1
<i>Salix caroliniana</i>	4	4	2	3	4	3	4	4	3	9
<i>Salvinia minima</i>	3	4	4	3	3	4	3	4	4	9
<i>Sambucus canadensis</i>					2	1	2			3
<i>Sambucus nigra</i>	1	2	3	1						4
<i>Schinus terebinthifolius</i>		1		1				2		3
<i>Schoenoplectus californicus</i>	3	1	2	1	2	2	1	2	2	9
<i>Scirpus cubensis</i>						3	4	3	4	4
<i>Scoparia dulcis</i>			1							1
<i>Sesbania</i>							1		1	2
<i>Setaria</i>								2		1
<i>Setaria parviflora</i>			1	1		1				3
<i>Spartina bakeri</i>						1				1
<i>Taxodium</i>		1		2	1		1	1		5
<i>Thelypteris</i>						1	3			2
<i>Typha</i>	4	4	4	3	4	3	4	3	4	9
<i>Urena lobata</i>								1		1
<i>Urochloa mutica</i>	1			1		1		1		4
<i>Utricularia floridana</i>								1		1
<i>Utricularia foliosa</i>								1		1

2017 LVI Proficiency Exercise Results

<i>Little Redwater Lake</i> Taxa Observed	Highlands	USF	Cardno	Lakeland	DEP AEQA	DEP SWROC 1	DEP SWROC 2	DEP SEROC	DEP SROC	# teams observed taxon
<i>Utricularia gibba</i>	3	2		4	2	1	1	1	1	8
<i>Utricularia inflata</i>					1					1
<i>Utricularia purpurea</i>					1					1
<i>Utricularia radiata</i>		1		1						2
<i>Utricularia subulata</i>									2	1
<i>Vallisneria americana</i>	1									1
<i>Vitis</i>						2	2			2
<i>Vitis rotundifolia</i>								3		1
<i>Xyris</i>					1			1		2
<i>Xyris ambigua</i>				1						1
TOTAL TAXA PER TEAM	48	38	44	59	49	45	47	60	58	