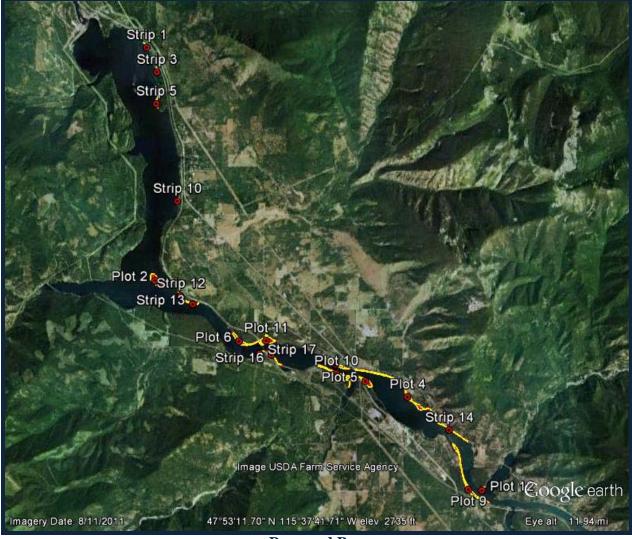
### NOXON RAPIDS RESERVOIR SANDERS COUNTY, MONTANA

### 2012 AIS Aquatic Pesticide Application Report (APAR)



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www.cleanlake.com

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September 2012

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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 (Permit related information is included in the Noxon Rapids Reservoir, Sanders County, Montana, 2012 AIS Aquatic Pesticide Application Plan (APAP)<sup>1</sup> on file with Sanders County).

On August 9, 2012 at approximately 10:00 AM, a Pre-Treatment meeting was held at the Trout

Creek Boat Launch facility. Representatives from Avista, the local BASS Club, CLI, the Montana Department of Agriculture, Montana State University Extension, Noxon Cabinet Shoreline Coalition, Sanders County Aquatic Invasive



Plant Task Force, and the local news media were in attendance.

A review of the Aquatic Pesticide Application Plan (APAP), the Montana Department of

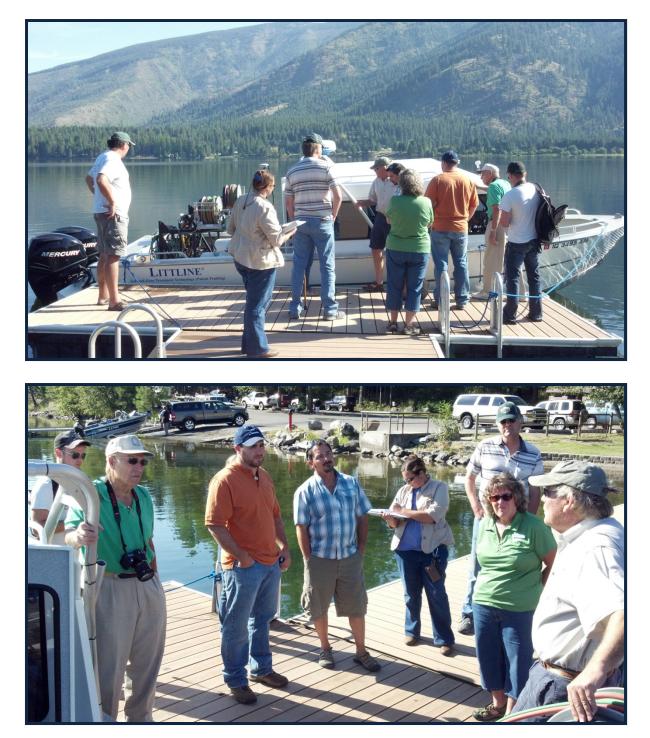


Environmental Quality Permits, the Site Specific Safety Plan and Spill Response equipment on site, and the general approach for the aquatic herbicide applications was discussed.

<sup>1</sup> Noxon Rapids Reservoir, Sanders County, Montana, 2012 AIS Aquatic Pesticide Application Plan (APAP)

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Following the land based discussions, a boat tour of some of the planned treatment sites was conducted.



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**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 up to 175 acres within pre identified areas of Noxon Rapids Reservoir.

**SUMMARY OF ACRES TREATED:** The plan consisted of treating 142.6 acres in Block Plots, and 20 acres in Strip Plots, for a total of 162.6 acres, or 1,402.20 acre feet (Block 1215.0, Strip 187.0). The Pre Treatment Plot surveys altered some of the plot sizes, and water depths were adjusted in the Plots based on water level conditions at the time of treatment. These adjustments resulted in the treatment of 153.1 acres in Block Plots, and 19.3 acres in Strip Plots, for a total of 172.4 acres, or 1,336.00 acre feet (Block 1,146.9, Strip 189.1).

**TREATMENT SCHEDULE:** The aquatic herbicide treatments were performed on August 9<sup>th</sup>, 13<sup>th</sup>, 14<sup>th</sup>, and 15<sup>th</sup>, 2012. To improve contact time of the aquatic herbicides for the treatment of Plot 2 that is located in an open water area of the reservoir, Avista was able to slow the water flows for a portion of the day on August 15<sub>th</sub>, (see Plot Aerials below).

**PRE-TREATMENT SURVEYS:** Sanders County hired a third party consultant to perform the 2012 pre-treatment surveys of Noxon Rapids Reservoir. The treatment area shapefiles were provided to CLI along with the "Guidance for Herbicide Use to Selectively Manage Eurasian watermilfoil and Curlyleaf Pondweed in Noxon Rapids Reservoir, Montana, 2012"<sup>2</sup>, Getsinger et al; "2012 Noxon Reservoir Herbicide Guidance Suggestions," July 2012, AquaTechnex LLC<sup>3</sup>; and "Recommendations for Aquatic Herbicide Applications, Noxon Rapids Reservoir 2012", Dr. Kurt Getsinger, U.S. Army Engineer Research and Development Center<sup>4</sup>.

<sup>&</sup>lt;sup>2</sup> Guidance for Herbicide Use to Selectively Manage Eurasian watermilfoil and Curlyleaf Pondweed in Noxon Rapids Reservoir, Montana, 2012, Getsinger et al;

<sup>&</sup>lt;sup>3</sup> 2012 Noxon Reservoir Herbicide Guidance Suggestions, July 2012, AquaTechnex LLC

<sup>&</sup>lt;sup>4</sup> Recommendations for Aquatic Herbicide Applications, Noxon Rapids Reservoir 2012, Dr. Kurt Getsinger, U.S. Army Engineer Research and Development Center

**EQUIPMENT USED:** Two of CLI's state-of-the-art Littoral Zone Treatment vessels (LittLines<sup>®</sup>) were used to perform the aquatic herbicide application. 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.



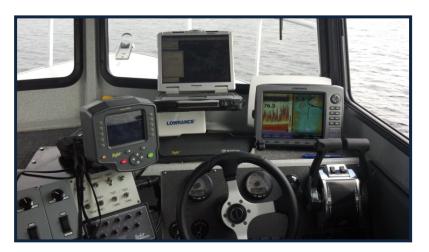






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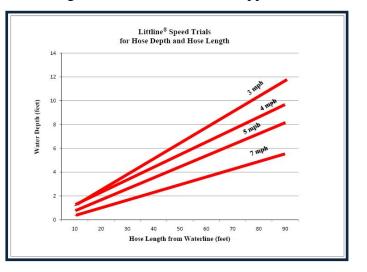
The AIS treatment area GIS shapefiles were loaded into the LittLine<sup>®</sup> computer system's for vessel guidance and herbicide application data recording. The treatment tracks were automatically recorded via the LittLine vessel's GPS guidance system for the production of the



final treatment area maps to document the treatment areas.

The patent pending 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. LittLine<sup>®</sup> Speed Trials were conducted for Hose Depth and Hose length



to support the LittLine<sup>®</sup> vessel operator adjust speed based on water depth in a specific treatment Plot (chart shown to the right, Speed Trials performed in Lake Coeur d'Alene, September 8, 2009, independent third party depth data collected by Jim Flodin, Divers West, CDA Idaho). The LittLine<sup>®</sup> hoses are electronically reeled in or reeled out based on the varying depths of the treatment Plots.

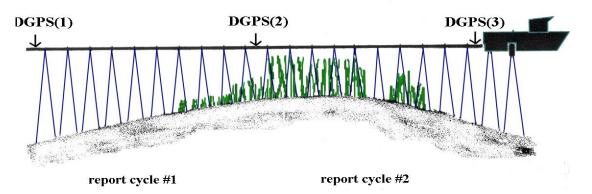
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The LittLine system's computerized rate controllers regulate the aquatic herbicide applications

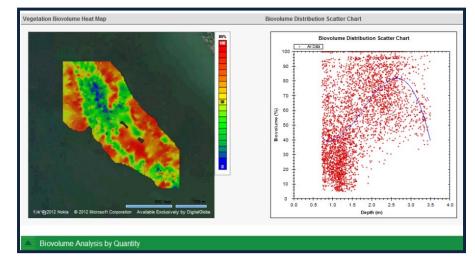


through preset treatment rates. When the vessel speeds up and or slows down, the rate controllers adjust the herbicide application rate to match the preset rate in gallons of product per acre.

**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 SAV data in the treatment plots. Data was collected to evaluate at time of treatment SAV coverage, height in the water column, and bio-



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volume to support post-treatment efficacy evaluations. An example of a SAV at time of treatment view from Plot 2, Noxon Rapids Reservoir is pictured above.

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, Reward 120 gallon, Triclopyr 265 and 250 gallon), and 2.5 gallons (Aquathol K) 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 endothall), Renovate 3<sup>®</sup> and Triclopyr 3<sup>®</sup> (liquid triclopyr), and Reward<sup>®</sup> (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 <u>http://www.cleanlake.com/2012noxonrapidsais.html</u> to provide project related information to the public.

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**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 that were used to generate the final 2012 Treatment Area Plots and Maps.

### TREATMENT SITE DATA:

2012 Nox	on Rapids	Reservoir I	Block Treatn	ient Data	Tri	clopyr Qty	En	dothall Qty
			Mean	Volume		Total		Total
	Plot		Depth	(Acre	Rate	Site	Rate	Site
Priority	Number	Acreage	(Feet)	Feet)	ppm	(Gal)	ppm	(GAL)
1	12	2.9	8.00	23			3.0	45
2	9	22.1	8.00	177	1.00	160	2.0	226
3	4	28.1	7.00	197	1.00	178	2.0	252
4	5	15.7	7.00	110	1.00	99	2.0	141
5	10	15.3	8.00	122	1.00	111	2.0	157
6	11	19.3	5.00	96	1.00	87	2.0	123
7	6	14.3	8.00	114	1.00	104	2.0	146
8	2	24.0	9.00	216	1.00	195	2.0	276
		141.7		1056		934		1366
Reserve								
12	8	11.4	8	91	1.00	83	2.0	117
Total		153.1		1146.9		1017		1483

<u>Table 1: Priority list of Large Stand Plots Treated on Noxon Rapids</u> <u>Reservoir, Treatment Site Data, Aquatic Herbicides Used, and Cost Data:</u>

Table 1 Notes:

- Application Rates in Large Stand Plots = Endothall 2 ppm, Triclopyr 1 ppm.
- Acreage, average depth and acre feet values were adjusted in some of the Plots based on the Treatment Survey results.
- The 2012 Treatment priority was based on treatment progressing in an upstream to downstream direction

2012 No	xon Rapid	<mark>s Reservoir</mark>	• Strip Treatmo	ent Data	Die	quat	End	lothall
			Mean	Volume		Qty		Qty
	Strip		Depth	(Acre	Rate	Site	Rate	Site
Priority	Number	Acreage	(Feet)	Feet)	ppm	(GAL)	ppm	(GAL)
1	14	2.7	8.00	21.6			3.0	41
2	16	3.5	8.00	28.0			3.0	54
3	17	1.0	6.00	6.0	0.37	3		
4	12	3.6	10.00	36.0			3.0	69
5	13	1.4	7.00	9.8	0.37	5		
6	10	1.5	11.00	16.5	0.37	8		
7	5	2.4	19.00	45.6	0.37	23		
8	3	1.2	8.00	9.6	0.37	5		
9	1	2.0	8.00	16.0	0.37	8		
Total		19.3		181.9		52		164

# Table 2: Priority list of Strip Plots Treated on Noxon Rapids Reservoir, Treatment Site Data, Aquatic Herbicides Used, and Cost Data

Table 2 Notes:

- Application Rates in Strip Plots = Endothall 3 ppm, Diquat 0.37 ppm
- Acreage, average depth and acre feet values were adjusted in some of the Plots based on the Treatment Survey results.
- The 2012 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

Table 3: Large Stand (Block) Plots Treated: Percent SAV Cover and SAV Bio-Volume at Time of Treatment Data

20		1	ervoir AIS B nd SAV Bio		
Priority	Plot Number	Acreage	SAV Percent Cover	SAV Bio- Volume	Date Data Collected
1	12	2.9	31.84	54.20	8/14/2012
2	9	22.1	N/A*	N/A*	8/13/2012
3	4	28.1	55.80	62.60	8/13/2012
4	5	15.7	50.30	74.80	8/13/2012
5	10	15.3	N/A*	N/A*	8/13/2012
6	11	19.3	79.50	69.90	8/9/2012
7	6	14.3	80.20	59.50	8/9/2012
8	2	24.0	79.90	56.20	8/15/2012
12	8	11.4	82.39	74.35	8/15/2012
	Average		69.42	64.51	
Total		153.1			

\* Block 9 & 10 SAV Percent Cover and Bio-Volume Data Not Available: Collection Error Due to Submerged Aquatic Vegetation Tangled on the Transducer Creating an Invalid Data Set

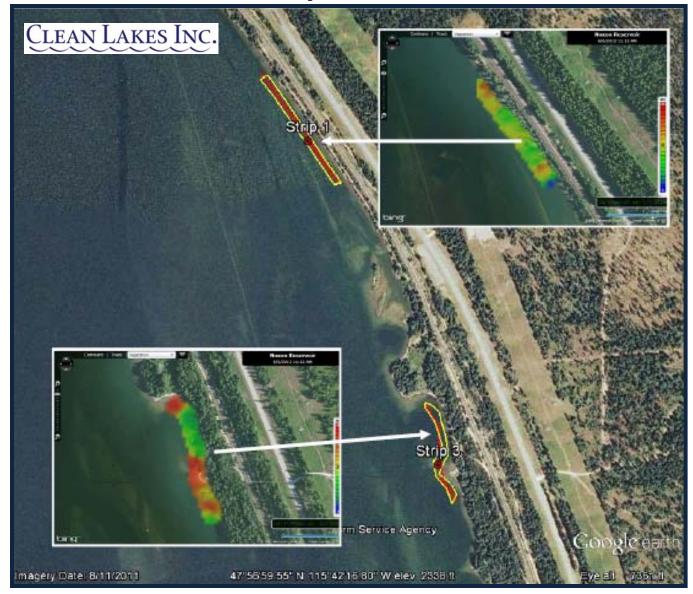
20		-	servoir AIS St and SAV BioV	-	
Priority	Strip Number	Acreage	SAV Percent Cover	SAV Bio- Volume	Date Data Collected
1	14	2.7	65.42	58.5	8/14/2012
2	16	3.5	42.25	80.4	8/14/2012
3	17	1.0	80.66	48.1	8/15/2012
4	12	3.6	78.11	50.2	8/14/2012
5	13	1.4	61.25	52.1	8/14/2012
6	10	1.5	84.40	66.7	8/14/2012
7	5	2.4	52.09	42.0	8/14/2012
8	3	1.2	59.69	52.4	8/14/2012
9	1	2.0	87.85	53.1	8/14/2012
	Average		67.97	55.9	
Total		19.3			

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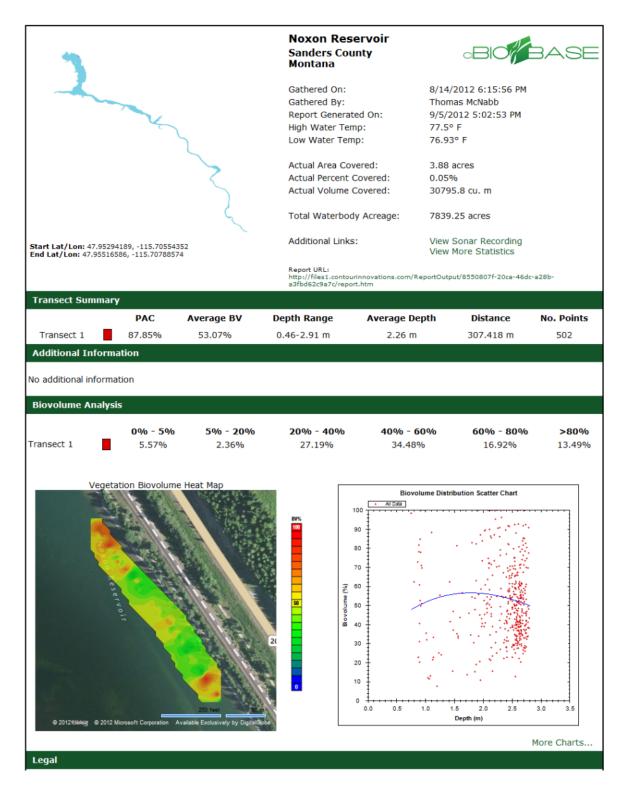
### **PROJECT AREA AERIALS**

### Strips Plots 1 & 3

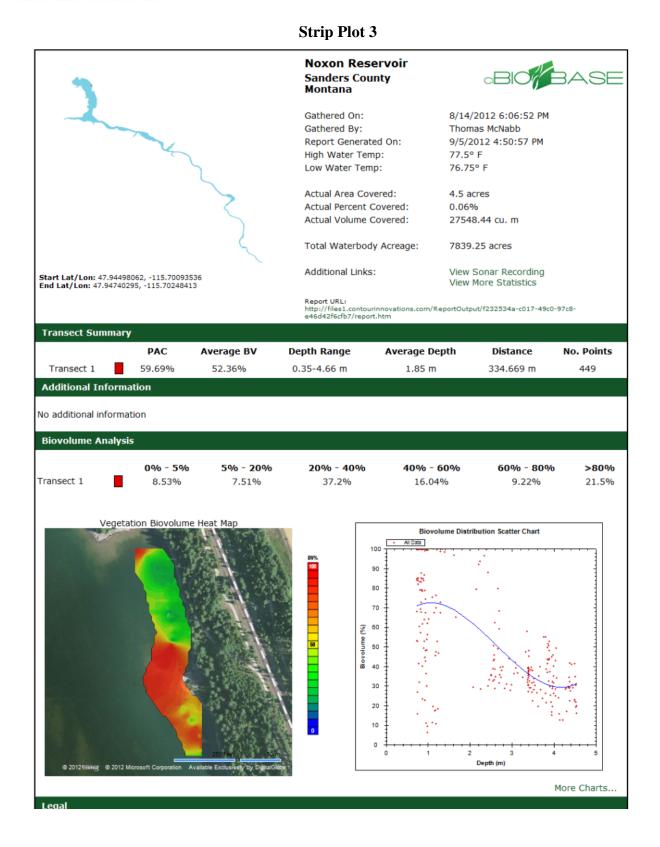


### SAV PERCENT COVER AND BIO-VOLUME DATA SETS

### **Strip Plot 1**

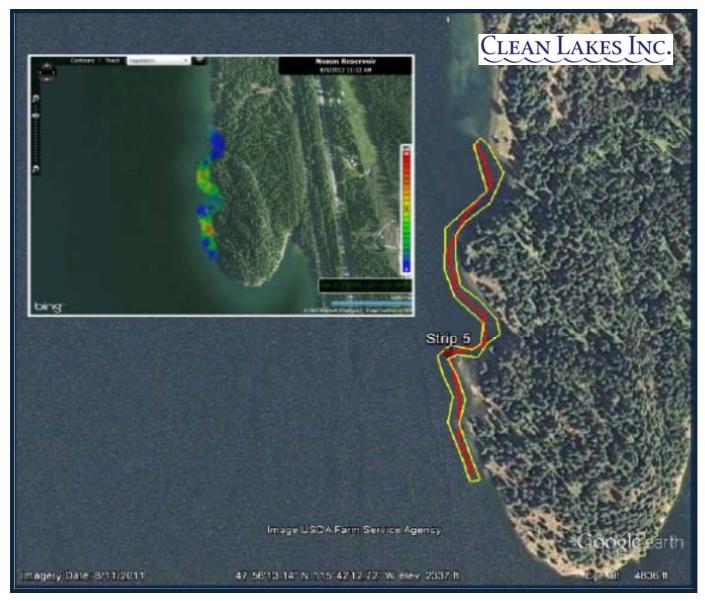


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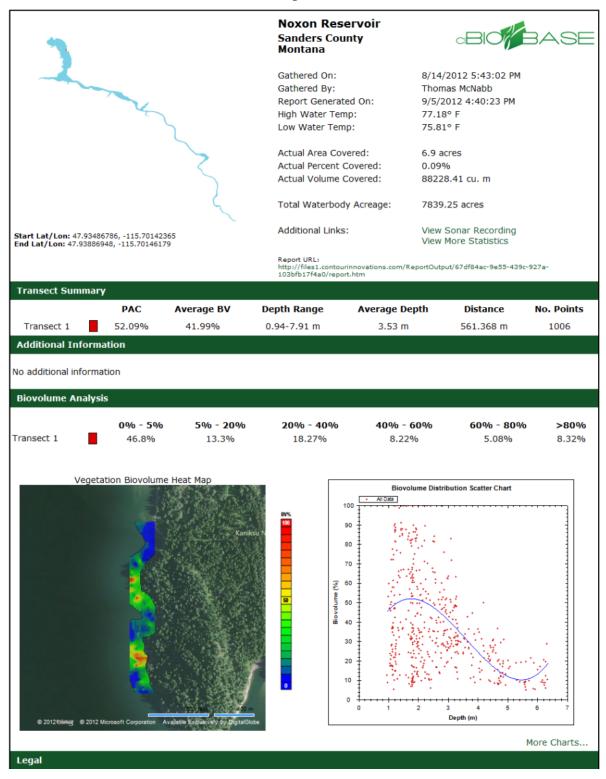
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**Strip Plot 5** 



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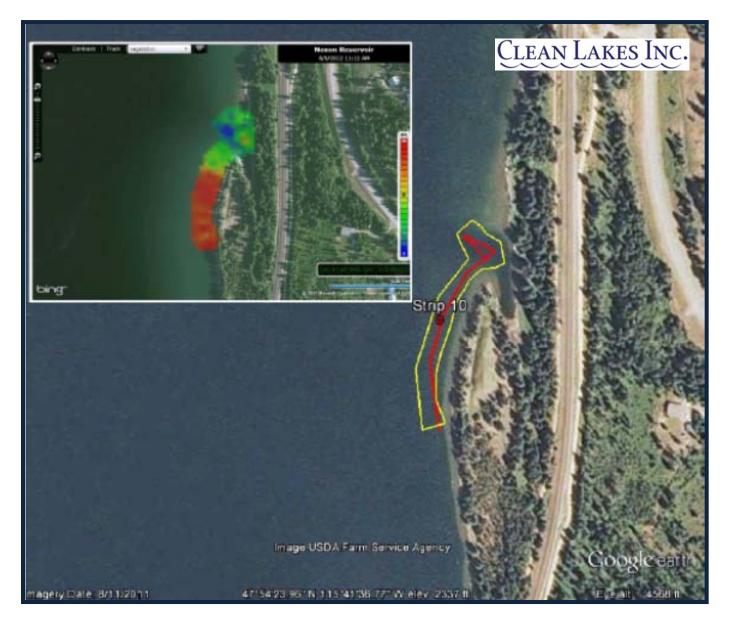
### SAV PERCENT COVER AND BIO-VOLUME DATA SET Strip Plot 5



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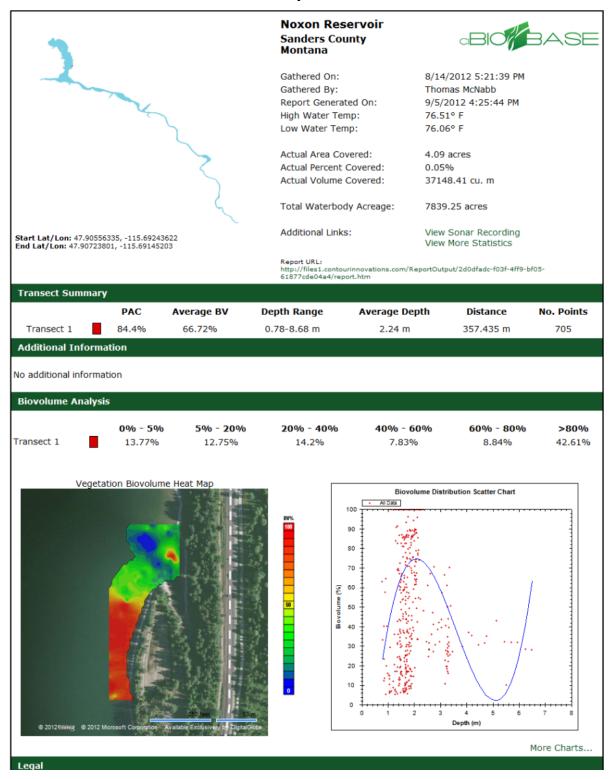


**Strip Plot 10** 



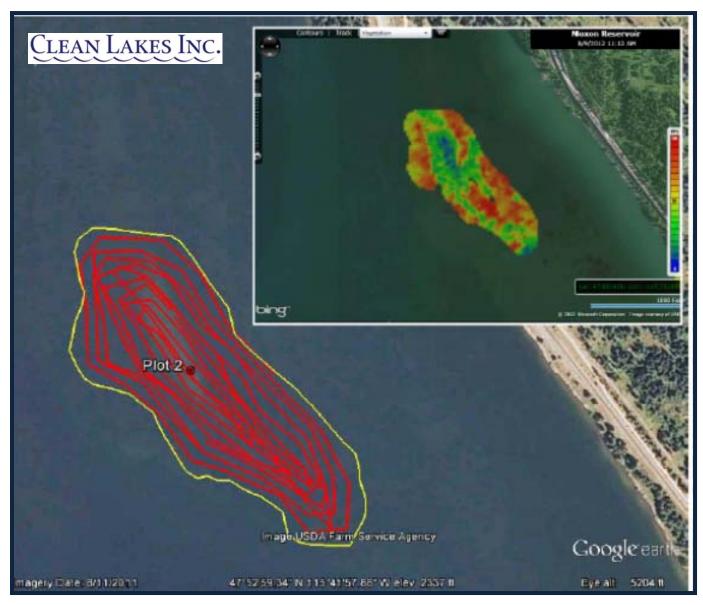
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### SAV PERCENT COVER AND BIO-VOLUME DATA SET Strip Plot 10



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**Block Plot 2** 

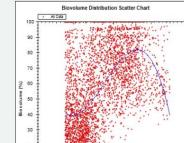


### SAV PERCENT COVER AND BIO-VOLUME DATA SET **Block Plot 2**

Voxo	n Rese	rvoir, Sa	nders Coun	ty Montana					G	ienerated: 9/13/20	012 8:57:39 PM (U
Vaterbo	dy Size: 3,17	72.43 ha (7,83	9.20 acres)								report
-			Data C	Collector		Survey Si	ze		Average	Water Temper	ature
_			Thoma	s McNabb		Area:	10.85 h		23.36° C	(74.05° F)	
		V.	Data C	Collection Date		Percent	(26.80	acres) of waterbody	Location	1	
		-	8/15/2	012 3:25:52 PM (UT	C)	Volume:	187,943	3.00 cu. m	Start:		-115.70071411
		~					(152.40	0 acre ft)	End:	47.88207245,	-115.70374298
		Immany	Ave Dife 2	SD RVn 2	Ava Blar 2	SD Pla	12	Denth Ranne	Áva Denth	Distance	No Points
Full	Type ? Point	PAC ? 79.9%	Avg BVp ?	SD BVp ? ±28%	Avg BVw ? 52.8%	SD BVv ±30.3%	_	Depth Range 0.37-4.16 m	Avg Depth 1.52 m	Distance 7.45 km	No. Points 5,005
Full	Type ? Point	PAC ?					_	10020			125522
Full Survey	Type ? Point Grid	PAC ? 79.9%	56.2% 57.3%	±28%	52.8%	±30.3%	_	0.37-4.16 m	1.52 m	7.45 km	5,005
Full Survey	Type ? Point Grid	PAC ? 79.9% 99.2%	56.2% 57.3%	±28%	52.8%	±30.3%		0.37-4.16 m	1.52 m	7.45 km	5,005
Full Survey	Type ? Point Grid Area of Int	PAC ? 79.9% 99.2% terest Sum	56.2% 57.3%	±28% ±22.5%	52.8% 56.9%	±30.3% ±23%	1?	0.37-4.16 m 0.35-3.96 m	1.52 m 1.59 m	7.45 km	5,005 3,797
Full Survey	Type ? Point Grid Area of Int Type ?	PAC ? 79.9% 99.2% terest Sum PAC ?	56.2% 57.3% htmary Avg BVp ?	±28% ±22.5% SD BVp ?	52.8% 56.9% Avg BVw ?	±30.3% ±23% SD BVw	1?	0.37-4.16 m 0.35-3.96 m Depth Range	1.52 m 1.59 m	7.45 km 	5,005 3,797 No. Points
Full Survey	Type ? Point Grid Area of Int Type ? Point	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1%	56.2% 57.3% Avg BVp ? 65.4%	±28% ±22.5% SD BVp ? ±21.1%	52.8% 55.9% Avg BVw ? 64.1%	±30.3% ±23% SD BVw ±22.8%	1?	0.37-4.16 m 0.35-3.96 m Depth Range 0.75-4.16 m	1.52 m 1.59 m Avg Depth 2.47 m	7.45 km - Distance 647.06 m	5,005 3,797 No. Points 549
Full Survey	Type ? Point Grid Area of Int Type ? Point Grid	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100%	56.2% 57.3% amary Avg BVp ? 65.4% 65.5%	±28% ±22.5% SD BVp ? ±21.1% ±18%	52.8% 56.9% Avg BVw ? 64.1% 65.5%	±30.3% ±23% SD BVw ±22.8% ±18%	1?	0.37-4.16 m 0.35-3.96 m Depth Range 0.75-4.16 m 0.73-3.96 m	1.52 m 1.59 m Avg Depth 2.47 m 2.27 m	7.45 km - Distance 647.06 m -	5,005 3,797 No. Points 549 1,069
Full Survey AOJ ? 1	Type ? Point Grid Area of Int Type ? Point Grid Point	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100% 98.8%	56.2% 57.3% Annary Avg BVp ? 65.4% 65.5% 66.9%	±28% ±22.5% SD BVp ? ±21.1% ±18% ±25.6%	52.8% 56.9% Avg BVw ? 64.1% 65.5% 66.5%	±30.3% ±23% SD BVw ±22.8% ±18% ±26.1%	1?	0.37-4.16 m 0.35-3.96 m Depth Range 0.75-4.16 m 0.73-3.96 m 0.6-3.05 m	1.52 m 1.59 m Avg Depth 2.47 m 2.27 m 1.9 m	7.45 km - Distance 647.06 m - 594.69 m	5,005 3,797 No. Points 549 1,069 495
Full Survey AOI ? 1 2	Type ? Point Grid Area of Int Type ? Point Grid Point Grid	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100% 98.8% 99.7%	56.2% 57.3% Avg BVp ? 65.4% 65.5% 66.9% 63%	+28% +22.5% SD BVp ? +21.1% +18% +25.6% +20.8%	52.8% 56.9% Avg BVw ? 64.1% 65.5% 66.5% 62.8%	±30.3% ±23% SD BVw ±22.8% ±18% ±26.1% ±21%	12	0.37-4.16 m 0.35-3.96 m 0.35-3.96 m 0.75-4.16 m 0.73-3.96 m 0.6-3.05 m 0.51-3.57 m	1.52 m 1.59 m Avg Depth 2.47 m 2.27 m 1.9 m 1.8 m	7.45 km - Distance 647.06 m - 594.69 m	5,005 3,797 No. Points 549 1,069 495 1,118
Full Survey AOI ? 1 2	Type ? Point Grid Area of Int Type ? Point Grid Point Grid Point	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100% 98.8% 99.7% 94.5%	56.2% 57.3% many Avg BVp ? 65.4% 65.5% 66.9% 63% 66.4%	+28% +22.5% SD BVp ? +21.1% +18% +25.6% +20.8% +25.2%	52.8% 56.9% Avg BVw ? 64.1% 65.5% 66.5% 62.8% 65.3%	±30.3% ±23% \$D BVw ±22.8% ±18% ±28.1% ±21% ±26.4%	13	0.37-4.16 m 0.35-3.96 m 0.35-3.96 m 0.75-4.16 m 0.73-3.96 m 0.6-3.05 m 0.51-3.57 m 0.48-3.71 m	1.52 m 1.59 m 2.47 m 2.27 m 1.9 m 1.8 m 1.77 m	7.45 km - Distance 647.06 m - 594.69 m - 1.21 km	5,005 3,797 No. Points 549 1,069 495 1,118 1,011
Full Survey AOI ? 1 2 3	Type ? Point Grid Area of Int Type ? Point Grid Point Grid Point Grid	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100% 98.8% 99.7% 94.5% 99.7%	56.2% 57.3% mary Avg BVp ? 65.4% 65.5% 66.9% 63% 66.4% 59.9%	+28% +22.5% SD BVp ? +21.1% +18% +25.6% +20.8% +25.2% +20.2%	52.8% 56.9% Avg BVw ? 64.1% 65.5% 66.5% 62.8% 62.8% 65.3% 59.7%	±30.3% ±23% \$D BVw ±22.8% ±18% ±26.1% ±21% ±26.4% ±20.5%	19	0.37-4.16 m 0.35-3.96 m 0.35-3.96 m 0.75-4.16 m 0.73-3.96 m 0.6-3.05 m 0.51-3.57 m 0.48-3.71 m 0.35-3.88 m	1.52 m 1.59 m 2.47 m 2.27 m 1.9 m 1.8 m 1.77 m 1.66 m	7.45 km - Distance 647.06 m - 594.69 m - 1.21 km	5,005 3,797 No. Points 549 1,069 495 1,118 1,011 2,020
Full Survey AOI ? 1 2 3	Type ? Point Grid Area of Int Type ? Point Grid Point Grid Point Grid Point	PAC ? 79.9% 99.2% terest Sum PAC ? 91.1% 100% 98.8% 99.7% 94.5% 99.7% 71.5%	56.2% 57.3% Avg BVp ? 65.4% 65.5% 66.9% 63% 66.4% 59.9% 53.2%	+28% +22.5% SD BVp ? +21.1% +18% +25.6% +20.8% +25.2% +20.2% +20.2% +27.1%	52.8% 56.9% Avg BVw ? 64.1% 65.5% 66.5% 62.8% 65.3% 59.7%	±30.3% ±23% \$D BVw ±22.8% ±18% ±26.1% ±26.1% ±21% ±26.4% ±20.5%	19	0.37-4.16 m 0.35-3.96 m 0.35-3.96 m 0.75-4.16 m 0.73-3.96 m 0.6-3.05 m 0.6-3.05 m 0.51-3.57 m 0.48-3.71 m 0.35-3.88 m 0.37-2.74 m	1.52 m 1.59 m <b>Avg Depth</b> 2.47 m 2.27 m 1.9 m 1.8 m 1.77 m 1.66 m 1.29 m	7.45 km - Distance 647.06 m - 594.69 m - 1.21 km - 2.52 km	5,005 3,797 No. Points 549 1,069 495 1,118 1,011 2,020 1,864



Vegetation Biovolume Heat Map



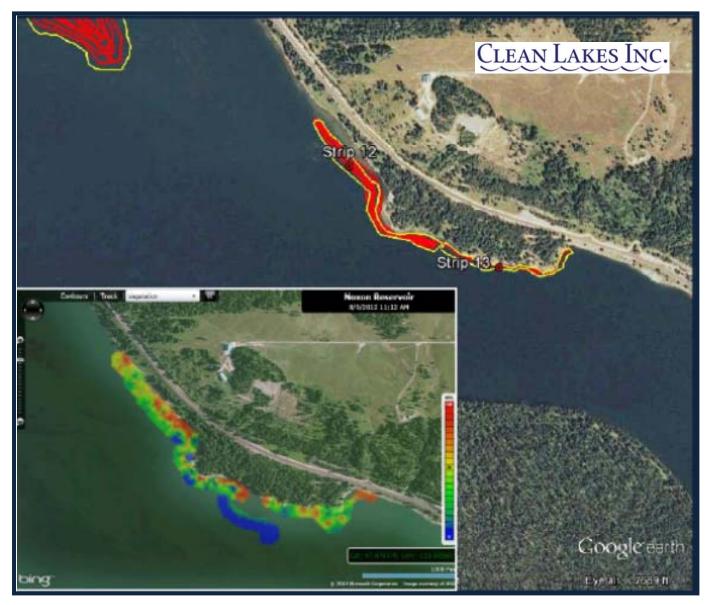
**Biovolume Distribution Scatter Chart** 

20 10 2.0 Depth (m) 0.0 0.5 2.5 3.0 3.5

01 ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
	1.96%	2.55%	9.22%	27.45%	32.94%	25.88%
2	0.61%	3.46%	13.62%	22.36%	25.61%	34.35%
3	1.65%	3.81%	14.42%	19.57%	25.03%	35.53%
4	4.65%	11.63%	23.66%	20.13%	19.57%	20.37%
5	16.57%	25.72%	28.71%	12.43%	7.42%	9.15%

NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA 2012 AIS Aquatic Pesticide Application Report (APAR) 20 of 41

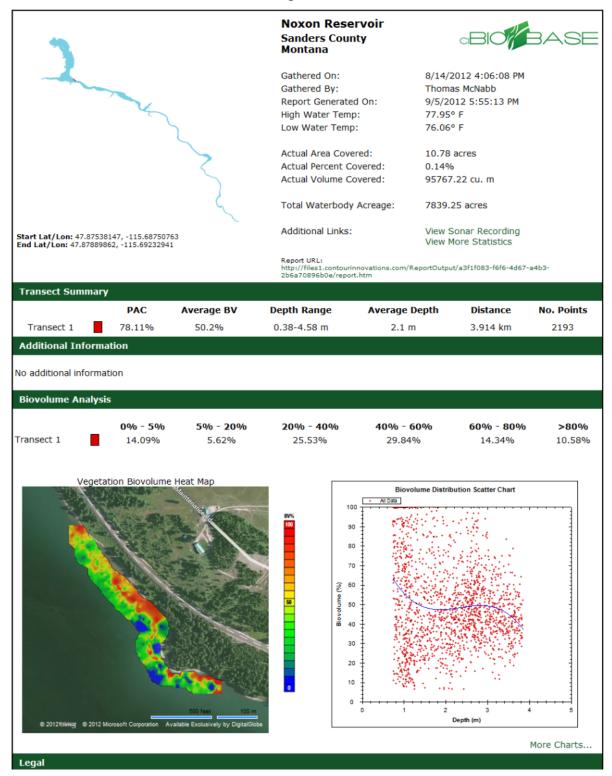
### Strips Plots 12 & 13



NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA 2012 AIS Aquatic Pesticide Application Report (APAR) 21 of 41

### SAV PERCENT COVER AND BIO-VOLUME DATA SETS

### Strip Plot 12



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### **Strip Plot 13**

	ASE		
			VEGETATION ANALYSIS REPORT
Noxon Reservoi	r, Sanders County Montana		Generated: 9/13/2012 9:24:46 PM (UTC)
Waterbody Size: 3,172.43 h	a (7,839.20 acres)		report link
	Data Collector	Survey Size	Average Water Temperature
	Thomas McNabb	Area: 3.67 ha	24.87° C (76.77° F)



Data Collection Date 8/14/2012 9:51:31 PM (UTC)

Survey S	ize
Area:	3.67 ha
	(9.10 acres)
Percent:	0.12% of waterbody
Volume:	194,557.00 cu. m
	(157.70 acre ft)

	e Water Temperature (76.77° F)	
ocatio	n	
tart:	47.87535858, -115.6819458	
nd:	47.87498856, -115.68421173	

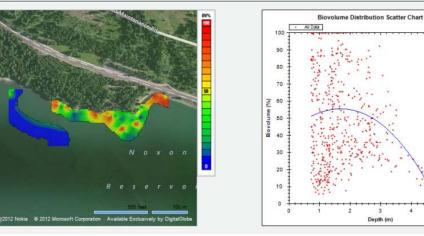
	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full	Point	49.5%	52%	±29.5%	28.8%	±33.9%	0.4-14.1 m	5.23 m	979.36 m	1,197
Survey	Grid	68%	41.5%	±23.4%	28.2%	±27.3%	0.01-14.39 m	5.3 m	-	1,097

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	86.6%	53.8%	±29.9%	48.6%	±32.5%	0.64-4.31 m	1.75 m	220.24 m	322
	Grid	99,7%	51.2%	±21.8%	51%	±21.9%	0.03-4.28 m	1.57 m	1993) 1993	315
2	Point	35.9%	50.4%	±29.2%	20.8%	±31.1%	0.4-14.1 m	6.51 m	759.12 m	875
	Grid	64,5%	37.4%	±20.8%	24.1%	±24.5%	0.01-14.39 m	5.72 m	151	989

Vegetation Biovolume Heat Map

### **Biovolume Distribution Scatter Chart**

3 Depth (m)



Biovolume Analysis by Quantity

01 ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
	9.71%	11.33%	28.8%	14.89%	11%	24.27%
2	58.74%	7.49%	10.38%	7.75%	6.7%	8.94%

Biovolume Analysis by Depth

NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA 2012 AIS Aquatic Pesticide Application Report (APAR) 23 of 41

# Block Plots 6 & 11 CLEAN LAKES INC lot 1 Plot,6 (eget) axon Reservo 18/2012 11:12 AM Imagery Date: 8/11.201

CLEAN LAKES INC.

NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA 2012 AIS Aquatic Pesticide Application Report (APAR) 24 of 41

### SAV PERCENT COVER AND BIO-VOLUME DATA SETS Block Plot 6

				VEGET	ATION ANALYSIS REPOR
Noxon Reservoir, S	anders County Montana			-	Generated: 9/14/2012 1:07:35 PM (UTC
Vaterbody Size: 3,172.43 ha (7,8	39.20 acres)				report.lin
*	Data Collector	Survey S	ize	Averag	e Water Temperature
1	Thomas McNabb	Area:	9.54 ha	25.35° (	C (77.63° F)
	Data Collection Date	Percent	(23.60 acres) 0.3% of waterbody	Locatio	n
	8/9/2012 6:12:17 PM (UTC)	Volume:	135,847.00 cu. m (110.10 acre ft)	Start: End:	47.86222839, -115.65416718 47.8635788, -115.66334534
and a second	8/9/2012 6:12:17 PM (UTC)		135,847.00 cu. m		

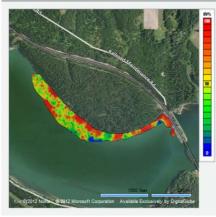
Su	vey	Su	mm	ary	

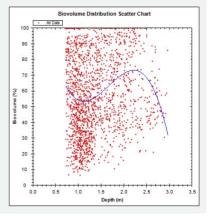
	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
	Point	80.2%	59.5%	±26.5%	55.4%	±29.6%	0.36-6.1 m	1.41 m	7.1 km	2,419
Survey	Grid	97.7%	62.1%	±23.6%	60.6%	±25.1%	0.01-6.09 m	1.32 m	-	3,242

### Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	88.5%	70.9%	±24.3%	67.8%	±27.7%	0.37-3.14 m	1.52 m	594.29 m	227
	Grid	97.8%	70.1%	±25.3%	68.6%	±27.1%	0.02-2.85 m	1.19 m	(R)	681
2	Point	82.7%	59.4%	±25.9%	57.5%	±27.6%	0.39-2.79 m	1.13 m	1.16 km	452
	Grid	99.5%	61.1%	±21.5%	60.8%	±21.9%	0.01-4.24 m	1.08 m	820	1,537
3	Point	81.9%	51.9%	±22%	44.6%	±27.2%	0.54-6.1 m	1.92 m	945.56 m	596
	Grid	96%	53.9%	±20.5%	51.8%	±22.7%	0.38-6.09 m	1.64 m	-	1,459
4	Point	76.7%	61.1%	±28.2%	58.3%	±30.3%	0.36-2.74 m	1.24 m	2.79 km	1,144
	Grid	99.2%	61.3%	±23.5%	60.8%	±24%	0.01-5.08 m	1.18 m	-	2,717







SD BVw ?

**Biovolume Distribution Scatter Chart** 

#### Biovolume Analysis by Quant

101 ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
	4.29%	0.95%	10.48%	24.29%	20.95%	39.05%
2	3.36%	5.68%	20.93%	22.48%	21.19%	26.36%
3	13.93%	5.64%	22.4%	29.28%	16.23%	12.52%
4	4.57%	6.96%	19.48%	21.33%	15.67%	31.99%

#### Biovolume Analysis by Depth

AOI ? Depth Type ? Count PAC ? Avg BVp ? SD BVp ? Avg BVw ?

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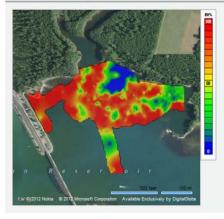
### **Block Plot 11**

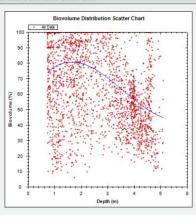
xon Re	servoir, Sa	inders Coun	ty Montana					G	enerated: 9/14/20	012 1:07:58 PM		
erbody Size	: 3,172.43 ha (7,83	9.20 acres)								repo		
-		Data C	ollector		Survey S	ize		Average	Water Temper	ature		
2		Thoma	s McNabb		Area:	9.15 ha		26.08° C	26.08° C (78.94° F)			
~	-	Data C	ollection Date			(22.60 acres) Percent: 0.29% of waterbody		(22.60 acres) ent: 0.29% of waterbody		Location	1	
	and a second	8/9/201	12 8:09:24 PM (UTC	)	Volume:	209,816.0	219 10 10 10 10 10 10 10 10 10 10 10 10 10	Start:	Start: 47.86261749, -11			
	v Summary											
Surve	? PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BV		Depth Range	Avg Depth	Distance			
Surve Type	7 PAC 7 79.5%	69.9%	±26.7%	62.3%	±33.3%	6	0.37-8.14 m	2.66 m	Distance 6.09 km	No. Points 3,387		
Surve Type ull Poin vey Grid	? PAC ?	<b>69.9%</b> 70.6%				6				10 Mar 10 1		
Surve Type Poin Grid Area o	? PAC ? 79.5% 95%	<b>69.9%</b> 70.6%	±26.7%	62.3%	±33.3%	6	0.37-8.14 m	2.66 m		3,387		
Survey Type Jill Poin Grid Area o ? Type	?         PAC ?           79.5%         95%           95%         95%           of Interest Sun         2           ?         PAC ?	69.9% 70.6%	±26.7% ±25.5%	62.3% 67%	±33.3% ±29.3%	V ?	0.37-8.14 m 0.02-7,89 m	2.66 m 2.3 m	6.09 km	3,387 3,051		
Survey Type util Poin Grid Area o	?         PAC ?           79.5%         95%           95%         95%           of Interest Sun         2           ?         PAC ?	69.9% 70.6% hmary Avg BVp ?	±26.7% ±25.5% SD BVp ?	62.3% 67% Avg BVw ?	±33.3% ±29.3% SD BVv	v ?	0.37-8.14 m 0.02-7.89 m Depth Range	2.66 m 2.3 m Avg Depth	6.09 km - Distance	3,387 3,051 No. Points		
Type ull Poin Grid Area o I ? Type 1 Poin	<ul> <li>PAC ?</li> <li>79.5%</li> <li>95%</li> <li>95%<td>69.9% 70.6% hmary Avg BVp ? 84.6%</td><td>±26.7% ±25.5% SD BVp ? ±21.6%</td><td>62.3% 67% Avg BVw ? 84%</td><td>±33.3% ±29.3% SD BVv ±22.9%</td><td>V 2</td><td>0.37-8.14 m 0.02-7.89 m Depth Range 0.37-1.82 m</td><td>2.66 m 2.3 m Avg Depth 0.86 m</td><td>6.09 km - Distance 503.55 m</td><td>3,387 3,051 No. Points 247</td></li></ul>	69.9% 70.6% hmary Avg BVp ? 84.6%	±26.7% ±25.5% SD BVp ? ±21.6%	62.3% 67% Avg BVw ? 84%	±33.3% ±29.3% SD BVv ±22.9%	V 2	0.37-8.14 m 0.02-7.89 m Depth Range 0.37-1.82 m	2.66 m 2.3 m Avg Depth 0.86 m	6.09 km - Distance 503.55 m	3,387 3,051 No. Points 247		
Survey Type Ull Poin Vey Grid Area o 1 ? Type 1 Poin Grid	<ul> <li>PAC ?</li> <li>79.5%</li> <li>95%</li> <li>95%<td>69.9% 70.6% Amary Avg BVp ? 84.6% 86.7%</td><td>±26.7% ±25.5% SD BVp ? ±21.6% ±15.8%</td><td>62.3% 67% Avg BVw ? 84% 86.7%</td><td>±33.3% ±29.3% SD BVv ±22.9% ±15.8%</td><td>₩ 2 2 2</td><td>0.37-8.14 m 0.02-7.89 m Depth Range 0.37-1.82 m 0.03-5.48 m</td><td>2.66 m 2.3 m Avg Depth 0.86 m 0.96 m</td><td>6.09 km - Distance 503.55 m -</td><td>3,387 3,051 No. Points 247 580</td></li></ul>	69.9% 70.6% Amary Avg BVp ? 84.6% 86.7%	±26.7% ±25.5% SD BVp ? ±21.6% ±15.8%	62.3% 67% Avg BVw ? 84% 86.7%	±33.3% ±29.3% SD BVv ±22.9% ±15.8%	₩ 2 2 2	0.37-8.14 m 0.02-7.89 m Depth Range 0.37-1.82 m 0.03-5.48 m	2.66 m 2.3 m Avg Depth 0.86 m 0.96 m	6.09 km - Distance 503.55 m -	3,387 3,051 No. Points 247 580		

2	Point	83.3%	65.9%	±29.1%	58%	±34.7%	0.41-5.74 m	2.83 m	1.41 km	586	
	Grid	92.3%	67.4%	±28%	62.2%	±32.4%	0.02-6.03 m	2.26 m	141	1,342	
3	Point	92.3%	76.6%	±24.6%	76.6%	±24.6%	0.48-4.21 m	2.84 m	99.41 m	52	
	Grid	100%	73.7%	±17.7%	73,7%	±17.7%	0.47-4.04 m	2.13 m		221	
4	Point	95.3%	90.9%	±13.1%	90.9%	±13.1%	0.59-5.4 m	2.5 m	286.2 m	129	
	Grid	100%	73%	±21.8%	73%	±21.8%	0.51-5.48 m	2.3 m		346	
5	Point	80.5%	68.5%	±26.1%	60.2%	±33.1%	0.41-8.14 m	2.81 m	3.34 km	2,373	
	Grid	94.1%	65.7%	±26%	61.8%	±29.6%	0.04-7.89 m	2.66 m	(a)	2,272	

Vegetation Biovolume Heat Map

**Biovolume Distribution Scatter Chart** 





#### Biovolume Analysis by Quantity

101 ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
	0.81%	1.61%	2.42%	12.1%	11.29%	71.77%
2	11.91%	3.79%	20.58%	16.06%	11.91%	35.74%
3	0%	0%	6.25%	27.08%	14.58%	52.08%
4	0%	0%	0%	4.07%	13.82%	82.11%
5	12.06%	2.07%	13.35%	20.35%	16.85%	35.31%

Biovolume Analysis by Dept

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Strip Plots 17 & 16



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### **Strip Plot 16**

BIOFBAS	5			VEGETATION ANALYSIS REPORT
Noxon Reservoir, S	anders County Montana			Generated: 9/14/2012 1:12:45 PM (UTC
Waterbody Size: 3,172.43 ha (7,8	339.20 acres)			report in
-	Data Collector	Survey S	Size	Average Water Temperature
2	Thomas McNabb	Area:	6.50 ha (16.10 acres)	24.34° C (75.82° F)
and the second s	Data Collection Date	Deve ent		Location

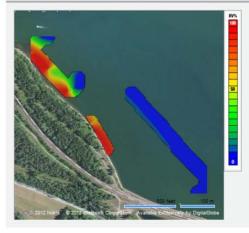


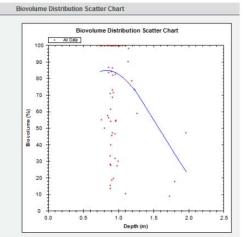
Data Collector	Survey S	lize	Averag	e Water Temperature
Thomas McNabb	Area:	6.50 ha (16.10 acres)	24.34° 0	2 (75.82° F)
Data Collection Date	Percent	0.2% of waterbody	Locatio	n
8/14/2012 5:00:54 PM (UTC)	Volume:	494.627.00 cu m	Start:	47.86074448, -115.65137482
		(401.00 acre ft)	End:	47.85736084, -115.64719391

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full	Point	13.7%	81.8%	±27.8%	17.7%	±36.1%	0.39-17.32 m	7.48 m	1.7 km	797
Survey	Grid	50.4%	58.5%	±33.5%	29.5%	±37.7%	0.02-14.29 m	6.49 m		1,373

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	73.7%	77.5%	±28.9%	77.5%	±28.9%	0.44-0.99 m	0.83 m	439.87 m	38
	Grid	100%	85.4%	±12.5%	85.4%	±12.5%	0.26-3.2 m	1.54 m	<b>.</b>	152
2	Point	10.8%	83.2%	±27.4%	14%	±33.1%	0.39-17.32 m	8.02 m	1.02 km	738
	Grid	44,4%	51%	±33.6%	22.6%	±33.8%	0.02-14.29 m	7.1 m	141	1,224
3	Point	4.8%	99.9%	±096	99.9%	±0%	0.39-0.74 m	0.57 m	240.37 m	21
	Grid	100%	82.7%	±12.2%	82,7%	±12.2%	0.27-2.42 m	1.39 m	-	54

Vegetation Biovolume Heat Map



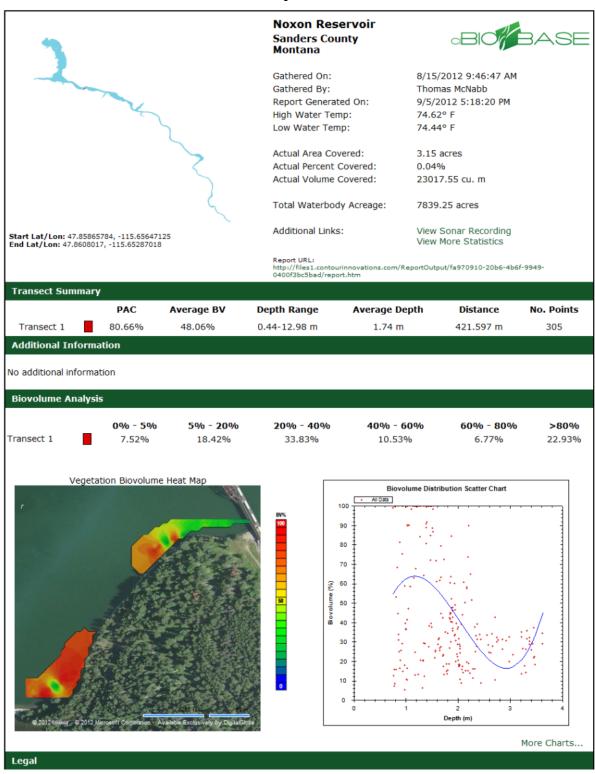


Biovolume Analysis by Quantity

Biovolume Analysis by Denth

AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
1	0%	7.14%	10.71%	10.71%	14.29%	57.14%
2	83.19%	1.05%	0.84%	1.89%	0.63%	12.39%

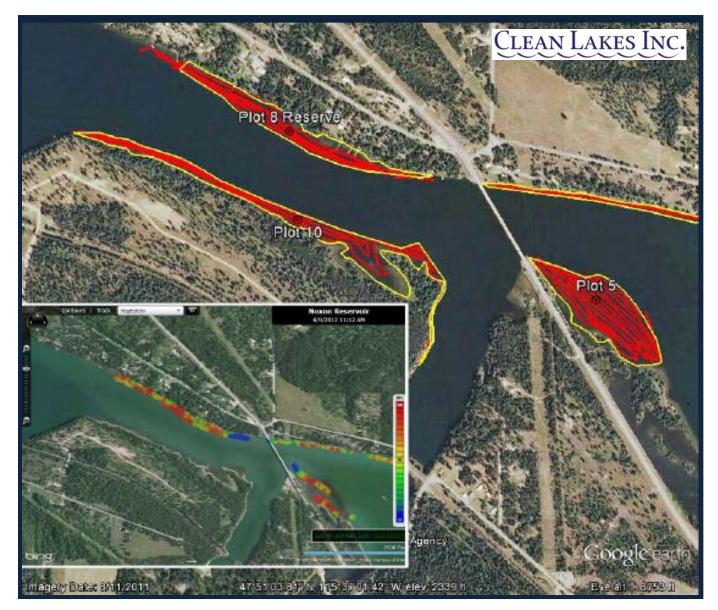
NOXON RAPIDS RESERVOIR, SANDERS COUNTY, MONTANA 2012 AIS Aquatic Pesticide Application Report (APAR) 28 of 41



Strip Plot 17

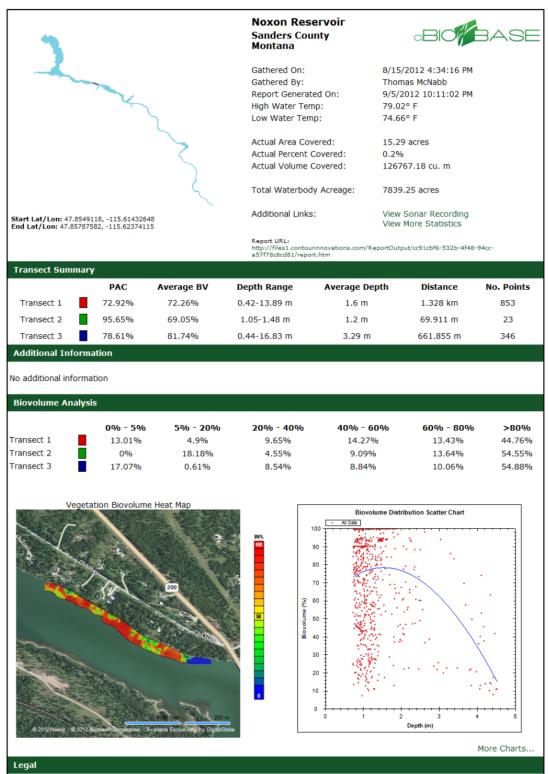
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Block Plots 8, 10 & 5



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**Block Plot 8** 



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**Block Plot 10** 

### Block 10 SAV Percent Cover and Bio-Volume Data Not Available Data Collection Error Due to Submerged Aquatic Vegetation Tangled on the Transducer Creating an Invalid Data Set

### **Block Plot 5**

BOKBAS	E				
Novon Posonuoir, Sa	nders County Montana				ATION ANALYSIS REPORT enerated: 9/15/2012 12:22:28 AM (UTC)
Waterbody Size: 3,172.43 ha (7,83)	).20 acres)				report link
1	Data Collector Thomas McNabb	Survey S	Size 5.88 ha		e Water Temperature
the second second	Data Collection Date 8/13/2012 8:30:56 PM (UTC)	Area: Percent: Volume:	5.85 na (14.50 acres) 0.19% of waterbody 132,716.00 cu. m (107.60 acre ft)	Locatio Start: End:	(80.75° F) 47.85009766, -115.60575867 47.85162354, -115.60794067

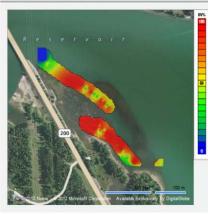
#### Survey Summa

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full	Point	50.3%	74.8%	±31%	67.3%	±37%	0.38-27.22 m	1.7 m	2.3 km	784
urvey	Grid	94.7%	74.1%	±23.1%	70.2%	±27.9%	0.04-27.53 m	2.74 m	-	1,155

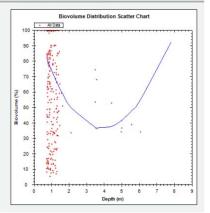
### Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	48%	79.6%	±29.4%	78.3%	±30.8%	0.39-1.64 m	0.75 m	279.26 m	394
	Grid	100%	83.3%	±20.5%	83.3%	±20.5%	0.04-1.39 m	0.7 m	100	474
2	Point	54.2%	88.6%	±22.1%	85.9%	±26.6%	0.38-1.13 m	0.75 m	234.94 m	118
	Grid	100%	89%	±12.8%	89%	±12.8%	0.2-1.46 m	0.73 m	120	229
3	Point	28.6%	68.7%	±31.6%	31.7%	±40.4%	0.7-26.57 m	13.7 m	128.3 m	21
	Grid	81%	64.5%	±27.9%	52.2%	±35.7%	0.06-27.53 m	7.57 m	(m)	294
4	Point	65.8%	63%	±32.8%	59.6%	±34.9%	0.45-1.42 m	0.91 <mark>m</mark>	153.35 m	190
	Grid	100%	73.5%	±17.4%	73.5%	±17.4%	0.46-3.06 m	1.06 m		350
5	Point	18.2%	48.1%	±16.1%	13.8%	±23.4%	0.45-27.22 m	8.9 m	594.02 m	55
	Grid	76.4%	54.4%	±21.9%	41.6%	±30%	0.46-27.53 m	7.62 m	140	259





Biovolume Distribution Scatter Chart



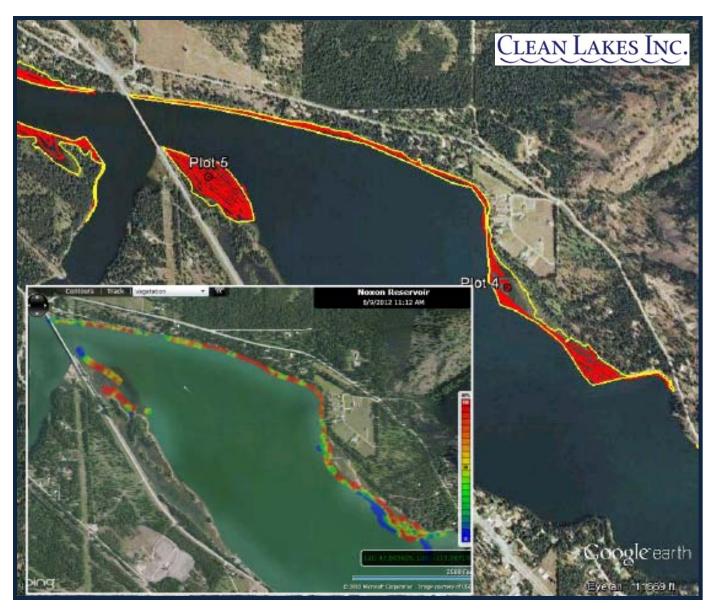
### Biovolume Analysis by Quantity

AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
	1.56%	8.33%	6.25%	8.85%	11.98%	63.02%
	3.03%	4.55%	0%	6.06%	4.55%	81.82%
3	53.85%	0%	15.38%	7.69%	0%	23.08%
	5.3%	12.88%	17.42%	11.36%	14.39%	38.64%
5	71.43%	0%	14,29%	5.71%	8.57%	0%

Biovolume Analysis by Dept

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**Block Plot 4** 



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### **Block Plot 4**

					ATION ANALYSIS REPO
Noxon Reservoir, Sa	nders County Montana				Generated: 9/14/2012 1:21:45 PM (U
aterbody Size: 3,172.43 ha (7,83)	9.20 acres)				report
-	Data Collector	Survey S	size	Averag	e Water Temperature
2	Thomas McNabb	Area:	16.36 ha (40.40 acres)	24.97" (	2 (76.95° F)
A Real Property of the second se	Data Collection Date	Percent	0.52% of waterbody	Locatio	n
T.	8/13/2012 4:17:38 PM (UTC)	Volume:	698,584.00 cu. m (566.40 acre ft)	Start: End:	47.84294128, -115.58081818 47.854702, -115.61169434

### Survey Summary

	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
Full	Point	55.8%	62.6%	±30.1%	52.7%	±35.8%	0.34-110.67 m	1.94 m	9.61 km	4,190
Survey	Grid	86.1%	64.8%	±27.4%	55.8%	±33.9%	0-87.12 m	3.91 m	8	5,347

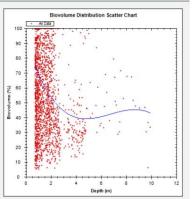
### Area of Interest Summary

101 ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	65.5%	73.1%	±27.7%	68.5%	±32.1%	0.38-4.08 m	1.18 m	2.98 km	1,429
	Grid	97.2%	72.8%	±23.9%	70.8%	±26.5%	0.01-87.12 m	1.76 m	. e	3,066
2	Point	56.8%	51.5%	±30.9%	42.2%	±34.3%	0.39-5.48 m	1.69 m	1.16 km	660
	Grid	90.7%	58.7%	±27.9%	53.2%	±31.6%	0.01-58.66 m	2.23 m	121	1,943
3	Point	85.5%	53.8%	±25.6%	49.1%	±28.8%	0.47-3.68 m	1.45 m	1.59 km	567
	Grid	99.4%	64.5%	±22.7%	64.1%	±23.2%	0-3.81 m	1.34 m		1,175
4	Point	37.5%	55.9%	±29.9%	37.9%	±35.9%	0.35-5.31 m	1.84 m	242.87 m	275
	Grid	91.9%	54.2%	±27%	49.8%	±29.8%	0.09-5.12 m	2.37 m	s.S	358
5	Point	29.4%	55.7%	±27.4%	49.2%	±31.4%	0.38-8.12 m	2.22 m	65.33 m	51
	Grid	92.6%	74.9%	±29.6%	69,4%	±34.5%	0.01-7.45 m	2.31 m	1. F	163
6	Point	9.8%	99.9%	±0%	99.9%	±0%	0.34-110.67 m	1.46 m	110.95 m	112
	Grid	97.5%	70.9%	±23.2%	69.2%	±25.4%	0.04-87.12 m	7.24 m	0.55	201
	Point	37.6%	59.9%	±31.3%	40.6%	±38%	0.37-28.69 m	3.39 m	2.75 km	1,096
	Grid	68,9%	59.7%	±28.9%	41.1%	±36.6%	0.01-87.12 m	7.3 m	142	2,034

#### Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



#### Biovolume Analysis by Quantit

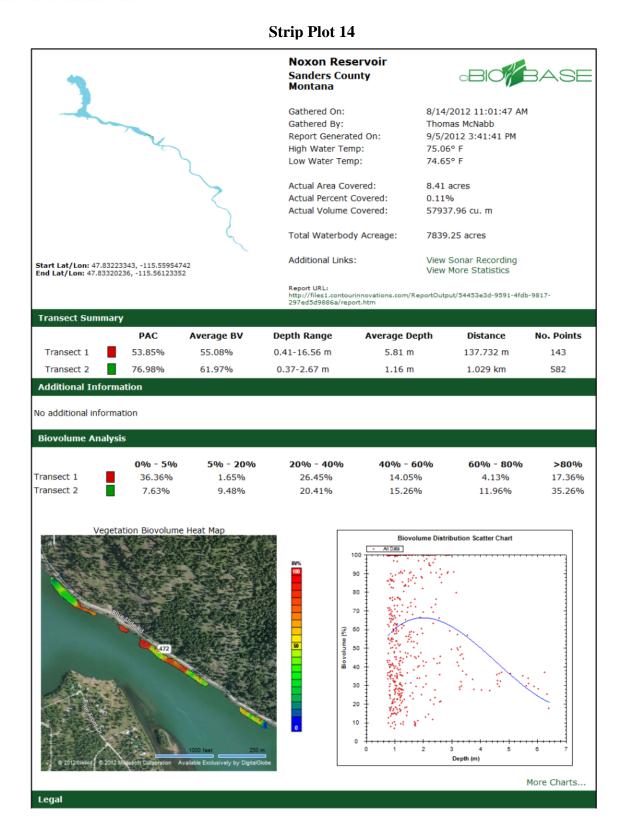
AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%	
	6.21%	3.01%	13.73%	14,03%	15.53%	47.49%	
2	18.12%	10.92%	29.69%	13.76%	6.33%	21.18%	
3	8.66%	8.1%	22.41%	26.37%	16.2%	18.27%	
4	32.24%	2.63%	26.97%	11.84%	6.58%	19.74%	
5	11.76%	0%	47.06%	11.76%	5.88%	23.53%	
6	32.24%	9.87%	10.86%	14.14%	9.87%	23.03%	

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Strip Plot 14



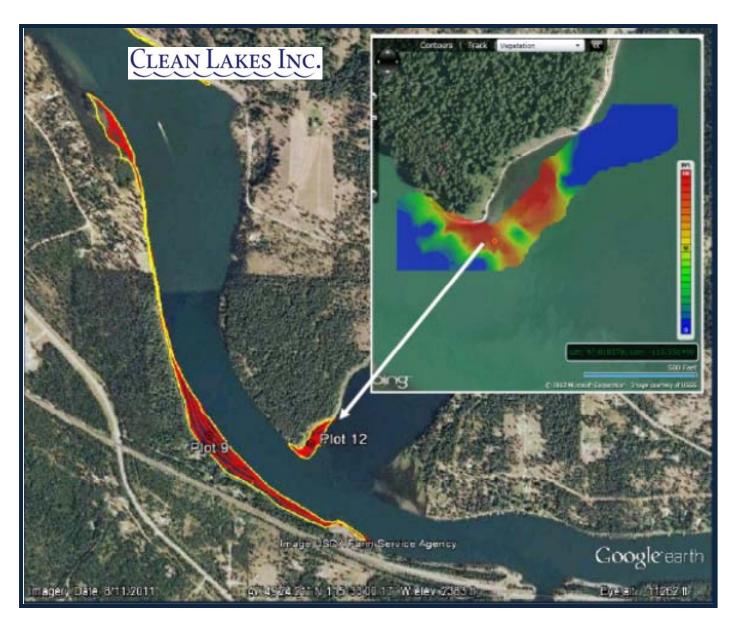
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Block Plot 9 & 12

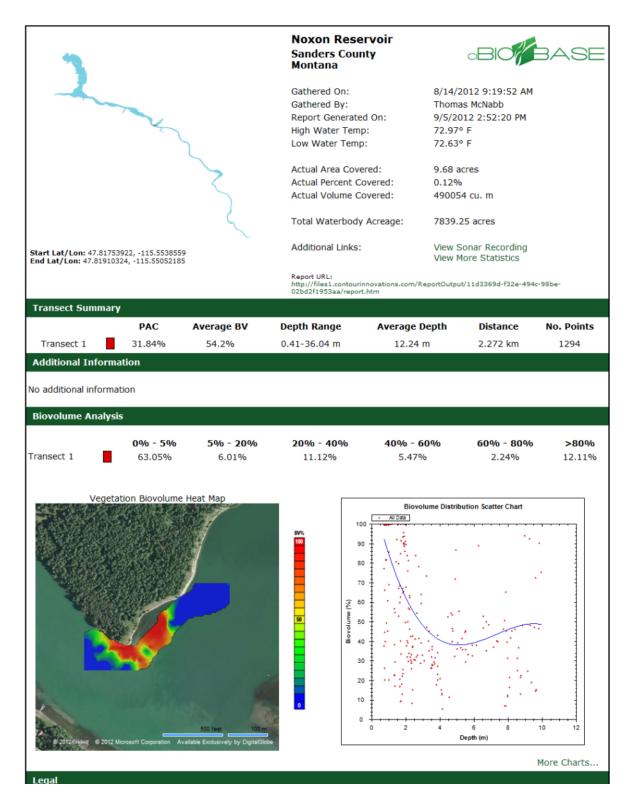




**Block Plot 9** 

Block 9 SAV Percent Cover and Bio-Volume Data Not Available Collection Error Due to Submerged Aquatic Vegetation Tangled on the Transducer Creating an Invalid Data Set

### **Block Plot 12**



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### LIST OF PROJECT PERSONNEL

### **PROJECT DIRECTOR:**

### **Montana Department of Agriculture**

This person has complied with the Pesticide Laws of the State of Montan 103231-12 Expires: 12/31/2012 THOMAS J MCNABB CLEAN LAKES, INC. 46 36 Thomas J. McNabb Montana Licensed Applicator Applicators License No. 103231-12 Cell Phone: 208-929-2748 Email: <u>tmcnabb@cleanlake.com</u>

### PROJECT MANAGER

Montana Department of Agriculture This person has complied with the Pesticide Laws of the State of Montana. 103230-12 Expires: 12/31/2012 THOMAS G MOORHOUSE CLEAN LAKES, INC. 36 Thomas G. Moorhouse Montana Licensed Applicator Applicators License No. 103230-12 Cell Phone: 208-929-2757 Email: <u>tmoorhouse@cleanlake.com</u>

### SITE SAFETY AND HEALTH OFFICER:

ALTERNATE SITE SAFETY OFFICER:

EMERGENCY RESPONSE COORDINATOR:

ALTERNATE EMERGENCY COORDINATOR:

**MSU EXTENSION** 

Thomas G. Moorhouse Cell Phone: 208-929-2757

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John Halpop Phone: 406-827-6934 Email: john.halpop@montana.edu

### END OF AQUATIC PESTICIDE APPLICATION REPORT

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