



**AquaTechnex**

*"Advancing the Science  
of Lake Management"*



**Clear and Beaver Lake  
Eurasian Milfoil and Invasive  
Aquatic Weed Control Program  
Year End Report**

# **Clear and Beaver Lakes Whole Lake Sonar Program 2007**

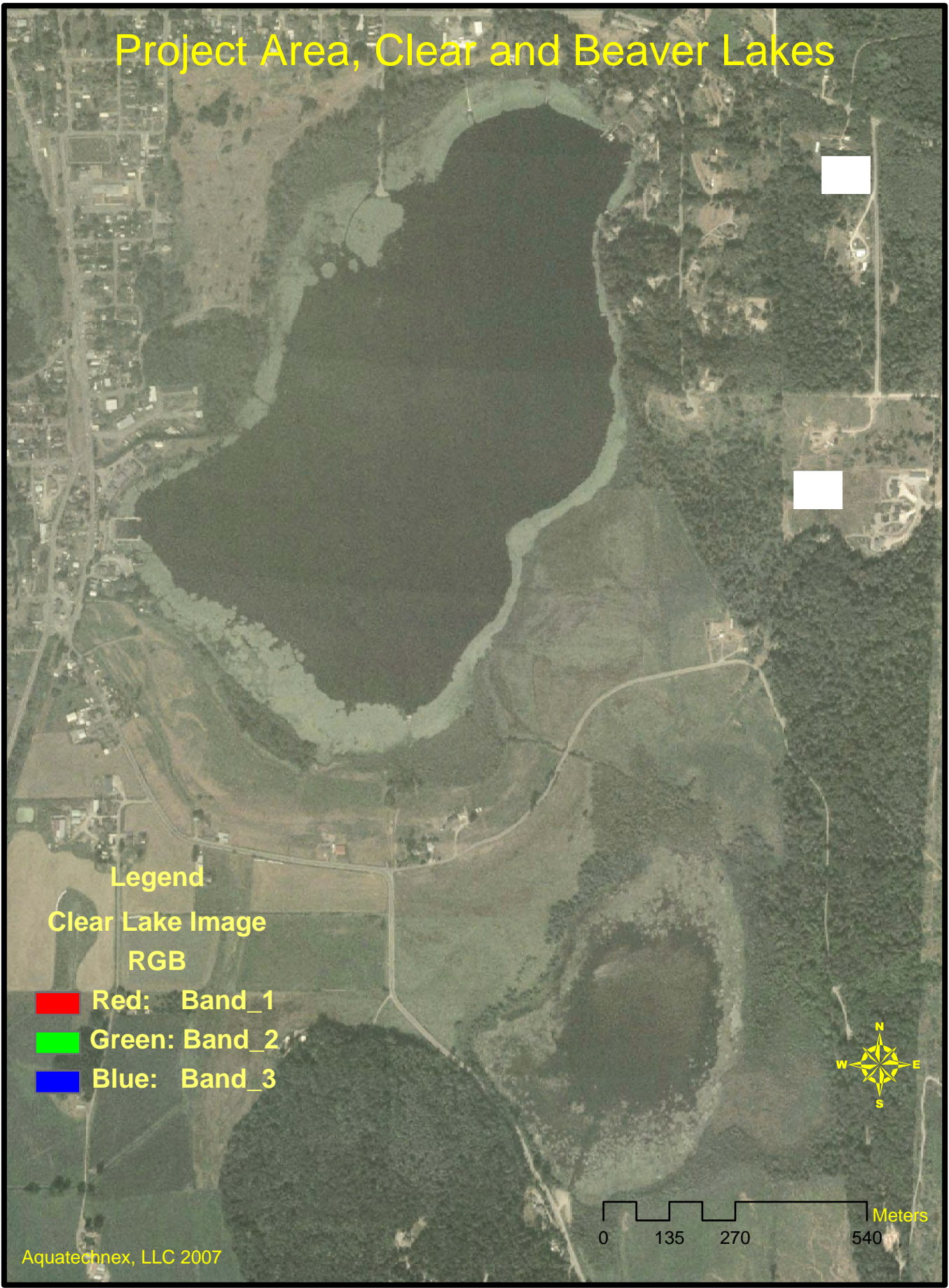
## **Introduction**

Clear and Beaver Lakes are located in Skagit County, just roughly 10 miles northeast of the city of Mount Vernon. Clear and Beaver are 200 acres and 73 acres respectively. Though the source is not clear, many residents feel that EWM was introduced into these waters by boat. Clear lake has both fishing and recreational usage, while Beaver is mostly used for fishing due to its shallow nature. Many non-residents use the lakes frequently in the summertime. By 2005-2006, both lakes had majority infestations and were becoming severely impacted by the EWM takeover. Skagit County was well aware of the growing situation and applied for a grant through the Washington Department of Ecology in 2006. Grant implications were directed towards a whole lake eradication approach for both lakes. In the spring of 2007, Skagit County Public Works put out a bid for the herbicide work that was to be done. Aquatechnex was chosen to perform whole lake treatments on both Clear and Beaver Lakes using Sonar AS liquid technology.




## **Preparation**

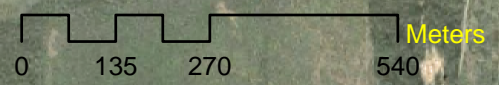
Once it was determined that Aquatechnex was going to be doing the treatments, our group began development of a plan for the 2007 season. The primary issue that needed immediate attention was getting permits validated in time for a treatment sequence to occur jointly with the EWM growing season. Clear Lake had an existing

# Project Area, Clear and Beaver Lakes



**Legend**  
**Clear Lake Image**  
**RGB**

-  Red: Band\_1
-  Green: Band\_2
-  Blue: Band\_3



permit in place for the Clear Lake Beach treatment that had been in place for the last several years. We made an amendment to this permit to include the entire lake as well as added Sonar AS to the list of herbicides covered. This permit was validated a few weeks prior to the Beaver Lake permit, which was created, as it had no prior permit in place. Once we had the permit positioning in place, we prepared our equipment for the two treatments to come. Sonar AS is a SePRO Corporation product that has an interesting attribute. When distributed in water, Sonar AS will find equilibrium throughout the entire water body. Our group calculated rates prior to treatment taking in average water depth and size to create a volume measurement. The Sonar AS was to be slightly diluted and directly injected into both lakes. We used a 17-foot Lund equipped with a 50-gallon spray tank. The tank had two motors powering six foot weighted booms. Each boom was directly off of each wing of the boat and submersed 6-12 inches below the surface while spraying. The hose could be in the water more or less depending on boat speed. For these two projects, it was of no concern to have deep line injections, so avg. boat speed was increased. The spray unit is designed to applicate at a rate of five gallons per minute. Looking at maps and calculating coverage, the right herbicide water mix was created to ensure an even distribution. Whole lake distribution can be achieved with this product quite easily, so a handheld Garmin 76cx was our only GPS arsenal. We used the Garmin to track lines for reference. Each application was to be run perpendicular of the prior treatments.

Preparation for both lake treatments began with a public notice distributed to all residents within a ¼ mile of the treatment zone. This notice was designed by the Department of Ecology to address our company's intentions on the specified water body. Herbicides to be used along with a range of treatment dates were provided on each notice. The project managers phone number was provided on all of the notices. Project managers for this program were to be

Curtis McMillan and Terry McNabb. Chief contact with Skagit County Public Works was Michael See. Communications between Aquatechnex and Michael See were always kept open and many issues were discussed prior to and during treatment. Both Lake Management Districts met with Curtis McMillan and Michael See to discuss the program for the lakes. Community knowledge was gained prior to the start of treatment.

## **Surveys**

Clear and Beaver Lakes both received pre and post treatment surveys in 2007. Despite a whole lake treatment, it was important to collect pre-treatment data for comparison to post treatment. It is important to track what native species are re-introduced to what regions of the lake after a whole lake application, and how well the lake is re-habilitating itself. A Lund survey boat was equipped with a Trimble Pro XT receiver that wirelessly transmitted signals to our laptop for recording of plant samples. Point intercept transects were made covering both lakes. We used a combination of a littoral survey and the point intercept survey modeled after the Idaho Milfoil Program protocols and the DOE protocols.

At the bottom of the maps section, you will see an excel spreadsheet with all of the pre and post treatment data on it. This data was collected as follows; A set of pre-determined points were established around both lakes. Starting at the boat launch for each lake, the survey crew navigated clockwise. Each point was traveled to and data was recorded. Going out from shore at each point, a series of points were collected in a transect. A species list was formed from most dominant to least dominant (left to right). Some sights held a variety of species, others possibly only milfoil was found. The last column of the chart highlights the plant density rating from 0-100% coverage. This is what the surveyors observed in the area 1square meter around each sampling point.

# Clear Lake Pre Treatment Survey Results

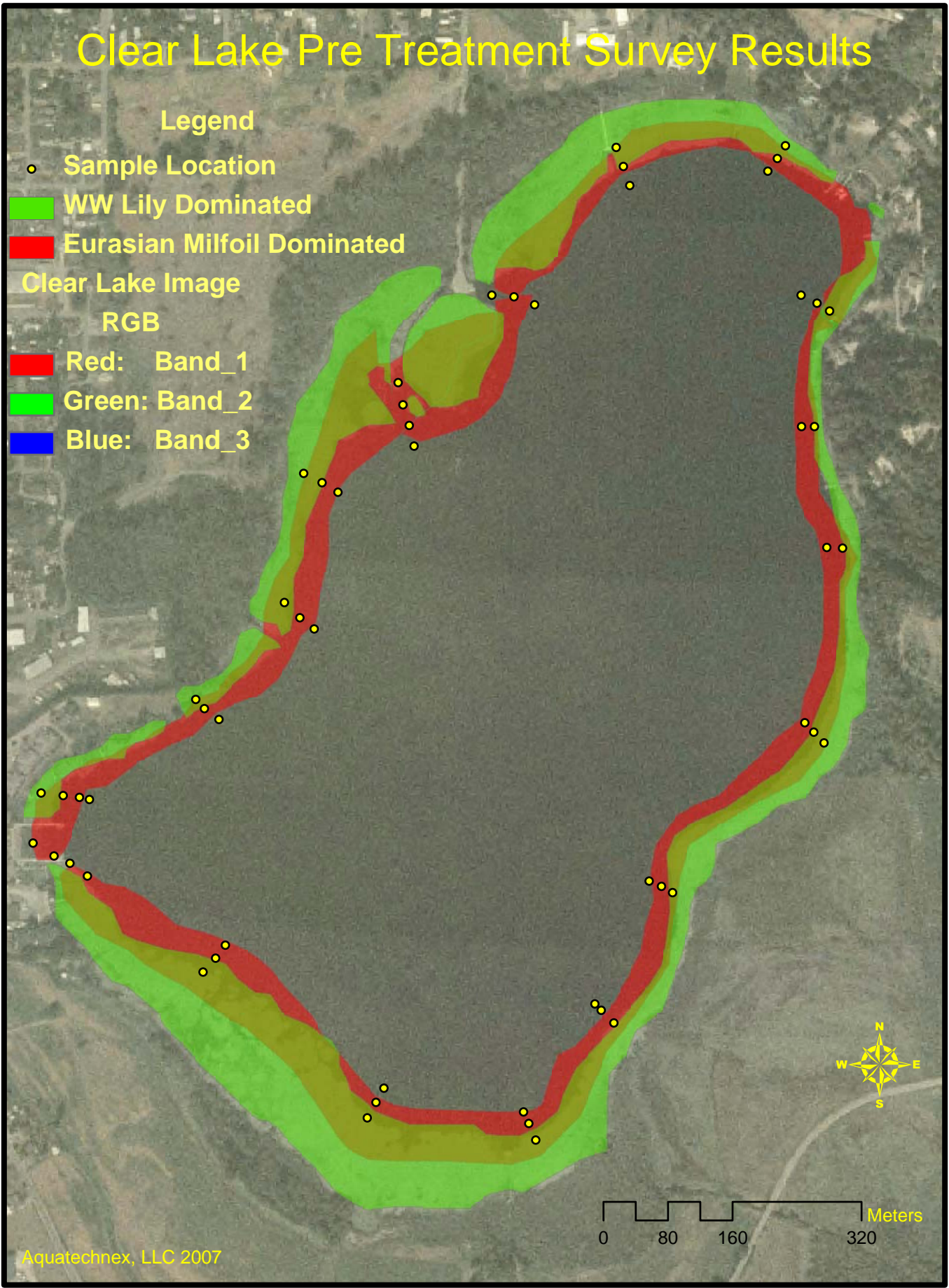
## Legend

- Sample Location
- WW Lily Dominated
- Eurasian Milfoil Dominated

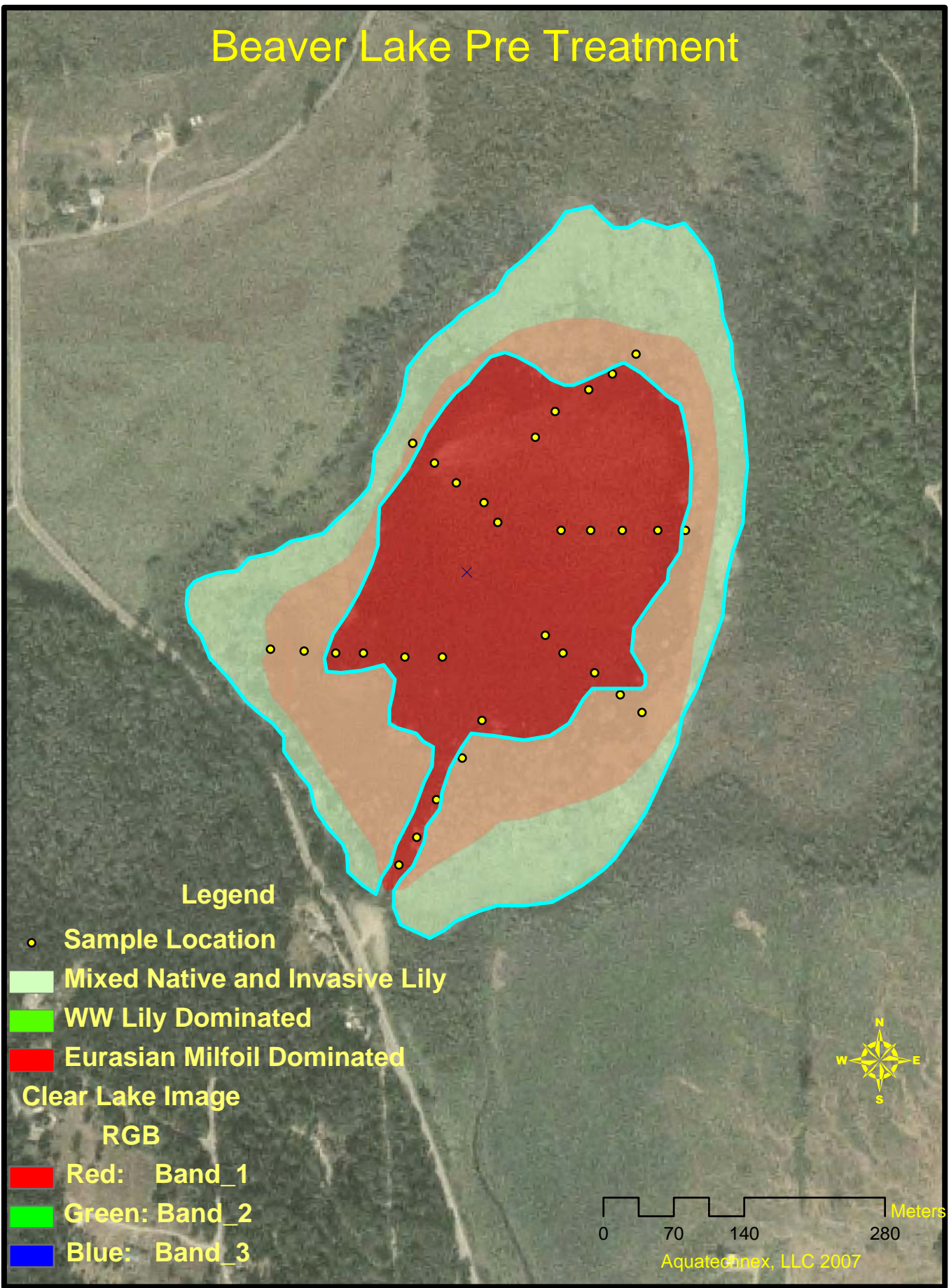
## Clear Lake Image

### RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3



# Beaver Lake Pre Treatment



## **Treatment & Testing**

Treatment began at Clear Lake on June 15<sup>th</sup>, 2007. Beaver was slightly behind starting July 5<sup>th</sup>, 2007. Both lakes were planned to receive three treatments apiece. An optional fourth treatment was planned, but not necessary as both lakes held their concentrations extremely well. Our initial goal was to do a full dose on both lakes achieving a concentration of 20 parts per billion (ppb). Testing was done through SePRO laboratories to determine initial levels and plan bump treatments accordingly. Two bump treatments took place roughly two weeks apart from the first treatment. In all, the program lasted 6 weeks.

The testing was known as a Fastest. Results were achieved within 48 hours of sampling. The sampling protocol required readings be taken at elbow depth below the surface, and at strategic locations. Locations remained the same for all samplings for the purpose of tracking the Sonar distribution and determining any changes in concentrations.

A separate treatment took place on Beaver Lake alongside the Sonar applications. A Brazilian Elodea infestation was located on Beaver Lake in 2006. As part of a separate grant, Skagit County had our group locate and spray 1.5 gallons of Reward herbicide to provide control on the populations. Locating the plant beds was complicated, so treatment was based off of a GIS map created by Envirovision in 2006.



Fastest results are provided below;

Sampling #1

Date Treated	Date Collected	Site #	Concentration PPB
6/15/2007	6/25/2007	1,2,3,4	30.2, 10.6, 10.3, 8.2

Sampling #2

Date Treated	Date Collected	Site #	Concentration PPB
7/5/2007	7/12/2007	Clear 1&2	13.6, 12.2
7/5/2007	7/12/2007	Beaver 1	18.5

Sampling #3

Date Treated	Date Collected	Site #	Concentration PPB
7/23/2007	9/7/2007	Clear 1&2	2.8 & 3 res.
8/07/2007	9/7/2007	Beaver 1	6.5

~ As is shown above, Clear Lake received three samplings and Beaver Lake received two. This is why concentrations are high for sampling #2 on Beaver. That was after the initial 20ppb application.

~ The final fastest above was collected 84 days (12-weeks) post treatment. For maximum control efforts, we like to see a rate between 5-10 ppb for 6 weeks. Residual levels at the 12-week sampling are great to ensure milfoil plants do not try and kick-start new plant tissue with what life they have left.

## **Results**

Prior to treatment, a few variables were considered with regards to native plant populations. Sonar AS has a broad spectrum of plants that it can affect. Having translocation as its mode of action, it can have a more long-term effect on the plants it controls. Due to the shallow nature of both lakes, a very dominant population of fragrant white water lily exists. It was determined that the Sonar would effect some but not all of the lily populations. Too much control would result in a large supply of biomass with nowhere to go. This topic was discussed several times throughout treatment. At the end of the treatments it was evident that the lily's had suffered. Some fell out of the water column, but most simply bleached a lighter yellow. At this point it is non-conclusive as to whether or not the lily populations will be an issue next spring. Both post treatment surveys showed no problems with the lilies. Scheduled lily spraying was postponed for both lakes, as the Sonar pushed them back as well as made it tough for a glyphosate treatment to be effective due to existing herbicide injury from the Sonar. Both Skagit County and Aquatechnex are anticipating some good control of the lilies on both lakes for next season.

## **Conclusion**

Both Clear and Beaver Lakes underwent one of the best treatment options available in today's aquatic marketplace. A target of eradication is planned and judging by our results, it may very well be achieved. Both lakes held concentrations above what is required for good control throughout the treatment process. Both surveys turned up absolute plant mortality.

The ultimate goal for Clear Lake and Beaver Lakes is eradication. To ensure that the goals of the 2007 treatments were met, a spring survey in 2008 is highly suggested. Divers would be a good idea

# Clear Lake PostTreatment Survey Results

## Legend

● Sample Location

■ WW Lily Dominated

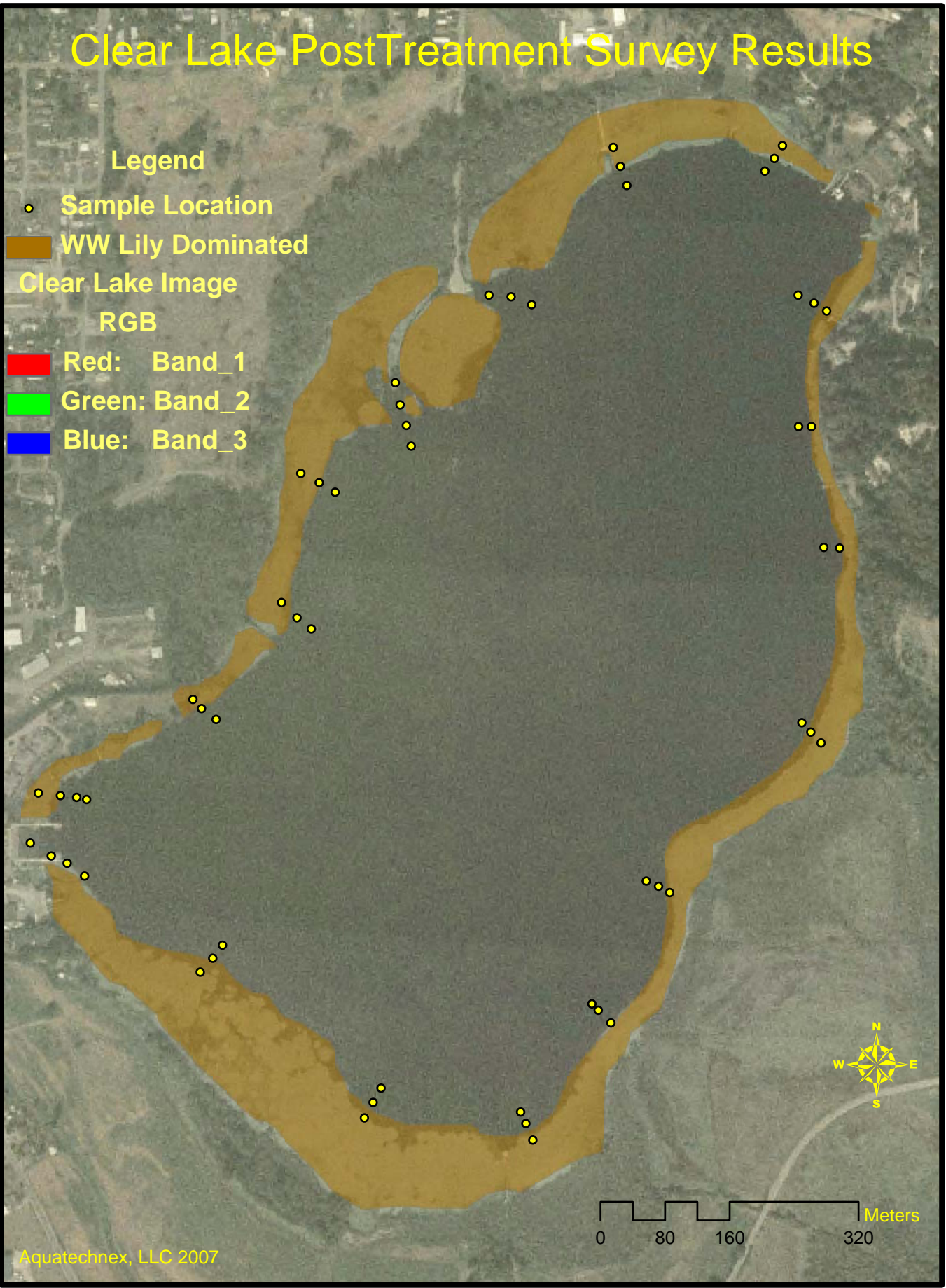
Clear Lake Image

RGB

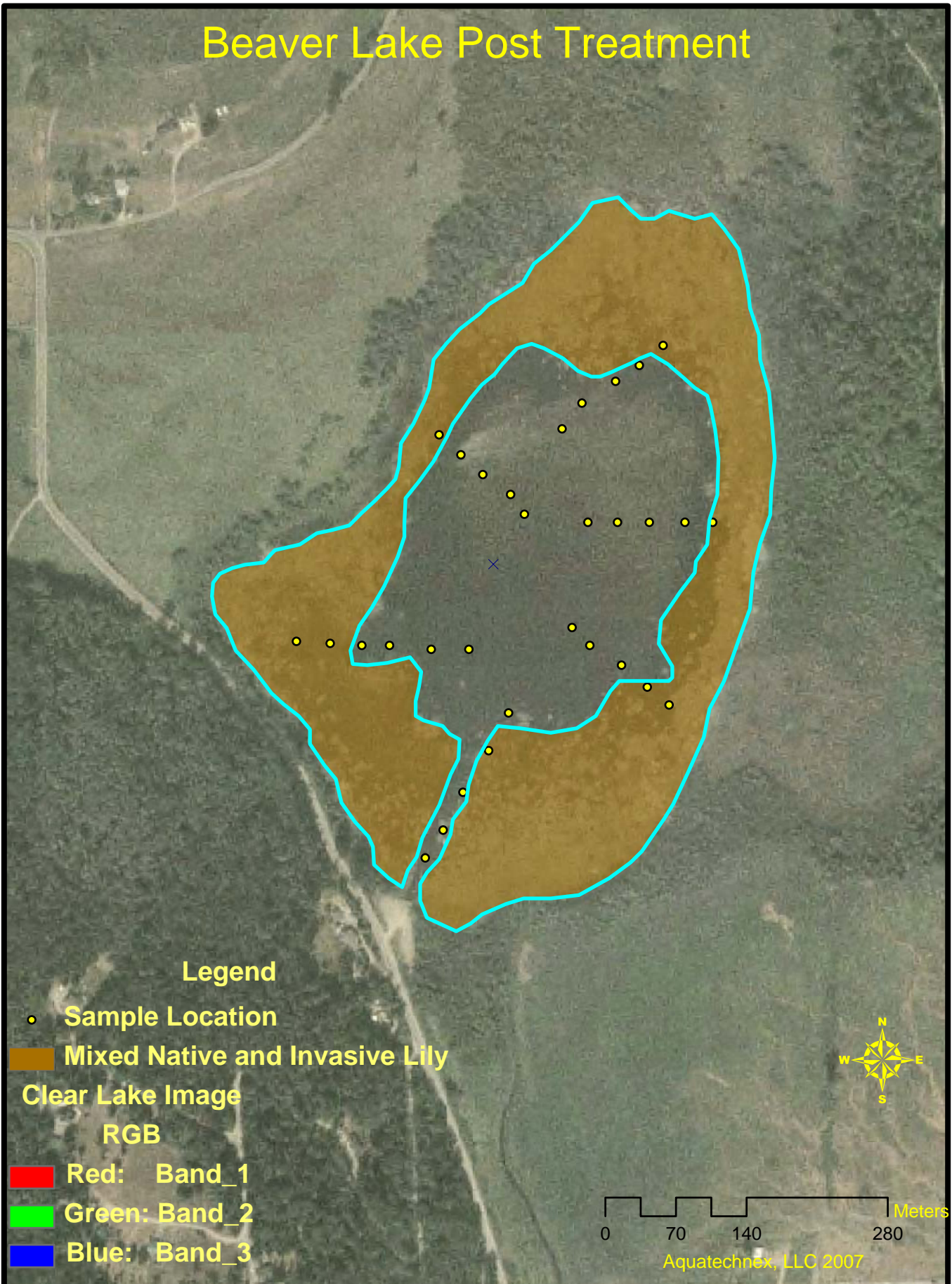
■ Red: Band\_1

■ Green: Band\_2

■ Blue: Band\_3



# Beaver Lake Post Treatment

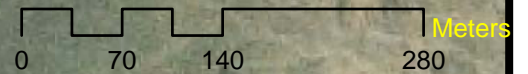


## Legend

- Sample Location
- Mixed Native and Invasive Lily

Clear Lake Image  
RGB

- Red: Band\_1
- Green: Band\_2
- Blue: Band\_3



Aquatechnex, LLO 2007

as well, providing less probability of any overlooked plant beds. If full control was in fact achieved in 2007, preventative survey's and control methods in the future can help keep these beautiful lakes milfoil free for years to come. It is important that the LMD figureheads remain pro-active on each lake, contacting the county with any information regarding milfoil sightings. Aquatechnex appreciated the opportunity to be a part of this program in 2007 and will assure that all remaining contract tasks for 2008 are carried out in a timely manner. For further information on this year's treatment program or for general questions, please feel free to call or e-mail Curtis McMillan of Aquatechnex;

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Phone # 1-204-221-3094  
[cmcmillan@aquatechnex.com](mailto:cmcmillan@aquatechnex.com)  
Aquatechnex, LLC.

Clear Lake Transect Data

Transect	Sample Point	Pre Treatment				Post Treatment		
		Species 1	Species 2	Species 3	Density	Species 1	Species 2	Density
Boat Ramp	1	E Milfoil	Elodea	Chara	50%	Chara		25%
	2	E Milfoil	Chara		75%	Chara		25%
	3	E Milfoil			75%	No Plants		
2	1	WW Lily	E Milfoil		100%	Chara		25%
	2	WW Lily	E Milfoil		100%	No Plants		25%
	3	E Milfoil	P. Rich	Naiad	75%	No Plants		25%
3	1	WW Lily	E Milfoil		100%	P. Rich		25%
	2	E Milfoil	P. Rich	Chara	75%	P. Rich		25%
	3	E Milfoil			25%	No Plants		0%
4	1	WW Lily	E Milfoil	Chara	100%	Chara	P. Rich	25%
	2	E Milfoil	P. Rich		75%	Chara		25%
	3	No Plants			0%	Chara		25%
5	1	WW Lily	E Milfoil		75%	No Plants		0%
	2	P. Rich	E Milfoil		75%	P. Rich		25%
6	1	P. Rich	E Milfoil		75%	P. Rich		25%
	2	E Milfoil	P. Rich	Naiad	75%	No Plants		0%
7	1	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	2	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	3	P. Rich	E Milfoil		75%	No Plants		0%
8	1	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	2	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	3	E Milfoil	P. Rich		75%	No Plants		0%
9	1	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	2	E Milfoil	Elodea	P. Rich	75%	P. Rich		25%
	3	No Plants			0%	No Plants		0%
10	1	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	2	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	3	P. Rich	E Milfoil		75%	No Plants		0%
11	1	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	2	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	3	P. Rich	E Milfoil		25%	P. Rich		25%
12	1	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	2	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	3	P. Rich	E Milfoil		50%	No Plants		0%
13	1	E Milfoil	Elodea		100%	Chara		25%
	2	E Milfoil			75%	Chara		25%

Clear Lake Transect Data

	3	E Milfoil			75%	No Plants		0%
	4	E Milfoil			50%	No Plants		0%
14	1	WW Lily	Elodea	E Milfoil	100%	Chara		25%
	2	WW Lily	E Milfoil		100%	Chara		25%
	3	E Milfoil			50%	No Plants		0%
	4	No Plants			0%	No Plants		0%
15	1	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	2	WW Lily	E Milfoil	P. Rich	100%	P. Rich		25%
	3	P. Rich	E Milfoil		25%	No Plants		0%
16	1	WW Lily	E Milfoil	P. Rich	100%	Chara		25%
	2	WW Lily	E Milfoil	P. Rich	100%	No Plants		0%
	3	P. Rich	E Milfoil		75%	No Plants		0%
17	1	WW Lily	E Milfoil	P. Rich	100%	Chara	Elodea	25%
	2	WW Lily	E Milfoil	P. Rich	100%	Chara		25%
	3	P. Rich	E Milfoil		100%	No Plants		0%
18	1	E Milfoil	WW Lily	P. Rich	100%	Chara	P. Rich	25%
	2	E Milfoil	WW Lily	Elodea	75%	Chara	P. Rich	25%
	3	E Milfoil	Chara		75%	Chara	Elodea	25%
	4	E Milfoil			25%	No Plants		0%

Beaver Lake Transect Data

Transect	Sample Point	Pre Treatment				Density	Post Treatment		
		Species 1	Species 2	Species 3	Species 4		Species 1	Species 2	Density
Boat Ramp	1	E Milfoil	Coontail	Elodea	Chara	100%	Chara		25%
	2	E Milfoil	Coontail	Chara		100%	Coontail		25%
	3	E Milfoil	Elodea			100%	No Plants		0%
	4	E Milfoil	P. Rich	P. Zoz		100%	No Plants		0%
	5	E Milfoil	Coontail			100%	No Plants		0%
2	1	E Milfoil	Coontail			100%	Coontail		25%
	2	E Milfoil	Elodea			100%	Elodea		25%
	3	E Milfoil	Elodea			100%	No Plants		0%
	4	E Milfoil	P. Rich	Elodea		100%	Elodea		25%
	5	E Milfoil	P. Rich			100%	No Plants		0%
	6	E Milfoil	P. Rich	Coontail		100%	P.Rich		25%
3	1	E Milfoil	Coontail			100%	No Plants		0%
	2	E Milfoil	Chara			100%	No Plants		0%
	3	E Milfoil	Chara	Coontail		100%	Coontail		25%
	4	E Milfoil	Chara	Chara		100%	Chara		25%
	5	E Milfoil	Chara			100%	No Plants		0%
4	1	E Milfoil	Coontail	Elodea		100%	Coontail		25%
	2	E Milfoil	P. Cripus			100%	No Plants		0%
	3	E Milfoil	Coontail			100%	No Plants		0%
	4	E Milfoil	Coontail	Elodea		100%	No Plants		0%
	5	E Milfoil	Elodea	Coontail		100%	Elodea		25%
5	1	E Milfoil	Coontail			100%	No Plants		0%
	2	E Milfoil	Coontail			100%	Coontail		25%
	3	E Milfoil	Elodea			100%	Elodea		25%
	4	E Milfoil	Coontail			100%	Coontail		25%
	5	E Milfoil	Elodea	Coontail		100%	No Plants		0%
6	1	E Milfoil	Elodea			100%	No Plants		0%
	2	E Milfoil	Coontail	Elodea		100%	No Plants		0%
	3	E Milfoil	Elodea	P. Rich		100%	Elodea		25%
	4	E Milfoil	Elodea	Chara		100%	No Plants		0%
	5	E Milfoil	Elodea	Coontail		100%	No Plants		0%