Aquatic Plant Management and AIS Pre/Post Treatment Protocols and Report

Kevin Gauthier, WDNR

Lakes Management Coordinator

March, 2009

WAL Convention

AIS Pre/Post Treatment Protocols and Report

- AIS management and goals
- Measuring management success
- Pre/Post treatment survey protocols
- Pre/Post treatment summary report
  - Developing a guidance document for creating the report based on:
    - Data collected
    - Maps generated
    - Analysis performed

Looking for Input into Guidance Document…

Why Manage AIS?

What are Management Goals

- Fewer exotics
  - What is the goal? This should be in APM plan.
  - <10 acres
  - Reduce treatable area
- More natives
  - What is the goal? Should also be in plan.
  - Filling in for exotics
  - Increase in total frequency of all natives
- Other?

Is That What's Happening?

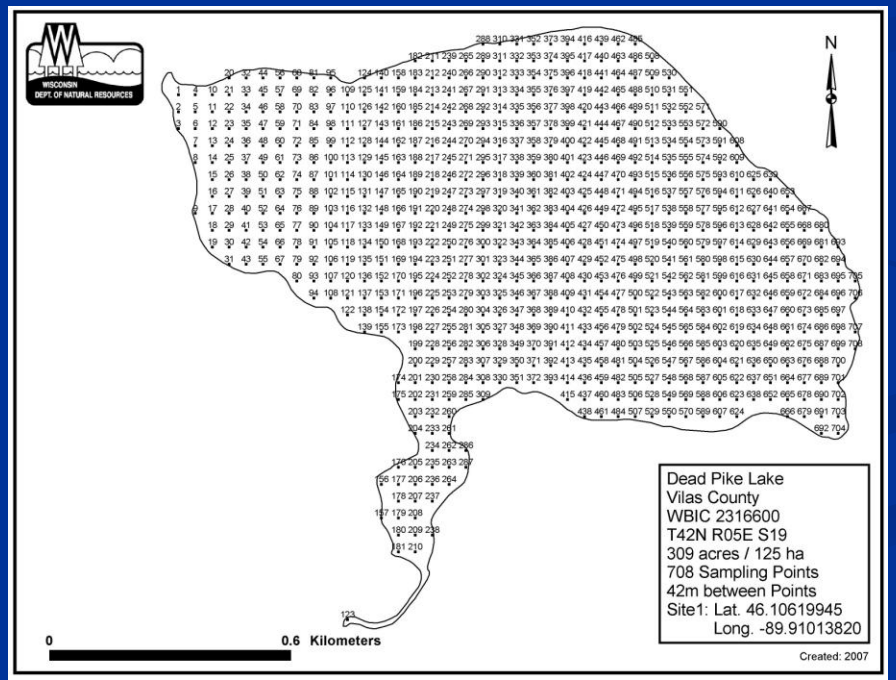
How is Management Success Measured?

- Long-Term
  - Whole lake Point Intercept (PI) survey
- Short-Term
  - Pre/post treatment survey monitoring

How is Management Success Measured?

Whole Lake PI Survey

- Repeat about every 5 years
- Hoping exotics decrease
- Hoping natives increase or maintain current levels



How is Management Success Measured?

Pre/Post Treatment Monitoring

- Assess natives in summer
  - Compare summer to summer
- Assess exotics in spring and summer
  - Compare spring to summer and summer to summer

Pre/Post Treatment Monitoring

- Assumptions
  - Whole lake PI survey
  - Dept approved Lake/Aquatic Plant Management Plan
  - Goals have been established for native and exotic species

Pre/Post Treatment Monitoring

- **Applicability**
  - **Treatments are >10 acres or >10% of littoral area**
  - **Restoration is a goal**
  - **Performance results are needed (permit, grant, other…)**
  - **Written for EWM, but can be used on other AIS**
  - **Can be used to evaluate non-herbicide controls**

Pre/Post Treatment Monitoring

- Pre-treatment survey (1st)
- Pre-treatment survey (2nd)
- Post-treatment survey

Surveys Completed Within One Season of Treatment and Evaluation

- 1st Pre-Treatment Survey
  - Late summer/early fall before treatment
  - Maps next season's treatment (i.e. uniquely identified treatment polygons)
  - Samples Sub-PI points to assess native and exotic plants
  - Takes 1-3 days to complete

Surveys Completed Within One Season of Treatment and Evaluation

- 2nd Pre-Treatment Survey
  - Early spring before treatment
  - Re-sample PI points within treatment areas looking for P/A of exotics
  - Refine treatment areas
  - Takes 1 day to complete

Surveys Completed Within One Season of Treatment and Evaluation

- **Post-Treatment Survey**
  - **Mid-late summer/early fall of treatment year**
  - **Re-sample PI points from treatment areas to assess native and exotic plants (summer to summer comparison)**
  - **Used to assess spring to summer exotics**
  - **Takes 1 day to complete**
  - **If multiple treatments – repeat 1st pre-treatment survey for next season**

Data Collected From Surveys:

- Species List
- Sub-PI data
  - Frequency of Occurrence (FOO)
  - Rake Fullness
  - P/A of Exotics (2nd Pre-treatment)
- Treatment Polygons of AIS
- Maps of Natives?
- Density?
- Other?

Data Collected From Surveys:

- Once data is collected…
  - Compiled into a pre/post treatment summary report
    - Used by management and research
    - Used to assess success at lake-wide scale and sometimes treatment area scale
    - Improve content consistency

Pre/Post Treatment Summary Report Guidance Document

- Want to develop…
  - Purpose
    - To be used in conjunction with already established pre/post treatment surveying protocols
    - Provide guidance/expectations of the content of pre/post treatment summary report

Pre/Post Treatment Summary Report Guidance Document

- **Want to develop…**
  - **Purpose**
    - **Any project using Pre/Post treatment survey protocols shall at a minimum provide the following analysis/maps/graphs/tables/other(?) and use these to interpret/discuss the pre/post treatment results and make next season's management recommendations**

Report should include…

- A summary of surveys performed and data collected
- Justification for # of PI points selected and location
- Data analysis
- Maps
- Graphs
- Tables
- Raw data – hard copy (in an appendix) and electronically
- Other?

Report should include…

- **Justification for # of PI points selected and location**

		4 pts/acre (minimum)	10 pts/acre (maximum)	
Area to be treated (acres)	Minimum points/lake	Points/lake	Points/lake	Recommended # of Points to sample
10	100	40	100	100
20	100	80	200	100
30	100	120	300	120
40	100	160	400	160
50	100	200	500	200

Report should include…

- Data analysis
  http://dnr.wi.gov/org/water/fhp/lakes/ComputePrePostData.xls
  - Use “Compute Pre&Post” worksheet to assess changes
    - Uses chi square test to determine significance of differences in each species from pre- to post- treatment
  - Create Pre- and Post-Treatment Graph
    - By species
    - By rake fullness
  - Identify and map areas of success and failure

Report should include…

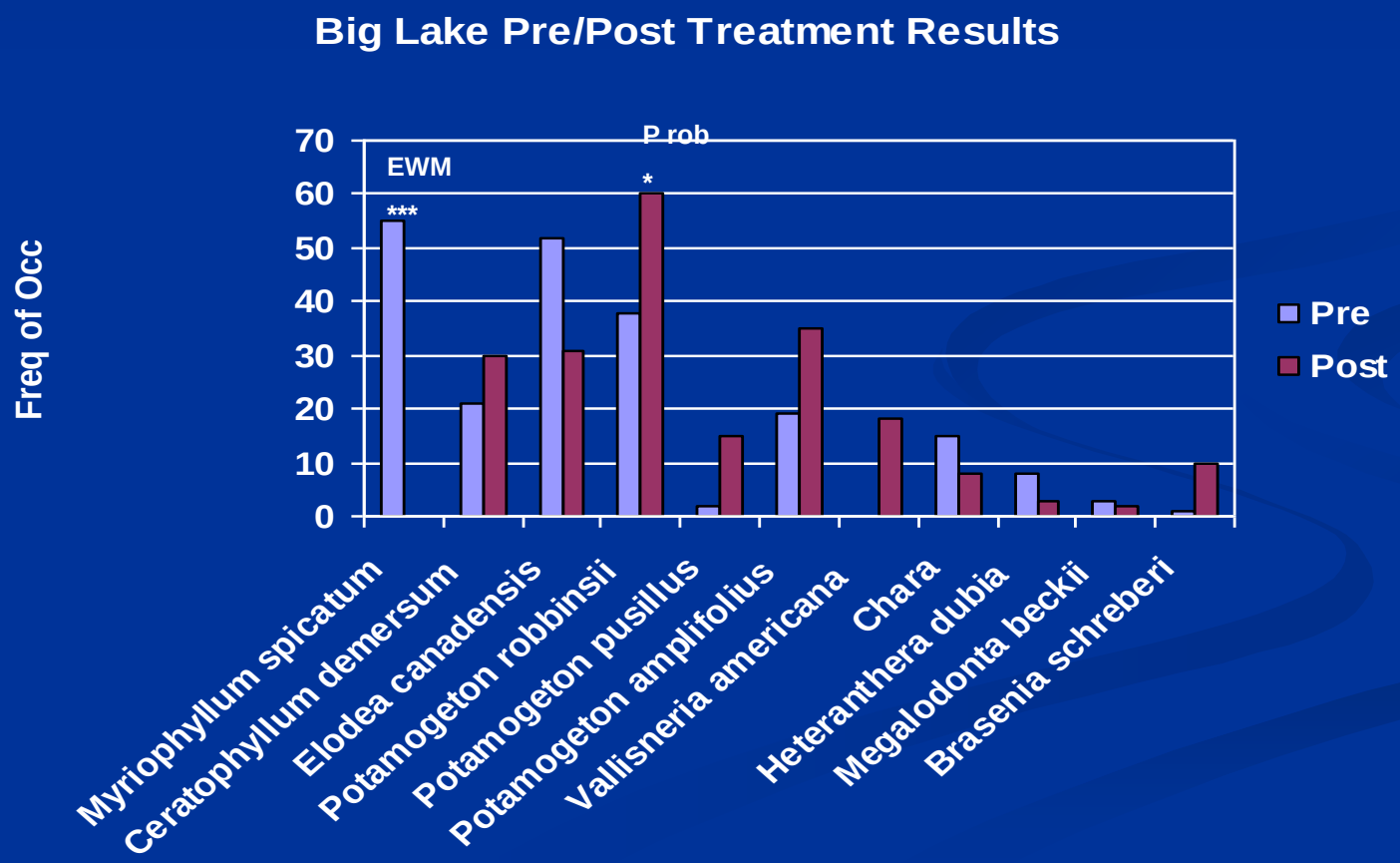
- **Data analysis**
  - **Compute Pre&Post worksheet to assess changes**

Big Lake

pre-treatment survey total points	85			
post-treatment survey total points	75			
	PRE present	POST present	p	Significant change
Myriophyllum spicatum	55	0	0.0000	***
Ceratophyllum demersum	21	30	0.0383	*
Elodea canadensis	52	31	0.0122	*
Potamogeton robbinsii	38	60	0.0000	***
Potamogeton pusillus	2	15	0.0003	***
Potamogeton amplifolius	19	35	0.0012	**
Vallisneria americana		18	0.0000	***
Chara	15	8	0.2092	n.s.
Heteranthera dubia	8	3	0.1770	n.s.
Megalodonta beckii	3	2	0.7543	n.s.
Brasenia schreberi	1	10	0.0024	**
Najas flexilis		1	0.2856	n.s.
Potamogeton zosteriformis	1	1	0.9290	n.s.
Eleocharis acicularis	6	1	0.0772	n.s.
Nymphaea odorata	2	6	0.1019	n.s.
Potamogeton strictifolius		1	0.2856	n.s.
Potamogeton natans		1	0.2856	n.s.
Potamogeton gramineus		2	0.1298	n.s.
Sagittaria sp.		6	0.0079	**
Nuphar variegata		2	0.1298	n.s.
Myriophyllum sibiricum	8	0	0.0064	**

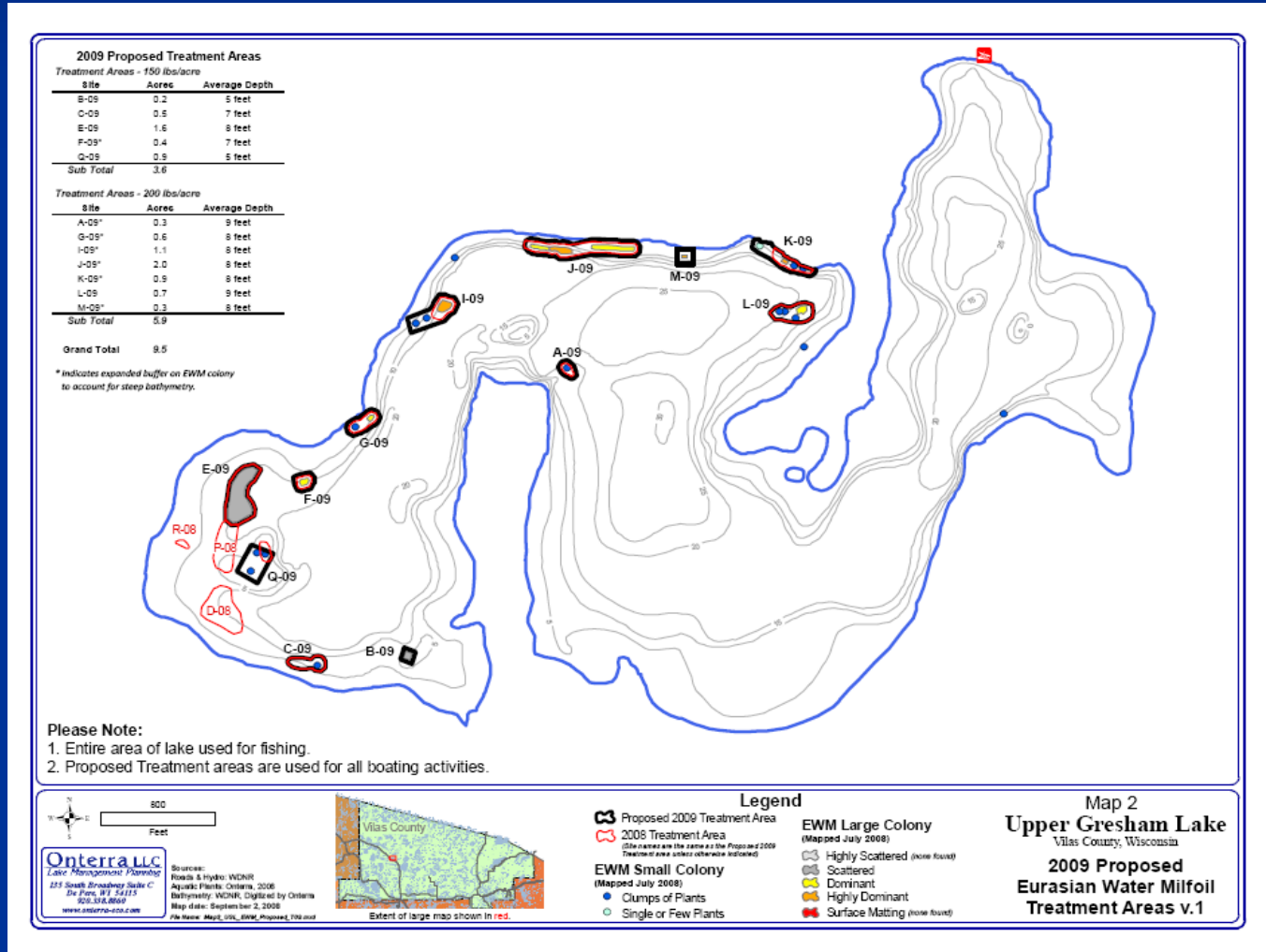
Report Should Include…

- Data analysis
  - Pre- and Post-Treatment Graph



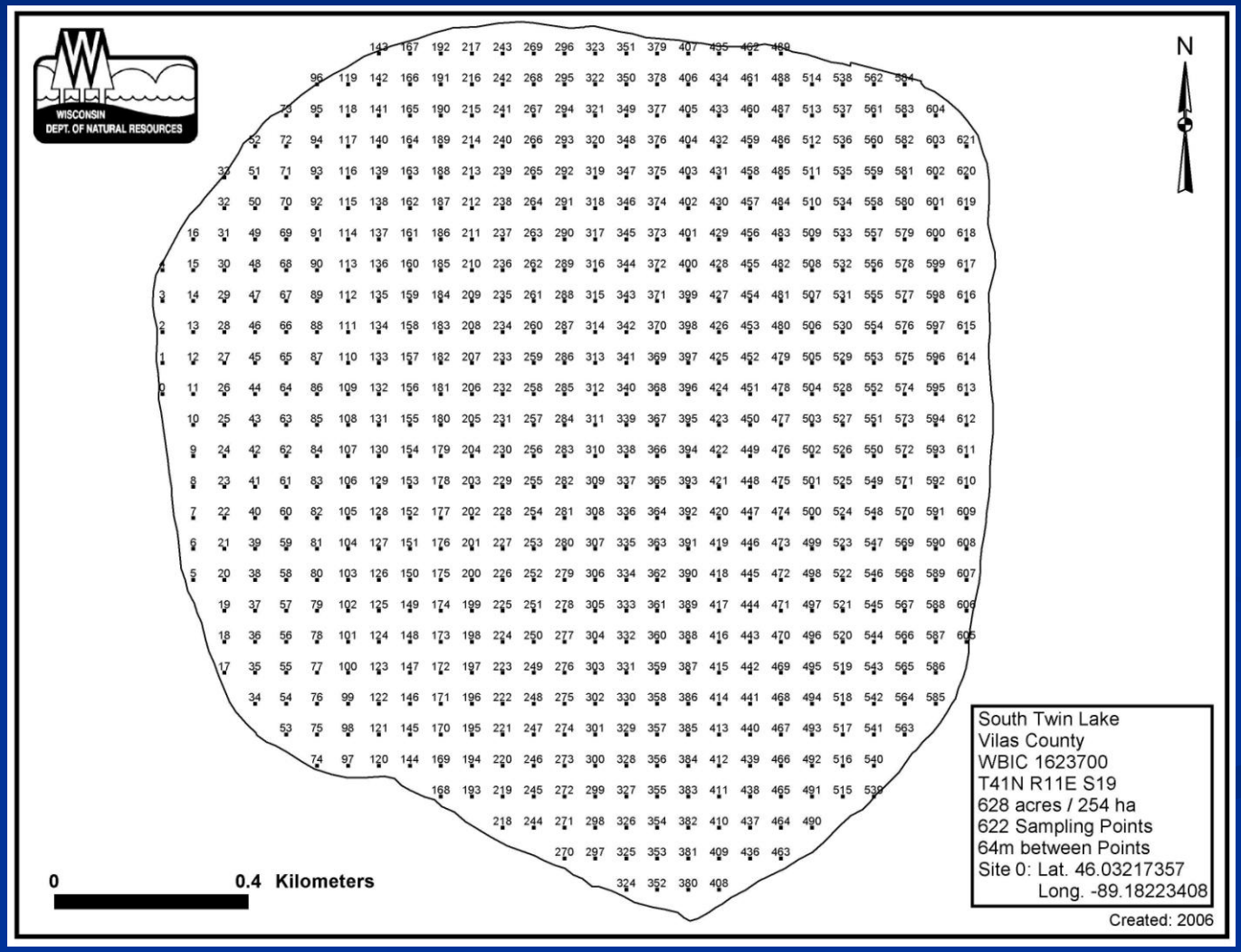
Report should include…

- **Maps (current year's treatment and next season's proposed treatment)**



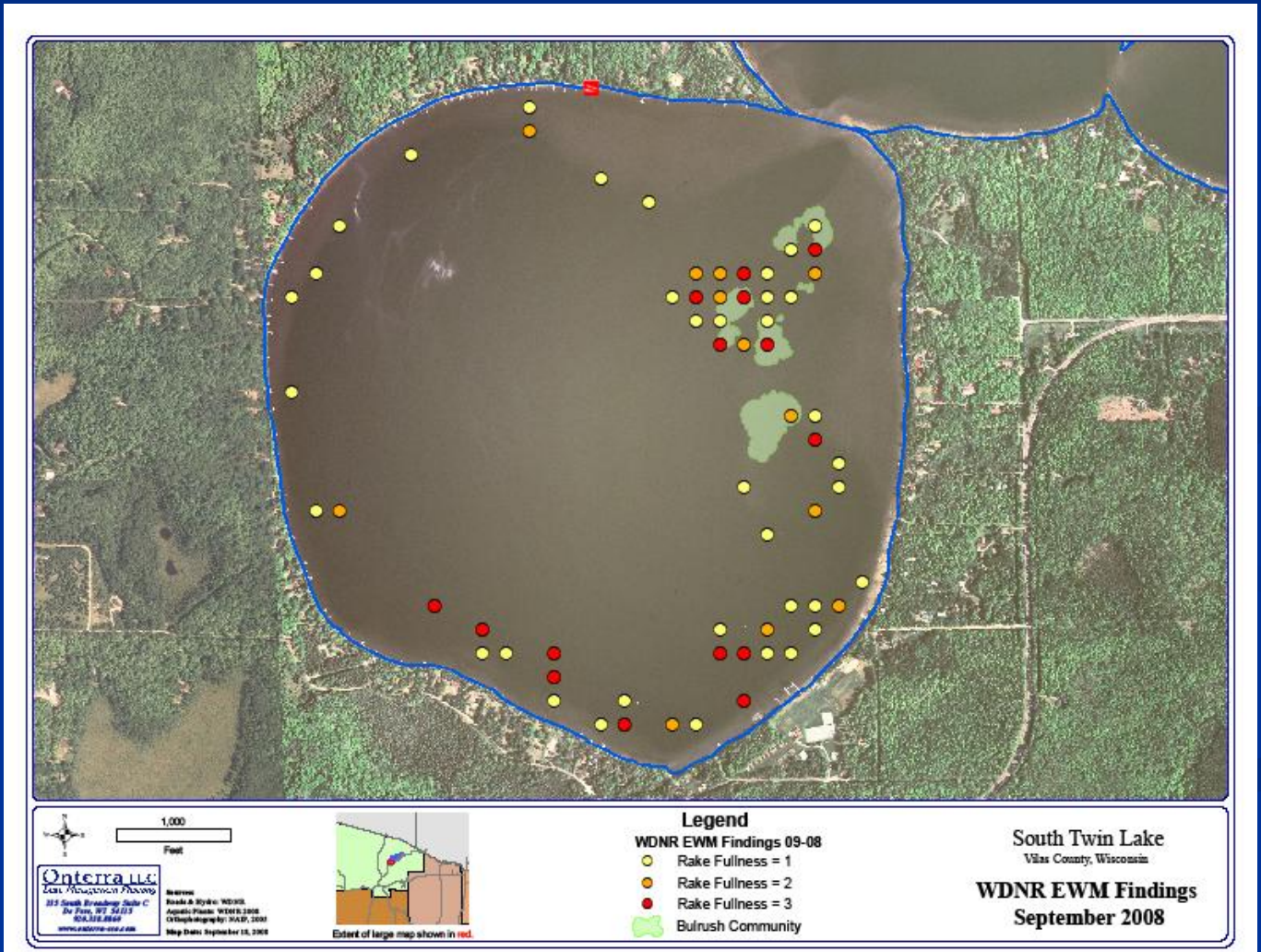
Report should include…

- **Maps (Whole Lake PI Survey)**



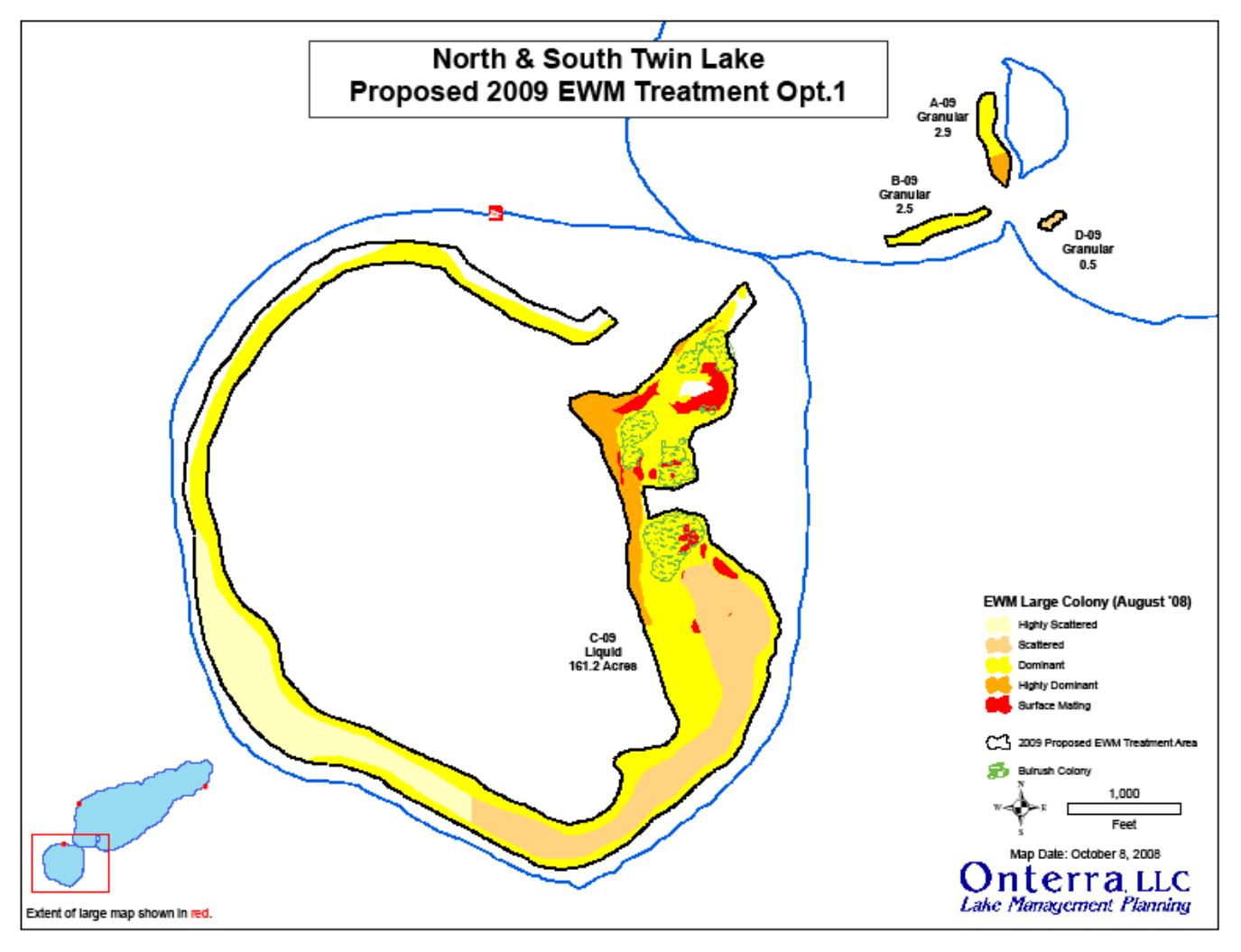
Report should include…

- Maps (AIS PI locations used to map AIS)



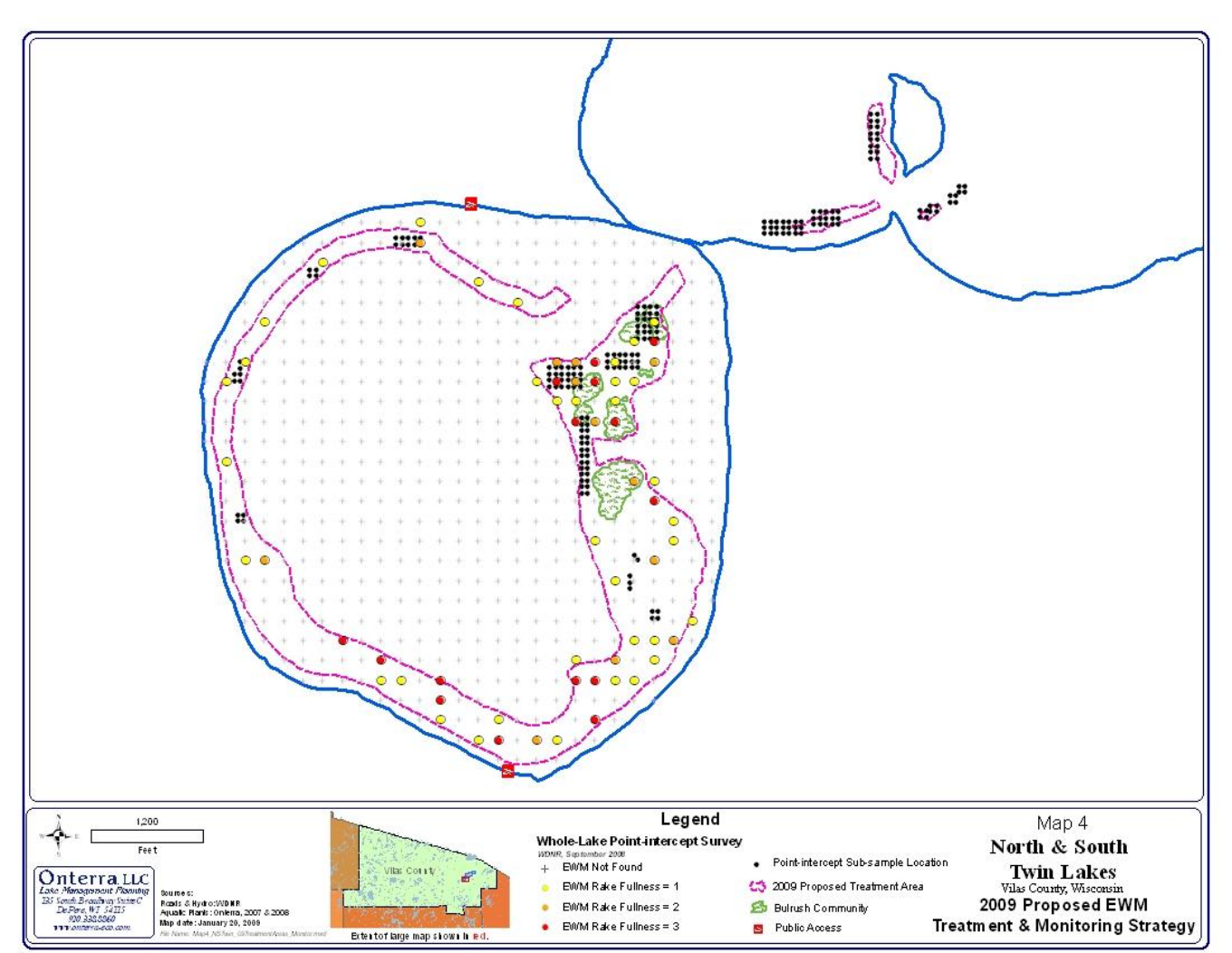
Report should include…

- Maps (AIS proposed treatment areas)



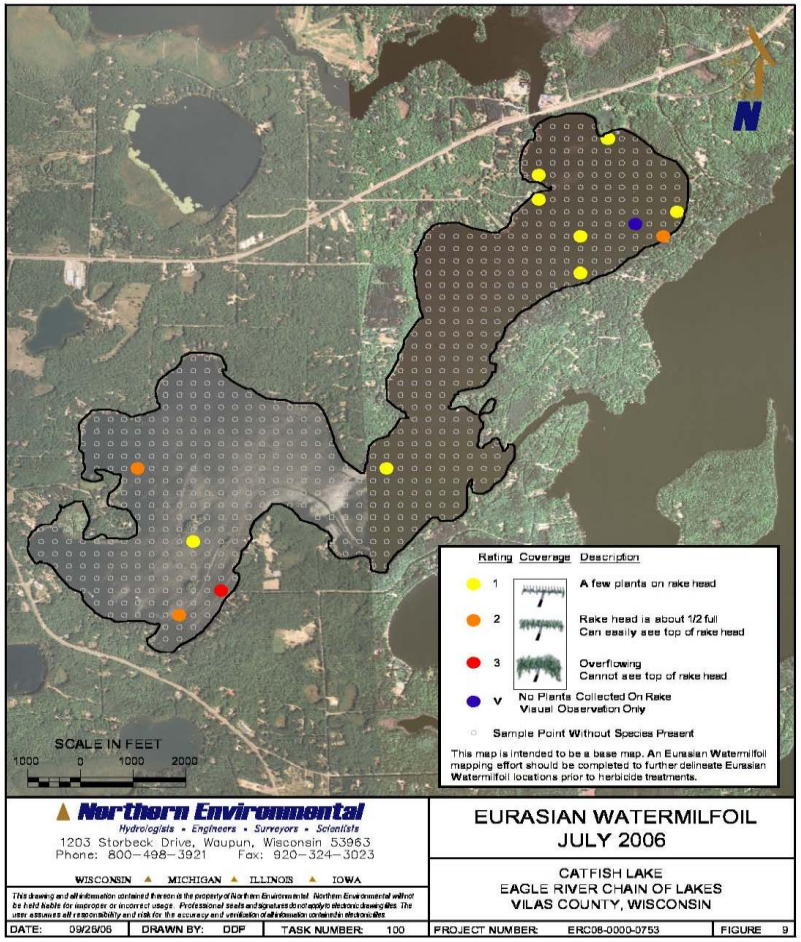
Report should include…

- Maps (Uniquely identified AIS PI points sampled)



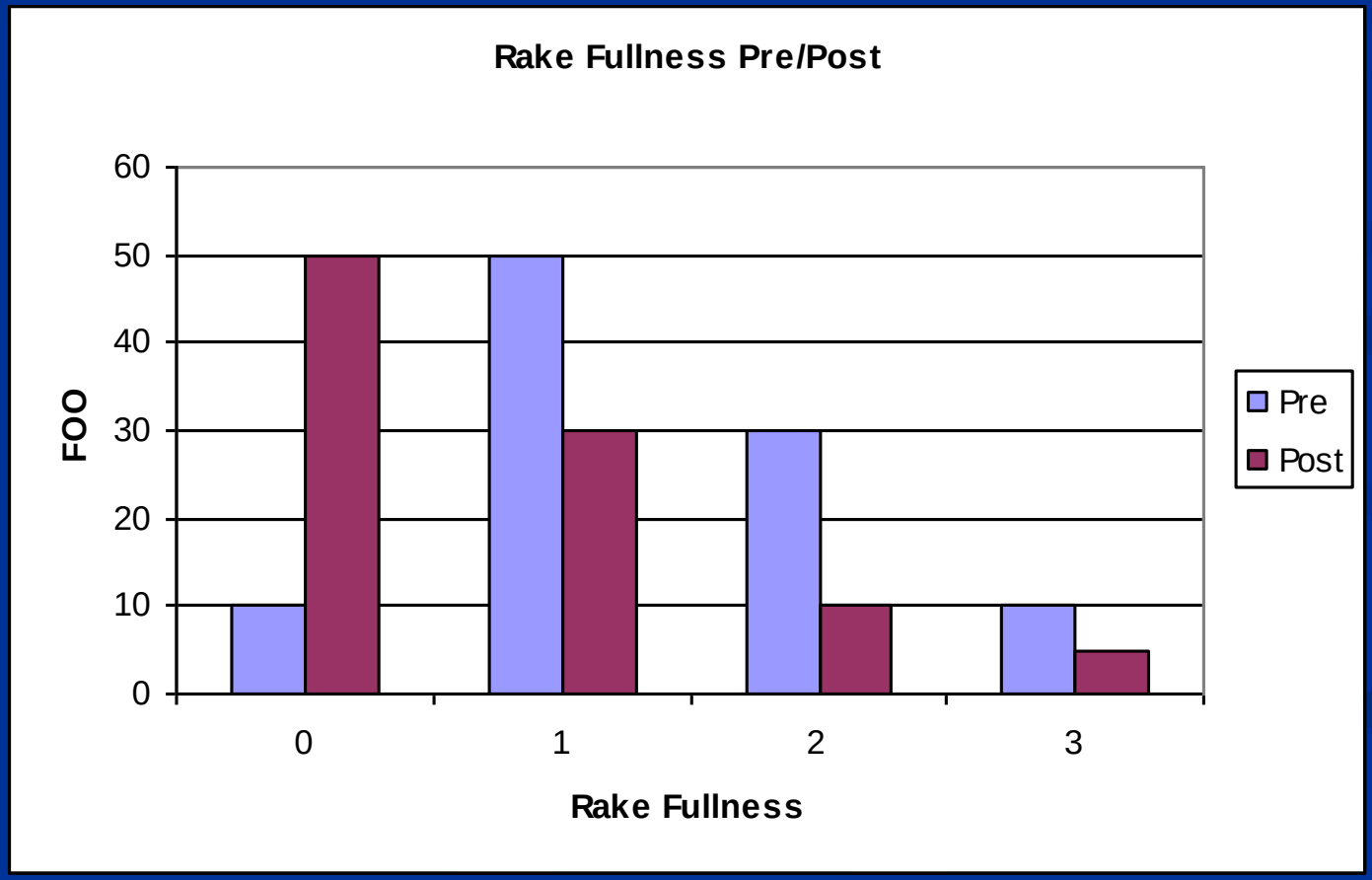
Report should include…

- Maps (Rake Fullness of AIS PI Points – could do natives also)



Report should include…

- Graphs
  - AIS and Native Plants



Report should include…

- **Tables**

EWM Beds	Acreage	Mean depth	Substrate	PI points	Treatment rate (lbs/acre)	Density?	Other?
a	1.2	4	Sand	5	100		
b	0.8	8	Muck	5	150		
c	5.6	5	Sand/Muck	25	100		
d	12.3	6	Muck	50	150		
e	2.4	7	Muck	15	150		

Report should include…

- **Raw data – hard copy and electronically**
  - **Data entry spreadsheet located at:**
    - **http://dnr.wi.gov/org/water/fhp/lakes/WiAPMS.xls**

Site	sampling point	ycoord	xcoord	Depth (ft)	Dominant sediment type (M=muck, S=Sa	Sampled holding rake pole (P) or rake rop	comments / rake fullness	# species	Myriophyllum spicatum ,Eurasian water-	Potamogeton crispus ,Curly-leaf	Najas flexilis ,Nodding waternymph	Brasenia schreberi ,Watershield	Carex comosa ,bottle brush sedge	Ceratophyllum demersum ,Coontail	Ceratophyllum echinatum,Spiny hornwort	Chara ,Muskgrasses	Decodon verticillatus ,Swamp loosestrife	Dulichium arundinaceum ,3-way sedge	Elatine minima ,Waterwort	Eleocharis acicularis ,needle spikerush	Eleocharis palustris, creeping	Eleocharis robbins	Elode
Dead Pike Lake	1	46.1062	-89.9101	2.5	M	P		1	7				1			1							
Vilas	2	46.10582	-89.9101	3	M	P		1	7				1			1			V				
2316600	3	46.10544	-89.9101	2.5	S	P		1	5				1			1							
7/29/08 - 7/31/0	4	46.1062	-89.9096	1	S	P		1	2												1		
	5	46.10582	-89.9096	4	M	P		3	5							3							1
Lindsey Watch,	6	46.10544	-89.9096	4	M	P		2	4							2							1
	7	46.10507	-89.9096	3	M	P		1	3				1			1							
	8	46.10469	-89.9096	1.5	S	P		1	2														
	9	46.10355	-89.9096	2	S	P		1	5				1						V				
	10	46.1062	-89.9091	2.5	S	P		1	6							1			V				
	11	46.10582	-89.9091	4.5	M	P		3	3							3							1
	12	46.10544	-89.9091	4.5	M	P		2	6							2							
	13	46.10506	-89.9091	4	M	P		2	2							2							
	14	46.10469	-89.9091	3.5	M	P		2	5				1			2							
	15	46.10431	-89.9091	2	S	P		1	3							1							
	16	46.10393	-89.9091	2	S	P		1	5			V				1							
	17	46.10355	-89.9091	4	M	P		3	8				2										
	18	46.10317	-89.9091	8.5	M	P		2	3														1
	19	46.1028	-89.9091	5	M	P		3	7				1										
	20	46.10658	-89.9085	1	M	P		1	7							1							
	21	46.1062	-89.9085	2.5	M	P		1	7							1			V				
	22	46.10582	-89.9085	5	M	P		3	2														
	23	46.10544	-89.9085	5	M	P		3	4							2							1
	24	46.10506	-89.9085	5	M	P		2	4							1							1
	25	46.10469	-89.9085	3.5	S	P			1														
	26	46.10431	-89.9085	3	S	P		1	4							1							
	27	46.10393	-89.9085	2.5	S	P		2	2							2							
	28	46.10355	-89.9085	2	S	P		1	4				1			1							
	29	46.10317	-89.9085	12	M	P			1														
	30	46.1028	-89.9085	9	M	P		2	2														
	31	46.10242	-89.9085	4	S	P		1	3			V											
	32	46.10658	-89.908	1	S	P		2	7			V				1							
	33	46.1062	-89.908	2.5	S	P		1	2							1							
	34	46.10582	-89.908	4	S	P		1	2														
	35	46.10544	-89.908	5	M	P		2	4							1							2

Report should include…

- Other?
  - What is Missing?
  - Ideas/suggestions?