# Clear Lake
# 2014 Aquatic Plant Control Program

**Prepared By**
**Northwest Aquatic Eco-Systems**
**855 Trosper Road SW #108-313**
**Tumwater, WA 98512**
**360-357-3285**
**Pondweeds@comcast.net**
**www.nwaquaticecosystems.com**

## Project Overview

This was Northwest Aquatic Eco-Systems (NWAE) third year of providing aquatic weed control services for the Clear Lake LMD #4 district. Clear Lake has been actively involved with an intense program to eradicate noxious aquatic macrophytes from the system for a number of years. The Local Management District was formed to specifically address these issues. Targeted species include Eurasian watermilfoil and Nymphaea odorata. Densities of Eurasian water-milfoil plants have been reduced considerably and are now contained mainly to an area located by the public swimming area. Lily pad sites are responding positively to years of prior treatment and this slow process will continue. Some residents living along the shoreline have requested that no herbicides be applied to their lakefront. The entire lakes littoral zone currently supports a wide range of native plant species. This growth extends outward beyond the 15 foot contour line and consumes much of the entire lake shoreline. These native plant stands also support sporadic single plant milfoil growth.

Resident native species now pose the same recreational problems often associated with the milfoil noxious species. Management practices of the lake have evolved over the past

few years to incorporate the control of native species at acceptable levels while also monitoring and controlling single milfoil plants that may always remain within the system.

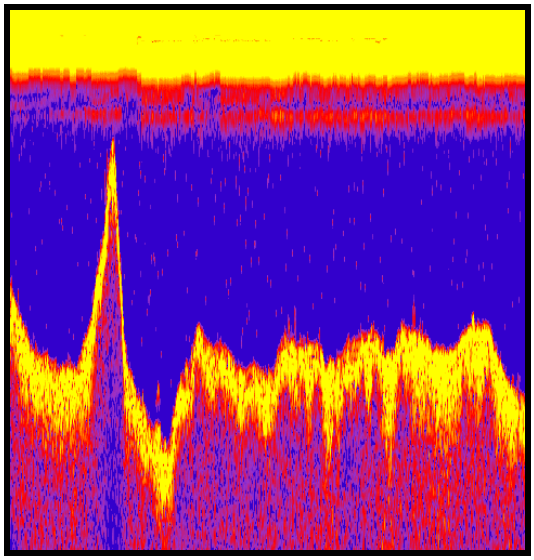
This 2014 report contains information identified in earlier reports in an effort for reviewers to understand most all the activities undertaken at Clear Lake without requiring the review of each yearly report. During the 2014 submersed weed control component of the project, the public swimming beach was closed down during and for 24 hours proceeding the application.

## Survey Protocol

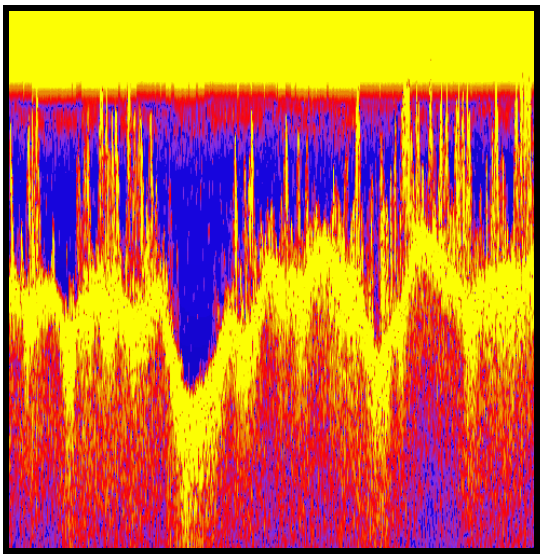
This year, NWAE continued to incorporate new state of the art surveying equipment in an effort to produce a survey that could easily be understood by all reviewers. Typically, past sampling consisted of manually retrieving weed samples from numerous locations lake-wide while observing growth through the water column. Although effective, individual bottom sampling can only identify plants within the immediate area sampled. Visual observations when water clarity permits is a far superior method for plant inventory since it allows for inspection of the entire lake bottom wherever the survey boat operates. This avoids the possibility of missing plants between bottom surveying data points. The old survey protocol employed a surface vehicle shadowing the weed bed borders and collecting data points corresponding to small or large occurrences of plants. To ensure the efficacy of the survey, a bottom sampling rake was thrown from the boat at various locations lake-wide. The rake is then drawn across the lake bottom, brought to the surface and into the boat. Plants attached to the rake are identified and confirmed as being the same species as noted visually through the water column. If the lake bottom is void of plants, no data is stored. The survey boat typically spends the entire survey within the lakes littoral zone while completing the task. This older system produced sub meter accuracy and automatically calculates and stores the position of every sampling data point. Data points are then assembled as a map layer, which are then incorporated into the project file.

During 2014, sonar data was collected utilizing specific transducers and bottom scanning equipment. The survey boat proceeds along predetermined transect lines spaced approximately 75 to 100 feet apart. Once the entire lakes littoral zone has been traveled and no vegetation appears on the chart recorder, the survey is terminated. Data collected on the SD card is then uploaded via cloud based technology and the processing of the data is finalized. The resulting work product is a color coded map of the lake bottom identifying weed growth areas and plant densities. Not only is a well-defined map produced but a sonar log of the survey is saved allowing a complete review and evaluation of the survey to occur in house. The sonar log allows you the ability to view all plant growth along the boats survey tracks. When nonnative milfoil species were identified, a milfoil specific data point was added to the transect line to ensure the

integrity of the survey bottom sampling was conducted at various locations along the transect lines.



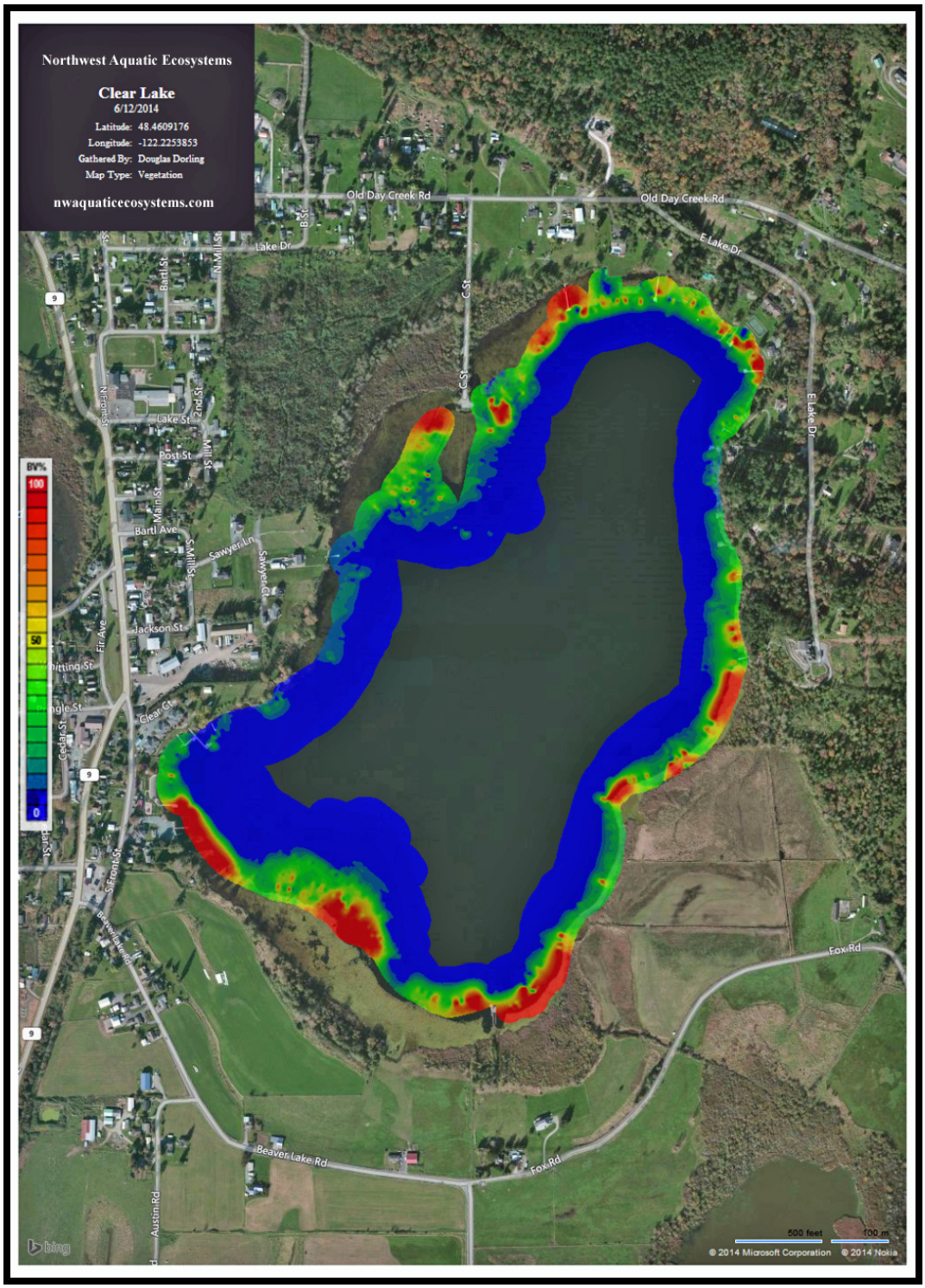
Weed Free Lake Bottom



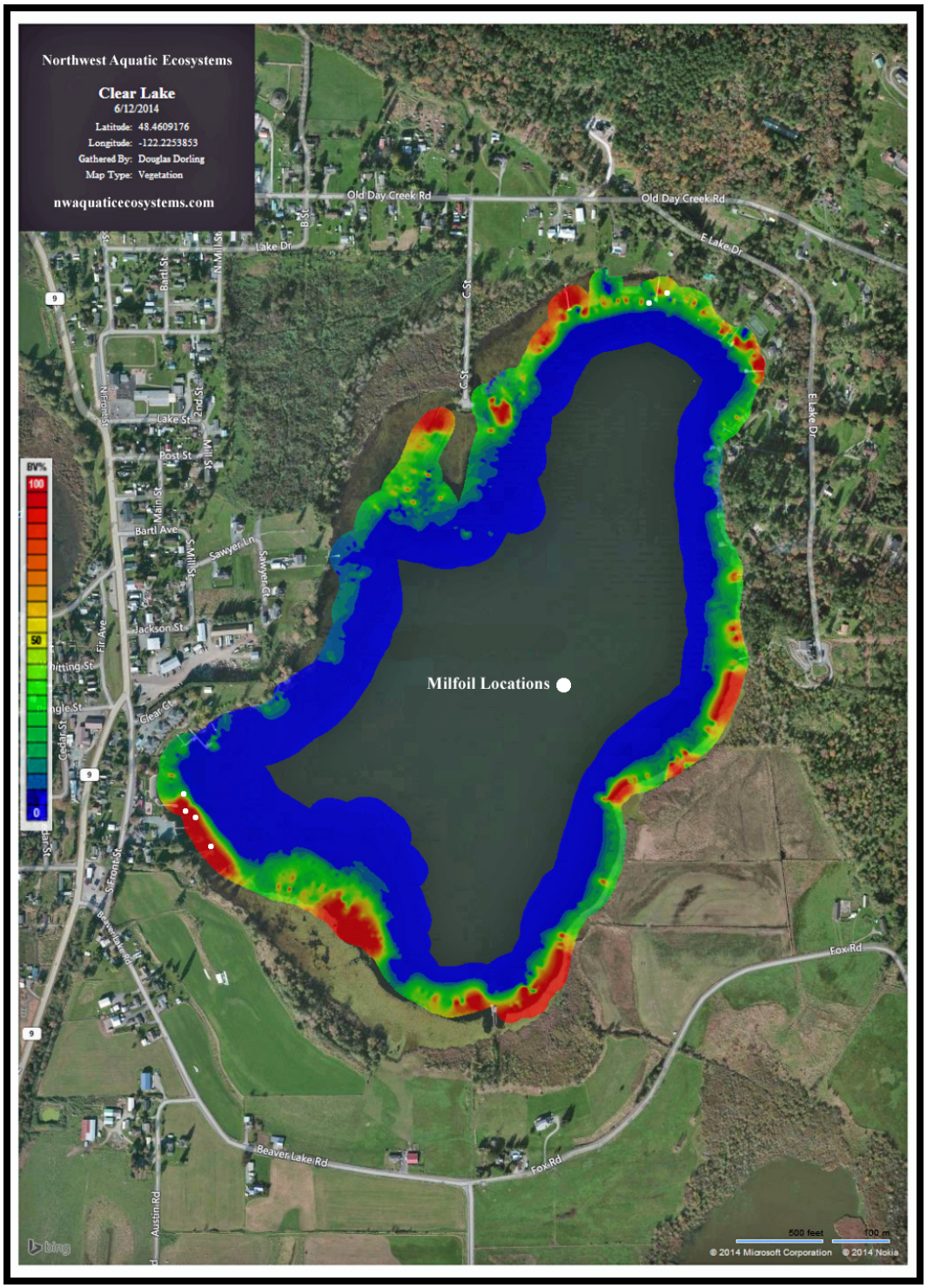
Weed Infested Lake Bottom

## Clear Lake Pre Treatment Survey Results

Clear Lake was surveyed on June 12, 2014. Water clarity was good with visibility reaching nearly to the bottom throughout most of the lake's littoral zone. Milfoil was present but was only noted as very sporadic single plants within two areas of the lake. Much of the shoreline was experiencing various degrees of native plant growth. There were no extended lake shoreline areas that were not experiencing some form of native plant growth. To a large extent, most of the problematic dense growth extended just beyond the dock areas. The NWAE survey identified the same native species present that have historically been observed. Such species would include Potamogeton amplifolius, P. robbinsii, P. natans, P. gramineus, Vallisineria americana, Elodea canadensis and Utricularia vulgaris. The most prolific pondweed was P. zosteriformis while there were other thin leafed pondweeds that could not be identified in the field. Similar to other lakes in the area different shoreline sections of the lake were dominated by dissimilar submersed species.




Red areas indicate maximum plant biomass occupying the entire water column. Blue areas indicate no plant biomass, green 50% coverage


Northwest Aquatic Ecosystems
Clear Lake
6/12/2014
Latitude: 48.4609176
Longitude: -122.2253853
Gathered By: Douglas Dorling
Map Type: Vegetation
nwaquaticecosystems.com
BV%
100
50
0
Milfoil Locations
Old Day Creek Rd
E Lake Dr
C St
Lake St
Post St
Bartl Ave
Jackson St
Beaver Lake Rd
Foxi Rd
Austin Rd
500 feet
100 m
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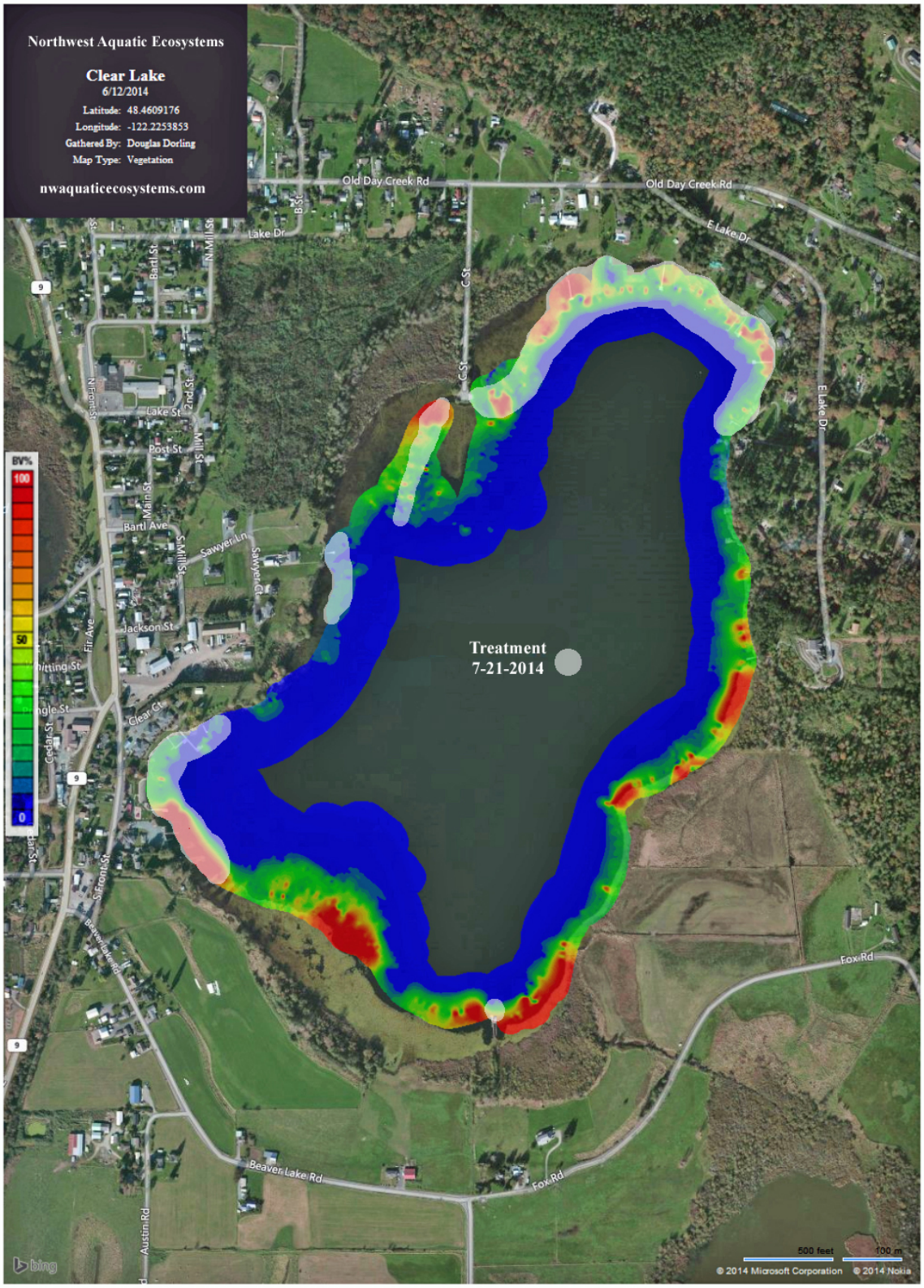
## July 21 Treatment

Under current NPDES guidelines, native macrophyte control is limited to no more than 50% of the shoreline or approximately 6,336 feet. The permit also mandates that "the geographic area where the Permittee intentionally applies chemicals must remain the same for the entire length of the permit coverage up to the maximum percentage of the littoral zone allowed by the water body". In essence, once native plant treatment sites within Clear Lake reach the 50% threshold level, no further expansion of the treatment areas are permitted and the areas treated cannot be changed until 2016.

Our approach during 2014 was similar to 2013. Provide lake property owners with an acceptable degree of control while continuing the compliant treatment model utilized during 2013.

Shoreline posting was conducted on the day of treatment. A two person crew initiated posting and treatment of the lake upon arrival in the afternoon. One small boat posted the lake while the treatment boat proceeded to treat those areas already posted. Material was offloaded from a locked truck container and transferred into two 25 gallon spray tanks mounted on the application boat. Containers were triple rinsed on site and returned empty back into the truck. Material was applied utilizing an 18 foot Airgator airboat. Lake water was drawn into the boat through intake ports located in the hull of the boat. Herbicide was then metered into the lake water via an injection manifold. Once the herbicide was injected, the water was then discharged back into the lake. Weighted hoses were used to place the material at the appropriate depth in the water column. Prior to treatment, a lake treatment map, identifying treatment plots was downloaded into the onboard GPS system. The boat utilized the onboard GPS to identify treatment site boundaries. Tanks were refilled and dispensed as needed. Submersed weeds were treated with Diquat at a rate of two gallons per surface acre in waters over three feet deep and one gallon per acre in waters less than 3 feet in depth. All of the targeted submersed weeds were treated on July 21.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Gathered By: Douglas Dorling
Map Type: Vegetation
nwaquaticecosystems.com
BV%
100
50
0
Treatment
7-21-2014
Old Day Creek Rd
E Lake Dr
Lake Dr
Lake St
Post St
Bartl Ave
Sawyer Ln
Jackson St
Clear Ct
Beaver Lake Rd
Fox Rd
Austin Rd
500 feet
100 m
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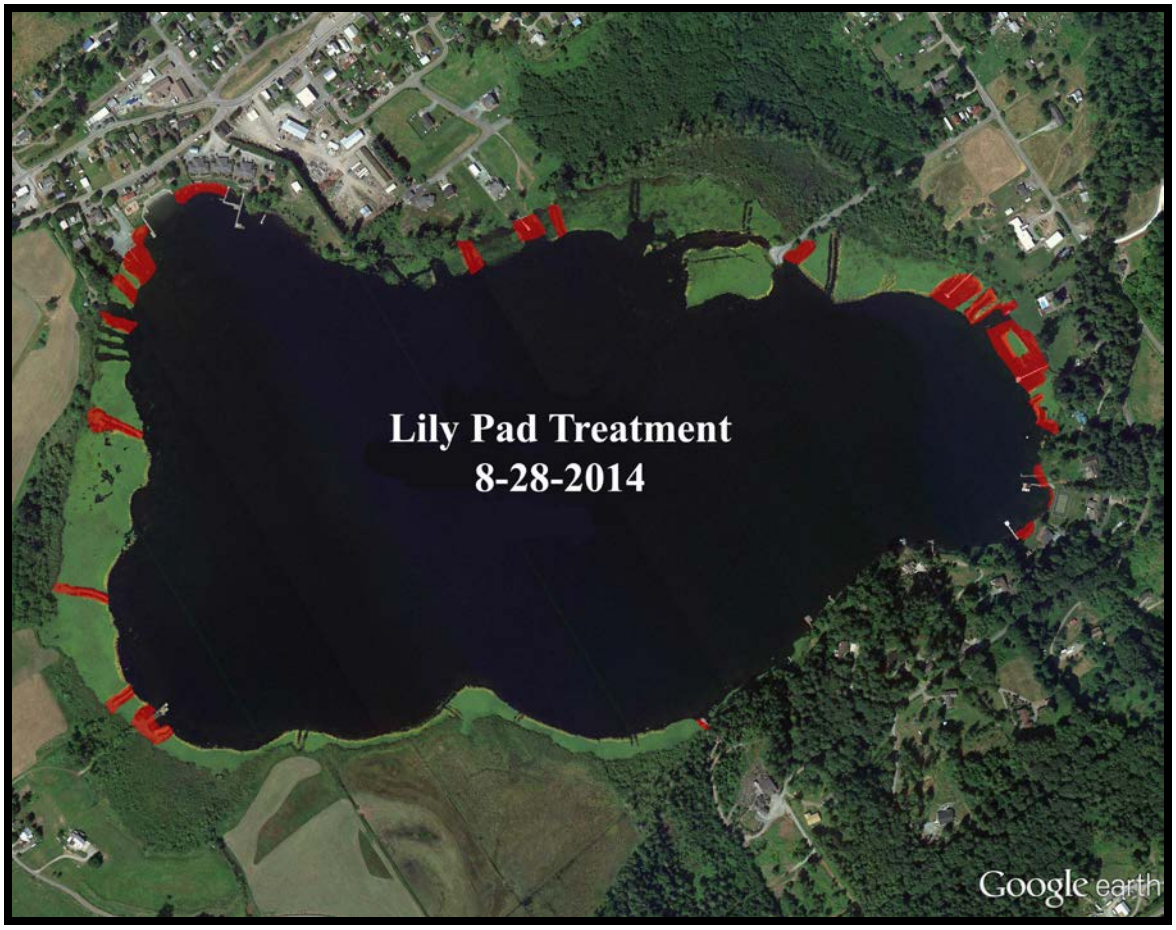
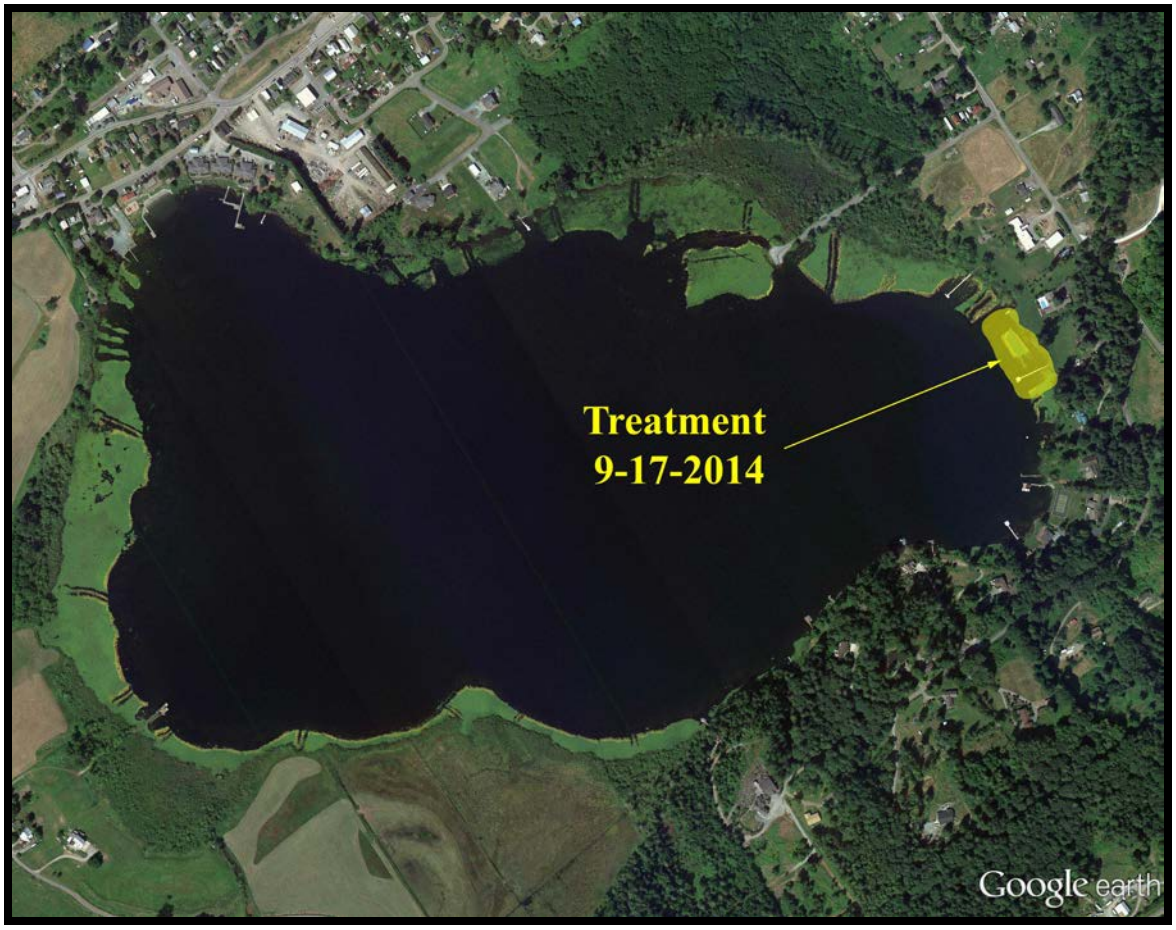
## August 28 Treatment

Lily pads within the residential shoreline areas of the lake were treated. Prior to treatment, shoreline posting was completed. During this spray event a 16 foot aluminum gas powered vehicle was utilized. Once mixed, the application boat drove along the shoreline identifying targeted sites and the spray mixture was then discharged using a spray gun. Tank was refilled and dispensed as needed. Once again the spray mix was blended on board in a 25 gallon tank and then discharged through a hand held spray nozzle directly onto the lily pad floating leaf surfaces. Pads were sprayed with a 1.5 % solution of glyphosate. In the course of this spray event it was noted that some of the previous areas targeted during past treatment seasons had created floating lily pad root mats. This occurrence is not unusual when large lily pad infestations are targeted for eradication. The same sites targeted during 2013 were again targeted during 2014.



## September 17 Lily Pad Treatment

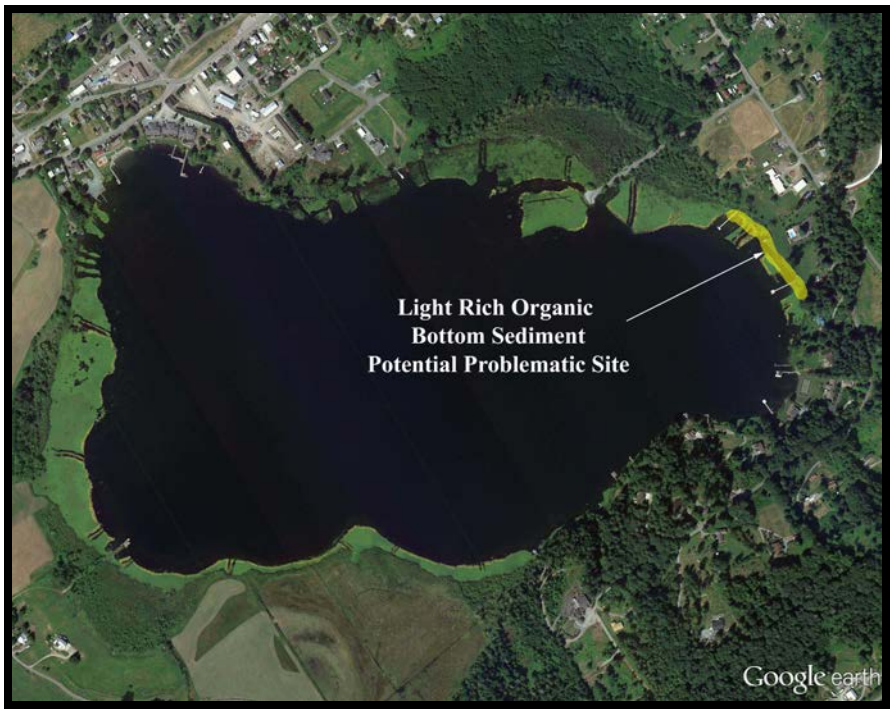
Previously sprayed shoreline areas had responded well to the prior spraying activities. One resident requested an additional spraying event. The area in question consisted of pads around a near shore dock area and a large patch that was slowly being controlled. All areas within the requested area were again posted and sprayed with a 1.5% glyphosate mixture.

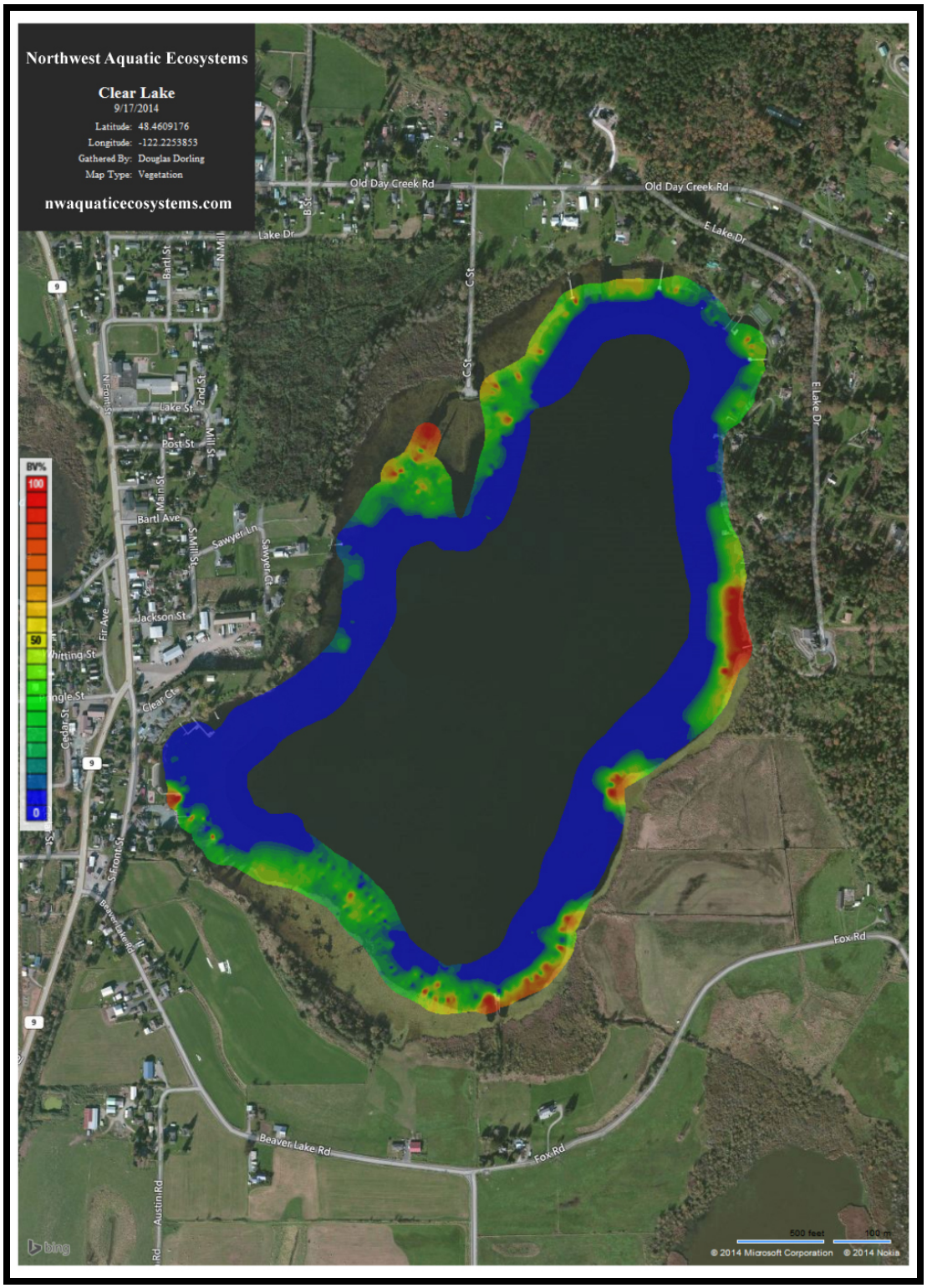


## Fall Survey

The fall survey was performed on September 19, 2014. Only one milfoil plant was identified throughout the littoral zone of the lake. Many of the pondweeds had already decomposed. However, the larger thick stemmed species were still evident but decomposing. Species such as Potamogeton amplifolius and Potamogeton robbinsii often degrade at a much slower rate than the thin leaved pondweeds. Although many of the targeted sites remained weed free, some were experiencing filamentous algae growth. There were minor occurrences of weed growth within shallow areas that were rich in soft black organic matter. This was particularly true along small sections of the northern shoreline. These soft rich organic bottoms have a tendency to neutralize the active ingredient of the herbicide used during treatment. In these areas, future treatments should consider the use of Aquathol K in conjunction with the diquat. This is similar to the successful approach developed on Big Lake. In years past, the use of diquat and associated boat lake use during treatment did not impact treatment results. During 2014 however, some areas were impacted by the wave action and resulting suspended water column sediments near shore.

Clear Lake appears to be more of a fishing and swimming resource than one used heavily for water skiing and boating. At times such activities, when occurring during treatment, may impact treatment results.

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Lake St
2nd St
Mill St
Post St
Main St
Bartl Ave
S Mill St
Sawyer Ln
Sawyer Ct
Jackson St
Fir Ave
Clear Ct
Cedar St
S Front St
Beaver Lake Rd
Fox Rd
Fox Rd
Beaver Lake Rd
Austin Rd
9
9
9
500 feet
100 m
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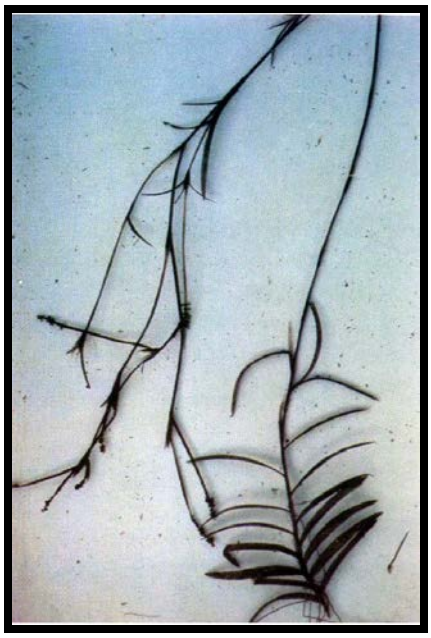
## Recommendations

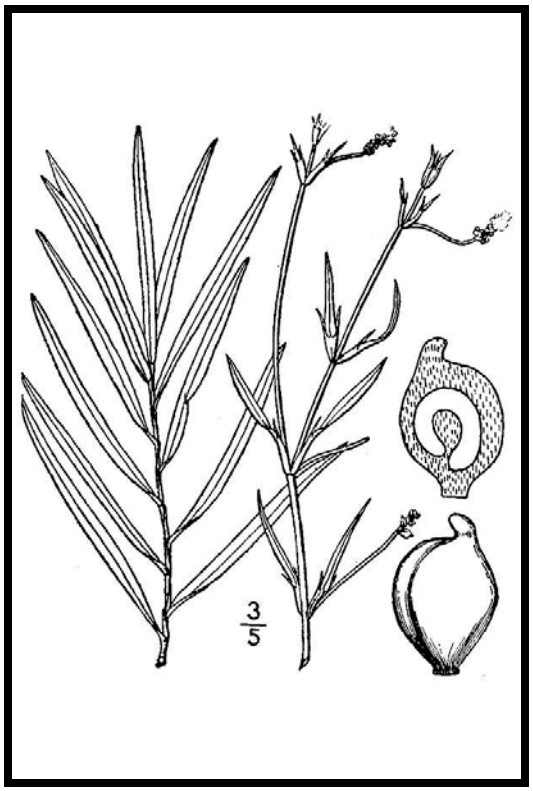
1. The 2014 treatment format still allows for additional native shoreline treatment if necessary. Clear Lake supports ample nonresidential shoreline areas that will adequately provide the required buffer without impacting residential recreational use.
2. There is only one native weed species that will prove to be difficult to control when necessary. Vallisneria americana (tape grass). Presently this species is not one of the dominant weeds lake-wide but is noted sporadically throughout the lake.
3. During 2014 minor problems occurred associated with boat wave action resulting from high speed boat use during treatment. Boat use should be restricted during future submersed weed treatments.
4. Use of Aquathol K and diquat should be considered during 2015. This mixture will result in better control to those areas susceptible to soft, lite organic soils.
5. Contract terms should be limited to no less than two years. A one year contract does not afford the consultant the ability to implement changes to a treatment scenario or revisit the site during the season in an effort to improve the efficacy of the treatment. One year contracts discourage consultants from seeking alternatives that might improve on past years practices.
6. Continued communication between residents and the consultant in an effort to keep property owners informed of the current weed growth conditions, what species are native and noxious species, what plants are targeted for control and what plants cannot be controlled. More dialogue between the consultant and the homeowners may result in a better understanding as to the homeowners concerns. This approach would probably result in a more effective treatment format.
7. Noxious species appear to no longer represent the problematic species lake-wide. The range and location of milfoil plants have stabilized and not much expansion has been detected. Plants currently coexist in mixed stands of native species. Low density milfoil growth can now seasonally be controlled with either contact herbicides or specifically targeted with systemic materials. How these species are controlled and what materials should be applied requires evaluation preceding the spring survey. Actions that may or may not be implemented will probably change on a year to year basis. One year native and noxious weeds may be targeted with a contact herbicide while during other years only milfoil may be targeted with systemic products. The apparent growth of the milfoil during the non-treatment year of 2010 to 2011 supports this approach.
8. The spring survey should be considered the more important of the two scheduled surveys. This survey will determine what plants are targeted and what materials will be used during any treatment year. The late summer survey is performed too late in the season to direct any further native weed control operations. In general this survey

will identify where successful control operations occurred and the need for any additional late season milfoil treatments.

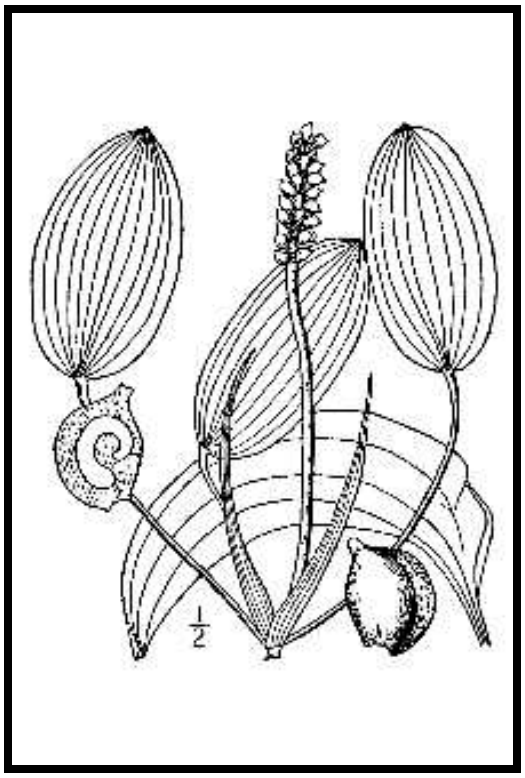
# Dominant Submersed Macrophyte Species

## Potamogeton robbinsii

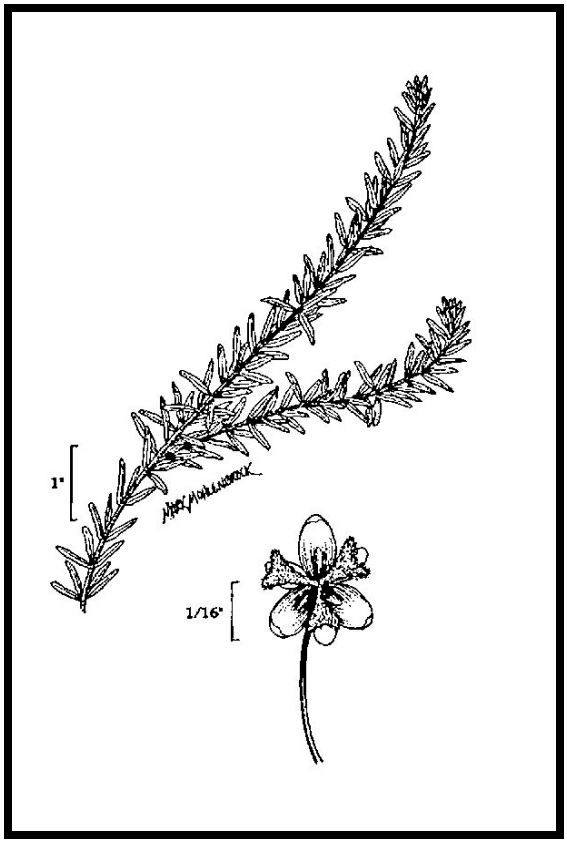




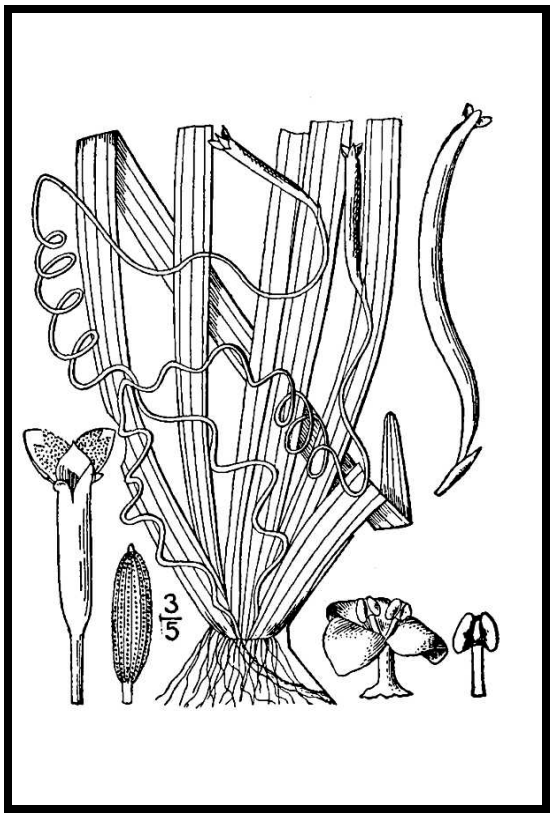

## Potamogeton amplifolius



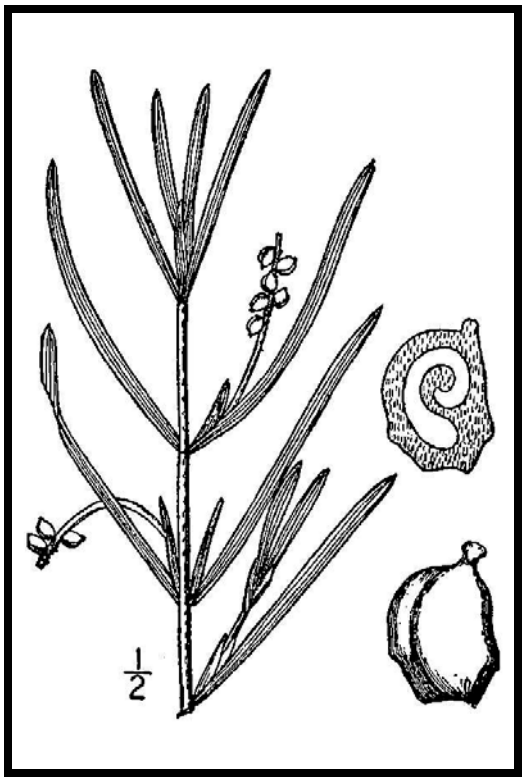

## Elodea canadensis



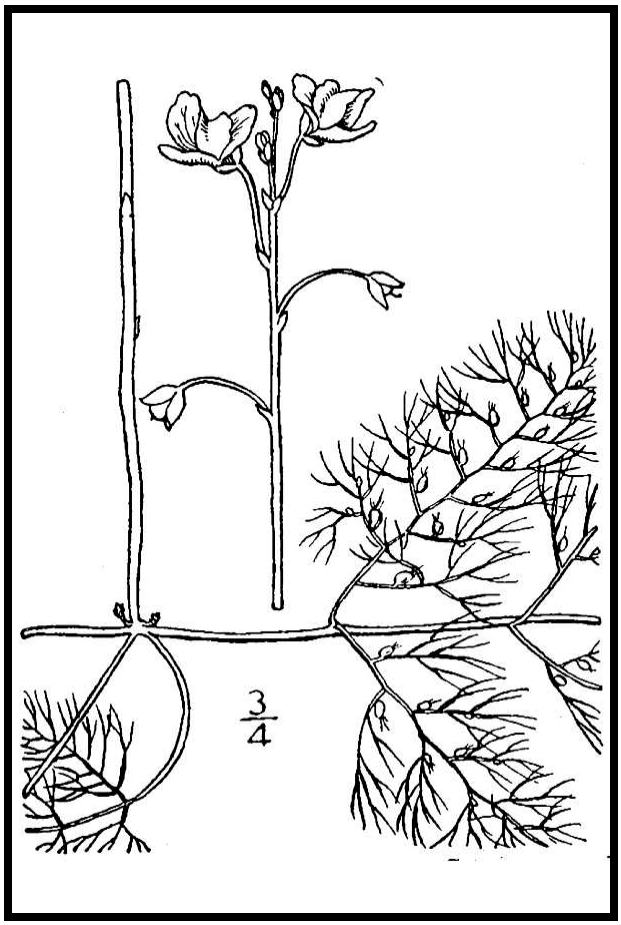

## Vallisneria americana



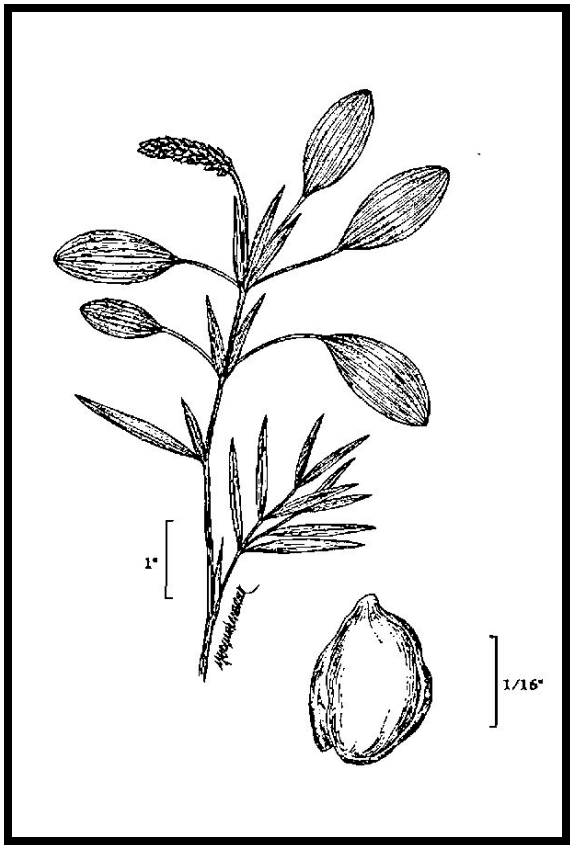

**Potamogeton zosteriformis**




**Utricularia vulgaris**




**Potamogeton gramineus**


1"
1/16"