Greetings Bear Chain of Lakes Residents! Please find the report for you lake below.

On September 12th 2012, Seminole County Lake Management Program (SCLMP) staff Thomas Calhoun and Devin Whitney surveyed the aquatic plants of **Bear Lake** on a windy day.

Three submersed aquatic vegetation (SAV) found during inspection including; eelgrass to 14 ft., southern naiad to 10 ft. and stonewort to 10 feet. This is the biggest increase in the diversity of SAV since 2010. Eelgrass remains the dominant plant in the lake including shoreline species.

Photo: Stonewort found during inspection.

Many of the shorelines of Bear Lake posses no aquatic vegetation or are only established with invasive exotic species. Appropriate shoreline plants also help reduce shoreline erosion. Having native aquatic plants along the shoreline can protect and improve the ecological health of your waterbody and provide a great view at the same time. Additionally, control of aquatic and wetland plants requires a Florida Fish and Wildlife Conservation Commission (FWC) aquatic plant control permit (which is free). Please contact FWC regional biologist Carl Greene at (407) 858-6170 or Carl.Greene@myfwc.com for your free permit. For more information please visit FWC's website at http://www.myfwc.com/license/aquatic-plants/.

Photo: Typical shoreline in Bear Lake.

No water hyacinths were observed in the canal off of Linneal Beach Drive. Residents of the canal have done a great job of managing this exotic plant. Other invasive plants found during the inspection of canal included: elephant ear, dwarf papyrus, cattail, primrose willow, and Brazilian pepper

Photo: Linneal Beach Drive Canal.

The Secchi (water clarity) was 7.2 ft in a depth of 13 ft. at the time of inspection. The water elevation was 103.64 lower than last month's reading of 102.63 ft. above sea level. No triploid (sterile) grass carp where seen during the inspection.

Little Bear Lake
On **September 12th, 2012**, Seminole County Lake Management Program (SCLMP) staff Thomas Calhoun and Devin Whitney surveyed the aquatic plants of **Little Bear Lake**.

The only submersed aquatic vegetation (SAV) found in Little Bear Lake during this inspection was filamentous algae to 3ft.

Photo: Typical debris found along the bottom of Little Bear Lake.

Some of the invasive shoreline plants found include: elephant ear, water primrose, alligator weed, torpedo grass, Brazilian pepper and cattails. Some of the beneficial native shoreline plants found include: water pennywort, flat sedge, pickerelweed, and duck potato.

Photo: Water flowing through outlet.

Photo: Torpedo grass found during inspection.

The Secchi (water clarity) was 6.3 ft in a depth of 12.3 ft. at the time of inspection. The water elevation was 102.79 ft. above sea level. No triploid (sterile) grass carp where seen during the inspection.

Cub Lake

On **September 12th, 2012**, Seminole County Lake Management Program (SCLMP) staff Thomas Calhoun and Devin Whitney surveyed the aquatic plants of **Cub Lake**.

Native submersed aquatic vegetation (SAV) observed included: lemon bacopa to a depth of 3 feet, road grass to 4 feet, stonewort to 6 feet, musk grass to 3 foot, bladderwort to 13 feet and eelgrass to 9 feet.

Photo: Nitella found in Cub Lake.

The lilies, spatterdock and fragrant water lily, generally are established from 3-9 feet and have not expanded since the previous inspection. The invasive exotics torpedo grass and dwarf papyrus continues to be the most abundant emergent aquatic plant, present throughout the lake.

Photo: Dwarf papyrus.

Photo: Grass carp fence.

The Secchi (water clarity) was 7.3 feet in a depth of 11.8 feet compared to 7.8 feet on the previous survey. The grass carp barrier was free from debris and operational and 1 grass carp was seen during the survey.

Bear Lake

On **April 18th 2012**, Gloria Eby (Seminole County [SC] Senior Environmental Scientist), Marianne Pluchino (SC Senior Environmental Scientist), Thomas Calhoun (SC Contracted Scientist), Antoine Khoury (Assistant Director SC Public Works), and Kalina Warren (Environmental Manager-Florida Department of Environmental Protection [FDEP]), surveyed the aquatic plants and conducted a Lake Vegetation Index (LVI) of **Bear Lake**.

The LVI was created by the FDEP as a rapid screening tool for ecological condition; it determines how closely a lake's flora (aquatic plants) resembles that of an undisturbed lake. Bear Lake is 311 surface acres in size with a mean depth of 12 feet, maximum depth of 37 feet, and is located in the Little Wekiva watershed. Historical LVI's scores (5 events to date) range from 26 (impaired) to 40 (healthy) with the latest score (April 2012) 40; in the healthy category.

LVI Range	Description
78-100	Exceptional
38-77	Healthy
0-37	impaired

The secchi reading (measurement for water clarity) was 9.6 feet in a depth of 12.7 feet at the time of inspection. The range of this reading (from 1973-2012; 309 samples) has been 4.9 to 36 feet. The Water Quality Index (Trophic State) was 35 (Good) taken 11/28/2011. The water quality range (283 samples taken from 1991 to 2011) has been 13 (Good) to 52 (Good). All this information is available on the Seminole County Water Atlas at http://www.seminole.wateratlas.usf.edu/

The only submersed aquatic vegetation (SAV) found during inspection was eelgrass to 14 feet; a decrease from a total of 4 SAVs found in June of 2010. Eelgrass is now the dominant plant in the lake including shoreline species.

Photo: Eelgrass found during inspection.

There is a direct correlation with the historical poor LVI scores and the quality of the emergent aquatic plant population. Many of the shorelines of Bear Lake possess no aquatic vegetation or are only established with invasive exotic species. Invasive plants found during this inspection include: torpedo grass, elephant ear, dwarf papyrus, paragrass, cattail, primrose willow, and Brazilian pepper. SC Lake Management Program (LMP) recommends providing a healthier shoreline for Bear Lake by planting native aquatic plants such as duck potato, pickerelweed, thalia, and canna. Contact LMP for native planting events that can target your lake with the support of the lake residents.

Photo: Typical shoreline in Bear Lake.

The water elevation was 102.63 feet, lower than last month's reading of 102.8 feet above sea level. A total of 14 triploid (sterile) grass carp fish were seen during the inspection.

Little Bear Lake

On **April 18th 2012**, Gloria Eby (Seminole County [SC] Senior Environmental Scientist), Marianne Pluchino (SC Senior Environmental Scientist), Thomas Calhoun (SC Contracted Scientist), Antoine Khoury (Assistant Director SC Public Works), and Kalina Warren (Environmental Manager-Florida Department of Environmental Protection [FDEP]), surveyed the aquatic plants and conducted a Lake Vegetation Index (LVI) of **Little Bear Lake**.

Historical LVI scores for Little Bear Lake range from 28 (impaired) to 47 (healthy) with latest score (April 2012) being 36; in the impaired range.

LVI Range	Description
78-100	Exceptional
38-77	Healthy

0-37	impaired

Little Bear Lake is 29 surface acres in size with a mean depth of 8 feet, maximum depth of 20 feet, and is located in the Little Wekiva watershed. The secchi reading (water clarity) was 5.9 feet in a depth of 7.6 feet. The range of this reading (from 1992-2012; 195 samples) has been 2.5 to 18 feet. The Water Quality Index (Trophic State) was 45 (Good) taken 10/20/2011. The water quality range (225 samples taken from 1998 to 2012) has been 7 (Good) to 57 (Good).

The only submersed aquatic vegetation (SAV) found in Little Bear Lake during this inspection was filamentous algae to 3 feet and stonewort to 4 feet. The dominant shoreline plant was St. Augustine grass. Some of the invasive shoreline plants found include: elephant ear, water primrose, alligator weed, torpedo grass, Brazilian pepper, and cattails. Some of the beneficial native shoreline plants found include: water pennywort, flat sedge, pickerelweed, and duck potato.

Photo: Brazilian pepper tree growing along shoreline.

The water elevation at the time of the inspection was 102.1 feet above sea level. No grass carp fish were observed during inspection.

Cub Lake

On **April 18th, 2011**, Seminole County Lake Management Program (SCLMP) staff Gloria Eby (Seminole County [SC] Senior Environmental Scientist), Marianne Pluchino (SC Senior Environmental Scientist), and Thomas Calhoun (SC Contracted Scientist) surveyed the aquatic plants and conducted a Lake Vegetation Index (LVI) of **Cub Lake**. Historical LVI scores for Cub Lake range from 28 (impaired) to 47 (healthy) with latest score (April 2012) being 43; in the impaired range.

LVI Range	**Description**
78-100	Exceptional
38-77	Healthy
0-37	impaired

Cub Lake is 14 surface acres in size with a mean depth of 7 feet, maximum depth of 17 feet, and is located in the Little Wekiva watershed. The secchi reading (water clarity) was 7.8 feet in a depth of 14.3 feet. The range of this reading (1982-2012; 112 samples) has been 3.0 to 15.5 feet. The Water Quality Index (Trophic State) was 33 (Good) taken 10/23/2011. The water quality range (108 samples taken from 1999 to 2011) has been 13 (Good) to 51 (Good).

Native submersed aquatic vegetation (SAV) observed include: lemon bacopa to a depth of 3 feet, road grass to 4 feet, stonewort to 4 feet, musk grass to 1 foot, bladderwort to 13 feet (*Utricularia radiata)* and eelgrass to 8 feet.

Photo: Bladderwort found in Cub Lake.

The lilies, spatterdock and fragrant water lily, generally are established from 3-9 feet in depth with a few plants reaching 11 feet. The invasive exotics, torpedo grass and dwarf papyrus, continues to be the most abundant emergent aquatic plant present throughout the lake.

Photo: Grass carp fence found in good condition.

The secchi reading (water clarity) was 7.8 feet in a depth of 14.3 feet compared to 8.2 feet on the previous survey. The grass carp barrier was free from debris and operational. Two grass carp fish were observed during inspection.

Lake Recommendations:

1 Work together with other lakefront owners to control and if possible eliminate invasive plants observed during this survey and increase native aquatic plantings along shoreline (such as pickerelweed, maidencane grass, and duck potato).

2 Treat invasives (torpedo grass, elephant ear, dwarf papyrus, paragrass, cattail, primrose willow, Brazilian pepper): Either do it yourself and establish a spray program or hire a contracted aquatic herbicide application company (we can provide a list of companies). Control of aquatic and wetland plants could require a free Florida Fish and Wildlife Conservation Commission (FWC) aquatic plant control permit. Contact CJ Greene at (407) 858-6170 or Carl.Greene@MyFWC.com for a permit. Please note that the canal is permit exempt therefore no permit is required for the canal.

3 These recommendations could be managed by Seminole County by establishing a Municipal Service Benefit Unit (MSBU); a funding format for aquatic weed control services via a special assessment. For additional information contact Carol Watral at (407) 665-7164 or cwatral@seminolecountyfl.gov

4 Increase educational outreach programs i.e. Shoreline Restoration Workshops (planting days), Florida Yards and Neighborhoods (FYN), Lake Management Video mail-outs, and reduction of personal pollution by using low fertilizer use; phosphorous free fertilizers; keeping a functional shoreline with beneficial native aquatic plants; keeping grass clippings out of your storm drains leading to the lake. All these activities aid in protecting your waterbody! Contact Seminole County Lake Management Program (407) 665-2439 for free educational programs available.

Greetings all, please find the latest assessment for your lake below. Please be sure to distribute this information to your lake communities. Key highlights of this update will include:

- Submersed aquatic vegetation update
- Emergent plant update- recommend torpedo grass removal with replanting of beneficial natives
- Benefits of native emergent vegetation
- Aquatic plant removal permit information
- Water hyacinth updates- good control efforts in canal off Linneal Beach Drive.
- Recommendations for you and your lake

On **February 8th, 2012**, Gloria Eby (Seminole County [SC] Lake Management Program), Dean Barber (SC Consultant), and CJ Greene (Florida Fish and Wildlife Conservation Commission [FWC]) surveyed the aquatic plants in **Bear Lake**.

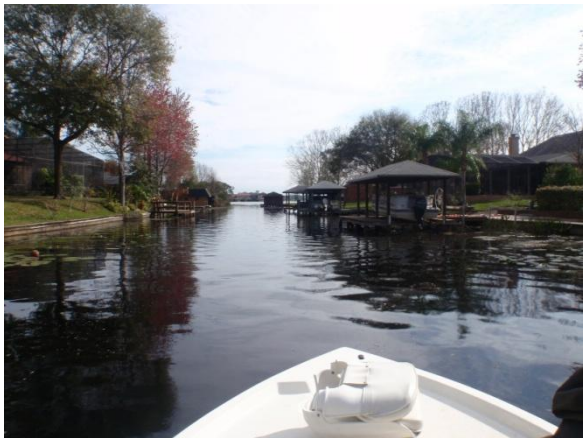
Three types of submersed aquatic vegetation (SAV) were found during the inspection. Eelgrass continues to be the dominant SAV found to a depth of 16 feet, which is an increase from previous survey of 13 feet. Muskgrass was found to a depth of 3 feet and stonewort was found to a depth of 6 feet. Both plants were found very sparse, small, and fragile. No hydrilla or southern naiad was observed. The decrease in plant diversity and expansion of eelgrass is a correlation to the introduced grass carp fish. With the fish consuming the more preferred SAVs (such as southern naiad, muskgrass, and stonewort), this has allowed for eelgrass expansion into the areas once occupied by the other species, thus becoming a monoculture (single crop) of eelgrass. It is yet to be determined whether or not the current stocking level of grass carp fish will be successful at reducing the eelgrass population to the desired level, or whether predation and/or mortality of the fish will allow eelgrass population to remain at current levels within the lake. Continued routine monitoring of the aquatic plant species and biomass will play a key role in determining the fate of SAVs in Bear Lake. During this inspection, 3 grass carp fish were observed.

Photo: Sprig of muskgrass found during inspection.

The dominant emergent plant along the shoreline is either torpedo grass or no vegetation at all, in many locations. Shoreline plants act as a buffer, reducing the amount of nutrients from runoff that enters your lake and also helps to reduce shoreline erosion. Having native aquatic plants along the shoreline can protect and improve the ecological health of your waterbody and provide a great view at the same time. Additionally, control of aquatic and wetland plants requires a Florida Fish and Wildlife Conservation Commission (FWC) aquatic plant control permit (which is free). Please contact FWC regional biologist Carl Greene at (407) 858-6170 or Carl.Greene@myfwc.com for your free permit. For more information please visit FWC's website at http://www.myfwc.com/license/aquatic-plants/.

Several small water hyacinth plants were observed in the canal off of Linneal Beach Drive. Residents of the canal have done a great job of managing this exotic plant. Other invasive plants found during the inspection of canal included: elephant ear, large and dwarf papyrus, cattail, primrose willow, and Brazilian pepper. There was a small algae bloom present at the end of the canal.

Photo: Canal with minor hyacinth plants present. Recommend to remove and dispose of these plants.



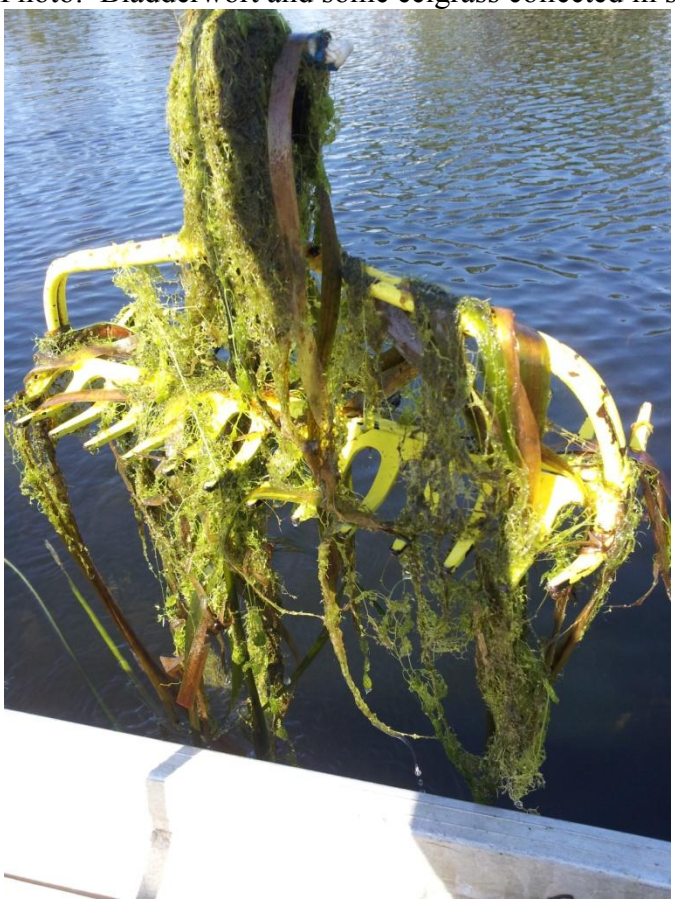
The secchi was 10.4 feet in a depth of 17.8 feet taken on February 9th, 2012. The water elevation was 103.3 feet which is lower than previous inspection reading of 103.89 feet above sea level.

Cub Lake 2-8-2012

On **February 8th, 2012**, Gloria Eby (Seminole County [SC] Lake Management Program), Dean Barber (SC Consultant), and CJ Greene (Florida Fish and Wildlife Conservation Commission [FWC]) surveyed the aquatic plants in **Cub Lake**.

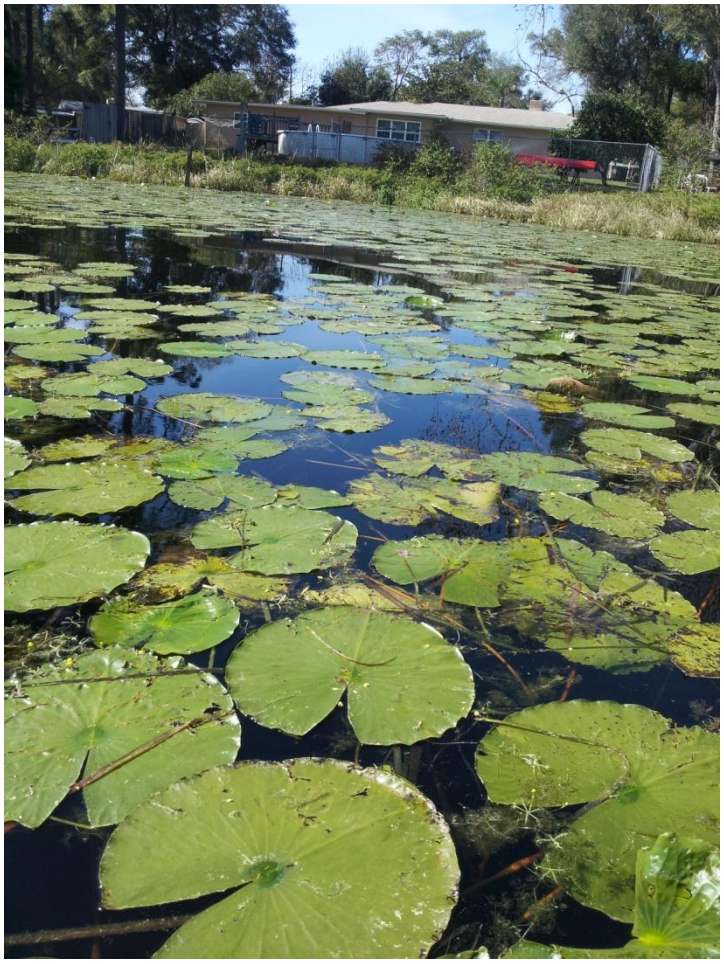
Native submersed aquatic vegetation (SAV) observed included: lemon bacopa to a depth of 4 feet, coontail to 7.5 feet, bladderwort to 10.5 feet, and eelgrass to 10 feet. The dominant SAV found was bladderwort followed by eelgrass. No hydrilla or stonewort was found during the inspection. Reduction in stonewort could be attributed to the 150 triploid (sterile) grass carp fish that has recently been stocked into the lake.

Photo: Bladderwort and some eelgrass collected in sample.



The lilies, spatterdock and fragrant water lily, are established from 3-10.5 feet in depth and are expanding within the lake. Although the lake reaches depths of 17 feet, the majority of the lake is shallow enough for lilies to establish in greater depths. This would result in very little open water if expansion continues. Control of aquatic and wetland plants could require a FWC aquatic plant control permit. Contact CJ Greene at (407) 858-6170 or CJ.Greene@myfwc.com for permit and recommendations.

Photo: Water lilies on the west side of the lake.



The most abundant exotic emergent aquatic plant continues to be torpedo grass, but is closely followed by the invasive species, dwarf papyrus and burhead sedge. These invasives will continue to spread and will out-compete native emergent aquatic plants. Burhead sedge is commonly found along the shoreline or in floating mats. These floating mats can continue to expand and create floating islands (or tussocks) within the lake. Other invasive plants/trees observed included: wild taro, also called elephant ear, Chinese tallow, Brazilian pepper, and water primrose. Torpedo grass along some shorelines appeared to have been impacted greatly by winter. We encourage further treatments of this invasive species, so as long as it is permitted through the FWC, (a no cost permit, which can be found at: http://myfwc.com/License/LicPermit_DownloadApps.htm) and re-established with beneficial native aquatic plants.

Photo: Burhead sedge along the shoreline.

The secchi was 10.4 feet in a depth of 17.8 feet compared to 13.5 feet on the previous survey. No grass carp fish were observed. The grass carp barrier was inspected and was found free of debris and operational. The water elevation at the time of the inspection was 99.85 feet above sea level. More information on Cub Lake can be found on the Seminole County Wateratlas at: http://www.seminole.wateratlas.usf.edu/lake/?wbodyatlas=lake&wbodyid=7531.

Little Bear Lake 2-8-2012

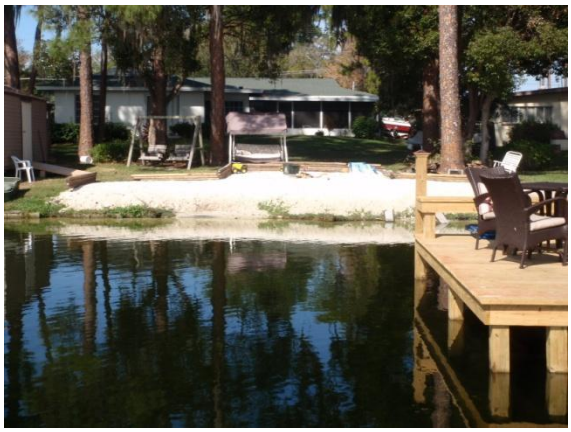
On **February 8th, 2012**, Gloria Eby (Seminole County [SC] Lake Management Program), Dean Barber (SC Consultant), and CJ Greene (Florida Fish and Wildlife Conservation Commission [FWC]) surveyed the aquatic plants in **Little Bear Lake**.

The only submersed aquatic vegetation (SAV) found in Little Bear Lake during this inspection was very small amounts of filamentous algae. Most of the lake bottom is covered with detritus (particulate organic material).

Photo: Example of detritus found in lake with monofilament line.

The dominant emergent plant along the shoreline is either torpedo grass or no vegetation at all, in many locations. Shoreline plants act as a buffer reducing the amount of nutrients from runoff that enters your lake and also helps to reduce shoreline erosion. Having native aquatic plants along the shoreline can protect and improve the ecological health of your waterbody and provide a great view at the same time. Additionally, control of aquatic and wetland plants requires a Florida Fish and Wildlife Conservation Commission (FWC) aquatic plant control permit (which is free). Please contact FWC regional biologist Carl Greene at (407) 858-6170 or Carl.Greene@myfwc.com for your free permit. For more information please visit FWC's website at http://www.myfwc.com/license/aquatic-plants/.

Photo: Typical shoreline of Little Bear Lake.

Other invasive shoreline plants found include elephant ear (*Colocasia esculenta*), water primrose (*Ludwigia peruviana*), Brazilian pepper (*Schinus terebinthifolius*), paper bark tree (*Melaleuca quinquenervia*), and cattails (*Typha sp*.).

Photo: Brazilian pepper

Photo: Paper bark or Melaleuca tree.

Some of the beneficial native shoreline plants found include: saw grass (*Cladium jamaicense*), pickerelweed (*Pontederia cordata*), and duck potato (*Sagittaria lancifolia*). Also the native water lilies *Nymphea oderata* and *Nuphar lutem* continue to expand in the south west corner of the lake.

The secchi was 15.6 feet however visible on bottom therefore greater lake depth could have yielded greater clarity. The water elevation at the time of the inspection was 102.45 feet above sea level. No grass carp fish were observed during the inspection.

Recommendations:

1 Continue to work together, with other lakefront owners, to control and if possible eliminate invasive plants observed during this survey and increase native aquatic plantings along shoreline (such as pickerelweed and duck potato). Encourage native plantings along the shoreline especially in areas without any vegetation.

2 Increase educational outreach programs i.e. Florida Yards and Neighborhoods (FYN), Lake Management Video mail-outs, and reduction of personal pollution (contact Seminole County Lake Management Program, Gloria Eby (407) 665-2439 for assistance).

3 These recommendations could be managed by Seminole County by establishing an MSBU, Municipal Service Benefit Unit, for aquatic weed control/enhancement. For additional information contact Carol Watral at (407) 665-7164 or cwatral@seminolecountyfl.gov or http://www.seminolecountyfl.gov/fs/msbu/.

4. Control of aquatic and wetland plants could require a Florida Fish and Wildlife Conservation Commission (FWC) aquatic plant control permit (such as the lilies in Cub). Contact CJ Greene at (407) 858-6170 or Carl.Greene@myfwc.com for a permit and recommendations.