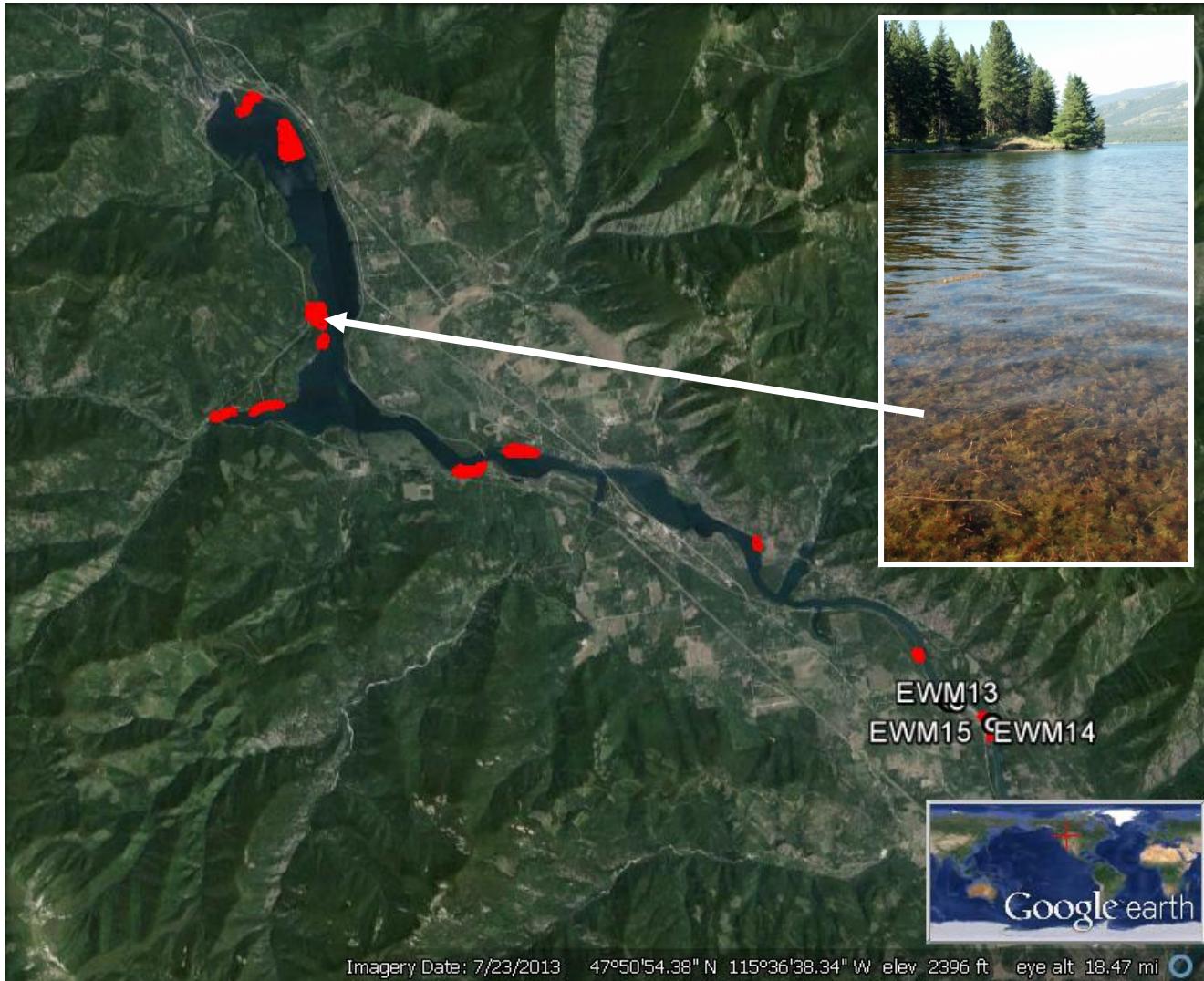


**NOXON RAPIDS RESERVOIR  
SANDERS COUNTY, MONTANA**

**2013 AIS Aquatic Pesticide Application Report (APAR)**



Prepared By:  
**CLEAN LAKES INC.**  
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Prepared For:  
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September 2013

NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA  
2013 AIS Aquatic Pesticide Application Report (APAR)

**BACKGROUND INFORMATION:** Clean Lakes, Inc. (CLI) was contracted by Sanders County Montana to provide aquatic herbicide applications for the control of Aquatic Invasive Species (AIS) within specific areas of Noxon Rapids Reservoir. Applications were conducted in compliance with the Montana Department of Environmental Quality National Pollutant Discharge Elimination System (NPDES) Pesticide General Permit (PGP) for Pesticide Application (NOI Permit # MTG870000), as well as the Pesticide Discharge Management Plan (PDMP) developed as part of the PGP. The Permit related information is included in the Noxon Rapids Reservoir, Sanders County, Montana, 2013 AIS Aquatic Pesticide Application Plan (APAP)<sup>1</sup> on file with Sanders County.

**SCOPE OF WORK:** The scope of work was for the application of aquatic herbicides, alone, or in combination, for the control of Eurasian watermilfoil and Curlyleaf pondweed in 188.3 acres within pre identified areas of Noxon Rapids Reservoir.

**PRE-TREATMENT SURVEYS:** Sanders County hired a third party consultant, AquaTechnex LLC to perform the 2013 pre-treatment surveys of Noxon Rapids Reservoir. AquaTechnex LLC provided CLI with the shapefiles of the treatment areas, along with the “DRAFT NOXON



RESERVOIR REPORT, July 13 2013, Noxon Reservoir Treatment Plots and Discussion (AquaTechnex LLC<sup>2</sup>). In addition, the “Guidance for Selective Control of Eurasian watermilfoil and Curlyleaf Pondweed Using Herbicides in Noxon Rapids and Cabinet Gorge Reservoirs, MT, 2013 (KD Getsinger, PhD, USAE Research and Development Center, 19 March 2013)<sup>3</sup> was used to finalize priority treatment areas.

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<sup>1</sup> Noxon Rapids Reservoir, Sanders County, Montana, 2013 AIS Aquatic Pesticide Application Plan (APAP)

<sup>2</sup> “DRAFT NOXON RESERVOIR REPORT, July 2013, Noxon Reservoir Treatment Plots and Discussion, July 2013 AquaTechnex LLC

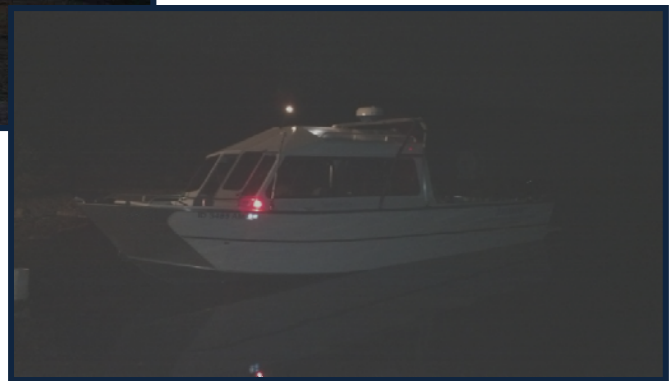
<sup>3</sup> “Guidance for Selective Control of Eurasian watermilfoil and Curlyleaf Pondweed Using Herbicides in Noxon Rapids and Cabinet Gorge Reservoirs, MT, 2013 (KD Getsinger, PhD, USAE Research and Development Center, 19 March 2013)

**SUMMARY OF ACRES TREATED:** The final plan consisted of treating 161.4 acres in Block Plots, and 26.9 acres in Strip Plots, for a total of 188.3 acres, or approximately 1,216.3 acre feet. Based on the Pre Treatment Plot surveys, water depths were adjusted in the Plots based on water level conditions at the time of treatment. Plots T-13-11 and T-13-14 were spot treated with Aquathol K and Diquat respectively, as EWM growth was minimal with scattered plants. The aquatic herbicide applications in these plots (T-13-11 and T-13-14) entailed the direct application to individual EWM plants, or small plant beds.

**TREATMENT SCHEDULE:** The aquatic herbicide treatments were performed on July 23<sup>rd</sup>, 24<sup>th</sup>, 25<sup>th</sup> and 31<sup>st</sup>, 2013. To increase aquatic herbicide contact and exposure times for the control of EWM in Plot T-13-30 (located in an open water area of the reservoir near the dam), and T-13-31 a & b (shoreline location near the Dam), Avista was able to greatly reduce water flows from approximately 12:00 AM to 10:00 AM on July 25<sup>th</sup>, 2013 (Plot 30 and 31 aerial to the right). Plots T-13-30 and T-13-31 (a & b) required a nighttime/early morning application to



correspond to the reduced water flow rates. These Plots were treated between the hours of 1:34 AM and 8:00 AM on July 25<sup>th</sup> (see the Treatment Dates and Time-Table 1 below):



**Table 1: Treatment Dates and Times**

2013 Noxon Rapids Reservoir Treatment Plots		Site Treatment Date, Time and Conditions				
Plot Number	Acreage	Date	Start	Stop	Shy	Wind
T-13-10	1.2	7/23/2013	3:50 PM	4:00 PM	Clear	1 W
T-13-17	4.1	7/23/2013	4:19 PM	4:28 PM	Clear	2 W
T-13-21	1.6	7/23/2013	4:35 PM	4:42 PM	Clear	2 W
T-13-25	5.1	7/24/2013	11:40 AM	12:04 PM	Clear	1 E
T-13-26	6.7	7/23/2013	5:45 PM	6:15 PM	Clear	4 W
T-13-27	5.1	7/23/2013	5:00 PM	5:32 PM	Clear	0
T-13-28 b	20.9	7/24/2013	12:20 PM	12:45 PM	Clear	1 E
T-13-28 a	21.4	7/31/2013	10:37 AM	11:50 AM	Clear	0
T-13-30	74.4	7/25/2013	1:34 AM	6:44 AM	Stars	3 E
T-13-31 a	9.1	7/25/2013	7:25 AM	7:46 AM	Clear	2 E
T-13-31 b	2.1	7/25/2013	7:50 AM	8:00 AM	Clear	2 E
T-13-32	18.6	7/24/2013	10:00 AM	11:09 AM	Clear	1 E
T-13-0903	14.9	7/31/2013	1:11 PM	1:40 PM	Haze	.4 E
<b>Sub Total</b>	<b>185.1</b>					
T-13-11	1.4	7/31/2013	3:05 PM	3:20 PM	Haze	0
T-13-14	1.9	7/31/2013	2:29 PM	3:00 PM	Haze	1 E
<b>Total</b>	<b>188.3</b>					

**EQUIPMENT USED:** One of CLI's state-of-the-art Littoral Zone Treatment vessels (LittLine<sup>®</sup>) was used to perform the aquatic herbicide applications. The herbicide applications



were made to the lower portion of the water column to increase herbicide concentration and exposure time (CET) relationships for the control of the target species.



The AIS treatment area GIS shapefiles were loaded into the LittLine<sup>®</sup> computer system for vessel guidance and herbicide application data recording. The treatment tracks were automatically recorded via the LittLine vessel's GPS guidance system for the production of the final treatment area maps to document the treatment areas.

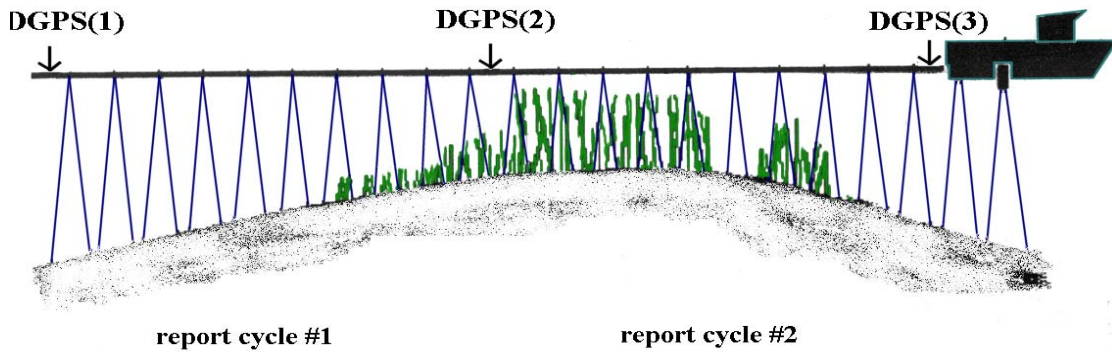


The LittLine<sup>®</sup> can place herbicides at any depth within the water column (2 - 30 feet), as well as within the bottom 2 foot of the water column. Impacts from currents, wind and wave action are reduced in deep water applications through the use of the LittLine<sup>®</sup> application system when compared to conventional subsurface applications. For the Noxon Rapids applications, the application swath widths were approximately 50 foot, and the vessel speeds averaged 3 to 5 mph depending on water depths within the plots. The herbicide discharge in all of the plots was within the bottom portion of the water column. The LittLine<sup>®</sup> hoses are electronically reeled in or reeled out based on the varying depths of the treatment Plots.

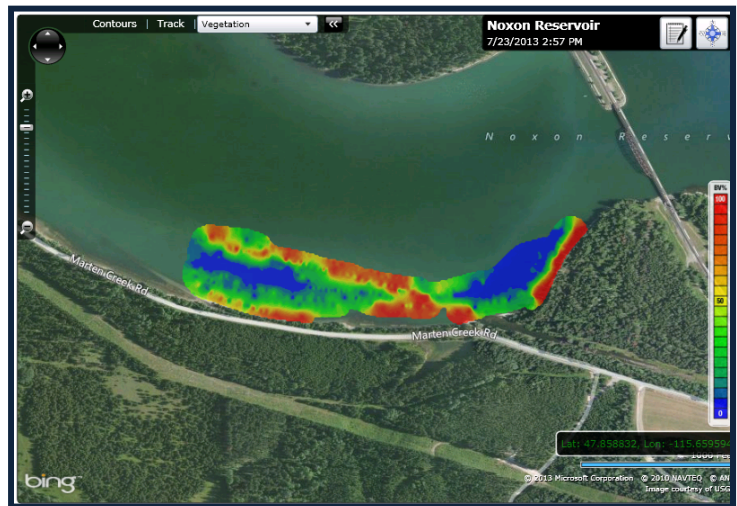


The LittLine system's computerized rate controllers regulate the aquatic herbicide applications through preset treatment rates. When the vessel speeds up and or slows down, the rate controllers adjust the herbicide application rate to match the preset rate in gallons of product per acre.

**Submerged Aquatic Vegetation (SAV) Mapping:** A Digital Echosounder System with a Structure Scan Module was used to record data of the submerged aquatic vegetation (SAV) profile in the control plots during treatment. Data was collected in both the .SLG (traditional sonar on HDS line) and the .SL2 (multi-channel structure scan) formats.



The data collected was processed for at time of treatment Submerged Aquatic Vegetation (SAV) data in the treatment plots. Data was collected to compare at time of treatment SAV coverage, height in the water column, and bio-volume to support post-treatment efficacy evaluations. An example of a SAV at time of treatment view from Plot 32, Noxon Rapids Reservoir is pictured to the right.



**AQUATIC HERBICIDES:** CLI provided the aquatic herbicides for the project, and they were delivered by IEDS of Spokane, WA in recyclable tote (Aquathol K 250 gallon, Triclopyr 250 gallon), and 2.5 gallons (Aquathol K and Diquat) containers. CLI provided the required



support equipment for material handling (herbicide transfer) as well as support vehicles for the vessel assigned to the project. The aquatic herbicides Aquathol K<sup>®</sup> (liquid endothal), Renovate 3<sup>®</sup>, Reward<sup>®</sup> and Tribune (liquid diquat dibromide) were applied to areas of Noxon Rapids Reservoir for the control of Eurasian watermilfoil and Curlyleaf pondweed as outlined in the Site Data Tables below (Herbicide Label's and Material Safety Data Sheets (MSDS's) included in the APAP).

**PERMIT COMPLIANCE:** CLI supported the development of the Aquatic Pesticide Application Plan, and Sanders County provided the required permits and approvals for the herbicide treatments from the Montana Department of Environmental Quality. There were no adverse incidents to report.

**SERVICES PROVIDED BY CLI:** All manpower, materials, insurance, equipment and technical advice required to perform aquatic herbicide applications in the project areas. In addition, CLI hosts a webpage at <http://cleanlake.com/2013noxonrapidsais.html> to provide project related information to the public.

**SERVICES PROVIDED BY THE SANDERS COUNTY:** Sanders County provided the required permits, published legal notices in newspapers, provided notification to property owners, posting at public boat launch facilities, and provided the project area GIS shapefiles through AquaTechnex that were used to generate the final 2013 Treatment Area Plots and Maps.

### TREATMENT SITE DATA

Table 2: Plots Treated on Noxon Rapids Reservoir, Treatment Site Data, Aquatic Herbicides Used:

2013 Noxon Rapids Reservoir Treatment Plots			Diquat		Triclopyr		Endothall	
Plot Number	Acreage	Mean Depth	Rate ppm	Qty Site	Rate ppm	Qty Total Site	Rate ppm	Qty Total Site
T-13-10	1.2	6.70	0.37	4.0				
T-13-17	4.1	8.00	0.37	16.2				
T-13-21	1.6	6.00	0.37	4.7				
T-13-25	5.1	4.60			1.00	21	2.0	30
T-13-26	6.7	9.00	0.37	30.2				
T-13-27	5.1	6.00	0.37	15.2				
T-13-28 b	20.9	4.60			1.00	87	1.0	62
T-13-28 a	21.4	6.25			1.00	121	2.0	171
T-13-30	74.4	7.00			1.00	471	2.0	663
T-13-31 a	9.1	7.00			1.00	58	2.0	82
T-13-31 b	2.1	7.00			1.00	13	2.0	19
T-13-32	18.6	8.00			1.00	135	2.0	190
T-13-0903	14.9	5.00			1.00	67	2.0	95
<b>Sub Total</b>	<b>185.1</b>			<b>70.2</b>		<b>974</b>		<b>1312</b>
T-13-11	1.4	Spot Treatment						0.7
T-13-14	1.9	“ “		0.3				
<b>Total</b>	<b>188.3</b>			<b>70.5</b>		<b>974</b>		<b>1313</b>

Table 2 Notes:

- Acreage, average depth and acre feet values were adjusted in some of the Plots based on the Treatment Survey results.
- The 2013 Treatment priority was based on treatment progressing in an upstream to downstream direction



**Plot Percent SAV Cover and SAV Bio-Volume Present at Time of Application in the Treatment Plots**

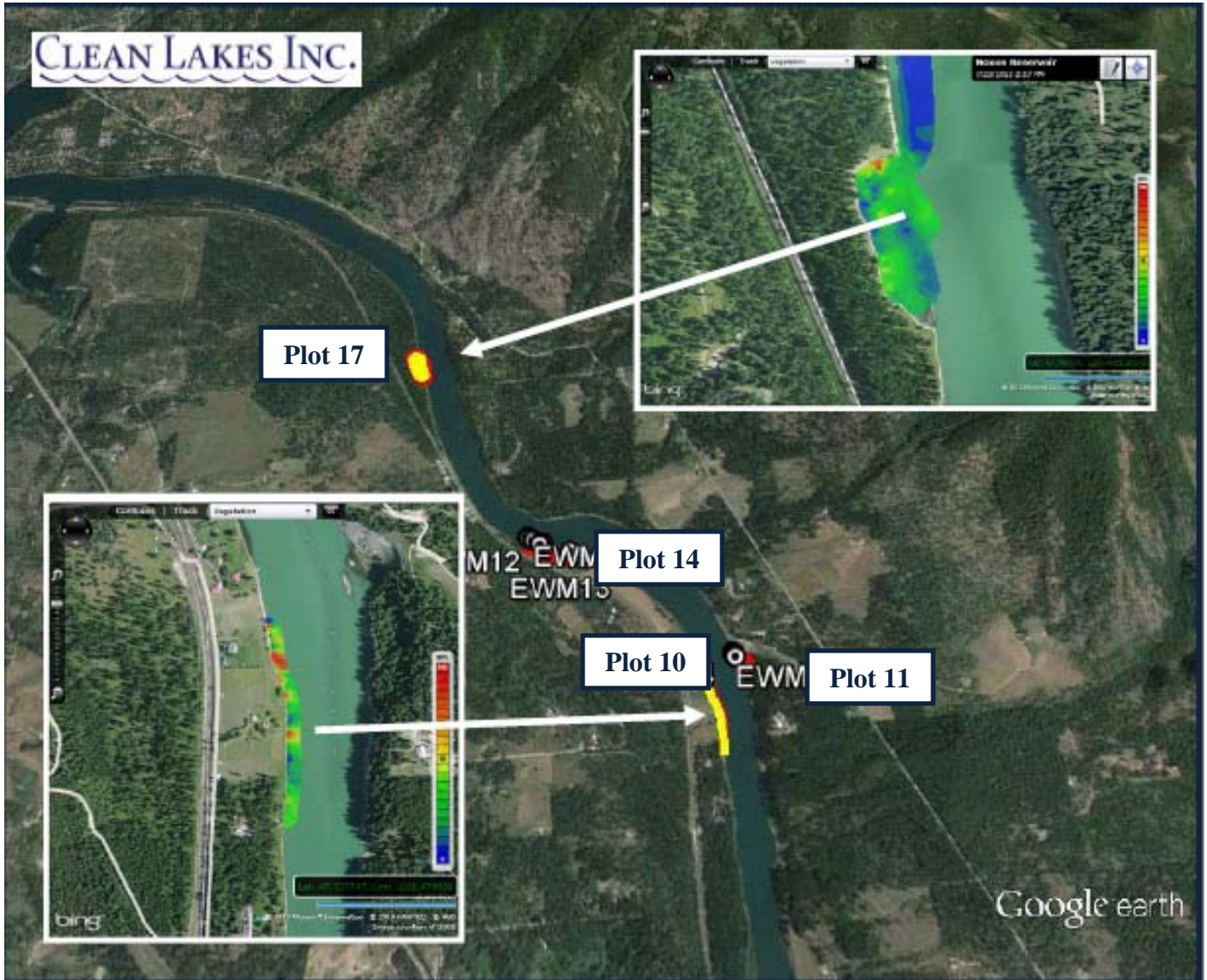
<b>2013 Noxon Rapids Reservoir AIS Treatment Plot SAV % Cover and SAV BioVolume Data</b>				
<b>Plot Number</b>	<b>Acreage</b>	<b>SAV Percent Cover</b>	<b>SAV Bio-Volume</b>	<b>Date Data Collected</b>
T-13-10	1.2	84.50	46.30	7/23/2013
T-13-17	4.1	78.50	24.80	7/23/2013
T-13-21	1.6	90.50	62.00	7/23/2013
T-13-25	5.1	84.00	53.80	7/24/2013
T-13-26	6.7	54.00	35.10	7/23/2013
T-13-27	5.1	95.00	51.90	7/23/2013
T-13-28 b	20.9	100.00	99.90	7/24/2013
T-13-28 a	21.4	89.80	61.20	7/31/2013
T-13-30	74.4	92.10	71.40	7/25/2013
T-13-31 a	9.1	72.30	58.2	7/25/2013
T-13-31 b	2.1	75.10	50.10	7/25/2013
T-13-32	18.6	69.10	45.90	7/24/2013
T-13-0903	14.9	92.20	65.10	7/31/2013
T-13-11*	1.4	N/A	N/A	N/A
T-13-14*	1.9	N/A	N/A	N/A

\* Individual EWM plants were spot treated in Plots T-13-11 and T-13-14, thus Percent Cover and Bio-Volume Data was not collected

PROJECT AREA AERIALS

Plots T-13-10, 11, 14\* & 17

S

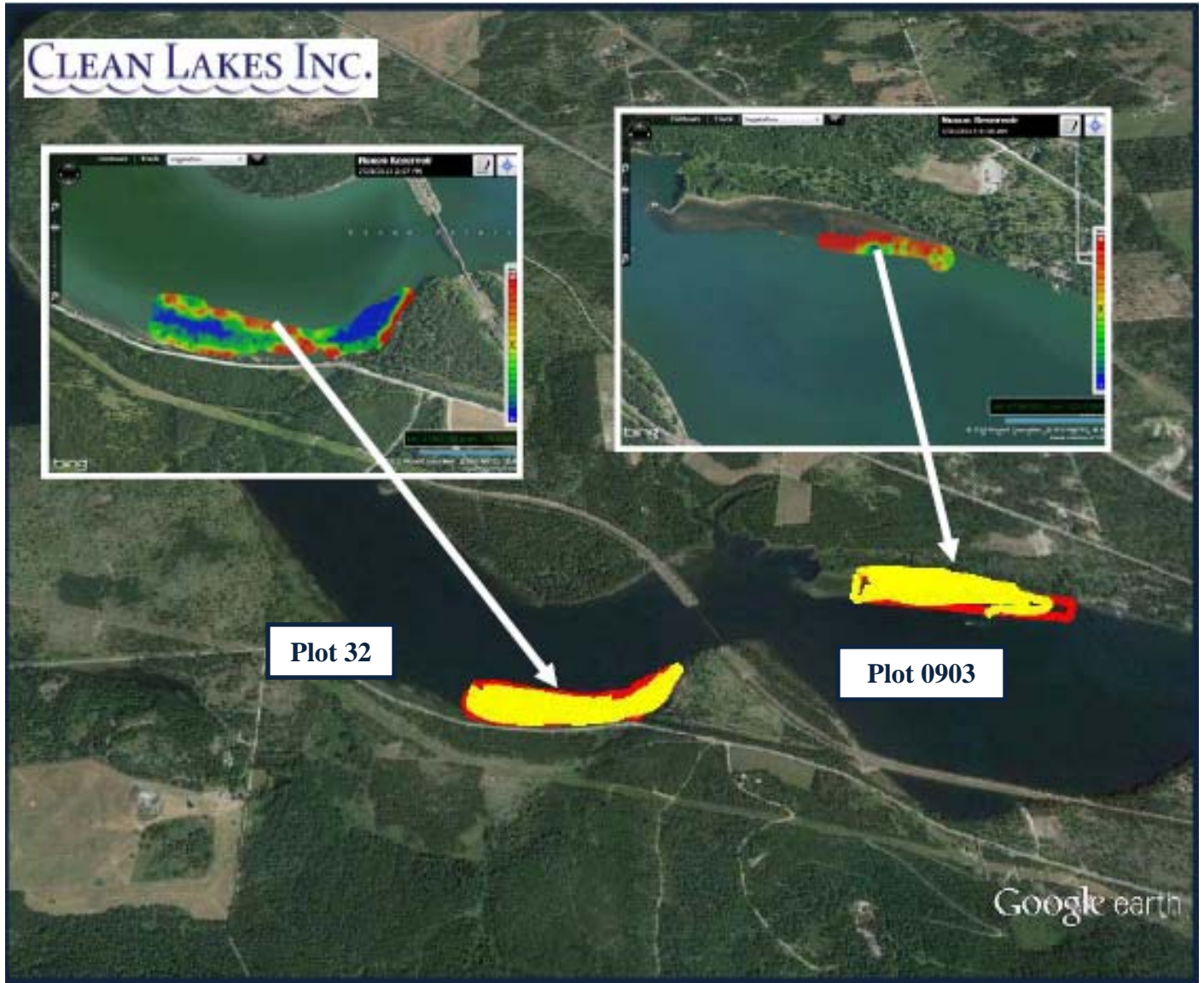


**\*Plot T-13-11 and T-13-14 were spot treated, and the SAV data in the Plots was not recorded at the time of treatment**

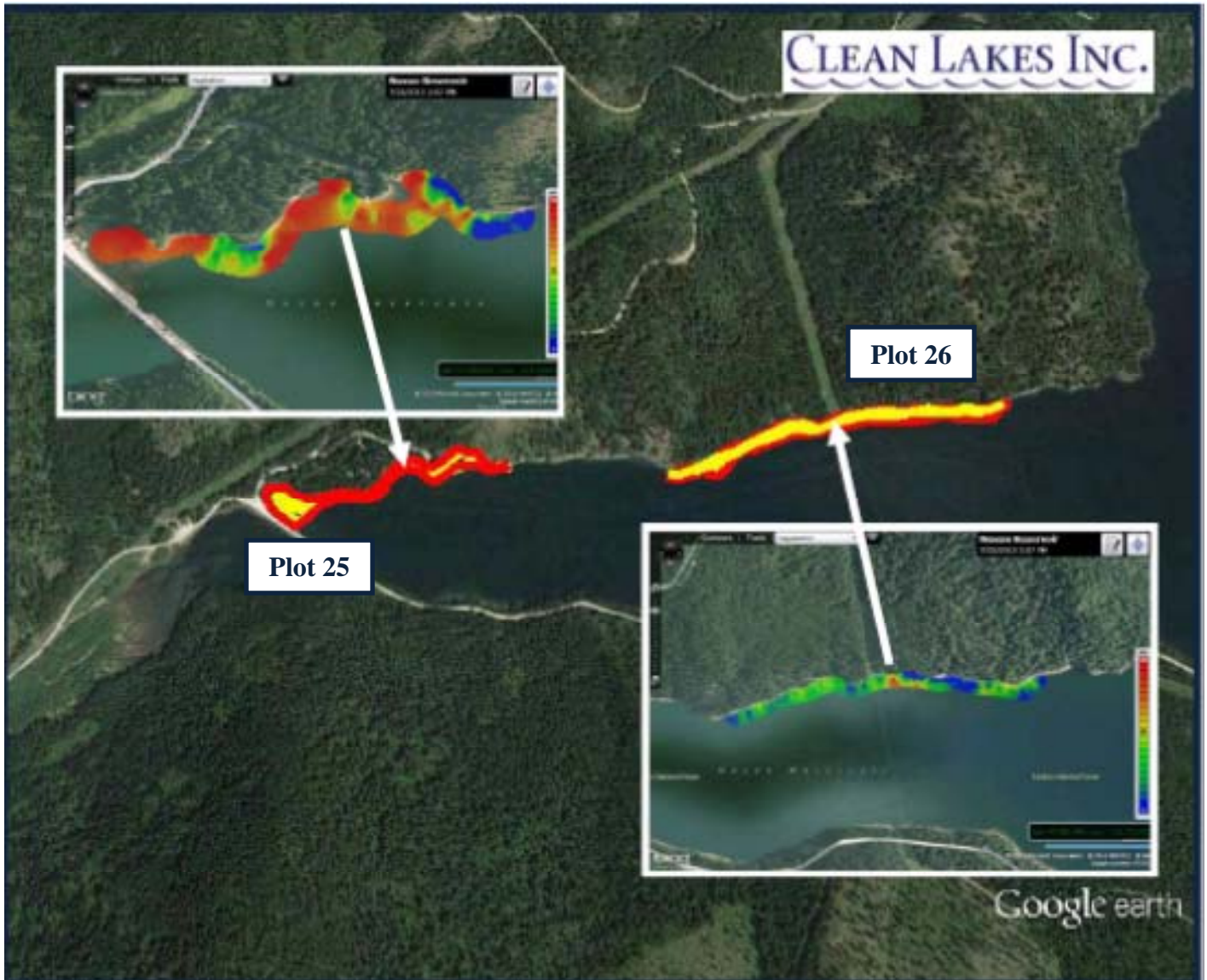
Plot T-13-21



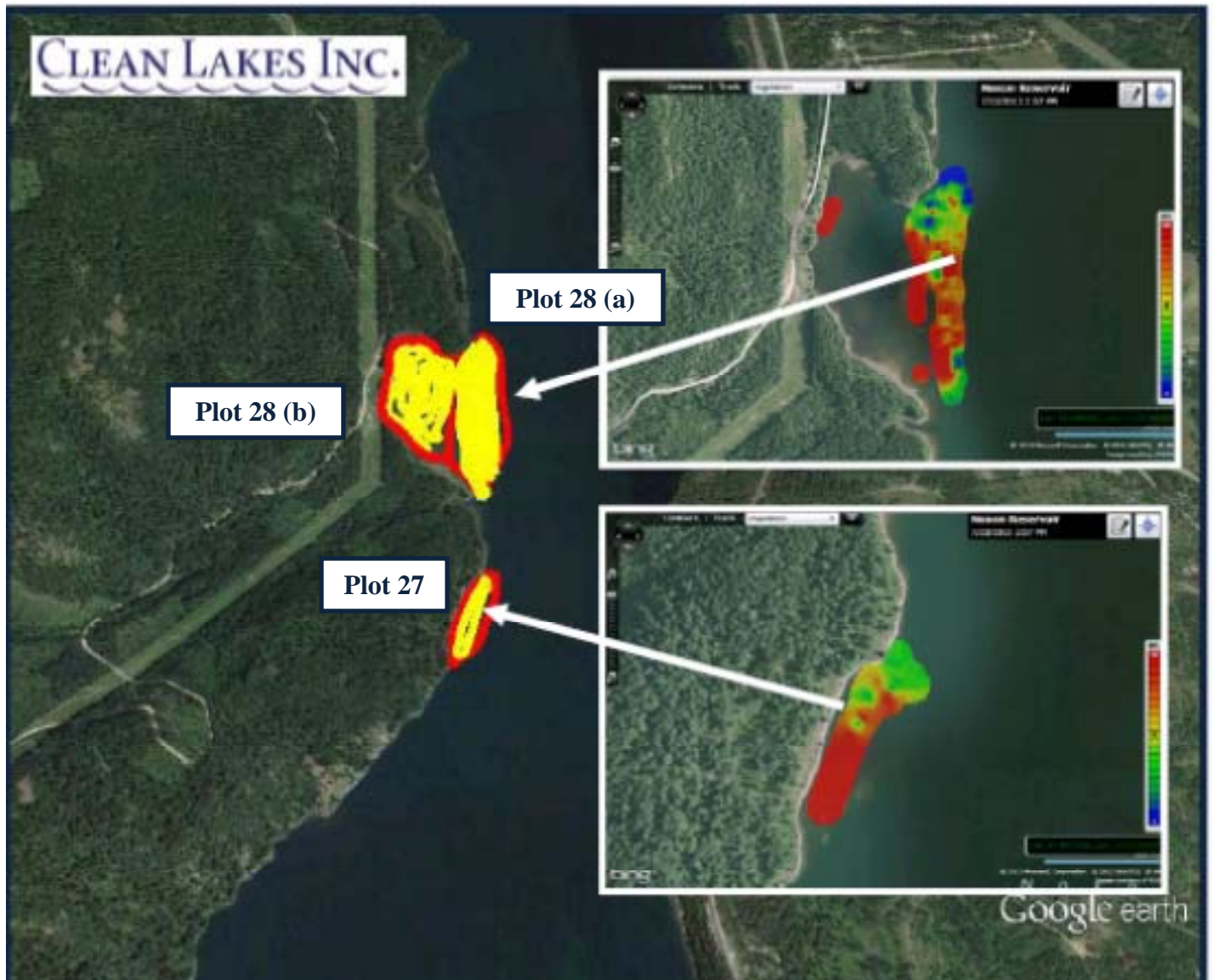
Plot T-13-32 & T-13-0903



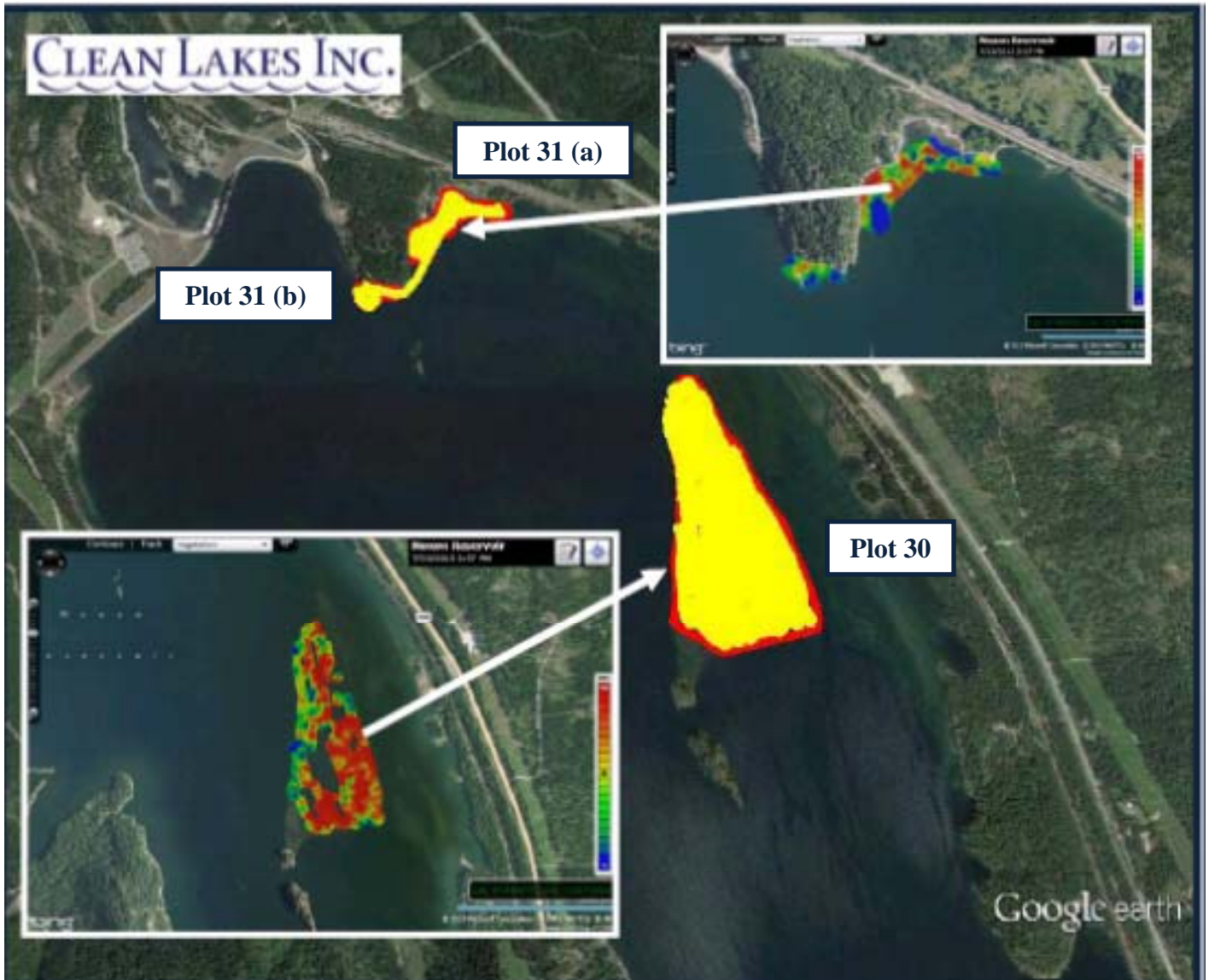
Plot T-13-25 & 26



Plots T-13-27, 28 (a) & 28 (b)



Plots T-13-30, 31 (a) & 31 (b)



SAV PERCENT COVER AND BIO-VOLUME DATA SETS

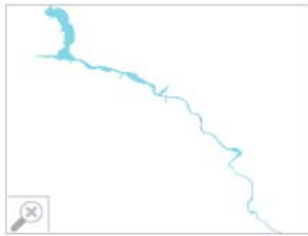
Plots T-13-10

**BIOBASE**

**VEGETATION ANALYSIS REPORT**

**Noxon Reservoir, Sanders County Montana** Generated: 9/20/2013 11:51:39 PM (UTC)

Waterbody Size: 3,241.65 ha (8,010.30 acres) [report link](#)

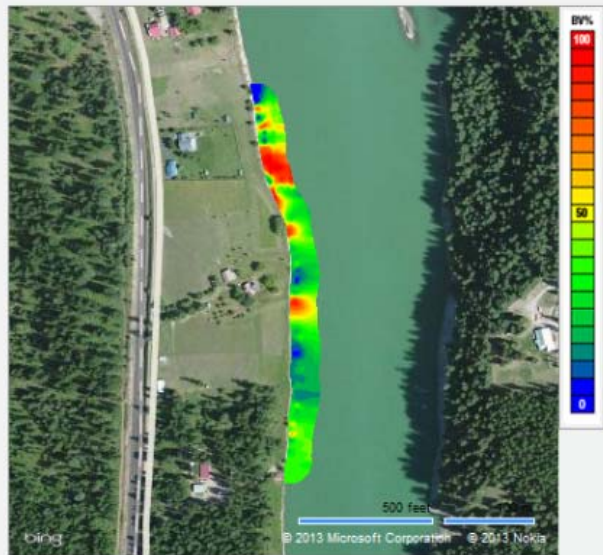


<b>Data Collector</b> Thomas McNabb  <b>Data Collection Date</b> 9/19/2013 9:10:18 PM (UTC)  <b>Average Water Temperature</b> 21.54° C (70.76° F)  <b>Location</b> Start: 47.77724075, -115.48442078 End: 47.77342224, -115.48387146	<b>Survey Size</b> Area: 1.49 ha (3.67 acres)  Percent: 0.05% of waterbody Volume: 48,656.90 cu. m (39.45 acre ft)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m  <b>Quality Control</b> Reviewer: McCormack, Ian Status: Passed
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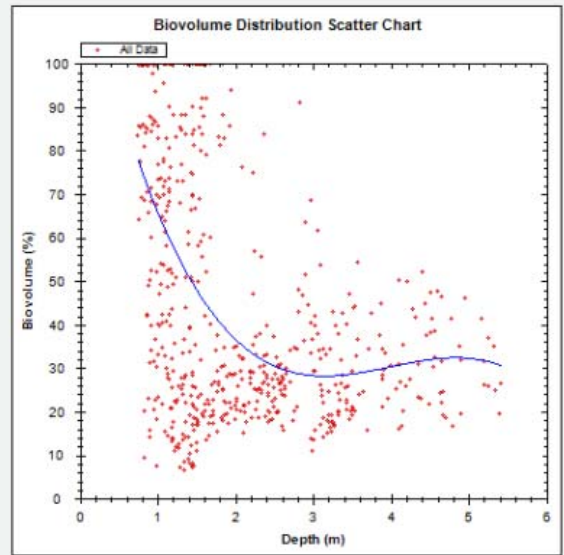
**Area of Interest Summary**

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	84.5%	46.3%	±29.9%	39.1%	±32.2%	0.37-7.79 m	2.08 m	449.92 m	702
	Grid	97.8%	39.1%	±21.5%	38.3%	±22%	0.08-7.99 m	3.32 m	-	651

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart





Plots T-13-17



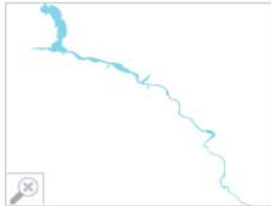
VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 1:52:31 PM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres)

[report link](#)



**Data Collector**  
Thomas McNabb

**Data Collection Date**  
7/23/2013 10:18:22 PM (UTC)

**Survey Size**  
Area: 2.98 ha (7.40 acres)  
Percent: 0.09% of waterbody  
Volume: 274,739.00 cu. m (222.70 acre ft)

**Average Water Temperature**  
25.31° C (77.57° F)

**Location**  
Start: 47.79731369, -115.50480652  
End: 47.79701233, -115.50534821

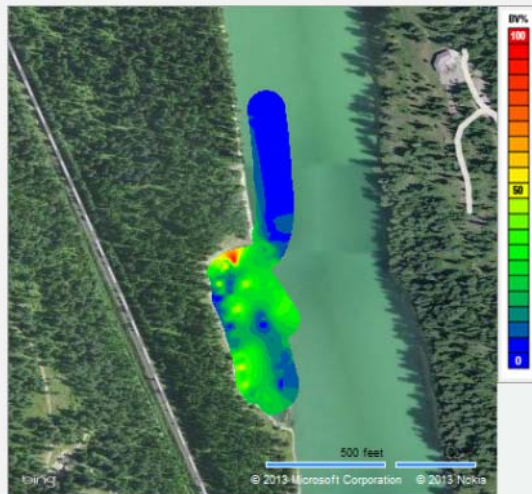
Survey Summary

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full Survey	Point	78.5%	24.8%	±17.3%	19.5%	±18.4%	0.54-27.6 m	6.69 m	984.4 m	573
	Grid	74.3%	22.2%	±11.7%	16.5%	±14%	0.02-29.42 m	9.04 m	-	896

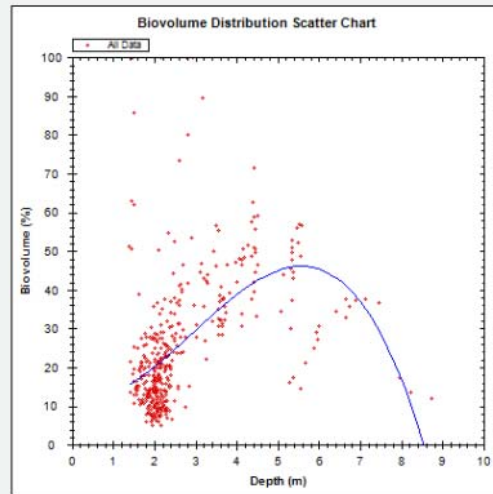
Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	82.9%	25%	±17.6%	20.7%	±18.6%	0.54-10.16 m	2.72 m	642.01 m	515
	Grid	98.6%	24.1%	±11.4%	23.7%	±11.7%	0.02-9.96 m	3.12 m	-	571
2	Point	39.7%	20.7%	±9.4%	8.2%	±11.7%	5.19-27.6 m	20.98 m	205.23 m	58
	Grid	35.8%	14.1%	±8%	5.1%	±8.3%	0.75-29.42 m	18.49 m	-	346

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



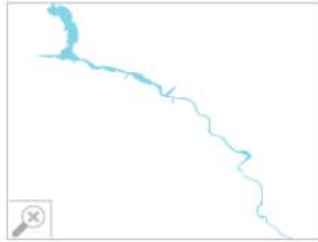
Plot T-13-21

**BIOBASE**

**VEGETATION ANALYSIS REPORT**

**Noxon Reservoir, Sanders County Montana** Generated: 8/1/2013 2:22:45 PM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres) [report](#)

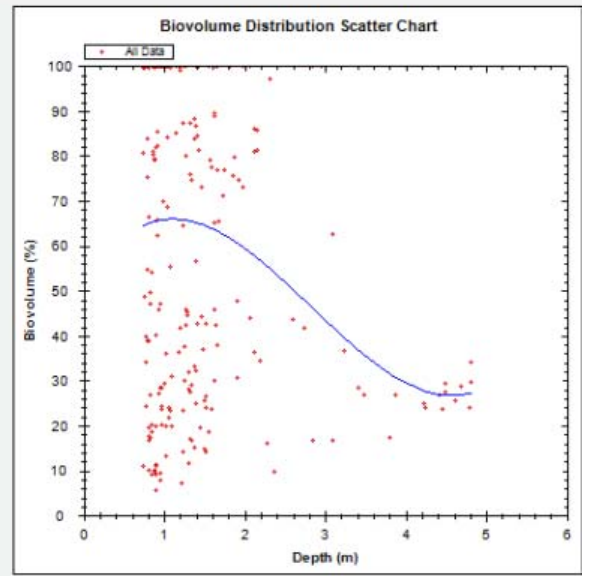


<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 1.54 ha (3.80 acres)	<b>Average Water Temperature</b> 25.79° C (78.42° F)
<b>Data Collection Date</b> 7/23/2013 10:39:41 PM (UTC)	Percent: 0.05% of waterbody Volume: 18,604.00 cu. m (15.10 acre ft)	<b>Location</b> Start: 47.82943726, -115.55797577 End: 47.83123016, -115.55854034

**Area of Interest Summary**

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	90.5%	62%	±34.1%	56.1%	±37.2%	0.36-5.07 m	1.18 m	378.55 m	274
	Grid	100%	57.2%	±24.7%	57.2%	±24.7%	0-4.82 m	1.09 m	-	594

**Vegetation Biovolume Heat Map** **Biovolume Distribution Scatter Chart**



**Biovolume Analysis by Quantity**

Plot T-13-25



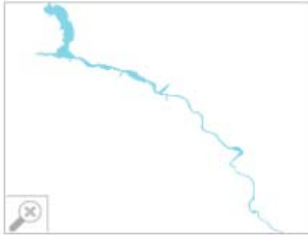
VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 1:35:05 AM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres)

[report link](#)



**Data Collector**  
Thomas McNabb

**Survey Size**

Area: 3.46 ha  
(8.60 acres)

**Average Water Temperature**

24.34° C (75.81° F)

**Data Collection Date**

7/24/2013 5:52:39 PM (UTC)

Percent: 0.11% of waterbody

Volume: 52,193.00 cu. m  
(42.30 acre ft)

**Location**

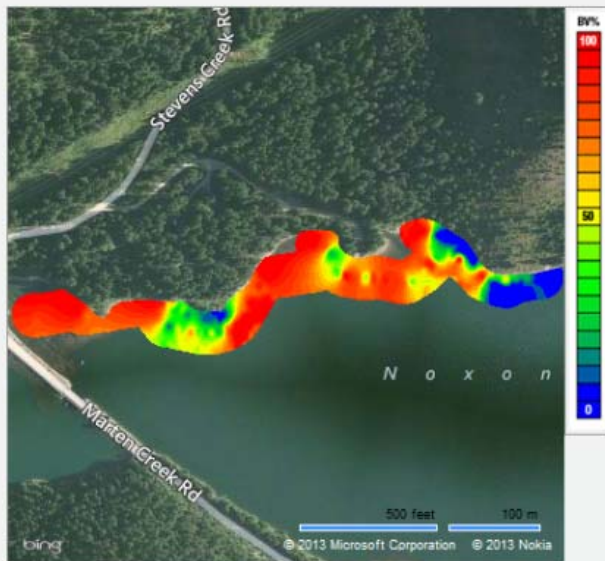
Start: 47.88171005, -115.74265289

End: 47.8816185, -115.74314117

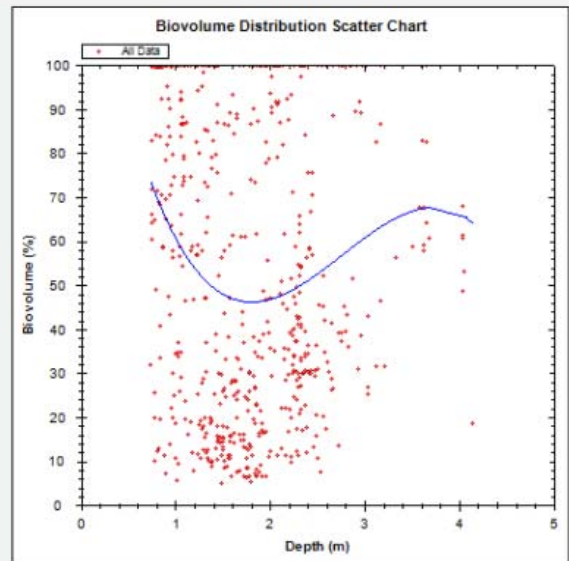
Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	84%	53.8%	±33.2%	45.2%	±36.3%	0.38-6.08 m	1.61 m	1.33 km	693
	Grid	92.2%	72.1%	±23.4%	66.5%	±29.7%	0-9.04 m	1.41 m	-	843

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Plot T-13-26



VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 2:48:04 PM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres)

[report link](#)



**Data Collector**  
Thomas McNabb

**Survey Size**  
Area: 3.61 ha (8.90 acres)

**Average Water Temperature**  
25.69° C (78.24° F)

**Data Collection Date**  
7/23/2013 11:54:08 PM (UTC)

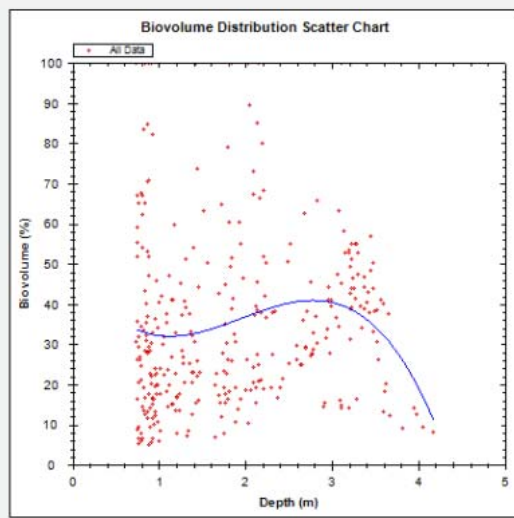
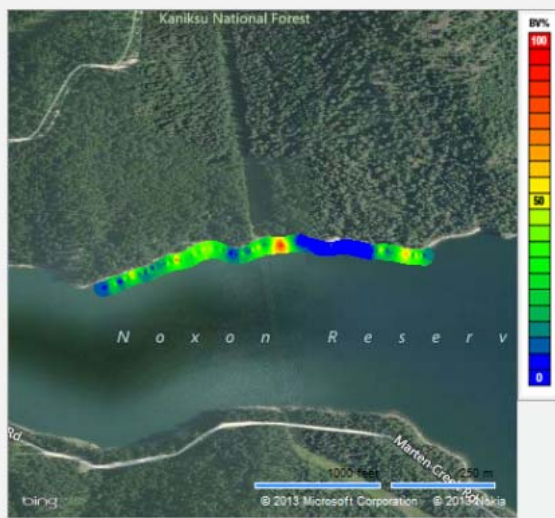
**Percent:** 0.11% of waterbody  
**Volume:** 85,133.00 cu. m (69.00 acre ft)

**Location**  
Start: 47.88191605, -115.72554016  
End: 47.88121033, -115.73638153

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	54%	35.1%	±21.8%	19%	±23.7%	0.51-6.01 m	2.41 m	845.52 m	604
	Grid	81%	27.7%	±15.3%	22.4%	±17.5%	0.01-7.3 m	2.09 m	-	891

Vegetation Biovolume Heat Map      Biovolume Distribution Scatter Chart



Plots T-13-27



VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 12:34:06 AM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres)

[report link](#)

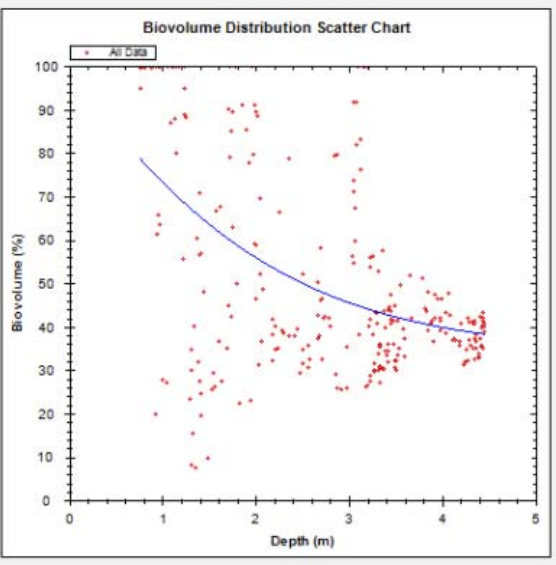
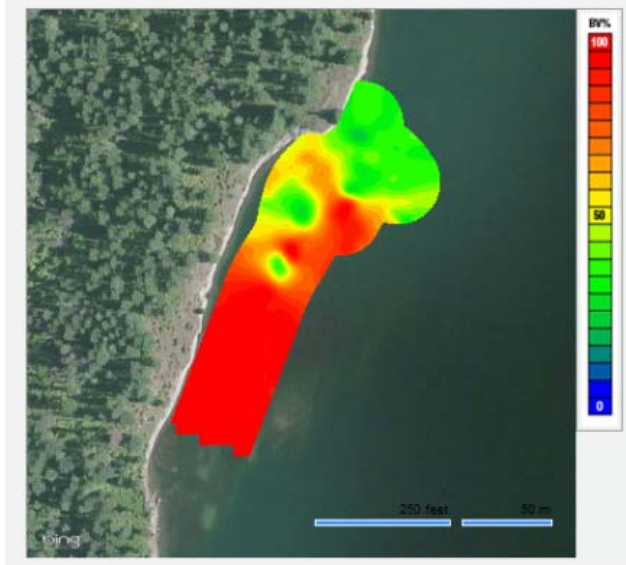


<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 1.79 ha (4.40 acres)	<b>Average Water Temperature</b> 26.63° C (79.94° F)
<b>Data Collection Date</b> 7/23/2013 11:19:14 PM (UTC)	<b>Percent</b> 0.06% of waterbody	<b>Location</b> Start: 47.89736557, -115.70691681 End: 47.89706421, -115.70662689
	<b>Volume</b> 24,839.00 cu. m (20.10 acre ft)	

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	95%	51.9%	±25%	49.3%	±26.8%	0.39-4.54 m	2.39 m	448.08 m	280
	Grid	100%	72.6%	±25.3%	72.6%	±25.3%	0.1-4.45 m	1.44 m	-	292

Vegetation Biovolume Heat Map      Biovolume Distribution Scatter Chart



Biovolume Analysis by Quantity

## Plot T-13-28(a)



**VEGETATION ANALYSIS REPORT**

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**Noxon Reservoir, Sanders County Montana**
Generated: 9/23/2013 10:13:14 PM (UTC)

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Waterbody Size: 3,241.65 ha (8,010.30 acres)
[report link](#)



<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 7.75 ha (19.16 acres) Percent: 0.24% of waterbody Volume: 165,001.30 cu. m (133.77 acre ft)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m
<b>Data Collection Date</b> 7/31/2013 4:38:34 PM (UTC)	<b>Average Water Temperature</b> 24.26° C (75.67° F)	
<b>Location</b> Start: 47.90089798, -115.70613861 End: 47.90179443, -115.70614624		

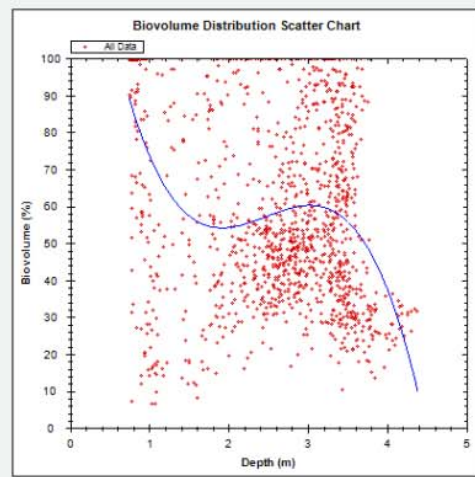
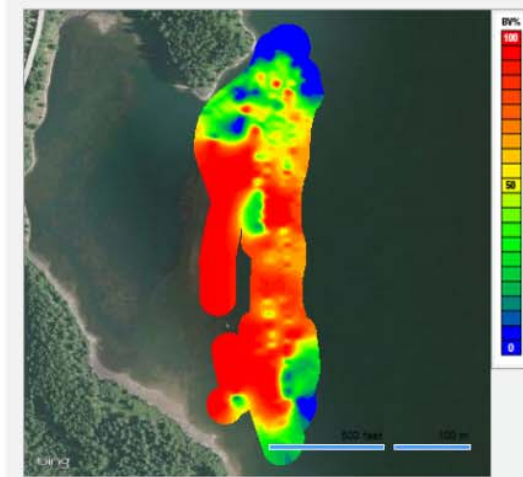
### Survey Summary

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
<b>Full Survey</b>	Point	89.8%	61.2%	±26.7%	55%	±31.4%	0.36-5.45 m	2.3 m	3.89 km	1,506
	Grid	94.3%	69.2%	±27.5%	65.3%	±31.2%	0.1-5.65 m	2.07 m	-	1,748

### Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
<b>1</b>	Point	85.5%	38.8%	±19.4%	33.2%	±22.5%	2.16-5.45 m	3.73 m	101.42 m	145
	Grid	93.4%	47.8%	±28.1%	44.7%	±29.6%	0.82-5.65 m	3.37 m	-	152
<b>2</b>	Point	90.8%	56.3%	±27.5%	51.1%	±30.9%	0.39-3.85 m	1.73 m	783.86 m	206
	Grid	93.1%	68%	±27.7%	63.3%	±31.8%	0.1-4.35 m	1.67 m	-	568
<b>3</b>	Point	84.2%	71.1%	±31.5%	59.9%	±38.8%	0.45-4.54 m	1.85 m	551.55 m	203
	Grid	93.8%	75.7%	±30.2%	71%	±34.5%	0.1-4.22 m	1.46 m	-	640
<b>4</b>	Point	91.4%	63.5%	±24.5%	58%	±29.4%	0.36-4.41 m	2.4 m	1.78 km	952
	Grid	92.9%	64.1%	±26.4%	59.5%	±30.3%	0.1-5.65 m	2.38 m	-	1,291

Vegetation Biovolume Heat Map
Biovolume Distribution Scatter Chart



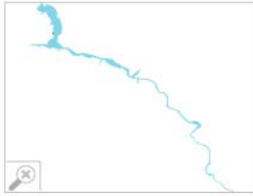
### Biovolume Analysis by Quantity

Plot T-13-28(b)\*

**dBIOBASE** VEGETATION ANALYSIS REPORT

**Noxon Reservoir, Sanders County Montana** Generated: 9/23/2013 10:04:55 PM (UTC)

Waterbody Size: 3,241.65 ha (8,010.30 acres) [report](#)



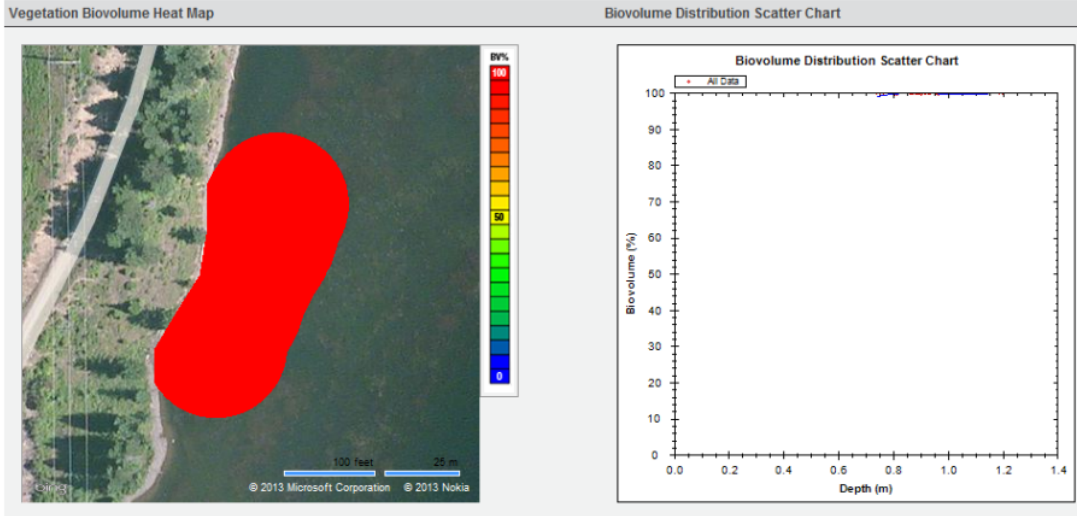
<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 4.68 ha (11.56 acres)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m
<b>Data Collection Date</b> 7/24/2013 6:15:25 PM (UTC)	Percent: 0.14% of waterbody Volume: 59,293.80 cu. m (48.07 acre ft)	
<b>Average Water Temperature</b> 26.04° C (78.88° F)		
<b>Location</b> Start: 47.90517807, -115.70928666 End: 47.90398788, -115.71079254		

**Survey Summary**

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full Survey	Point	100%	99.9%	±0%	99.9%	±0%	0.31-3.64 m	1.51 m	1.29 km	65
	Grid	100%	99.9%	±0%	99.9%	±0%	0.02-1.2 m	0.65 m	-	344

**Area of Interest Summary**

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	100%	99.9%	±0%	99.9%	±0%	0.37-1.21 m	0.69 m	211.51 m	65
	Grid	100%	99.9%	±0%	99.9%	±0%	0.02-1.2 m	0.65 m	-	344



\*Due to the dense growth of EWM in this site, the Echosounder System was unable to penetrate and collect all of the data.

Plot T-13-30



VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 9/23/2013 11:22:32 PM (UTC)

Waterbody Size: 3,241.65 ha (8,010.30 acres)

[report link](#)



<b>Data Collector</b> Thomas McIabb	<b>Survey Size</b> Area: 28.81 ha (71.20 acres)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m
<b>Data Collection Date</b> 7/25/2013 7:40:14 AM (UTC)	<b>Percent</b> 0.09% of waterbody	
<b>Average Water Temperature</b> 24.08° C (75.34° F)	<b>Volume</b> 374,301.40 cu. m (303.45 acre ft)	
<b>Location</b> Start: 47.94509506, -115.7088623 End: 47.94442368, -115.70883179		

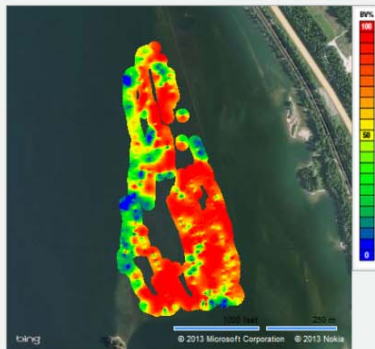
Survey Summary

Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full Survey	Point 92.1%	71.4%	±30.5%	65.7%	±35%	0.35-8.38 m	1.12 m	13.06 km	3,325
	Grid 98.5%	68.5%	±27%	67.5%	±28.1%	0.32-8.32 m	1.22 m	-	8,475

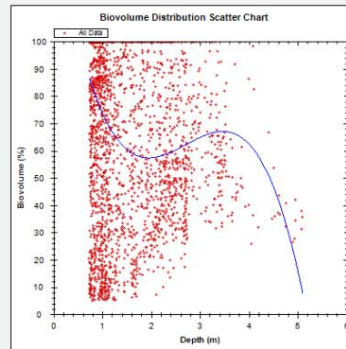
Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	81.5%	71%	±38.1%	57.9%	±44.1%	0.39-0.88 m	0.74 m	188.99 m	27
	Grid	100%	78.7%	±22.7%	78.7%	±22.7%	0.39-1.08 m	0.7 m	-	296
2	Point	87.8%	69.9%	±35.6%	61.4%	±40.5%	0.39-1.24 m	0.73 m	1.12 km	197
	Grid	99.9%	76.8%	±22.1%	76.7%	±22.2%	0.42-5.87 m	0.81 m	-	1,328
3	Point	94.1%	81.8%	±29.6%	77%	±34.6%	0.39-3.61 m	0.8 m	2.16 km	493
	Grid	99.9%	77.4%	±23.1%	77.3%	±23.2%	0.4-6.04 m	0.86 m	-	2,429
4	Point	92.9%	76.3%	±29.2%	70.9%	±34.3%	0.37-5.22 m	1.08 m	2 km	932
	Grid	99.8%	75.2%	±22.2%	75.1%	±22.4%	0.32-7.23 m	1.04 m	-	2,871
5	Point	100%	79.7%	±35%	79.7%	±35%	0.47-0.78 m	0.64 m	11.83 m	4
	Grid	100%	60.4%	±20.8%	60.4%	±20.8%	0.42-2.02 m	0.86 m	-	84
6	Point	98.6%	82.6%	±22.7%	81.5%	±24.5%	0.46-1.19 m	0.73 m	632.81 m	74
	Grid	100%	74.2%	±24.3%	74.2%	±24.3%	0.44-1.64 m	0.79 m	-	661
7	Point	96.7%	79.8%	±22.9%	77.1%	±26.7%	0.55-8.38 m	1.81 m	503.21 m	211
	Grid	99.1%	80%	±20.8%	79.3%	±22.1%	0.49-8.32 m	1.61 m	-	847
8	Point	97.8%	72.2%	±26.5%	70.6%	±28.3%	0.4-3.64 m	1.53 m	1.17 km	544
	Grid	99.7%	75.6%	±23%	75.3%	±23.4%	0.46-6.98 m	1.42 m	-	1,253
9	Point	85.9%	55%	±29.7%	47.3%	±33.6%	0.35-6.88 m	1.32 m	3.77 km	843
	Grid	96.6%	55.6%	±27.8%	53.7%	±29.1%	0.32-7 m	1.4 m	-	3,355

Vegetation Biolume Heat Map



Biolume Distribution Scatter Chart



Biolume Analysis by Quantity

AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
1	18.52%	14.81%	11.11%	0%	3.7%	51.85%
2	12.18%	15.23%	9.14%	5.58%	6.09%	51.78%
3	5.88%	8.92%	4.87%	5.48%	7.91%	67.14%
4	7.08%	4.94%	11.05%	10.94%	10.19%	55.79%
5	1.35%	1.35%	6.76%	10.81%	8.11%	71.62%
6	3.32%	0%	8.06%	16.11%	14.69%	57.82%
7	2.21%	5.88%	7.9%	17.65%	20.59%	45.77%
8	14.12%	11.27%	20.4%	19.93%	11.63%	22.66%

Biolume Analysis by Depth



Plot T-13-31(a)



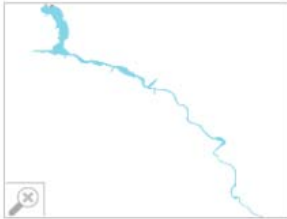
VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 4:06:40 AM (UTC)

Waterbody Size: 3,229.58 ha (7,980.90 acres)

[report link](#)



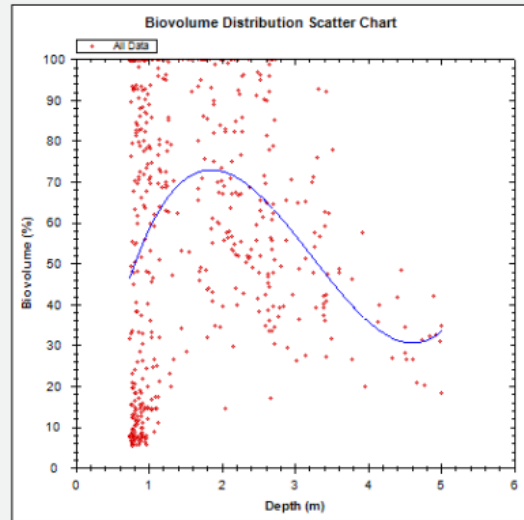
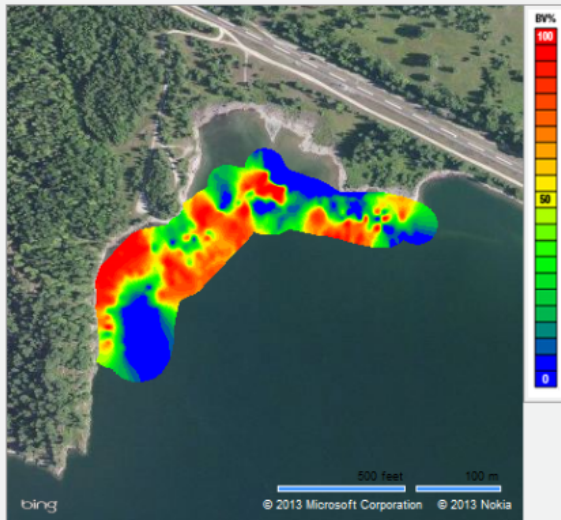
<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 4.78 ha (11.80 acres)	<b>Average Water Temperature</b> 23.14° C (73.65° F)
<b>Data Collection Date</b> 7/25/2013 1:25:31 PM (UTC)	<b>Percent</b> 0.15% of waterbody	<b>Location</b>
	<b>Volume</b> 94,918.00 cu. m (77.00 acre ft)	<b>Start</b> : 47.95952988, -115.71844482
		<b>End</b> : 47.96015167, -115.72176361

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	72.3%	58.2%	±32.5%	42.1%	±38%	0.35-8.45 m	1.71 m	2.16 km	755
	Grid	81.1%	53.4%	±28.2%	43.3%	±32.9%	0.02-8.3 m	1.95 m	-	1,210

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart



Biovolume Analysis by Quantity

AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
1	27.68%	14.3%	9.8%	12.19%	12.19%	23.84%

Plot T-13-31(b)



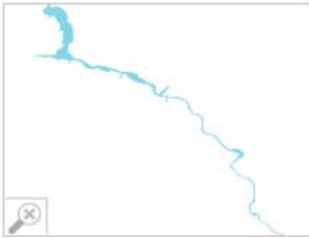
VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 8/2/2013 4:01:14 AM (UTC)

Waterbody Size: 3,229.58 ha (7,980.50 acres)

[report link](#)



Data Collector  
Thomas McNabb

Survey Size

Area: 1.35 ha  
(3.30 acres)

Average Water Temperature

23.39° C (74.11° F)

Data Collection Date

7/25/2013 1:48:21 PM (UTC)

Percent: 0.04% of waterbody

Volume: 58,293.00 cu. m  
(47.30 acre ft)

Location

Start: 47.95667267, -115.72455597

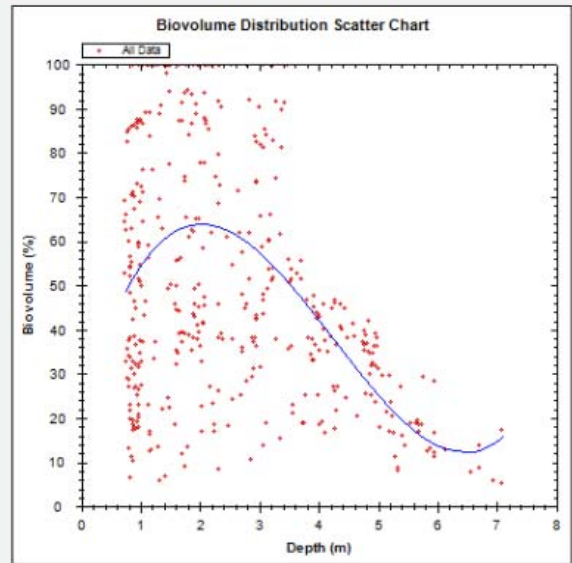
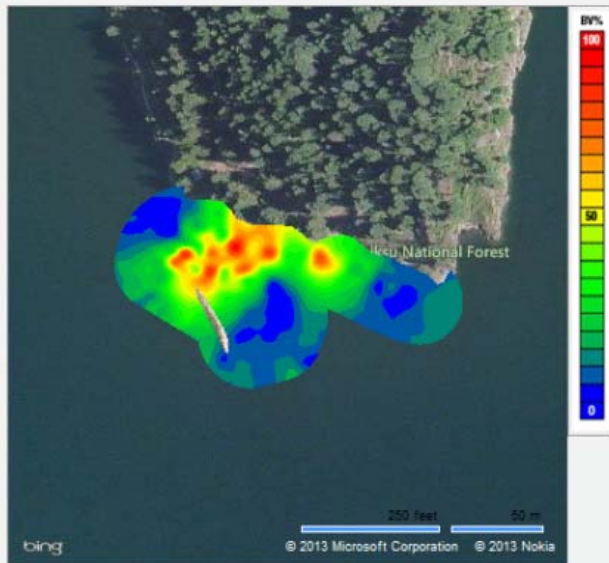
End: 47.95684814, -115.72650146

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	75.5%	50.1%	±28.8%	37.8%	±33%	0.41-12.36 m	3.68 m	537.41 m	576
	Grid	89.2%	26.9%	±20.8%	24%	±21.3%	0.02-11.78 m	4.13 m	-	332

Vegetation Biovolume Heat Map

Biovolume Distribution Scatter Chart



Biovolume Analysis by Quantity

Plot T-13-32



VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 9/23/2013 10:06:42 PM (1)

Waterbody Size: 3,241.65 ha (8,010.30 acres)

[report](#)



<b>Data Collector</b> Thomas McNabb	<b>Survey Size</b> Area: 9.24 ha (22.83 acres) Percent: 0.29% of waterbody Volume: 525,668.50 cu. m (426.17 acre ft)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m
<b>Data Collection Date</b> 7/24/2013 4:00:33 PM (UTC)		
<b>Average Water Temperature</b> 23.9° C (75.02° F)		
<b>Location</b> Start: 47.85894012, -115.65982819 End: 47.85909271, -115.66033936		

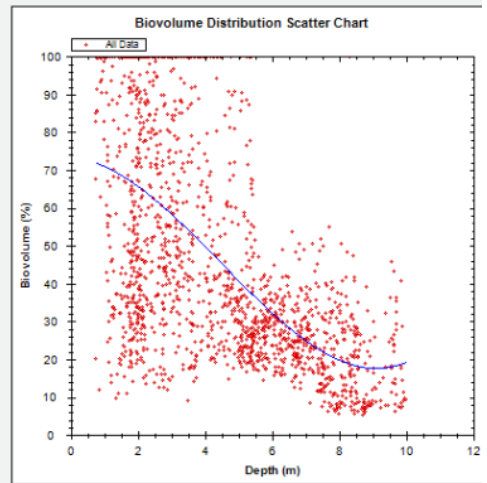
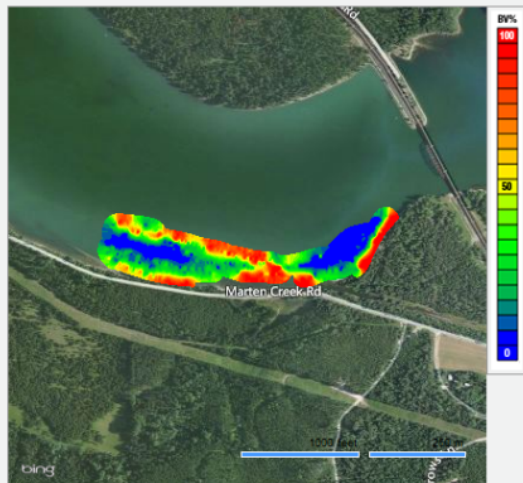
Survey Summary

Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points	
Full Survey	Point	69.1%	45.9%	±29.6%	31.7%	±32.5%	0.4-17.44 m	5.73 m	5.08 km	2,508
	Grid	79.8%	44.1%	±28%	35.2%	±30.7%	0-17.85 m	5.69 m	-	2,702

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	80.2%	59.3%	±28.2%	47.5%	±34.6%	0.43-17.44 m	4.84 m	1.39 km	908
	Grid	75.2%	48.7%	±27.1%	36.6%	±31.5%	0-17.85 m	6.12 m	-	1,273
2	Point	80.4%	49.5%	±26.8%	39.8%	±31%	0.4-11.84 m	4.01 m	534.93 m	332
	Grid	91.7%	43.3%	±23.7%	39.7%	±25.6%	0-12.32 m	4.64 m	-	782
3	Point	58.3%	31.5%	±25%	18.3%	±24.6%	0.5-12.75 m	6.86 m	2.69 km	1,268
	Grid	75.4%	39.7%	±27.8%	29.9%	±29.6%	0-17.6 m	5.96 m	-	2,115

Vegetation Biovolume Heat Map      Biovolume Distribution Scatter Chart



Biovolume Analysis by Quantity

Plot T-13-0903



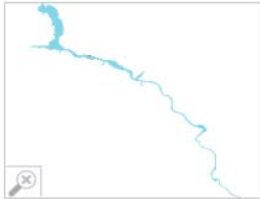
VEGETATION ANALYSIS REPORT

Noxon Reservoir, Sanders County Montana

Generated: 9/23/2013 10:11:34 PM (UTC)

Waterbody Size: 3,241.65 ha (8,010.30 acres)

[report link](#)



<b>Data Collector</b> Thomas McNabb  <b>Data Collection Date</b> 7/31/2013 7:17:17 PM (UTC)  <b>Average Water Temperature</b> 26.27° C (79.29° F)  <b>Location</b> Start: 47.86210251, -115.64325714 End: 47.86170578, -115.63846588	<b>Survey Size</b> Area: 3.04 ha (7.50 acres) Percent: 0.09% of waterbody Volume: 29,209.10 cu. m (23.68 acre ft)	<b>Settings</b> Track Buffer: 25 m Grid Cell Size: 5 m Min. BV Detect: 5% Min. Veg Depth Detect: 0.73152 m
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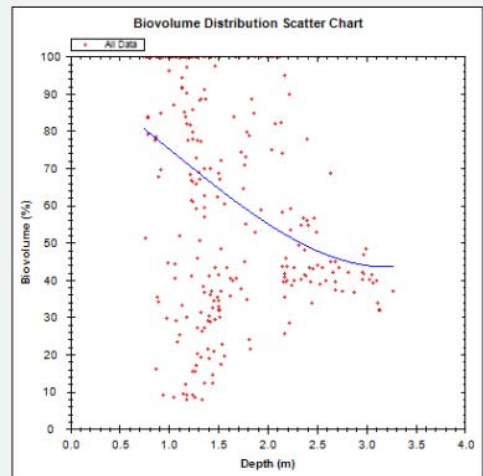
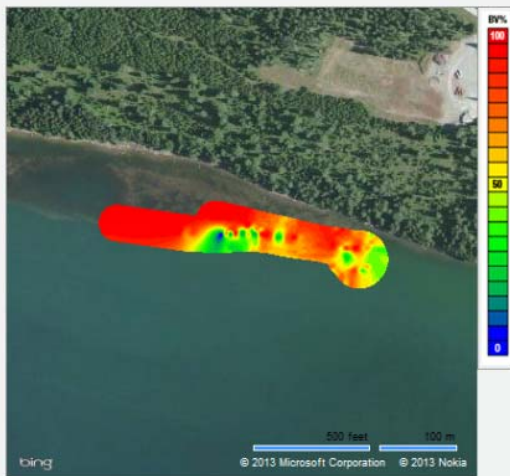
Survey Summary

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full Survey	Point	92.2%	65.1%	±30.2%	60.1%	±33.9%	0.36-3.4 m	1.12 m	763.74 m	322
	Grid	100%	74.4%	±22.2%	74.4%	±22.2%	0.3-3.03 m	0.94 m	-	715

Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	89.5%	60%	±32.4%	53.7%	±35.7%	0.36-1.64 m	0.79 m	365.79 m	105
	Grid	100%	76.1%	±24.4%	76.1%	±24.4%	0.34-1.48 m	0.8 m	-	450
2	Point	93.5%	67.5%	±28.9%	63.2%	±32.5%	0.41-3.4 m	1.48 m	370.12 m	217
	Grid	100%	70.3%	±19.1%	70.3%	±19.1%	0.3-3.03 m	1.03 m	-	449

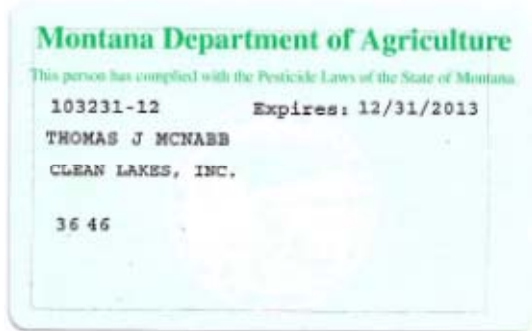
Vegetation Biovolume Heat Map      Biovolume Distribution Scatter Chart



Biovolume Analysis by Quantity

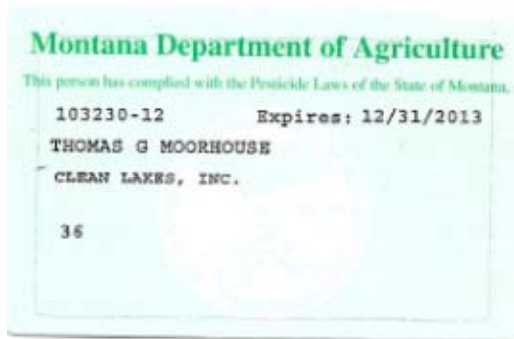
**LIST OF PROJECT PERSONNEL**

**PROJECT DIRECTOR:**



Thomas J. McNabb  
Montana Licensed Applicator  
Applicators License No. 103231-12  
Cell Phone: 208-929-2748  
Email: [tmcnabb@cleanlake.com](mailto:tmcnabb@cleanlake.com)

**PROJECT MANAGER**



Thomas G. Moorhouse  
Montana Licensed Applicator  
Applicators License No. 103230-12  
Cell Phone: 208-929-2757  
Email: [tmoorhouse@cleanlake.com](mailto:tmoorhouse@cleanlake.com)

**SITE SAFETY AND HEALTH OFFICER:**

Thomas G. Moorhouse  
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**END OF AQUATIC PESTICIDE APPLICATION REPORT**