

The logo for AquaTechnex features the company name in a bold, sans-serif font. 'Aqua' is in blue and 'Technex' is in black. A yellow swoosh underline is positioned above the text, starting from the left and curving under the 'x'.

American Lake Eurasian Milfoil Program 2021 Year End Report



City of Lakewood
American Lake
Management District

**AquaTechnex,
LLC**

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American Lake 2021 Summer Survey Results

Introduction

Aquatechnex is completing the second year of a contract to evaluate and target Eurasian Milfoil in American Lake following a major ProcettaCOR herbicide treatment in 2019.

The spring and summer of 2021 had the following ongoing operations.

New permit issues

In April of this year, the new five-year Washington Department of Ecology permit was issued. One concerning condition was that this permit had new fish and wildlife timing windows for lakes that precluded the ability to treat at the most appropriate times for herbicide mode of action and life stages of target weeds. This information was not communicated to aquatic plant managers prior to receiving this permit. This timing window process was presented as an online map. Any deviation from those timing windows required an exemption issued by the Department of Ecology and the Department of Fish and Wildlife.

American Lake did not have any individual direction attached to it at that point, as such we were required to follow statewide guidance that didn't allow for treatment until July 15th. As Curly Leaf Pondweed was to be a primary target early in the season, we spent a considerable amount of time working with Ecology staff to adjust this, but it took until about July 1st.

This should not be an issue this coming year, we were informed during the Washington Lakes Protective Association meeting this week that the two departments will be releasing a new timing window web site this week (October 25). We intend to spend time this coming week to evaluate all of the lakes we work on and determine if exemptions need to be processed. We will report back to the city staff if that is the case.

Survey and suggested approach to 2021

The City of Lakewood helped form a Lake Management District for American Lake. The LMD covers the residential portion of the lake. The western end of the lake is owned by various state and federal government agencies including the Washington National Guard, the US Army, and the Veterans Administration. These agencies cooperate with the city in the administration of the Integrated Aquatic Vegetation Management Plan that was developed for the lake.

By 2018, the invasive aquatic weed Eurasian Milfoil had colonized the entire littoral area of the lake. Approximately 120 acres along most of the shoreline were monocultures of this noxious weed out to the 15-foot contour. In the summer of 2019 166 acres of the lake were treated with ProcettaCOR herbicide, the weed populations had expanded between the time of the IAVMP development and the treatment year. That application was extremely successful. Populations in the lake were reduced to close to zero.

During the summer of 2020, two surveys were conducted. Individual plants were located scattered through the littoral area of the lake. Diver teams spent approximately 20 hours surveying and hand-picking Eurasian Milfoil plants. One area totaling 1.7 acres near the Washington Department of Fish and Wildlife Ramp was treated with ProcettaCOR.

The fall 2020 survey found additional Milfoil plants starting to appear throughout the littoral area of the lake. These were not observed to be present at a level that would justify treatment, much less than 1

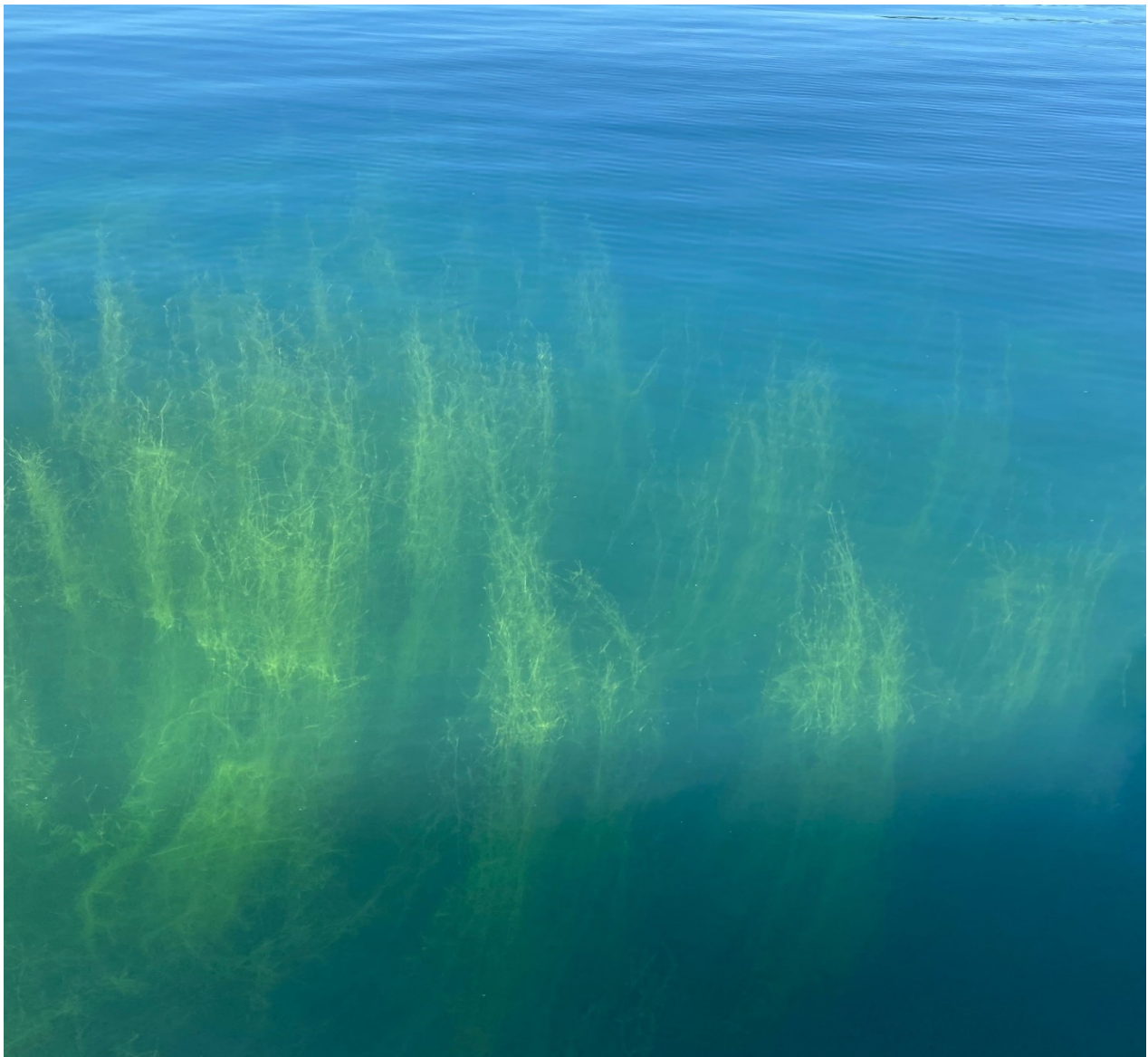
American Lake 2021 Summery Survey Results

percent of the littoral area acres were covered, and plants scattered too far from each other to justify treatment.

A trip was made in June with City Staff to review conditions, overall, the impact of Eurasian Milfoil on the lake is extremely low. It is an aggressive weed however and given time can expand.

A complete survey of the littoral areas of the lake was performed on July 19th. The littoral areas of the lake were observed and mapped.

While most of the lake littoral area remains clear of noxious aquatic weeds, there are extensive areas that are supporting growth of native aquatic plant species, especially on the south shoreline of the lake. We observed several Potamogeton species present. There were also colonies of Naiad scattered through the zone. Some of these areas are developing to the point where there may be an impact on beneficial uses such as swimming and boating even though these plants are not on the noxious weed list. Some examples are presented here.



American Lake 2021 Summery Survey Results

Potamogeton or Pondweed species present on South Shore of LMD zone

Naiad with Filamentous algae present on South Shore of LMD zone





American Lake 2021 Summer Survey Results

Most of the lake remains clear of Eurasian Milfoil. Some pre and post treatment examples are shown here.



WDFW boat ramp pre treatment and 2 years post treatment July 2021, Lake bottom exposed gravel no milfoil present



Portion of Ft. Lewis zone pre treatment 2019 and two years post treatment, lake bottom exposed no milfoil present

American Lake 2021 Summery Survey Results

Eurasian Milfoil is however starting to creep back into the picture. There are a few zones in deep water where with lower water levels plants have appeared. There are also areas where individual plants are starting to fill back in. Eurasian Milfoil is an aggressive weed and some additional treatment options should be considered.

A map is attached depicting the conditions observed in the lake. We are recommended that treatments be considered for 14 sites in the lake. The majority of these are in the Government zone. These are numbered clockwise around the lake starting from the City of Lakewood Park and boat ramp on the north shore.

| Zone | Acres | Herbicide recommended | LMD or Gov't |
|------|-------|-----------------------|--------------|
| 1 | 1 | Procellacor | LMD |
| 2 | 1 | Procellacor | LMD |
| 3 | 2 | Procellacor | LMD |
| 4 | 1 | Renovate OTF | LMD |
| 5 | 1.75 | Procellacor | LMD/Gov't |
| 6 | 1 | Procellacor | Gov't |
| 7 | 1.75 | Procellacor | Gov't |
| 8 | 1.5 | Procellacor | Gov't |
| 9 | 2.5 | Procellacor | Gov't |
| 10 | 2 | Procellacor | Gov't |
| 11 | 1 | Procellacor | Gov't |
| 12 | 1 | Procellacor | Gov't |
| 13 | 1 | Procellacor | Gov't |
| 14 | 4.25 | Procellacor | Gov't |

There are 6.75 acres present in the LMD zone of the lake, 5.75 of which should be targeted with Procellacor and 1.75 acres that should be targeted with Renovate OTF granular because of higher water exchange.

There are 16 acres present in the Gov't zone of the lake that should be targeted with Procellacor.

The remainder of the shoreline has very scattered plants. Diver operations again could be focused on high use areas. The City Boat ramp has a few plants scattered there. The City Park on the south shore could be second priority. After that focus on the north shore would be recommended east of the City Boat ramp.

Treatment

This information was evaluated by the City and the Lake Management District and approved for treatment. Aquatechnex provided the required 10 day written notice to affected residents and mobilized to the lake to perform the application on September 2nd. The zones on the lake were treated as noted in the table above after posting.

Diver Treatment

Diver operations where also performed on the lake. The first areas targeted by the diver team were the public boat launch and beach at the North Shore City Park. The second area targeted by the diver team

were the crew docks and public beach at the south shore park. Divers then moved to Silcox Island. The shallower areas on the western side of the island had been treated with herbicide for milfoil plants present there. Divers worked around the rest of the littoral area around the island. The diver team finished using allotted hours along the south shoreline and within the military area as shown on the attached map. The diver operations consumed 18 hours of diver labor.

Year End Comments

The 2022 season will be three years post treatment of the major control effort on the lake. Approximately 166 acres covering the entire littoral zone of the lake were treated in August of 2019. When the mapping was completed in 2018 and budgets/contracts were developed for treatment in 2019, there were approximately 120 acres infested by this noxious weed. When it came time to treat in 2019, the populations had expanded to 166 acres. The decision was made to use application rates that would allow for the funds budgeted to target the 120 acres. This was done by breaking the treatment areas up into shallow, medium depth and deeper water zones and focusing the herbicide by water volume. This resulted in excellent control that has largely remained through this summer. While there is milfoil present in the lake, ongoing targeting with herbicides and divers has suppressed this noxious weed dramatically.

Curly Leaf Pondweed has been noted in one area on the south shoreline and was present early in the year when the issue with the fish timing window was being delt with. Upon resolving the fish timing window issue a planned treatment of this area was attempted, but the plants had been removed or not otherwise present. This could have been from early senescence of this weed species, it can drop out of the water column in the mid-summer after turrion formation, or in some cases local residents contract s to remove problem vegetation. In any event no treatment was performed, and this area should be reviewed again early this coming spring to see if there are remaining population of this weed. As the fish timing window was adjusted, it should be possible to target it early next year if present.

Conditions in the lake are however changing. The niche previously occupied by dense Eurasian Milfoil growth is in many areas filling in with native aquatic vegetation. Eurasian Milfoil grows rapidly from deep water to the lake surface and as it fills in shaded out this native growth. When the milfoil canopies are no longer present, light penetration allows for these native plants to recover back into these areas.

In many cases this is beneficial. Native aquatic plants provide habitat for fish and waterfowl. They can also develop into problems if growth is in the shoreline areas and impacts beaches and boat operations. In some portions of the lake, this is occurring. The permit that allows for the control of Eurasian Milfoil does have options for controlling native species when they reach weed densities or otherwise impact beneficial uses of the lake.

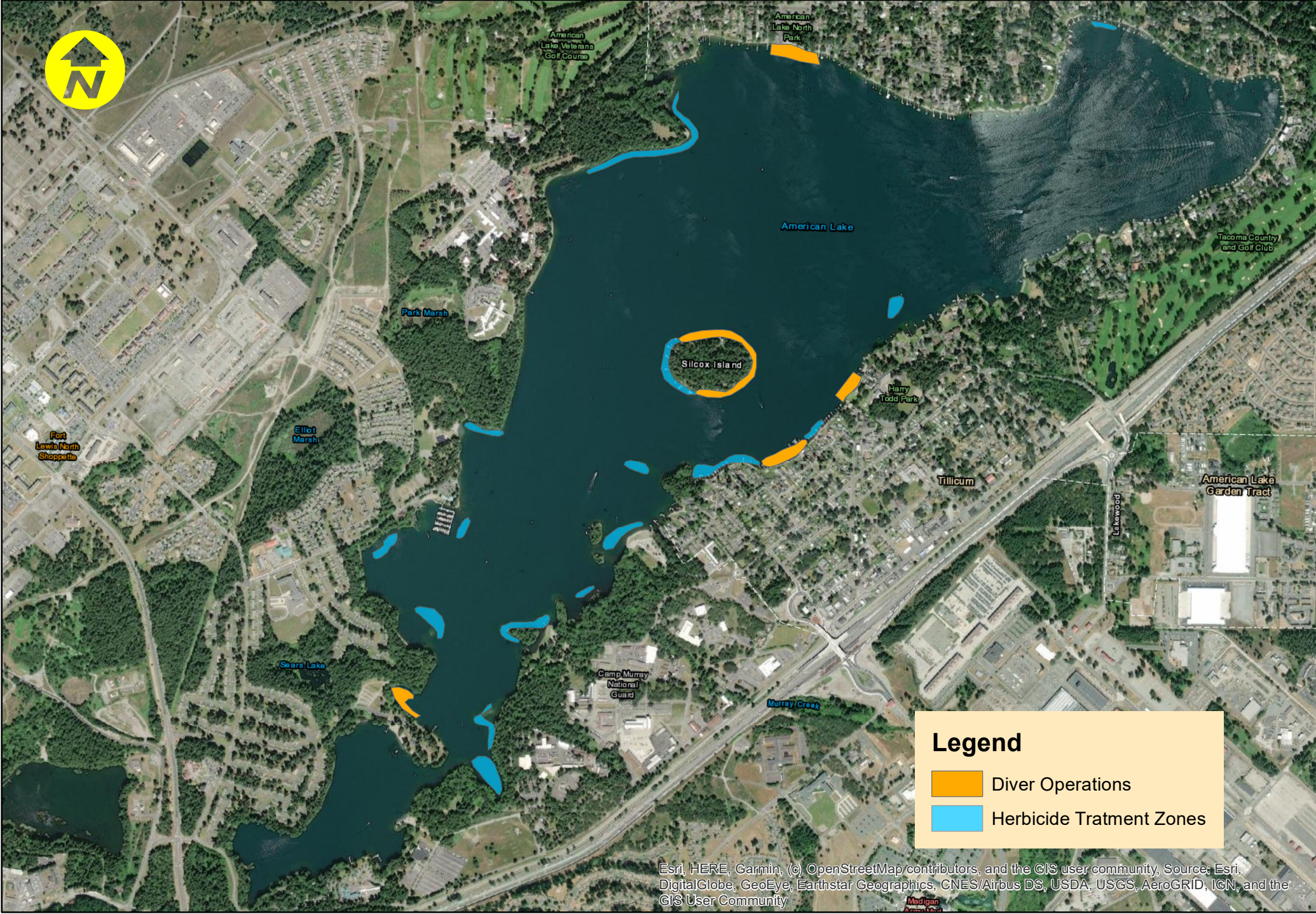
Dense beds of native aquatic weeds also complicate survey and diver removal operations. As noted in the pictures above, these dense beds were often covered with filamentous algae making plant identification visually from a boat hard to impossible without time consuming coming through the dense growth. Divers attempting hand removal also consume time sorting through these areas, they can take hours and not find and remove significant amounts of vegetation.

Eurasian Milfoil is an aggressive aquatic weed. The milfoil beds we treated in 2019 had probably been established for several years. The planning and survey work started as part of this process in 2016-17

showed that dense “old growth” milfoil beds were present lake wide. There should be an active survey and response program ongoing.

COVID has impacted the ability to meet, staff operations and perform aquatic plant management operations. Permitting agency staff remain largely working from home at this point. Hopefully this changes as next season approaches. We plan to hire two additional aquatic biologists and reinstate our summer intern program if we can find applicants.

Lastly, our divers are seeing a trend of milfoil plants in very deep water, around the 20-foot contour. At these depths the plants are not detectable from a visual boat survey. Survey operations should use the boat survey technique for the shallower areas and should deploy an underwater drone with video systems to circumnavigate the lake deeper water areas. This would require an increased survey budget and that should be considered for the coming years.



Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

2021 Eurasian Milfoil Treatment Operations

American Lake Request for Timing Window Change

American Lake is not classified on the WDFW map as having concerns for priority species. When a lake is in that category a blanket restriction on using herbicides exists prior to July 15th.

The work on American Lake is strictly focused on controlling invasive aquatic weeds on the state noxious weed list. Eurasian Milfoil was the primary problem. The Washington Department of Ecology funded the development of an Integrated Aquatic Vegetation Management Plan or IAVMP that was completed in 2018. The Department of Ecology then provided a grant to target Eurasian Milfoil that heavily impacted the littoral area of the lake.

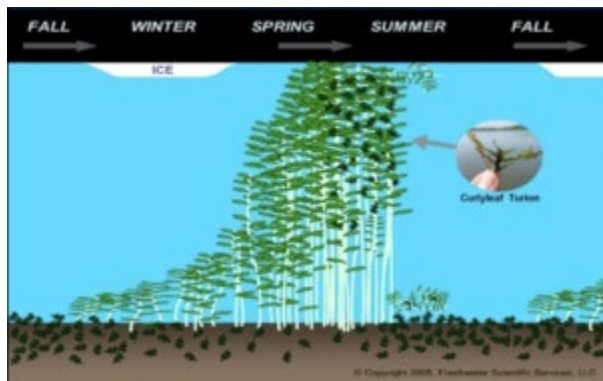
In 2019, a Procellacor herbicide treatment was performed that largely controlled the Eurasian Milfoil present.

In 2020-2021 a combination of survey work, herbicide treatment and diver hand removal where very sparse colonies of Eurasian Milfoil are noted. There are some areas in the lake where Eurasian Milfoil remains at very low density, the plan for 2021 is to map the lake again, determine where diver removal or herbicide options best fit and to control the Eurasian Milfoil found.

A second problem has appeared in the lake. Curly Leaf Pondweed is an aggressive aquatic weed and pioneering colonies of this plant were located in the lake in the summer of 2020.

The plan was to treat them early in the growing season of 2021.

Curly Leaf Pondweed has a unique growth habit. The plant reproduces and spreads through the production of turions. These turions sprout in the fall of each year, they grow about six to twelve inches and overwinter in that condition. The plant then rapidly grows in the spring, often shading out native species that emerge later in the spring. The plant then forms many more turions and the plants crash in about July of each year depositing the new turions on the lake bottom. So one turion that sprouts in the fall ends up depositing a significant number of turions for the following year's growth in mid summer.



The objective of killing this plant in the early spring is to reduce or stop turion production as there are no systemic herbicides that have activity against this species.

This program only treats state listed noxious aquatic weeds. The timing window of July 15th does not allow treatment of Curly Leaf Pondweed prior to turion production. We recommend that American Lake be highlighted on the WDFW Habitat Program Timing Window Web map and that language states that

“Aquatic Herbicide Treatments for state listed noxious aquatic weeds can occur between June 1 and December 31st”



Last summer American Lake Pioneering Curly Leaf Pondweed infestation and example of turion formation.

At this point, a survey will be conducted to add any new sites to the attached map.

Treatment of these plants is accomplished in about 4-5 hours with the boat being at each treatment site for a very short period of time. We estimate at this point that Curly Leaf treatments would be under 10 acres. If the timing window does not change it is probably that treatment area sizes will expand considerably in future years.

Aquathol K or Clipper is used for control of Curly Leaf Pondweed. Eurasian Milfoil will also require treatment after the survey is completed. ProcellaCOR would be used in that role.