White Trout Lake Lake Vegetation Index Survey Summary 2012

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Background

The Lake Vegetation Index (LVI) is a rapid assessment protocol in which selected sections of a lake are assessed for the presence or absence of vegetation through visual observation and through the use of a submerged vegetation sampling tool called a Frodus. The assessment results provide a list of species present and the dominant (and where appropriate, co-dominant) species that are found in each segment. These results are then entered into a scoring table and a final LVI score is computed, using a multi-step algorithm which incorporates four scoring metrics: % native taxa, % invasive species, % sensitive species and Coefficient of Conservatism of the dominant species. The Coefficient of Conservatism is a number from 0 to 10 that indicates how broad or narrow a taxon's ecological niche is, as determined by expert botanists. The LVI score provides an estimate of the vegetative health of a lake at a particular point in time. The threshold score for impairment is 37.

Our assessment team was trained and qualified by FDEP to conduct these assessments as an independent team and must prequalify each year, prior to conducting additional assessments. The LVI field data collection method consists of dividing the lake into twelve pie-shaped segments (see diagram below) and selecting a set of four segments from the twelve to include in the LVI. The assessment team then travels across the segment and identifies all unique species of aquatic plants present in the segment. Additionally, a Frodus is thrown at several points on a single five-meter belt transect that is established in the center of the segment, from a point along the shore to a point beyond the submerged vegetation zone.

Although a healthy, well-balanced lake community may be maintained with some level of human disturbance, human activities may result in lake degradation. Human stressors include increased inputs of nutrients, sediments and/or pesticides from watershed runoff, undesirable removal of native shoreline and/or upland buffer vegetation, and introduction of nuisance (generally exotic) plants and animals. DEP has methods to evaluate if human activities have resulted in the condition where a particular waterbody has exceeded water quality criteria (Chapter 62-02, Florida Administrative Code), including whether adverse impacts to biological communities have occurred. DEP water quality standards are designed to protect designated uses of the waters of the state (e.g., recreation, aquatic life support), and an exceedance of these standards is associated with interference with the designated use.

Chlorophyll a is a measure of algal biomass in the water column. In clear, low alkalinity lakes (lakes where color is < 40 PCU and alkalinity is < 20 mg/L $CaCO_2$), a healthy system is expected to have ≤6 µg/L of chlorophyll a. In colored (≥40 PCU) lakes or clear, high alkalinity (≥ 20 mg/L $CaCO_2$) lakes, healthy

systems are expected to have ≤20 µg/L of chlorophyll a. Higher Chlorophyll a values may result in unwanted shading of aquatic plants and/or greater potential for harmful algal blooms. The Lake Vegetation Index (LVI) assesses how closely the plant community of a lake resembles a native undisturbed community. It is used in combination with cholorophyll a measurement to allow detection of an imbalance in the plant community, even when the algal community appears healthy (and vice versa).

Methods

White Trout Lake was sampled on November 9, 2012 by the Florida Center for Community Design and Research at the University of South Florida. Surface water samples were obtained in each of the 4 sections of the LVI assessment for analysis of nutrients, chlorophyll a, bacteria and color.

For the LVI, species lists were developed for four of twelve sections of the lake (Figure 1), and the following information was derived from those lists: percent native species, percent invasive exotic species, percent sensitive species, and the Coefficient of Conservatism (C of C; a measure of how tolerant a species is to disturbance) of the dominant species. According to DEP SOP LT 7000, the LVI score ranges and categories are: (78-100) Exceptional; (38-77) Healthy; and (0-37) Impaired. DEP's new draft F.A.C. Chapter 62.302 requires at least two temporally independent LVIs with an average score of 43 or above in order to meet the expectation of a healthy, well balanced community. The LVI was sampled per DEP SOP FS7310 and calculated per DEP SOP LT7000.

Site Information

White Trout Lake is located in the Sweetwater Creek Watershed in west central Florida in Hillsborough County near Tampa. The lake has a surface area of 78 acres with a mean depth of 12 feet and a maximum depth of 27 feet. The dominant land use in the surrounding area is single family residential.

Results

Water Quality

Table 1 details sampling results from the 2012 water quality assessment that coincide with the LVI assessment.

Table 1. Water Quality Summary for White Trout Lake LVI Efforts

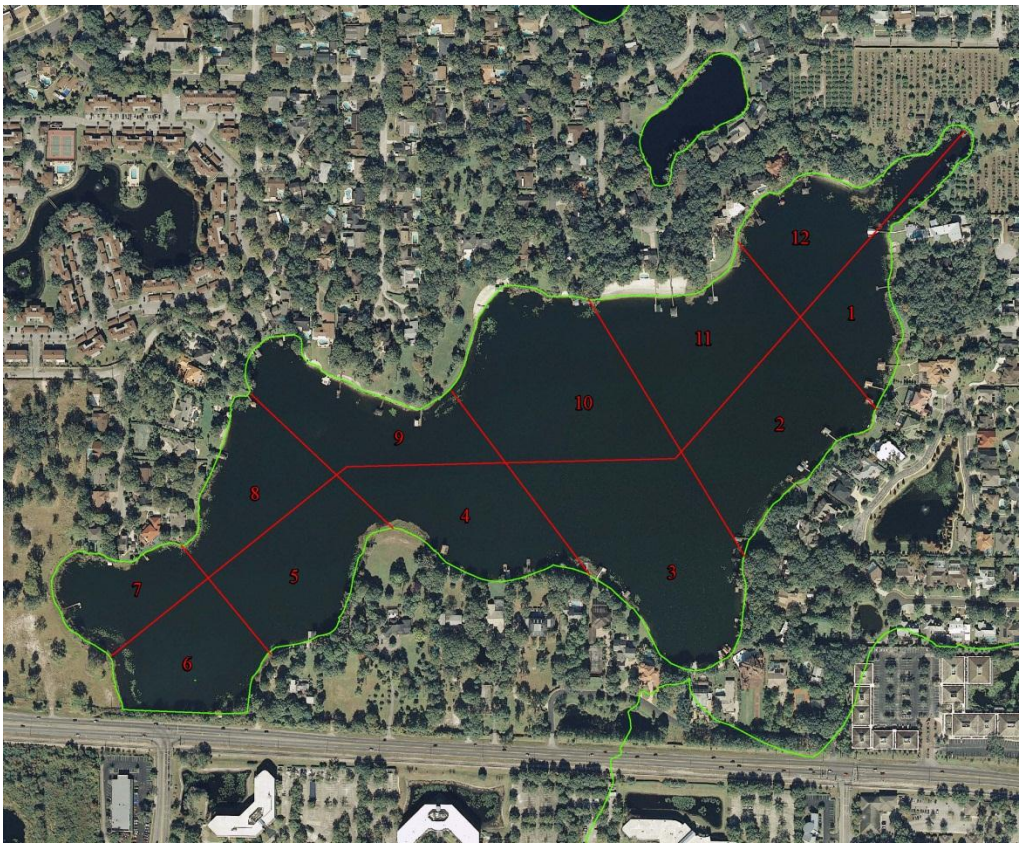
Analysis	**Results 11/9/2012**
Field Water Temperature (^{o}C)	31.64
Field pH (SU)	6.84
Alkalinity (mg/L $CaCO_3$)	36
Secchi Depth (ft)	9.78
Field Dissolved Oxygen (mg/L)	6.19

Field Specific Conductance (µmhos/cm)	0.241
Color (pcu)	11.5
Chlorophyll a (µg/L	4.98
Total Phosphorous (mg/L)	0.02
Ammonia (mg/L)	0.045
Nitrate+Nitrite (mg/L)	0.003
Total Kjeldahl Nitrogen (mg/L)	0.416
Total Nitrogen (mg/L)	0.419
Fecal Coliform (#/100ml)	<20
Enterococci (#/100ml)	20

Lake Vegetation Index Summary

The LVI survey was conducted by the Florida Center for Community Design and Research following the FDEP SOP (http://www.dep.state.fl.us/water/bioassess/docs/lvi-1000.pdf) on 11/9/2012 using regions 3, 6, 9 and 12 scored a 38. This survey identified 8 non-native invasive species out of 35 total species (22.85%).

Figure 1. LVI region map for White Trout Lake



Florida Department of Environmental Protection has proposed changes to the scoring metrics that comprise the Lake Vegetation Index (http://www.dep.state.fl.us/water/bioassess/docs/lvi-1000.pdf). These changes are an update to existing Coefficient of Conservatism scores and an alteration of the % invasive metric to include only Florida Exotic Pest Plant Council (FLEPPC) Type I plants. When these changes are applied to the data collected in 2012, the score is raised from a 38 to a 43. Both scores are in the Healthy category. However, if *Hydrilla* biomass increases to levels of dominance instead of co-dominance the score would become below 37 and would fall in the impaired category. Tables 2 and 3 contain the species list and occurrence information relating to these two LVI events.

SPECIES	CofC	3	6	9	12
Alternanthera philoxeroides	0	1	1	1	1
Andropogon glomeratus	3	1			
Bacopa caroliniana	4.5		1		1
Bacopa monnieri	3.5				1
Blechnum serrulatum	5.5	1			
Fuirena scirpoidea	5.5	1			
Hydrilla verticillata	0	C	C	C	C
Hydrocotyle	2	1	1	1	1
Ludwigia leptocarpa	3	1			
Ludwigia peruviana	0.62	1	1	1	1
Melaleuca				1	1
Melaleuca quinquenervia	0	1	1		1
Micranthemum glomeratum	5.85				1
Mikania scandens	1.95	1			1
Myrica cerifera	2		1	1	
Najas guadalupensis	5.07	1	1	1	1
Nitella	6	1	1	1	1
Nuphar advena	3.5			1	1
Nymphaea capensis	0.5		1		
Nymphaea odorata	5	1	1	1	1
Panicum hemitomon	5.82		1	1	
Panicum repens	0	1	1	1	1
Polygonum hydropiperoides	2.5				1
Pontederia cordata	5.38		1		1
Potamogeton illinoensis	6.64	1	1	1	1
Sabal palmetto	2.85		1		
Sagittaria lancifolia	3	1		1	1
Salix caroliniana	2.95		1		
Schoenoplectus californicus	5		1		
Taxodium distichum	7.21		1		
Typha	0.8	1	1	1	1
Urochloa mutica	0		1		

Table 2. LVI summary from 11/9/2012 Survey "1" indicates presence of plant species in LVI section. "C" indicates that the species is present and the co-dominant species in the LVI section

Utricularia gibba	6.37	1	1		
Vallisneria americana	7	C	C	C	C
Vitis rotundifolia	1.18	1			

This report is a supplement to the White Trout Lake Assessment Report from the Florida Center for Community Design and Research at the University of South Florida (USF-FCCDR). The most recent full assessment of White Trout Lake was conducted in 2010 by USF-FCCDR. The assessment report can be found at: http://www.hillsborough.wateratlas.usf.edu/upload/documents/885_WhiteTrout2010.pdf
The USF-FCCDR Lake and Stream Assessment Program is funded by Hillsborough County and the Southwest Florida Water Management District with the goal to assess 24 lake and stream segments each summer.