Holly Lake Ranch
Mr. Rob James
220 Holly Lodge Circle
Holly Lake Ranch, TX 75765

Southern Sportsman Aquatics & Land Management

18 May 2011

Rob,

I am very sorry I missed the meeting yesterday; we didn't get off the water until about 4:00 PM. There were a few folks at the ramp when we got back who had questions, mainly regarding the new plant we identified as Egeria or Brazilian Elodea, which looks like Hydrilla.

I conducted my May site visit to treat vegetation and collect water chemistry data from the big lake at Holly Lake Ranch on 17 May 2011. Water chemistry parameters fell within the acceptable or desirable ranges. From a fish and wildlife perspective the lake continues to look very good. There were lots of active bream beds observed. There were also lots of forage fish along the shore and amongst vegetation and docks. There was less coontail scattered around the lake that was treated during the April treatment, but more filamentous algae than the two previous visits. No trash was observed in the lake.

Below are the results from water chemistry parameters tested at the three locations around the lake. Site one is out from the dam, site two was half way to three-quarters up the East Fork and the third was about the same distance up the West Fork. Dissolved Oxygen (DO) was good to 16 ft, with the remaining 13 feet below desirable, and unable to support fish for a very long period of time. This is normal in deep lakes as the water warms at the top and will fluctuate during the year as water temperatures go up and down along with the density of the planktonic algae bloom. There is a nice algae bloom (green water) occurring, which again from a fishery and aquatic weed management standpoint is a good thing and helps the lake support a lot more fish. Visibility was around 31 inches, which is desirable as we want it to fall between 16 and 36 inches this time of year. An algae bloom helps reduce light penetration into the water and reduces submerged vegetation and filamentous algae growth, reducing the need for herbicide treatment.

The species of plants treated included coontail, purple fanwort, filamentous algae and Egeria (Brazilian Elodea). A spray mix of Diquat and Hydrothol 191 was used to spot spray approximately one acre total along the shore mostly around docks, except the Egeria was treated no matter where if we could see it. Some vegetation was left around the lake where it was not an eye-sore or it did not hinder navigation or dock access. Coontail is a quality plant habitat species for fish. The last dock up the East Fork cannot be reached do to shallow water. None of the herbicides prevent growth, if it was not there it did not get treated, and can start to grow now or become visible and will continue to grow until our next visit, but once we can see it we can treat it.

Treating the entire East Fork in my opinion is not advisable. According to Google Map, there is only about three to four acres of dense vegetation and shallow water where water flows into the lake under the road from the north. The depths range from half foot to 1.5 feet deep. The vegetation present that we observed (lilies, fanwort, algae, coontail) helps filter the water as it comes into the lake, removing some nutrients and reducing sediment in the water coming in after big rains. Our boat can handle shallow water, but we could not get to the last dock on the East shore of the East Fork. If all treated at once poor water quality could develop and oxygen levels could drop to where fish are stressed or perish. It would

have to be done in small sections. This visit we did spray the lower perimeter and west shore of the East Fork (approximately 1/6 acre) from the last dock on West shore heading south of fanwort and algae. That is as far as we could get the boat and maneuver around.

As I stated earlier the new plant species does look like Hydrilla, but I am sure what we have seen to date is Egeria. It is a non-native species and can grow aggressively. Below I have included some additional information compiled by Texas A&M University regarding the plant. It either washed in from upstream or was brought into the lake by boat trailer. It is a common aquarium plant, but I am not sure it can still be purchased today for aquariums. I will order another herbicide (I believe I will use Aquathol granular) type this week and have it ready for June. I have a call into our herbicide supplier for his input prior to ordering. Since much of this plant is submerged a granular will work better on the small submerged patches.

I am planning on coming back next week one morning to spray the small trees along the dam we couldn't get too yesterday and to inspect how this week's treatment did. We will also be back for the June treatment (around June 13 – 17th) to collect water chemistry and treat nuisance vegetation again.

Russell indicated some of the home owners want to pay for additional spraying around their docks and I am not sure how to handle this. If we offer this service, the last dock owner on the East Fork may want to pay us to spray that entire end, and I've already indicated that is not advisable. I will think more about this and would like your or Russell's opinion.

Russell also indicated he would like an estimate for evaluating the lake's fish population in addition to treating vegetation. Since we are already inventorying vegetation and taking water chemistry data the evaluation costs less than if we were looking at everything together. In the Data Summary and Management Strategy I would tie in the water chemistry data results (already being collected), vegetation inventory and plant management being done with the results of the fish assessment. If we continue to work together I could also compile harvest and catch rates monthly if it was provided to me and can be included with the herbicide and water chemistry summaries during treatment months. Since we are already gathering water chemistry during spring, summer and fall I only recommend a site visit in January to collect water chemistry data in winter, so we then have an idea of what is going on during all four seasons. The Management Strategy will include proper feeding, increasing habitat, stocking recommendations, harvest guidelines to help reach whatever the goal for the lake is (trophy bass fishery, quality all around fishery, etc).

As always, thank you for your patronage and if you have any questions before my next visit, do not hesitate to E-Mail or call. If you need to contact me please call my mobile or office telephone or E-Mail me a message and I will get back with you as soon as I can. If you or Russell would like to meet next week when I come out, I would be glad too.

Sincerely,

Scott Brown

Southern Sportsman Aquatics & Land Management, L.L.C.
1234 Rio Grande Drive, Allen Texas 75013, (214) 383-3223
tazmanlabs1@sbcglobal.net
southrensportsmanaquaticsandland.com

Big Lake Holly Lake Ranch
Out from Dam 5/17/11

- Sample Time: 9:15AM
- Air Temp: 62^{o} F
- Cloud Cover: 0%
- Wind Speed & Dir: calm
- Water Temp Surface: 74.5^{o} F
- Water Temp Bottom (29 ft): 52.6^{o} F
- DO Surface: 9.2 mg/l
- DO Bottom (29 ft): 1.2 mg/l
- pH: 7.9
- Conductivity: 129 uS/cm
- Salinity: 0.05 ppt
- Ammonia: 1.0 ppm
- Nitrites: 0 ppm
- Alkalinity: 36 ppm
- Carbon Dioxide: 0 ppm
- Chlorides: 30 ppm
- Hardness: 38 ppm
- Visibility: 32 in
- Thermo-cline Depth: 16 ft

Big Lake Holly Lake Ranch
East Fork 5/17/11

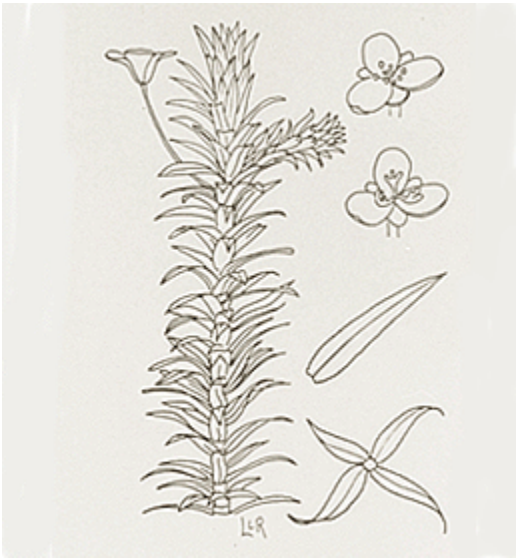
- Sample Time: 9:40 AM
- Air Temp: 63^{o} F
- Cloud Cover: 0%
- Wind Speed & Dir: calm
- Water Temp Surface: 73.6^{o} F
- Water Temp Bottom (8 ft): 71.8^{o} F
- DO Surface: 8.7 mg/l
- DO Bottom (8 ft): 9.1 mg/l
- pH: 8.5
- Conductivity: 102 uS/cm
- Salinity: 0.05 ppt
- Ammonia: 1.25 ppm
- Nitrites: 0 ppm
- Alkalinity: 38 ppm
- Carbon Dioxide: 0 ppm
- Chlorides: 34 ppm
- Hardness: 38 ppm
- Visibility: 29 in
- Thermo-cline Depth: None

Big Lake Holly Lake Ranch
West Fork 5/17/11

- Sample Time: 10:00 AM
- Air Temp: 73.4^{o} F
- Cloud Cover: 0%
- Wind Speed & Dir: S 2 mph
- Water Temp Surface: 73.4^{o} F
- Water Temp Bottom (10 ft): 69.8^{o} F
- DO Surface: 9.4 mg/l
- DO Bottom (10 ft): 8.5 mg/l
- pH: 8.1
- Conductivity: 106 uS/cm
- Salinity: 0.05 ppt
- Ammonia: 0.6 ppm
- Nitrites: 0 ppm
- Alkalinity: 32 ppm
- Carbon Dioxide: 0 ppm
- Chlorides: 28 ppm
- Hardness: 40 ppm
- Visibility: 31 in
- Thermo-cline Depth: None

Southern Sportsman Aquatics & Land Management, L.L.C.
1234 Rio Grande Drive, Allen Texas 75013, (214) 383-3223
tazmanlabs1@sbcglobal.net
southrensportsmanaquaticsandland.com

Egeria Description



Non-Native

Egeria is native to South America but has become naturalized in much of the Southeastern U.S. Egeria is a rooted perennial plant but can survive and grow as floating fragments. The dark green lance-like leaves are in whorls of 4 to 6 which become more dense near the tip of the stem (near the surface). Leaves are about 1/2 inch wide and from 3/4 to 1 1/4 inches long with finely toothed margins. Flowers are white about 3/8 to 3/4 inches in diameter on short stalks which commonly are emergent.

Submerged portions of all aquatic plants provide habitats for many micro and macro invertebrates. These invertebrates in turn are used as food by fish and other wildlife species (e.g. amphibians, reptiles, ducks, etc.). After aquatic plants die, their decomposition by bacteria and fungi provides food (called “detritus”) for many aquatic invertebrates. Egeria is utilized by some duck species as food.

Egeria is often confused with the native Elodea or the non-native Hydrilla. Hydrilla has one or more teeth on the underside of the midrib, neither Elodea nor Egeria have these midrib teeth. The teeth make Hydrilla feel rough when drawn through your hand from base to tip. Flowers of Egeria are larger than Hydrilla. Egeria leaves are larger than elodea and in whorls of 4 to 6 and not 3 as with elodea.

Management Options

Southern Sportsman Aquatics & Land Management, L.L.C.
1234 Rio Grande Drive, Allen Texas 75013, (214) 383-3223
tazmanlabs1@sbcglobal.net
southrensportsmanaquaticsandland.com

Mechanical/Physical Control Options

Egeria can be removed by raking or seining it from the pond but will reestablish from any remaining fragments and roots.

Fertilization to produce a phytoplankton or algal “bloom” prevents the establishment of most bottom rooted aquatic weeds and produces a strong food chain to the pond fish.

Non-toxic dyes or colorants prevent or reduce aquatic plant growth by limiting sunlight penetration, similar to fertilization. Aquashade, Blue Springs, and Crystal Blue are examples of non-toxic dye and other products are available. However, dyes do not enhance the natural food chain and may suppress the natural food chain of the pond.

Many types of mechanical removal devices are available that cut or chop up aquatic weeds. It is important to remember that many submerged plants regrow from fragments, so removal of cut fragments many be necessary to keep from spreading the unwanted plant. Companies that make cutters and rakes include but are not limited to Cutting Edge, Jenson Lake Mower, Midwest Aqua Care, and WeedRoller.

Physical barriers are also used to eliminate plants by shading the bottom. These work well for swimming areas, docks, etc. but must be kept clean of any buildup of sediment and debris. Lake Mat and Lake Bottom Blanket are examples of companies that makes these mats.

Biological Control Options

Grass carp will seldom control aquatic vegetation the first year they are stocked. They will consume egeria but it is not a preferred food item. Grass carp stocking rates to control egeria are usually in the range of 7 to 15 per surface acre. In Texas, only triploid grass carp are legal and a permit from the Texas Parks and Wildlife Department is required before they can be purchased from a certified dealer.

Chemical Control Options

Grass carp will active ingredients that have been successful in treating egeria include copper complexes with diquat (E), endothall (E), fluridone (G), and penoxsulam (G). E = excellent, G = good

Reward is a liquid diquat formulation that has been effective on egeria and is very effective if mixed with a copper compound. It is a contact herbicide. Contact herbicides act quickly and kill all plants cells that they contact.

Aquathol K, and Aquathol Super K are dipotassium salts of endothall and comes in both liquid and granular formulations. These endothall products have been effective on egeria and can be mixed with copper compounds for additional effectiveness. Contact herbicides act quickly and kill all plants cells that they contact.

Southern Sportsman Aquatics & Land Management, L.L.C.
1234 Rio Grande Drive, Allen Texas 75013, (214) 383-3223
tazmanlabs1@sbcglobal.net
southrensportsmanaquaticsandland.com

Hydrothol 191 is an alkylamine salt of endothall and comes in both liquid and granular formulations. It is a contact herbicide and has been effective on egeria. Contact herbicides act quickly and kill all plants cells that they contact. Hydrothol can be toxic to fish.

Komeen is a registered copper compound for use on egeria (8% active). It is a contact herbicide. Contact herbicides act quickly and kill all plants cells that they contact.

Nautique is a registered copper compound for use on egeria. (9.1% active) It is a contact herbicide. Contact herbicides act quickly and kill all plants cells that they contact.

Sonar, Avast , and Whitecap are floridone compounds and comes in both liquid and granular formulations, and have been effective on egeria. These are broad spectrum, systemic herbicides. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides.

Galleon is a liquid penoxsulam formulation. It is a broad spectrum, systemic herbicide. Systemic herbicides are absorbed and move within the plant to the site of action. Systemic herbicides tend to act more slowly than contact herbicides. Galleon may be sprayed directly onto emergent plants or applied directly into the water. Galleon should not be applied in areas where it will be diluted rapidly. Galleon will take 60-120 or longer to completely kill the target plants. Galleon will need a surfactant for foliar and exposed sediment applications.

One danger with any chemical control method is the chance of an oxygen depletion after the treatment caused by the decomposition of the dead plant material. Oxygen depletions can kill fish in the pond. If the pond is heavily infested with weeds it may be possible (depending on the herbicide chosen) to treat the pond in sections and let each section decompose for about two weeks before treating another section. Aeration, particularly at night, for several days after treatment may help control the oxygen depletion.

Southern Sportsman Aquatics & Land Management, L.L.C.
1234 Rio Grande Drive, Allen Texas 75013, (214) 383-3223
tazmanlabs1@sbcglobal.net
southrensportsmanaquaticsandland.com