Aquatic Invasive Plants

Removing Brazilian Elodea from Battle Ground Lake

Introduction

Battle Ground Lake is a 28-acre lake located near the community of Battle Ground in Clark County, Washington. The lake lies within the boundaries of Battle Ground Lake State Park, which features hiking trails and camping facilities. This deep lake formed in a crater left from a long-extinct volcano. The lake is popular for fishing, swimming, and non-motorized boating, and is a destination for campers.

Problem

Ecology staff discovered Brazilian elodea, a state-listed freshwater noxious weed, during a 1999 aquatic plant survey. A South America native plant that has been introduced to Western Washington waters, Brazilian elodea forms dense surfacing mats of vegetation that can choke out native plants and create problems for water quality and recreation. Brazilian elodea was once sold as a popular aquarium plant in Washington. It was likely introduced to Battle Ground Lake by somebody dumping an aquarium into the lake. By 2002, Brazilian elodea colonized much of the shallow area of the lake and interfered with swimming and fishing. Park rangers grew increasingly concerned about the safety of swimmers, and people complained about excessive vegetation in the lake.

Project Goals

In 2002, Ecology staff looked for a "test lake" to study the effects of the aquatic herbicide diquat on Brazilian elodea. Diquat is a fast-acting contact herbicide that causes rapid vegetation removal. Although it was used as an aquatic herbicide for nearly 50 years, Ecology only recently allowed diquat to be used under its aquatic herbicide-permitting program. Because of this, Ecology also wanted to determine its environmental dissipation and persistence in water. Ecology searched for a small lake with no inlet or outlet, no residents, a single owner, and a healthy problem population of Brazilian elodea. About the time that Ecology staff started looking for a test lake, Battle Ground State Park staff asked for help with their increasing Brazilian elodea problem in Battle Ground Lake. Because this lake fit Ecology needs perfectly as a test site and Washington State Parks and Recreation Commission (Parks) needed help in controlling increasing populations of Brazilian elodea, the two agencies agreed to work together on this project.

Ecology's project goal was to study the persistence, dissipation, and water quality impacts of the herbicide diquat and to determine its efficacy in controlling Brazilian elodea. The state park's goal was to achieve long-term control (or even eradication) of the Brazilian elodea infestation in Battle Ground Lake to improve swimming safety for the state park users. The goals of the two agencies were compatible. Because Ecology staff did not think diquat would eradicate Brazilian elodea, Ecology agreed to continue working with Parks after the diquat application to find a solution to achieve long-term control of this noxious plant.

Milestones and Outcomes

After public outreach efforts, including a public meeting, the shallow areas of the lake were treated with diquat in the early summer of 2003. Ecology collected plant data before and at eight weeks, one year, and two years after treatment. Ecology contracted with Clark County to collect water quality and herbicide data before

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and for one season after treatment. Results from the plant monitoring showed a significant reduction (99 percent) in the amount of Brazilian elodea in the lake, even two years after the treatment. Such a significant and lasting reduction of Brazilian elodea was unexpected because the herbicide is not known to kill the plant roots. The herbicide data showed that diquat spread from the shallow treated areas to the entire lake and herbicide concentrations persisted at low levels for at least two weeks after treatment. Dissolved oxygen and water clarity decreased slightly following the herbicide treatment, possibly due to plant die-off. However, there were no significant or permanent impacts from the diquat treatment on the lake other than the almost complete removal of Brazilian elodea.

Project highlights

The herbicide treatment did an excellent job of removing the majority of Brazilian elodea in the lake and did not cause significant environmental impacts to the lake. Although the herbicide treatment removed 99 percent of the plants, the plant started growing back in spite of diver hand pulling efforts. Parks received an Aquatic Weeds grant from Ecology to stock sterile grass carp into the lake. Grass carp, a plant-eating fish, are used to manage the excessive growth of aquatic plants in some Washington lakes. Because this lake traditionally did not have many submersed plant species and the shallow areas of the lake have a wealth of woody debris, grass carp were expected to have little impact on the fishery (mostly stocked trout). In June 2005, 135 grass carp were planted in the lake. Ecology surveyed the lake in summer of 2006 and did not locate a single Brazilian elodea plant. Parks achieved their goal of eliminating this invasive species from Battle Ground Lake. Ecology staff will publish the project data in a peer-reviewed scientific journal, so Ecology staff also achieved their goal of learning more about diquat and its effect on Brazilian elodea.

Partners

Ecology partnered with the Washington State Parks and Recreation Commission, manager of Battle Ground Lake State Park, which graciously allowed Battle Ground Lake to be used as a test lake. In addition, Ecology contracted with Clark County to conduct water quality and herbicide residue sampling during and after the herbicide treatment. The private chemical company Syngenta donated the herbicide and paid for the lake treatment. Ecology Water Quality Program staff and Environmental Assessment Program staff monitored the plants before and for several years after the treatment. Lead staff: Kathy Hamel, Water Quality Program, (360) 407-6562, kham461@ecy.wa.gov and Jenifer Parsons, Environmental Assessment Program, (509) 457-7136, jenp461@ecy.wa.gov.

Funding

Ecology's Aquatic Weeds Program funded this project. The contract with Clark County was approximately $30,000. Ecology contributed staff time for aquatic plant monitoring and survey work. The grass carp grant with Parks was $18,000 (Ecology share) with a $6,000 match from Parks.

Ecology Web site for more information:

http://www.ecy.wa.gov/programs/wq/links/plants.html

Kathy Hamel
Aquatic Plant Specialist
Lacey