

## Sliver Glen Springs Restoration Plan

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## Executive Summary:

Silver Glen Springs is a unique treasure found in the Ocala National Forest. For years it has been the boating destination for thousands during the hot Florida summers. Unfortunately this has taken its toll on the quality and health of the spring system. In the following pages I will provide a course of action that I believe will help alleviate the strain placed on the spring system by boaters and swimmers alike. This plan includes the creation of a mooring system to deter boaters from anchoring or tying off of vegetation, the creation of a no-motor zone to help restore the natural subaquatic vegetation and the implementation of charging a fee for day use of the spring by boaters, something that has not yet happened and is truthfully unfair to those who pay to enjoy the spring.

## Introduction:

Silver Glen Springs in Marion Co. Florida (Latitude 29°14'45.04" N, Longitude 81°38'36.50" W) is a first magnitude spring. Silver Glen Springs has an average flow rate of 112 cubic feet of water per second. It is in a unique location at the boundaries of three counties and by the fact that it is predominantly surrounded by the Ocala National Forest and a large body of water, Lake George. Silver Glen Springs is famous for its crystal clear 72F water and its popularity as party spot during the summer months. Unfortunately this, over the years, has placed a toll on the ecology of the springs. What once was a fountain of environmental health has now degraded into a spring that needs our help.

The Volusia Co. portion of the springshed is predominantly comprised of Lake George. On the east coast of Lake George there is the Welaka State Forest in Putnam Co. which is mostly pine and some private residences. The Lake Co. portion is comprised of the Ocala National Forest. The largest portion is in Marion Co. which has a variety of land uses. According to the 2005 Marion County Water Resource Assessment and Management Study: Water Resource Inventory and Analysis 42% of the county is forest, 18% agricultural lands, 15% natural systems, 11% residential, commercial, industrial, mining, institutional, recreational, transportation, utilities and other land uses make up the remaining 25%.

## Review:

### Current Ecological Conditions of the Run:

#### Flora:

Rooted Submerged Aquatic Vegetation covers approximately 30% of the Run. The predominant species are: *Vallisneria Americana* (eelgrass), *Myriophyllum spp* (water milfoils), *Hydrilla verticillata* (hydrilla) *Eleocharis spp* (spikerushes), *Ceratophyllum spp* (coontails), *Sagittaria kurziana* (strap-leaf sagittaria)

A major point of concern is that *Hydrilla verticillata* is present in over 20% of the run, because it is a non-native species and is known to outcompete native vegetation. If the hydrilla continues to spread it runs the risk of becoming the dominant species and destroying the delicate spring ecosystem.

Another point of concern is the density of algae found in parts of the spring basin. In some areas it has blocked out the sun and nutrients native plants require (such as eel grass) to grow. It has, in some areas, created an anaerobic condition.

#### Fauna:

Like many Florida Springs, Silver Glen Springs is home to a diverse array of native and nonnative fish and wildlife: Manatee, black bear, grey fox, hawks, various ducks, egrets, herons, vultures, Bald Eagles, American Alligators, various turtles, Large mouth Bass, Mullet, Florida Gar, and tilapia to name a few.

#### Recreational use:

The main recreational usage for Silver Glen is swimming, fishing and boating. Access to the spring for swimming can be achieved either by land or by boat. There is obvious damage done to the SAV due to trampling and swimmers uprooting the vegetation.

There are three typical fishing : Bow and Arrow (mainly for mullet), rod and reel and cast net. There seemed to be minimal impact directly due to fishing.

Boating has the biggest impact on the spring run. During the busy season between Memorial Day and Labor Day the weekends can average around 200 vessels per day. Motors and anchors cause the most damage to the vegetation. By limiting the area in which vessels are able to use their motor and anchor we can help encourage re-growth.

Table 1:

Average Boat Type and Specs for Holiday Weekends at Silver Glen Spring 1999-2001					
	Average # of boats	Percent total	Minimum Size	Maximum Size	Average width
Runabout	136	80%	17 feet	22 feet	8 feet
Cabin Cruiser	15	9%	23 feet	38 feet	10 feet
Houseboat Reg.	18	7%	24 feet	45 feet	15 feet
Houseboat Large	7	4%	46 feet	60 feet	15 feet

Source: <http://www.dep.state.fl.us/springs/reports/files/FinalReport-Complete-Document.pdf>

Table 2: Water Quality

Silver Glen Springs	Min	Mean	Median	Max	Count	Period
Water temperature, °C	20.5	23.2	23.1	26	78	1972-2005
Specific conductance, field, µmhos/cm at 25 °C	956	1882	1938	2184	45	1984-2005
Specific conductance, lab, µmhos/cm at 25 °C	1640	1990	1990	2400	47	1972-2005

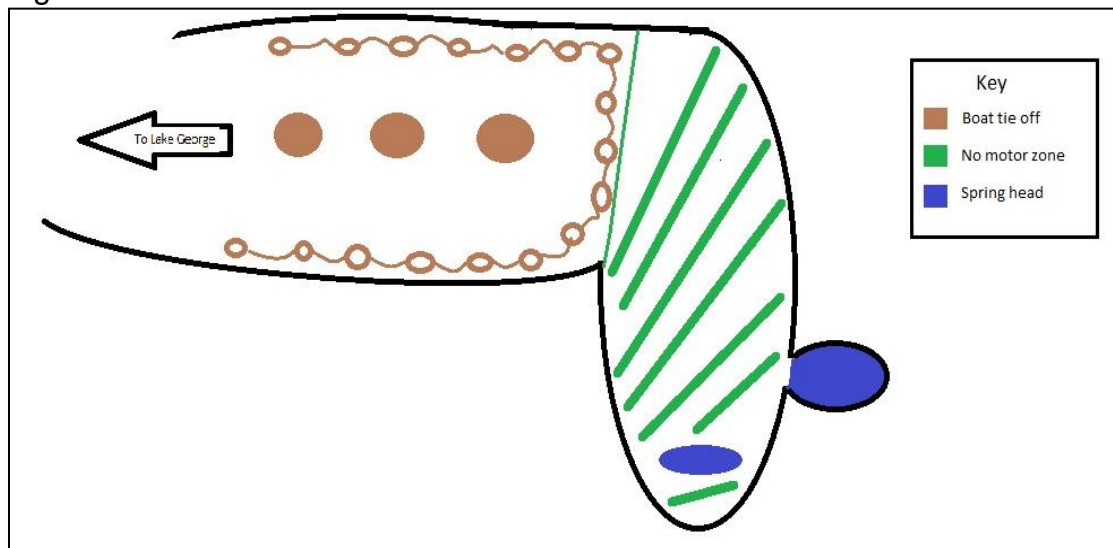
<b>pH, field</b>	6.2	7.76	7.8	8.57	69	1972-2005
<b>Discharge, cfs</b>	38.2	104	100	245	175	1931-2005

Recommendations:

1. Boat tie offs

- a. In the Florida Keys there is a strong initiative to protect the reefs. In order to allow people to still enjoy snorkeling/diving reefs but to reduce the damage done by anchors they have “anchored” buoys so that boats can tie off to them instead of boaters throwing out their own anchors and tearing up the bottom. I propose a similar tie off system along the center of the spring run for larger boats and a piling and rope system along the banks of the spring run for smaller vessels to encourage boaters to tie off instead of either a) destroying the underwater vegetation or b) trespassing on Juniper hunting club property and doing damage to the vegetation.

Figure 1:



2. Terracing of the shoreline:

- a. The terrain around the spring head is very interesting, if you arrive by car you have to walk down into a ravine to reach the spring head. During the summer months when there is high motor vehicle traffic in the parking lot and late afternoon thunderstorms much of the runoff comes down this hill and has started to cause significant damage to the shoreline surrounding the springhead. I propose that terracing of the shoreline will help with water runoff and erosion around the spring head. Many northern states are using this technique to help defend against coastal erosion. There are very little construction materials needed beyond good soil, some wood for siding, and plant material. The terracing would also provide more space

for visitors, allowing for picnic and sunbathers to take advantage of an area that was previously unused.

As an added benefit the terracing would also act as a natural filter for the oils and chemicals that are washed down from highway 19 and the parking lot. This will in turn help the overall health of the spring.

3. Charging boaters a daily entrance fee:
  - a. Much of the traffic that Silver Glen Springs sees is from the boaters along the St. John’s River. This is a major source of lost revenue. I propose that a toll building be erected at the mouth of the spring run and that boaters are charged an entrance fee. \$5 per boat under 22 feet and \$10 for boats over 22 feet with the exception of house boats. In addition there could be an overnight pass or a weekend pass similar to the camping passes required in the state forest.
4. Making more of the basin “no-motor”
  - a. In the above diagram I have moved the boundary for “no-motor” vessels to encourage re-growth of local submerged plants. I would also recommend that there be designated pathways to and from the boat tie off area and the spring head to help lessen the impact on the vegetation.

Economics:

Of the four projects the mooring system is going to cost the most to implement but would be the easiest to start with. The No-motor aspect will just involve creating a barrier between the two areas and that would be achieved by the mooring system.

The gate house at the end of the run would cost \$2,000 for the building (at least for a temporary building such as a floating metal office) and the salary for the park ranger collecting the fee. This would easily be made up during the peak season where as many as 200 boats can come through on a daily basis.

Also, there would need to be periodic monitoring and evaluation to determine if these plans are having the hoped for effect on the spring health.

Table 2:

<b>Cost of Mooring System:</b>			
	Cost:	# needed	Total
Buoy:	230	10	2300
Rope:	1.53	1800	2754
Cement:	15	40	600
Hardware:	10.7	180	1926

Pilings:	50	180	9000
Labor:			5000
Total:			21580

Table 3:

Revenue from boat entrance /day			
	#of boats	entrance fee	total
boats < 22 ft	136	5	680
boats > 22 ft	40	10	400
total average per day			1080

Schedule of Implementation:

Depending upon licensing and permitting I would recommend that they begin with blocking off of the no-motor zone, followed by (during the slow winter months) the creation of the moorings. To be followed by the erection of the gatehouse.

References:

Carrying Capacity Study of Silver Glen Spring and Run  
<http://www.dep.state.fl.us/springs/reports/files/FinalReport-Complete-Document.pdf>

Mooring Buoy System: <http://floridakeys.noaa.gov/mbuoy/welcome.html>

Shore Erosion Control Guidelines for Waterfront Property Owners  
<http://www.dnr.state.md.us/ccws/sec/download/waterfrontpropertyownersguide.pdf>

SJRWMD Silver Glen Springs [http://www.sjrwmd.com/springs/marion/silver\\_glen.html](http://www.sjrwmd.com/springs/marion/silver_glen.html)