

# 2003 GPS Survey of Eagle Lake Essex County New York

Baseline study documenting the location and  
size of the largest and densest beds of  
Eurasian Water Milfoil in Eagle Lake

Prepared for  
the Eagle Lake Property Owners, Inc. (ELPOI)  
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## A Study of Milfoil in Eagle Lake (Summer of 2003)

### **Back Ground:**

Eagle Lake is a 412-acre lake in Essex County, New York. It is at the top of the Schroon River watershed, and has had a continuing problem with Eurasian Water Milfoil in the lake. Eurasian Water Milfoil, is an invasive aquatic plant species, which grows in extremely dense stands, that provide a navigational hazard, as well as out competing the native plant species already in the lake. Since it's discovery in the lake in the late 1970's, people have debated whether the milfoil patches in the lake are getting larger or smaller. This study hopes to lay the groundwork to conclude these arguments, by providing the first study to determine the current size of the milfoil patches in Eagle Lake.

### **Purpose:**

The purpose of this project is to provide a starting point for the future tracking of the size of milfoil patches in Eagle Lake. This was undertaken after years of debating about the size of the patches, using only the physical appearance of the patches as a guide line, as well as to be able to present to the APA, DEC and other state agencies that we have a problem that is getting worse, should we apply for a permit to remove the milfoil in whatever way is practical.

In order to gain an accurate picture of the size of the milfoil beds present and established in Eagle Lake, it was necessary to find a method of obtaining accurate location data. The only practical technology, which was within the budget constraints, was a handheld global positioning receiver (GPS) being used by a person in a boat to plot the outline of the bed using the GPS's waypoints. (The use of this technology was determined as appropriate, after temporary use of Lloyd Burroughs GPS unit) (The ELPOI selected a Garmin "GPS 76," that was sold to the organization at a discounted price by one of the lake members business). These waypoint, were then transferred to a computer using a free download of the software "G7twin," which was the only software, that we found that did not include a street map of the area, but gave a list of the latitude, and longitude coordinates.

### **Sample Collection:**

Through trial and error, it was determined that the most effective time to map the perimeter of the patches, was between 1 and 4 in the afternoon, on days that were either clear and sunny (for shallow water); or overcast and gray (for deeper water, limiting the glare on the surface). These conditions allowed for the uniform light distribution on the lake, allowing you to see through the water more clearly, the time frame, also reduced the amount of light reflection off the surface of the water. It is best to plot the patches, when the lake is calm, or has a chop of less than 2 inches, so that the bottom picture is not broken up past usefulness.

It was also determined through trial and error, that the best way to follow the outline of the patch is to use the boat in reverse. With a person standing in the back of the boat, following the outline of the bed with the boat, using the GPS to record his position every few feet around the patch where practicable and to the shore line when not.

This was the most effective method, because it not only made it possible for the mapping to be done by one person, but it also reduce the chance of spreading the Milfoil by keeping the prop from getting tangled in the Milfoil.

### **Data Management:**

After searching online, we discovered the program called “g7towin” which allowed, through a link cable, the GPS unit to talk to the computer and vice versa. After more searching online, and in discussion with Larry Eichler, it was determined that the most effective software for plotting the milfoil beds, was the program “MapInfo.” This was determine to be the best program because of its ability to not only plot the GPS points, but also to overlay them on Arial photography of Eagle Lake, as well as topographic maps provide for free download at the NYSGIS website <http://www.nygis.state.ny.us>.

Each red point on the maps represents a point taken along the edge of a milfoil bed, and multiple red points indicate the outline of the patch. Yellow points, indicate a landmark, such as a boathouse, the bridge or the boat launch. And blue points, indicate a milfoil patch that in my opinion is small enough, and lacking sufficient density, so that it is possible to hand-harvest it with a mask, snorkel and dive fins (figures 1-7). It is my suggestion that these patches be addressed as quickly as possible, so as to remove one more breeding ground for milfoil from Eagle Lake.

### **Results:**

With this information, we were able to determine, using a built in area calculator and an Excel spreadsheet, that the surface area of Eagle Lake is approximately 412 acres, being composed of approximately 336 acres on the west end (after taking out the surface area of the 3 islands) and 76 acres on the east end. It was also determined that Eagle Lake is approximately 2.7 miles long, and at it’s widest point, is approximately 0.45 miles across. Using the same area calculator, we were able to calculate the surface area of the patches, and then using an Excel spreadsheet to sort the patches based on size, it was possible to determine that Eagle Lake has approximately 8.0 acres of milfoil located in 49 separate locations. This means that the 8.0 acres of Milfoil occupy just under 2% of the total surface area of Eagle Lake (Figures 1 and 2).

It was also determined, through the use of a Microsoft Excel spreadsheet and the area calculator, the locations of the milfoil beds with a surface area of greater than half an acre. Of the 6 that met this limit, only 1 of them has a surface area greater than 1 acre. These 6 patches however contain 63% of the milfoil in Eagle Lake. Of the 38 other patches, all but 3 of these were smaller than ¼ of an acre. However, it is interesting to note that of the 23 patches that were large than 100 square feet, 10 of them are located around Fox Island and the causeway, where milfoil was originally found in Eagle Lake (Figure 3). This means that the concentration of milfoil in the area between Fox Island, Route 74, and the Causeway is 6 times greater than it is in Eagle Lake as a whole. The percentage of Eagle Lake being covered by Milfoil in this portion of the Lake is just under 13% of the surface area. It is also interesting to note that this is also the location of 2 of the patches that are larger than 1/2 half an acre in size. An explanation for this may

be that the milfoil, since it was first identified in this area, may be better established than in the other parts of Eagle Lake, as well as it being a relatively wind sheltered area, that allows milfoil fragments to collect, and become established plants.

Another section on the Eagle Lake that has a high concentration of milfoil, is Crown Point Beach. This area actually has three patches that are separated by about 10 feet, and stretch from the south side of Crown Point Bay to past Janie Stevens's boathouse (figure 4). However these three separate patches contain 2.11 acres of milfoil, or nearly  $\frac{1}{4}$  of the milfoil in Eagle Lake. The other two remaining patches, are the one in the bay between Bob Steven's and Bill Knaus's boathouse and the patch around Sunken Island, with surface area's of 0.70 and 0.59 acres respectively (Figures 4 & 5 respectively). There were no major milfoil patches on the West End of the lake, with the total surface area between the 5 patches, being just over  $\frac{4}{5}$  of an acre, as well as the percentage of surface coverage being half the east end of the lake at just over 1%.

It is interesting to note that of all of the milfoil in the East End of Eagle Lake, 53% of it is located around the Beach and Around Fox Island. I therefore suggest the continued survey of these two sections of Eagle Lake so that they include depth measurements, sediment analysis, and plant density studies at these sites, to determine if possible why the milfoil grows so well in these two locations. It is also suggested that due to the fact that there were, in past years, patches of milfoil on Eagle Lake, that no longer exist (ex. in front of the Tiedemann residence), that similar measurements also be taken there to determine if possible why milfoil no longer grows there. Also I suggest that those sites that are marked on the map as being hand-harvestable be hand-harvested so that they are no longer potential places for milfoil to spread from. It is also suggested that Eagle Lake be surveyed on a yearly basis for new areas of milfoil growth so that they can be acted on before they become a major problem, with a resurvey of the already identified patches every few years so as to be able to track the growth or decline of these patches.

Special thanks to: International Paper for providing the grant which allowed us to purchase the GPS unit, Larry Eichler at the Darien Freshwater Institute for providing technical assistance in the selection of a GPS unit and on the operation of MapInfo, Scott Davis for his time spent out on Eagle Lake with me surveying the patches, Hydes Boat & RV for providing us with a GPS unit at cost, to Rolf Tiedemann for the use of his boat in the survey process, and to anyone else who I may have missed that contributed to the project.

Figure 1

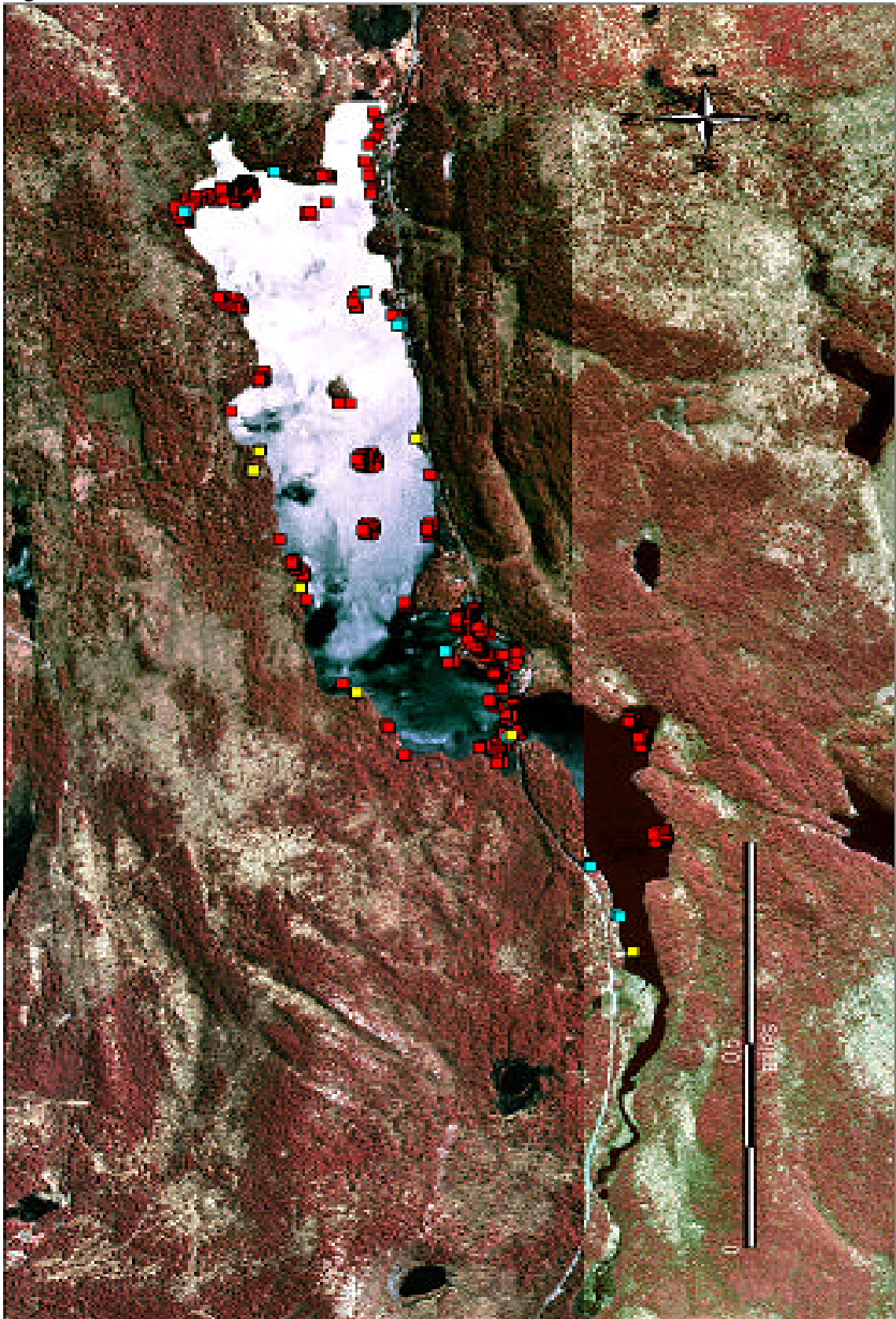


Figure 2

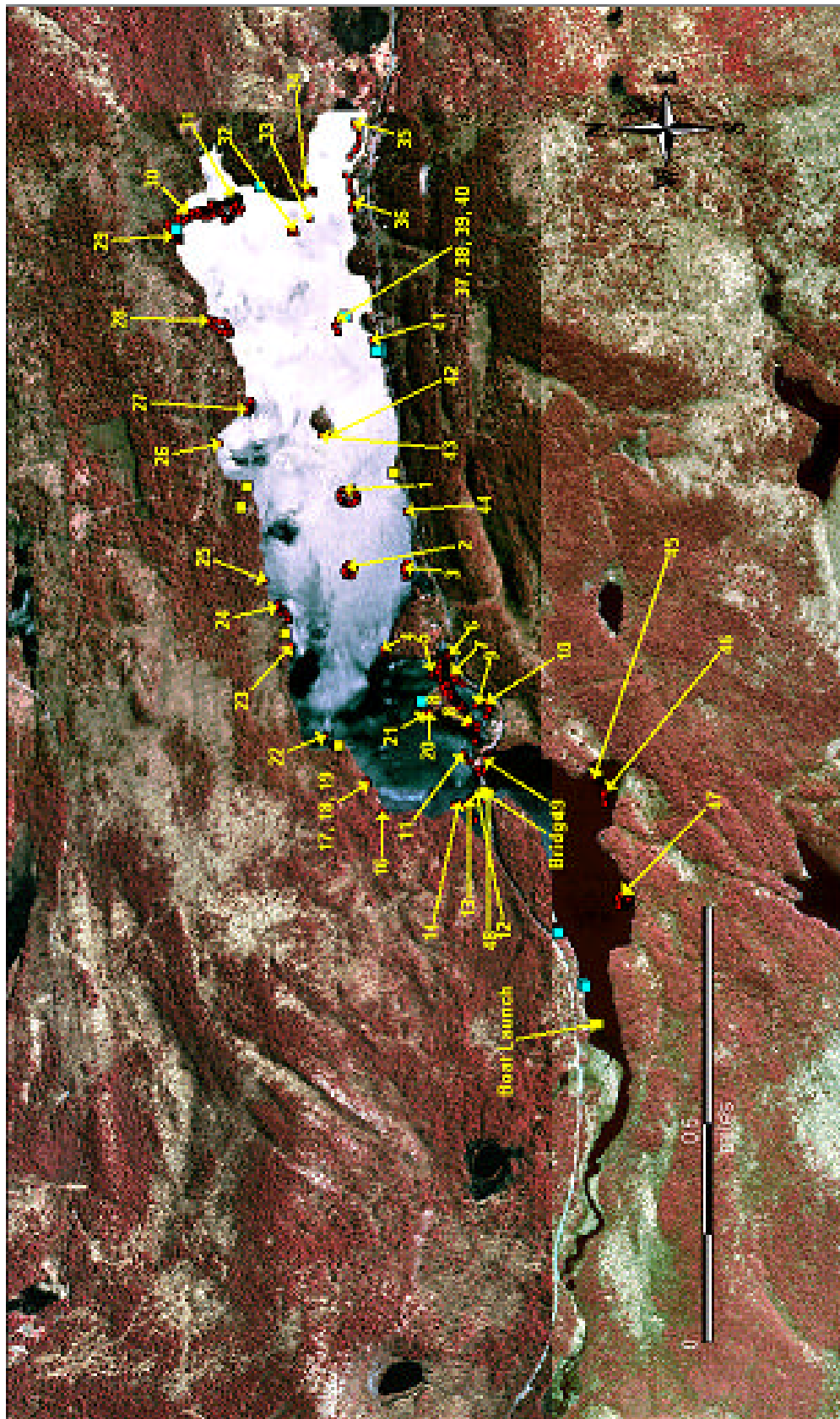


Figure 3



Figure 4

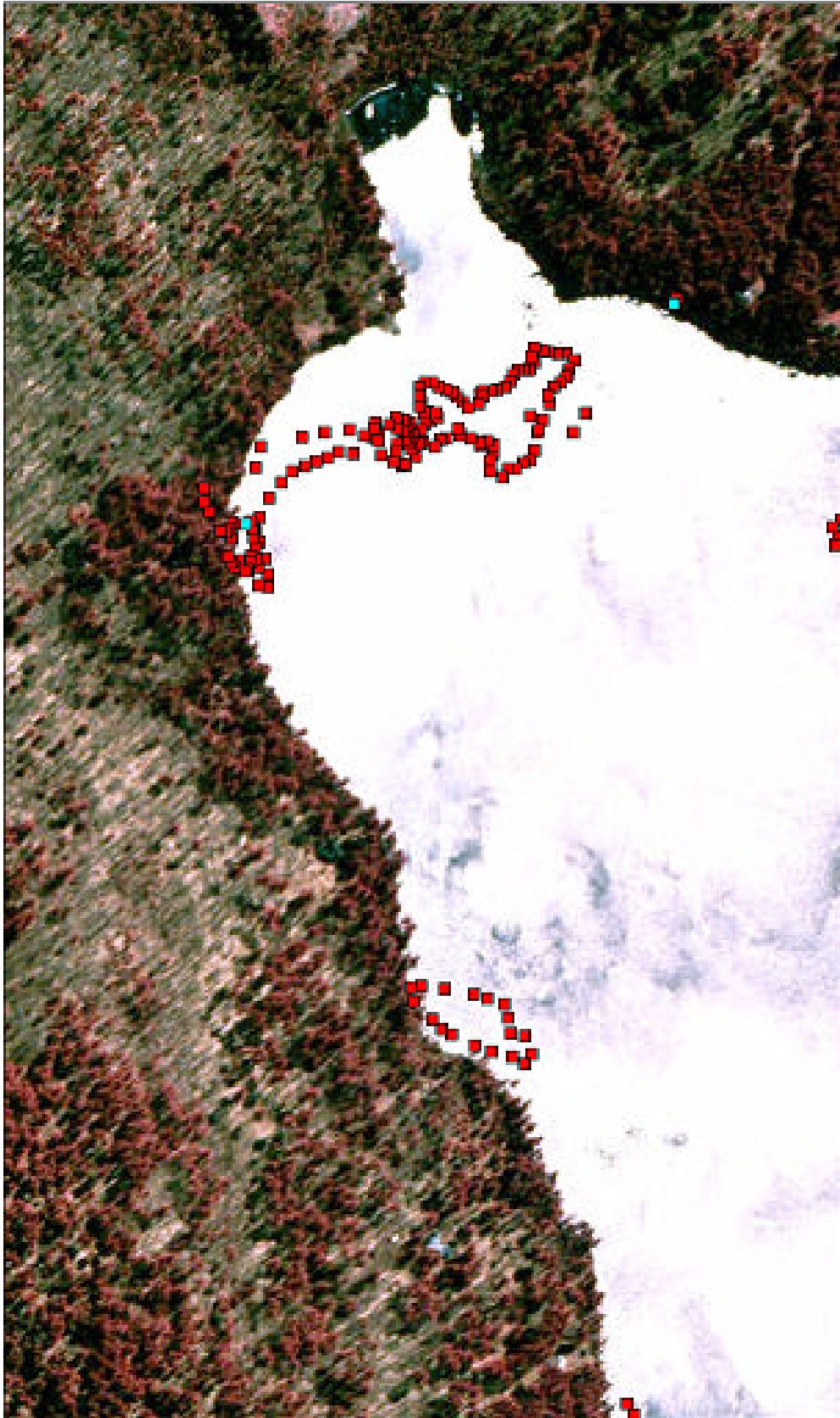
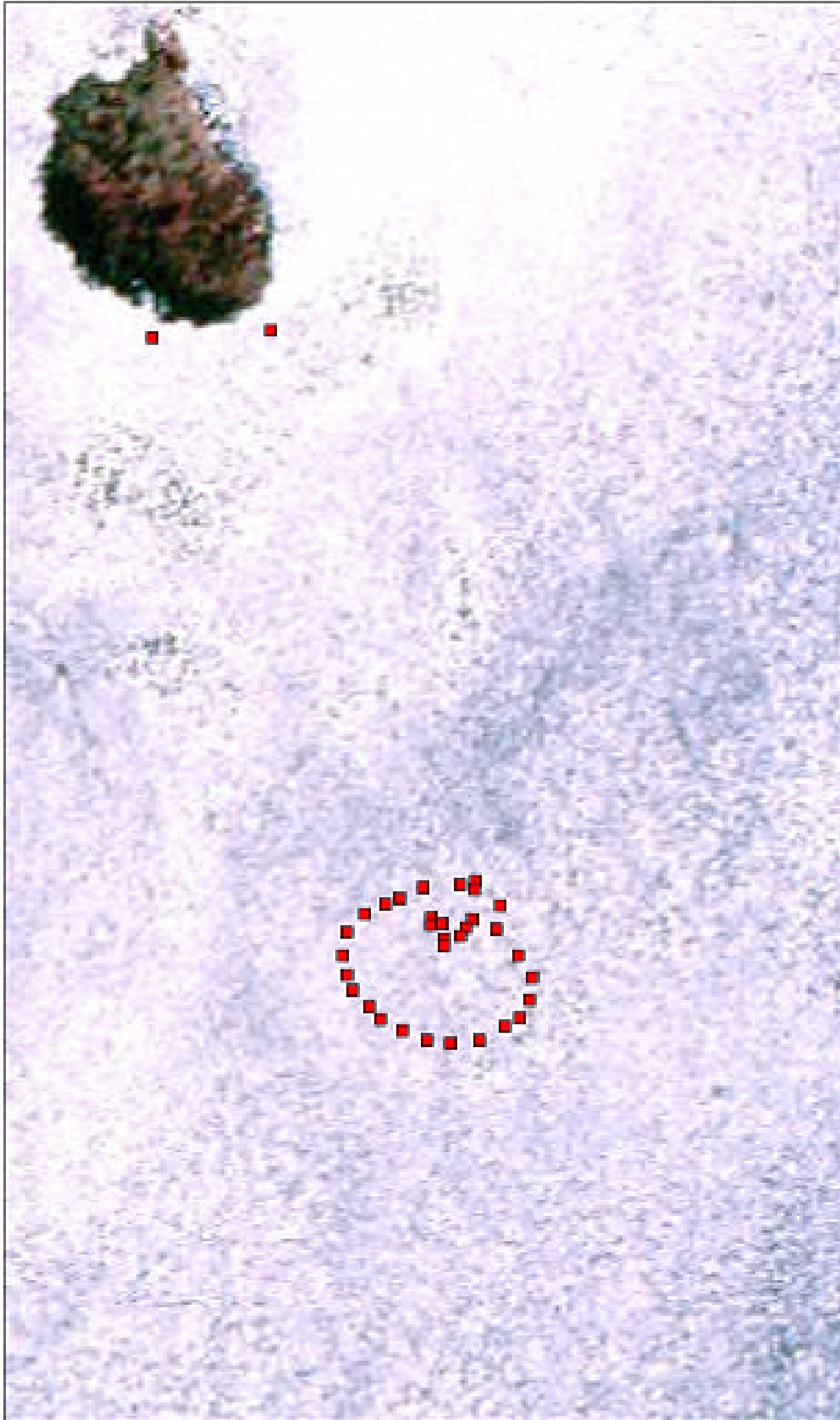




Figure 5



## Sorted By Patch Number

		Data Gathered	
		Summer of 2003	
Patch Name	Patch Number	Patch Size (in Acres)	Patch Size (in Square Feet)
East End of the Lake			
Sunken Island	1	0.70807	30843.52920
Middle of Lake 2	2	0.27620	12031.27200
Corner of Herd Point along 74	3	0.27340	11909.30400
Herd Point	4	0.07709	3358.04040
Between Fox Island and Burrough's	5	0.05131	2235.06360
Along 74 by Bouroughs	6	0.03708	1615.20480
Along 74 across from Fox Island	7	0.10630	4630.42800
Along Fox Island South Side	8	0.65090	28353.20400
Between Fox Island, 74 and Zankales	9	0.02064	899.07840
Zankales	10	0.12120	5279.47200
Along 74 by Cabins	11	0.13240	5767.34400
Causeway	12	0.03529	1537.36308
Between Causeway and Causeway Cove	13	0.66354	28903.80240
Causeway Cove	14	0.10510	4578.15600
Along Shoreline from 74 to Aldens	15	0.00230	100.00000
Along Shoreline from 74 to Aldens	16	0.00230	100.00000
Along Shoreline from 74 to Aldens	17	0.00230	100.00000
Along Shoreline from 74 to Aldens	18	0.00230	100.00000
Along Shoreline from 74 to Aldens	19	0.00230	100.00000
Along North Shore of Fox Island	20	0.00230	100.00000
Along North Shore of Fox Island	21	0.00230	100.00000
Ore Bed Bay	22	0.00369	160.70000
In Front of Barwigs	23	0.00230	100.00000
Between Barwig's and Emerich's	24	0.16860	7344.21600
In Front of Emerich	25	0.00230	100.00000
Between Tiedemann's and Patterson's	26	0.00230	100.00000
In Front of Anne Patterson's	27	0.10940	4765.46400
Bewtween Knauss's and Steven's	28	0.59230	25800.58800
In Front of Janie Steven's Boathouse	29	0.17640	7683.98400
In Front of Beach	30	0.66530	28980.46800
Across Crown Point Bay	31	1.27700	55626.12000
Harris Point	32	0.04566	1988.94960
Harris Point 2	33	0.00230	100.00000
Harris Boathouse	34	0.12120	5279.47200
Ti Bay	35	0.24480	10663.48800
Ti Bay 2	36	0.36020	15690.31200
Turtle Island	37	0.00230	100.00000
Turtle Island 2	38	0.02542	1107.29520
Turtle Island 3	39	0.01228	534.91680
Turtle Island 4	40	0.00230	100.00000
Kral	41	0.09641	4199.61960
Charles Island	42	0.00230	100.00000
Charles Island	43	0.00230	100.00000

Clarence Waters	44	0.01450	631.62000
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West End Of The Lake		Size in Acres	Size in Square Feet
Ruck's	45	0.1142	4974.55200
Ruck's	46	0.14070	6128.89200
Martin's	47	0.42830	18656.74800
Forest Leyer	48	0.05932	2583.97920
Along the Causeway	49	0.08653	3769.24680

East End	Total East End	7.20612	313898.47508
West End	Total West End	0.82905	36113.41800
	Total	8.03517	350011.89308

Lake Area		Size in Acres	Size in Square Feet
East End Lake Surface Area		340.00	14810400.00
West End Lake Surface Area		75.81	3302283.60
Fox Island Surface Area		2.51	109204.92
Charles Island Surface Area		1.43	62377.92
Turtle Island Surface Area		0.11	4835.16
	Total East End	335.95	14633982.00
	Total West End	75.81	3302283.60
	Total	411.76	17936265.60
1 acre is equal to 43560 square feet			

## Sorted By Patch Size

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		Summer of 2003	
Patch Name	Patch Number	Patch Size (in Acres)	Patch Size (in Square Feet)
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Across Crown Point Bay	31	1.27700	55626.12000
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In Front of Beach	30	0.66530	28980.46800
Between Causeway and Causeway Cove	13	0.66354	28903.80240
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Along 74 by Cabins	11	0.13240	5767.34400
Zankales	10	0.12120	5279.47200
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Causeway	12	0.03529	1537.36308
Turtle Island 2	38	0.02542	1107.29520
Between Fox Island, 74 and Zankales	9	0.02064	899.07840
Clarence Waters	44	0.01450	631.62000
Turtle Island 3	39	0.01228	534.91680
Ore Bed Bay	22	0.00367	160.00000
Turtle Island 4	40	0.00230	100.00000
Turtle Island	37	0.00230	100.00000
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