AquaTechnex

"Advancing the Science of Lake Management"

Big Lake
2005 Year End Report

for

Skagit County and Big Lake Lake Management District

P.O. Box 118 • Centralia, WA 98531 • (360) 330-0152 • Fax: (360) 330-0174 • www.aquatechnex.com

Introduction

The property owners at Big Lake in Skagit County have long been proactive in the management of this important water resource. In the mid 1990's, the community recognized the impact that an invasive aquatic weed, Brazilian Elodea, was having on this resource. They banded together and implemented an Integrated Aquatic Vegetation Management Plan to target this plant. The community also voted to form a Lake Management District (LMD) to provide dedicated funding for ongoing operations on the lake.

Aquatechnex has been involved with the community in this process since the beginning. We were contracted by the community through Skagit County Public Works to develop the Integrated Aquatic Plant Management Plan. We also were selected to implement major portions of program over the past number of years. Previously, the lake has been treated with Sonar Aquatic Herbicide to significantly reduce the amount of Brazilian Elodea present in the system, a yearly treatments with Reward Aquatic Herbicide to continue to focus on the problem.

In the spring of 2005, the County and LMD issued a Request for Proposals for ongoing services. Aquatechnex responded to this request and was selected as the most qualifies respondent to carry on this work through the 2005 and 2006 season.

This report will summarize the work performed on the lake this summer and make recommendations for 2006. Any questions on this document should be directed to Terry McNabb at 360-527-1271 or terry@aquatechnex.com.

Permit Issues

One of the key permits that is necessary to apply aquatic herbicides in Washington State was placed in jeopardy by the Washington Toxics Coalition this past year. Properly labeled and US EPA registered aquatic herbicides are key tools in the management of invasive aquatic weeds. Without them, there would be a substantial impact on the aquatic environment because these are often the only economical tools to attack these forms of biological pollution. Anti herbicide activists groups have been able to attack these permits through the Court system because Ecology chose to use a National Pollution Discharge Elimination System (NPDES) permit to govern our work the past few years.

There is a "citizens suit" provision in that law that makes it easy to file suits where these groups feel there is a problem protecting the environment.

In the fall of 2004, the Washington Toxics Coalition sued the Washington Department of Agriculture over their administration of the NPDES for noxious aquatic weed control. This NPDES permit had been issued to Agriculture by the Department of Ecology with the proviso that AG provide umbrella coverage to private applicators and lake communities combating invasive aquatic species. State law requires that Ecology have a permit available for commercial applicators to fight any weed on the state noxious weed list. When the Department issued this permit to Agriculture our company was concerned about this potential impact. The fact sheet accompanying this permit specifically addresses our comments submitted and indicated that AG would be responsible for providing this coverage to private applicators.

The Department of Agriculture announced in May of 2005, that as part of their settlement with the Washington Toxics Coalition, they would no longer provide this coverage. Ecology also refused to develop a new permit in time for the 2005 season. After considerable discussion with the Department, they decided they could provide coverage to other government entities. In June we were able to facilitate Skagit County Public Works sponsoring this permit application and work was allowed to move forward.

We will discuss this with respect to next year in a section below.

Aquatic Plant Mapping

Our first work task on the lake this summer was to perform an submerged aquatic plant mapping mission to help plan treatments for the summer.

Our biologists mobilized a mapping vessel and team to the lake for a number of days in mid June to perform this work. The boat was equipped with aquatic plant sampling equipment and a Trimble GeoXT DGPS data logging receiver. The team used Washington Department of Ecology methodology to perform point sampling on a gird across the littoral area of the lake. At each sampling point on the gird, the team used a aquatic plant sampling rake to collect the plant species present at the site. This information was stored using the Trimble unit at each GPS point as an attribute. The team downloaded that information into ArcView GIS mapping software and created maps that document the extent and location of the various submerged weed communities.

While we did see a few more species in the lake, for the purposes of the control program we maps areas by the dominate species present. Three categories were mapped, areas dominated by Brazilian Elodea, areas with mixed Brazilian Elodea and Potamogeton species (primarily *P. nodosus*), and Pondweed Species (primarily *P. illinoensis*). Polygons were then created based on the point data and field observations to map the extent of each plant community present in the lake.

The map created with close up pages is presented here for review.

Noxious Aquatic Weed Treatments

Once the permit issue was resolved, our team proceeded to perform the tasks necessary to complete a herbicide application targeting Brazilian Elodea.

The permit requires that a public notification procedure is followed prior to treatments. As there is a fish timing restriction in the permit for Reward Herbicide at Big Lake, a treatment date in Mid July was selected. The permit does not allow treatment prior to July 15th in Big Lake.

In early July, Aquatechnex staff delivered handbills to each dwelling on the lake 10 days prior to the treatment date. The purpose of this handbill was to inform residents that the treatment will be occurring, the date of the treatment, the herbicides to be use and any water use restrictions.

We did receive calls and emails as a result of this public notification. There were some general questions and some of the residents on the south west corner of the lake wanted to insure we treated their areas. We answered these questions and noted the location of the citizens that were concerned.

The herbicide treatment was performed on July 20th, 2005. On the day of treatment, the Aquatechnex team posted the lake shoreline with signage indicating that the treatment was taking place. These signs are required by the permit and are posted on each property around the lake. They include the product to be used.

On completion of the posting, our team used a vessel mounted aquatic herbicide application system to apply Reward herbicide to the treatment area of the lake. 135 acres of the lake were treated with Reward. This application was made using weighted drop hoses to insure good mixing of the product in the water column.

We applied Reward at a rate of 2 gallons per surface acre. This process consumed most of the day.

Reward is a relatively fast acting contact herbicide. Its mode of action is such that it will control the portions of the plant in the water column that it comes in contact with. The plants in the treatment area exhibit discoloration and decline generally within two weeks.

Treatment Monitoring

As part of the treatment protocols, we provided pre and post treatment monitoring of dissolved oxygen levels and sampled for herbicide residues post treatment.

There have been occasions when large scale contact herbicide treatments have suppressed dissolved oxygen levels in lake systems. This can happen when whole lake or ponds are treated with a herbicide later in the year and the vegetation decays rapidly. When that occurs, the excessive bacterial activity can consume and depress dissolved oxygen in the water column and that can impact aquatic life.

We established three sampling sites within the treatment areas and one outside as a reference site. Each site was monitored pre treatment, 48 hours post treatment, one week post treatment and two weeks post treatment. Our team used a boat to transit to these sites and used a YSI digital dissolved oxygen and temperature meter to record conditions present.

We did not observe any significant drop in dissolved oxygen levels as a result of this treatment. The data is presented in the appendix of this report.

We also collected water samples and assayed them for the presence of Reward Herbicide. These samples were collected at stations within and outside the treatment area as well approximately one week post treatment. The results were no detection at any location. This is to be expected with this herbicide. Reward breaks down rapidly after affecting the plants. This information was useful to the County in that there was an inquiry regarding possible exposure to a child while swimming in the lake well after the treatment occurred. We were able to document that there was no Reward present in the lake at the time of this potential event.

Review of Control

The LMD Steering Committee members and County staff had a few questions regarding control approximately three weeks post treatment. We arranged a meeting and boat tour at the lake to review conditions and discuss issues.

Generally the control throughout the treatment area was observed to be excellent. There were some concerns voiced by one or two homeowners regarding the impact on their weeds. We reviewed these areas in detail with the Steering Committee members. There were a few small patches of native pondweed present in these areas. The Brazilian Elodea was effectively suppressed. The pondweeds present did exhibit signs of herbicide injury and were still in the process of falling from the water column.

One of the issues we face when using Reward is that the permit fish timing window does not allow this product to be applied when it is most effective. Contact herbicides like Reward do provide control when applied throughout the summer, but they are most effective when applied during the spring growth spurts the plants make.

The NPDES permit that was originally issued by Ecology in 2001 and that we were operating under did not include Reward Herbicide. The other two products that the Department determined may need review by Washington Department of Fish and Wildlife (2,4-D and Aquathol) had a permit condition that allowed the applicator to write a letter to that agency announcing the intention to use the product, or to use Fish Timing Windows issued by the Department at a later date. When Reward was added to the permit, the agency required the use of the fish timing tables. WDFW set what we consider to be arbitrary tables for all aquatic herbicide. Reward for example is used in trout and salmon fish hatcheries as a drug to control many of the diseases the fry can be exposed to. In that case, the material is applied and maintained at a rate 10 times higher that the rates used in the field for weed control to fish that are much younger and more sensitive to any potential toxicity. As such, there would be no potential for harm to fish of these species in these treatment areas, but since this is a permit condition it has to be followed.

We also looked at the expanding populations of White Water Lily growth around the lake. This plant is also on the state noxious weed list and can be a severe nuisance to shoreline property owners where present in dense mats. The

community steering committee asked us to add treatment of this problem species in the developed areas of the lake to our work tasks.

We did receive email communication from residents on the lake that observed excellent control and were expressing gratitude. We passed these communications on to the LMD through the County Public Works Department.

White Water Lily Control

These plants were targeted on September 12th, 2005. Our biologists traveled to the lake, performed the required shoreline posting and spot sprayed this species where present within the developed shoreline of the lake. Rodeo Aquatic Herbicide with an aquatic surfactant was applied. This is a systemic herbicide that will translocate and control the root systems as well. Generally, there is good carry over into the following season so that only touch up work is required.

New Permits Coming for 2006 and Beyond

Because of the problems with the Washington Toxics Coalition suit this past year, the Department of Ecology was in the process of developing a new NPDES permit for noxious and nuisance aquatic weed control. In November, the Department changed focus in this regard because of two recent rulings. The US EPA issued an interpretive statement that said NPDES permits are not required to apply EPA registered aquatic herbicides to our nation's waters. In addition, the US Ninth Circuit Court of Appeals ruled that NPDES permits were not required when using EPA registered aquatic herbicides.

The new permit is out in draft form. There is a public comment period open until mid January and there are three public hearings on this permit including one in Edmonds, WA on January 12th (see attached announcement). We are encouraging our clients and lake communities to participate in this process to insure comments aren't weighted heavily toward the anti herbicide community. Our specific concerns about this permit are:

- We would like to see Ecology remove the public legal notice requirement. In many cases, this requirement will be extremely costly and could limit noxious weed control efforts.
- We would like to see Ecology provide an alternative to the Department of Fish and Wildlife fish timing windows. If the permit allowed for a situation where we could use a letter to notify the department of planned

treatment activities and place the burden on them to respond and tell us why they want to wait at a particular lake. If they would respond, it provides a basis for appeal if the condition is not warranted such as with Reward in Big Lake.

- We want to insure that Ecology follows state law. RCW 91.48 requires them to issue a permit for noxious aquatic weed control and to not use that authority to burden noxious weed control efforts. Many of the conditions in this draft permit have the ability to do this.

We would like the steering committee to look at this permit and provide comments as you feel appropriate. If we can modify some of these conditions, it would make our work more effective on the lake and limit your costs.

If the permit goes through in its current form, the LMD will have to amend our contract to add fees required by this new permit. Ecology will be charging a permit fee yearly once the new permit is issued. In addition, there will be a one time charge for two legal notice publications in your local paper using Ecology's required format. There will also be a need to prepare and submit a permit application and SEPA checklist to Ecology this winter to obtain this permit. Once obtained, this permit will be good for a five year period and Ecology permit fees will be invoiced by them annually.

Work Plan for 2006

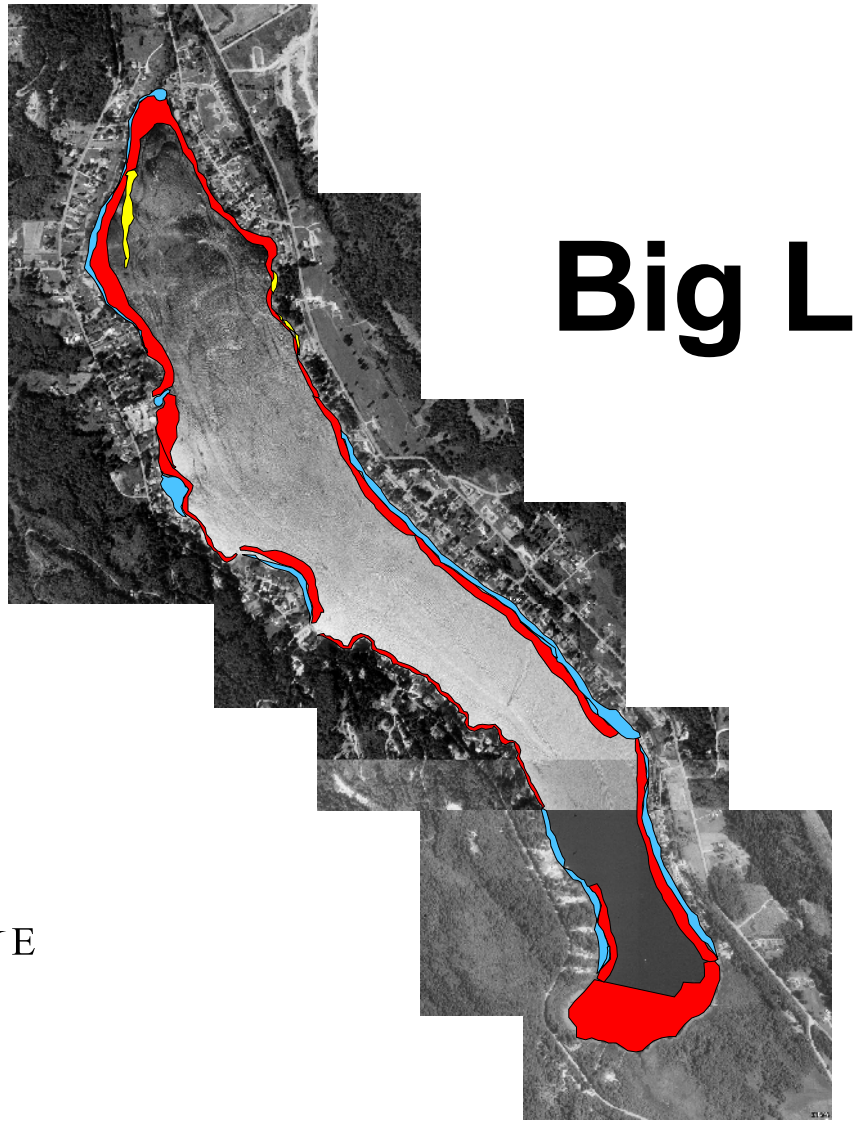
The work plan for 2006 will be as follows.

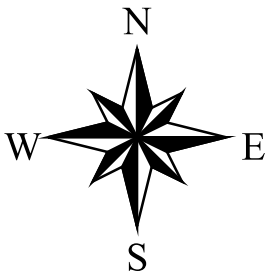
1. Submit a permit application with SEPA checklist to Ecology as soon as the new permit is finalized.
2. Perform the mapping mission on the lake in late May/early June depending on weather.
3. Perform public notification and comply with permit in that regard
4. Perform the treatment based on the mapping effort and plant distribution
5. Monitor the application and control
6. Review conditions with the Steering Committee post treatment
7. Generate the Year End Report

We will be adding one component to our mapping effort at no additional charge to the community. We have developed an effective aerial imaging technology for mapping aquatic plant communities. This will be flown in the time frame of the

field sampling and mapping efforts and help us further define the plant communities. It will also be good visual pre treatment data and be useful in discussing the program at future public meetings. We have provided a copy of a similar report to the County Public Works Department for their review.

Big Lake 2005





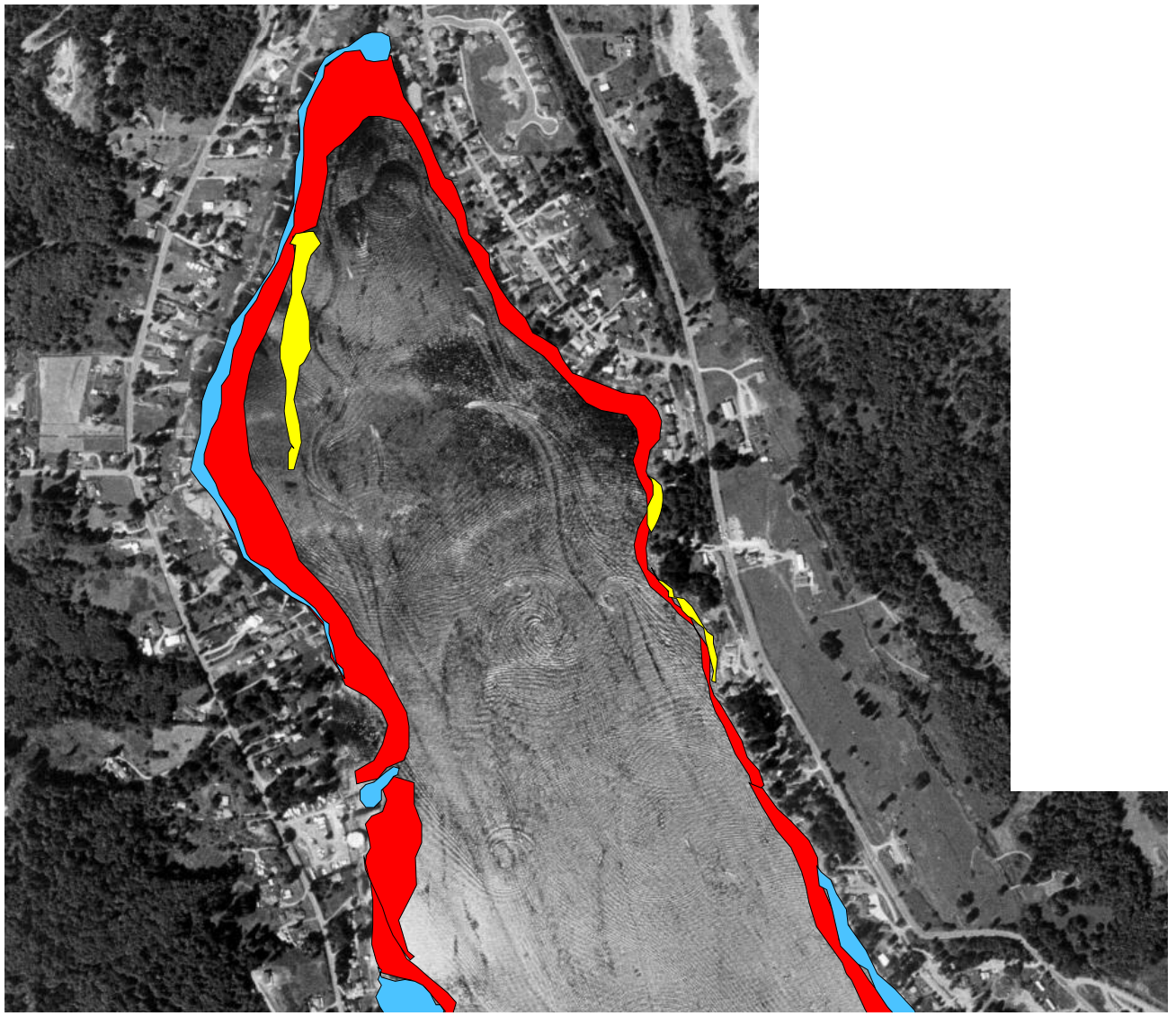
Whole Lake June 2005 Plant Coverage

Pondweed and brazilian elodea

Potamogeton ill

Brazilian elodea

Big Lake 2005



June 2005 Aquatic Plant Cover

Pondweed and brazilian elodea

Potamogeton ill

Brazilian elodea

N

W

E

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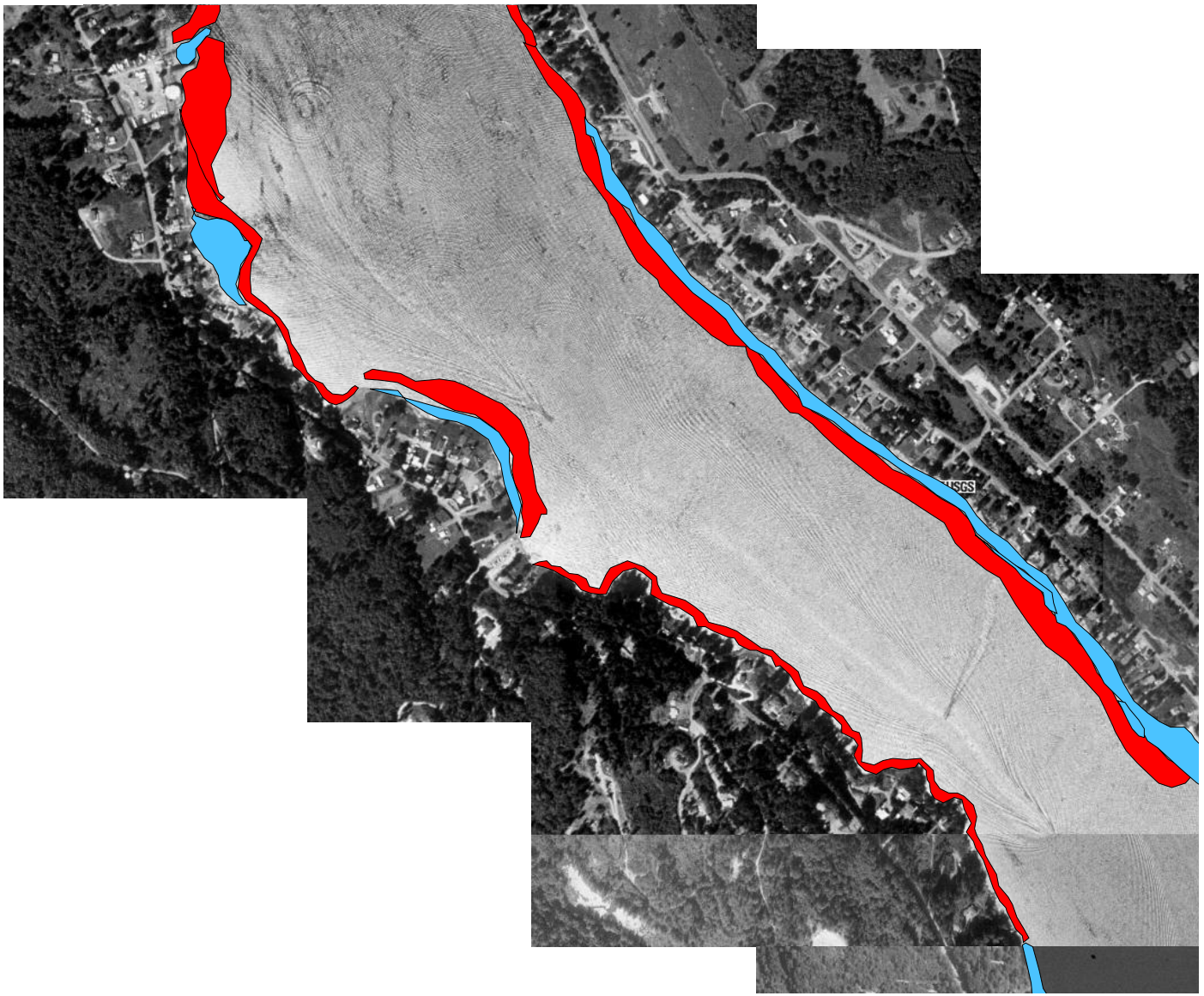
Big Lake 2005



June 2005 Aquatic Plant Cover

Pondweed and brazilian elodea

Brazilian elodea

N

W

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Big Lake 2005

June 2005 Aquatic Plant Cover

Pondweed and brazilian elodea

Brazilian elodea

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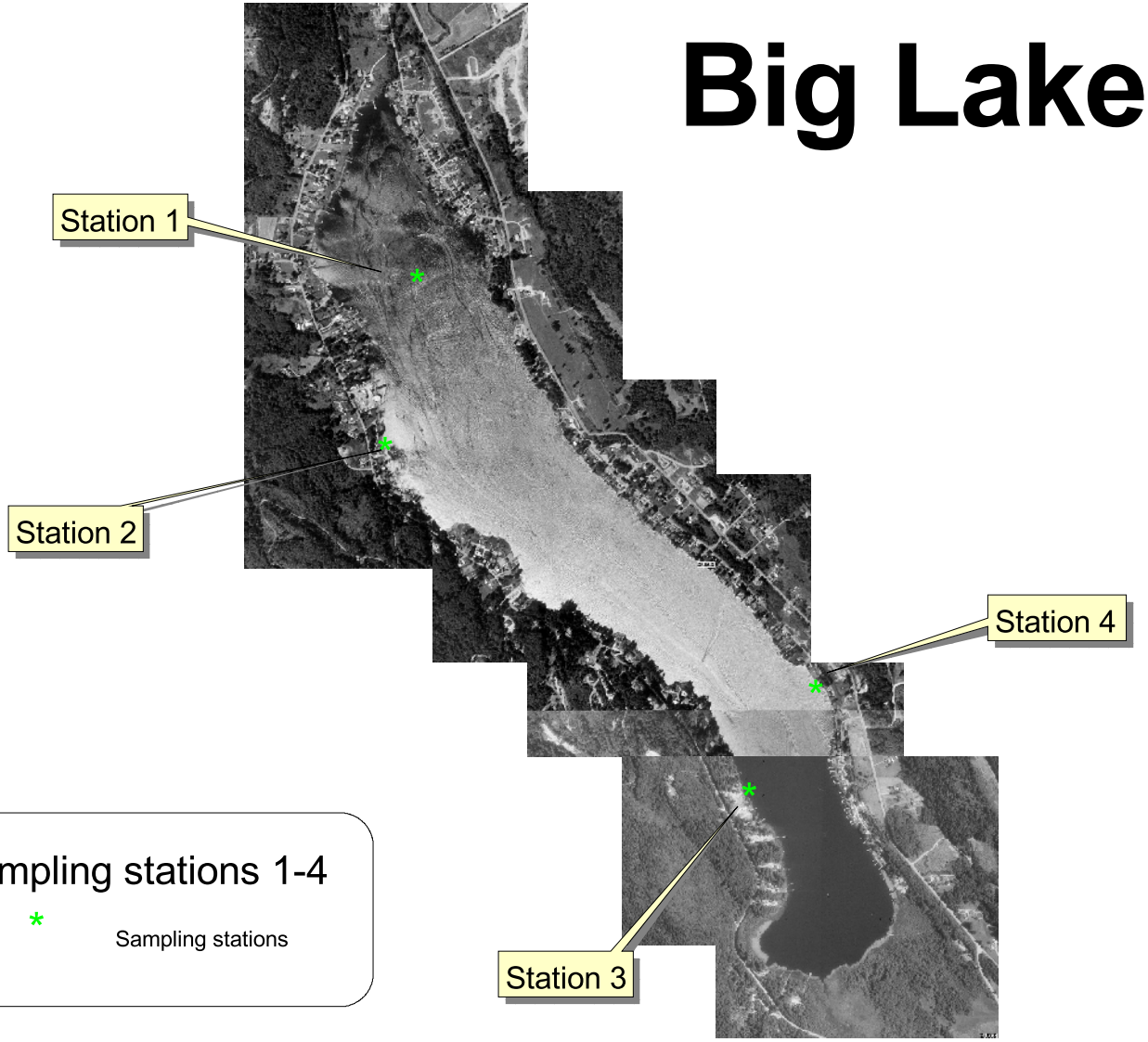
Big Lake 2005



Station One						
Depth	***0***	***2.5***	***5***	***7.5***	***10***	***12.5***
DO Pre Treatment	8.6	8.6	8.4	7.6	7.1	6.5
DO 48 Hours Post	8.7	8.9	8.5	7.5	7	7
DO 1 Wk Post	8.6	8.4	8.3	7.1	7	6.8
DO 2 Wk Post	8.1	8.5	8.2	7.5	7.1	6.5
Station Two						
Depth	***0***	***2.5***	***5***	***7.5***	***10***	***12.5***
DO Pre Treatment	8.5	8.5	8.3	7.2	7	6.8
DO 48 Hours Post	8.6	8.3	8.4	7.2	6.8	6.8
DO 1 Wk Post	8.7	8.5	8.5	7.3	7	6.4
DO 2 Wk Post	8.5	8.1	8.3	7.4	7.2	6.7
Station Three						
Depth	***0***	***2.5***	***5***	***7.5***	***10***	***12.5***
DO Pre Treatment	8.4	8.6	8.3	8.2	7.4	6.8
DO 48 Hours Post	8.6	8.4	8.3	7.5	7.2	6.8
DO 1 Wk Post	8.4	8.6	8.3	7.5	7.1	6.9
DO 2 Wk Post	8.3	8.5	8.2	7.2	7.1	6.6
Station Four						
Depth	***0***	***2.5***	***5***	***7.5***	***10***	***12.5***
DO Pre Treatment	8.3	8.5	8.4	7.8	7.3	6.5
DO 48 Hours Post	8.6	8.5	8.3	7.5	7.2	6.4
DO 1 Wk Post	8.4	8.1	8.1	7.6	7.1	6.8
DO 2 Wk Post	8.2	8.6	8.1	7.4	7.1	6.5

Anatek Labs, Inc.

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AQUATECHNEX, LLC
TERRY MCNABB
PO BOX 30824
BELLINGHAM, WA 98229

Project: BIG LAKE
Report Date 8/15/2005

Certificate of Analysis - EPA 549.2

		Analyte	Result	Units	PQL
Sample:	BIG LAKE 1	diquat	ND	ug/L	1
Collect Date:	8/8/2005				
Lab Sample #	05X2699-01				
Date Analyzed	8/12/2005				

		Analyte	Result	Units	PQL
Sample:	BIG LAKE 2	diquat	ND	ug/L	1
Collect Date:	8/8/2005				
Lab Sample #	05X2699-02				
Date Analyzed	8/12/2005				

		Analyte	Result	Units	PQL
Sample:	BIG LAKE 3	diquat	ND	ug/L	1
Collect Date:	8/8/2005				
Lab Sample #	05X2699-03				
Date Analyzed	8/12/2005				

Approved by: John W. Cobb

PQL Practical Quantitation Limit ND - Not Detected (<PQL) EPA 549.2 Report

State of Washington
Department of Agriculture
Olympia, Washington 98504

PESTICIDE APPLICATION RECORD (Version 1)

NOTE: This form must be completed same day as the application and it must be retained for 7 years (Ref. RCW 17.21)

1. Date of Application - Year: 05 Month: 7 Day: 20 Time: 8 am-3 pm
2. Name of Person for whom the pesticide was applied: Stephanie Woolett
   Firm Name (if applicable): Skagit County Public Works
   Street Address: 1800 Centenial Place City: Mt. Vernon State: WA Zip: 98273
3. Licensed Applicator's Name (if different from #2 above): Terry McNabb License No. 7973
   Firm Name (if applicable): Aquatechnex, LLC Tel. No. 360-330-0152
   Street Address: PO Box 118 City: Centralia State: WA Zip: 98531
4. Name of person(s) who applied the pesticide (if different from #3 above): .....
   ..... License No(s). if applicable: .....
5. Application Crop or Site: Big Lake
6. Total Area Treated (acre, sq. ft., etc.): 135
7. Was this application made as a result of a WSDA Permit? ❑ No ❑ Yes (if yes, give Permit No.) # .....
8. Pesticide Information (please list all information for each pesticide in the tank mix):

a) Product Name	b) EPA Reg. No.	c) Total Amount of Pesticide Applied in Area Treated	d) Pesticide Applied/Acre (or other measure)	e) Concentration Applied
Reward	10182-404	270 gal	2 gal / ac	
			/	
			/	
			/	

9. Address ***or exact location*** of application. NOTE: if the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

10. Wind direction and estimated velocity during the application: Calm
11. Temperature during the application: 65 degrees
12. Apparatus license plate number (if applicable): C137
13. ❑ Air ❑ Ground ❑ Chemigation
14. Miscellaneous Information:

State of Washington
Department of Agriculture
Olympia, Washington 98504

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