Bulrush Density Survey: 2018 Report

Introduction:

In 2006 five areas were identified for bulrush density measurement. The recommendation was to repeat the study every few years as a monitor of bulrush health in the representative areas. The first follow up survey was done in 2017.

Summary:

Within the five study areas the overall bulrush density within the first 9 quadrats over water (e.g. within the first 90 feet) has been maintained or improved when compared to 2006 and actually slightly improved compared to 2017 in all areas. When all of the available quadrats are considered, levels were maintained in 4 of the 5 areas with a slight decrease in the fifth area.

When each transect is evaluated, there is a decrease in several that suggests a changing morphology of the study areas. Slight variation in the determination of the transect line may also account for the change.

This year we are also doing a mapping of the bulrush beds around the lake. These maps were compared to 2006 for each of the five density sites. They reveal a general reduction in the size and a change in the shape of many of the sites.

Additional observational notes along the transect lines microenvironment are essential for interpreting the overall health of the beds. Site coordinators wil be asked to continue in those positions for several surveys.

Volunteer recruitment

Volunteers from 2017 were contacted and additional volunteers were recruited by an all member e-mail which included a description of the tasks and appropriate footwear and clothing. This year there were 17 volunteers which included 5 who were new and needed full training. Site teams ranged between four and seven people.

Training:

See the 2017 report for details of the training.

5 volunteers from last year agreed to each be the coordinator for one of the five sites.
The team coordinator was provided a written check off list, recording sheets and access to all equipment required to complete the survey. They also scheduled the date and time for the survey

Methods:

See the 2017 report for the methods.

Maps were created by using a GPS track created by circumnavigating the site in a kayak. The tracks were uploaded to My Google Maps. The tracks were then traced with the map tool to create a polygon that calculated the area in acres. The coordinates of the benchmarks were noted and the transect lines were added.

Survey

Measurements were performed by the teams between 8/16/2018 and 8/22/2018.

Two sites are far from parking and two teams approached from the water for ease of transport of equipment.

Survey times including transport and set up were between 1 and 2 hours.

Mapping for each area takes about 30-60 minutes with a kayak or small boat.

Map indicating the 5 Survey Sites

Results:

The following tables and charts show the density comparison for the three survey years.

Because we only had complete data for the first 9 quadrats of each area, the first table and chart have the total number of emergent bulrush in those 9 quadrats. The second set of data use the average number of emergent bulrush per quadrat and includes all data collected for each area.

Table 1: Total number of emergent shafts in three transects recorded for 9 quadrats over water.

Year	1	2	3	4	5
2006	354	80	29	127	188
2017	368	24	5	331	179
2018	423	23	8	474	182

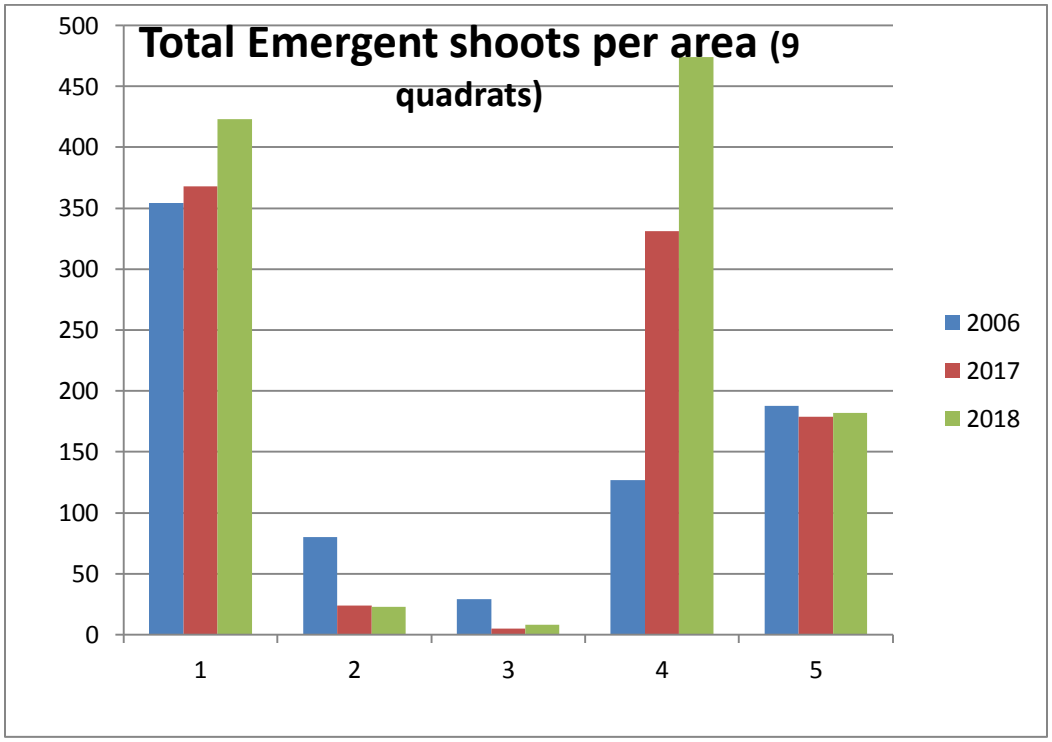
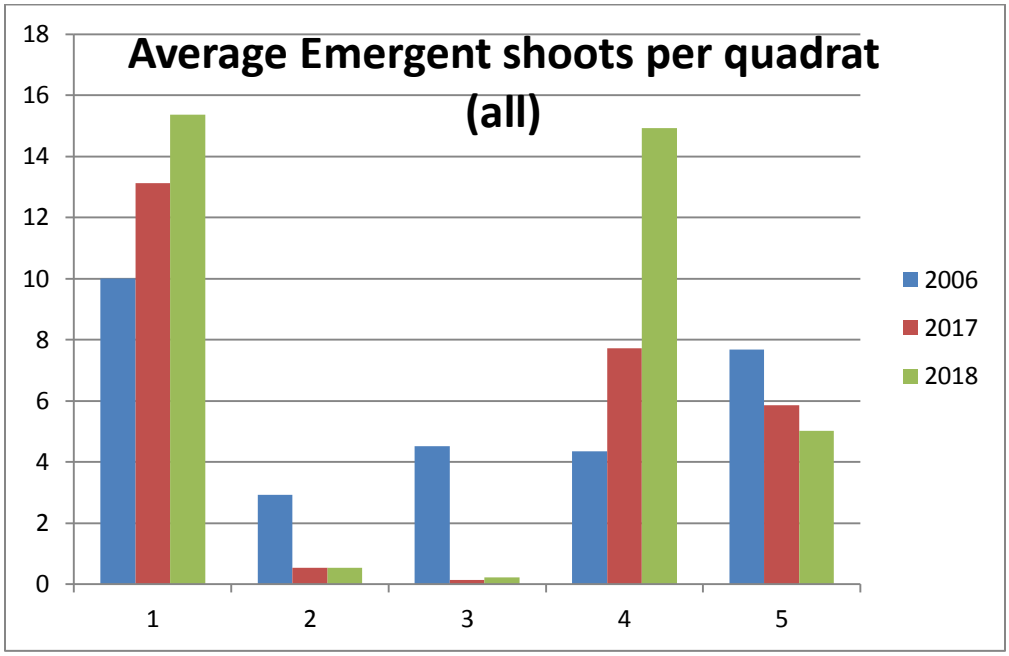


Table 2: Average number of emergent shafts in three transects recorded for all quadrats over water.

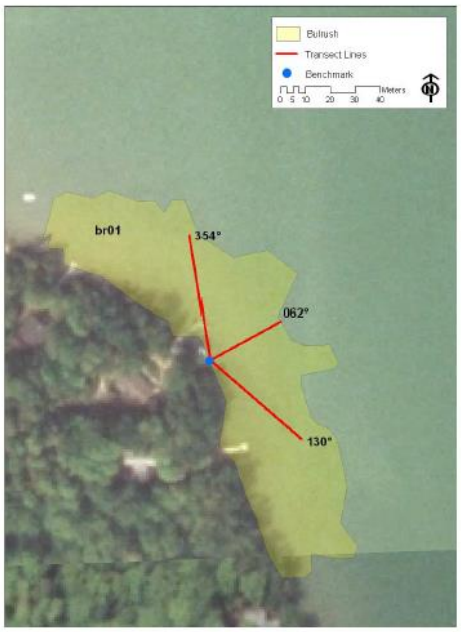
Year (all measured)	1	2	3	4	5
2006	10	2.933	4.516	4.3529	7.676
2017	13.1212	0.5333	0.1389	7.711	5.8627
2018	15.357	0.5333	0.2222	14.9286	5.0263



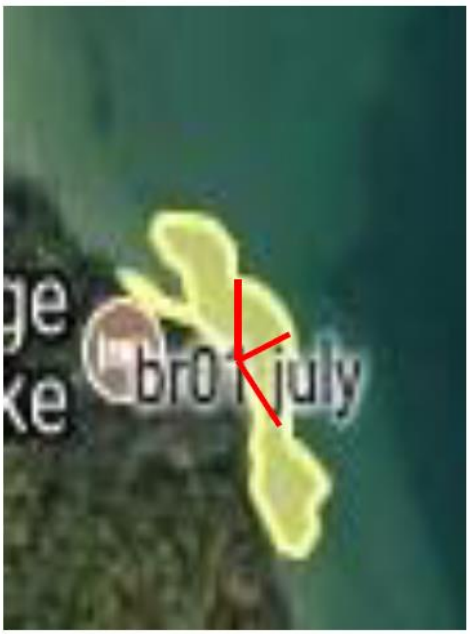
Bulrush density area 1; br1

Br1 area acres:	2006	2018
	1.755	1.775

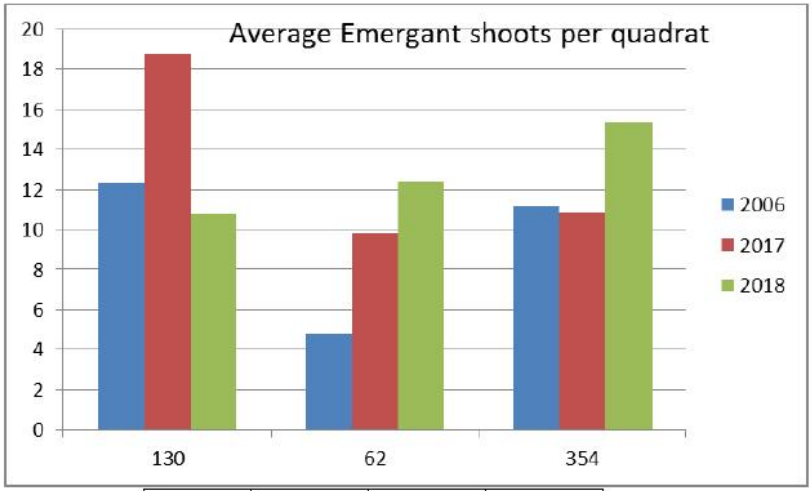
Despite the consistent total area, the shape of br1 is changing, especially at the northern edge where a rental property is now situatuted. Transcet 1 (130 degrees) now aligns close to an invagination and slight variance in determining the transect could account for the decrease in that section 2006.



2006



2018



Area1			
Year	130	62	354
2006	12.33333	4.8	11.13333
2017	18.72727	9.818182	10.81818
2018	10.76923	12.36364	15.35714

Bulrush density area 2; br 7

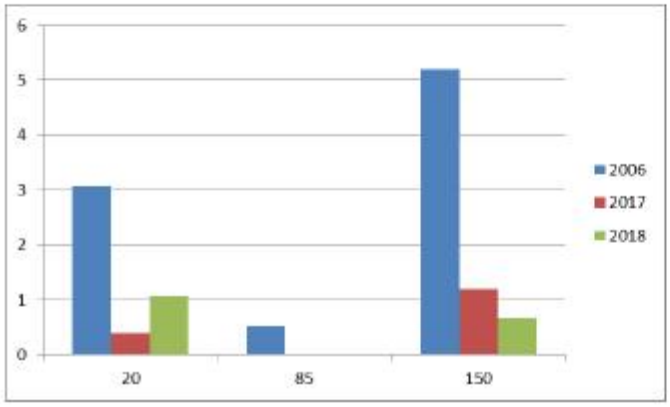
Br7 area acres:	2006	2018
	.519	.333

There has been a decrease in the overall area of br 7. The bulrush are so sparse that the difference may be due to only a few plants absent or not included in the perimeter in 2018.

2006

2018

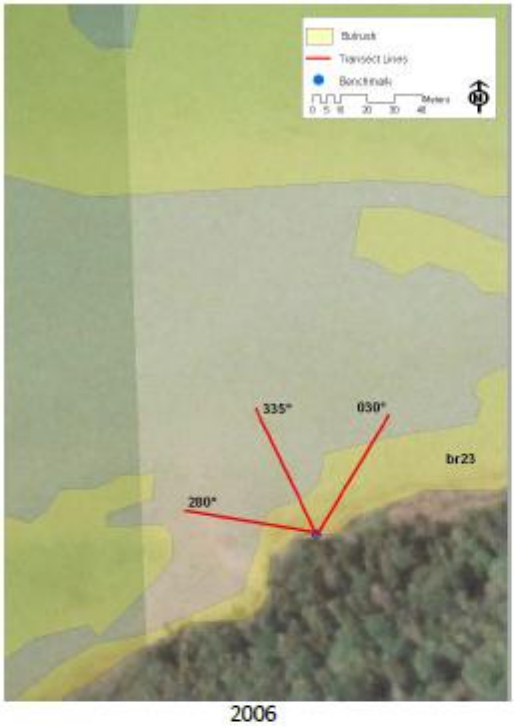
Average Emergant shoots per quadrat



Area 2	Average all Quadrats		
Year	20	85	150
2006	3.066667	0.533333	5.2
2017	0.4	0	1.2
2018	1.076923	0	0.666667

Bulrush density area 3 ; br 23

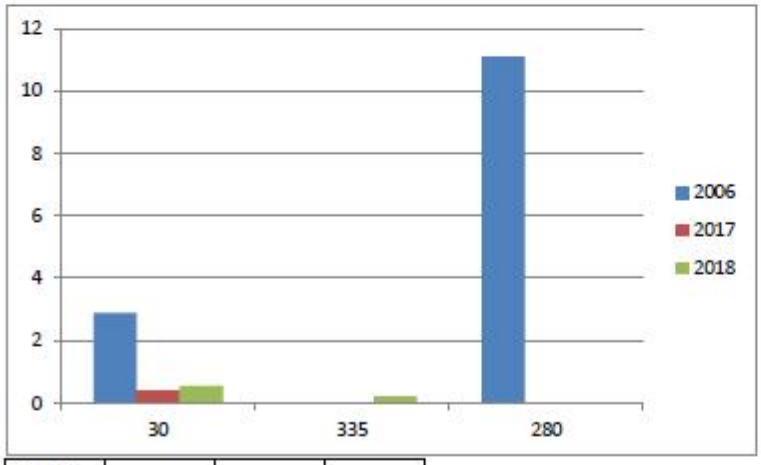
Br23 area acres:	2006	2018
	2.126	.613



Sedge overgrowth near shore. Bulrush only Patchy near shore as indicated by low density readings.

2006 2018

Average Emergant shoots per quadrat

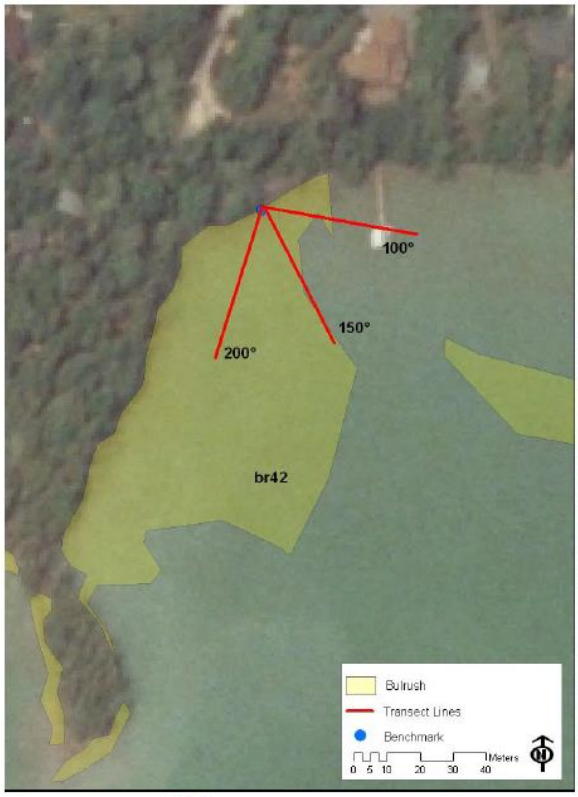


Area3			
Year	30	335	280
2006	2.9	0	11.1
2017	0.384615	0	0
2018	0.555556	0.214286	0

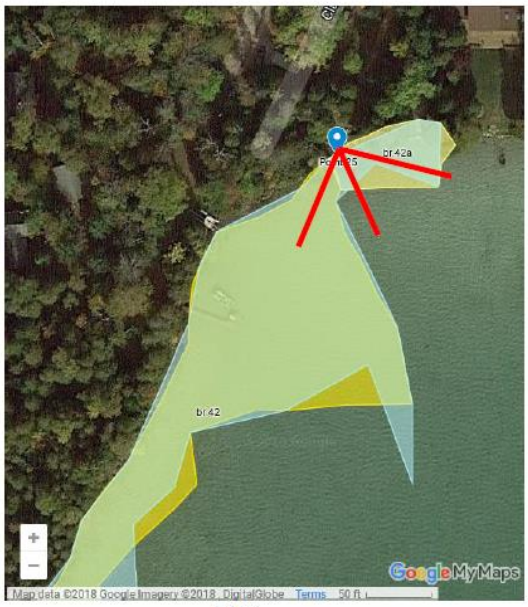
Bulrush density area 4 ; br 42

Br42 area acres:	2006	2018
	1.509	.802

Bulrush denser near shore and patchy to sparse as move outward. The benvhmark tree has fallen into the water and its base provides almost a monoculture of bulrush. An entire bulrush island has disappeared and this large bed is receding from the South end.

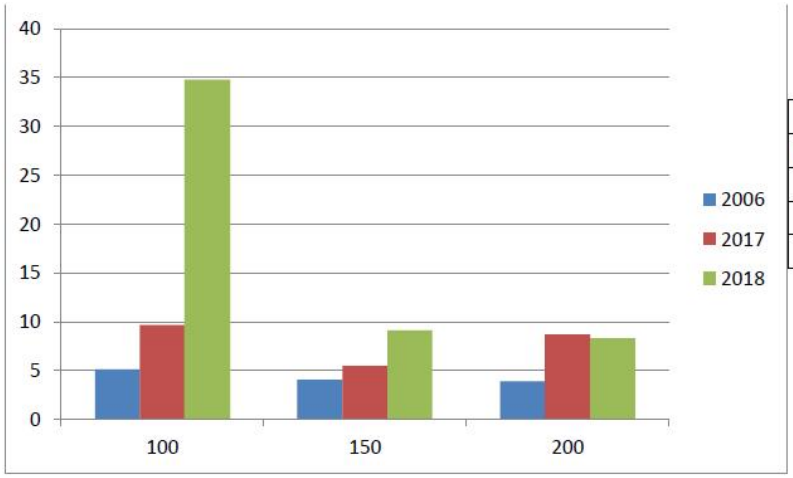


2006



2018

Average Emergant shoots per quadrat

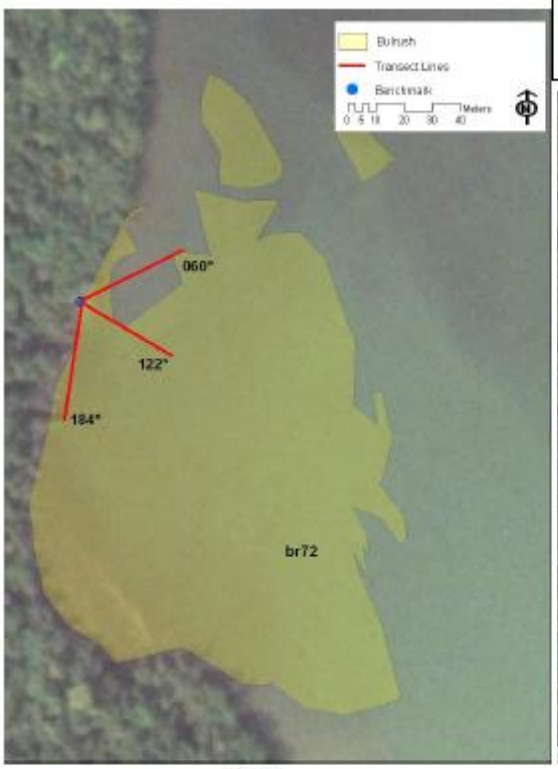


Area4			
Year	100	150	200
2006	5.117647	4.058824	3.882353
2017	9.636364	5.470588	8.705882
2018	34.8	9.125	8.3125

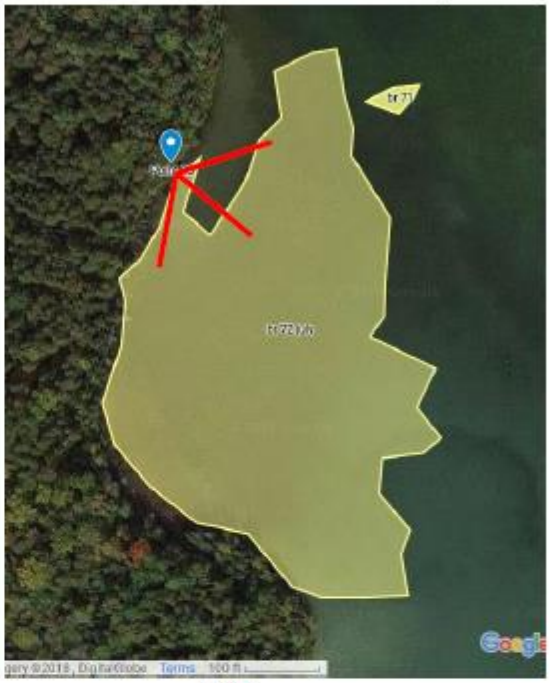
Bulrush density area 5 ; br 72

Br 72 area acres: 2006 4.333 2018 4.34

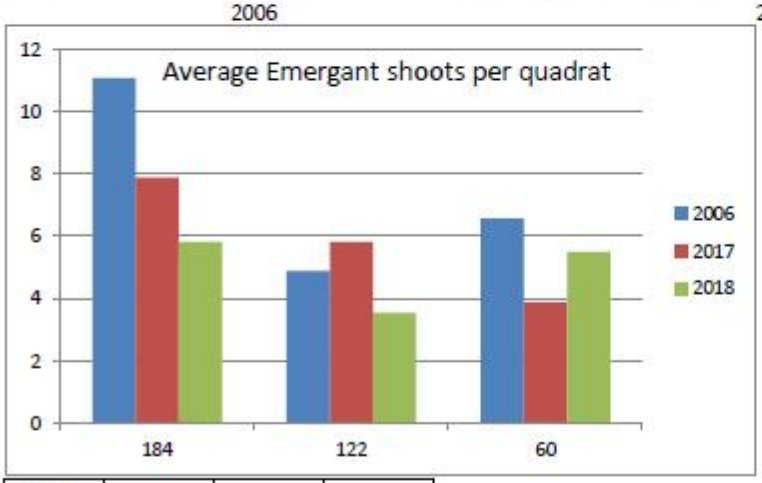
Overall this bed appears healthy. It has actually merged with a smaller bed just to the north. Two of the transects range over a "bay" in the NW corner of the bed and this year the 184 transect was disrupted by a downed tree that damaged the bed.



2006



2018



Area 5			
Year	184	122	60
2006	11.08333	4.9	6.583333
2017	7.882353	5.823529	3.882353
2018	5.818182	3.545455	5.5

Discussion:

Areas 1 and 4 continue to show density improvement in both the first 9 quadrat and all quadrat readings when compared to both 2006 and last year. Areas 2,3 and 5 have shown little change since last year.

Area 1 is on private property but the shore itself has minimal development and little evidence of boating beyond a narrow access corridor. The map from 2018 does show some change in morphology near a rental property.

Area 4 is in a sheltered cove with development along transect one about 130 feet away and only a small pier on natural shoreline over 130 feet away along transect three. The benchmark tree has fallen into the water providing some additional protected area allowing a thick bulrush growth close to shore. There is changing morphology with the bed creeping toward the east but receding at its southern end. The overall area has decreased and an island of bulrush west of here has disappeared since 2006. Despite a good density report, this appears to be a delicate situation and bears close attention.

Area 5 is in the Ridges sanctuary. Overall area is intact and the north end has actually merged with a previous island of bulrush. Morphology and a downed tree damaging the bed along one of the transects accounts for the drop from 2017. This bed actually is in better shape than the density measure would suggest.

Area 2 is the most developed of this study. The bulrush lie along some remaining natural shoreline that buffer between the adjacent properties. They range out from shore as scattered small clumps of a few plants .This area is definitely at risk and efforts to bolster the remaining plants, especially near shore is warranted. The area may also benefit from education and efforts to further reduce recreational traffic for several hundred feet outward.

Area 3 is in the state park with a shallow slope of the bottom and is populated mostly by thick sedge for the first 50-60 feet over water. The sedge "chokes out" the bulrushes in this area. There are many more bulrush noted well beyond the limits of our study measurements. The number of bulrush near shore was low in 2006 and the current numbers, although lower, probably do not reflect a significant loss.

Conclusion:

Within the five study areas the overall bulrush density has been maintained or improved where there is adequate natural shoreline and controlled use of the near shore and shallows.

The density measures were easily learned by our volunteers. The method can be easily adapted to other beds for quantitatively monitoring the effects of development and rehabilitation efforts.

The current method of using the first 9 quadrats over water is not as useful when the slope of the bottom is so shallow and most of the bulrush is beyond 100 feet from shore. This is especially the case along the south shore. Another method for identifying a benchmark for defining the transect bearings will be needed in this area.

This year the additional data from comparison of the entire 160 foot measures suggests we should do the full distance, if possible, and continue tracking both results.

Observational notes about the transect line micro environment are quite helpful and should be included as training for the site coordinators. We also will try to have the same site coordinator for several years so they can add personal experience with the bed to the interpretation of the data.

Additional information from comparison mapping is beneficial and should be used in conjunction with the micro environment notes and density data when deciding on preservation and restoration efforts.

We will continue the density survey, density area mapping and observational notes annually for another few years to determine any natural variation, enabling both an estimate of values indicating real change and the optimal interval for measurement.

When we begin the Bulrush preservation/ replanting program we can use these results to prioritize the proposals and monitor progress.