

Bathymetric Maps and Aquatic Plants Surveys for Five Walton County Dune Lakes

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Sponsored by:

Choctawhatchee Basin Alliance, under the guidance of the Coastal Dune Lakes Advisory Board

Report by:

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Introduction

Florida LAKEWATCH assisted Choctawhatchee Basin Alliance in the development of a Management Plan for the Walton County Dune Lakes (Hoyer and Canfield 2008). In this plan there were recommendation to create bathymetric maps for all of the dune lakes to help model the water chemistry and limnological functioning of the dune lakes. The management plan also recommended that the aquatic plants in the dune lakes be monitored to keep track of exotic plants and to also help monitor the limnology of the dune lakes. To aid in achieving these goals Florida LAKEWATCH was contracted to creat bathymetric maps and conduct aquatic plant surveys on the following five Walton County Dune Lakes: Allen, Draper, Fuller, Morris and Oyster.

Methods

Aquatic macrophyte surveys were conducted onfive Walton County Dune Lakes during the summer (May – September) of 2009. The above-ground standing crop of emergent, floating-leaved, and submerged vegetation was measured along ten uniformly placed transects around the water body. At each transect divers cut the above-ground portions of aquatic macrophytes that were inside a 0.25m² plastic square randomly thrown once in each plant zone. The vegetation was placed in nylon mesh bags, spun to remove excess water, and weighed to the nearest 0.1 kg. Average standing crop (kg wet weight/m²) for each vegetation zone was calculated by averaging samples from each transect. The combined width (m) of the floating-leaved and emergent zones was estimated at each transect and then averaged for each water body. All plant species seen while sampling were listed according to the frequency that they occurred in evenly spaced transects around the water body.

The percent volume infested with aquatic macrophytes (PVI) and the percent area covered with aquatic macrophytes (PAC) were determined according to modified methods of Maceina and Shireman (1980). The methods were modified because of advancing technologies. PAC and PVI in deeper, open water portions of the lakes were measured using sonar bottom transect images recorded with a Lowrance LCX – 28c HD sonar and GPS system. Random samples from

all data points on each water body were taken and measured for lake depth and plant height, if plants were present. These data were used in conjunction with the littoral zone measurements to acquire estimates of whole lake PAC and PVI.

Florida LAKEWATCH personnel created the bathymetric maps using differentially corrected global positioning equipment (GPS). Data were collected at the same time that aquatic plant surveys were conducted. Map contours are in 1 foot increments and were generated using kriging technique in Surfer¹ software package (Golden CO). These maps are only approximate bathymetric maps and should not be used for navigation.

Deliverables

The following pages contain the summaries of the plant surveys and a copy of the bathymetric maps created for the five Walton County Dune Lakes.

Allen / Walton

Aquatic plant data collected on May 13, 2009

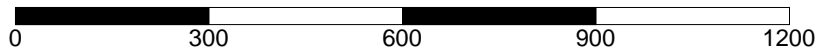
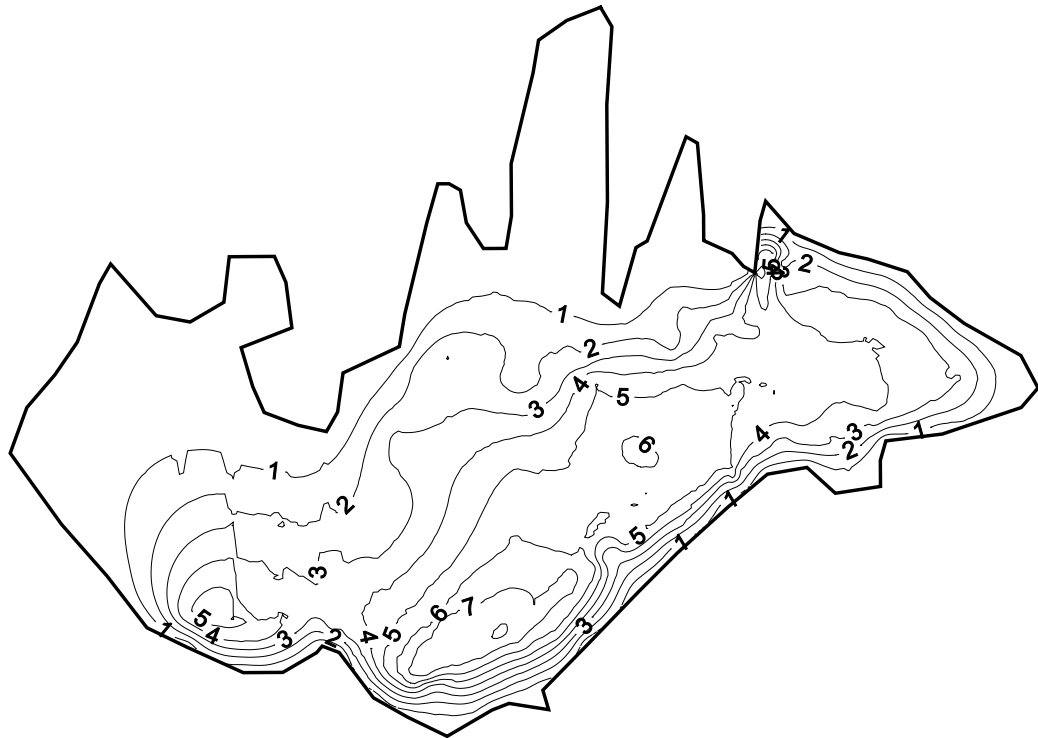
Percent area covered with aquatic vegetation (PAC, %)	4.0
Percent of lake's volume filled with vegetation (PVI, %)	0.4
Average emergent plant biomass (kg wet wt/m ²)	1.5
Average floating-leaved plant biomass (kg wet wt/m ²)	0.0
Average submersed plant biomass (kg wet wt/m ²)	1.1
Average width of emergent and floating-leaved zone (ft.)	54.8
Average lake depth (m)	1.3

Frequency that plant species occur in 10 evenly spaced transects around the lake.

* indicates non-native plant species

<u>Common Name</u>	<u>Plant Species</u>	<u>Frequency (%)</u>
banana-lily	<i>Nymphoides aquatica</i>	90
St. John's wort	<i>Hypericum spp.</i>	70
torpedograss*	<i>Panicum repens</i>	70
Florida bladderwort	<i>Utricularia floridana</i>	70
water spikerush	<i>Eleocharis elongata</i>	50
buttonbush	<i>Cephalanthus occidentalis</i>	40
water-pennywort	<i>Hydrocotyle umbellata</i>	40
southern water-grass	<i>Luziola fluitans</i>	40
rush fuirena	<i>Fuirena scirpoidea</i>	30
slender spikerush	<i>Eleocharis baldwinii</i>	20
red root	<i>Lachnanthes caroliniana</i>	20
inundated beaksedge	<i>Rhynchospora inundata</i>	20
alligator-weed*	<i>Alternanthera philoxeroides</i>	10
salt-bush	<i>Baccharis spp.</i>	10
sawgrass	<i>Cladium jamaicense</i>	10
swamp titi	<i>Cyrilla racemiflora</i>	10
hatpin	<i>Eriocaulon decangulare</i>	10
black rush	<i>Juncus roemerianus</i>	10
spatterdock	<i>Nuphar luteum</i>	10
maidencane	<i>Panicum hemitomon</i>	10
cone-spur bladderwort	<i>Utricularia gibba</i>	10

**Allen (Walton County)
Florida LAKEWATCH Bathymetric Map**



Florida LAKEWATCH personnel created this map using differentially corrected global positioning equipment (GPS). Data were collected May 14, 2009. Map contours are in 2-foot increments and were generated using kriging technique in Surfer® software package (Golden CO). The center of the lake is located at Latitude N 30° 21' 14.8" and Longitude W 86° 15' 7.3". On this date, the lake surface area was calculated at 16.1 acres (6.5 hectares) and the lake elevation was 3.08 feet above MSL. This is only an approximate bathymetric map and should not be used for navigation.

Draper / Walton

Aquatic plant data collected on May 14, 2009

Percent area covered with aquatic vegetation (PAC, %)	0.0
Percent of lake's volume filled with vegetation (PVI, %)	0.0
Average emergent plant biomass (kg wet wt/m ²)	1.0
Average floating-leaved plant biomass (kg wet wt/m ²)	0.0
Average submersed plant biomass (kg wet wt/m ²)	0.0
Average width of emergent and floating-leaved zone (ft.)	5.2
Average lake depth (m)	1.8

Frequency that plant species occur in 10 evenly spaced transects around the lake.

* indicates non-native plant species

<u>Common Name</u>	<u>Plant Species</u>	<u>Frequency (%)</u>
black rush	<i>Juncus roemerianus</i>	90
torpedograss*	<i>Panicum repens</i>	70
seashore dropseed	<i>Sporobolus virginicus</i>	50
salt-bush	<i>Baccharis spp.</i>	30
sawgrass	<i>Cladium jamaicense</i>	20
duck-potato	<i>Sagittaria lancifolia</i>	20
smooth cord grass	<i>Spartina alterniflora</i>	20
green algae	<i>Chlorophyta</i>	10
rush fuirena	<i>Fuirena scirpoidea</i>	10
swamp rosemallow	<i>Hibiscus grandiflorus</i>	10
water-pennywort	<i>Hydrocotyle umbellata</i>	10
baby-tears	<i>Micranthemum umbrosum</i>	10
marshhay cordgrass	<i>Spartina patens</i>	10
cat-tail	<i>Typha spp.</i>	10
sea oats	<i>Uniola paniculata</i>	10

**Draper (Walton County)
Florida LAKEWATCH Bathymetric Map**



Florida LAKEWATCH personnel created this map using differentially corrected global positioning equipment (GPS). Data were collected May 14, 2009. Map contours are in 2-foot increments and were generated using kriging technique in Surfer® software package (Golden CO). The center of the lake is located at Latitude N 30° 20' 45" and Longitude W 86° 12' 48". On this date, the lake surface area was calculated at 27.6 acres (11.2 hectares). This is only an approximate bathymetric map and should not be used for navigation.

Fuller / Walton

Aquatic plant data collected on May 13, 2009

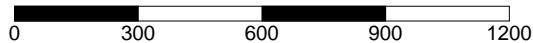
Percent area covered with aquatic vegetation (PAC, %)	3.0
Percent of lake's volume filled with vegetation (PVI, %)	0.3
Average emergent plant biomass (kg wet wt/m ²)	3.1
Average floating-leaved plant biomass (kg wet wt/m ²)	1.2
Average submersed plant biomass (kg wet wt/m ²)	0.6
Average width of emergent and floating-leaved zone (ft.)	81.0
Average lake depth (m)	2.0

Frequency that plant species occur in 10 evenly spaced transects around the lake.

* indicates non-native plant species

<u>Common Name</u>	<u>Plant Species</u>	<u>Frequency (%)</u>
fragrant water-lily	<i>Nymphaea odorata</i>	100
St. John's wort	<i>Hypericum spp.</i>	80
sawgrass	<i>Cladium jamaicense</i>	70
swamp titi	<i>Cyrilla racemiflora</i>	70
water spikerush	<i>Eleocharis elongata</i>	60
swamp bay	<i>Persea palustris</i>	50
bladderwort species	<i>Utricularia spp.</i>	50
buttonbush	<i>Cephalanthus occidentalis</i>	40
jointed spikerush	<i>Eleocharis interstincta</i>	30
wax myrtle	<i>Myrica cerifera</i>	30
Florida bladderwort	<i>Utricularia floridana</i>	30
water-pennywort	<i>Hydrocotyle umbellata</i>	20
water primrose*	<i>Ludwigia spp.</i>	20
spatterdock	<i>Nuphar luteum</i>	20
maidencane	<i>Panicum hemitomon</i>	20
salt-bush	<i>Baccharis spp.</i>	10
green algae	<i>Chlorophyta</i>	10
soft rush	<i>Juncus effusus</i>	10
torpedograss*	<i>Panicum repens</i>	10
duck-potato	<i>Sagittaria lancifolia</i>	10
cat-tail	<i>Typha spp.</i>	10

**Fuller (Walton County)
Florida LAKEWATCH Bathymetric Map**



Florida LAKEWATCH personnel created this map using differentially corrected global positioning equipment (GPS). Data were collected May 13, 2009. Map contours are in 1-foot increments and were generated using kriging technique in Surfer® software package (Golden CO). The center of the lake is located at Latitude N 30° 22' 22.3" and Longitude W 86° 19' 02.7". On this date, the lake surface area was calculated at 48.9 acres (19.8 hectares) and the lake elevation was 7.86 feet above MSL. This is only an approximate bathymetric map and should not be used for navigation.

Morris / Walton

Aquatic plant data collected on June 26, 2009

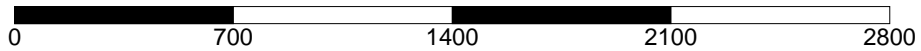
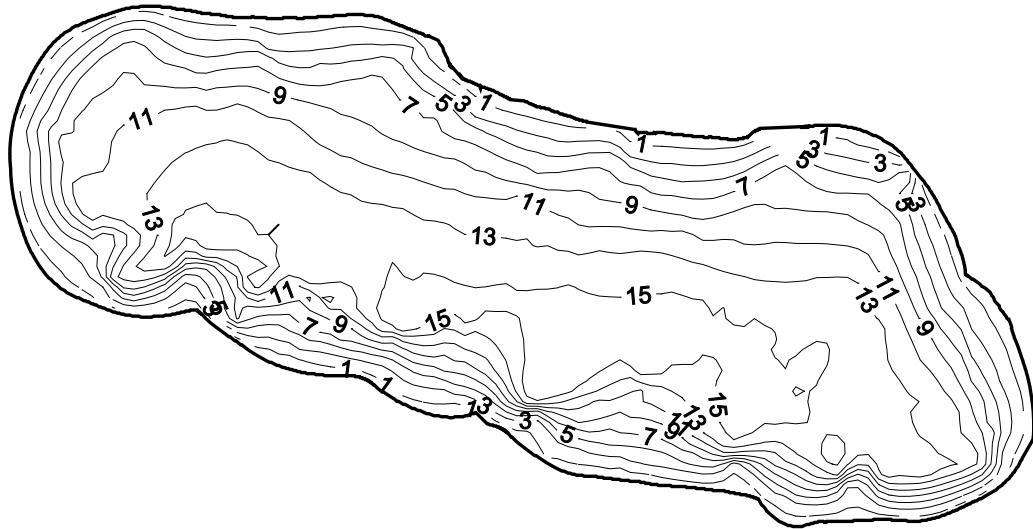
Percent area covered with aquatic vegetation (PAC, %)	22.0
Percent of lake's volume filled with vegetation (PVI, %)	5.7
Average emergent plant biomass (kg wet wt/m ²)	0.7
Average floating-leaved plant biomass (kg wet wt/m ²)	0.8
Average submersed plant biomass (kg wet wt/m ²)	0.2
Average width of emergent and floating-leaved zone (ft.)	63.6
Average lake depth (m)	2.8

Frequency that plant species occur in 10 evenly spaced transects around the lake.

* indicates non-native plant species

<u>Common Name</u>	<u>Plant Species</u>	<u>Frequency (%)</u>
rush fuirena	<i>Fuirena scirpoidea</i>	100
little floating-heart	<i>Nymphoides cordata</i>	100
slender spikerush	<i>Eleocharis baldwinii</i>	90
St. John's wort	<i>Hypericum spp.</i>	70
wax myrtle	<i>Myrica cerifera</i>	70
fragrant water-lily	<i>Nymphaea odorata</i>	70
sawgrass	<i>Cladium jamaicense</i>	60
salt-bush	<i>Baccharis spp.</i>	50
leconte sedge	<i>Cyperus lecontei</i>	50
maidencane	<i>Panicum hemitomon</i>	40
torpedograss*	<i>Panicum repens</i>	40
duck-potato	<i>Sagittaria lancifolia</i>	40
buttonbush	<i>Cephalanthus occidentalis</i>	20
black rush	<i>Juncus roemerianus</i>	20
red root	<i>Lachnanthes caroliniana</i>	20
swamp hornpod	<i>Mitreola sessilifolia</i>	20
variable-leaf milfoil	<i>Myriophyllum heterophyllum</i>	20
bladderwort	<i>Utricularia foliosa</i>	20
coinwort	<i>Centella asiatica</i>	10
flat sedge spp.	<i>Cyperus spp.</i>	10
spikerushes	<i>Eleocharis spp.</i>	10
pipewort	<i>Eriocaulon spp.</i>	10
water-pennywort	<i>Hydrocotyle umbellata</i>	10
variableleaf pondweed	<i>Potamogeton diversifolius</i>	10
bald cypress	<i>Taxodium distichum</i>	10
purple bladderwort	<i>Utricularia purpurea</i>	10

Morris (Walton County)
Florida LAKEWATCH Bathymetric Map



Florida LAKEWATCH personnel created this map using differentially corrected global positioning equipment (GPS). Data were collected June 26, 2009. Map contours are in 2-foot increments and were generated using kriging technique in Surfer® software package (Golden CO). The center of the lake is located at Latitude N 30° 22' 09" and Longitude W 86° 18' 21". On this date, the lake surface area was calculated at 74.8 acres (30.3 hectares) and the lake elevation was estimated at 9.2 ft above MSL. This is only an approximate bathymetric map and should not be used for navigation.

Oyster / Walton

Aquatic plant data collected on May 12, 2009

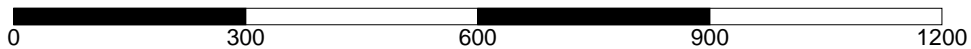
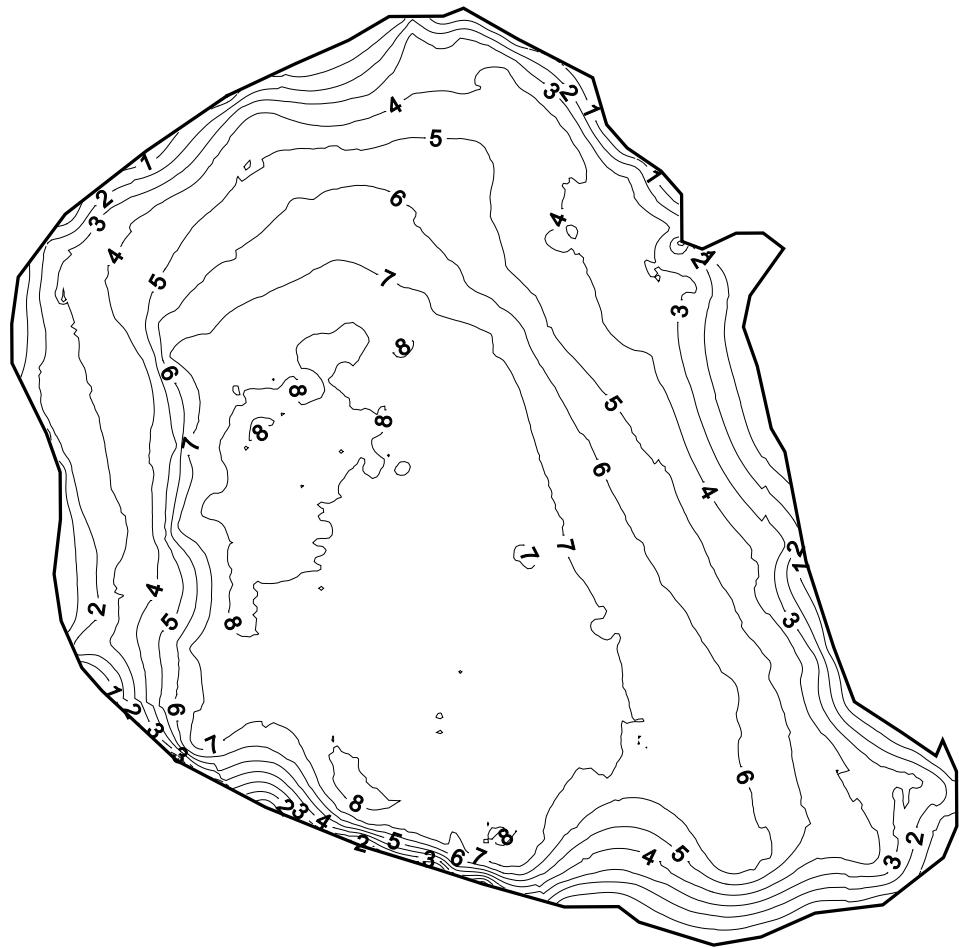
Percent area covered with aquatic vegetation (PAC, %)	0.0
Percent of lake's volume filled with vegetation (PVI, %)	0.0
Average emergent plant biomass (kg wet wt/m ²)	8.8
Average floating-leaved plant biomass (kg wet wt/m ²)	0.3
Average submersed plant biomass (kg wet wt/m ²)	0.1
Average width of emergent and floating-leaved zone (ft.)	583.6
Average lake depth (m)	1.7

Frequency that plant species occur in 10 evenly spaced transects around the lake.

* indicates non-native plant species

<u>Common Name</u>	<u>Plant Species</u>	<u>Frequency (%)</u>
cat-tail	<i>Typha spp.</i>	100
alligator-weed*	<i>Alternanthera philoxeroides</i>	90
torpedograss*	<i>Panicum repens</i>	80
sawgrass	<i>Cladium jamaicense</i>	60
giant bulrush	<i>Scirpus californicus</i>	50
black rush	<i>Juncus roemerianus</i>	40
green algae	<i>Chlorophyta</i>	30
water primrose*	<i>Ludwigia spp.</i>	30
duck-potato	<i>Sagittaria lancifolia</i>	30
water-pennywort	<i>Hydrocotyle umbellata</i>	20
wax myrtle	<i>Myrica cerifera</i>	20
fragrant water-lily	<i>Nymphaea odorata</i>	20
salt-bush	<i>Baccharis spp.</i>	10
elephant-ear*	<i>Colocasia esculenta</i>	10
slender spikerush	<i>Eleocharis baldwinii</i>	10
spikerushes	<i>Eleocharis spp.</i>	10
St. John's wort	<i>Hypericum spp.</i>	10
southern naiad	<i>Najas guadalupensis</i>	10
sesbans	<i>Sesbania spp.</i>	10
cone-spur bladderwort	<i>Utricularia gibba</i>	10

**Oyster (Walton County)
Florida LAKEWATCH Bathymetric Map**



Florida LAKEWATCH personnel created this map using differentially corrected global positioning equipment (GPS). Data were collected May 12, 2009. Map contours are in 1 foot increments and were generated using kriging technique in Surfer® software package (Golden CO). The center of the lake is located at Latitude N 30° 21' 8.5" and Longitude W 86° 14' 37.8". On this date, the lake surface area was calculated at 21.9 acres (8.9 hectares). This is only an approximate bathymetric map and should not be used for navigation.

Literature Cited

Hoyer M. V. and D. E. Canfield, Jr. 2008. Findings from workshops on citizen's concerns regarding the future management of Walton County Coastal Dune lakes. Report to Chactawhatchee Basin Alliance and Coastal Dune lakes Advisory Board. Florida LAKEWATCH, Department of Fisheries and Aquatic Sciences, University of Florida/Institute of Food and Agricultural Sciences. Gainesville, FL.