Introduction

Aquatechnex was retained after evaluation of Requests for Proposal (RFP) in 2019 to perform a ProcellaCOR herbicide treatment on American Lake. This treatment was a result of recommendations in the Integrated Aquatic Vegetation Management Plan (IAVMP) developed by the City of Lakewood to direct management of Eurasian Milfoil in the lake.

Eurasian Milfoil has been present in American Lake for several years and at the point of treatment had formed dense monocultures throughout the littoral areas of the lake. ProcellaCOR is a selective systemic herbicide that target milfoil species. The product has an extremely rapid update time, and has proven to be extreme effective in removing this invasive species.

The treatment in 2019 was performed on August 1st. Three application vessels were used to target milfoil beds throughout the lake. At the end of the season in 2019, most of the lake showed complete control of Eurasian Milfoil plants. In the western end of the lake, there were plants remaining with severe injury. These were expected to drop out through the fall and winter months.

Current conditions

Aquatechnex performed survey of the littoral areas of the lake in late May and early June of 2020. This work involved developing a hydro-acoustic map of aquatic plant biovolume in the lake, a review of treatment site to determine the level of control achieved in 2019 and to make recommendations to the City of Lakewood as to next potential steps.

Our review of all treatment sites has determined that the 2019 ProcellaCOR treatment was extremely effective in removing this invasive species from the lake.

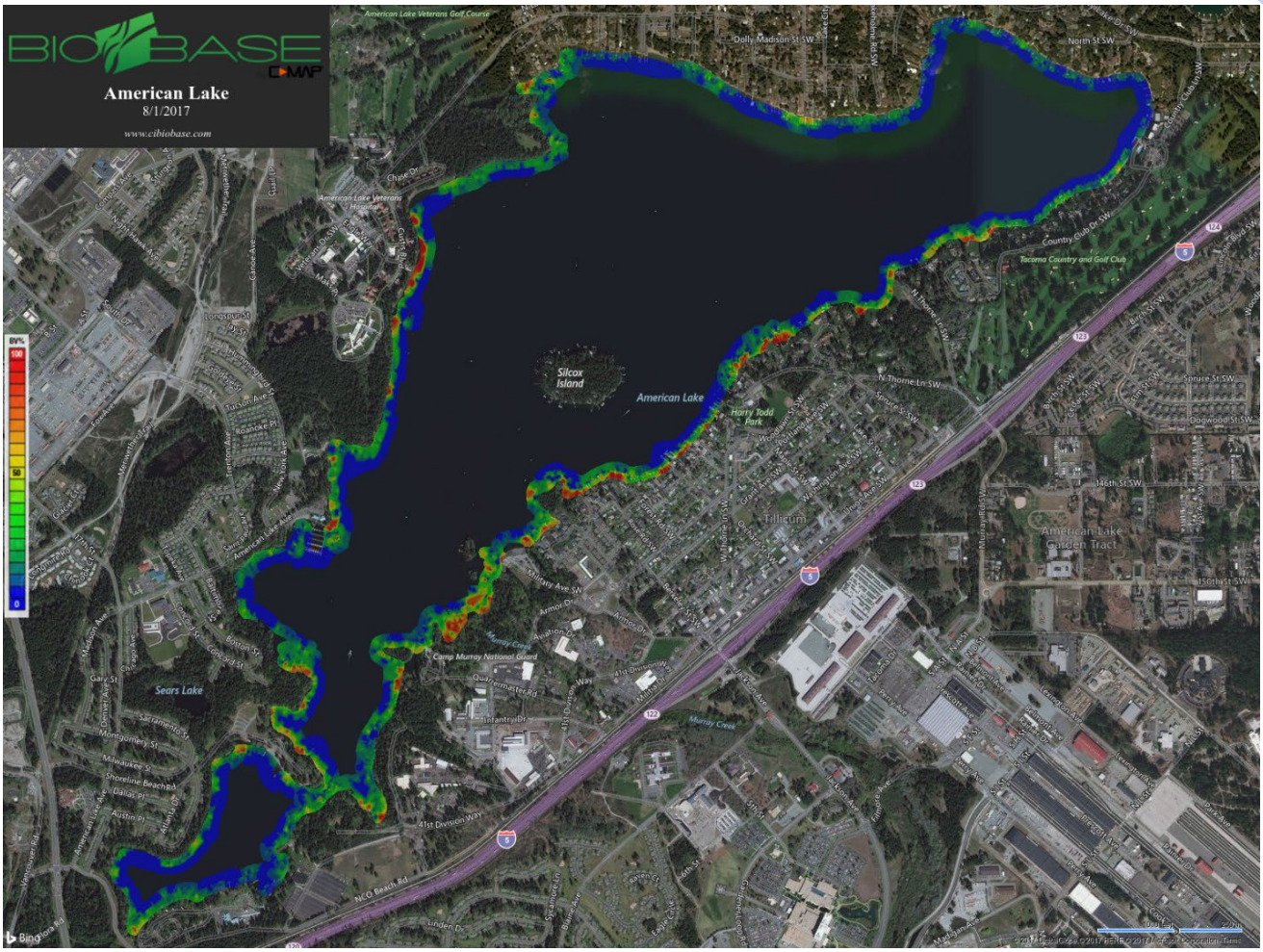
The hydro-acoustic aquatic plant biovolume work provides a map of the location of aquatic plant beds present and the statistics with respect to area covered and biovolume present in the water column throughout those locations.

The pretreatment hydro-acoustic analysis was performed as part of the development of the IAVMP in the summer of 2017. At that point 64.9 percent of the littoral area of the lake contained aquatic plant growth by hydro-acoustic analysis. GIS mapping work calculated this to be 106 acres heavily impacted.

In 2018 a second survey was performed of the lake. Many areas where there had been scattered patches of milfoil on the North Shore of the lake had started to fill in upping the acreage to 118 acres.

A pretreatment survey in 2019 showed that further expansion had occurred and there were 166 acres that would require treatment. Those are the areas that were targeted and treated in 2019.

The spring 2020 biovolume study showed that only 7.5 percent of the littoral area of the lake had aquatic plants present. The density of the plant beds where they exist dropped dramatically as well. Species observed were primarily *Potamogeton foliosus* or Leafy Pondweed, *Potamogeton zosteriformis* or Flat Stem Pondweed, *Potamogeton crispus* or Curly Leaf Pondweed and *Vallisneria americana* or Tapegrass. The dominant species was Leafy Pondweed at this point.



The summer 2017 aquatic plant biovolume map developed from hydro-acoustic analysis. These plant communities were monocultures of the invasive aquatic weed Eurasian Milfoil. By 2019, these beds had occupied 166 acres of the littoral area of the lake

The 2020 hydro-acoustic mapping effort showed significant reductions in aquatic plant biovolume lake wide. Throughout the littoral zone, the aquatic plants that were present were primarily Potamogeton native to this region. While there were a few Eurasian Milfoil plants observed, their population has been reduced in excess of 95% from pretreatment conditions. They were hard to find and rarely observed. They have been mapped for future attention.

Potamogeton crispus or Curly Leaf Pondweed was observed in some areas of the lake. This weed is also a listed species on the state noxious weed list and should be monitored and potentially targeted.

The following pages show representative pre and post treatment photographs around the lake. These areas were observed with City of Lakewood Staff on June 19th.

Site 1, Point at VA Property

Extremely dense milfoil beds present to the 15-foot contour pretreatment.

No milfoil plants observed June 2020, complete control accomplished

Site 2, WDFW Access area

Area to the west of the WDFW access site. Pretreatment conditions show extremely dense monoculture of milfoil.

No milfoil observed in this area June 2020

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Site 3, South Side

This bay and the adjacent developed shoreline areas had extensive monocultures of milfoil present pretreatment.

No milfoil present throughout this area June 2020

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Recommendations for 2020

While the control achieved from the 2019 ProcellaCOR herbicide treatment was well more than 95% effective, we did observe some single and fairly sick milfoil plants. Three plants were observed along the VA Beach area. A few additional plants were observed just offshore of the beach at the WDFW public access site and the deep-water tip of the underwater point northeast of the WDFW site had some plants laying on the bottom of the lake.

We would recommend targeting approximately 3 acres with herbicide to finish these plants off.

A mid-summer survey should also be conducted to Conduct deep water survey locate and target any stragglers with diver hand removal. We would also recommend that a underwater drone survey be performed in deeper water zones adjacent to last years treatment areas to see if there were any plants that were outside of the treatment zone. There may be more scattered single plants in the treatment area, diver removal could be utilized to remove these.

Curly Leaf Pondweed is starting to pop up through some areas of the lake, this invasive weed can be problematic if allowed to expand. The survey work should add this species as one of concern and a map make of locations and densities where Curly Leaf is starting to be noted in the lake.

Curly Leaf Pondweed has a unique growth habit that can give it a competitive advantage in outcompeting native species. The plant sprouts from turrion that develop the previous season in the fall of the year and generally grows a couple of feet and pauses for the winter. When the day lengths start to expand in the early spring, this weed grows aggressively and earlier than native plant species. Where densities are such that the plant forms canopies on the lake surface, the plants will shade out native species. During the mid-summer, the plant forms additional turions and the plant senesces dropping the turions to the lake sediment where they sit until sprouting in the fall. The key to effectively targeting this weed is to kill the plant prior to generating more turions in order to reduce the turion bank over time.

An example of a turion formed at the tip of a Curly Leaf Pondweed Plant found at the public access on American Lake

There is one site on the lake where Curly Leaf Pondweed is present at levels that would be considered a weed problem. This area should be treated with Aquathol Herbicide to control and start to reduce turion populations in this part of the lake.

Location of the south shore of American Lake where Curly Leaf Pondweed plants are starting to form monoculture and dense mats. This area should be targeted for control.

It might also be advisable to use the survey maps from this summer with respect to Curly Leaf Pondweed to apply for funding from the Freshwater Aquatic Weed Fund at Ecology to control this population lake wide before it expands to levels that are problematic.