

Watershed Stewardship Program Summary of Programs and Research 2012



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Cover: Lake Flower boat launch.
This page: Raquette Lake.

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Executive Summary and Introduction

By Eric Holmlund, Director

Paul Smith's College's Watershed Stewardship Program (WSP) is the public education and aquatic invasive species (AIS) spread prevention element of the College's Adirondack Watershed Institute (AWI), which works to improve the quality of ecosystems through environmental research and management of AIS infestations across the Adirondack Park. The WSP mission involves providing on-site stewardship of terrestrial and aquatic natural resources, primarily through public education, field monitoring, and service work. The WSP works closely with state environmental agencies and local advocacy groups, such as lake owner associations and regional environmental organizations, to protect the integrity of native ecosystems from the negative effects of invasive species. Since 2000, when the WSP began posting stewards at Upper St. Regis Lake and St. Regis Mountain, the program has gradually expanded through the central Adirondacks, building relationships with lake associations, state foresters, forest rangers, fisheries staff, and conservation police as the challenge of invasive species becomes an ever greater priority among the science, property owner, and tourism communities of the region.

After a decade of gradually increasing service made possible by a combination of local lake association sponsorship, grants from private foundations and regional NGO's, and federal support designated through the New York State Office of Invasive Species Coordination, the WSP tripled in scope in 2011 with a large award for stewards in the Lake Ontario watershed from the United States Fish and Wildlife Service through funding designated by the Great Lakes Restoration Initiative. Under this award, the WSP posted stewards throughout the western Adirondack Park, from Old Forge to Cranberry Lake. In 2011, the Environmental Protection Agency awarded the WSP with funding to continue and expand the program for the 2012 field season. Together with important grant support from the Lake Champlain Basin Program (LCBP), the WSP has been able to post stewards at important waterways throughout the western and central Adirondacks, complementing the boat ramp steward coverage in the eastern Adirondacks by the Lake George Association (LGA), the LCBP, and the Schroon Lake Association.



Figure 1- Watershed Steward Cody Rickman, Saratoga Lake.

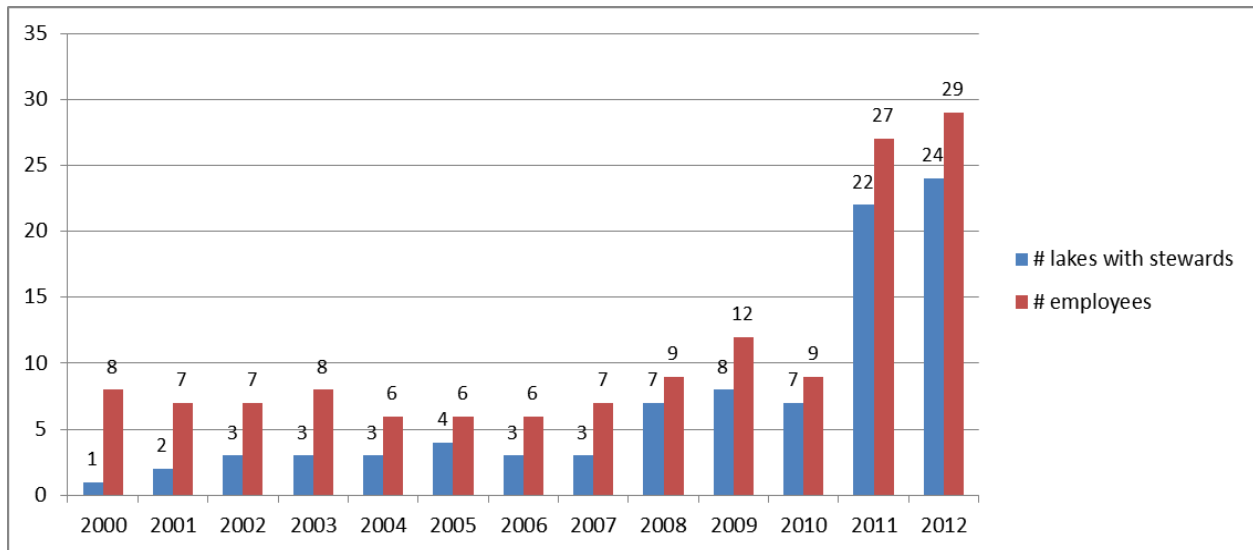


Figure 2-WSP growth, boat ramps and employees, 2000-2012.

For the last decade, the Watershed Stewardship Program has worked closely with the Adirondack Park Invasive Plant Program (APIPP) which has served as the regional coordinator of invasive species programming and principal New York State liaison for the Adirondack region. In this capacity, APIPP, the WSP, the LGA, and the LCBP have joined together as the Adirondack Watershed Stewardship Program to coordinate steward messages, procedures, data collection, publications, and staff training. The WSP has served as a resource for developing programs from across the state, which have observed our regional steward training at Paul Smith's College, and used our staff handbook, procedures and materials to support the development of their own program procedures and materials. In their turn, these organizations have shared their own lessons and best practices with the Adirondack Watershed Stewardship Program partners.

For the fifth year, the WSP hosted a regional training for boat ramp stewards from the Lake George Association, our own WSP stewards, and stewards sponsored by individual lake associations across the Adirondack Park. Over 60 stewards from across the state traveled to Paul Smith's College's Joan Weill Student Center during the week before Memorial Day to experience a multiple-element staff training. Staffers from APIPP, AWI, LCBP, LGA, and WSP gave hands-on training sessions on AIS identification and ecology, public interaction and education skills, and data collection procedures. In addition, trainees benefited from presentations by the Department of Environmental Conservation, the New York State Office of Historic Preservation, and the Adirondack Park Agency.



Figure 3-- New York State Department of Environmental Conservation Region 5 Director, Robert Stegemann, Adirondack regional steward training at Paul Smith's College, May, 2012.



Figure 4-Regional steward training, Paul Smith's College 2012.

In 2012, stewards were stationed at 24 different boat launches across the Adirondack Park. Variations in coverage depended on funding resources allocated by lake associations and grant sources. In some instances, coverage was increased by volunteer steward coverage, as was the case with Rainbow Lake, Long Lake, Raquette Lake, and Osgood Pond. 2012 was the first year that the program provided stewards at Chateaugay Lake, which is a popular northern Adirondack waterway infested with Eurasian watermilfoil, and White Lake, a privately owned lake right along the route 28 entryway to the western Adirondack Park. The WSP increased coverage at Stillwater Reservoir and Forked Lake as well.

Table 1-- Scope of boat ramp coverage, WSP 2012

Duty Post	Coverage, days per week
Chateaugay Lake	weekends
Cranberry Lake	5
Eighth Lake Campground	1
Forked Lake Campground	1
Fourth Lake	4
Hoel Pond, St. Regis Canoe Area	1
Lake Flower	5
Lake Placid	7
Lake Placid Village	weekends
Little Clear Pond, St. Regis Canoe Area	3
Limekiln Lake Campground	1
Long Lake	7
Meacham Lake	weekends
Osgood Pond	2
Rainbow Lake	5
Raquette Lake, Village Boat Launch	7
Raquette Lake, Burke's Marina	2
Saratoga Lake	7
Second Pond	5
Seventh Lake	5
Stillwater Reservoir	4
Tupper Lake	5
Upper St Regis Lake	7
White Lake	weekends

The WSP's 26 Watershed Stewards kept busy inspecting a total of over 24,000 boats and imparting an invasive species awareness message to almost 50,000 people across 24 sites. Saratoga Lake was again the busiest site, representing over 3,600 boat inspections and over 8,000 members of the public contacted. Second Pond was the next busiest site, with over 3,000 boats inspected, followed by Lake Placid and Long Lake, each with over 2,000 boat inspections performed.

Table 2-Comprehensive data summary, 2012; M = motorboat; PWC = personal watercraft; S = sailboat; C = canoe; K = kayak; B = construction barge; R = rowboat; SUP= stand-up paddleboard; Docks = boat docks launched for seasonal installation/maintenance.

WSP Data Summary, 2012 Waterbody	Boat Type										total #	total #	organisms found	
	M	PWC	S	C	K	B	R	SUP	Docks	boats	people	entering	leaving	
Chateaugay Lake	770	96	1	23	66	0	9	0	0	965	2391	65	90	
Cranberry Lake	963	53	8	90	87	0	3	0	4	1208	2922	84	53	
Eighth, Forked, Limekiln, White Lakes	191	71	0	219	165	2	18	2	2	670	1325	47	38	
Fourth Lake	1291	333	23	12	85	6	2	0	0	1752	4393	118	44	
Lake Flower	1010	63	2	204	200	4	14	1	0	1498	2995	81	186	
Lake Placid	1183	0	15	180	571	4	11	52	0	2016	3765	38	13	
Lake Placid Village	143	1	0	40	56	0	0	0	0	240	456	3	1	
Long Lake	1236	105	10	568	402	2	18	0	4	2345	4779	185	96	
Meacham Lake	137	52	2	23	34	0	6	0	0	254	641	6	7	
Osgood Pond	19	3	0	79	78	0	15	0	0	194	303	5	6	
Rainbow Lake	235	6	0	138	276	0	25	0	0	680	1215	27	63	
Raquette Lake (all locations)	994	80	4	273	348	12	5	0	1	1717	3021	100	90	
Saratoga Lake	3460	71	18	34	71	0	11	0	0	3665	8076	322	720	
Second Pond	870	55	10	936	1091	0	22	19	0	3003	5393	49	120	
Seventh Lake	253	19	2	89	1	182	3	6	0	555	1236	19	18	
SRCA: Hoel Pond, Little Clear Pond	0	0	0	349	133	0	3	4	0	489	736	4	9	
Upper St. Regis Lake	297	0	15	349	313	4	5	0	0	983	1525	13	15	
Tupper Lake	863	42	20	125	79	4	3	0	0	1136	2448	42	96	
Stillwater Reservoir	590	32	6	140	233	0	10	0	0	1011	2097	54	26	
totals	14505	1082	136	3871	4289	220	183	84	11	24381	49717	1262	1691	

As a result of 23,415 boat inspections, stewards removed 2,965 organisms (invasive and non-invasive) from boats entering or leaving boat ramps, for a 12.7% organism transport rate over all 24 sites, and all watercraft types, which represents a 33% increase from 2011 (8.5% from 22 sites). Organism transport rates for waterways staffed regularly ranged from a high of 25% range (Saratoga Lake) to lows in the single percents (Second Pond- 7%, Seventh Lake 7%, Lake Placid 2%, etc.). 435 fragments of Eurasian watermilfoil, 194 of curly-leaf pondweed, 58 of variable-leaf milfoil, 24 zebra mussels sightings and 21 fragments of water chestnut comprised the total invasive species removed over the summer. The majority of these AIS were encountered at Saratoga Lake. Overall, approximately 87% of boats visiting the waterways covered by the WSP can be expected to be "clean" or weed-free, with 2.9% of all inspections resulting in detection of visible AIS.

Table 3-Summary of organisms removed from watercraft, 2012; BW = bladderwort; CLP = curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC= water chestnut; ZM = Zebra mussel.

WSP Data Summary, 2012	organism type								
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other
Chateaugay Lake	5	7	69	22	2	0	0	2	48
Cranberry Lake	5	9	16	71	1	1	0	1	33
Eighth, Forked, Limekiln, White Lakes	1	1	0	39	2	1	0	0	41
Fourth Lake	6	3	11	83	8	5	3	1	42
Lake Flower	9	4	36	152	7	24	0	0	35
Lake Placid	1	0	1	43	1	0	0	0	5
Lake Placid Village	0	0	0	3	0	0	0	0	1
Long Lake	9	0	1	89	1	1	2	0	178
Meacham Lake	0	1	0	9	0	0	0	0	3
Osgood Pond	1	0	0	3	3	0	0	0	4
Rainbow Lake	7	1	0	17	0	0	0	0	65
Raquette Lake (all locations)	34	2	4	74	7	20	4	1	44
Saratoga Lake	2	159	228	283	8	0	11	19	332
Second Pond	3	3	48	94	0	3	0	0	18
Seventh Lake	1	0	6	21	2	0	0	0	7
SRCA: Hoel Pond, Little Clear Pond	0	0	0	10	2	0	0	0	1
Upper St. Regis Lake	0	0	1	24	0	1	0	0	2
Tupper Lake	12	0	1	129	0	1	0	0	6
Stillwater Reservoir	1	4	13	39	0	1	1	0	22
totals	97	194	435	1205	44	58	21	24	887
% of visitor groups with organisms on watercraft	0.4%	0.8%	1.9%	5.1%	0.2%	0.2%	0.1%	0.1%	3.8%

Of the 2,965 organisms removed over the summer, 674 are considered aquatic invasive species by the APIPP, constituting 22.7% of organisms removed from watercraft. Stewards positively identified Eurasian watermilfoil from among organisms removed from watercraft 435 times over the summer, with the highest incidence of this invasive species at Saratoga Lake (228 samples), Chateaugay Lake (69), Second Pond (48), Lake Flower (36 samples), Cranberry Lake (16), Stillwater Reservoir (13) and Fourth Lake (11) and other lakes in the single digits (**Error! Reference source not found.**). Zebra mussels were discovered 24 times, in greatest numbers at Saratoga Lake. Curly leaf pondweed was found 194 times, mostly at Saratoga Lake, which has dense growth immediately adjacent to the boat ramp. Variable leaf milfoil was found most frequently at Raquette Lake and Lake Flower. Various grasses were most commonly found and removed, along with “other,” a category reserved for miscellaneous and unknown organisms such as pine needles, spider webs, mud and badly degraded organics that hopefully pose little risk of introducing new AIS.

Table 4- AIS spread prevention information, 2012. Yes = took one or more AIS spread prevention measures; I = inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = disposed of unused bait; Dry = dried boat.

WSP Data Summary, 2012 Waterbody	# groups taking AIS spread prevention measures										# inspections	
	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	# groups	by group	
Chateaugay Lake	549	130	339	43	1	10	0	73	0	877	1095	
Cranberry Lake	660	154	315	219	4	34	1	116	0	1097	1201	
Eighth, Forked, Limekiln, White Lakes	266	71	201	9	0	0	0	33	3	530	608	
Fourth Lake	1121	251	800	190	0	16	0	83	24	1486	1842	
Lake Flower	824	521	544	33	3	5	1	58	2	1332	1516	
Lake Placid	981	343	690	45	2	5	1	50	3	1600	2265	
Lake Placid Village	146	69	118	9	0	0	0	9	5	211	275	
Long Lake	1046	320	795	83	6	14	1	48	1	1571	1950	
Meacham Lake	141	54	82	14	0	2	0	9	0	212	274	
Osgood Pond	108	38	73	1	0	1	1	33	1	140	214	
Rainbow Lake	321	147	217	24	0	7	3	45	0	525	676	
Raquette Lake (all locations)	657	249	436	113	2	26	1	64	26	990	1131	
Saratoga Lake	1573	471	1073	157	0	68	0	48	1522	3442	4094	
Second Pond	1323	767	909	43	0	7	0	165	29	2313	2411	
Seventh Lake	330	116	214	21	0	0	0	29	6	507	630	
SRCA: Hoel Pond, Little Clear Pond	169	59	107	1	0	0	0	27	0	294	355	
Upper St. Regis Lake	452	251	308	7	1	6	3	50	10	717	865	
Tupper Lake	653	277	432	45	0	7	2	31	2	808	1189	
Stillwater Reservoir	210	130	48	22	1	4	0	16	57	785	824	
totals	11530	4418	7701	1079	20	212	14	987	1691	19437	23415	
% of groups taking AIS spread prevention measures	65%	25%	43%	6%	0%	1%	0%	6%	10%			

Stewards at all 24 sites encountered a total of 19,437 groups of visitors, each of whom was asked about the AIS spread prevention measures they took prior to arriving at the boat ramp. 65% (66% in 2011) of visitors queried reported taking some spread prevention measure; some of these visitors took more than one measure, so the total adds up to greater than 100%. 25% (27% in 2011) inspected their boats prior to launching, 43% (43%) washed them, and 12% (17%) drained the bilge or dried their boats. Safely disposing of unwanted bait remains an infrequently exercised AIS spread prevention measure (Figure 2).

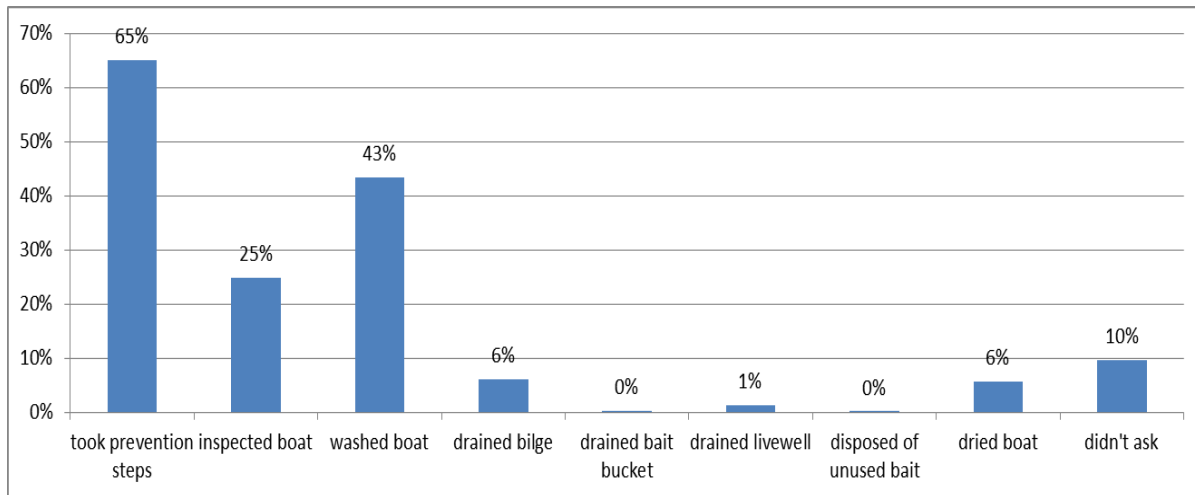


Figure 5-AIS spread prevention measures taken, all WSP sites, 2012.

Table 5-Percent of respondents adopting any AIS spread prevention measure, WSP boat ramps, 2012

WSP Data Summary, 2012	
Waterbody	yes %
Chateaugay Lake	63%
Cranberry Lake	60%
Eighth, Forked, Limekiln, White Lakes	50%
Fourth Lake	75%
Lake Flower	62%
Lake Placid	61%
Lake Placid Village	69%
Long Lake	67%
Meacham Lake	67%
Osgood Pond	77%
Rainbow Lake	61%
Raquette Lake (all locations)	66%
Saratoga Lake	46%
Second Pond	57%
Seventh Lake	65%
SRCA: Hoel Pond, Little Clear Pond	57%
Upper St. Regis Lake	63%
Tupper Lake	81%
Stillwater Reservoir	27%
totals	59%

The total percentages of visitors taking any AIS spread prevention measures varied from lake to lake. The steward survey of visitors revealed high rates of visitors reporting spread prevention measures at Tupper Lake (81% of visitors taking AIS spread prevention measures; 68% in 2011), Osgood Pond (77%; 56%), Fourth Lake (75%; 65%), Meacham Lake (67%; 58%) and Long Lake (67%; 50%). The lowest rates occurred at Stillwater Reservoir (27%; 59%), Saratoga Lake (46%; 73%) and the St. Regis Canoe Area (57%; 59%). There are two dimensions of variability: across waterways and between years. At this point there is no definitive explanation for the differences.

Analysis of prior waterway visitation

Stewards ask each visitor group where their boat has been last in the prior two-week period. The 19,437 groups in the survey reported a wide range of prior waterways they had visited. Visitors reported using their boats at 525 different waterways in the prior two-week period (up 15% from the 458 reported in 2011). These waterways were located all over the eastern United States and Canada, with a few from points more distant. An analysis of the top 50 responses, excluding same-lake responses (e.g., a visitor from Lake Placid listing "Lake Placid" as the prior lake visited, constituting 32% of total visits), shows a range of responses. The most frequent response was "None" (39% of all visits) followed by "rental" (3.8%), the Saranac Lake Chain (3.3%), the Fulton Chain of Lakes (1.3%), and descending to the fiftieth most common prior waterway, Osgood

Pond (0.14%). Visitors were almost three times as likely to have visited the Saranac Lake Chain as they were to have visited the next most mentioned lake, the Fulton Chain. Overall, there was great variety in prior waterways mentioned by visitors, with most lakes well under 1% of total visits. 232 of the 525 waterbodies mentioned were cited only one time each, representing a total of 1.3% of total visits (232 of 17,748 groups responding to the question). The top 5 most reported prior waterways remained consistent with those reported in 2011, with changes in order. The next 5 showed greater change compared with 2011, with Lake Flower and Lake George declining in rank, replaced in the top 10 by Mirror Lake and Raquette Lake.

Table 6- 50 most-visited waterways in two-week prior period, all WSP lakes, 2012.

Combined WSP Site Visits 2012				
Prior Waterway Visited	Sum of all visits	% of total visits	Rank in 2012	Rank in 2011
None	7517	38.68%	1	2
Same-lake prior visit	6200	31.90%	2	1
Rental	733	3.77%	3	4
Saranac Chain	632	3.25%	4	3
Fulton Chain	246	1.27%	5	5
Lake Champlain	208	1.07%	6	8
Lake Placid	144	0.74%	7	7
Hudson River	134	0.69%	8	10
Raquette Lake	121	0.62%	9	15
Mirror Lake	113	0.58%	10	18
St. Lawrence River	110	0.57%	11	13
Lake George	108	0.56%	12	9
Oneida Lake	107	0.55%	13	24
Lake Ontario	98	0.50%	14	11
Tupper Lake	93	0.48%	15	12
Upper St. Regis Lake	75	0.39%	16	19
Long Lake	74	0.38%	17	20
Lake Flower	72	0.37%	18	6
Mohawk River	72	0.37%	19	14
Great Sacandaga Reservoir	58	0.30%	22	16
Delta Lake	52	0.27%	23	40
Raquette River	48	0.25%	26	25
Indian Lake	47	0.24%	28	52
Black River	43	0.22%	29	71
Schroon Lake	43	0.22%	30	23
Follensby Clear Pond	42	0.22%	31	41
Blue Mountain Lake	39	0.20%	32	39
Lake Bonaparte	39	0.20%	33	29
Saratoga Lake	39	0.20%	34	31
Black Lake	34	0.17%	35	45
Chateaugay Lake	34	0.17%	36	27
Lake Colby	34	0.17%	37	32
Sacandaga Lake	34	0.17%	38	51
Canandaigua Lake	33	0.17%	39	36
Atlantic Ocean	32	0.16%	40	26
Fish Creek Pond	32	0.16%	41	21
Saranac River	31	0.16%	42	38
Kayuta Lake	30	0.15%	43	73
Forked Lake	29	0.15%	44	86
Hinckley Reservoir	29	0.15%	45	54
Rainbow Lake	28	0.14%	46	34
Skaneateles Lake	28	0.14%	47	51
Big Moose Lake	27	0.14%	48	64
Cayuga Lake	27	0.14%	49	57
Osgood Pond	27	0.14%	50	33

A large percentage of visitors, differing among the 24 boat ramps, reported having visited the same lake as the last lake they had visited in the prior two-week period. These “same-lake prior visits” represented 6,200 total responses or 32% of the total visits in the data set. In sum, two answers comprise 71% of the responses for the prior-waterway question: “none” (39%) and “same-lake” (32%). Both of these categories represent lower risk of transporting AIS; therefore, 71% of visiting boats in this study presented a lower (possibly inconsequential) risk of transporting new AIS to waterways.

However, the same-lake prior visit figures vary considerably among the 24 lakes in the study (Table 7). 80% of visitors (58% in 2011) to Lake Placid’s Village Launch cite it as a prior waterway, followed by 53% (52%) of visitors to Saratoga Lake, Tupper Lake (52%; 57%), Lake Placid (46%; 60%), and Lake Flower (48%; 40%). Lake Placid (Village site), Saratoga Lake and Tupper Lake can be thought of as “repeat-visit” lakes, with over half of visitors using their watercraft on these lakes before. Over half of the boats visiting repeat-visit lakes can be considered “lower risk.”

Conversely, several lakes can be thought of as “new-visit” lakes, with far greater percentages of visitors reporting a wide range of prior waterway visits. The lakes with the lowest same-lake prior visit figures (“new-visit” category) are Forked Lake (3% same-lake visits), Chateaugay Lake (9%), Second Pond (10%), Cranberry Lake (16%), Raquette Lake (17%) and White Lake (17%). Over 80% of the visitors to these waterways can be considered “higher risk” since they are much more likely than visitors to the repeat-visit category lakes to have visited another waterway, which might host AIS.

Table 7-- Same-lake and prior-lake diversity analysis, WSP lakes, 2012.

Lake	Total # visits by groups	Same-lake prior visits, % of total visits	Total # waterbodies reported for prior visits	Shannon-Weiner Index of Diversity	Shannon-Weiner 2011 value
Raquette Lake	990	17%	92	3.29	2.93
Hoel and Little Clear Pond	294	18%	59	3.24	3.32
Upper St. Regis Lake	717	24%	88	3.17	2.95
Long Lake	1571	16%	102	3.04	2.78
Osgood Pond	140	19%	31	3.03	2.64
Second Pond	2313	10%	163	2.99	3.39
Cranberry Lake	1097	16%	77	2.85	2.99
Rainbow Lake	525	34%	52	2.71	3.03
Seventh Lake	507	21%	59	2.70	2.71
Fourth Lake	1486	26%	76	2.67	2.91
White Lake	253	17%	27	2.26	NA
Eighth Lake	59	24%	15	2.14	NA
Lake Placid	1600	46%	128	2.13	1.97
Lake Flower	1332	38%	80	2.12	2.25
Meacham Lake	212	30%	26	1.98	1.85
Stillwater Reservoir	785	29%	47	1.82	NA
Tupper Lake	808	52%	62	1.49	1.65
Chateaugay Lake	877	9%	54	1.44	NA
Forked Lake	186	3%	24	1.41	NA
Saratoga Lake	3442	53%	81	1.08	1.04
Lake Placid Village	211	80%	19	1.03	1.36

There was a range of diversity in terms of prior waterways reported at each of the 24 boat launches. The total number of different waterways reported at each boat launch ranged from 163 (Second Pond) to 15 (Eighth

Lake). The Shannon-Weiner Index, initially used in the fields of information theory and demographics, measures order or lack thereof in data sets.¹ Ecologists commonly use the Shannon-Weiner Index of Diversity (SW) to assess the biological (species) diversity of test sites. It provides a metric for how the relative uncertainty in predicting the type of an individual selected from a group; in this case it is the amount of uncertainty in predicting the name of the next waterway encountered by boat stewards at a particular boat launch. The SW involves calculating the percent frequency of the different responses (in this case prior-visited water bodies) and multiplying this by the frequency's natural log. The sum of these products for each lake is a value representing diversity, labeled H' . This formula measures water body-variance evenness and richness. That is, the Shannon-Weiner Index score (or *uncertainty* in predicting water bodies) increases when visits to water bodies are both *evenly distributed* (similar number of visits reported for each water body) and *richly varied* (greater comparative number of possible water bodies).

The SW is useful in characterizing boat launch traffic as it indicates the likelihood of boat stewards interacting with visitors from either broadly varied or comparatively homogenous points of origin, which has possible implications for steward allocation. Managers might conclude that, other things being equal, stewards should be preferentially stationed at boat launches with high SW indices of diversity in order to intercept AIS arriving from a long and evenly distributed list of originating water bodies. Of course, the SW should be considered in concert with other indicators of AIS spread risk, such as the proportion of boats encountered that are "dirty" or carrying AIS (see last column of **Error! Reference source not found.**), "new visit" versus "repeat visit" characterized lakes (see above), and comparative traffic levels (slow versus busy launches).

By this metric, Raquette Lake is the most diverse and Lake Placid Village Boat Launch is the least, in terms of the evenness and richness of prior-visited water bodies mentioned by respondents at each site. This indicates that Raquette Lake, Upper St. Regis Lake, Long Lake, Second Pond and the other lakes at the high end of the scale are the more "diverse" boat ramps and could thereby be considered higher risk in terms of being the focal points of *significant numbers of visits each* from a variety of waterways. While Lake Placid has a comparatively high number of different water bodies reported as prior visits (128) it has low *evenness*, that is, the visitor-reported prior water bodies each have highly varied numbers of responses (most are 1, and several are in the double digits; few are in the middle). It is important to note that the Shannon-Weiner diversity scores are on a logarithmic scale, that is, values increase logarithmically, not arithmetically. The chart helps illustrate the comparative differences between the diversity index scores of each lake.

¹ (Raytheon Employees Wildlife Habitat Committee, 2000)

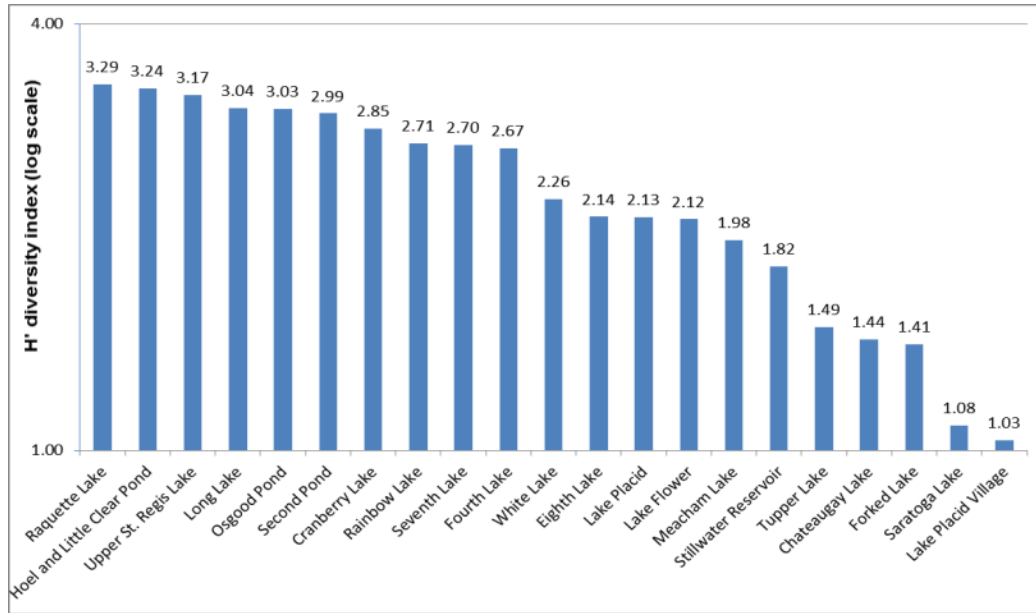


Figure 6- Shannon-Weiner diversity index scores, WSP lakes, 2012.

Multiple-Year perspective

Since 2000, the Watershed Stewardship Program has enjoyed steady growth in terms of the number of lakes served and numbers of boats inspected and people educated. With the increasing and changing array of lakes served by Watershed Stewards, the number of visitors educated by the program has increased dramatically as well. From the initial summer, which saw approximately 1,000 visitors contacted at Upper St. Regis Lake, stewards at 24 lakes contacted almost 50,000 visitors in 2012 (Figure 7). Stewards contacted 186,795 people in total over 12 years.

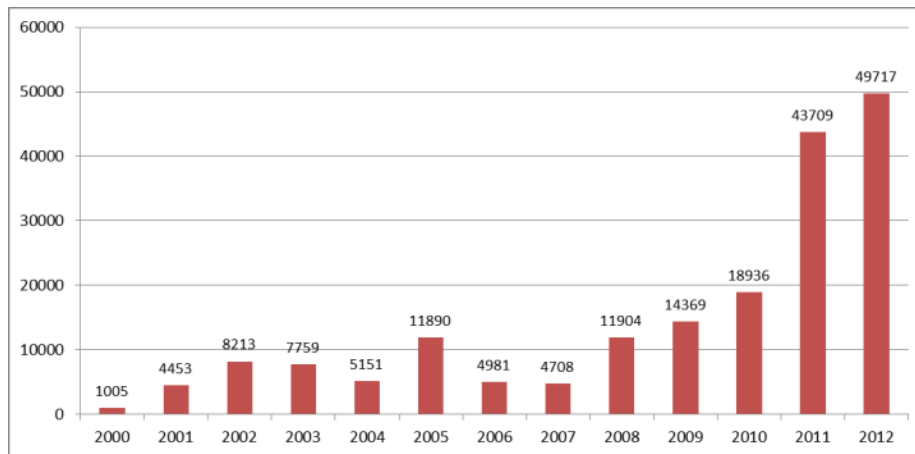


Figure 7- Number of visitors contacted by the Watershed Stewardship Program, 2000-2012.

Another indicator of program growth is the number of boats inspected by stewards at each location over the last thirteen years (Figure 8). Stewards inspected 489 boats in 2000, and 20,634 in 2011, a 40-fold increase. A grand total of 87,446 boats have been inspected over the history of the Watershed Stewardship Program.

Research and Service Projects

In addition to the core duties of educating the public about AIS and inspecting boats to interdict invasive species, our stewards are involved in a variety of service and research functions designed to support the integrity of local ecosystems and to educate the public at large, away from the boat ramp. On the following pages, you will find reports describing research including a study of variable leaf milfoil response to climate change, management of terrestrial invasive species, education and outreach at a variety of venues, field observations of damselflies and dragon flies, observational study of banded loons, and stewardship of two Adirondack mountain summits. These special projects challenge and engage our stewards in useful and important science and service functions that enrich and renew them for their main work at the boat ramps. This element is what distinguishes the WSP from other boat ramp steward programs. Our science projects are under the expert guidance and mentorship of Dr. Celia Evans, WSP Science Director, who provides oversight and technical support as the stewards conduct both field and laboratory work. Our loon monitoring work is directed by Dr. Nina Schoch, who directs the Adirondack Center for Loon Conservation, which is a program of the Biodiversity Research Institute. Our terrestrial invasive species program is a collaboration with the Adirondack Park Invasive Plant Program and The Nature Conservancy. Each of these collaborations allows our stewards valuable opportunities to network with professionals in the natural resources and conservation community. The WSP would like to acknowledge these important partnerships.

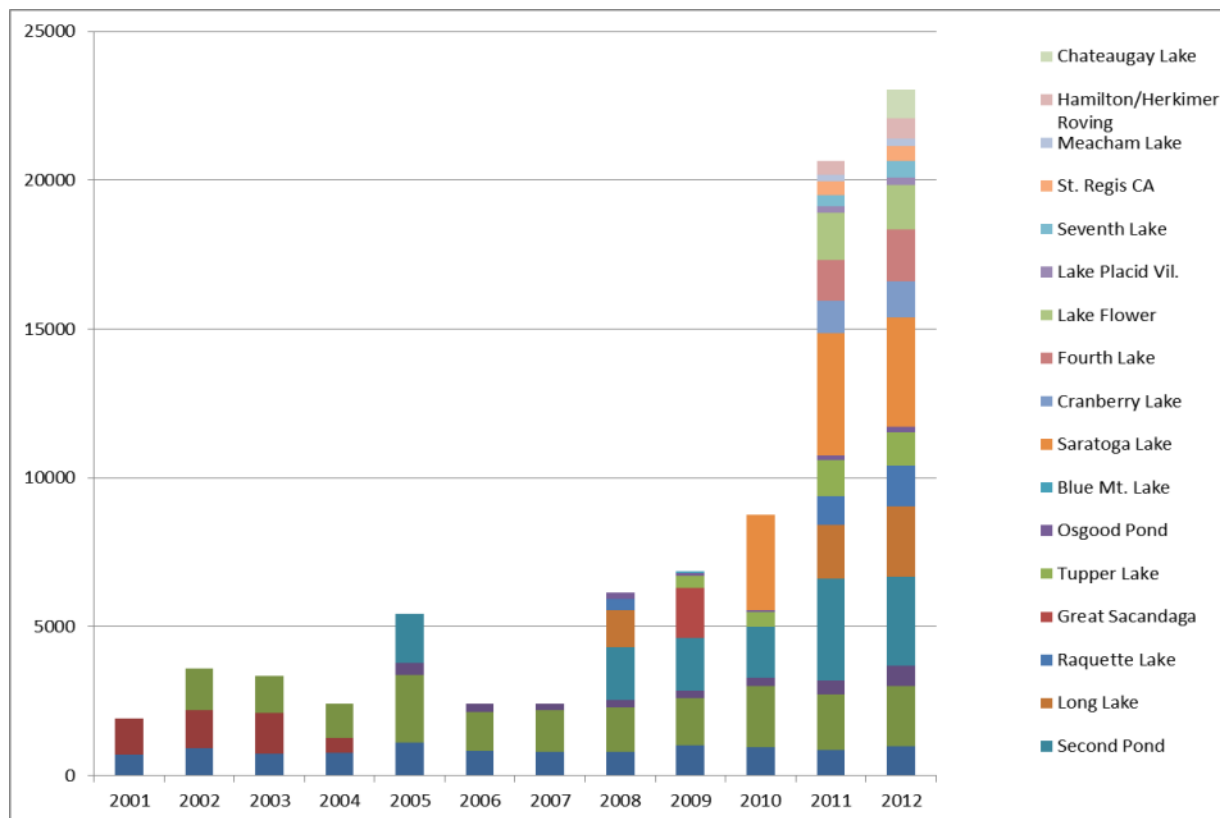


Figure 8- Number of watercraft inspected by Watershed Stewardship Program stewards, 2000-2012.

Conclusion and acknowledgements

The WSP has enjoyed a thirteenth summer of service to Adirondack waterways. Our program is larger in size and scope than ever before, requiring high levels of employee support, coordination, and communication. We would like to acknowledge the funding support of the United States Environmental Protection Agency, the Great Lakes Restoration Initiative, the Lake Champlain Basin Program, the Nature Conservancy, the St. Regis Foundation, the Saratoga Lake Improvement District, the Rainbow Lake Association, and the Lake Placid Shore Owners' Association. In addition to financial support, the invaluable enthusiasm and contributions of people at each of the previously mentioned agencies and associations has injected creativity, enthusiasm and vision into what we do. We gratefully rely on the collaboration of Anne Weld, Mark Wilson, Pat Willis, Jim Hauber, Bob Hall, Pat Deyle, Ken Hawks, Bill Landmesser, Alan McCauley, Bud Thompson, Barbara Taylor, Jackie Mallory, Allen Splete, Phyllis Thompson, Steve Guglielmi, Nick McKay, Kris Alberga, Joe LaPierre, Luke Evans, and our close working group of Hilary, Meghan, Emily and Meg. The WSP is a synergistic program that benefits from the people and organizations within the Adirondack community, and seeks to reciprocate through all of our programming and service.

Reference:

Raytheon Employees Wildlife Habitat Committee. (1999-2000). *Biodiversity Measures: Shannon-Weiner Index*. Retrieved 27, 2012, from REWHC: <http://rewhc.org/biomeasures.shtml#shannon>

West-Central Adirondack Region Summary

By Kathleen Wiley, WSP Assistant Director

Through a grant of continued Great Lakes Restoration Initiative funding designated by the Environmental Protection Agency, the Watershed Stewardship Program (WSP) at Paul Smith's College was able to provide a second year of stewardship in the west-central Adirondack region. The WSP provided part and full-time coverage at 17 public and private boat launches within the Black River, Oswegatchie River, and Raquette River watersheds. The private boat launch in the village of Raquette Lake and the public boat launch on Long Lake again had full-time coverage. There was partial week coverage at the public Meacham Lake Campground, Cranberry Lake, Fourth Lake, Seventh Lake, and Stillwater Reservoir Boat Launches as well as the private White Lake and Burke's Marina Boat Launches. There was weekly coverage at Eighth Lake, Forked Lake, and Limekiln Lake State Campgrounds. The private boat launch for the Hollywood Hills Association was staffed intermittently.

Table 8- Scope of boat ramp coverage, WSP Western Region 2012.

Duty Post	Coverage, days per week
Chateaugay Lake	weekends
Cranberry Lake	5
Eighth Lake Campground	1
Forked lake Campground	1
Fourth Lake	4
Hollywood Hills	as staff available
Limekiln Lake Campground	1
Long Lake	7
Meacham Lake	weekends
Raquette Lake Village	7
Burke's Marina	2
Seventh Lake	5
SRCA	1
Stillwater Reservoir	4
Tupper Lake	5
White Lake	weekends

A conference call was held with the Adirondack White Lake Association on February 10th to discuss posting a steward at the private White Lake Boat Launch. The WSP Director and I met on April 11 at the White Lake Boat Launch with representatives of the Adirondack White Lake Association, the Shores Association, and representatives of the local fire department and town to further discuss the new steward post. On that same day the WSP met with a representative of the Raquette Lake Property Owners Association to discuss the addition of the ILIDS boat launch education and surveillance technology to the village boat launch. I also conducted an end of season meeting on September 21 with two representatives from the Raquette Lake Property Owners' Association at the Raquette Lake School and also met with two representatives of the Adirondack White Lake Association.

Between Memorial Day and Labor Day, the Watershed Stewards inspected 12,117 boats with a total of 26,009 people at 17 boat launches in the west-central region. 63% of the groups took some AIS prevention measures with 20% inspecting their boat, 41% washing their boat, 8% draining the bilge, 6% drying their boat, no groups draining bait buckets or disposing of unused bait, and 1% draining livewells,. 1% of boater groups were not asked. More boaters had heard the message about spreading AIS, this being the WSPs second season in the region and we expect that number to continue to rise in 2013.

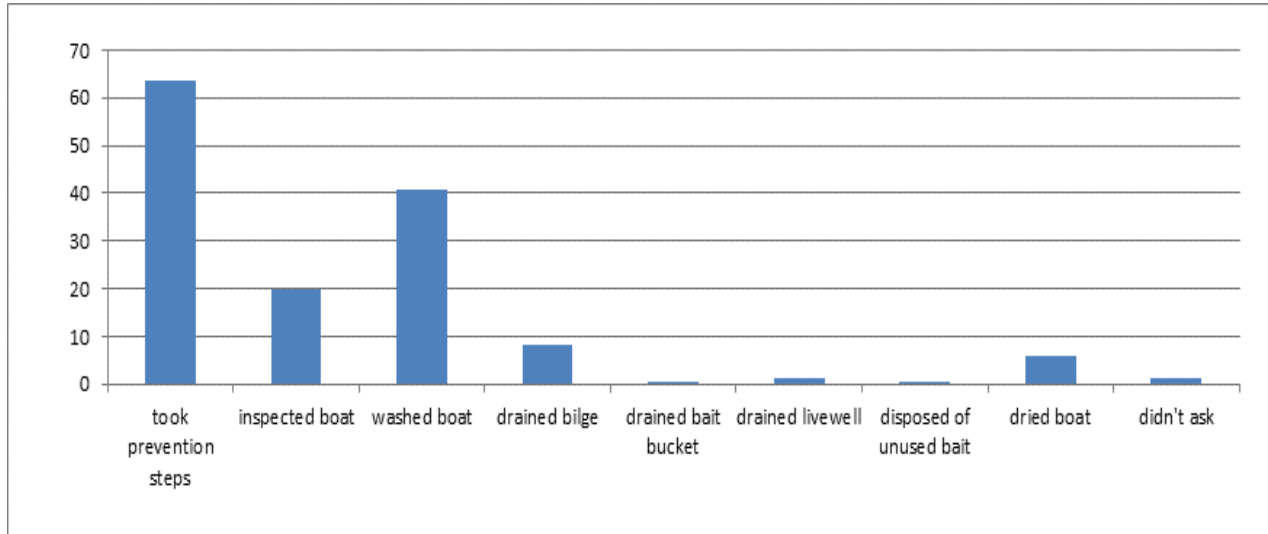


Figure 9- Percent of visitors taking AIS spread prevention measures at western WSP sites, 2011.

The organism transport rate at all 17 sites in the western region was 11% or 1,291 organisms found over 11,485 inspections of both boats entering and leaving the body of water. Forked Lake Campground had the highest transport rate at 34%, but also a high proportion of rental boats. Burke's Marina on Raquette Lake was second at 16%. Chateaugay Lake Boat Launch and Long Lake Boat Launch both had transport rates of 14%. The St. Regis Canoe Area and Eighth lake Campground had an extremely low rate of 4%. The lowest transport rate was reported at Hollywood Hills Boat Launch at 0%, but that boat launch was not covered enough for accurate statistics. 193 invasive organisms were removed at all 17 sites. 27 organisms were curly-leaf pondweed, 121 organisms were Eurasian watermilfoil, 30 were variable leaf milfoil, ten were water chestnuts, and five were zebra mussels.

Research and Service Projects

The stewards spent one day during the work week working on a special project other than AIS prevention at the boat launches. In the west-central region several projects built upon what had been initiated in 2011 as well as incorporating the current stewards' interests and what type of activity would benefit the region. Three stewards monitored loons on Big Moose Lake, Seventh Lake, and South Pond for the Biodiversity Research Institute. A Biodiversity Research Institute technician stationed in the area and a local volunteer for the project were able to assist the stewards. One steward worked with the Adirondack Park Invasive Plant Program (APIPP) eradicating garlic mustard and surveying for pale swallowwort on a seven mile stretch of dirt road in the southern portion of the Adirondack Park. The Regional Inlet Invasive Plant Program (RIIPP) enlisted four Watershed Stewards to identify Japanese knotweed stands on private property for future pesticide application. A steward hiked up Bald Mt. weekly to interact with hikers at the summit of this small mountain. The WSP continued to expand the social media project that had been begun last summer with a blog, Facebook page, Twitter feed, and

the two original newsletters for each region. Two Watershed Stewards were dedicated to this project with many others writing relevant articles.

This was the first year that the WSP maintained a weekly Watershed Steward at Stillwater Reservoir and so the Watershed Steward was able to assist the New York State Department of Environmental Conservation Forest Ranger in managing campsites and trails, and extinguishing a forest fire in the Stillwater Reservoir area. Two Watershed Stewards conducted AIS surveys for the Adirondack Watershed Institute and the Adirondack Park Invasive Plant Program (APIPP). Dr. David Patrick, of Paul Smith's College's All Taxa Biological Inventory, went out in the field with three Watershed Stewards to identify mink frogs. The Watershed Stewards then used this information to conduct surveys in their areas. This project was just begun in 2012 and has potential for becoming more robust in the 2013 season. The Watershed Stewards' special projects should continue to gain impact in 2013 building on the work of the 2012 field season.

Conclusion

Administration of the west-central region went much smoother during the second season due to relationships that had been forged during the 2011 season. Also beneficial was that the schedule was standardized so the Watershed Stewards maintained a much more consistent routine. The supervisor was also able to work from the Paul Smith's campus weekly and maintain better contact with all WSP members through email capability on a smart phone and Skype. Through the hiring process, the Watershed Stewards, in general, were more prepared for the remoteness of the area. The Watershed Stewards in the west-central region still felt isolated from the hub of activity in the Tri-Lakes region and every effort should be made to provide program-wide social activities. A specific end date was negotiated for each Watershed Steward upon hiring which proved beneficial.

Acknowledgements go to the Environmental Protection Agency for the Great Lakes Restoration Initiative Grant for the ability to continue the WSP in the west-central region of the Adirondacks. Town Supervisors John Frey, Inlet, and Clark Seaman, Long Lake, were supportive of AIS prevention. Mitch Edelstein, Raquette Lake District Clerk, and Louis Burke allowed the WSP use of the Raquette Lake Union Free School. All area lake associations including the Fulton Chain of Lake Association, Sixth and Seventh Lakes Improvement Association, Raquette Lake Property Owners' Association, Long Lake Association, Hollywood Hills Association, Big Moose Lake Association, the Adirondack White Lake Association and The Shores Association assisted the WSP throughout the summer. Pat Deyle and Ken Hawks of the Raquette Lake Property Owners Association, Barbara Taylor and Jackie Mallery of the Long Lake Association, Bill Landmesser of the Sixth and Seventh Lake Association, and Danielle Mazuy and Courtney Wellar of the Adirondack White Lake Association were particularly helpful over the summer. The New York State Department of Environmental Conservation was welcoming in allowing us at their boat launches, campgrounds and firetower summits throughout the region. Jim Dillon and Burke's Marina allowed the WSP to cover their boat launches. NYS Department of Conservation Forest Rangers Jim Waters, Jason Scott, and Luke Evans were helpful to the WSP. Caitlin Stewart of the Hamilton County Soil & Water District, Mitch Lee, Gary Lee, the Biodiversity Research Institute- particularly Amy Sauer and Nina Schoch, Brendan Quirion and Meghan Johnstone of APIPP, and Doug Johnson of RIPP.

Table 9- Summary, 2012. M= motorboat; PWC= personal watercraft; S=sailboat; C= canoe; K= kayak; B= construction barge; R= rowboat; SUP= stand-up paddleboard; D= dock.

WSP W-C Data Summary, 2012 Waterbody	Boat Type									total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people
	M	PWC	S	C	K	B	R	SUP	D				
Chateaugay Lake	770	96	1	23	66	0	9	0	0	965	71	175	2391
Cranberry Lake	963	53	8	90	87	0	3	0	4	1208	71	242	2922
Eighth Lake Campground	12	1	0	39	25	0	4	0	0	81	26	2	157
Forked Lake Campground	16	0	0	160	73	2	10	0	0	261	29	3	467
Fourth Lake	1291	333	23	12	85	6	2	0	0	1752	76	239	4393
Hollywood Hills	7	3	0	0	5	0	0	0	0	15	101	0	20
Limekiln Lake Campground	16	0	0	11	26	0	2	0	0	55	35	5	87
Long Lake	1236	105	10	568	402	2	18	0	4	2345	64	263	4779
Meacham Lake Campground	137	52	2	23	34	0	6	0	0	254	47	42	641
Raquette Lake Village	694	46	4	272	345	5	3	0	1	1370	52	144	2286
Burke's Marina	300	34	0	1	3	7	2	0	0	347	57	88	735
Seventh Lake	253	19	2	89	182	3	6	1	0	555	66	73	1236
SRCA	0	0	0	349	133	0	3	4	0	489	0	0	736
Stillwater Reservoir	590	32	6	140	233	0	10	0	0	1011	57	195	2097
Tupper Lake	863	42	20	125	79	4	3	0	0	1136	65	260	2448
White Lake	147	70	0	9	41	0	2	2	2	273	100	58	614
Totals	7295	886	76	1911	1819	29	83	7	11	12117		1789	26009

Table 10- BW= bladderwort; CLP= curly-leaf pondweed; EWM= Eurasian watermilfoil; GRS= grass; NM= native milfoil; VLM= variable leaf milfoil; WC=water chestnut; ZM= Zebra mussel.

WSP W-C Data Summary, 2012 Waterbody	# groups				organism type									
	launching	retrieving	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	
Chateaugay Lake	767	328	65	90	5	7	69	22	2	0	0	2	48	
Cranberry Lake	713	488	84	53	5	9	16	71	1	1	0	1	33	
Eighth Lake Campground	39	36	1	0	0	0	0	1	0	0	0	0	0	
Forked Lake Campground	100	93	31	34	1	0	0	26	1	0	0	0	37	
Fourth Lake	1218	624	118	44	6	3	11	83	8	5	3	1	42	
Hollywood Hills	6	7	0	0	1	0	0	0	0	0	0	0	0	
Limekiln Lake Campground	32	18	2	0	0	0	0	1	0	0	0	0	1	
Long Lake	1237	713	185	96	9	0	1	89	1	1	2	0	178	
Meacham Lake Campground	192	82	6	7	0	1	0	9	0	0	0	0	3	
Raquette Lake Village	652	479	57	72	29	0	0	44	5	18	4	0	29	
Burke's Marina	257	116	43	18	5	2	4	30	2	2	0	1	15	
Seventh Lake	384	246	19	18	1	0	6	21	2	0	0	0	7	
SRCA	208	147	4	9	0	0	0	10	2	0	0	0	1	
Stillwater Reservoir	482	342	54	26	1	4	13	39	0	1	1	0	22	
Tupper Lake	818	371	42	96	12	0	1	129	0	1	0	0	6	
White Lake	203	87	13	4	0	1	0	11	1	1	0	0	3	
Totals	7308	4177	724	567	75	27	121	586	25	30	10	5	425	

Table 11- I= inspected boat; WB= washed boat; DB= drained bilge, BB= emptied bait bucket; LW= drained livewell; Dis= disposed of unused bait; Dry= dried boat.

WSP W-C Data Summary, 2012	# groups taking AIS spread prevention measures										Transport	
Waterbody	yes	I	WB	DB	BB	LW	Dis	Dry	didr	# groups	Rate %	
Chateaugay Lake	549	130	339	43	1	10	0	73	0	877	14	
Cranberry Lake	660	154	315	219	4	34	1	116	0	1097	11	
Eighth Lake Campground	29	8	14	0	0	0	0	6	1	60	1	
Forked Lake Campground	72	10	44	0	0	0	0	11	1	188	34	
Fourth Lake	1121	251	800	190	0	16	0	83	24	1486	9	
Hollywood Hills	9	2	7	0	0	0	0	0	1	14	0	
Limekiln Lake Campground	19	7	11	2	0	0	0	3	0	39	4	
Long Lake	1046	320	795	83	6	14	1	48	1	1571	14	
Meacham Lake Campground	141	54	82	14	0	2	0	9	0	212	5	
Raquette Lake Village	451	190	316	65	2	7	1	45	26	642	11	
Burke's Marina	206	59	120	48	0	19	0	19	0	348	16	
Seventh Lake	330	116	214	21	0	0	0	29	6	507	6	
SRCA	169	59	107	1	0	0	0	27	0	294	4	
Stillwater Reservoir	210	130	48	22	1	4	0	16	57	785	10	
Tupper Lake	653	277	432	45	0	7	2	31	2	808	12	
White Lake	146	46	132	7	0	0	0	13	1	243	6	
Totals	5811	1813	3776	760	14	113	5	529	120	9171	11	
	Percentages	63	20	41	8	0	1	0	6	1		

Staff Profiles



Claire Baker is originally from Western New York and is currently an Environmental Science major at Paul Smith's College. She enjoys climbing, hiking, and any other Adirondack adventure you can think of. She has been a great help to the Watershed Stewardship Program and other members of the team. She is always willing to help in any way she can and always with a smile on her face. The program would not have been the same without her passion and knowledge of the environment, as well as her general good nature.



Wesley is a graduate of the State University of New Hampshire with a Bachelor's Degree in Environmental Conservation. He spent the summer of 2010 in Colorado interning at a National Park. Wesley grew up in New Hampshire, but he has found a new love in the Adirondack High Peaks. He aspires to continue to work in environmental conservation with possible side endeavors in Search and Rescue. Wesley worked for the WSP for the second summer as a weekend supervisor.



Michelle Berrus is studying at Plattsburgh State University for her May 2013 B.S. in Ecology. Additional studies include developing inter-community connections and enabling collaboration for the common cause of preserving ecological health and security. Michelle fell in love with the wilderness of Adirondack waterways upon developing a whitewater paddling lifestyle at the age of 20. She participated in a study of the growth of the invasive variable leaf watermilfoil under specific environmental conditions this summer.



Michael Bicknell is originally from Parishville, New York and is currently pursuing a double major in Environmental Studies and Biology at SUNY Potsdam. Michael is interested in invasive species because of their ability to colonize almost any kind of habitat. Invasive species not only effect the biological environment, but they degrade everyone's enjoyment of our waterways. In his spare time Michael likes to hike, ski, and play sports such as basketball and soccer.



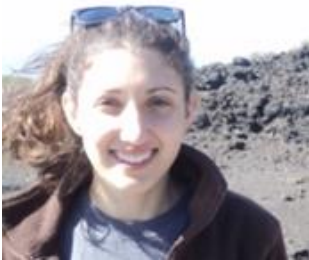
EJ Borchert is originally from Marlboro, NY in the lower Hudson Valley and is currently a senior at the SUNY College of Environmental Science and Forestry where he is majoring in conservation biology. He enjoys hunting and camping with his friends. This was his first summer in the Adirondacks and proved to be a fun one.



Jennifer Breen is from Theresa, NY and is a junior at Paul Smith's College where she is earning her Bachelor's Degree in Environmental Science. Her many hobbies include reading, hiking, swimming, and canoeing. This was her first year as a Watershed Steward and she worked with the Adirondack Park Invasive Plant Program for her special project.



Andrew Bull is a graduate of Paul Smith's College with a bachelor's degree in Fisheries and Wildlife Science. He is also one of our veteran stewards, returning from last year and offering knowledge and experience to our "rookie" stewards. He enjoys kayaking and other outdoor activities. Andrew is once again a part of the loon monitoring and research special project in cooperation with the BRI. He travels various local waterways via kayak to locate record nesting sites as well as tag information. Andrew has also worked with milfoil desiccation project teams in the past. He hopes to continue work in related fields upon completion of the WSP.



Elena Capaldi is entering her Junior year at Dickinson College in Carlisle, PA. An Environmental Studies Major and Italian Studies Minor, Elena enjoys biking and being outside in her free time. The Watershed Steward position was her favorite job because she is enjoying the Adirondacks and hopes to one day work in conservation efforts.



Kearsten Cubit is originally from southern Pennsylvania. She attends St. Lawrence University and is currently a junior. She wanted to work as a Watershed Steward because of childhood memories of spending family outings out on the lakes in PA. Since she was blessed with such an experience while growing up, she wishes to allow future generations to participate in something similar. Being a steward allows her to participate in the preservation of lakes.



Tim Grossman is from Westmoreland, NY and is a junior at Paul Smith's College. He enjoys keeping the lakes free from invasive species. He enjoys doing just about everything outdoors including cross-country skiing and running.



Emma Horton is 21 years old and from Warren, New Hampshire. She graduated this spring from Saint Lawrence University with a degree in Anthropology and Environmental Studies and a minor in African Studies. Growing up in a rural town surrounded by the White Mountains and national forests gave Emma a sense of connectivity and responsibility towards conserving the environment at a young age. She loves hiking, rock climbing, trail running and kayaking. Emma is spent her summer living like the Vanderbilt's at Great Camp Sagamore.



Hannah Huber is a junior at Paul Smith's College, studying mostly biology and chemistry, with a dash of mathematics. She remembers many summers spent with family on Seneca Lake that were unfortunately inconvenienced by tangled patches of Eurasian Watermilfoil and nasty zebra mussels that forced her to wear unnatural water shoes. Hannah enjoys busying herself with a mix of evolutionary nutrition, environmental science, and mycology.



Stacey Judge is from Boonville, NY and is studying Wilderness Recreation and Leadership at North Country Community College. She enjoys spending time outdoors climbing, hiking, and kayaking. She believes in protecting the environment from invasive species, both on land and in water. She spends her summers on Otter Lake, which used to have a bladderwort problem a few years ago.



Stephanie Korzec is an environmental science and natural resources major at Paul Smith's College. She has always loved the outdoors and taken an interest in preserving it. She was an intern for the East Quabbin Land Trust during the summer of 2009. She grew up on her family's farm which borders a land trust parcel and she has always enjoyed wandering the trails there.



Stephanie Kramer just finished her first year at the University of New England College of Osteopathic Medicine after graduating from the University of New Hampshire in 2011. She grew up in a small town outside Concord, NH and a love for the outdoors was instilled in her very early in life. This appreciation, along with strong belief of the importance of prevention (in healthcare as well as wilderness preservation) has led her to Saranac Lake this summer to work as a steward.



David Lattuca is a senior at Paul Smith's College in the Natural Resource Management and Policy program. He is also pursuing a certificate in Geographic Information Systems. As a Watershed Steward, Dave enjoyed engaging the Adirondack Community about current environmental problems and future management solutions. After work during the summer, Dave enjoyed taking his dog Achilles for walks, and ending his nights by a camp fire.



Emily Martin is currently a senior at The State University of New York College of Environmental Science and Forestry where she is studying environmental science with a focus on education. Upon graduation in 2013, she would like to continue on to graduate school for environmental education. Emily would like to make the environment part of every curriculum, not just a unit in a science class. Originally from the Adirondacks, Emily grew up spending every moment in the outdoors. She enjoys hiking, gardening, running, fishing, paddling and any other outdoor adventure you could think of!



Billy Martin is a senior at Paul Smith's College, majoring in Natural Resource Management and Policy. Billy has been a frequent visitor to the Adirondack Park since early childhood. He has family in Saranac Lake that has been very helpful in acclimating him to the Adirondack experience. He enjoys backpacking, day hikes, canoe trips, and just about every other outdoor activity available. The Watershed Stewardship Program has been a terrific fit for Billy in combination with his passion for the natural environment and a wide range of work experience. Thanks Billy!



Katie Metz is from Ilion, NY and is heading into her senior year at SUNY Potsdam as an Environmental Studies major and Sociology minor. She took an interest in the environment after taking an ecology class in high school. She enjoys kayaking on the Salmon River as well as Lake Ontario. Additionally, Katie likes hiking, backpacking, photography, and being anywhere outside with her friends.



Kyle Matthew Milner, age 29, has taken the path less traveled in life. Kyle is from the small rural town of Churchville, near Rochester, New York. He volunteered at Station Rochester for several summers. Kyle went to Kandahar, Afghanistan working as a contractor on an N.A.T.O air base. Kyle studied forestry at Paul Smith's College. Kyle worked for the famous Native American poet Maurice Kenny. Kyle also has an interest in the philosophy of Permaculture. This was his second summer with the Watershed Stewardship Program, which Kyle describes as the most rewarding job he has ever had.



Eric Paul is a returning steward and a student at Paul Smith's College. He has a bachelor's degree in Business and Technology Management from Clarkson University, and is pursuing a second bachelor in Natural Resources Management and Policy at Paul Smith's College. Eric enjoys hiking and paddling in the Adirondack High Peaks region and hopes to become involved with law enforcement upon graduation.



As a 2011 graduate from PSC and an outdoor enthusiast, Kelli Quinn is proud to serve as a watershed steward. She grew up waterskiing and kayaking on the rivers and lakes in central PA. She has a degree in General Biology and plans to eventually go to grad school for paleoecology. She thinks it is important to maintain the integrity of the environment and enjoys expending her energies towards a productive end, such as the Watershed Steward Program.



Greg Redling lives in the Town of Waterford, NY. He graduated from Shenendehowa High School with an Advanced Regent's diploma and is currently a junior at Paul Smith's College studying Environmental Studies with a dual Major in Natural Resources Management and Policy. As a child the outdoors was a place of adventure and discovery. To this day that sense of adventure has morphed into a partnership with nature and the outdoors. He wants to strengthen his bond with it because it lent so much of itself to him as a child. He is an avid kayaker and hiker and enjoys playing basketball in the winter months. He has a strong interest in poetry and lyrical styles of writing.



Cody Rickman graduated from Ballston Spa Senior High School in 2008. So he has always been a Saratoga Lake user. He never wanted to swim through all of the milfoil and even had his own incident with zebra mussels slicing open his foot. This is one of the main reasons he joined the WSP to help slow the spread of invasive species and prevent new ones from entering the lake. He graduated from SUNY College of Environmental Science and Forestry in May 2012. There he learned about the issues invasive species cause in watershed ecosystems. One of his hobbies is making items out of recycled materials. He plans on working with biofuels in the future or entering environmental consulting.



Jeff Sann is in his second year with the Watershed Stewardship Program and is a recent graduate of Paul Smith's College. He believes strongly that the WSP's message of AIS awareness is crucial in prevention and management of AIS. He enjoys fly fishing, and just about anything else outside. Jeff spends his free time operating his own business and playing with his dogs. He resides in Alder Creek, NY with his wife Brooke.



Derek Scott is a senior at Paul Smith's College, currently majoring in Environmental Science, as well as minoring in Chemistry. Originally from Pennsylvania, he now lives in Goshen, New York. He loves spending time outside, whether it's running, hiking, or snowshoeing.



Matt Wehrin graduated from Finger Lakes Community College with an A.A.S. in Natural Resource Conservation this past spring. He has spent plenty of time in Raquette Lake every summer of his life. He wants to protect Raquette Lake from invasive species because in Canandaigua, NY, where Matt grew up, there are many invasive species and he has seen what they can do to beautiful places.



Jessica Wenke is originally from Babylon, NY and is heading into her senior year at Paul Smith's College. She is an Environmental Science and Pastry Arts major with a GIS certificate and a Business minor. Growing up in the suburbs of New York City Jessica did not have much time to experience nature because the area she lived in was extremely developed. However she connected with the environment at the local park and her favorite climbing tree. She learned quickly that there's more to the world than the suburbs of NYC. Some of her hobbies are running, drawing/painting, biking, baking, and reading.



WSP Science Director Celia Evans has her Ph.D. in Ecology and Evolutionary Biology from Dartmouth College. Celia joined the faculty at Paul Smith's College in 2001 where she is an Associate Professor of Ecology in the Science Liberal Arts and Business Division specializing in biogeochemical cycling and plant / soil / herbivore interactions in forested ecosystems. Celia also conducts research in science education with particular emphasis on student / scientist partnerships and citizen science. Dr. Evans has published in the *Canadian Journal of Forest Research* (1998), *American Biology Teacher* (2001), and *Plant and Soil* (2001).



WSP Assistant Director Kathleen Wiley is pursuing a doctorate in conservation biology at Antioch University in Keene, NH. She lives full-time in Keene Valley, NY with her cat and enjoys getting outside whenever she can. She was excited that the Watershed Stewardship Program was able to continue in the west-central Adirondacks for the second summer and hopes to see you at a boat launch sometime soon.



Professor Eric Holmlund is Program Director for Liberal Arts, Environmental Studies and Recreation at Paul Smith's College as well as the Director of the WSP. He is co-author of a book, *The Camper's Guide to Outdoor Pursuits* and has been a full time faculty member at PSC since 1998. He and his wife Kim have a daughter, Dana, and twin boys, Will and John. He enjoys most outdoor activities, especially canoeing, xc skiing, and camping. Eric has a Ph.D. in Environmental Studies.

Chateaugay Lake Boat Launch Use Report

By Elena Capaldi, Watershed Steward



Figure 10 - Chateaugay Lake Boat Launch.

Introduction

In 2000, the Watershed Stewardship Program (WSP) of the Adirondack Watershed Institute of Paul Smith's College was first formed. The purpose of the program is to further public education and awareness-building regarding the aquatic invasive species (AIS) that continue to threaten the Park, many introduced by users of public boat launches. Today, the WSP posts approximately 26 Watershed Stewards to spread this message and to collect data about the spread and origin of AIS. 2012 marked the first year that the program stationed a Watershed Steward at the public boat launch of Chateaugay Lake, located in the northeastern coverage area of the WSP. The steward stationed at Chateaugay Lake was present on Saturdays and Sundays to present boaters with information on AIS and to collect data on recreational boat traffic.

Methods

A Watershed Steward was on duty at the Chateaugay Lake public boat launch from 7 in the morning to 4 in the afternoon every Saturday and Sunday from the week of May 27th to Labor Day weekend. The Watershed Steward introduced each arriving boater to the WSP's mission, information about AIS ecology, asked the boater if their watercraft had been in another boater of water in the last two weeks and where, and if they had taken any steps to prevent the spread of AIS. The steward would also record the type and number of boats, horsepower of outboard motor (if applicable), group size, and boat registration state of origin. Each boat would then be inspected by the steward for possible traces of AIS. The steward inspected boats launching and retrieving at the boat launch. If any organism was found on the boat or trailer by the steward, it would be identified and recorded, before being carefully discarded. If the steward was unsure about the identification of the organism, she stored it in a plastic bag, labeled the sample, and brought it to the weekly staff meeting for examination. Additionally, if a plant not previously known to be found in this body of water was brought in on a boat or retrieved from a boat, the sample would be sent for further identification back to AWI and then recorded.

During the visual inspection of the boat and trailer, the steward would show the boat owner key places that organisms can easily become trapped, so that boat owners understand what an efficient inspection consists of. Also, if the boat owner did not know the proper prevention steps for AIS, indicated by their response of "no" steps taken in the questionnaire, the steward explained the following procedures: inspecting, washing and/or drying the boat, emptying live wells, and draining the bilge. Further educational materials were then be given out, including a sticker from the steward as a reminder to always check a boat after retrieval.

Results

From the weekend of May 26th through Labor Day Weekend, the steward at Chateaugay Lake inspected 964 watercraft and educated 2,391 boaters. The peak for both number of visitors and watercraft was the weekend of June 28 through July 4 with 92 boats and 226 visitors present at the launch. July was the most-visited month with 341 total boats and 826 total visitors seen at the launch. This trend can be partially explained by the fact that overall use at the boat launch was affected by the overall good weather in July.

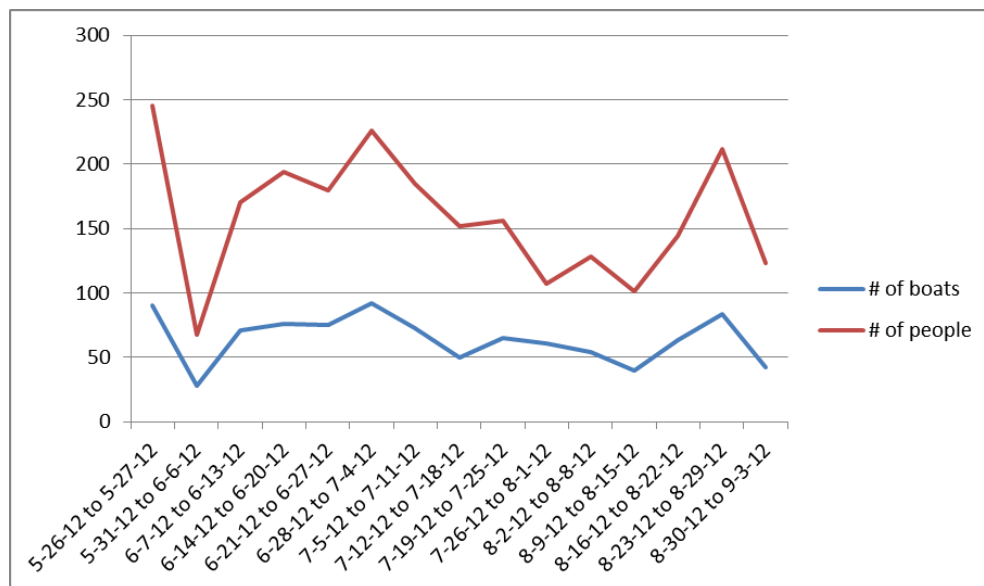


Figure 11- Chateaugay Lake Boat Launch use, 2012.

The majority of watercraft inspected at Chateaugay Lake launch in 2012 were motorboats (80% of usage), with personal watercraft (10%) and kayaks (7%) being the next biggest two groups. Because this was the first year at Chateaugay Lake launch, a comparison cannot be made to previous years of recreation use in terms of watercraft type use.

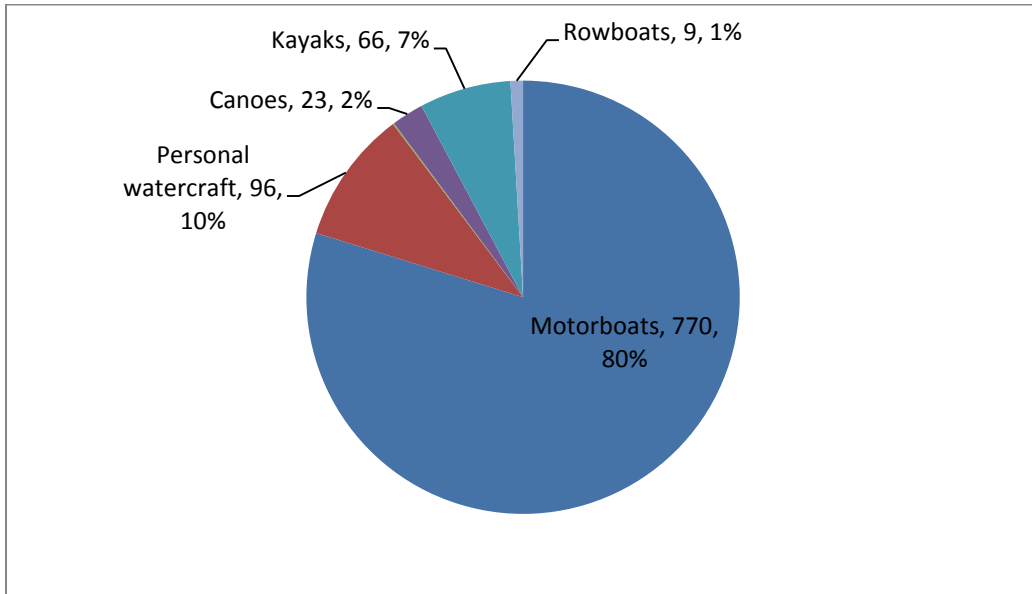


Figure 12- Types of Watercraft Launched, Chateaugay Lake Boat Launch, 2012.

The Chateaugay Lake Boat Launch is supported by the NYSDEC and permits access to motorized boats, with a generously-sized cement launch. Due to its size and popularity in the Eastern corner of the Adirondacks, especially with bass fisherman, it was expected that many of the users would be local with boats registered in New York State.

Table 12- State or province of registration of motorboats using Chateaugay Lake Boat Launch, 2012.

State	# boats	State	# boats
CT	4	NH	1
DC	1	NJ	5
DL	1	NY	544
FL	2	ON	3
GA	2	PA	3
MA	1	QC	9
MD	1	RI	1
MS	1	VA	1
No registration	58	VT	6
NC	3	Total	647

655 out of the 965 watercraft (68%) inspected by stewards at Chateaugay Lake boat launch site reported using their watercraft during the last two weeks. 19% of watercraft (181 out of 965 watercraft) were used in a

body of water *other* than Chateaugay Lake. 49% of visitors reported that the last lake they visited was Chateaugay Lake. 28% of visitors reported no prior use of their boat this season. 4% of visitors were not asked about their prior waterway. Therefore, 77% of visitors to the boat ramp presented no appreciable risk of introducing AIS. However, 141 of the total 965 watercraft reported prior visits from AIS-infected waterways (15% of total boats).

Table 13- Waterways visited in previous two-week period, Chateaugay Lake Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Chateaugay Lake	Yes	470	Did not ask		42
Lake Champlain	Yes	50	Upper St. Regis Lake		9
St. Lawrence River	Yes	25	Higley Flow		2
Chazy Lake	Yes	14	Penn Warner Club PA		2
Saranac Chain	Yes	11	Rainbow Lake		2
Saranac River	Yes	6	Buck Pond		1
Meacham Lake	Yes	5	Chateaugay River		1
Indian Lake	Yes	3	Chippewa Lake		1
Lake Flower	Yes	3	Cranberry Lake NJ		1
Mountain View Lake	Yes	3	Gatineau River		1
Norwood Lake	Yes	3	Great Chazy River		1
Black Lake	Yes	2	Lake Kushaqua		1
Lake Alice	Yes	2	Lake Newago QC		1
Lake Placid	Yes	2	Lake Serenity NY		1
Lake Titus	Yes	2	Little Clear Pond		1
Lower Saranac Lake	Yes	2	Long Pond		1
Saranac River	Yes	2	Long Pond ME		1
Candlewood Lake CT	Yes	1	Monkton Pond VT		1
Erie Canal	Yes	1	Moonlight Lake QC		1
Fish Pond	Yes	1	Mountain Pond		1
Indian Brook Reservoir VT	Yes	1	Osgood Pond		1
Lake Bonaparte	Yes	1	Raquette River		1
Lake Winnepesaukee	Yes	1	Rental		1
Lincoln Pond	Yes	1	Richelieu River		1
Niagara River	Yes	1	Round Valley Reservoir NJ		1
Saratoga Lake	Yes	1	Washington DC		1
Second Pond	Yes	1	Waterman's Lake RI		1
Seneca River	Yes	1	Total		963
None		268			

Another way for the steward to determine the likelihood of AIS presence on watercraft is by asking the boater if they regularly take steps to reduce the spread of aquatic hitchhikers. Not only will this question help the steward to determine how carefully to inspect the watercraft, it also helps them to educate boaters on the common, simple prevention measures they can take to reduce the spread of AIS in the future. These preventative steps include a visual inspection, washing the boat, draining the bilge water, emptying the bait buckets and live wells, and disposing of live bait away from the waterway, as well as drying the boat off completely. All of these steps drastically improve the chances of AIS not remaining on the boat between launches.

When posed the question, stewards did their best not to lead the interviewee to a response. For example, if a steward asks a boater, “Did you wash your boat before launching?” they might be more likely to respond affirmatively since they know the watershed program is promoting this AIS spread prevention method. The steward will ask instead a more open-ended question, such as, “Did you take any steps to prevent the spread of AIS?” This way the steward will be able to gauge the boaters’ level of knowledge specifically as to AIS, and the mission of our program and educational component.

Stewards at Chateaugay Lake found that 549 of the 877 groups interviewed, answered “yes” to taking at least one of the preventative measures against transporting AIS (63%). The most common measure taken was washing of their boat (39%), followed by a visual inspection (15%).

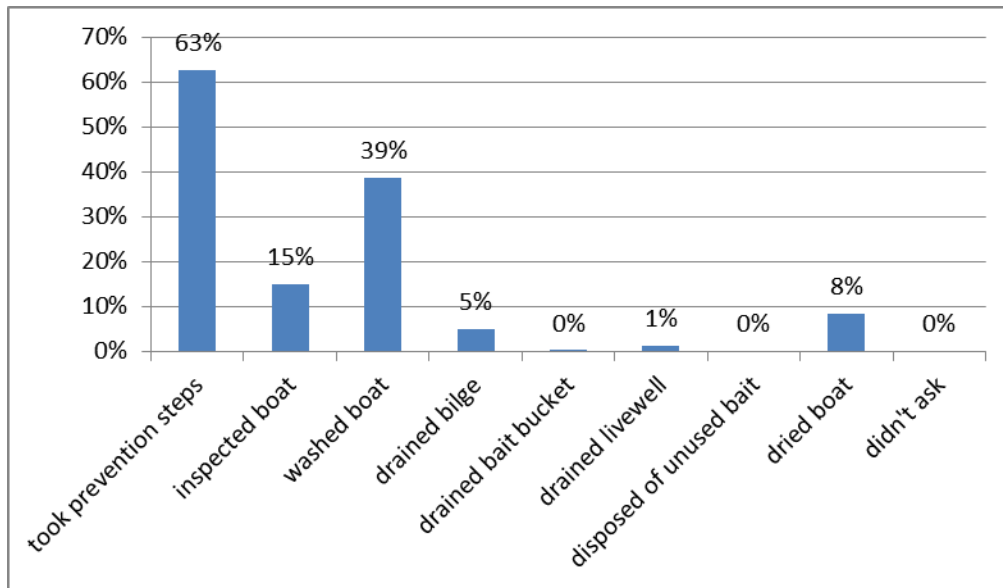


Figure 13- AIS spread prevention measures taken by visitors, Chateaugay Lake Boat Launch, 2012.

Aquatic Invasive Species Removed From Watercraft

Upon visual inspection by the steward on duty, plant material was removed from 65 boats entering, and 90 boats leaving from the launch. This material was then recorded in the data as 5 cases of bladderwort, 7 of curly leaf pondweed, 69 of Eurasian Water Milfoil, 22 of grass, 2 of native milfoil, 2 of zebra mussels, and 48 “other” category (leaves, pine needles, twigs—no AIS). More boats were found carrying materials departing from Chateaugay Lake than arriving there. The prior waterways of watercraft carrying AIS frequently mention Chateaugay Lake, followed by Lake Champlain, Chazy Lake, and the Saranacs. Clearly, the data demonstrates that Chateaugay Lake contains invasive species, and that further more material comes more from boats leaving the water body, than boats entering. Therefore, it could be suggested that Chateaugay Lake is a water body that might be the source of other AIS found in the surrounding area.

Table 14- AIS removed from watercraft and trailers at Chateaugay Lake Boat Launch, 2012.

Organism	# Entering	# Leaving	Prior waterway
Curly-leaf pondweed	5	2	Chateaugay Lake (3), Lake Champlain (2), Meacham Lake
Eurasian watermilfoil	22	47	Chateaugay Lake (37), Chazy Lake (2), Higley Flow, Lac St. Louis, Lake Champlain, Lake Flower, St. Lawrence River (2), St. Regis Lake (2), Saranac River, Seneca River, none (20)
Zebra mussels	2	0	Chateaugay Lake, Lake Champlain
totals	29	49	

Discussion and Conclusion

The location, number of days the steward was on duty (i.e., weekends), and the relatively easy accessibility of the boat launch at Chateaugay Lake are all factors which contribute to the comparatively small number of visitors encountered by stewards of the WSP in 2012. As previously mentioned, this was the first year of steward presence at Chateaugay Lake, so the number of watercraft inspected and people interacted with cannot be compared to previous data. However, the large quantity of data we reached from the weekend alone, suggests that a continued presence at Chateaugay Lake will no doubt reach more visitors as AWI continues to promote our message about AIS. In fact, Chateaugay Lake, along with similarly popular and sized launches, suggest that our quantity of data is on-par with other lakes of such similarity. It is important for the WSP to continue this outreach to such a large group of recreational boaters, like is found at Chateaugay Lake, so that AIS spread is halted in and around the Park.



Figure 14- Watershed Steward on duty at Chateaugay Lake Boat Launch.

Table 15- Chateaugay Lake Boat Launch use figures, 2012. KEY: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Chateaugay Lake Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people	# groups launching	# groups retrieving	organisms found		
	M	PWC	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	77	10	0	0	2	0	1	90	64	28	245	79	16	7	5	
5-31-12 to 6-6-12	26	0	0	2	0	0	0	28	71	3	68	23	14	0	0	
6-7-12 to 6-13-12	57	6	0	0	7	0	1	71	94	21	170	60	24	3	4	
6-14-12 to 6-20-12	65	5	0	2	3	0	1	76	78	17	194	58	27	6	4	
6-21-12 to 6-27-12	55	11	0	1	6	0	2	75	61	13	180	70	15	5	6	
6-28-12 to 7-4-12	74	5	0	3	8	0	2	92	63	13	226	76	29	5	15	
7-5-12 to 7-11-12	42	17	0	4	10	0	0	73	62	24	185	45	36	4	13	
7-12-12 to 7-18-12	44	6	0	0	0	0	0	50	68	7	152	39	29	4	12	
7-19-12 to 7-25-12	51	8	0	1	5	0	0	65	66	9	156	55	18	9	10	
7-26-12 to 8-1-12	45	6	0	1	9	0	0	61	63	7	107	49	12	4	1	
8-2-12 to 8-8-12	42	4	0	2	6	0	0	54	82	0	128	43	16	2	3	
8-9-12 to 8-15-12	31	6	1	1	0	0	1	40	65	5	101	27	17	3	3	
8-16-12 to 8-22-12	52	8	0	3	0	0	0	63	0	4	144	39	27	0	8	
8-23-12 to 8-29-12	75	4	0	1	4	0	0	84	70	16	212	67	36	9	3	
8-30-12 to 9-3-12	34	0	0	2	6	0	1	43	51	8	123	37	12	4	3	
totals	770	96	1	23	66	0	9	965	Summer Avg = 71	175	2391	767	328	65	90	
									Median HP = 60							

Table 16- Chateaugay Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Chateaugay Lake Recreation Study 2012																		
Week	organism type									# groups taking AIS spread prevention measures								
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	0	1	8	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	18	6	11	1	0	0	0	3	0
6-7-12 to 6-13-12	0	0	7	0	0	0	0	0	0	41	6	25	7	0	3	0	3	0
6-14-12 to 6-20-12	1	1	4	2	1	0	0	1	0	56	14	40	4	0	1	0	5	0
6-21-12 to 6-27-12	0	1	5	2	0	0	0	0	3	43	12	22	1	0	0	0	9	0
6-28-12 to 7-4-12	0	0	8	2	0	0	0	0	10	51	3	37	3	0	1	0	11	0
7-5-12 to 7-11-12	0	0	7	2	0	0	0	0	8	33	10	23	2	0	0	0	1	0
7-12-12 to 7-18-12	0	1	3	3	1	0	0	0	8	30	8	17	3	0	0	0	4	0
7-19-12 to 7-25-12	1	0	6	4	0	0	0	0	8	36	11	22	4	0	1	0	3	0
7-26-12 to 8-1-12	0	0	4	1	0	0	0	0	0	31	5	17	7	0	0	0	6	0
8-2-12 to 8-8-12	0	0	4	0	0	0	0	0	1	39	8	23	5	0	0	0	6	0
8-9-12 to 8-15-12	0	0	2	0	0	0	0	0	4	29	7	20	1	0	0	0	2	0
8-16-12 to 8-22-12	0	0	4	3	0	0	0	0	1	53	14	33	2	0	2	0	6	0
8-23-12 to 8-29-12	3	2	4	3	0	0	0	0	0	60	19	38	2	1	2	0	6	0
8-30-12 to 9-3-12	0	1	3	0	0	0	0	0	3	29	7	11	1	0	0	0	8	0
totals	5	7	69	22	2	0	0	2	48	549	130	339	43	1	10	0	73	0

Cranberry Lake Boat Launch Use Study

By Eric Paul, Watershed Steward



Figure 15- Cranberry Lake.

Introduction

The summer of 2012 marks the second consecutive year the Paul Smith's College Watershed Stewardship Program (WSP) posted a Watershed Steward at the state boat launch in Cranberry Lake. Cranberry Lake is the third largest lake within the Adirondack Park, and is the setting of two hamlets. Wanakena is on the southern end of the lake while the hamlet of Cranberry Lake is on the northern end of the lake. The lake is also the site of a New York State DEC campground and 48 remote-access free use campsites. In addition to this, the lake serves as the northern boundary and access point to the Five Ponds Wilderness Area and has a 50 mile trail system that surrounds the lake. Cranberry Lake receives significant traffic from Lake Ontario, Lake Bonaparte and the St. Lawrence River, all of which are infested with various aquatic invasive species (AIS). This makes Cranberry Lake vulnerable to the introduction of invasive species via personal watercraft.

The steward was responsible for educating boaters about the risks invasive species pose as well as methods to mitigate their transportation from waterway to waterway. The steward would also inspect all incoming and outgoing watercraft for organic material in an attempt to detect invasive species and prevent their introduction into a new water body.

Methods

Throughout the 15 week summer season from Memorial Day weekend in May to Labor Day weekend in September, a single steward was posted at the Cranberry Lake state boat launch Friday through Monday from 7 a.m. to 4 p.m. The steward would conduct a brief interview with boaters, gathering information such as the last used waterway within a two week period, and whether or not the visitor took any AIS spread prevention measures such as a visual inspection, washing their boat and draining bilges and live wells. The steward would then proceed to inspect the boat with the owners for any organic material. The steward would point out certain areas including the axle and license plate areas on trailers, and the lower unit, propeller, and transducer on the boat itself as these are more likely to pick up plant life. Often, the steward would show boaters several invasive species that are commonly transported either with real samples collected from previous boats or with pictures if no samples were available.

Results

The steward encountered 1,208 boats and 2,922 visitors marking a relative increase from the previous year’s totals of 1,099 boats and 2,696 visitors. Because the Independence Day holiday fell on a weekday this year traffic throughout that week wasn’t what would normally be expected if it were to fall on a weekend. Therefore peak use instead occurred between the weeks of July 19th and August 8th.

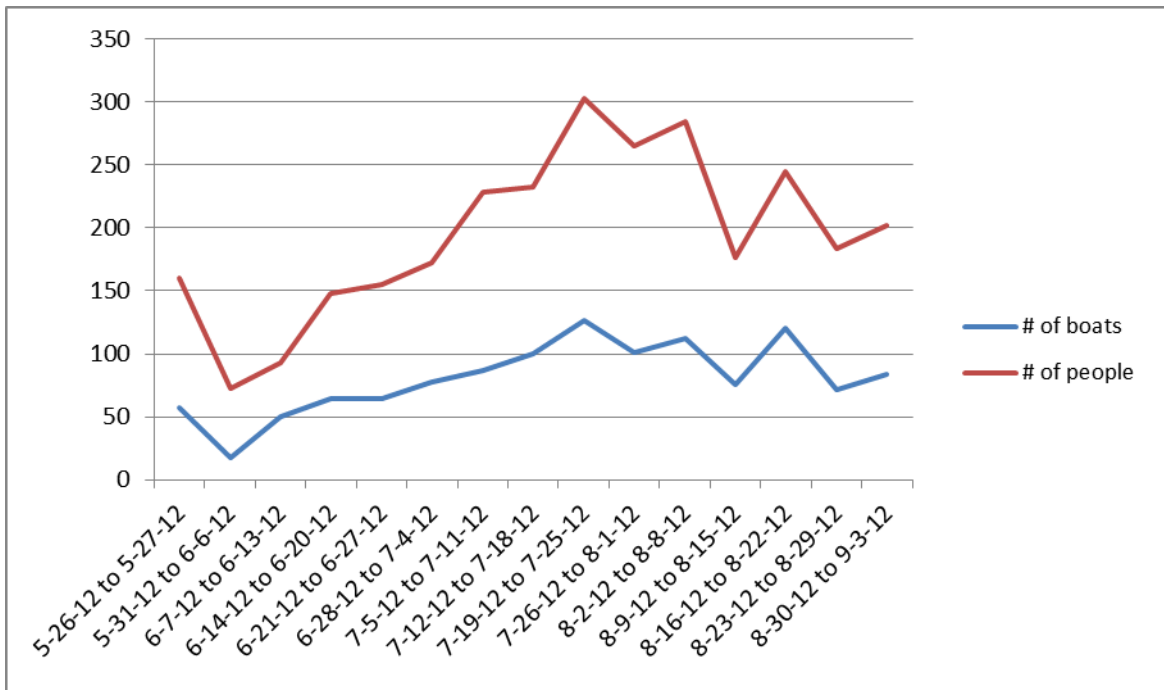


Figure 16- Cranberry Lake Boat Launch use, 2012.

Motorboats are the most common type of watercraft encountered, totaling 963, which represented a slight decline from the previous year’s total of 978 in spite of 2012’s warm and dry summer. The increase in total boats in 2012 comes from a significant increase in canoes and kayaks at 90 and 87 boats respectively, as opposed

to 39 canoes and 38 kayaks from the previous year. The steward also encountered 53 personal watercrafts this year, and far less frequent were 8 sailboats and 3 rowboats.

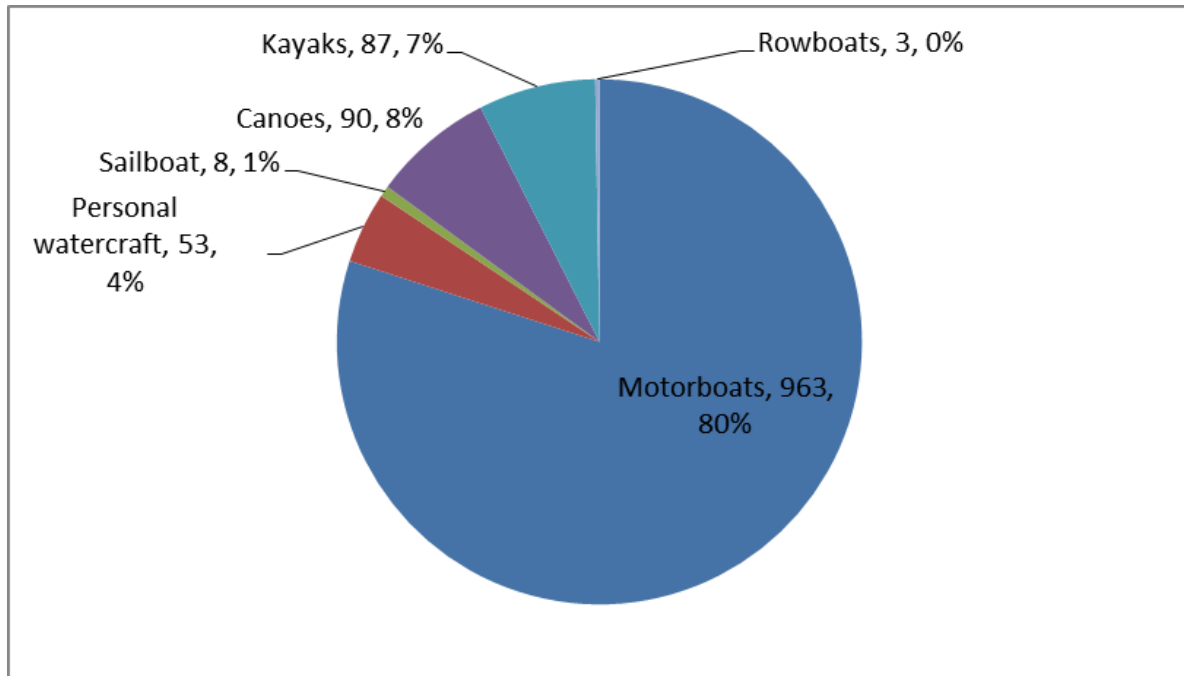


Figure 17- Types of Watercraft Launched, Cranberry Lake, 2012.

State of Origin

Cranberry Lake is frequented by out of state boaters on a regular basis with 17 non-New York states and one Canadian Province represented. Unsurprisingly the highest numbers of out of state users come from bordering states that include Pennsylvania with 22 and New Jersey with 13 separate visitors.

AIS Spread Prevention Measures

Watershed stewards also ask boaters if they took any measures to prevent the transfer of AIS from one body of water to another. This question serves as a springboard into educating methods of prevention as well as another way to assess the likelihood of AIS being present on the boat. It was found that 660 (60%) of boat owners had taken prevention steps before launching which is a 7% increase from the previous year. Washing boats was the most frequent form of preventative measure taken at 29% of all boat owners. 20% of boat owners drained their bilge, 14% inspected their boat, and 11% dried their boats for at least one week before launching. Less common were the draining of livewells, and bait buckets, as well as the disposal of bait. The lack of these methods being utilized is not surprising as only a percentage of total boats surveyed were active fishermen, and of that percentage only a proportion use live bait.

Table 17- State or province of registration of motorboats using Cranberry Lake Boat Launch, 2012.

State	# boats	State	# boats
CT	7	NY	931
DL	3	PA	22
FL	2	QC	1
IN	1	RI	3
MC	2	TN	1
MD	5	TX	1
MS	4	VA	1
NC	3	VT	6
NH	4	WI	1
NJ	13	Total	44

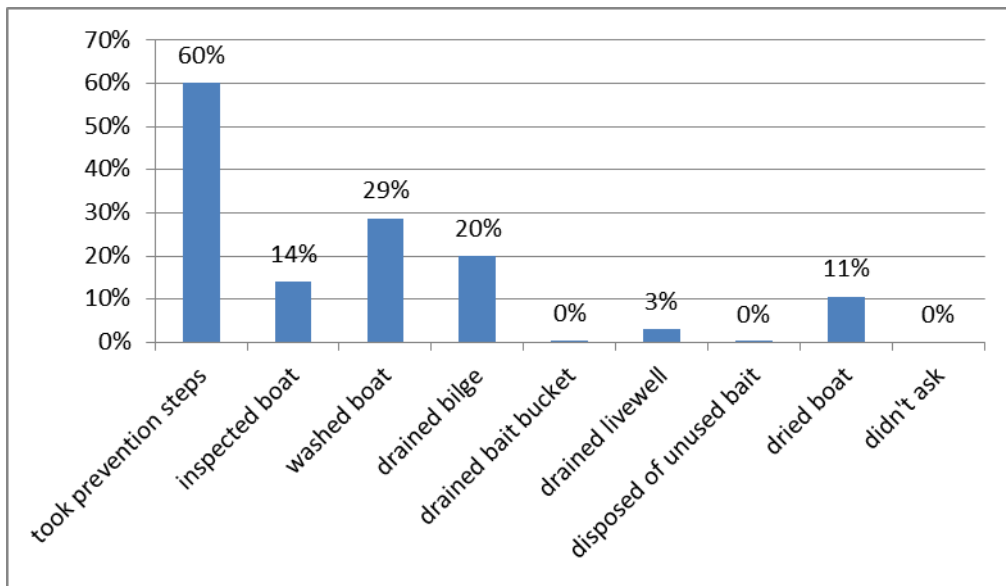


Figure 18- AIS spread prevention measures taken by visitors, Cranberry Lake Boat Launch, 2012.

During visual inspections the steward detected and removed organic materials from 84 incoming watercraft, as well as 53 outgoing watercraft. The watershed steward would then attempt to identify the organic material. Overall, 129 organisms were detected on boats either being launched or retrieved from the lake. Four species of invasive organisms were detected at the launch site including Eurasian watermilfoil with 16 cases, curly-leaf pondweed with 9, one case of variable leaf watermilfoil, and one incoming boat with zebra mussels adhered to the lower unit.

Table 18- AIS removed from watercraft and trailers at Cranberry Lake Boat Launch, 2012.

Organism	Entering	Leaving	Prior Waterway	total
Bladderwort	1	4		5
Curly Leaf Pondweed	8	1	St. Lawrence River (4 times), Black Lake	9
Eurasian Watermilfoil	15	1	Lake Bonaparte (4), Lake Ontario (2), Pine Lake (Wisconsin), St. Lawrence River (3), Oneida Lake, Black Lake (2), Carry Falls Reservoir	16
Grass	42	29		71
Native Watermilfoil		1		1
Variable Leaf Milfoil		1	Unknown	1
Zebra Mussels	1		Unknown	1
Other	17	16		33
Total	84	53		129



Figure 19- Zebra mussels found on boat at Cranberry Lake Boat Launch.

Previously Visited Water Bodies

As many aquatic invasive species can survive out of water for long periods of time, Watershed Stewards inquire about the most recent water body entered within a two week period. If the most recent water body is known to be infected the boat may be inspected with more scrutiny.

Table 19- Waterways visited in previous two-week period, Cranberry Lake Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Cranberry Lake	Yes	173	Great Sacandaga Reservoir	Yes	1
St. Lawrence River	Yes	29	Keuka Lake	Yes	1
Lake Bonaparte	Yes	25	Lake Alice	Yes	1
Black Lake	Yes	16	Lake Carmi VT	Yes	1
Lake Ontario	Yes	16	Lake St. Claire MI	Yes	1
Black River	Yes	9	Millsite Lake	Yes	1
Oneida Lake	Yes	8	Mohawk River	Yes	1
Oswegatchie River	Yes	8	Onondaga Lake	Yes	1
Tupper Lake	Yes	7	Owasco Lake	Yes	1
Carry Falls Reservoir	Yes	6	Pleasant Lake	Yes	1
Butterfield Lake	Yes	5	Saratoga Lake	Yes	1
Conesus Lake	Yes	5	Skaneateles Lake	Yes	1
Cazenovia Lake	Yes	4	Tully Lake	Yes	1
Lake Flower	Yes	4	None		681
Long Lake	Yes	4	Rental		4
Lower Saranac Lake	Yes	4	Stillwater Reservoir		3
Raquette River	Yes	4	Hannawa Falls Reservoir		2
Blake Falls Reservoir	Yes	3	Redfield Reservoir		2
Canandaigua Lake	Yes	3	Trout Lake		2
Charleston Lake ON	Yes	3	Yellow Lake		2
Lake Champlain	Yes	3	Brantingham Lake		1
Lake Placid	Yes	3	Chub Lake		1
Sylvia Lake	Yes	3	Dyer Lake		1
Higley Flow	Yes	2	Harvey's Lake PA		1
Lake George	Yes	2	Lake Ozonia		1
Lake Winnepesaukee	Yes	2	Little River		1
Norwood Lake	Yes	2	Lower St. Regis Lake		1
Raquette Lake	Yes	2	Massawepie Lake		1
Raquette Pond	Yes	2	Moose River		1
Red Lake	Yes	2	Ochoco Creek		1
Seneca Lake	Yes	2	Pine Lake WI		1
Atlantic Ocean	Yes	1	Rainbow Falls Reservoir		1
Candlewood Lake CT	Yes	1	Sis and Bubb Lakes		1
Chazy Lake	Yes	1	Soft Maple Reservoir		1
Chesapeake Bay	Yes	1	Spitfire Lake		1
Follensby Clear Pond	Yes	1	St. Regis River		1
Forked Lake	Yes	1	Star Lake		1
Fourth Lake	Yes	1	Swinging Bridge Reservoir		1
Grasse River	Yes	1	Wallum Lake MA		1
Lake			Total		1097

Additional Projects

Throughout the summer, the Cranberry Lake Watershed Steward also participated with the Regional Inlet Invasive Plant Program (RIIPP) to combat the terrestrial invasive plant Japanese Knotweed. The steward was tasked with identifying the plant throughout the area, and obtaining permissions from landowners for treatment. The steward contacted a number of landowners who had Japanese Knotweed on their property in Star Lake, Wanakena, and Cranberry Lake, and obtained 15 permissions for treatment.

This steward also gave two presentations over the summer. One presentation was given to the Cranberry Lake Boat Club in coordination with the Watershed Stewardship Program director Eric Holmlund, and highlighted the program history and objectives as well as an update on the data being taken from the boat launch. The second presentation was to the general public at the Clifton Community Center in Cranberry Lake about invasive species, and the threats they pose to our waterways.

Conclusion

The second season of the Paul Smith's College Watershed Steward Program showed an increase in the percentage of boaters taking prevention steps which may correlate with the decrease in percentage of boats harboring some form of organic matter. Of the 1208 watercraft encountered this season, just over 11% of boats were found to be harboring some form of organic matter, and 2% of all boats were found to have an invasive species attached. The increase in preventative measures being taken, and decrease in infested boats is an encouraging sign that the knowledge of invasive species within the general public is growing. Furthermore it is a sign that this knowledge is being considered in boater's routines of launching and retrieving.



Figure 20- Eric Paul, Watershed Steward at Cranberry Lake Boat Launch.

However encouraging the data may be, there is still much room for improvement when one considers that it only takes one infested boat to infect an entire waterway. This data shows that 42% of boat owners who visited Cranberry Lake this summer while a steward was on duty do not knowingly take any prevention steps. Of the 1208 boats the steward encountered 507 of them did not go through any prevention steps before being inspected on site. When considering that there is a watershed steward on duty at the state launch only from Memorial Day to Labor Day, and then only from 7:00am to 4:00pm Friday through Monday it becomes apparent that there is a considerable window for an infected boat to enter the waterway. When taking the unofficial Wanakena launch site into account, the risk level

increases even more as the steward can only be at one launch at a time.

While prevention improvements were made in the second season of the Watershed Steward Program at Cranberry Lake, the data suggests that the waterway is still at a relatively high risk level to the introduction of aquatic invasive species. Continuation of the program would be recommended to encourage prevention steps to trend higher in the future.

Table 20- Cranberry Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Cranberry Lake Recreation Study 2012												
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people	
	M	PWC	S	C	K	B	R					
5-26-12 to 5-27-12	51	4	0	0	1	0	0	57	60	13	160	
5-31-12 to 6-6-12	13	0	0	4	0	0	0	17	80	1	73	
6-7-12 to 6-13-12	38	2	2	6	2	0	0	50	57	11	93	
6-14-12 to 6-20-12	63	0	0	1	0	0	0	64	67	23	148	
6-21-12 to 6-27-12	61	0	0	2	0	0	0	64	72	21	155	
6-28-12 to 7-4-12	72	0	1	4	1	0	0	78	74	21	172	
7-5-12 to 7-11-12	70	3	0	9	5	0	0	87	70	16	228	
7-12-12 to 7-18-12	76	3	1	11	8	0	0	100	75	21	233	
7-19-12 to 7-25-12	104	10	1	6	6	0	0	127	91	37	303	
7-26-12 to 8-1-12	77	4	0	12	7	0	0	101	63	15	265	
8-2-12 to 8-8-12	87	7	1	11	5	0	1	112	61	21	285	
8-9-12 to 8-15-12	55	3	1	5	11	0	1	76	66	9	176	
8-16-12 to 8-22-12	70	4	1	9	36	0	0	120	73	13	245	
8-23-12 to 8-29-12	58	9	0	2	2	0	0	71	78	10	184	
8-30-12 to 9-3-12	68	4	0	8	3	0	1	84	63	10	202	
totals	963	53	8	90	87	0	3	1208	Summer Avg = 71	242	2922	
									Median HP = 60			

Table 21- Cranberry Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel.

Cranberry Lake Recreation Study 2012													
Week	# groups	# groups	organisms found		organism type								
	launching	retrieving	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other
5-26-12 to 5-27-12	54	9	8	0	0	0	2	4	0	0	0	0	2
5-31-12 to 6-6-12	8	9	2	4	0	0	0	5	0	0	0	0	1
6-7-12 to 6-13-12	29	18	3	1	0	1	0	1	0	0	0	0	2
6-14-12 to 6-20-12	38	30	8	4	0	3	1	4	0	0	0	0	5
6-21-12 to 6-27-12	38	35	4	6	0	0	1	3	0	0	0	0	6
6-28-12 to 7-4-12	62	21	9	0	0	0	1	5	0	0	0	1	3
7-5-12 to 7-11-12	49	38	4	6	1	0	1	6	0	0	0	0	0
7-12-12 to 7-18-12	59	39	6	5	0	1	1	8	0	0	0	0	0
7-19-12 to 7-25-12	66	65	4	7	1	0	1	6	1	0	0	0	2
7-26-12 to 8-1-12	59	35	9	2	0	2	3	5	0	0	0	0	2
8-2-12 to 8-8-12	57	59	3	5	0	2	1	2	0	0	0	0	2
8-9-12 to 8-15-12	43	30	6	3	0	0	0	7	0	0	0	0	2
8-16-12 to 8-22-12	46	44	2	9	1	0	2	4	0	1	0	0	2
8-23-12 to 8-29-12	46	31	9	1	2	0	1	6	0	0	0	0	3
8-30-12 to 9-3-12	59	25	7	0	0	0	1	5	0	0	0	0	1
totals	713	488	84	53	5	9	16	71	1	1	0	1	33

Table 22- Cranberry Lake Boat Launch use figures, 2012. Key: I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Cranberry Lake Recreation Study 2012										
Week	# groups taking AIS spread prevention measures									
	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	
5-26-12 to 5-27-12	31	5	11	10	0	1	0	12		0
5-31-12 to 6-6-12	7	4	3	3	0	0	0	0		0
6-7-12 to 6-13-12	19	4	13	9	0	1	0	3		0
6-14-12 to 6-20-12	36	10	20	15	0	4	0	0		0
6-21-12 to 6-27-12	35	9	15	15	0	0	0	4		0
6-28-12 to 7-4-12	39	15	25	7	0	2	0	7		0
7-5-12 to 7-11-12	39	8	15	14	1	3	0	10		0
7-12-12 to 7-18-12	67	11	32	20	1	1	1	14		0
7-19-12 to 7-25-12	80	22	33	21	1	10	0	13		0
7-26-12 to 8-1-12	65	17	38	17	0	1	0	12		0
8-2-12 to 8-8-12	75	14	38	25	0	3	0	16		0
8-9-12 to 8-15-12	36	6	15	14	0	2	0	8		0
8-16-12 to 8-22-12	56	13	25	22	1	4	0	9		0
8-23-12 to 8-29-12	38	6	14	19	0	2	0	3		0
8-30-12 to 9-3-12	37	10	18	8	0	0	0	5		0
totals	660	154	315	219	4	34	1	116		0



Figure 21- Boat inspection, Cranberry Lake.

Fourth Lake Boat Launch Use Report

By: Jennifer Breen, Watershed Steward



Figure 22- Fourth Lake from Boat Launch.

Introduction

In 2012, the Paul Smith's Watershed Stewardship Program (WSP) at the Adirondack Watershed Institute (AWI) received a Great Lakes Restoration Initiative grant through the Environmental Protection Agency (EPA) to continue their coverage of the west-central Adirondack lakes in the Lake Ontario watershed. Lakes in this area included Long Lake, Forked Lake, Raquette Lake, Limekiln Lake Campground, Hollywood Hills, Stillwater Reservoir, and White Lake. Areas also covered include the Fulton Chain of Lakes river system at Fourth, Seventh, and the Eighth Lake campground. At all of these locations, stewards were present to check all boats and to spread the message of preventing the spread of aquatic invasive species (AIS).

The Fulton Chain of Lakes is located in the Central Adirondack Mountains of New York State. There are eight lakes starting at the dam in Old Forge extending through navigable waters into Fifth Lake and then by portage to the dam at Sixth lake through Eighth lake. According the Fulton Chain of Lakes Association, the Fulton Chain of Lakes is part of an intricate river system that was originally dammed in 1798 at Old Forge. The current dam in place holds 6.8 billion gallons of water. Water flowing through the chain of lakes enters the middle branch of the Moose River at the dam. First, Second, Third Lake, and Fourth Lake are connected by narrow channels totaling approximately 10 miles from Old Forge to Inlet. The Fulton Chain of Lakes has been a popular location for both recreational boaters and fisherman for more than a century, with many visitors returning year after year. The

lakes are densely developed with hotels, lakeside cottages, and several boat rental liveries. The Fulton Chain is the first section of the Northern Forest Canoe Trail, a 740-mile water route extending from Old Forge to Fort Kent, Maine. It is also the first part of the ever-popular Adirondack Canoe Classic race that starts in Old Forge and ends in Saranac Lake, 90 miles distant.

Fourth Lake State Boat Launch has been one of the busiest lakes for the west-central Adirondack Region. It is the only public access point for motorboats to the lower lakes of the Fulton Chain, including Old Forge Pond and Fifth Lake. Fourth Lake is the largest and busiest of the Fulton Chain of Lakes. It is nearly five and a half miles in length and includes half of the 4,310 acres of Fulton Chain. It is 90 feet deep at the deepest point. With this depth, fisherman can enjoy both shallow and deep water fish including bass, lake trout rainbow trout, landlocked salmon, northern pike, tiger muskellunge, bullhead, and more than enough sunfish and rock bass for kids. Stewards advise boaters to be cautious of the high winds and rough waters that are very common at Fourth Lake. The NYS DEC maintains a picnic area on the south shore of Fourth Lake. The lake also has a public campground on Alger (Big) Island with fifteen lean-tos and a facilities supervisor in attendance.

In 2010, it was discovered that Fourth Lake had a small colony of variable leaf watermilfoil (VLM) and Eurasian watermilfoil (EWM). The Adirondack Park Invasive Plant Program (APIPP), the Fulton Chain of Lakes Association (FCLA), and the Adirondack Watershed Institute (AWI) are aware of its presence as well as the presence of EWM in Fifth and Seventh Lake. It appears that the invasion of Fourth Lake is fairly recent for a 2009 survey did not detect the milfoil in the lake. However, this quite small colony is being actively contained and managed. A dive team from the Adirondack Watershed Institute came to Fourth Lake in 2011 and 2012 to treat the EWM and VLM. As of now, there are only a few plants remaining in Fifth Lake and a very small patch behind one of the islands on Fourth Lake. Boaters should be aware of these areas so to not disrupt these areas and cause fragmentation of these plants.

Methods

To help stop the spread of invasive species, the Fourth Lake boat launch had a steward present from Memorial Day Weekend (May 25) through Labor Day weekend (September 3). A steward was at the boat launch from 7:00am to 4:00pm with a total of one hour breaks during the day. Stewards were stationed at the Hollywood Hills private boat Launch on First Lake as available during the same times as listed above.

The steward approached boaters, identifying him/her and the program, and discussed the issue of aquatic invasive species. If boaters did not know about AIS, they were given photographs of several species as well as other pamphlets about AIS and the steward discussed how these species were invasive. The steward proceeded to ask if the boater and his/her boat had been in any other body of water in the past two weeks, and what, if any, steps the boater took to prevent the spread of AIS. If the boater had not taken any steps, the steward discussed the recommended



Figure 23- Jennifer Breen, Watershed Steward, talking to a visitor to the Fourth Lake Boat Launch, 2012.

preventative measures with the boater including; washing the boat, visually inspecting the boat, draining the bilge, live wells, and bait buckets, and disposing of bait. The steward then discussed why these measures were necessary. The steward then proceeded to inspect the watercraft with its trailer, checking key areas such as the motor, bunks, and any sharp edges that would likely snag AIS. During the inspection, the steward took note of the type of boat, horsepower of any engines, type of outboard engines, the number of people in the party, and the state of registration.

Results

For the summer of 2012, Fourth Lake Stewards encountered 1,752 boats and about 4,393 people between May 26 and September 3. The week from June 28 to July 4 was the busiest week for both boats and people with 178 boats and 473 people even with July 4 falling on a Wednesday. Watershed Stewards were stationed at the Fourth Lake Boat Launch for 14 weekends throughout the summer with Tuesdays being the least covered day for there was a steward present only twice on a Tuesday. This was the same for last year as well. Tuesday was the least covered day for the summer of 2011 as well. Monday was also not covered as often as well. There was only a stewards present on three Mondays this past summer. The day that was most covered was Saturday for every Saturday during the summer of 2012 had a steward present at the boat launch. In total there 15 Saturdays this summer that had a Steward present at the boat launch. Fridays, Saturdays, and Sundays saw the most amount of boat traffic during the summer with almost over 50 boats seen each weekend.

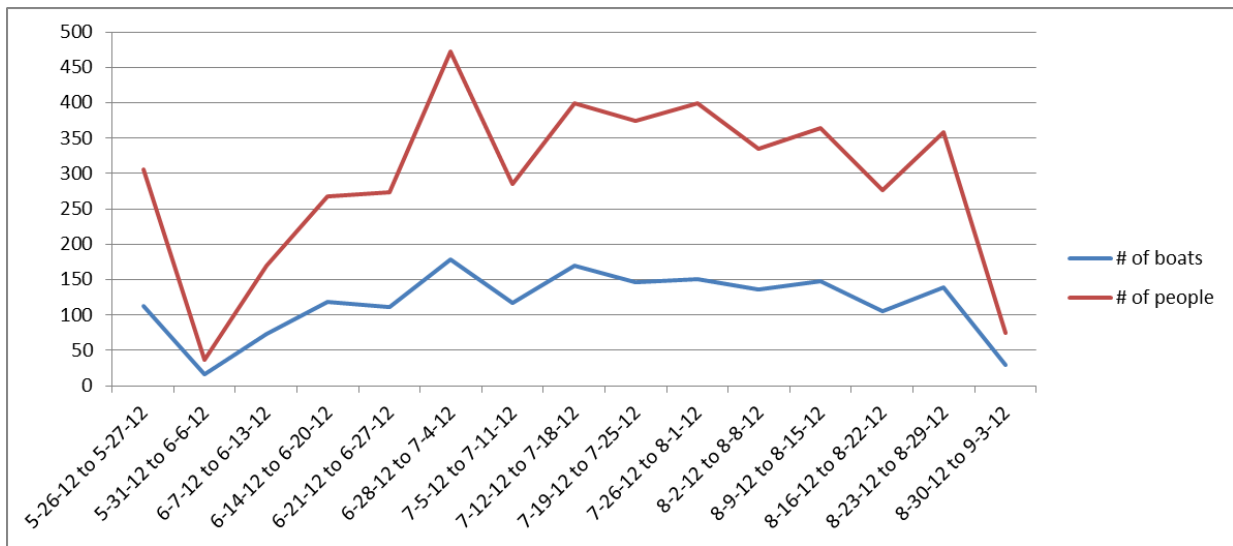


Figure 24- Fourth Lake Boat Launch use, 2012.

Table 23-Days of steward coverage per week at the Fourth Lake Boat Launch, 2012.

Week	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Total Days per Week
5/26/12-5/27/12				X	X			2
5/31/12-6/6/12		X		X	X			3
6/7/12-6/13/12		X	X	X	X	X		5
6/14/12-6/20/12		X	X	X	X			4
6/21/12-6/27/12	x	x	x	x	x			5
6/28/12-7/4/12	x	x	x	x	x	x	x	7
7/5/12-7/11/12	x	x	x	x	x			5
7/12/12-7/18/12	x	x	x	x	x	x	x	7
7/19/12-7/25/12		x	x	x	x			4
7/26/12-8/1/12	x	x	x	x	x			5
8/2/12-8/8/12	x	x	x	x	x			5
8/9/12-8/15/12	x	x	x	x	x			5
8/16/12-8/22/12		x	x	x	x			4
8/23/12-8/29/12			x	x	x			3
8/30/12-9/3/12			x	x				2
Total Days of Steward Coverage	7	12	13	15	14	3	2	66

Of the 1,752 boats visiting the Fourth Lake Boat Launch during the summer of 2012, about three-quarters (1,291) were motorboats. Personal watercraft was the second most common with 333 visiting the boat launch this summer. This is a very large increase compared to last year's numbers. The next biggest visitor to the boat launch was kayaks with 85 kayaks visiting the launch this summer. This was also an increase since last year. In fact, numbers of sailboats, canoes, and barges increased this year. The only exception was rowboats, which decreased from 3 to 2. Even though numbers increased, kayaks, barges, canoes, sailboats, and rowboats only accounted for 7% of the boat traffic at the boat launch.

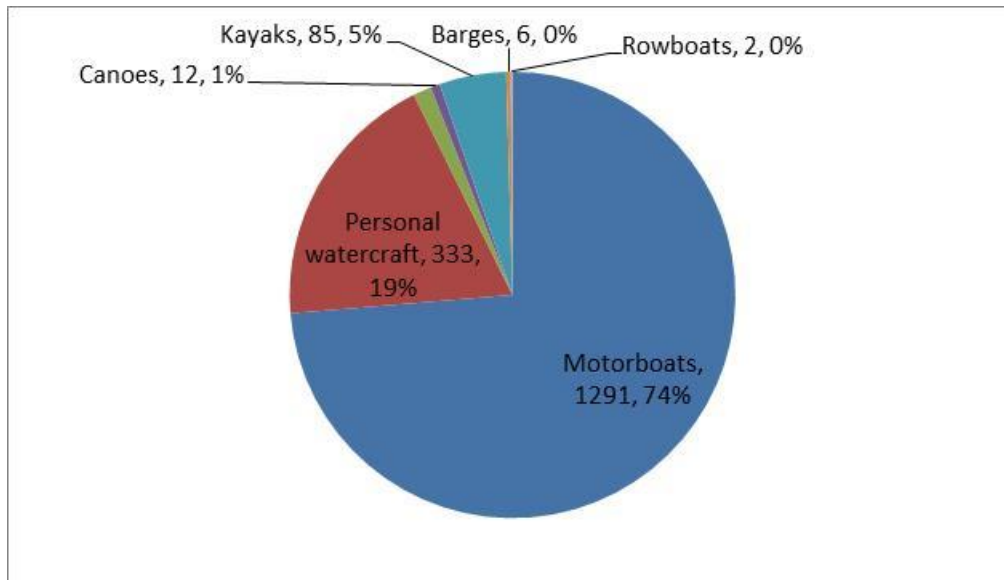


Figure 25- Types of Watercraft Launched, Fourth Lake, 2012.

Stewards recorded the horsepower of outboard engines and if they were two stroke, four stroke, or E-TEC (two-stroke direct injection). Many of the boats that were encountered were inboard, outboard, or inboard-outboard. There were also boats that had jet engines. For those that had outboard engines, 239 were either 4-stroke or an E-TEC engine. Four stroke and E-TEC engines are cleaner for the environment. E-TEC uses a computer to calculate how much fuel to inject into the motor for maximum efficiency. This causes complete combustion of fuel which leads to less air and water pollution. The horsepower of engines varied from 5 to 350HP. The average horsepower for the summer was 57HP.

Stewards also asked boaters when they came to the launch what body of water they had been in most recently in the past two weeks. AIS can survive for considerable time periods outside of the water so it is critical to know where they are coming from. It allows us to determine possible pathways of AIS spread. We can also use this data to see where the visitors are coming from to visit this lake. Over half of all boaters reported that they had visited a body of water in the previous two weeks. At the beginning of the summer, many boaters told the stewards that they had a home or a lake on the lake and they were launching for the season. Other boaters came every week to the Fourth Lake Boat Launch or repeatedly came to the boat launch throughout the summer. Some boaters came from as far away as Virginia, Pennsylvania, Massachusetts, Connecticut, Ohio, Vermont, and New Jersey. Many of these boaters come to Fourth Lake each year for their vacation. Fourth Lake saw multiple visitors who came from Delta Lake, Kayuta Lake, Lake Ontario, Oneida Lake, Raquette Lake, and other lakes within the Fulton Chain of Lakes. The Fulton Chain of Lakes was grouped into one category on the following chart. Also, the state of registration was recorded. Some of the states that the boats were registered include Vermont, Connecticut, New Hampshire, and Pennsylvania.

Table 24- Waterways visited in previous two-week period, Fourth Lake Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Fourth Lake	Yes	399	Otisco Lake	Yes	2
Raquette Lake	Yes	47	Schroon Lake	Yes	2
Oneida Lake	Yes	38	Third Lake	Yes	2
Seventh Lake	Yes	36	Tupper Lake	Yes	2
Lake Ontario	Yes	35	Candlewood Lake CT	Yes	1
Hinckley Reservoir	Yes	19	Cazenovia Lake	Yes	1
Canandaigua Lake	Yes	16	Chateaugay Lake	Yes	1
Kayuta Lake	Yes	16	Delaware River	Yes	1
Skaneateles Lake	Yes	16	Fish Creek Pond	Yes	1
St. Lawrence River	Yes	13	Lake Luzerne	Yes	1
Fulton Chain	Yes	9	Susquehanna River	Yes	1
Saratoga Lake	Yes	8	Upper Saranac Lake	Yes	1
Canadarago Lake	Yes	7	None		674
Lake Erie	Yes	7	Delta Lake		27
Cayuga Lake	Yes	6	Big Moose Lake		11
Keuka Lake	Yes	6	Eighth Lake		10
Sacandaga Lake	Yes	6	Brantingham Lake		7
Atlantic Ocean	Yes	5	Indian Lake		5
Barge Canal	Yes	5	Limekiln Lake		5
Erie Canal	Yes	5	Piseco Lake		5
Mohawk River	Yes	5	White Lake		4
Otsego Lake	Yes	5	Blue Mountain Lake		3
Hudson River	Yes	4	Otter Lake		3
Silver Lake, Perry NY	Yes	4	Twitchell Lake		3
Silver Lake, Staten Island NY	Yes	4	Brown Tract Pond		2
Chautauqua Lake	Yes	3	Canada Lake		2
Honeoye Lake	Yes	3	Nick's Lake		2
Niagara River	Yes	3	Black River		1
Old Forge Pond	Yes	3	Blue Marsh Lake PA		1
Sandy Pond, Lake Ontario NY	Yes	3	Crystal Lake, Perry NY		1
Seneca Lake	Yes	3	Deruyter Reservoir		1
Seneca River	Yes	3	Eaton Brook Reservoir		1
Stillwater Reservoir	Yes	3	Mirror Lake UT		1
Black Lake	Yes	2	Moraine Lake, AB		1
Conesus Lake	Yes	2	Raritan Bay NJ		1
Lake Bonaparte	Yes	2	Redfield Reservoir		1
Lake George	Yes	2	Round Valley Reservoir NJ		1
Lime Lake	Yes	2	Sixth Lake		1
			Total		1545

Table 25-State or province of registration of motorboats using Fourth Lake Boat Launch, 2012.

State	# Boats	State	# Boats
CT	15	NJ	39
CF	1	OH	5
DL	2	PA	42
FL	8	VA	4
MA	4	VT	6
MD	2	WS	1
NH	4		

For the summer of 2012 at the Fourth Lake boat launch, there were 158 organisms either entering or leaving Fourth Lake. Most organisms were found going into Fourth Lake. They were removed promptly before the water craft entered the water. Fourth Lake has a very

small number of invasive species in it compared to the other lakes that people came from to visit Fourth Lake. There are small populations of variable leaf milfoil and Eurasian watermilfoil currently in Fourth Lake. The organisms were categorized by species such as bladderwort, curly-leaf pondweed, Eurasian watermilfoil, grass, native milfoil, variable-leaf milfoil, water chestnut, zebra mussels, and other. The category “other” included anything that we couldn’t identify properly or pine needles, leaves, etc. 116 organisms were found on boats entering Fourth Lake and 42 found leaving Fourth Lake. Last year, there were 159 organisms found entering Fourth Lake and 57 organisms found leaving Fourth Lake. The most



Figure 26- Water chestnut seeds found at Fourth Lake Boat Launch.

common specimen found was grass, followed by the category “other,” and then by Eurasian watermilfoil with 11 specimens found. The total number of organisms is overall less than what was found than last year.

Table 26- AIS removed from watercraft and trailers at Fourth Lake Boat Launch, 2012.

	Entering	Leaving	Prior Waterway
Eurasian Watermilfoil (EWM)	9	1	Braddock Bay, Chateauguay Lake, Oneida Lake, Cayuga Lake, Kayuta Lake, Irondequoit Bay
Bladderwort (BW)	5	1	Lake Moraine, Fulton Chain of Lakes, Big Moose Lake
Native Milfoil (NM)	6	1	St. Lawrence River, Chautauqua Lake, Fulton Chain of Lakes, Oneida Lake
Water Chestnut (WC)	3		Hudson River Valley, Mohawk River, Oneida Lake
Curly Leaf Pondweed (CLP)	2	1	Cayuga Lake
Zebra Mussel (ZM)	1		
Other (O)	24	13	Fulton Chain of Lakes, Sacandaga Lake, Lime Lake, Oneida Lake, Lake Ontario, Saratoga Lake, Cayuga Lake, St. Lawrence River
Variable Leaf Milfoil (VLM)	1	4	Lake Ontario, Fulton Chain of Lakes, Oneida Lake
Grass (GRS)	60	25	Irondequoit Bay, Erie Canal, Fulton Chain of Lakes, Oneida Lake, Delta Lake, Keuka Lake, Canandaigua Lake, Candlewood Lake, Canadarago Lake, St, Lawrence River

There was more grass found on boats this year than there was last year, however, there were more organisms found in the “other” category last year than this year by over half. Last year there were 113 organisms found in this category with only 42 organisms found this year. Unfortunately, water chestnut was found three times this year. The number of variable leaf milfoil plants found increased this year with it being found four times this summer and it only being found twice last year. There were less zebra mussels found this year as well as Eurasian watermilfoil.

The Watershed Stewardship Program’s Watershed Stewards asked boaters if they had taken any prevention steps to help stop the spread of invasive species prior to visiting the waterway. These steps might be anything that the boater did to get rid of the invasive plants on their boats including washing their boat or draining any bilges. If a boater responded negatively, it was recorded as a “no” even if they subsequently acknowledged that they had unknowingly taken steps. This is to ensure that prevention steps were consciously taken by the boater. Out of the 1,752 boats that were at the Fourth Lake boat launch, 75% of these boats have taken prevention steps to stop the spread of invasive species. Of these 75% of boats that have had prevention steps taken, 53% of these washed their boats. The second most popular prevention step taken was inspection of the boats followed by draining the bilge, and then drying the boat. Other steps that were taken were draining the livewell, draining the bait bucket, and disposing of unused bait. This was a definite increase than last year. For last year, 65% of boaters took prevention steps. Many of the boaters remembered the stewards from last year who told them about invasive species and how to prevent the spread of them.

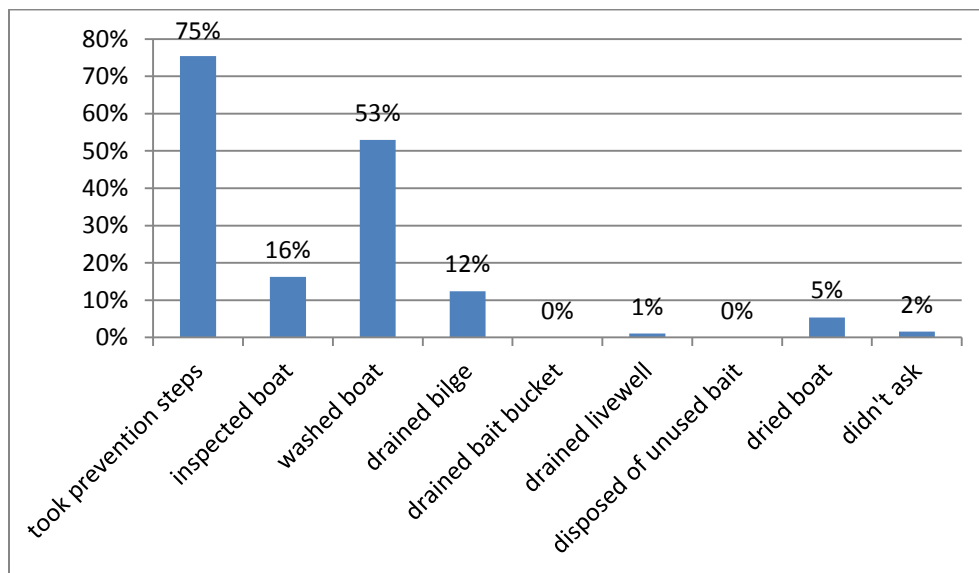


Figure 27- AIS spread prevention measures taken by visitors, Fourth Lake Boat Launch, 2012.

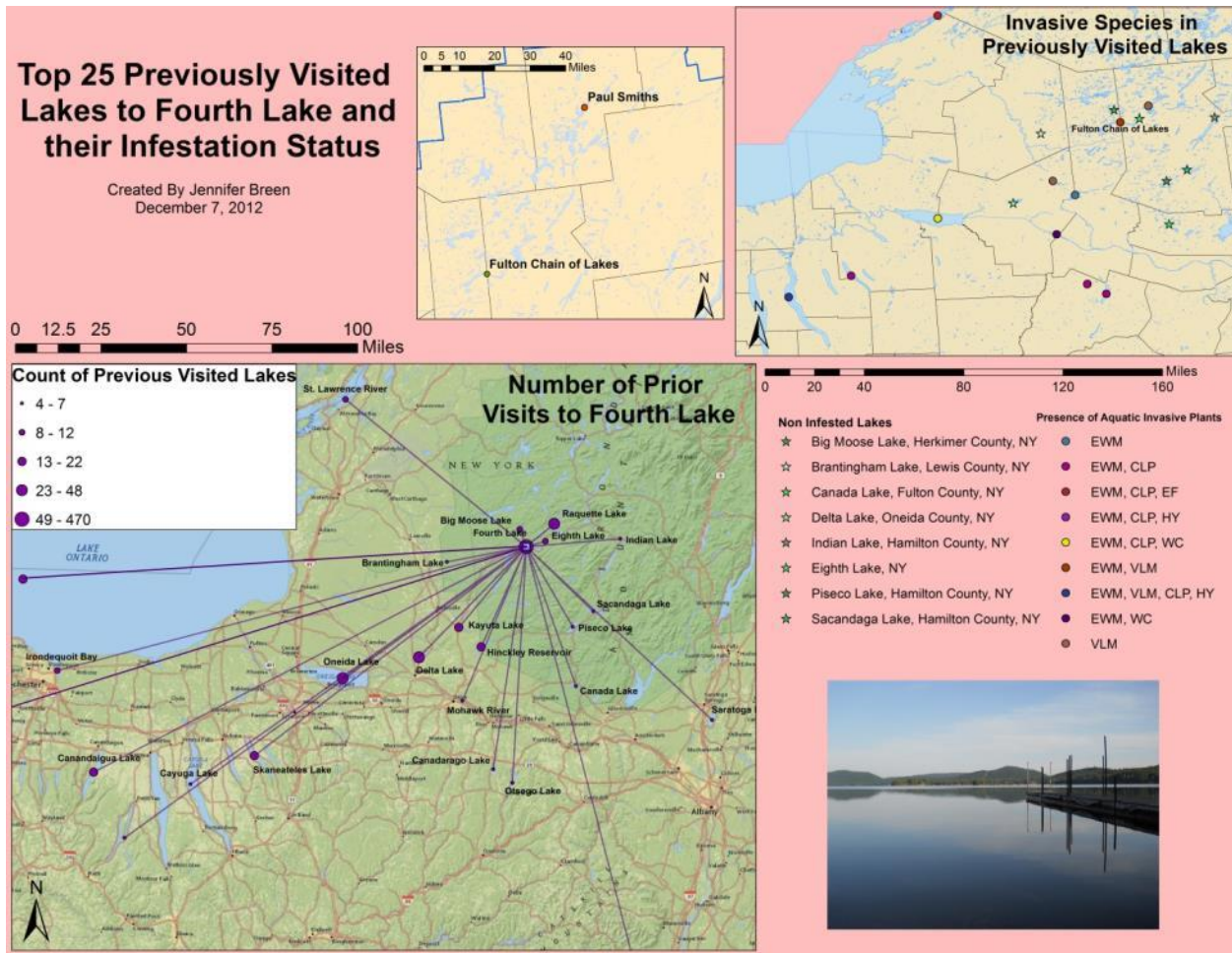


Figure 28-Prior waterway visits, Fourth Lake Boat Launch, 2012

Discussion:

For the summer of 2012 there were more boats and people recorded visiting the Fourth Lake Boat Launch than last year. There were a total of 1,752 boats this year compared to 2011 when there were only 1,346 boats. There were 3,364 people who visited Fourth Lake last year when there were 4,393 people. This is surprising when there were more days covered in 2011. Last year 68 days were covered at the boat launch and only 66 days were covered in 2012. Fourth Lake saw a large increase in boaters from last year. Fridays, Saturdays, and Sundays saw the most traffic at the launch. Memorial Day Weekend alone saw 106 boats; 65 on Saturday and 41 on Sunday. Similar numbers were seen each weekend for the rest of the summer. There were 60-70 boats visiting the boat launch every weekend during the summer of 2012. Fourth Lake is near a few major cities such as Utica, Boonville, and Rome so several people came on weekends to Fourth Lake.

There were 1,752 boats that launched from the Fourth Lake boat launch this summer. Many of them were motorboats and personal watercraft. However, these numbers do not account for repeats or people who repeatedly came to the boat launch on a weekly basis or sometimes a daily basis. There were many visitors who came to the boat launch on a weekly basis to spend their weekends at Fourth Lake. Also, there were a few rental companies that had often rented on weekends and during the week to several visitors all summer. There was a Jet-Ski rental business that frequently came to the boat launch using the same four Jet-Skis. There were a few boat

rental companies as well that came almost every weekend as well. There were also a few locals that came almost every weekend as well. The Stewards were able to get to know some of the locals and rental companies who came to the boat launch. This allowed the watershed stewards' message to be spread for many of the locals started cleaning their boat before coming to the launch and it helped the process go more smoothly once they arrived at the boat launch. The overall number of kayaks increased since last year; however, some of them were repeat visitors to the boat launch. The overall numbers of canoes, sailboats, kayaks, and rowboats are small due to the fact there is another boat launch near Alger Island on Fourth Lake that serves canoes and kayaks so they can avoid the mayhem of Fourth Lake on weekends. Also, these can be put in the water without the use of a boat launch. It should be noted that staff numbers decreased near the end of the summer due to the fact that many of our stewards returned to school.

This year there were more lakes that were visited two weeks prior coming to Fourth Lake compared with 2011. There were about 80 different lakes that were visited prior to coming to Fourth Lake. Unfortunately, most of them are infested with an aquatic invasive species. Most of the visitors told the stewards that Fourth Lake is only the place they visit every year. Many of these visitors came back every week so the number of boats do not account for repeat visitors. At the beginning of the summer, many people who were launching their boats lived on Fourth Lake and kept their boats in for the rest of the summer. Generally, the visitors to the Fourth Lake boat launch accepted the steward's presence at the boat launch. Many of them remembered the stewards from last year as well as our message. Some of the boaters told the steward at the boat launch that they cleaned their boats before launching it for the season or before coming to Fourth Lake for the day for they remembered what the steward told them about invasive species and preventing the spread of them. Several of the people who lived on the lake were concerned about keeping their lake clean and free of invasive species. Many boaters did not want their fishing to be ruined by invasive species.

One of the goals of this program is to promote awareness of AIS. Most boaters were aware of AIS, but their knowledge was restricted to zebra mussels and did not know about the different types of milfoil or other aquatic plants. Almost no boaters or residences were aware of the status of Fourth Lake. Many did not know there was a problem at all. Boaters seemed glad there were no zebra mussels and expressed a greater willingness to take AIS prevention steps once they learned Fourth Lake had hardly any invasive species. Some were concerned about the invasive species in the lake and wanted to know what was being done to get rid of them.

Public perception of the program was mostly positive. There was more resistance from the year-round residents of the lake who didn't know there were invasive species in Fourth Lake. However, some residents did appreciate what the stewards were doing to keep the lake clean. Many of the people assumed that we were with the Department of Environmental Conservation. This year the stewards did have a sign at the boat launch but many boaters did not pay attention to it. They thought they had to pay a fee to launch their boat. Even after explaining the program, some still seemed to view it as a waste of time and money and did not understand why we were checking their boats. Though some people were in a rush to get on the water, most of the visitors who came to the Fourth Lake boat launch were accepting of the stewards' presence and their message.

Conclusion

Fourth Lake Boat Launch had an increase in the number of boats launching at this site for the 2012 summer. Motorboats were three-quarters of the boats visiting the boat launch. Motorboats, Personal Watercraft, Sailboats, Kayaks, and Barges all had an increase in numbers this year from last year. The number of people launching a boat also increased from since last year. The week of June 28, 2012 to July 4, 2012 experienced the most visitors to the Fourth Lake boat launch. We also saw an increase in the number of people taking prevention

steps to stop the spread of the invasive species. This might have led to the fewer amounts of invasive species that were found coming into Fourth Lake on boats in 2012.

Recommendations

Throughout the summer, stewards encountered several boat launch visitors each day who did not know about invasive species and what the Watershed Stewardship Program was about. There was some media coverage about what we do. The stewards did print out a newsletter every month during the summer, however, it would be helpful if there was more media coverage before the actual season began or right when the season begins to let boaters know that they should know about the watershed steward program and invasive species.

People at the launch all the time asked the stewards what these invasive plants looked like. It was helpful when the stewards were able to display live samples of different types of milfoil for many boaters did not know about milfoil and had only heard about zebra mussels. Samples of native and invasive species at the boat launch dramatically increased public engagement. People are more interested and become more engaged with hands-on specimens. It also sparked people's interest when the steward could tell them if a body of water they had previously visited had an invasive species in it. Stewards need to make consistent use of an up-to-date list of AIS infested waterways.

Additionally, Fourth Lake was very busy on weekends. Boaters began arriving in crowds from about 10am and continued well after 4pm. It was often very difficult for the steward to reach boats exiting the boat launch due to the importance of reaching boats entering Fourth Lake. The narrow boat launch did not permit exiting boaters to wait for long to be inspected. It might be helpful to have two stewards at this launch especially during very busy times of the day. Also, because the weekends are so busy, not all the boats were inspected during the day. Every weekend the steward had to stay overtime for the line of boats did not cease. The steward also noticed that boat traffic did not let up in the evenings. Boat traffic was still heavy even after 6pm. It might be helpful to have a steward here in the evening, or switch the hours of the steward so they will be there later during the day. It might also help to have overlapping shifts at the Fourth Lake boat launch on weekends so exiting boats aren't missed, boater stress will decline, and more of the boats will be inspected as they enter Fourth Lake.

Table 27 – Fourth Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Week	Boat Type							total # boats	Weekly Avg HP outboard	4 Stroke/ 2 strk DI	Group Size
	M	PWC	S	C	K	B	R				
5-26-12 to 5-27-12	90	16	0	1	6	0	0	113	73	18	306
5-31-12 to 6-6-12	11	4	0	0	1	0	0	16	104	1	37
6-7-12 to 6-13-12	53	16	1	0	2	1	0	73	77	17	170
6-14-12 to 6-20-12	97	9	0	1	11	1	0	119	68	13	268
6-21-12 to 6-27-12	76	31	1	1	2	0	0	111	67	21	273
6-28-12 to 7-4-12	135	33	6	0	4	0	0	178	99	23	473
7-5-12 to 7-11-12	84	27	3	1	2	0	0	117	84	16	285
7-12-12 to 7-18-12	108	46	3	0	11	1	0	169	64	16	399
7-19-12 to 7-25-12	106	25	1	1	14	0	0	147	75	14	375
7-26-12 to 8-1-12	123	18	0	3	6	0	0	150	77	22	399
8-2-12 to 8-8-12	98	26	3	0	7	1	1	136	75	20	335
8-9-12 to 8-15-12	99	37	3	1	5	2	1	148	76	17	364
8-16-12 to 8-22-12	83	14	2	1	6	0	0	106	62	19	277
8-23-12 to 8-29-12	101	29	0	2	7	0	0	139	91	13	358
8-30-12 to 9-3-12	27	2	0	0	1	0	0	30	83	9	74
totals	1291	333	23	12	85	6	2	1752	Summer Avg = 76	239	4393
									Median HP = 65		

Table 28-Fourth Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian Watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel.

Week	# groups launching	# groups retrieving	organisms found		organism type								
			entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other
5-26-12 to 5-27-12	100	20	5	0	0	0	0	4	0	0	0	0	1
5-31-12 to 6-6-12	11	8	1	0	0	0	0	0	0	0	0	0	1
6-7-12 to 6-13-12	58	20	6	2	0	0	1	3	0	0	1	0	3
6-14-12 to 6-20-12	88	51	5	2	0	0	0	5	0	0	0	0	2
6-21-12 to 6-27-12	80	44	6	4	0	0	0	4	1	0	0	0	5
6-28-12 to 7-4-12	149	40	10	2	0	0	3	6	0	1	0	0	2
7-5-12 to 7-11-12	76	41	4	4	1	1	0	3	0	1	0	0	2
7-12-12 to 7-18-12	114	59	16	5	0	1	2	11	1	0	0	1	5
7-19-12 to 7-25-12	98	58	4	5	2	0	0	2	1	1	0	0	3
7-26-12 to 8-1-12	105	59	12	4	2	0	0	8	3	0	0	0	3
8-2-12 to 8-8-12	84	45	12	4	0	0	1	10	0	0	0	0	5
8-9-12 to 8-15-12	80	71	9	2	0	0	1	6	0	1	0	0	3
8-16-12 to 8-22-12	66	44	9	3	0	0	1	5	0	1	1	0	4
8-23-12 to 8-29-12	97	45	15	3	0	0	1	13	2	0	1	0	1
8-30-12 to 9-3-12	12	19	4	4	1	1	1	3	0	0	0	0	2
totals	1218	624	118	44	6	3	11	83	8	5	3	1	42

Table 29- Fourth Lake Boat Launch use figures, 2012. Key: I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Week	# of groups taking AIS spread prevention measures								
	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	92	0	78	38	0	2	0	6	2
5-31-12 to 6-6-12	9	0	7	3	0	2	0	0	2
6-7-12 to 6-13-12	47	6	39	15	0	1	0	1	3
6-14-12 to 6-20-12	85	17	63	12	0	2	0	7	3
6-21-12 to 6-27-12	73	17	56	7	0	0	0	6	1
6-28-12 to 7-4-12	105	21	82	4	0	0	0	11	5
7-5-12 to 7-11-12	65	18	45	8	0	0	0	3	2
7-12-12 to 7-18-12	92	29	54	15	0	0	0	5	1
7-19-12 to 7-25-12	96	27	57	23	0	1	0	8	0
7-26-12 to 8-1-12	110	25	69	23	0	3	0	10	2
8-2-12 to 8-8-12	87	20	67	7	0	0	0	6	0
8-9-12 to 8-15-12	91	28	65	14	0	1	0	11	1
8-16-12 to 8-22-12	66	20	44	7	0	2	0	3	0
8-23-12 to 8-29-12	87	16	64	12	0	2	0	5	0
8-30-12 to 9-3-12	16	7	10	2	0	0	0	1	2
totals	1121	251	800	190	0	16	0	83	24
	75%	17%	54%	13%	0%	1%	0%	6%	2%



Figure 29- Fourth Lake Steward.

Lake Flower and Second Pond Boat Launch Use Study

By Wesley Bates and Derek Scott, Watershed Stewards



Figure 30- Lake Flower, Village of Saranac Lake (1).

Introduction

Paul Smith's College Watershed Stewardship Program posted Watershed Stewards at both the Lake Flower and Second Pond Boat Launches during the summer of 2012 due to a generous grant from the Lake Champlain Basin Program and support from Paul Smith's College's Adirondack Watershed Institute. The Lake Flower and Second Pond state boat launches are both located along the Saranac chain of lakes, which also includes Oseetah Lake, Kiwassa Lake, and the three Saranac Lakes. These lakes contain the same aquatic invasive species (AIS) because they are hydrologically connected and experience heavy recreational boating through-traffic. These lakes receive the most AIS pressure in the High Peaks area of the Adirondack Park due to their heavy public visitation.

Being the primary launching points for both Lower and Middle Saranac Lakes, both these boat launches offer access to the very popular Saranac Lake Islands Campground. The campground originally began in 1934 when public land was leased from the state by individuals, but became the attraction it is today when the Department of Environmental Conservation opened the sites as a public campground in 1974. The campground is composed of 87

campsites as well as 5 lean-to sites, and day-use sites on many of the islands. With a variety of activities from hiking to fishing, the Saranac Lake Islands Campground is one of the most desirable attractions in the area.

The Lake Flower Boat Launch is located within the Village of Saranac Lake on Route 86. In 1829 the Saranac River was dammed in order to create the lake (1). Lake Flower encompasses approximately 202 acres and is no deeper than fifteen feet (2). The lake was initially called Newell Pond, but was renamed for the former New York State Governor Roswell P. Flower following the end of his term in 1894. The lake is primarily owned by private individuals and is the last body of water in the Saranac Chain of Lakes before the water flows into the Saranac River.

The Saranac Chain of Lakes is known to possess Eurasian watermilfoil (*Myriophyllum spicatum*), variable-leaf milfoil (*Myriophyllum verticillatum*), and curly leaf pondweed (*Potamogeton crispus*). Eurasian watermilfoil has the ability to aggressively reproduce from small fragments. Once introduced to a waterway, Eurasian watermilfoil can quickly outcompete other plant species within the lake, transforming the native ecology. It forms thick mats of vegetation which then chokes out other species and hampers recreation. Both Lake Flower and Second Pond are potential sources of invasive species moving to other bodies of water and therefore high priority locations for efforts to prevent the spread of AIS.

Paul Smith's College Watershed Stewardship Program (WSP) has been engaging with boaters at Lake Flower since 2011. Lake Flower is the second busiest launch within the program's eastern section and is frequented by boaters from out of town as well as many from the immediate area (3). The Lake Flower location proved to be ideal for public outreach and education, as its location in town proved to be a busy area for recreationists on the water and on land.

The WSP is a public outreach program designed to educate and increase public awareness of AIS in addition to other environmental issues regarding the waterways of the Adirondack Park. The outreach at Second Pond began in 2005 and has been recurring every year since 2008. The continuity of the waterways from Second Pond makes the launch a high priority, being a primary source of Eurasian watermilfoil, which can easily be transported throughout the region.



Figure 31- Watershed Stewards educating stand-up paddleboard users at Lake Flower Boat Launch.

Methods

For the fifteen weeks between May 26th to September 3th, a steward was on site at both the Lake Flower State Boat Launch and Second Pond Boat Launch from 7:00AM to 4:00PM with one hour off for breaks and lunch. Watershed Stewards were stationed at the New York State Department of Environmental Conservation (NYSDEC) Second Pond boat launch five days per week (Thursdays- Mondays) and the Lake Flower State Boat Launch six days per week (excluding Tuesdays). Watershed Stewards provided boaters and visitors with interpretive information concerning AIS. Stewards asked boaters what body of water they had most recently visited with their water craft. Data was additionally collected on what steps the visitor took to prevent the transport of invasive species from lake to lake. Information was also collected concerning the group size, horsepower of outboard engines, state registration and if the outboard engine was a 4-stroke or direct injection 2-stroke.

All stewards provided a courtesy inspection for boats entering and leaving Lake Flower and Second Pond. Propellers, outdrives, trailer bunks, axles, standing water, and other nooks and crannies were areas of high focus due to the potential for harboring invasive hitchhikers. Boaters were then offered informational literature on aquatic invasive species and how to prevent them from infecting other waterways. Although the Watershed Stewards performed inspections for visitors they also recommended that boaters take responsibility for washing and inspecting their own boats. All viable boater responses were recorded in a Microsoft Excel database for future study and determination of use and risk.

Results

During the summer months of 2012, the WSP observed and inspected a total of 1,498 boats that were recreating on Lake Flower. From Labor Day to Memorial Day stewards interacted with 2,995 visitors accompanying the vessels. Of the 1,498 entering and exiting the lake, 567 boats visiting stated that the Saranac Chain of Lakes had been their last body of water visited in the prior two weeks, with many boats stating that their boats exclusively stayed on Lake Flower. 1,010 boaters recreating on Lake Flower possessed motorboats, accounting for two thirds (68%) of the total visitors. After motorboats, canoes totaled 14% (204) of launches, followed closely by kayaks at 13% (200). The remaining percentage of boats was divided between personal watercraft (63 for 4%), rowboats (14 for 1%), stand up paddleboards (1 rounding to 0%), and construction barges (4 rounding to 0%).

In 2012, watershed stewards encountered a total of 3,003 boats and 5,393 visitors at the Second Pond boat launch between May 26th and September 3rd. There were a total of 870 motorboats (29% of all launched), 1,091 kayaks (36%), 936 canoes (31%), 55 personal watercraft (2%), 22 rowboats (1%), and 19 (1%) stand up paddleboards.

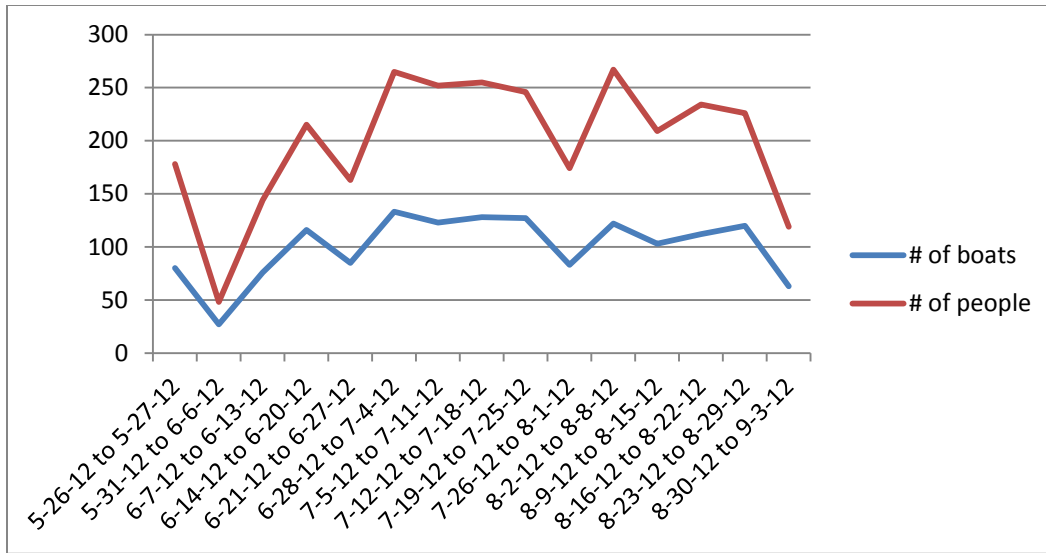


Figure 32- Lake Flower Boat Launch use, 2012.

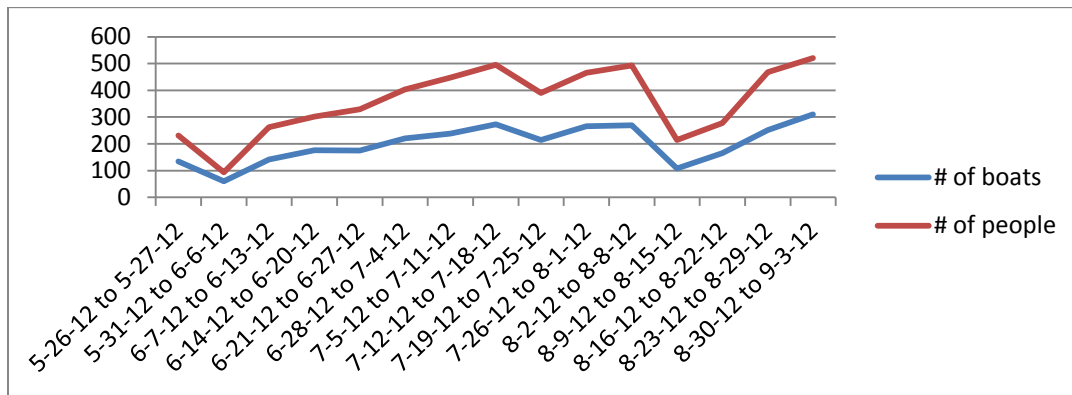


Figure 33- Second Pond Boat Launch use, 2012.

The greatest usage at Lake Flower State Boat Launch occurred during the week ending in Independence Day and the first week in August. Second Pond State Boat Launch had the most use during the middle of July, the week of the 12th-18th, the first week in August, and over Labor Day weekend. These numbers indicate that in the future the WSP should, at a minimum, be fully staffed throughout July into the beginning of August.

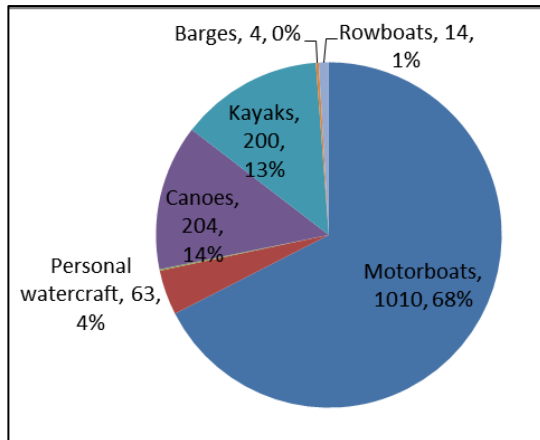


Figure 34- Types of watercraft launched, Lake Flower Boat Launch, 2012.

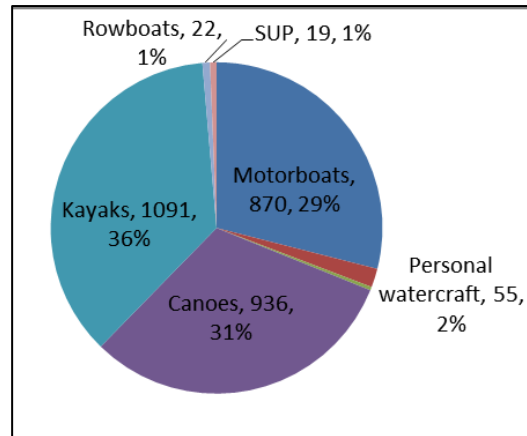


Figure 35- Types of watercraft launched, Second Pond Boat Launch, 2012.

Aquatic Invasive Species Spread Prevention Measures Taken by Visitors

Watershed Stewards recorded any preventative measures boaters took to stop the spread of both native and non-native species from one waterway to the next, including visual inspections of boats, washing or drying boats, draining the bilge, live well, or bait buckets, and disposing of any found species in the indicated disposal sites. During the season, 62% of boaters said that they took some prevention step before launching or after retrieving their vessel at the Lake Flower State Boat Launch. Most of these boaters washed (41%) and/or visually inspected their boat (39%) for AIS. 4% of boaters allowed their boats to dry up to two weeks between launches, an important threshold for the viability of AIS. 2% of boaters drained their bilge between visits. It is important to note that many visitors took multiple steps while others took no actions at all, often citing that they never switched waterways with their boats. At the Second Pond State Boat Launch a total of 57% of boaters took some kind of prevention steps. 33% of groups inspected their boats, 39% washed their boats after use, 7% dried their boats, 2% drained the bilge, and a negligible number of groups emptied their bait bucket, live well, or disposed of bait properly.

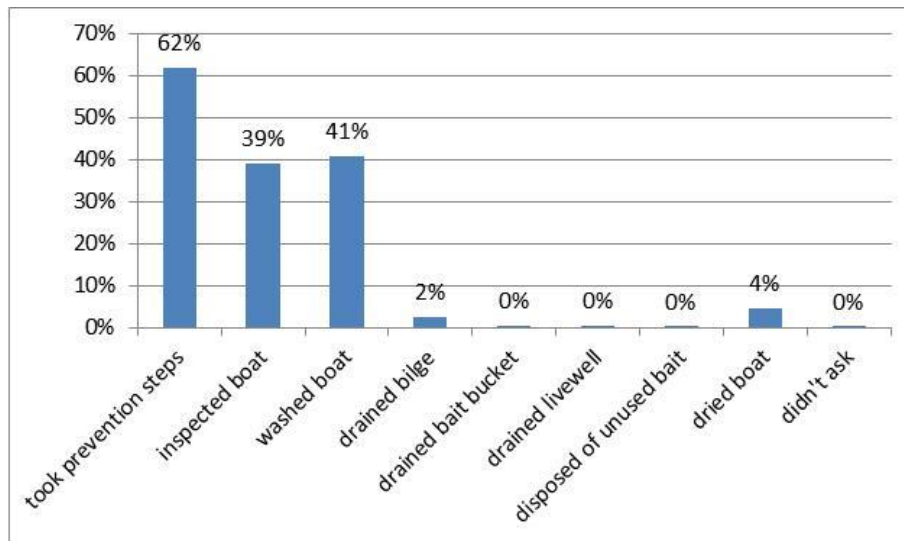


Figure 36-AIS spread prevention measures taken by visitors, Lake Flower Boat Launch, 2012.

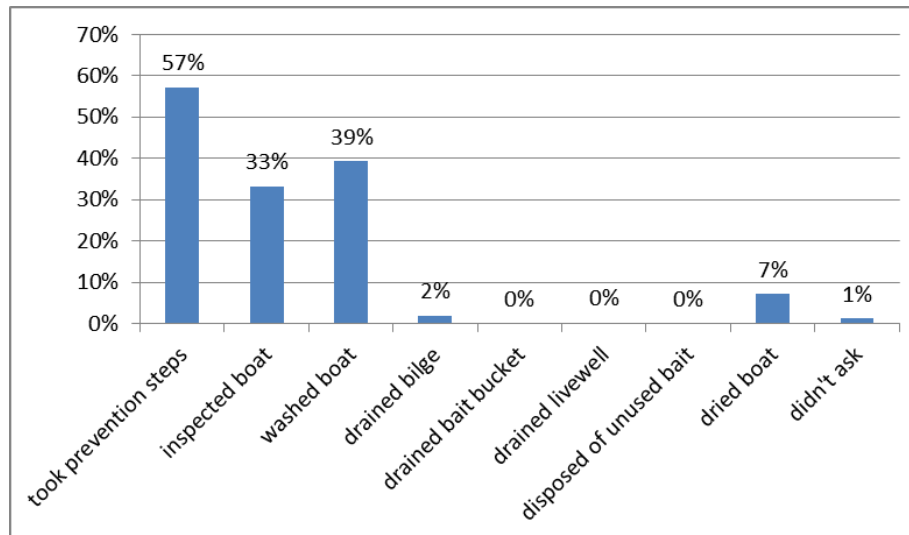


Figure 37- AIS spread prevention measures taken by visitors, Second Pond Boat Launch, 2012.

Organisms Removed from Watercraft

During the summer of 2012 watershed stewards removed a total of 267 aquatic plant species from vessels entering and/or leaving Lake Flower. Of these species 99 were confirmed AIS. The majority of the species found were from boats that being retrieved from Lake Flower. These 185 incidents accounted for 36% of the 508 boats leaving. Of the 1,008 boats entering the waterway only 8% (81) had organisms attached to the boat or trailer. There were over four times as many species found on boats leaving than entering, making Lake Flower a highly probable source of AIS infestation for the Adirondacks. The AIS that were found on boats throughout the summer were primarily Eurasian watermilfoil; 36 instances of this organism were recorded. There were also 24 specimens of variable leaf milfoil, 4 curly leaf pondweed and 35 unidentified species. For the 2012 summer there were no recorded instances of zebra mussels, down from one the previous summer. Many of the recorded organisms found and removed were common indigenous grasses (152). The overall organism transport rate for Lake Flower was 18% (total number of organisms-267- divided by total number of inspections-1,516).

Watershed Stewards saw and removed organisms, both native and non-native, from boats entering and leaving Second Pond. In 2012, stewards removed 33 organisms (3.1% of all launches) from boats entering the waterway, and 73 (11.9% of all retrievals) from those leaving. The frequency of organisms found on boats leaving Second Pond was almost three times greater than those found entering the waterway. Overall, a total of 36 fragments of Eurasian watermilfoil, 12 bladderwort fragments, and 3 fragments of both curly leaf pondweed and variable-leaf milfoil were removed. A total of 64 AIS were found in the 3,003 boats inspected, making the species transport rate 3.1%. Eurasian watermilfoil was frequently found on boats exiting Second Pond, as the lake is a source of the invasive. However, prior waterway history shows that many of the recorded water bodies are known hosts as well. The overall organism transport rate for Second Pond (invasive combined with non-invasive organisms) was 7%.

Table 30- AIS removed from watercraft and trailers at Lake Flower and Second Pond State Boat Launches, 2012

Aquatic Invasive Organism	Entering Lake Flower	Leaving Lake Flower	Entering Second Pond	Leaving Second Pond	Waterway Visited in Previous 2 weeks
Curly Leaf Pondweed			2	1	Upper St. Regis (1), none (1)
Curly Leaf Pondweed	3	1			None (3)
Eurasian Watermilfoil	30	8			Chateaugay Lake, Chazy Lake, Lake Champlain (2), Lake Flower (3), Saranac River, Seneca River, none (16)
Eurasian Watermilfoil			29	19	Lake Champlain (2), Saranac River (2), Second Pond (3), none (22)
Variable Leaf Milfoil	18	6			Keuka Lake, Lake Flower (5), Saranac River (2), none (10)
Variable Leaf Milfoil			1	2	Canandaigua Lake
Totals	51	15	32	22	

Although the Second Pond State Boat Launch saw double the number of boats seen at Lake Flower during the summer it is still extremely important to have a Watershed Steward present at Lake Flower State Boat Launch because both launches provide access to the Saranac Chain of Lakes. Even though there were fewer boaters using the Lake Flower State Boat Launch, the boats at that launch were more likely to be transporting AIS. Both launches had a similar number of Eurasian watermilfoil fragments on boats entering while boats at Lake Flower were more likely to be carrying fragments of variable leaf milfoil. The two boat launches had similar spread prevention statistics, with the boaters at Second Pond being slightly more likely to take any measure.

Table 31- Waterways visited in previous two-week period, Lake Flower Boat Launch, 2012. (Note: The Saranac Chain of Lakes includes Oseetah Lake, Second Pond, Lower, Upper and Middle Saranac Lakes.)

Body of Water	AIS Present	# Visits		Body of Water	AIS Present	# Visits
Lake Flower	Yes	473		Lake George	Yes	1
Saranac Chain	Yes	106		Niagara River	Yes	1
Lake Placid	Yes	51		Port Bay, NY	Yes	1
Lake Champlain	Yes	17		Sacandaga Lake	Yes	1
Tupper Lake	Yes	15		Saranac River	Yes	1
Chateaugay Lake	Yes	8		Taylor Pond	Yes	1
St. Lawrence River	Yes	8		Thompsons Lake	Yes	1
Lake Colby	Yes	7		None		371
Lake Ontario	Yes	6		Rental		41
Fish Creek Pond	Yes	5		Rainbow Lake		7
Bantam Lake CT	Yes	4		Lake Clear		5
Black Lake	Yes	4		Upper St. Regis Lake		5
Connecticut River	Yes	4		Mirror Lake		3
Hudson River	Yes	4		Raquette River		3
Kiawassa Lake	Yes	4		Little Moose Pond, Old Forge		2
Long Lake	Yes	4		Lower St. Regis Lake		2
Mountain View Lake	Yes	4		Rollins Pond		2
Brant Lake	Yes	3		Upper St. Regis Lake		2
Erie Canal	Yes	3		Barnum Pond		1
Follensby Clear Pond	Yes	3		Big Moose Lake		1
Lake Dunmore VT	Yes	3		Blue Lake		1
Meacham Lake	Yes	3		Blue Mountain Lake		1
Raquette Lake	Yes	3		Canada Lake		1
Schroon Lake	Yes	3		Chittenden Reservoir VT		1
Loon Lake	Yes	2		Fern Lake		1
Oseetah Lake	Yes	2		Jones Pond		1
Saratoga Lake	Yes	2		Jones Pond, Angelica, NY		1
Atlantic Ocean	Yes	1		Lake Everest		1
Canadarago Lake	Yes	1		Lake Kushaqua		1
Canandaigua Lake	Yes	1		Lake Lillinonah CT		1
Candlewood Lake CT	Yes	1		Lake Whitaker		1
Cayuga Lake	Yes	1		Little Clear		1
Congamond Lake MA	Yes	1		Little Magathy River MD		1
Forked Lake	Yes	1		Little Tupper Lake		1
Franklin Falls Pond	Yes	1		Little Wolf Lake		1
Grafton Lake	Yes	1		Long Pond		1
Grasse River	Yes	1		Lost Pond		1
Hinckley Reservoir	Yes	1		Spitfire Lake		1
Housatonic River CT	Yes	1		Stony Creek		1
Hyde Lake	Yes	1		Turtle Pond NJ		1
Lake Bonaparte	Yes	1		Total		1236

Table 32- Waterways visited in previous two-week period, Second Pond Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Osetah Lake, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Saranac Chain	Yes	345	Lake Dunmore VT	Yes	2	Mirror Lake		5
Second Pond	Yes	226	Lake Titus	Yes	2	Rainbow Lake		5
Lake Placid	Yes	47	Loon Lake, Chestertown NY	Yes	2	Ausable River		4
Lake Champlain	Yes	31	Meacham Lake	Yes	2	Cascade Lakes		4
Fish Creek Pond	Yes	24	Otsego Lake	Yes	2	Moose Pond		3
Follensby Clear Pond	Yes	22	Skaneateles Lake	Yes	2	Abenaki Brook NH		2
Hudson River	Yes	21	Arrowhead Lake	Yes	1	Averill Lake VT		2
Tupper Lake	Yes	19	Butternut Pond	Yes	1	Boyd Pond, Russell NY		2
Lake Colby	Yes	14	Canadarago Lake	Yes	1	Heart Lake		2
Lake Ontario	Yes	11	Canadice Lake	Yes	1	Hoel Pond		2
Atlantic Ocean	Yes	10	Caroga Lake	Yes	1	Lake Clear		2
Chateaugay Lake	Yes	10	Cassadaga Lake	Yes	1	Lake Eaton		2
Long Lake	Yes	10	Cayuga Lake	Yes	1	Lake Everest		2
Lake George	Yes	9	Cazenovia Lake	Yes	1	Little Wolf Lake		2
Canandaigua Lake	Yes	7	Chazy Lake	Yes	1	Loon Lake, Vermontville NY		2
Saratoga Lake	Yes	7	Chazy River	Yes	1	Lowe's Lake		2
St. Lawrence River	Yes	7	Dog Pond CT	Yes	1	Monksville Reservoir NJ		2
Rollins Pond	Yes	6	East Fork Lake OH	Yes	1	Abel Lake VA		1
Long Island Sound	Yes	5	First Lake	Yes	1	Arnold Lake		1
Mohawk River	Yes	5	Forked Lake	Yes	1	Assateague Bay MD		1
Oneida Lake	Yes	5	Glen Lake VT	Yes	1	Barnum Pond		1
Saranac River	Yes	5	Grasse River	Yes	1	Blue Marsh Lake PA		1
Cranberry Lake	Yes	4	Hinckley Reservoir	Yes	1	Blue Mountain Lake		1
Floodwood Pond	Yes	4	Housatonic River CT	Yes	1	Blue Mountain Reservoir PA		1
Great Sacandaga Reservoir	Yes	4	Hunt Lake	Yes	1	Casey Park NY		1
Lake Erie	Yes	4	Kinderhook Lake	Yes	1	Cedar River Flow		1
Lincoln Pond	Yes	4	Lake Cochituate	Yes	1	Chapel Pond		1
Mountain View Lake	Yes	4	Lake Nockamixum PA	Yes	1	Chittenden Reservoir VT		1
Taylor Pond	Yes	4	Lake Ronconcoma	Yes	1	Connery Pond		1
Black Lake	Yes	3	Lake St Louis QC	Yes	1	Dyken Pond		1
Cossayuna Lake	Yes	3	Lake Superior	Yes	1	Eagle Creek		1
Delaware River	Yes	3	Niagara River	Yes	1	Eaton Pond NY		1
Erie Canal	Yes	3	Oswego River	Yes	1	Genesee River		1
Franklin Falls Pond	Yes	3	Otsego Lake	Yes	1	Gillette Pond VT		1
Hemlock Lake	Yes	3	Pontoosuc Lake MA	Yes	1	Henderson Lake		1
Horseshoe Pond	Yes	3	Rhode Island Sound	Yes	1	Lake Marburg		1
Indian Lake	Yes	3	Round Lake	Yes	1	Lake Redman PA		1
Kiawassa Lake	Yes	3	Sacandaga Lake	Yes	1	Lamoille River VT		1
Lake Bonaparte	Yes	3	Seneca Lake	Yes	1	Lewey Lake		1
Lake Durant	Yes	3	Seneca River	Yes	1	Long Pond		1
Putnam Pond	Yes	3	Sodus Bay	Yes	1	Long Pond ON		1
Raquette Lake	Yes	3	Spring Lake RI	Yes	1	Moody Pond		1
Schroon Lake	Yes	3	Stony Creek Ponds	Yes	1	Moose River		1
Tupper Lake	Yes	3	Summit Lake	Yes	1	Mt. Arab Lake		1
Union Falls Reservoir	Yes	3	White Lake	Yes	1	Oak Orchard Creek		1
Black Pond	Yes	2	None		839	Oswegatchie River		1
Buck Pond	Yes	2	Rental		375	Piseco Lake		1
Conesus Lake	Yes	2	Upper St. Regis Lake		19	Polliwog Pond		1
Connecticut River	Yes	2	Raquette River		9	Splitrock Reservoir NJ		1
Fern Lake	Yes	2	Osgood Pond		7	Stillwater Reservoir		1
Fourth Lake	Yes	2	Black River		6	Sunrise Lake NJ		1
Greenwood Lake	Yes	2	Little Clear Pond		6	Wallenpaupack Lake PA		1
Kayuta Lake	Yes	2	Lower St. Regis Lake		6	Waterbury Reservoir VT		1
Lake Algonquin	Yes	2	Big Bass Lake PA		5	Whaley Lake		1
			Lake Kushaqua		5	Total		2350

As expected the majority of watercraft entering Lake Flower and Second Pond State Boat Launches were registered in New York State. New Jersey, Connecticut, Massachusetts, Vermont, and Pennsylvania were the registrations most often seen at these two boat launches. Overall, motor boaters were registered in 18 different states and provinces.

Table 33-State or province of registration of motorboats using Lake Flower Boat Launch, 2012.

State	# boats	State	# boats
AR	2	NJ	37
CT	22	NV	1
DE	4	NY	983
FL	6	OH	2
KY	1	ON	1
MA	15	PA	5
MD	3	QC	5
ME	1	RI	1
MT	1	SC	2
NC	2	VT	10
NH	2	Total	1106

Table 34- State or province of registration of motorboats using Second Pond Boat Launch, 2012.

State	# boats	State	# boats
NY	788	DE	6
NJ	56	KY	2
MA	23	OH	2
VT	18	RI	2
CT	13	ME	1
PA	11	MO	1
FL	10	NH	1
MD	7	Total	949
QC	7		

Discussion

During Lake Flower's second summer of program monitoring it continues to be a concern for the health of Adirondack lakes. Lake stewardship worked effectively to prevent the infection of many new introductions to the waterway while also thwarting organisms that could have potentially been removed and introduced to other lakes. Lake Flower is one of the most highly used of all the tri-Lakes area boat launches and this makes it a great location for further data collection and a crucial site for continued prevention inspections. Although most boats visiting claim to exclusively recreate at Lake Flower the organisms removed was each a possible vector for other pristine lakes around the Adirondacks.

The mixed composition of out of state versus instate boaters provided a great demographic for the continuing education of the public. Unfortunately, since the inaugural year in 2011 at Lake Flower State Boat Launch there was a decrease in percentage of boaters who took preventative steps. In 2011 79% of boaters employed some method to prevent the spread of invasives but during the 2012 season only 62% did so. The drop off in preventative steps shows that continuing education is important at this crucial site.

The importance of the Lake Flower boat launch cannot be understated. Many believe that since the waterway already has invasive species present that resources would be better used at other locations. This point has some validity but it is also important to recognize that the lake is a highly probable source for invasives being transported to other invasive free bodies of water. Its proximity to many key pristine lakes (Lake Placid, Osgood Pond and the St. Regis waterways) illustrate that an effort of prevention at Lake Flower could mean that these other waterways stay clean.

Lake Flower has become a vital part of the Paul Smith's Watershed Stewardship Program through its continued efforts in the community to prevent the spread of invasive species. Its positive impact on community education and involvement cannot be understated as it continues to combat the growing problem of invasive species. The program has been able to interact with a variety of boaters; the weekend water skiers to the canoe camping gurus. This continued outreach allows people far and wide to begin to understand the impact invasives can have upon our communities and our lakes. This summer the Paul Smith's Watershed Program continued to

spread the message concerning why early detection and prevention are important to keeping our environments clean for us and our natural ecosystems.

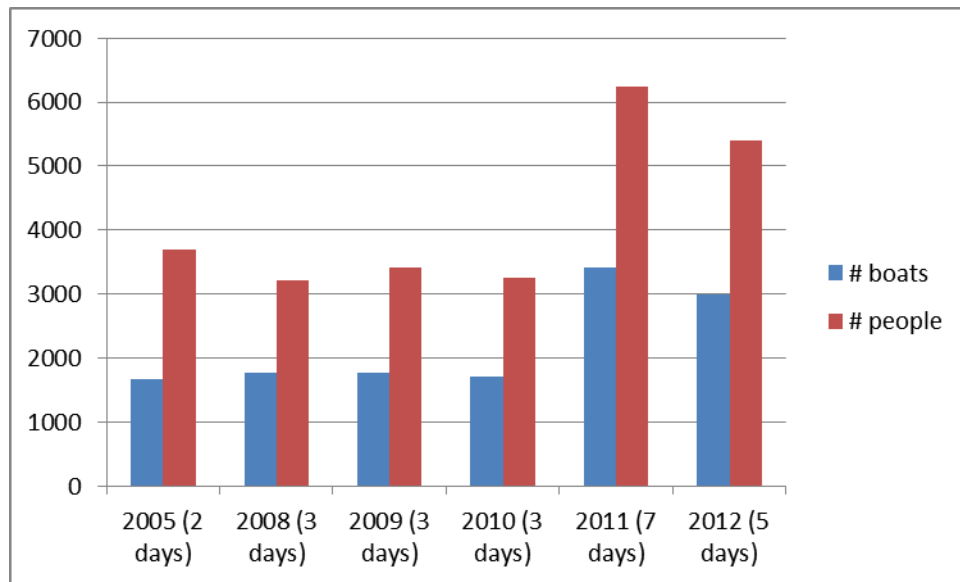


Figure 38- Historical usage data, Second Pond Boat Launch, 2005-2012. (Year, number of days of steward coverage per week).

Usage at the Second Pond Boat Launch decreased from 2011 numbers owing to decreased steward coverage, but had remained fairly steady for the three years of three day per week coverage prior to that. This launch remains one of the most critical in the WSP coverage area due to its high visitation rates and potential for moving AIS throughout the Adirondacks.

The Lake Flower and Second Pond Boat Launches are important because of the high potential for AIS education, pressure for AIS being imported to the Saranac Chain of Lakes, and the potential of exporting AIS to other areas. The Watershed Stewardship Program recognizes the support and collaboration of the Lake Champlain Basin Program and the Adirondack Watershed Institute for both underwriting and helping to train and guide the stewards posted to these important public waterway access points.



Figure 39- Boat inspection, Lake Flower.

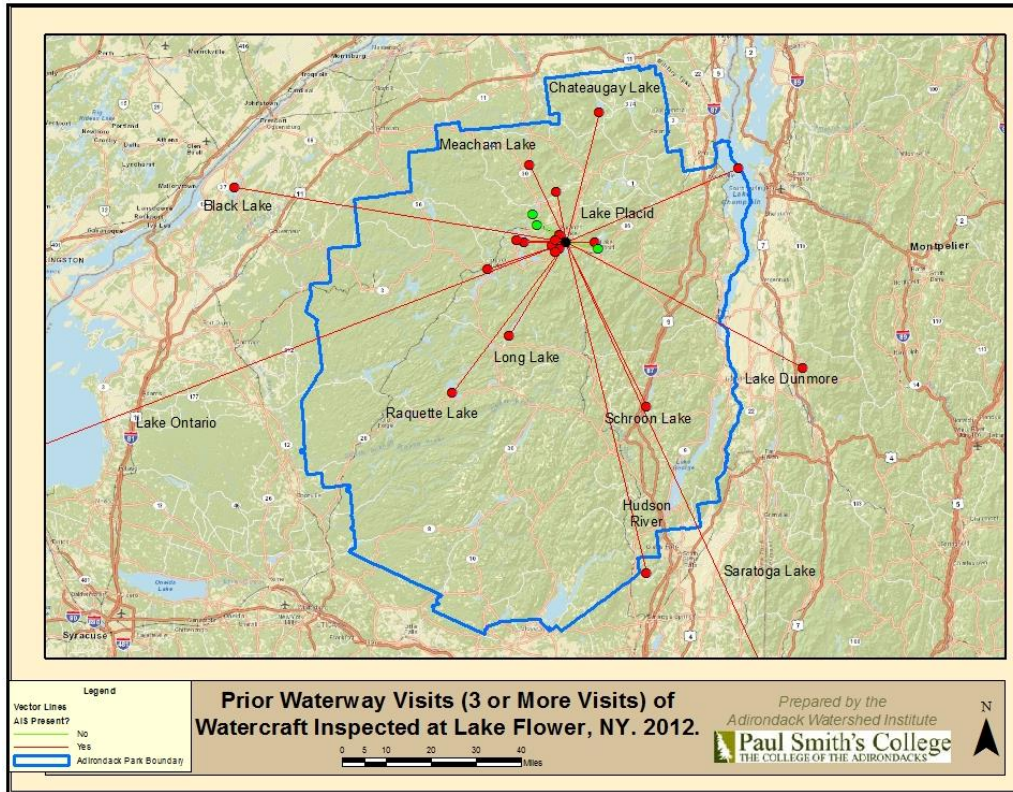


Figure 40- Prior waterway visits, Lake Flower Boat Launch, 2012.



Figure 41- Wider view of prior waterway visits, Lake Flower Boat Launch.

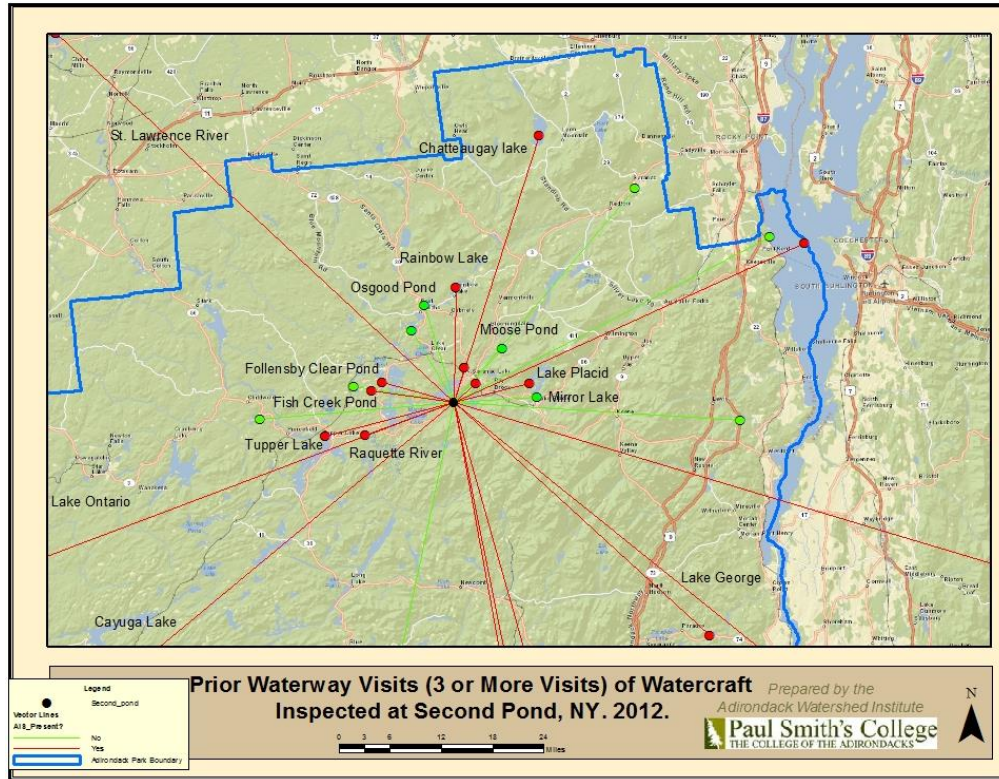


Figure 42- Prior waterway visits, Second Pond Boat Launch, 2012.

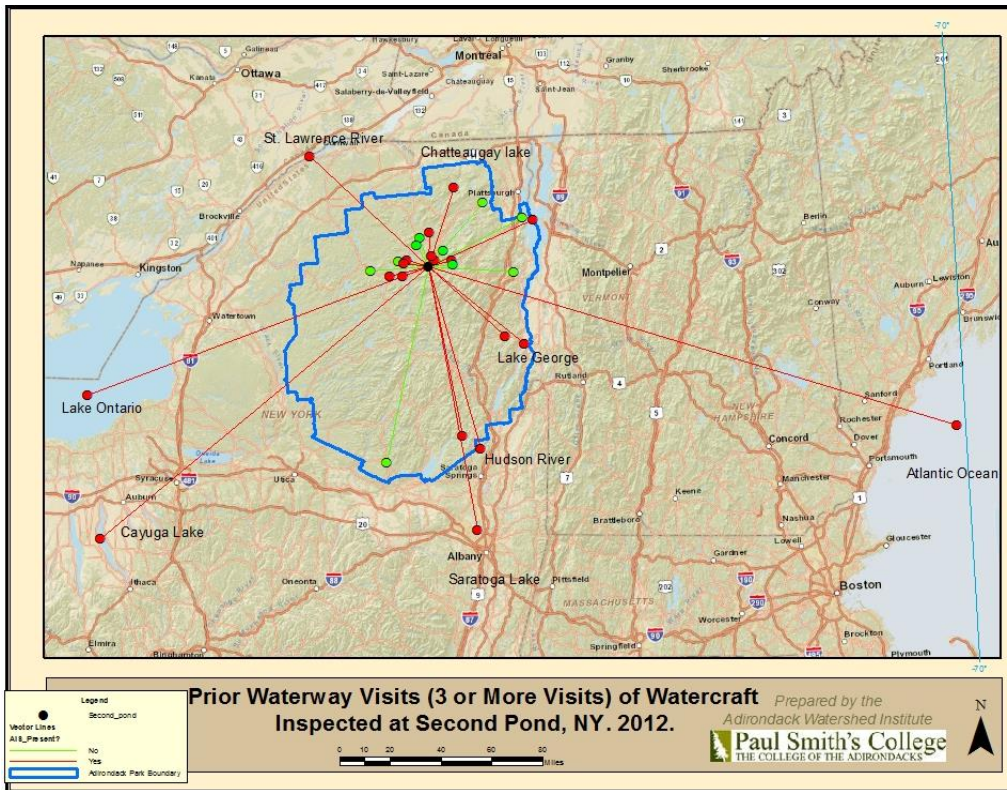


Figure 43- Wider view of prior waterway visits, Second Pond Boat Launch.

Table 35- Lake Flower Boat Launch use figures, 2012. KEY: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; SUP= stand-up paddleboard; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Lake Flower Recreation Study 2012																
Week	Boat Type								total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of Visitors	# groups launching	# groups retrieving	organisms found	
	M	PWC	S	C	K	B	R	SUP							entering	leaving
5-26-12 to 5-27-12	66	2	0	6	6	0	0	0	80	61	31	178	69	24	1	1
5-31-12 to 6-6-12	20	0	0	4	2	0	1	0	27	54	5	48	23	14	6	6
6-7-12 to 6-13-12	58	7	0	3	7	1	0	0	76	72	18	144	67	23	1	7
6-14-12 to 6-20-12	88	4	0	8	16	0	0	0	116	63	26	215	82	44	11	13
6-21-12 to 6-27-12	69	4	0	2	10	0	0	0	85	81	20	163	61	48	11	12
6-28-12 to 7-4-12	79	7	0	22	15	1	9	0	133	65	35	265	101	47	6	13
7-5-12 to 7-11-12	93	6	1	10	12	1	0	0	123	70	15	252	87	37	5	19
7-12-12 to 7-18-12	71	9	0	37	11	0	0	0	128	64	27	255	81	36	7	11
7-19-12 to 7-25-12	82	2	0	9	31	0	3	0	127	62	28	246	87	52	4	20
7-26-12 to 8-1-12	58	4	0	9	11	1	0	0	83	64	19	174	67	19	9	6
8-2-12 to 8-8-12	71	3	0	34	13	0	1	0	122	64	30	267	60	47	5	22
8-9-12 to 8-15-12	58	2	0	18	25	0	0	0	103	73	17	209	50	44	4	22
8-16-12 to 8-22-12	71	5	0	22	14	0	0	0	112	61	27	234	70	39	2	12
8-23-12 to 8-29-12	80	4	1	13	21	0	0	1	120	61	33	226	83	27	6	3
8-30-12 to 9-3-12	46	4	0	7	6	0	0	0	63	70	12	119	20	7	3	19
totals	1010	63	2	204	200	4	14	1	1498	Summer Avg = 65 Median HP = 50	343	2995	1008	508	81	186

Table 36- Lake Flower Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Lake Flower Recreation Study 2012																			
Week	organism type										# groups taking AIS spread prevention measures								# groups
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	
5-26-12 to 5-27-12	0	0	0	1	0	1	0	0	0	44	31	31	2	1	2	1	3	0	77
5-31-12 to 6-6-12	0	0	1	6	0	1	0	0	4	11	10	4	0	0	0	0	1	0	25
6-7-12 to 6-13-12	1	0	2	4	0	0	0	0	1	39	26	28	2	0	0	0	3	0	74
6-14-12 to 6-20-12	0	1	4	14	1	2	0	0	2	52	42	30	4	0	0	0	0	0	100
6-21-12 to 6-27-12	1	0	5	11	0	3	0	0	3	47	22	34	3	2	0	0	1	0	78
6-28-12 to 7-4-12	0	1	5	9	0	2	0	0	2	65	34	45	1	0	1	0	1	0	117
7-5-12 to 7-11-12	1	0	2	12	0	4	0	0	5	72	42	50	2	0	0	0	2	0	113
7-12-12 to 7-18-12	0	0	0	11	0	5	0	0	2	67	38	44	0	0	0	0	9	0	99
7-19-12 to 7-25-12	1	0	4	13	0	1	0	0	5	75	50	46	1	0	0	0	11	0	110
7-26-12 to 8-1-12	1	1	1	9	0	1	0	0	2	45	26	28	2	0	1	0	5	0	69
8-2-12 to 8-8-12	1	0	4	17	0	2	0	0	3	66	50	45	0	0	0	0	1	0	95
8-9-12 to 8-15-12	1	1	3	17	0	1	0	0	3	56	35	36	2	0	0	0	5	0	78
8-16-12 to 8-22-12	0	0	0	11	0	0	0	0	3	47	22	34	2	0	0	0	3	1	94
8-23-12 to 8-29-12	1	0	3	5	0	0	0	0	0	68	47	47	3	0	0	0	3	1	96
8-30-12 to 9-3-12	1	0	2	12	6	1	0	0	0	70	46	42	9	0	1	0	10	0	107
totals	9	4	36	152	7	24	0	0	35	824	521	544	33	3	5	1	58	2	1332

Table 37- Second Pond Boat Launch use figures, 2012. KEY: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; SUP= stand-up paddleboard; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Second Pond Recreation Study 2012

Week	Boat Type									total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	Group Size	# groups launching	# groups retrieving	organisms found	
	M	PWC	S	C	K	B	R	SUP	entering							leaving	
5-26-12 to 5-27-12	32	2	0	41	59	0	0	0	134	56	1	231	73	25	0	0	
5-31-12 to 6-6-12	8	0	0	30	22	0	0	0	60	55	4	94	18	20	0	1	
6-7-12 to 6-13-12	48	4	4	55	25	0	3	3	142	58	26	262	76	41	2	5	
6-14-12 to 6-20-12	67	7	0	38	63	0	0	1	176	50	19	302	106	62	1	6	
6-21-12 to 6-27-12	60	0	0	65	48	0	2	0	175	51	13	329	78	70	3	12	
6-28-12 to 7-4-12	70	2	0	79	66	0	1	2	220	70	10	403	125	65	8	6	
7-5-12 to 7-11-12	79	4	1	58	88	0	1	7	238	61	20	448	129	70	4	15	
7-12-12 to 7-18-12	76	6	0	94	91	0	2	0	273	59	26	496	141	74	3	8	
7-19-12 to 7-25-12	68	7	0	58	81	0	0	3	214	65	21	390	117	65	3	10	
7-26-12 to 8-1-12	62	2	0	75	121	0	3	3	266	52	18	465	143	62	6	3	
8-2-12 to 8-8-12	75	3	3	77	110	0	1	0	269	49	18	493	110	86	5	12	
8-9-12 to 8-15-12	28	0	0	50	25	0	5	0	108	58	6	214	48	30	1	4	
8-16-12 to 8-22-12	39	5	0	54	67	0	1	0	166	53	10	278	78	44	4	9	
8-23-12 to 8-29-12	77	9	2	68	94	0	2	0	252	53	23	468	130	81	3	16	
8-30-12 to 9-3-12	81	4	0	94	131	0	1	0	310	53	34	520	162	81	6	13	
totals	870	55	10	936	1091	0	22	19	3003	Summer Avg = 57	249	5393	1534	876	49	120	
										Median HP = 40							

Table 38- Second Pond Boat Launch use figures, 2012. Key: EWM = Eurasian watermilfoil; BW = native bladderwort; NM = native milfoil; GRS = grass; WC = water chestnut; ZM = zebra mussel; VLM = variable leaf milfoil. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Second Pond Recreation Study 2012

Week	organism type										# groups taking spread prevention measures								# groups
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	
5-26-12 to 5-27-12	0	0	0	0	0	0	0	0	0	0	50	22	35	2	0	0	6	1	88
5-31-12 to 6-6-12	0	0	0	1	0	0	0	0	0	0	21	18	13	0	0	0	3	0	36
6-7-12 to 6-13-12	0	0	2	5	0	0	0	0	0	0	50	34	36	5	0	0	6	3	99
6-14-12 to 6-20-12	0	0	2	4	0	0	0	0	1	80	48	52	1	0	1	0	5	2	139
6-21-12 to 6-27-12	1	1	6	7	0	0	0	0	0	84	51	60	3	0	3	0	1	3	158
6-28-12 to 7-4-12	0	0	5	6	0	0	0	0	3	102	61	69	1	0	1	0	7	3	170
7-5-12 to 7-11-12	0	0	8	9	0	0	0	0	2	93	63	74	1	0	0	0	6	5	177
7-12-12 to 7-18-12	1	0	3	4	0	1	0	0	2	127	61	92	8	0	0	0	15	3	195
7-19-12 to 7-25-12	0	1	4	7	0	0	0	0	1	102	62	75	3	0	1	0	14	3	161
7-26-12 to 8-1-12	0	0	1	7	0	0	0	0	1	106	61	69	0	0	0	0	20	1	184
8-2-12 to 8-8-12	0	1	5	9	0	2	0	0	0	131	72	88	2	0	0	0	19	2	187
8-9-12 to 8-15-12	0	0	0	4	0	0	0	0	1	42	3	39	1	0	0	0	2	0	158
8-16-12 to 8-22-12	0	0	2	9	0	0	0	0	2	64	45	36	3	0	0	0	13	2	149
8-23-12 to 8-29-12	1	0	8	10	0	0	0	0	0	131	78	69	9	0	0	0	18	1	193
8-30-12 to 9-3-12	0	0	2	12	0	0	0	0	5	140	88	102	4	0	1	0	30	0	219
totals	3	3	48	94	0	3	0	0	18	1323	767	909	43	0	7	0	165	29	2313

References:

Jamieson, Paul and Morris, Donald. *Adirondack Canoe Waters, North Flow*. Lake George, NY : Adirondack Mountain Club, 1987.

Tourism, Regional Office of Sustainable. Lake Flower. *Lake Placid: Adirondacks, U.S.A.* [Online] Lake Placid Convention and Visitor Bureau, 2012. [Cited: January 7, 2012.] <http://www.lakeplacid.com/do/paddling/lake-flower>.

Martin, William. *Watershed Stewardship Program Summary of Programs and Research: 2011*. Paul Smiths, NY : Paul Smith's College Adirondack Watershed Institute, 2011.

Lake Placid State and Village Boat Launch Use Study

By Andrew Bull, Watershed Steward



Figure 44- Lake Placid Village Boat Launch (A. Bull).



Figure 45- Lake Placid State Boat Launch (A. Bull).

Introduction

The Paul Smith's College Watershed Stewardship Program (WSP), has been working with a variety of local, regional and governmental partners for the past 13 years to aid in the prevention of the spread of aquatic invasive species (AIS) within the Adirondack Park. This has been accomplished through the education of the public and performing courtesy watercraft/trailer inspections at various state boat launches. Invasive species in question are

non-native species that have the potential to negatively affect the ecosystem by outcompeting native species for resources found within the environment. All Stewards underwent a two-week training program that was designed to familiarize them with identification techniques, preventative steps, inspection methods and natural history of the park itself. The Lake Placid Shore Owners' Association and the Lake Champlain Basin Program have provided resources, information and cooperation with the WSP to respond to the threat of AIS in Lake Placid. The Lake Placid Village Launch and State Launch are both located along the eastern edge of the lake. These are very important launches not only for the protection of a mostly AIS free lake, but also the launch sites aid in the dispersal of information on reducing the spread of aquatic invasive species through a high influx of steward public interface. The village launch is located on Victor Hubert Road, and is also referred to as Paradox Bay. This is a smaller launch mostly used by the local public from Lake Placid; it is also a launch of great concern to the residents of Lake Placid because in 2009 it served as the entrance site for an infestation of variable leaf milfoil, a non-native invasive species. While the village launch has only been monitored on a limited basis for the past two summers, it is an important steward duty post because of the need for data on its usage and to prevent the introduction of new AIS. The Lake Placid State boat launch is located along George and Bliss Lane; this launch serves the general public and accomodates larger vessels; there is also parking for 25 vehicles and trailers.

Methods

The first day of the 2012 steward season was Saturday, May 26th, and the last was September 4th. Lake Placid is one of the boat launches where a steward is stationed seven days a week. Stewards are on duty starting at 7am and work until 4pm with one hour taken out for breaks and a lunch. Whether the watercraft were launching or being retrieved, the steward on duty was responsible for the collection of data. Data collected included type of watercraft, state of registration, if it is an inboard or an outboard, horse power of motor if it is an outboard. Other data included whether the outboard motor is a four stroke or two strokes, the group size, the time the vessel is being launched or retrieved and if the boater has taken any preventative steps to prevent the spread of AIS prior to arriving at the boat launch. While the steward was conversing with the boater he or she would conduct a visual inspection of the craft and trailer to inform the operator about the most common points of attachment for AIS. If a species is found it is identified and then discarded in an appropriate location. All boaters were encouraged to take all proper steps when launching between waterways and given informational materials that provided the proper prevention steps and pictures of the most common invasive species they may come across.

Results

During the 2012 season the stewards located at Lake Placid Village and State launch encountered 2,016 boats and 3,765 people at the State launch and 240 boats and 456 people at the Village launch.

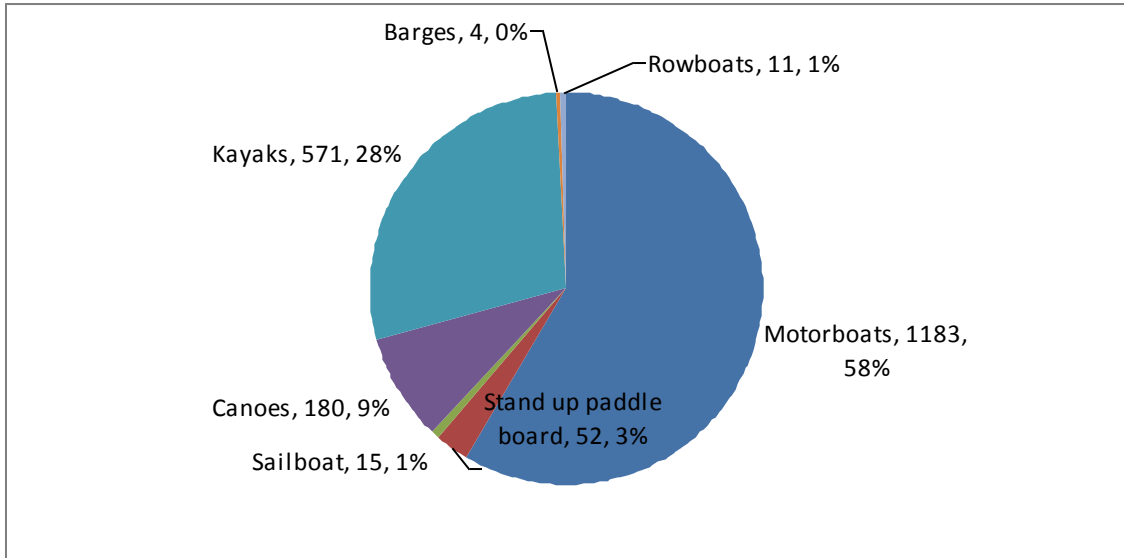


Figure 46- Types of watercraft launched, Lake Placid State Boat Launch, 2012.

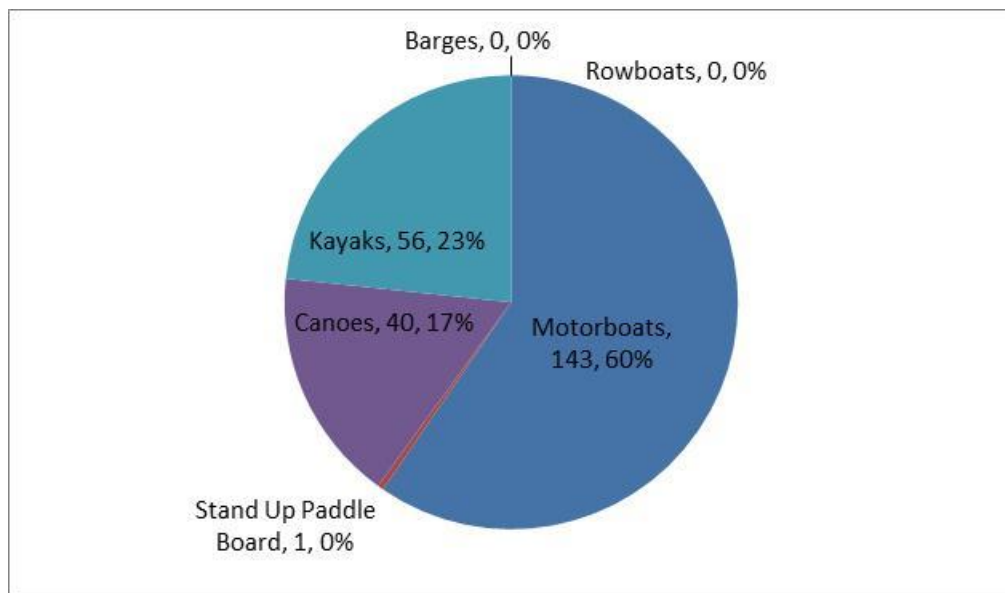


Figure 47- Types of watercraft launched, Lake Placid Village Boat Launch, 2012.

The peak usage for Lake Placid State Launch was from 8-2-12 to 8-8 2012 (190 boats and 361 people). The peak usage for Lake Placid Village Launch was different in both date and size of sample it was from 8-23-12 to 8-29-12 and consisted of (27 boats and 46 people).

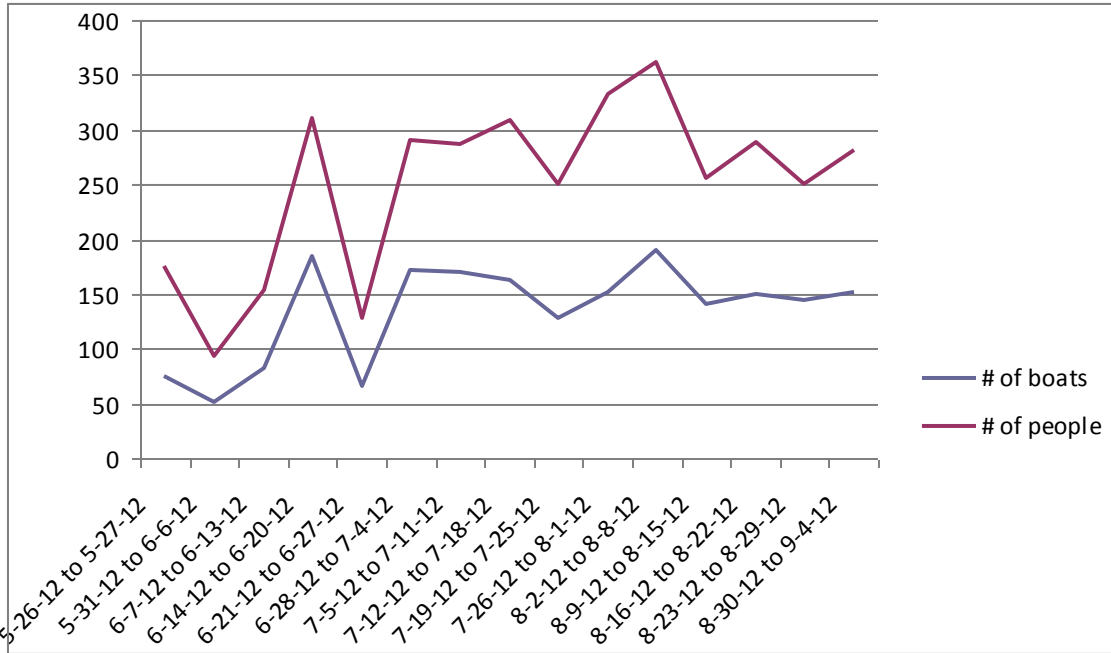


Figure 48- Lake Placid State Boat Launch use, 2012.

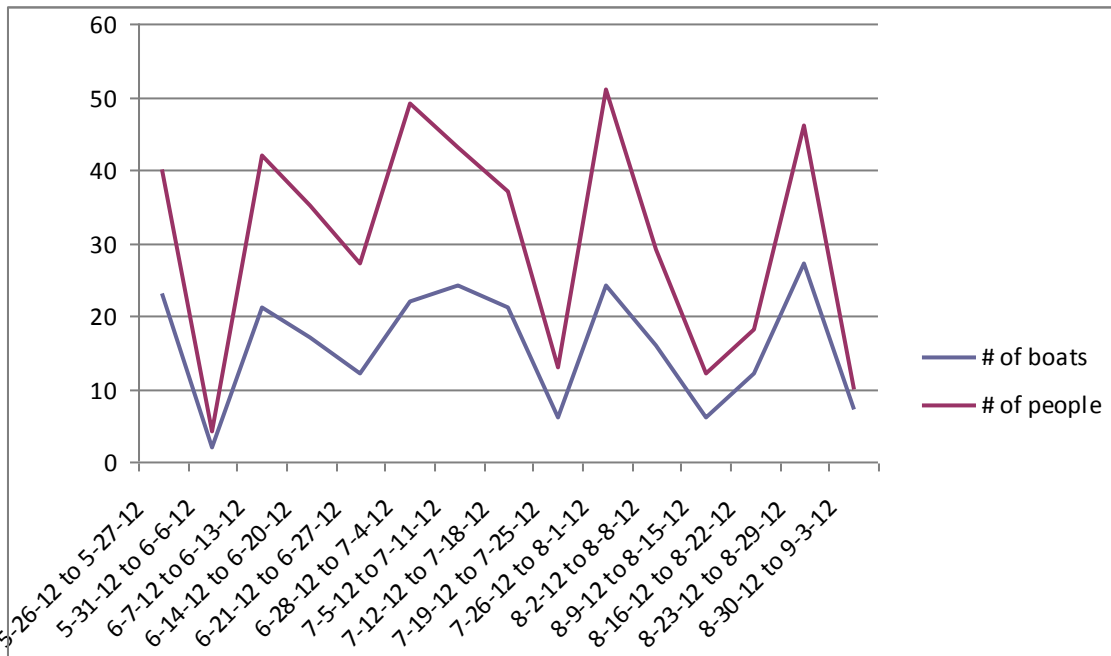


Figure 49- Lake Placid Village Boat Launch use, 2012.

State/ Province of Origin

The Lake Placid State and Village Boat Launches are located in the northern Adirondack Mountains. Lake Placid is a very popular tourist destination during all four seasons so it is not unlikely to see boats from many outside states as well as from Canada launching on any given week.

Table 40-State/province of registration of motorboats using Lake Placid Village Boat Launch, 2012.

State	# boats
CT	4
FL	1
MD	1
MS	2
NH	1
NJ	3
NY	122
OH	1
PA	4
RI	1
VT	1
Total	141

Table 39-State or province of registration of motorboats using Lake Placid State Boat Launch, 2012.

State	# boats	State	# boats
CT	22	NH	4
DE	1	NJ	49
FL	1	NY	1013
IL	2	OH	2
IA	1	ON	5
KY	1	PA	14
MI	1	QC	1
MD	11	RI	1
ME	1	VA	1
MN	1	VT	10
MA	18	Total	1162
NC	2		

Prevention steps of AIS taken by Visitors

Stewards asked visitors if they had taken any steps to prevent the spread of aquatic invasive species (AIS) when moving from one water body to another, or prior to coming to their launch that day. 61% of the people launching at the state launch reported taking at least one AIS prevention step, with 43% washing their boats, 21% inspecting them for AIS, and far fewer numbers of groups taking the other spread prevention steps.

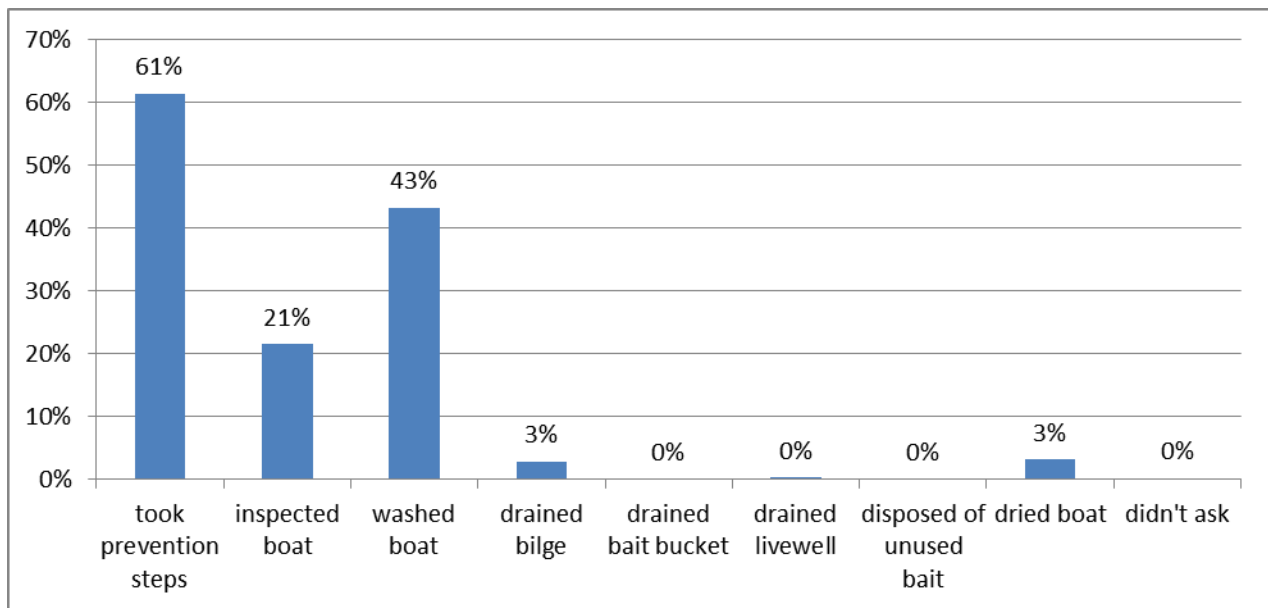


Figure 50- AIS spread prevention measures taken by visitors, Lake Placid State Boat Launch, 2012.

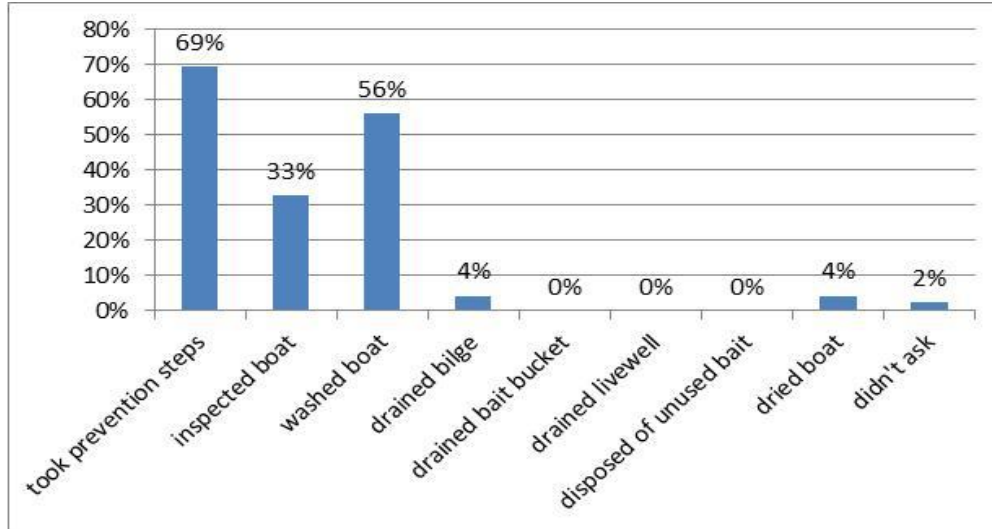


Figure 51- AIS spread prevention measures taken by visitors, Lake Placid Village Boat Launch, 2012.

Previously Visited Water Bodies

What makes the AIS such a problem for waterways is that many species are able to survive out of water for an extended period of time. By asking boaters where the last body of water their watercraft was in during the preceding two weeks, a steward on duty could make a more accurate assessment if the boater had a higher probability of transporting AIS.

Table 41- Waterways visited in previous two-week period, Lake Placid Village, 2012.

Body of Water	AIS Present	# Visits
Lake Placid	Yes	119
Lake Flower	Yes	5
Saranac Chain	Yes	4
Lake George	Yes	2
Atlantic Ocean	Yes	1
Chesapeake Bay	Yes	1
Fourth Lake	Yes	1
Keuka lake	Yes	1
Lake Colby	Yes	1
Lower Saranac Lake	Yes	1
Meacham Lake	Yes	1
Mill Pond	Yes	1
Upper Saranac Lake	Yes	1
Mirror Lake		5
Caesar's Creek OH		1
Fern Lake		1
Lake Todd NH		1
Little Clear Pond		1
Upper St. Regis Lake		1

Table 42- Waterways visited in previous two-week period, Lake Placid State Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Lake Placid	Yes	795	Cape Cod MA	Yes	1	Waterbury Reservoir VT		3
Lake Flower	Yes	36	Cazenovia Lake	Yes	1	Blue Mountain Lake		2
Lower Saranac Lake	Yes	24	Chautauqua Lake	Yes	1	Chapel Pond		2
Lake Champlain	Yes	17	Chazy Lake	Yes	1	Garnet Lake		2
Lake George	Yes	13	Delaware River	Yes	1	Lake Everest		2
Saranac River	Yes	12	Fourth Lake	Yes	1	Lake Lila		2
Indian Lake	Yes	11	Fulton Chain	Yes	1	Lake Lonely		2
Upper Saranac Lake	Yes	11	Kayuta Lake	Yes	1	Alpine Lake		1
Saratoga Lake	Yes	10	Kiwassa Lake	Yes	1	Ausable River		1
Middle Saranac Lake	Yes	9	Lake Hortonia VT	Yes	1	Black River		1
Lake Erie	Yes	7	Lake Taghkanic	Yes	1	Blake River		1
Seneca Lake	Yes	7	Lake Willoughby VT	Yes	1	Buck Pond		1
Tully Lake	Yes	7	Mill Pond	Yes	1	Budd Lake NJ		1
Fish Creek	Yes	6	Mississippi River	Yes	1	Cascade Lakes		1
Franklin Falls Pond	Yes	5	Monongahela River	Yes	1	Cedar River Flow		1
Long Island Sound	Yes	5	Niagara River	Yes	1	Chub Pond		1
Raquette Lake	Yes	5	Northwood Lake NH	Yes	1	Chubb River		1
Atlantic Ocean	Yes	4	Oneida River	Yes	1	Crooked Creek		1
Cayuga Lake	Yes	4	Onondaga Lake	Yes	1	Deer Lake NJ		1
Fern Lake	Yes	4	Oswego Lake	Yes	1	Dunham Reservoir		1
Lake Ontario	Yes	4	Owasco lake	Yes	1	Grafton Pond NH		1
Schroon Lake	Yes	4	Pontoosuc Lake MA	Yes	1	Higley Flow		1
Susquehanna River	Yes	4	Potomac River	Yes	1	Hoel Pond		1
Chesapeake Bay	Yes	3	Putnam Pond	Yes	1	Jones Pond		1
Hudson River	Yes	3	Quabbin Reservoir MA	Yes	1	Lac Wentworth QC		1
Meacham Lake	Yes	3	Round Lake	Yes	1	Lake Adirondack		1
Warner's Lake	Yes	3	Sacandaga Lake	Yes	1	Lake Kushaqua		1
Canandaigua Lake	Yes	2	Saranac Lake	Yes	1	Lake Wallenpaupack PA		1
Chateaugay Lake	Yes	2	Second Pond	Yes	1	Little Tupper Lake		1
Connecticut River	Yes	2	Seneca River	Yes	1	Long Pond ME		1
Cranberry Lake	Yes	2	Silver Lake	Yes	1	Love Lake		1
Follensby Clear Pond	Yes	2	Sixth Lake	Yes	1	Lower St. Regis Lake		1
Great Sacandaga Reservoir	Yes	2	Skaneateles Lake	Yes	1	Moose Pond ME		1
Lake Carmi VT	Yes	2	Snyder's Lake	Yes	1	Muskrat Lake ON		1
Lake Colby	Yes	2	St. Lawrence River	Yes	1	Nick's Lake		1
Lincoln Pond	Yes	2	Taylor Pond	Yes	1	Pine Creek		1
Mohawk River	Yes	2	Tupper Lake	Yes	1	Piseco Lake		1
Atlantic Ocean	Yes	1	None		403	Rollins Pond		1
Ballston Lake	Yes	1	Mirror Lake		91	Sacandaga River		1
Black Lake	Yes	1	Rental		79	Sharp Bridge		1
Brant Lake	Yes	1	Upper St. Regis Lake		15	South Pond VT		1
Canadarago Lake	Yes	1	Lake Clear		3	Swift River MA		1
Candlewood lake CT	Yes	1	Rainbow Lake		3	Total		1723

Visitors reported a more slightly more diverse list of previously visited waterbodies in 2012 (128) compared with 2011 (112). Once again, the list contains waterways from both near and far, and from sources both known to host AIS and those either uninfested with AIS or with unknown status. Lake Flower and the Saranac Lakes are frequently mentioned prior waterways, which causes great concern

for the health of Lake Placid's ecosystem, because these lakes are both close at hand (within 12 miles) and infested with Eurasian watermilfoil and curly-leaf pondweed. Cayuga Lake, the site of last year's well-publicized hydrilla outbreak, was reported as a prior waterway four times. Exposure to zebra mussels and Asian clam is present through boats with prior visits to Lake George, Lake Champlain, Lake Ontario, and Saratoga Lake. As can be seen in the second spread-vector map below, watercraft originate in locations spanning the eastern U.S. seaboard, including the Great Lakes. Note that only the locations with three or more visits were plotted on the maps for the purpose of clarity.

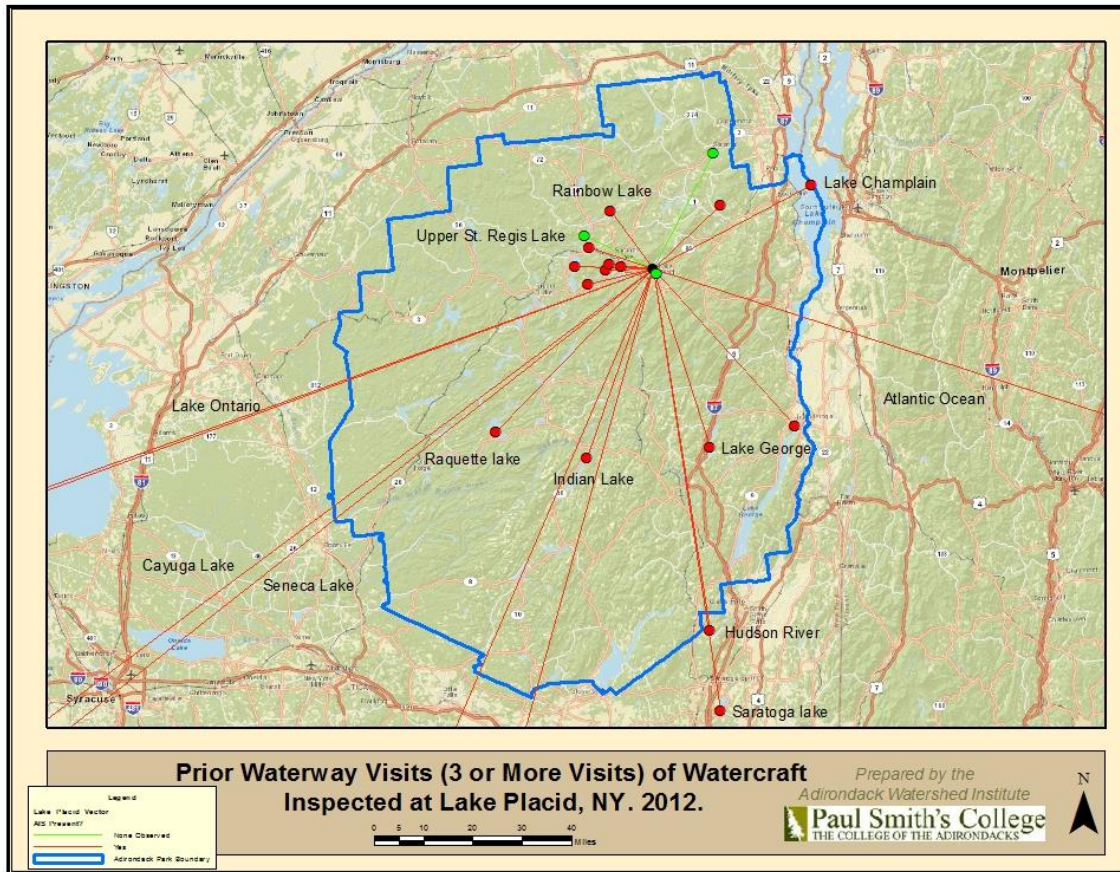


Figure 52- Prior waterway visits, Lake Placid Boat Launch.

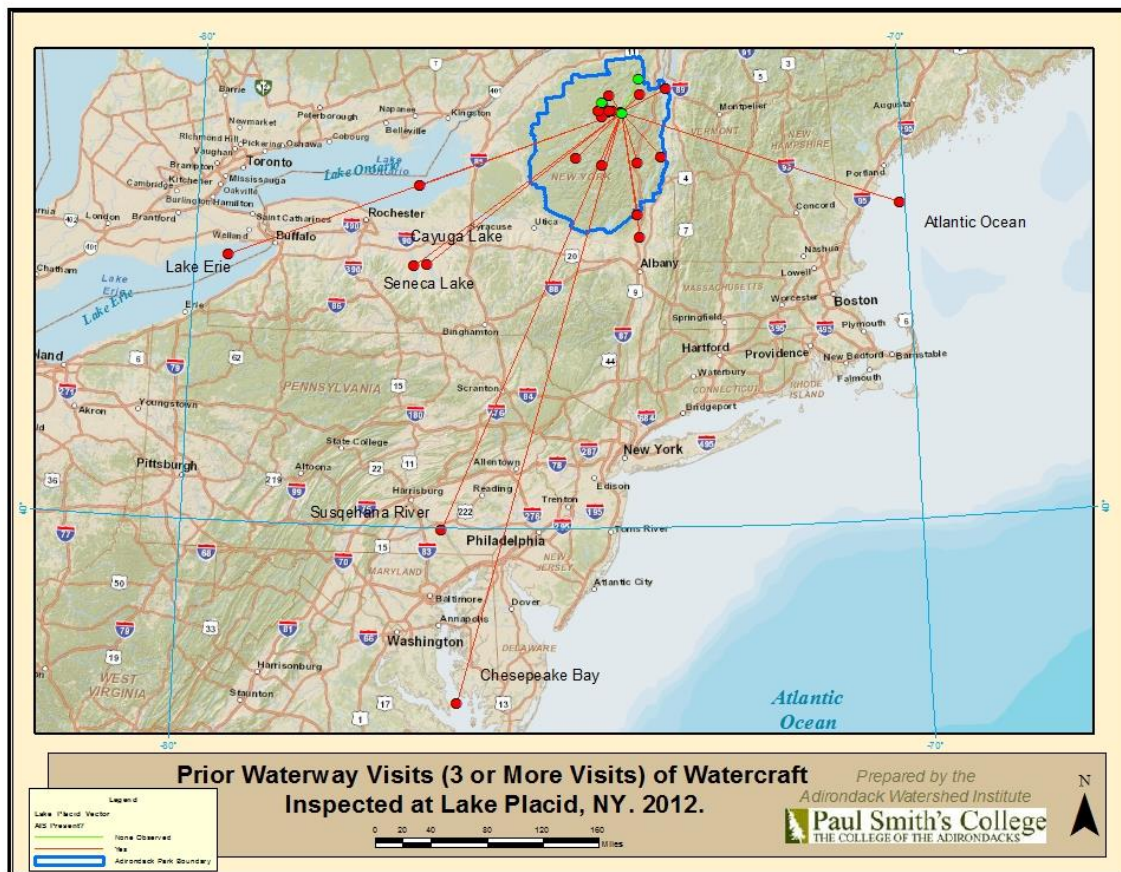


Figure 53- Wider view of prior waterway visits, Lake Placid State Boat Launch.

Invasive species spread prevention- Organisms removed from watercraft

Stewards removed a total of 4 organisms off vessels launching and retrieving from Lake Placid Village and 51 organisms at the Lake Placid State Launch. No invasive species were found on boats either entering or leaving the village launch while one invasive species was found on the boats entering the Lake Placid State Launch: one instance of Eurasian watermilfoil on a boat that had visited Saratoga Lake. Grasses were the most prevalent species found on vessels and trailers both entering and leaving both launches.

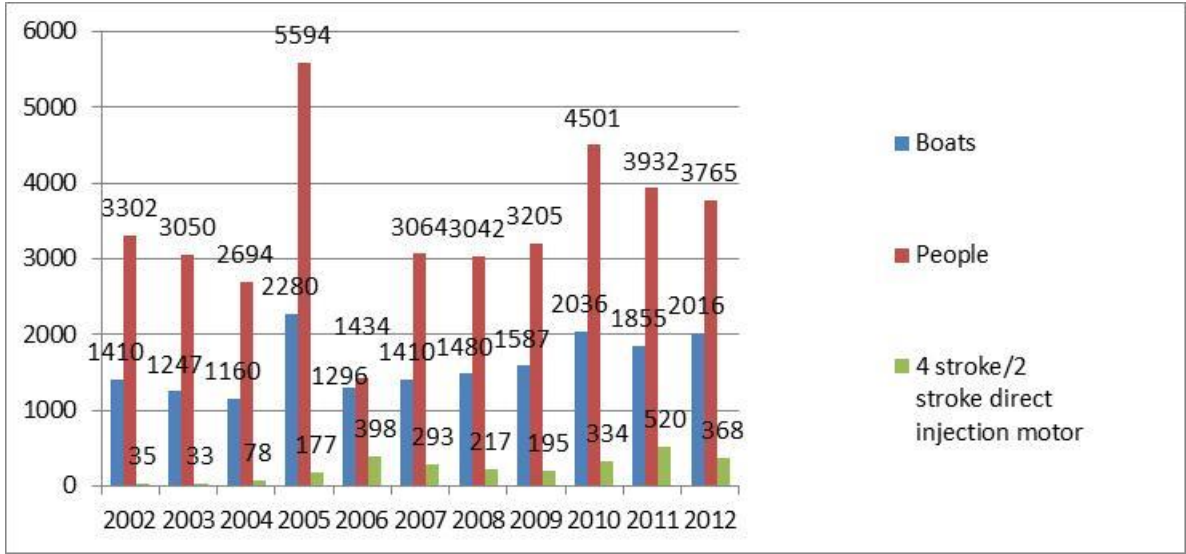


Figure 54- Historical usage data, Lake Placid State Boat Launch, 2005-2012.

Conclusion

During the summer of 2012 at the Lake Placid Village Launch, stewards spoke to 456 people and inspected 240 watercrafts, while at the Lake Placid State Launch they spoke to 3,765 people and inspected 2,016 vessels. A total of 55 organisms were removed from both launches. As the public is becoming more aware of AIS boaters should engage in more prevention methods leading to less species being found especially on incoming boats.

Next season the Watershed Stewardship Program hopes to continue the diligent work of monitoring both of the Lake Placid boat launches. The assistance and support of the Lake Placid Shoreowners’ Association and the Village of Lake Placid administration made this program possible. The WSP would like to thank both organizations for their contributions and their continuing support of the program and what it stands for.



Figure 55- Steward table with specimens for public education.

Table – Lake Placid State Boat Launch use figures, 2012. Key: M=motorboat; SUP= stand-up paddleboard; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Lake Placid Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of Visitors	# groups launching	# groups retrieving	organisms found		
	M	SUP	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	47	0	0	10	17	0	0	74	104	15	175	57	33	5	2	
5-31-12 to 6-6-12	41	0	0	4	6	0	0	51	52	26	94	39	22	0	1	
6-7-12 to 6-13-12	66	0	0	4	12	0	1	83	80	41	153	62	48	1	2	
6-14-12 to 6-20-12	106	4	4	14	55	1	0	184	83	24	310	130	71	2	0	
6-21-12 to 6-27-12	53	0	0	6	7	0	0	66	66	40	128	49	35	1	0	
6-28-12 to 7-4-12	104	9	5	12	41	0	0	171	84	22	291	131	69	1	1	
7-5-12 to 7-11-12	106	4	1	10	47	0	2	170	84	66	286	121	86	5	3	
7-12-12 to 7-18-12	85	4	0	23	49	0	2	163	75	15	309	113	84	2	1	
7-19-12 to 7-25-12	65	14	0	11	34	2	1	127	76	14	251	79	55	7	1	
7-26-12 to 8-1-12	89	4	0	19	39	0	1	152	74	18	332	105	60	1	1	
8-2-12 to 8-8-12	109	4	1	9	67	0	0	190	69	27	361	123	71	5	0	
8-9-12 to 8-15-12	80	1	1	12	43	1	2	140	77	21	256	96	52	2	0	
8-16-12 to 8-22-12	68	5	0	17	59	0	1	150	59	8	288	108	45	2	1	
8-23-12 to 8-29-12	88	2	2	10	41	0	1	144	68	14	250	109	59	2	0	
8-30-12 to 9-4-12	76	1	1	19	54	0	0	151	70	17	281	109	44	2	0	
totals	1183	52	15	180	571	4	11	2016	Summer Avg = 75 Median HP = 70	368	3765	1431	834	38	13	

Table 43- Lake Placid State Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. Purpose of Visit: Fish = fishing; Rec= Recreation/sightseeing/skiing; Comm = commercial (construction/guiding). I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Lake Placid Recreation Study 2012																					
Week	organism type									Purpose of Visit			# groups taking AIS spread prevention measures								
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	Fish	Rec	Comm	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	0	0	0	6	0	0	0	0	1	8	54	0	41	16	28	2	0	0	0	3	0
5-31-12 to 6-6-12	0	0	0	1	0	0	0	0	0	12	25	6	25	12	17	5	0	0	0	0	0
6-7-12 to 6-13-12	0	0	0	2	0	0	0	0	0	14	58	9	48	25	31	4	1	0	0	3	0
6-14-12 to 6-20-12	0	0	0	2	0	0	0	0	0	23	111	14	84	19	73	3	0	0	0	3	0
6-21-12 to 6-27-12	0	0	0	1	0	0	0	0	0	12	45	6	45	11	36	3	0	0	0	3	0
6-28-12 to 7-4-12	0	0	0	2	0	0	0	0	0	8	128	11	92	28	73	5	0	0	0	6	0
7-5-12 to 7-11-12	0	0	0	6	1	0	0	0	1	27	107	7	84	45	47	3	0	2	1	5	1
7-12-12 to 7-18-12	0	0	0	2	0	0	0	0	1	7	118	13	64	15	49	3	0	0	0	2	0
7-19-12 to 7-25-12	1	0	0	8	0	0	0	0	0	2	93	11	61	13	50	3	0	0	0	3	0
7-26-12 to 8-1-12	0	0	0	2	0	0	0	0	0	3	88	6	81	35	48	5	1	1	0	3	1
8-2-12 to 8-8-12	0	0	0	5	0	0	0	0	0	10	112	13	81	19	59	3	0	0	0	7	0
8-9-12 to 8-15-12	0	0	0	1	0	0	0	0	1	11	66	20	73	26	50	3	0	2	0	3	0
8-16-12 to 8-22-12	0	0	0	2	0	0	0	0	1	8	90	6	72	26	48	0	0	0	0	4	1
8-23-12 to 8-29-12	0	0	0	2	0	0	0	0	0	1	86	17	60	23	38	1	0	0	0	3	0
8-30-12 to 9-4-12	0	0	1	1	0	0	0	0	0	3	97	8	70	30	43	2	0	0	0	2	0
totals	1	0	1	43	1	0	0	0	5	149	1278	147	981	343	690	45	2	5	1	50	3

Table 44- Lake Placid Village Boat Launch use figures, 2012. Key: M=motorboat; SUP= stand-up paddleboard; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Lake Placid Village Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of visitors	# groups launching	# groups retrieving	organisms found		
	M	SUP	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	11	0	0	4	8	0	0	23	145	6	40	14	10	0	0	
5-31-12 to 6-6-12	1	0	0	1	0	0	0	2	70	0	4	2	2	0	0	
6-7-12 to 6-13-12	12	0	0	5	4	0	0	21	49	6	42	19	7	0	0	
6-14-12 to 6-20-12	11	0	0	4	2	0	0	17	45	5	35	13	9	0	0	
6-21-12 to 6-27-12	9	0	0	2	1	0	0	12	51	3	27	12	5	0	0	
6-28-12 to 7-4-12	12	0	0	6	4	0	0	22	76	3	49	19	10	1	0	
7-5-12 to 7-11-12	19	0	0	1	4	0	0	24	52	2	43	13	12	0	0	
7-12-12 to 7-18-12	13	0	0	2	6	0	0	21	124	0	37	12	13	0	1	
7-19-12 to 7-25-12	6	0	0	0	0	0	0	6	85	1	13	6	1	0	0	
7-26-12 to 8-1-12	14	1	0	2	7	0	0	24	67	3	51	16	11	0	0	
8-2-12 to 8-8-12	13	0	0	2	1	0	0	16	66	0	29	10	9	1	0	
8-9-12 to 8-15-12	3	0	0	2	1	0	0	6	43	0	12	5	0	0	0	
8-16-12 to 8-22-12	6	0	0	2	4	0	0	12	113	1	18	6	7	0	0	
8-23-12 to 8-29-12	10	0	0	6	11	0	0	27	63	0	46	14	11	1	0	
8-30-12 to 9-3-12	3	0	0	1	3	0	0	7	133	0	10	4	3	0	0	
totals	143	1	0	40	56	0	0	240	Summer Avg = 77	30	456	165	110	3	1	
									Median HP = 63							

Table 45- Lake Placid Village Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Lake Placid Village Recreation Study 2012																		
Week	organism type										# groups taking AIS spread prevention measures							
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	0	0	0	0	0	0	0	0	0	13	8	9	2	0	0	0	1	0
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	2	2	2	0	0	0	0	0	0
6-7-12 to 6-13-12	0	0	0	0	0	0	0	0	0	12	5	8	1	0	0	0	3	1
6-14-12 to 6-20-12	0	0	0	0	0	0	0	0	0	10	7	6	2	0	0	0	0	1
6-21-12 to 6-27-12	0	0	0	0	0	0	0	0	0	9	4	6	1	0	0	0	1	0
6-28-12 to 7-4-12	0	0	0	1	0	0	0	0	0	17	5	13	0	0	0	0	2	0
7-5-12 to 7-11-12	0	0	0	0	0	0	0	0	0	15	10	12	1	0	0	0	1	1
7-12-12 to 7-18-12	0	0	0	1	0	0	0	0	0	15	9	12	0	0	0	0	1	0
7-19-12 to 7-25-12	0	0	0	0	0	0	0	0	0	3	3	3	0	0	0	0	0	1
7-26-12 to 8-1-12	0	0	0	0	0	0	0	0	0	15	4	14	2	0	0	0	0	0
8-2-12 to 8-8-12	0	0	0	1	0	0	0	0	0	11	6	10	0	0	0	0	0	0
8-9-12 to 8-15-12	0	0	0	0	0	0	0	0	0	4	4	4	0	0	0	0	0	0
8-16-12 to 8-22-12	0	0	0	0	0	0	0	0	0	6	1	6	0	0	0	0	0	0
8-23-12 to 8-29-12	0	0	0	0	0	0	0	0	1	10	1	9	0	0	0	0	0	1
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	0	0
totals	0	0	0	3	0	0	0	0	1	146	69	118	9	0	0	0	9	5

Long Lake Boat Launch Use Study

By: Ernest Borchert, Watershed Steward



Figure 56- View of Long Lake Boat Launch.

Introduction

The Watershed Stewardship Program of Paul Smith's College (WSP) was developed in 2000 as a community based service program to educate the public about conservation and environmental issues facing Adirondack watersheds. The main focus of the program is to prevent the spread of aquatic invasive species (AIS) through educational messages and courtesy boat inspections at local boat launches throughout the Adirondacks. Thanks to a grant awarded by the United States Environmental Protection Agency, the WSP was able to station 27 Watershed Stewards at 24 boat launches throughout the park in the summer of 2012.

2012 is the fifth year a steward has been stationed at the Long Lake State Boat Launch. Stewarding at Long Lake began in 2008 as a combined effort between the Town of Long Lake, the Long Lake Association (LLA), and a state grant designated by New York State Senator Betty Little. In 2009 and 2010 the steward position was funded solely through the LLA and the Town of Long Lake. In 2011 and 2012 a WSP steward was employed

through a Great Lakes Restoration Initiative Grant awarded by the U.S. Fish and Wildlife Service (2011) and the U.S. Environmental Protection Agency (2012).

The Long Lake boat launch is a popular area with visitors looking to boat, canoe, kayak, and fish. The lake is formed by a widening of the Raquette River, is fourteen miles long and has a maximum depth of forty-five feet. The program site provides a hard surface boat launch where people can launch all types of motorized and non-motorized boats. Common fish species include largemouth bass, smallmouth bass, Northern pike, brown bullhead, yellow perch, and brook trout.

According to the Adirondack Park Invasive Plant Program (APPIP) Long Lake contains only one invasive species, variable-leaf milfoil (*Myriophyllum heterophyllum*) (Smith, Smith & Quirion, 2010).

Methods

The boat launch received coverage seven days a week from Memorial Day weekend (May 26) through Labor Day (September 3rd). The stewards' workday began at 7:00 am and lasted until 4:00 pm. A total of one hour's time was allotted for breaks throughout the day; at these times the launch was not covered.

The steward welcomed boaters when they arrived at the launch, and then informed the boater about the threats aquatic invasive species pose to Adirondack waterways. The steward next asked the visitor if their boat had been in the water in the past two weeks. If it had, the steward recorded the name and location of the water body. The steward also asked visitors if they took any steps to prevent the spread of aquatic invasive species. If the boater didn't take appropriate steps the steward recommended steps that would be easy and effective such as inspecting and washing the boat, draining the bilge and live wells, discarding of bait in the trash, and drying the boat.

After speaking with the boater, the steward conducted the visual inspection. During the visual inspection they noted the type of boat, horsepower of the outboard motor, whether the motor was a 4-stroke, 2 stroke direct injection or regular 2 stroke. Also collected were the group size, state of registration, what organisms were found if any, and the time. Boat type was determined by method of propulsion. For example, if a rubber raft was rowed like a row boat it was classified as a rowboat. This information was recorded on data sheets at the launch and later transferred to a database using Microsoft Excel.

Results

During the 2012 season, the stewards inspected a total of 2,345 boats and interacted with 4,779 people. Out of the 2,345 boats that were inspected, 1,237 were inspected launching and 713 were inspected retrieving. It is important to note that one group could have had multiple boats, and boats could be inspected twice (both launching and retrieving.)

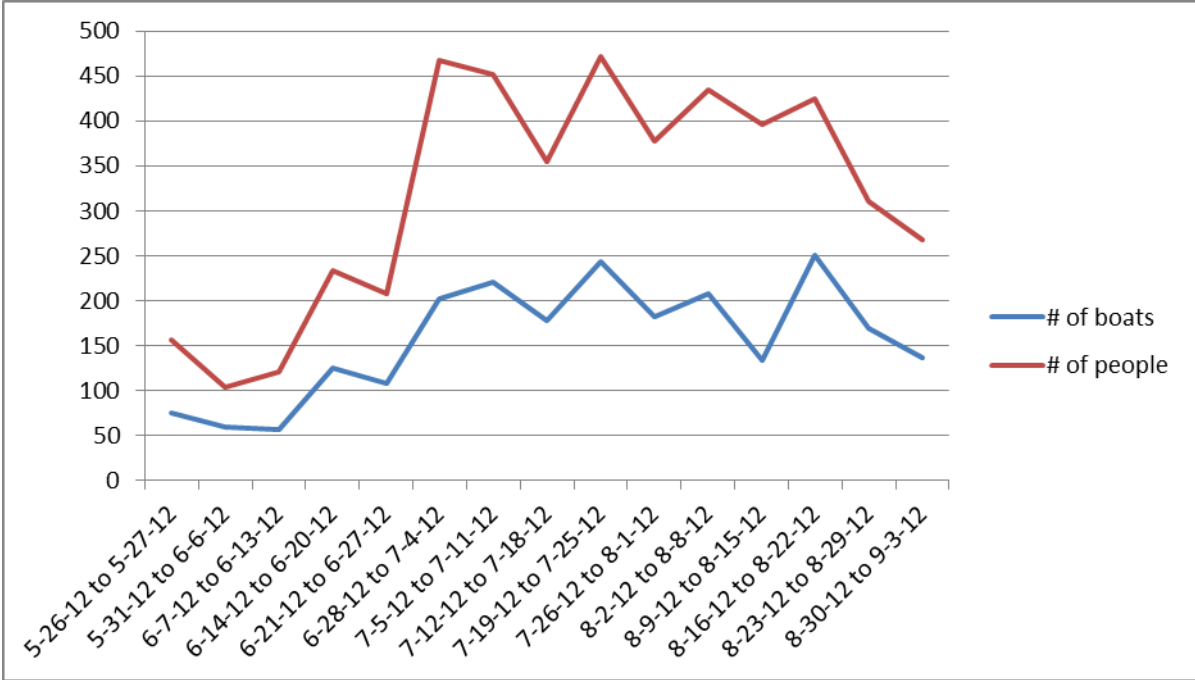


Figure 57- Long Lake Boat Launch use, 2012.

There was a slow start to the season. Before 6/28 less than 150 boats had been inspected and the stewards were coming in contact with less than 200 people per week (Figure 57). The busiest weeks at the boat launch were from 6/28-7/4, 7/5-7/12, and 7/19-7/25 where stewards inspected 202, 219, and 244 boats respectively.

Out of the 2,345 boats inspected the majority (53%) were motorboats. Canoes made up the next largest percentage of boats seen (24%). They were followed by kayaks (17%), personal water crafts (5%), and rowboats (1%) (Figure 58). The number of docks, barges, and sailboats was negligible (<1%). Out of the 1,236 motorboats inspected 263 had either four-stroke or two-stroke direct injection motors. The average horsepower for a boat was calculated to be 64 where the median horsepower was 50.

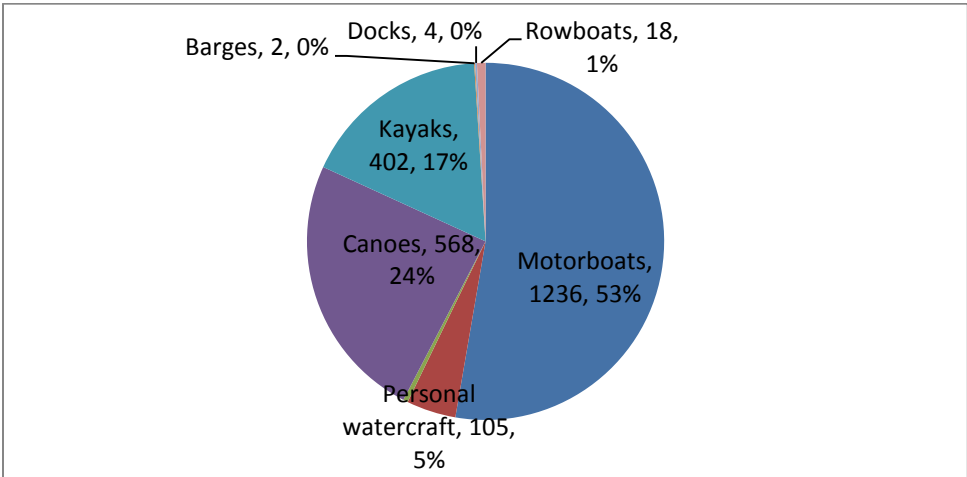


Figure 58- Types of Watercraft Launched, Long Lake Boat Launch, 2012.

When asked if they take steps to prevent the spread of invasive species, 67% of boaters indicated that they did. The two most frequent invasive species spread prevention methods used were washing the boat (51%) and inspecting the boat (20%). Very few (5%) mentioned that they drain their bilge in order to prevent invasive species and only 1-3% of boaters mentioned that they drained bait buckets, live wells, or let the boat dry. No boaters indicated that they dispose of unused bait in the trash as opposed to dumping it in water bodies.

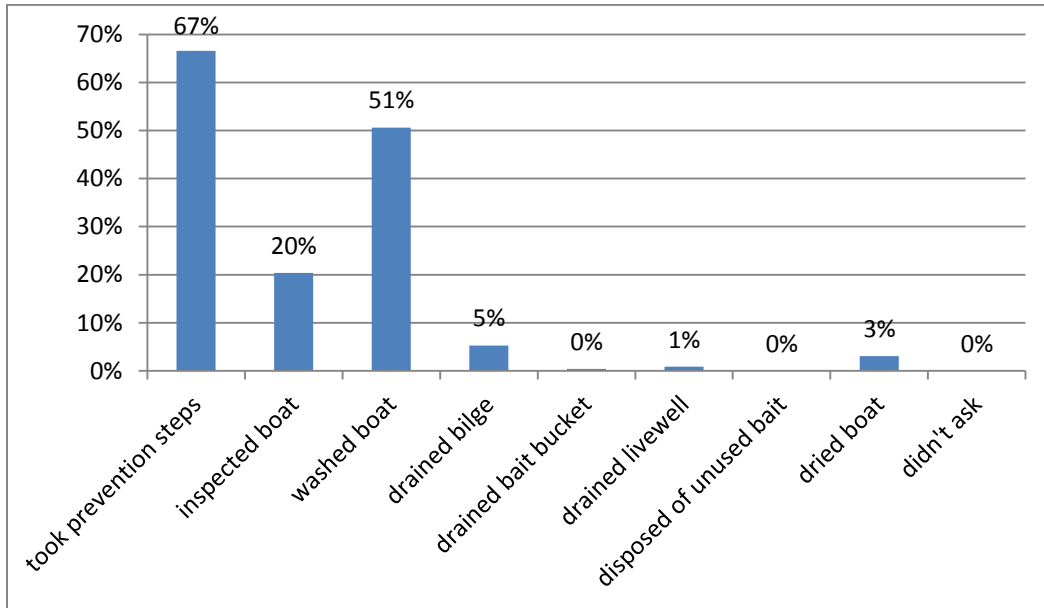


Figure 59- AIS spread prevention measures taken by visitors, Long Lake Boat Launch, 2012.

Table 46- State or province of registration of motorboats using Long Lake Boat Launch, 2012.

State	# of boats
CT	25
DL	4
FL	2
IL	3
IN	2
LA	3
NJ	44
NY	1115
OH	7
ONT	1
PA	40
RI	5
UT	1
VA	2
VI	1
VT	27
WI	1

This year the stewards at Long Lake encountered boaters from 17 states the most common being New York (1,115 groups), New Jersey (44), Pennsylvania (40) and Vermont (27 Groups).

In addition to the state of registration the stewards also asked the visitor if they had been in any water body in the previous two weeks. This data can be used to predict where threats are coming from and give the steward an indication of what organisms they might find. For example, if the visitor was coming from Great Sacandaga Reservoir the steward would make sure the bilge water was drained to prevent the spread of Spiny waterflea (*Bythotrephes cederstroemi*).

The most frequent response (981 times) boaters gave was that their boat hadn't been in any water body in the past two weeks. The second most common response was that they had been in Long Lake (271 times). Many visitors who used the launch owned property on the lake or lived in town and launched multiple times throughout the summer. After Long Lake, Raquette Lake and Tupper Lake were the most common water bodies visitors were coming from with 39 and 35 visitors respectively Table 47.

The amount of use the Long Lake boat launch received in 2012 increased slightly compared to 2011. 2011 received 1,807 boats and 3,854 people whereas

2012 received 2,345 boats and 4,779 people.

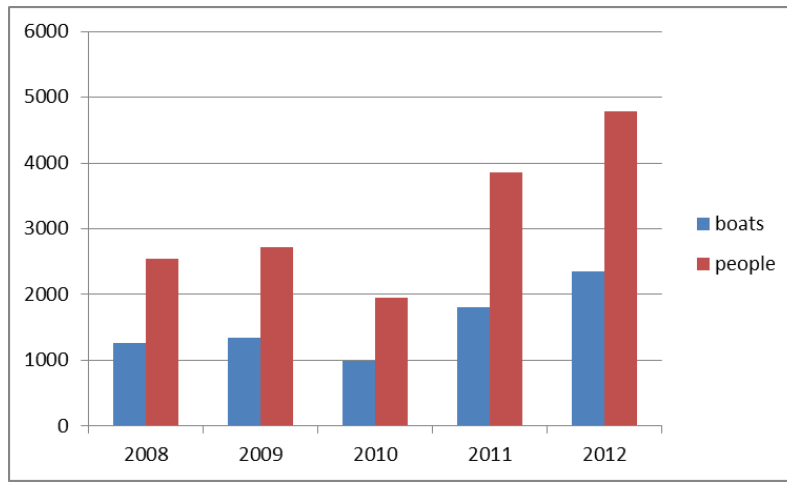


Figure 60-Historical usage data, Long Lake Boat Launch, 2008-2012.



Figure 61- Watershed Steward Tim Grossman inspecting a boat at Long Lake Boat Launch.

Table 47- Waterways visited in previous two-week period, Long Lake Boat Launch, 2012.

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Long Lake	Yes	271	Niagara River	Yes	1
Raquette Lake	Yes	39	Otisco Lake	Yes	1
Tupper Lake	Yes	35	Seneca River	Yes	1
Forked Lake	Yes	24	Silver Lake, Pittsford NY	Yes	1
Hudson River	Yes	19	Thompson's Lake	Yes	1
Lake Eaton	Yes	19	Waneta Lake	Yes	1
Raquette River	Yes	19	None		981
Mohawk River	Yes	14	Rental		43
Lake George	Yes	11	Indian Lake		15
Oneida Lake	Yes	11	Blue Mountain Lake		9
Sacandaga Lake	Yes	11	South Pond		6
Schroon Lake	Yes	9	Harris Lake		4
Lake Champlain	Yes	8	Oswegatchie River		4
Fourth Lake	Yes	7	Unknown		4
Lake Flower	Yes	6	Lake Adirondack		3
Saratoga Lake	Yes	6	Moose River		3
Upper Saranac Lake	Yes	6	Piseco Lake		3
Brant Lake	Yes	5	Bog River		2
Lake Ontario	Yes	5	Budd Lake NJ		2
Lower Saranac Lake	Yes	5	Canada Lake		2
Seventh Lake	Yes	4	Cranberry Lake NJ		2
Greenwood Lake	Yes	3	Delta Lake		2
Stillwater Reservoir	Yes	3	Lake Denmore		2
Susquehanna River	Yes	3	Round Pond		2
Atlantic Ocean	Yes	2	Trout Lake		2
Auger Lake	Yes	2	Allagash River ME		1
Cayuga Lake	Yes	2	Cohansey River NJ		1
Conesus Lake	Yes	2	Connecticut River		1
Cranberry Lake	Yes	2	Eigth Lake		1
Cuba Lake	Yes	2	Eric Lake ON		1
Paradox Lake	Yes	2	Forest Lake, Columbia County NY		1
Round Lake	Yes	2	Gull Pond		1
Skaneateles Lake	Yes	2	Johnson's Pond RI		1
Allegheny Reservoir	Yes	1	Lake Bomoseen VT		1
Canadarago Lake	Yes	1	Lake Hopatcong NJ		1
Canandaigua Lake	Yes	1	Lake Kushaqua		1
Caroga Lake	Yes	1	Lake Lila		1
Carry Falls Reservoir	Yes	1	Lake Pleasant		1
Cazenovia Lake	Yes	1	Lake Quinsigamond MA		1
Fifth Lake	Yes	1	Little Clear Pond		1
Floodwood Pond	Yes	1	Little Tupper Lake		1
Great Sacandaga Reservoir	Yes	1	Lowe's Lake		1
Hinckley Reservoir	Yes	1	Mystic River CT		1
Kayaderoseras Creek	Yes	1	Rainbow Lake		1
Kayuta Lake	Yes	1	Riley's Lock MD		1
Lake Bonaparte	Yes	1	Schuylkill River PA		1
Lake Durant	Yes	1	Spruce Run NJ		1
Lake Erie	Yes	1	Spy Lake		1
Lake Hopatcong NJ	Yes	1	Upper St. Regis Lake		1
Lake Placid	Yes	1	Ware River VA		1
Martha's Vinyard MA	Yes	1	Wolf Pond		1
			Total		1702

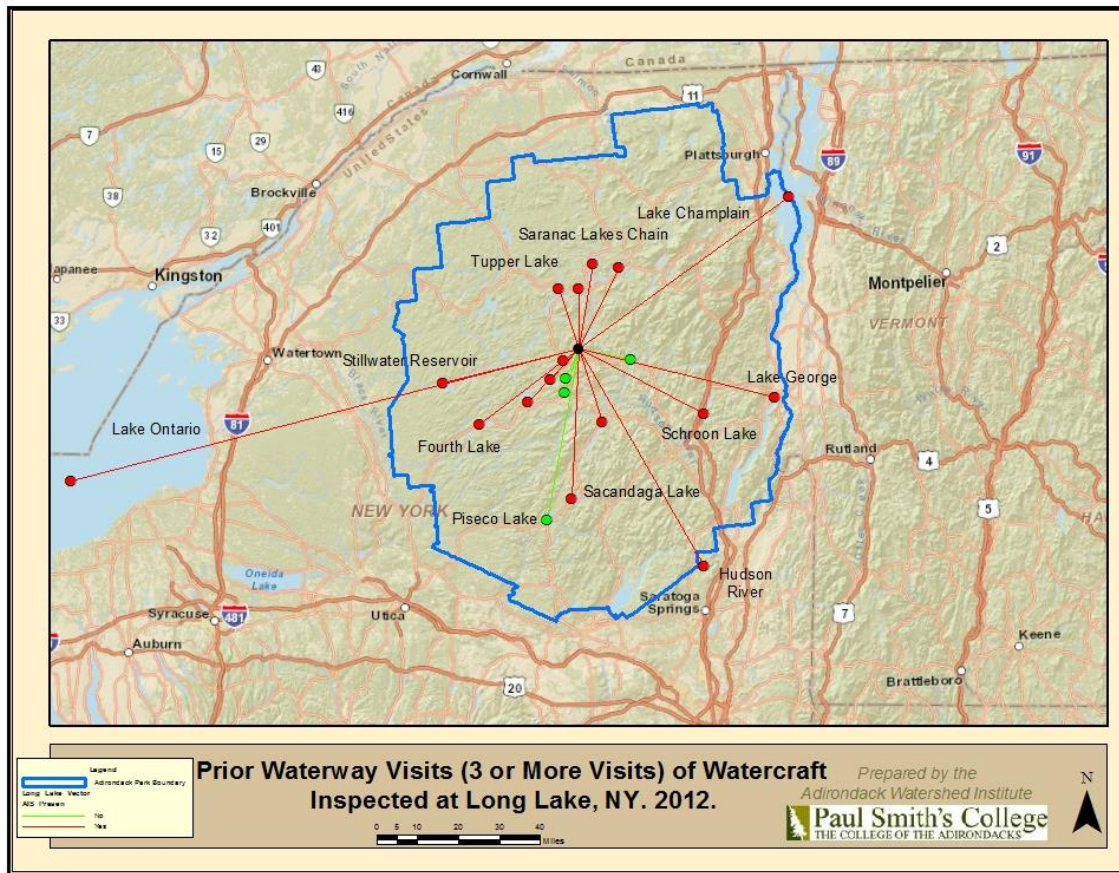


Figure 62- Prior waterway visits, Long Lake Boat Launch.

Stewards would often find organisms and organic material on boats launching and retrieving from Long Lake. Over the course of the summer 1,237 boats launched and 713 retrieved from Long Lake. The organisms per inspection of boats entering Long Lake were 14.9% (185 detections on 1,237 boats). The organisms per inspection found leaving Long Lake was 13.5% (96 detections on 713). Very little of the organic material found was considered invasive. The invasive species found on boats consists of Eurasian watermilfoil (1 boat), variable-leaf milfoil (1 boat), and water chestnut (2 boats).

Table 48- AIS removed from watercraft and trailers at Long Lake Boat Launches, 2012

Organism	# Entering	# Leaving	Prior waterway
Eurasian watermilfoil	1		Greenwood Lake, NY
Variable-leaf milfoil		1	Long Lake, NY
Water chestnut	2		None (2)
Totals	3	1	



Figure 63- Long Lake Boat Launch.

Discussion

The WSP enjoyed another successful summer at the Long Lake State Boat Launch. Most people the stewards encountered were aware of the damage that invasive species can have on an ecosystem. Many also wanted to know what they could do to help prevent AIS from entering Long Lake. It also helped that the Long Lake boat launch has had stewards for the past five years. Because of the work of previous stewards, the visitors who come every year are familiar with the program and are happy to have their boat inspected.

It seemed that the aquatic invasive species that people were most familiar with were zebra mussels and Eurasian watermilfoil. Many were unaware of water chestnut, variable-leaf milfoil, and the introduced disease viral hemorrhagic septicemia (VHS). In the beginning of the season most visitors were unfamiliar with spiny waterflea but became more interested and asked more questions after the announcement that it became established in Lake George. The public was definitely more familiar with the most publicized species and unfamiliar with the recently invasive species. It is very important the WSP puts emphasis on all invasive species affecting Adirondack lakes so the public becomes more aware of the scale of the problem. All invasive species reported as being detected at the Long Lake State boat launch were collected and sent to the Adirondack Watershed Institute for verification. Water chestnuts were easily identified on the incoming watercraft and were confirmed by program assistant director.

The percentage of organisms (invasive and non-invasive) found on boats increased from 8.0% (125 organisms to 1,569 inspections) in 2011 to 14.4% (184 organisms to 1,275 inspections) in 2012. This shows the need for our program to continue as a higher percentage of boats continue to contain organic matter. This growth is either attributed to the boats being “dirtier” this summer or a more thorough and diligent job by our stewards.

The use of the lake continues to increase. The summer of 2012 was a beautiful warm and dry summer which is likely a contribution to the increase we see since 2008.

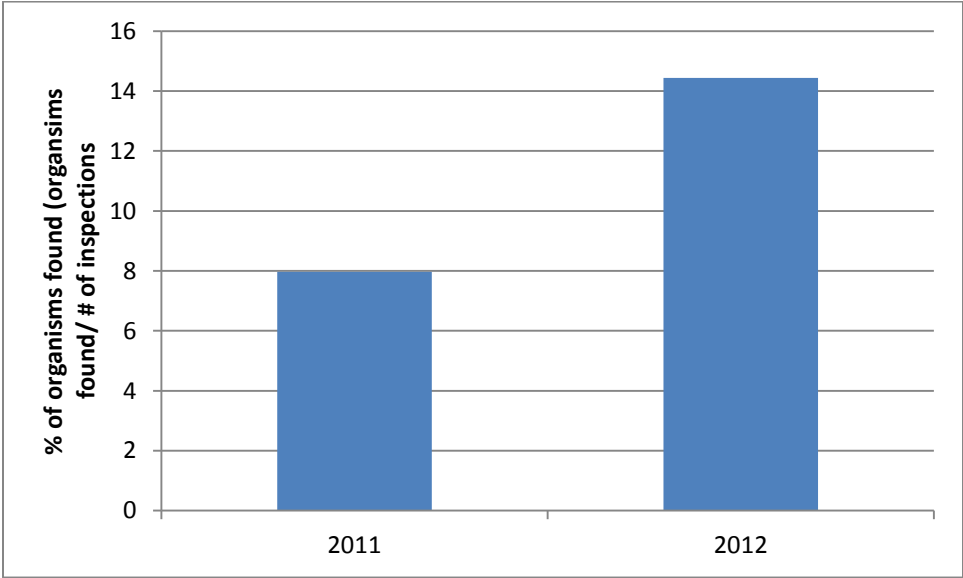


Figure 64- Percent of inspections discovering transported organisms at Long Lake Boat Launch, 2011-2012.

Conclusion

Paul Smith’s College Watershed Stewardship Program was stationed a Long Lake again this year with great success. The data the program collected can be useful to managers when assessing the risk of invasion at specific boat launches. The stewards at Long Lake were received warmly by the community and received many thanks from concerned boaters. The WSP would like to thank the Long Lake Association and the Town of Long Lake for their wonderful support, Barb Taylor and Jackie Mallory for their involvement in the program and role with the Long Lake Association as well as New York State Forest Ranger Jim Waters. Additionally, great thanks goes to the Environmental Protection Agency for the Great Lake Restoration Initiative grant, without it, this work would not have been possible.

Works Cited

Smith, H., Smith, T., Quirion, B. (2010). Adirondack Park Invasive Plant Program: 2010 Annual Report. Retrieved from: http://www.adkinvasives.com/documents/APIPP2010AnnualReport_final.pdf

Table 49- Long Lake Boat Launch use figures 2012, M = motorboat; K = kayak; C = canoe; B = construction barge; R = rowboat; S = sailboat; PWC = personal watercraft; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Long Lake Recreation Study 2012															
Week	Boat Type									total # boats	Weekly Avg HP outboard	Four stroke	# of visitors	# groups launching	# groups retrieving
	M	PWC	S	C	K	B	D	R							
5-26-12 to 5-27-12	37	4	2	13	16	0	0	3		75	71	10	157	47	20
5-31-12 to 6-6-12	35	0	0	6	16	0	0	2		59	100	10	104	28	21
6-7-12 to 6-13-12	45	2	0	4	4	0	0	1		56	56	11	120	46	23
6-14-12 to 6-20-12	86	4	1	22	9	0	1	2		125	53	18	234	79	40
6-21-12 to 6-27-12	58	7	0	30	10	0	0	3		108	62	14	207	61	28
6-28-12 to 7-4-12	147	10	0	29	13	1	2	0		202	71	29	467	155	47
7-5-12 to 7-11-12	109	16	0	67	27	0	0	1		220	65	22	451	111	67
7-12-12 to 7-18-12	92	10	0	45	31	0	0	0		178	49	26	355	83	64
7-19-12 to 7-25-12	104	8	1	79	49	1	1	1		244	63	22	471	136	67
7-26-12 to 8-1-12	91	5	1	55	27	0	0	3		182	64	20	378	96	61
8-2-12 to 8-8-12	109	6	2	70	20	0	0	0		207	61	22	435	62	40
8-9-12 to 8-15-12	71	5	0	32	25	0	0	1		134	93	14	396	65	54
8-16-12 to 8-22-12	92	9	0	74	75	0	0	0		250	61	13	425	97	76
8-23-12 to 8-29-12	83	9	3	24	49	0	0	1		169	58	18	311	100	58
8-30-12 to 9-3-12	77	10	0	18	31	0	0	0		136	57	14	268	71	47
totals	1236	105	10	568	402	2	4	18		2345	Summer Avg = 64	263	4779	1237	713
											Median HP = 50				

Table 50-Long Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel.

Week	# groups		organisms found		organism type									
	launching	retrieving	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	
5-26-12 to 5-27-12	47	20	13	1	0	0	0	6	0	0	1	0	7	
5-31-12 to 6-6-12	28	21	6	7	0	0	0	4	0	0	0	0	9	
6-7-12 to 6-13-12	46	23	16	3	0	0	0	7	0	0	0	0	12	
6-14-12 to 6-20-12	79	40	15	7	0	0	0	6	0	0	0	0	16	
6-21-12 to 6-27-12	61	28	17	4	0	0	0	7	0	0	0	0	14	
6-28-12 to 7-4-12	155	47	20	3	0	0	1	4	0	0	0	0	18	
7-5-12 to 7-11-12	111	67	14	10	1	0	0	6	0	1	0	0	16	
7-12-12 to 7-18-12	83	64	10	9	1	0	0	6	0	0	0	0	12	
7-19-12 to 7-25-12	136	67	14	3	0	0	0	5	1	0	0	0	11	
7-26-12 to 8-1-12	96	61	9	4	0	0	0	5	0	0	1	0	7	
8-2-12 to 8-8-12	62	40	12	8	0	0	0	6	0	0	0	0	14	
8-9-12 to 8-15-12	65	54	15	18	3	0	0	15	0	0	0	0	15	
8-16-12 to 8-22-12	97	76	14	14	1	0	0	5	0	0	0	0	22	
8-23-12 to 8-29-12	100	58	10	4	2	0	0	7	0	0	0	0	5	
8-30-12 to 9-3-12	71	47	0	1	1	0	0	0	0	0	0	0	0	
totals	1237	713	185	96	9	0	1	89	1	1	2	0	178	

Table 51- Long Lake Boat Launch use figures, 2012. I = inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = disposed of unused bait; Dry = dried boat.

Week	# of groups taking AIS spread prevention measures								
	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	29	4	26	3	1	1	1	5	0
5-31-12 to 6-6-12	26	9	22	8	4	3	0	0	0
6-7-12 to 6-13-12	26	10	19	3	0	0	0	2	0
6-14-12 to 6-20-12	57	28	45	8	0	0	0	4	0
6-21-12 to 6-27-12	43	19	33	6	1	0	0	1	0
6-28-12 to 7-4-12	110	48	92	14	0	2	0	0	0
7-5-12 to 7-11-12	80	25	61	5	0	1	0	7	0
7-12-12 to 7-18-12	72	24	57	3	0	1	0	2	0
7-19-12 to 7-25-12	107	32	82	4	0	0	0	4	0
7-26-12 to 8-1-12	71	21	62	2	0	0	0	2	0
8-2-12 to 8-8-12	96	20	75	6	0	2	0	4	0
8-9-12 to 8-15-12	95	9	50	3	0	1	0	5	0
8-16-12 to 8-22-12	89	30	74	2	0	0	0	0	0
8-23-12 to 8-29-12	88	27	59	10	0	3	0	6	0
8-30-12 to 9-3-12	57	14	38	6	0	0	0	6	1
totals	1046	320	795	83	6	14	1	48	1
	67%	20%	51%	5%	0%	1%	0%	3%	0%



Figure 65- Long Lake Boat Launch.

Meacham Lake Campground Boat Launch Use Study

By: Elena Capaldi, Watershed Steward

Introduction

In 2000, the Watershed Stewardship Program of the Adirondack Watershed Institute of Paul Smith's College was first formed. The purpose of which was to further the education and awareness-building of the aquatic invasive species that continue to threaten the Park, especially in bodies of water, to the general public at boat launches. Today, the program funds 27 eastern and western stewards of the Park to spread this message and collect data about the spread and origin of invasive species present. Last year (2011), marked the first year that the program stationed a Watershed Steward at the Meacham Lake State Campground, located on Route 30 about halfway between Malone, New York and the Paul Smiths. Stewards stationed at Meacham Lake were present on Saturdays and Sundays and presented boaters with information on AIS and to collect data. Since the program at Meacham Lake is only in its second year of data collection and outreach, a continued presence there will give AWI and the Stewardship Program a better picture about the type of boater that utilizes the boat launch as well as data on where potential AIS threats come from before arriving at Meacham Lake.

Methods

A Watershed Steward was on duty at the Meacham Lake Campground public boat launch from 7 in the morning to 4 in the afternoon every Saturday and Sunday from the week of May 27th to Labor Day weekend. The steward greeted each boater, providing an introduction to WSP and aquatic invasive species (AIS), and then asked if their watercraft had been in another body of water in the last 2 weeks and where, and if they have taken any steps to prevent the spread of AIS. Also the steward would record the type and number of boats, horsepower of motor (if applicable), motor type (if applicable), group size, and boat registration information. Each boat would then be inspected by the steward on duty for possible traces of AIS and recorded in the database prior both to launching and following retrieval. If any such species of concern were found by the steward, they would be identified and correctly marked as such, before being carefully discarded away from the lake and preferably in a sunny place for maximum desiccation potential. This reduced the risk, greatly, of this plant fragment from getting into another body of water and reproducing again. If a plant not previously known to be found in this body of water was brought in on a boat or retrieved from a boat, the sample would be sent for further identification back to AWI and then recorded, as well as further information about past locations the boat had visited from the boat owner.

During the visual inspection of the boat and trailer, the steward would take the boat owner around the boat as well to point out key places that plants can easily become trapped upon retrieval from one body of water, so that boat owners understand what an efficient inspection looks for. Also, if the boat owner does not know the proper prevention types for AIS, indicated by their response of "no" steps taken in the questionnaire, the steward told them that these prevention steps include inspecting, washing and/or drying the boat, emptying live wells, and

draining the bilge. Further educational materials may then be given out, including a sticker from the steward as a reminder to always check a boat after retrieval.

Results

Throughout the duration of the 2012 summer season, Meacham Lake had stewards inspecting a total of 253 watercraft and educated a total of 641 boaters during the weekly Saturday and Sunday shifts that had stewards on duty. The peak number of visitors and boats to the campground was during the week of July 26th through August 1 with 29 boats and 78 people. July was the busiest month with 77 boats and 199 visitors seen at the launch, no doubt due to the moderate and pleasant weather. When weather was rainy, overcast, or too hot, boater use decreased visibly.

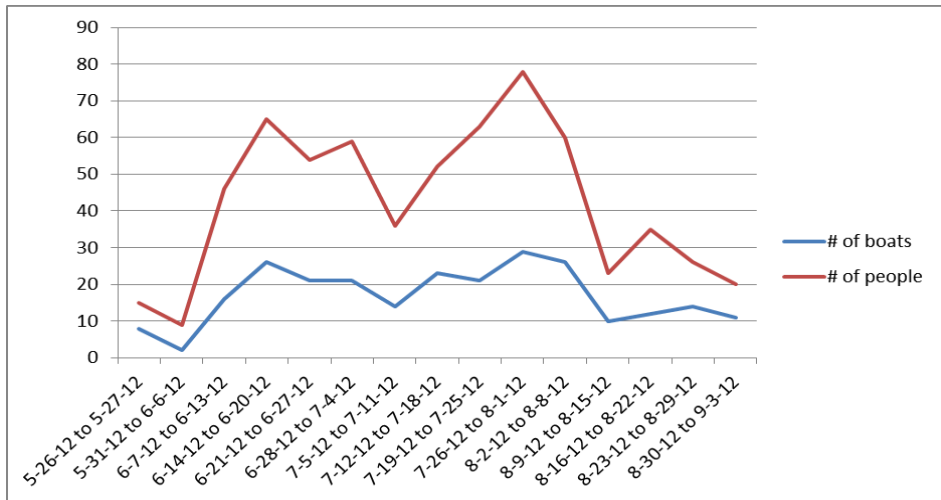


Figure 66- Meacham Lake Campground Boat Launch use, 2012.

The majority of watercraft inspected by the stewards fell into the category of motorboats (56%), followed by personal watercraft (22%) and then a tie for canoes (9%) and kayaks (10%). As this is the second year of study at Meacham Lake, this year marks a similar level of types of watercraft used compared with 2011.

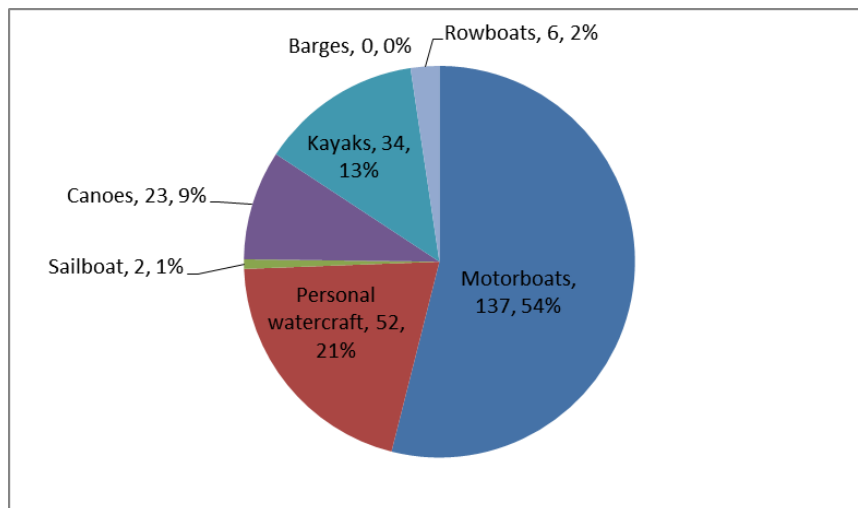


Figure 67- Types of Watercraft Launched, Meacham Lake Campground Boat Launch, 2012.

The Meacham Lake Campground boat launch is managed by the NYSDEC and permits motorboat as well as non-motorized boat launches. However, the launch is shallow, making it difficult to launch larger, heavier motorboats. Despite this challenge, many of the repeat visitors are drawn by the seclusion and beauty of the lake. The data clearly shows the popularity of Meacham Lake with NY State boaters, especially when compared to the number of boaters with out-of-state registration.

Boats coming from infected waterways receive extended attention from the steward on duty. Another way of determining the likelihood of AIS presence on a boat or trailer is by asking the boater if they take spread prevention measures to reduce aquatic hitchhikers. If a boater says no, or is unaware of what these spread prevention measures are, the steward can then work to educate the boater on the methods that reduce the spread of AIS. These methods of prevention include: a visual inspection, washing the boat, draining the boat, draining the bilge water, emptying the bait buckets and/or livewells, and drying the watercraft.

It was important for the steward on duty to ask the boater “Did you take any AIS spread prevention methods prior to launching your boat?” rather than the leading question, “Did you wash your boat prior to launching?” By asking a non-leading question, it can be

Table 53-State or province of registration of motorboats using Meacham Lake Campground Boat Launch,

State	# boats
MN	1
MA	1
NH	1
NJ	1
NY	125
ON	2
PA	1
QC	8
SC	1
No Registration	38
Total	179

gauged whether the boater is already aware of proper spread prevention methods before we educate them further.

Stewards at Meacham Lake State Campground found that 67% of groups interviewed answered “yes” to taking at least one of the spread prevention methods indicated on the data collection sheet. The most common method was washed boat (39%), followed by inspected boat (25%). After being inspected by the steward on duty, plant material was removed from 13 watercraft, with 6 before launching and 7 following retrieving. Some of this material was categorized as invasive, while other material was recorded as non-invasive material such as the recorded 9 cases of grass found on watercraft. One incidence of curly leaf pondweed was found on a boat leaving Meacham Lake which had not been anywhere in the previous two weeks.

Table 52-Waterways visited in previous two-week period, Meacham Lake Campground Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits
Meacham Lake	Yes	47
Chateaugay Lake	Yes	6
St. Lawrence River	Yes	5
Mountain View Lake	Yes	2
Black Lake	Yes	1
Brant Lake	Yes	1
Deer River Flow	Yes	1
Fish Creek Pond	Yes	1
Grasse River	Yes	1
Hudson River	Yes	1
Lake Flower	Yes	1
Lake Memphremagog	Yes	1
Lake Placid	Yes	1
Salmon River	Yes	1
Saranac Chain	Yes	1
None		71
Upper St. Regis Lake		3
St. Regis Falls		2
Barnum Pond		1
Clear Pond		1
Maynard Falls		1
Rental		1
Rollins Pond		1
Sixth Pond ON		1
Slush Pond		1
St. Regis River		1

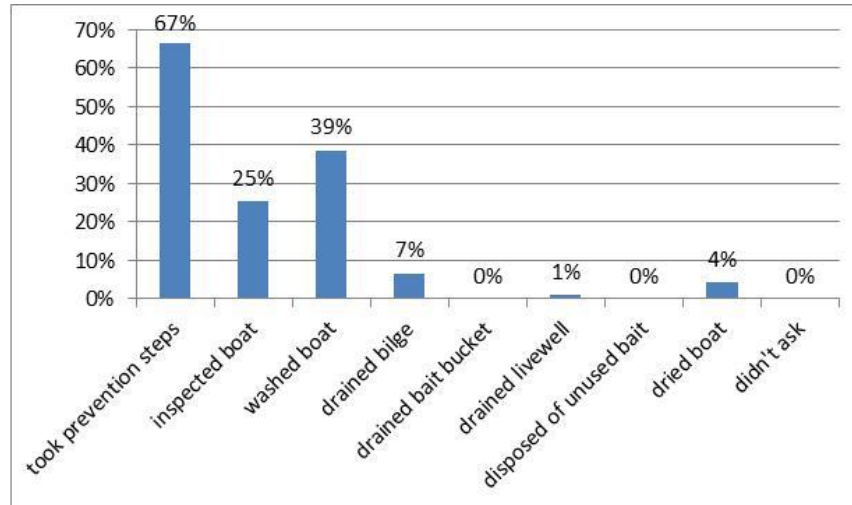


Figure 68- AIS spread prevention measures taken by visitors, Meacham Lake Campground Boat Launch, 2012.

Discussion

The location, number of days of stewards on duty, and accessibility of the public boat launch at Meacham Lake are all factors that contribute to the comparatively small number of visitors encountered by the stewards of the WSP in 2011. As previously mentioned, this was the second year of steward presence at Meacham Lake, with the number of watercraft inspected and visitors educated falling about equal to the data collected from the 2011 season. With the increasing threat of AIS both within and outside of the Adirondack Park, it is important for the WSP to continue the boater education program and inspection component to help educate the public on how they can stop the spread of AIS as a responsible boater. The visitors of Meacham Lake are included in the program's future goals. The WSP acknowledges the support and cooperation of the NYSDEC campground staff at Meacham Lake Campground. The Watershed Stewardship Program would like to acknowledge the generous support and funding of the Great Lakes Restoration Initiative and the United States Environmental Protection Agency.



Figure 69- Meacham Lake State Campground (S. Fuller, Adirondack Scenic Byways)

Table 54- Meacham Lake Campground Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Meacham Lake Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of visitors	# groups launching	# groups retrieving	organisms found		
	M	PWC	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	7	0	0	1	0	0	0	8	35	5	15	8	4	0	1	
5-31-12 to 6-6-12	2	0	0	0	0	0	0	2	65	0	9	2	1	0	0	
6-7-12 to 6-13-12	10	0	1	1	4	0	0	16	46	5	46	13	6	0	0	
6-14-12 to 6-20-12	17	7	1	1	0	0	0	26	37	11	65	22	6	0	1	
6-21-12 to 6-27-12	11	5	0	3	2	0	0	21	14	5	54	16	5	0	1	
6-28-12 to 7-4-12	10	7	0	4	0	0	0	21	28	3	59	18	7	0	0	
7-5-12 to 7-11-12	9	3	0	0	2	0	0	14	39	0	36	6	8	1	0	
7-12-12 to 7-18-12	16	3	0	2	1	0	1	23	52	1	52	20	8	4	0	
7-19-12 to 7-25-12	14	2	0	1	3	0	1	21	59	0	63	18	8	1	0	
7-26-12 to 8-1-12	9	9	0	4	5	0	2	29	183	7	78	23	8	0	0	
8-2-12 to 8-8-12	11	7	0	2	5	0	1	26	36	0	60	13	10	0	1	
8-9-12 to 8-15-12	6	4	0	0	0	0	0	10	38	1	23	4	5	0	3	
8-16-12 to 8-22-12	6	2	0	0	4	0	0	12	44	1	35	9	2	0	0	
8-23-12 to 8-29-12	7	1	0	1	5	0	0	14	41	3	26	11	3	0	0	
8-30-12 to 9-3-12	2	2	0	3	3	0	1	11	20	0	20	9	1	0	0	
totals	137	52	2	23	34	0	6	254	Summer Avg = 47	42	641	192	82	6	7	
									Median HP = 25							

Table 55- Meacham Lake Campground Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Meacham Lake Recreation Study 2012																			
Week	organism type									# groups taking AIS spread prevention measures								# groups	
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry		didn't ask
5-26-12 to 5-27-12	0	0	0	1	0	0	0	0	0	6	2	1	4	0	1	0	1	0	8
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	2
6-7-12 to 6-13-12	0	0	0	0	0	0	0	0	0	12	5	8	1	0	0	0	0	0	14
6-14-12 to 6-20-12	0	1	0	0	0	0	0	0	0	17	9	10	0	0	1	0	0	0	24
6-21-12 to 6-27-12	0	0	0	0	0	0	0	0	1	12	5	6	1	0	0	0	0	0	7
6-28-12 to 7-4-12	0	0	0	0	0	0	0	0	0	15	6	9	2	0	0	0	0	0	18
7-5-12 to 7-11-12	0	0	0	0	0	0	0	0	1	10	1	9	3	0	0	0	0	0	13
7-12-12 to 7-18-12	0	0	0	3	0	0	0	0	1	11	5	5	0	0	0	0	1	0	23
7-19-12 to 7-25-12	0	0	0	1	0	0	0	0	0	14	6	8	1	0	0	0	2	0	20
7-26-12 to 8-1-12	0	0	0	0	0	0	0	0	0	15	3	12	0	0	0	0	0	0	25
8-2-12 to 8-8-12	0	0	0	1	0	0	0	0	0	7	5	4	0	0	0	0	0	0	19
8-9-12 to 8-15-12	0	0	0	3	0	0	0	0	0	2	0	2	1	0	0	0	0	0	7
8-16-12 to 8-22-12	0	0	0	0	0	0	0	0	0	6	3	3	0	0	0	0	0	0	10
8-23-12 to 8-29-12	0	0	0	0	0	0	0	0	0	7	2	3	0	0	0	0	2	0	13
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	5	1	2	0	0	0	0	3	0	9
totals	0	1	0	9	0	0	0	0	3	141	54	82	14	0	2	0	9	0	212
										67%	25%	39%	7%	0%	1%	0%	4%	0%	



Figure 70- Steward E. Capaldi.

Osgood Pond Waterway Access Site Use Study

By Elena Capaldi, Watershed Steward

Introduction

The Watershed Stewardship Program of Paul Smith's College's Adirondack Watershed Institute was founded in 2000 as a means to develop awareness and to educate the public on aquatic invasive species (AIS). 2012 marked the fifth consecutive annual season of steward presence inspecting watercraft at the public boat launch on Osgood Pond. The Osgood Pond Association also funds the stationing of stewards on Osgood Pond on the weekends. After the steward completes the physical boat inspection and records data, all stewards additionally provide boaters with educational information and materials on AIS. This user information aids in the program's collection of data in regards to recreational usage of Osgood, and therefore, a more comprehensive understanding of AIS contamination and/or spread throughout the Park.

Methods

A Watershed Steward was on duty at the Osgood Pond public boat launch site from 7 in the morning until 4 in the afternoon throughout the season, from the week of May 26th until Labor Day weekend, on Fridays and Sundays. A steward would greet each boater and give a brief summary of what the WSP is doing, noting Osgood Pond's potential for AIS contamination. The boater was then asked what (if any) water body their watercraft had been in during the previous two weeks and whether they had taken any steps to prevent the spread of AIS. The steward would then collect the type and number of boats entering or retrieving from Osgood, including horsepower of the outboard motor (if applicable), outboard motor type (two- or four-stroke), group size and state of boat registration. Each watercraft then underwent a visual inspection by a steward, who would record a presence, if applicable, and type of AIS present on the boat or boat trailer both prior to launching and after retrieving. If AIS were found to be present the specific type would also be noted in the data collected, and the physical specimen to be removed and disposed of far away from the boat launch and body of water. If the specimen was previously unknown to be present in the area, the steward would ask the boat owner for further information in an attempts to find the origin of the specimen.

During the inspection, a steward would explain the proper places on the boat and boat trailer that the owner could check themselves for AIS on their watercraft and trailer. If the boater had answered "no" to taking any steps to prevent AIS, they would be educated during the inspection on ways to stop the spread of AIS on their watercrafts. This includes washing the boat, drying the boat, visually inspecting it, draining the bilge, and emptying live wells and bait buckets away from the body of water they are entering or retrieving from. Finally, the steward would give out materials on potential AIS threats to the waterway for future reference. Stewards could also offer the boater a "Stop Invasive Hitchhikers" sticker to place on their trailer or boat as a personal reminder to always inspect their watercraft.

Results

From the week of May 26th to Labor Day weekend, stewards inspected 194 watercraft and educated 303 boaters during their shifts at the boat launch. The Watershed Stewards worked nine-hour shifts with one hour for lunch and breaks. The peak numbers for both number of visitors and watercraft was the week of July 21st through 27th, with 27 boats and 41 people at the boat launch. July was the most visited month, no doubt with heavy usage of the launch correlating with the best boating weather.

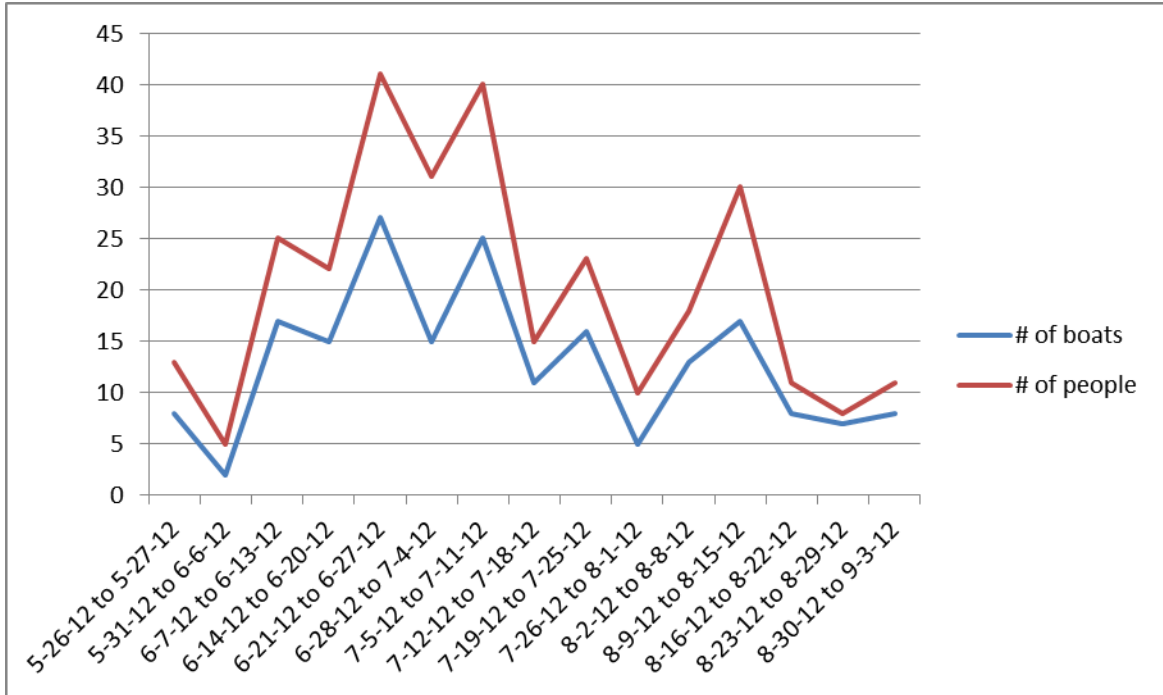


Figure 71- Osgood Pond Waterway Access Site use, 2012.

The majority of boats inspected at Osgood Pond in 2012 were non-motorized watercraft, with canoes and kayaks taking up 41% and 40% of the boats inspected, respectively. Motorized boats at Osgood Pond made up just 10% of the boats that entered or exited the launch. 2012 marks consistent data trends from the previous year (2011).

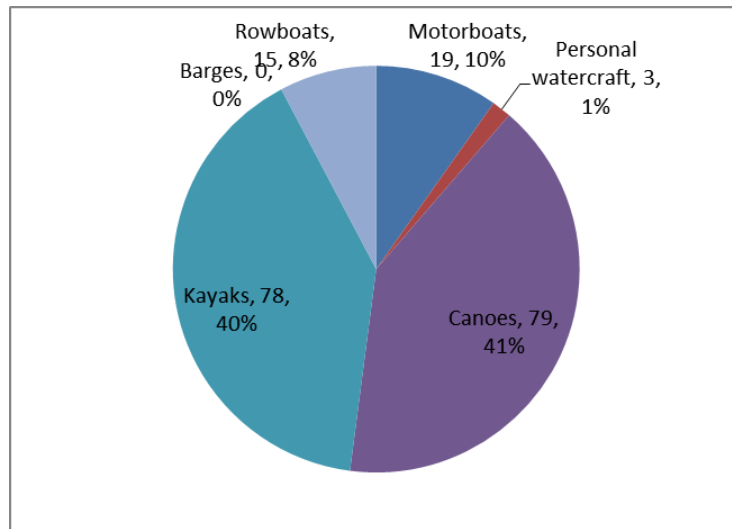


Figure 72- Types of Watercraft Launched, Osgood Pond Waterway Access Site, 2012.

Osgood Pond has a smaller-sized public launch permitting access to motorized boats, but restricting personal watercraft (i.e. jet skis). Due to its small size and central location within the Adirondack Park, it was predicted that most recreational users would be boats with local New York State registration. The data showed that 21 boats were from New York, one from New Jersey, one from Vermont, and the rest with unknown or no registration (most of the watercraft launched at Osgood Pond are non-motorized, and hence unregistered in New York State; stewards gathered state information from visible registration stickers, rather than verbal interrogation).

67 boats reported having used their boats in a prior visit in a water body in the last two weeks. Of these, 54 of the 67 were waterbodies other than Osgood Pond from a prior visit. 19 of these reported visits were in water bodies known to be infected with aquatic invasive species. Upon receipt of this information, the steward can spend more time inspecting boats coming from infected waterways.

Another way for the steward to determine the likelihood of AIS presence on watercraft is by asking the boater if they regularly take steps to reduce the spread of aquatic hitchhikers on their boat and trailer upon retrieving. This question helps to aid the steward on both how closely to inspect the watercraft and also on how much to educate the

Table 57-State or province of registration of motorboats using Osgood Pond Waterway Access Site, 2012

State	# boats
NJ	1
NY	21
VT	1
No Registr	117

boater on AIS and prevention methods they can do themselves. These steps, previously mentioned in the report, include: visual inspection, washing the boat, draining bilge water, emptying the bait buckets and live wells, disposing of live bait away from the waterway, and drying the watercraft.

When the steward poses the question of prevention methods the boater may or may not have taken prior to launching their craft in Osgood Pond, the steward must be attentive to how they ask the question. It is important to not “lead” the boater to the correct response. For example, asking “Did you wash your boat before launching?” might make a boater more likely to respond “yes” since they already are under the assumption that this is what our program is promoting. The steward instead should be careful to phrase the question as “Did you take any steps to prevent the spread of invasive species?” This way the steward will both be educating the boater as to correct prevention measures, while assessing the boater’s knowledge of AIS and appropriate spread prevention measures.

Table 56- Waterways visited in previous two-week period, Osgood Pond Waterway Access Site, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present!	# Visits
Lake Champlain	Yes	3
Eighth Lake Campground	Yes	2
Lake Placid	Yes	2
Saranac River	Yes	2
Connecticut River	Yes	1
Erie Canal	Yes	1
Floodwood Pond	Yes	1
Follensby Clear Pond	Yes	1
Horseshoe Pond	Yes	1
Lake Colby	Yes	1
Lake Flower	Yes	1
Lake Titus	Yes	1
Lower Saranac Lake	Yes	1
Meacham Lake	Yes	1
Upper Saranac Lake	Yes	1
None		14
Osgood Pond		13
St. Regis River		4
Jones Pond		3
Buck Pond		1
Butternut Pond		1
Deer River Flow		1
Lake Everest		1
Lake Kushaqua		1
Little Salmon River		1
Little Tupper Lake		1
Long Lake		1
Long Pond		1
Oswegatchie River		1
Rainbow Lake		1
Rat Pond		1
Upper St. Regis Lake		1
Total		67

Data from Osgood Pond showed that 77% of groups questioned answered “yes” to taking AIS spread prevention methods, with a distribution of 27% performing a visual inspection, 52% washing their boats, and 24% drying their boats. 1 case of bladderwort was found on watercraft by stewards on duty, along with 3 cases of grass, 3 cases of native milfoil, and 4 “other” specimens found on watercraft. These plants were correctly identified by the steward and then properly removed from the launch area.

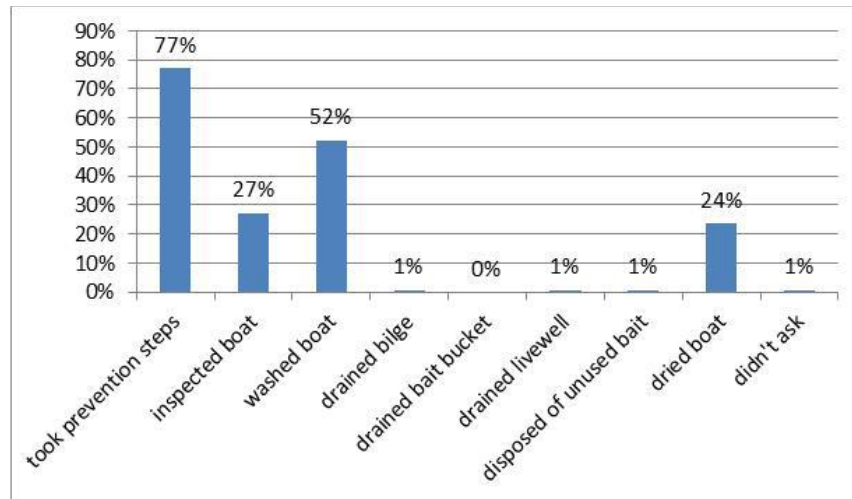


Figure 73- AIS spread prevention measures taken by visitors, Osgood Pond Waterway Access Site, 2012.

Discussion and Conclusion

The size, location, and accessibility of the boat launch at Osgood Pond were all factors that contributed to the relatively small numbers of visitors to the launch as recorded by the weekend stewards on duty in 2012. Data from the 2012 season is difficult to compare to the 2011 season, because in 2011, stewards were on duty during bi-weekly shifts; in 2012 stewards were on duty consecutive weekends during the summer season. However, the data from 2012 curiously shows that the percentage of boaters who took preventative measures to stop the spread of AIS was less than in 2011 (9% compared to 54%, respectively). Although the WSP would of course wish to see greater growth in this area of prevention steps proactively taken by boaters, the program now knows that further and continued education of prevention methods needs to occur at Osgood Pond in order to bring these numbers up. Although the number of visitors is small in comparison to those of larger launch sites with greater traffic, Osgood Pond recreational users are just as important to the WSP recreation studies to prevent AIS from spreading elsewhere.

Table 58- Osgood Pond Waterway Access Site use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Osgood Pond Recreation Study 2012

Week	Boat Type							total # boats	Weekly Avg HP outboard	Four stroke	Group Size	# groups launching	# groups retrieving	organisms found	
	M	PWC	S	C	K	B	R							entering	leaving
5-26-12 to 5-27-12	1	0	0	2	4	0	1	8	1	1	13	5	4	0	0
5-31-12 to 6-6-12	2	0	0	0	0	0	0	2	50	1	5	2	1	0	0
6-7-12 to 6-13-12	0	0	0	9	4	0	4	17	5	1	25	12	7	1	0
6-14-12 to 6-20-12	1	1	0	8	4	0	1	15	0	0	22	10	9	0	1
6-21-12 to 6-27-12	2	0	0	16	9	0	0	27	5	0	41	12	13	0	0
6-28-12 to 7-4-12	2	0	0	7	4	0	2	15	34	0	31	9	3	1	0
7-5-12 to 7-11-12	2	0	0	7	16	0	0	25	0	0	40	14	10	0	1
7-12-12 to 7-18-12	4	0	0	4	3	0	0	11	51	1	15	5	8	0	0
7-19-12 to 7-25-12	1	0	0	5	8	0	2	16	0	0	23	10	8	1	2
7-26-12 to 8-1-12	0	0	0	3	1	0	1	5	15	1	10	5	2	0	1
8-2-12 to 8-8-12	1	2	0	5	5	0	0	13	30	0	18	10	10	0	0
8-9-12 to 8-15-12	3	0	0	5	7	0	2	34	28	1	30	11	7	2	1
8-16-12 to 8-22-12	0	0	0	4	4	0	0	8	0	0	11	6	4	0	0
8-23-12 to 8-29-12	0	0	0	1	6	0	0	7	0	0	8	4	2	0	0
8-30-12 to 9-3-12	0	0	0	3	3	0	2	6	0	0	11	6	5	0	0
totals	19	3	0	79	78	0	15	209	Summer Avg = 29	6	303	121	93	5	6

Median HP = 20

Table 59- Osgood Pond Waterway Access Site use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Osgood Pond Recreation Study 2012

Week	organism type									visitor prevention steps									# groups
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	
5-26-12 to 5-27-12	0	0	0	0	0	0	0	0	0	4	0	3	0	0	0	0	1	0	6
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2
6-7-12 to 6-13-12	1	0	0	0	0	0	0	0	0	9	2	9	1	0	1	0	5	0	13
6-14-12 to 6-20-12	0	0	0	0	1	0	0	0	0	12	5	8	0	0	0	0	6	0	15
6-21-12 to 6-27-12	0	0	0	0	0	0	0	0	0	14	2	12	0	0	0	1	4	1	13
6-28-12 to 7-4-12	0	0	0	1	0	0	0	0	0	7	5	2	0	0	0	0	2	0	11
7-5-12 to 7-11-12	0	0	0	0	1	0	0	0	0	12	4	6	0	0	0	0	6	0	16
7-12-12 to 7-18-12	0	0	0	0	0	0	0	0	0	8	4	5	0	0	0	0	2	0	8
7-19-12 to 7-25-12	0	0	0	1	1	0	0	0	1	11	7	6	0	0	0	0	1	0	12
7-26-12 to 8-1-12	0	0	0	0	0	0	0	0	1	3	0	2	0	0	0	0	2	0	5
8-2-12 to 8-8-12	0	0	0	0	0	0	0	0	0	7	4	3	0	0	0	0	0	0	10
8-9-12 to 8-15-12	0	0	0	1	0	0	0	0	2	11	3	8	0	0	0	0	1	0	13
8-16-12 to 8-22-12	0	0	0	0	0	0	0	0	0	3	0	2	0	0	0	0	2	0	6
8-23-12 to 8-29-12	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	4
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	4	2	4	0	0	0	0	1	0	6
totals	1	0	0	3	3	0	0	0	4	108	38	73	1	0	1	1	33	1	140

77% 27% 52% 1% 0% 1% 1% 24% 1%



Figure 74- Osgood Pond Waterway Access

Rainbow Lake Waterway/ Buck Pond Campground Boat Launch Use Study

By Kyle Milner, Watershed Steward



Figure 75- Rainbow Lake Association Member P. Willis operating Buck Pond Campground's dump station hose/boat wash.

Introduction

The New York State Department of Environmental Conservation (DEC) Buck Pond Campground Boat Launch is located on the eastern shore of the Rainbow Lake Waterway and opens into the Kushaqua Narrows. This launch gives access to the interconnected Rainbow Lake Waterway. Starting from Lake Kushaqua one can travel into the Kushaqua Narrows and through to the Rainbow Narrows where the north branch of the Saranac River connects into the system. From the Rainbow Narrows one can journey further into Rainbow Lake and the Flow. The interconnectedness of these water bodies makes their protection from aquatic invasive species (AIS) important, for if one part were to become infested the entire waterway could become degraded.

Lake Kushaqua is home to an aquatic plant species called southern naiad (*Najas guadalupensis*). Southern naiad growth was vigorous in the summer of 2012. The exact reasons for this excessive growth is unknown; however rainfall patterns, lake water level, and changing weather conditions may have been contributing factors.

This submerged aquatic plant makes it hard for people to fish, swim, and boat. Watershed Stewards took extra care to remove this plant from boats so that it would not travel to other water bodies and become invasive. Otherwise Lake Kushaqua and the Rainbow Lake Waterway host no AIS.

Methods

The Paul Smith's College Watershed Stewardship Program (WSP) began the season on May 26, 2012 and worked through September 3, 2012. Watershed Stewards were placed at the DEC Buck Pond Campground Boat Launch five days per week from 7am to 4pm, with one hour for lunch and breaks, which was the peak of boat traffic. From July to September volunteer stewards from the lakeshore community took over steward duties on Fridays.

Before a boater would launch or after a boater would retrieve their boat the boater and the Steward would visually inspect the watercraft together. This was an opportunity for the Watershed Steward to point out places on the boat and trailer where AIS can get trapped, and educate them about the resident nuisance species, southern naiad. The Watershed Steward would ask a series of questions regarding the boats previous use and if the boater had taken any steps to prevent the spread of AIS. Watershed Stewards recorded these steps along with any water body the boat was in within two weeks prior to the boater's visit to the DEC Buck Pond Campground Boat Launch. The Watershed Steward would alert the boater of any steps that they could be taking in addition to any they already took. Boaters were also encouraged to use the DEC Buck Pond Campground boat wash facility before and after each use.

After conducting the interview, the Watershed Steward would proceed to visually inspect each boat for any attached organisms. The Watershed Stewards would inspect the lower unit of the engine, the hull, trailer, axles, and any surface that could carry AIS. If any plant or animal matter was found it would be removed from the boat, and then it would be recorded on the Watershed Steward's data sheet. The type of boat, horsepower of outboard motor, whether the motor was an environmentally friendly four stroke or two stroke direct injection model, group size, and state of boat registration would also be recorded.

Results

During the 2012 season at Rainbow Lake the Watershed Stewards on duty encountered 680 watercrafts and 1,215 visitors. Kayaks made up 41% of the vessels, a 5% increase from 2011. Motor boats were second with 34% of the visiting watercraft. 69 out of 235 (29%) boats were propelled by environmentally friendly four stroke or two stroke direct injection outboard motors, which is a 23% decrease from 2011, but comparable to 2010.



Figure 76- Buck Pond Campground Boat Launch.

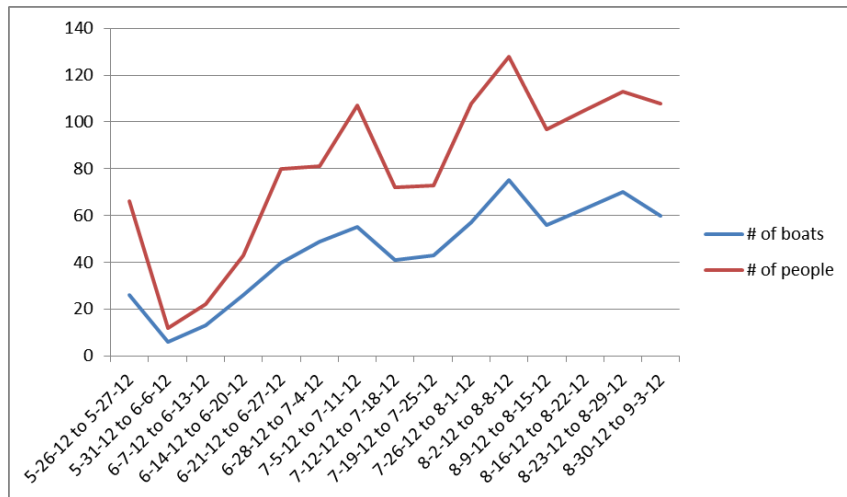


Figure 77- Buck Pond Campground Boat Launch Use, 2012

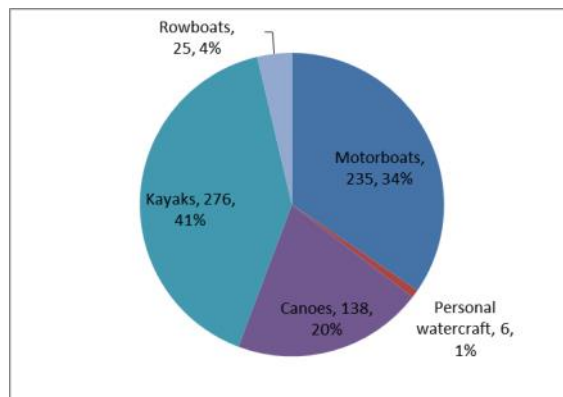


Figure 78- Types of watercraft launched, Buck Pond Campground Boat Launch, 2012.

Watershed Stewards encountered watercraft registered in 10 states and provinces, with New York as the most frequent state of origin. Watershed Stewards asked the boat owners at the DEC Buck Pond Campground Boat Launch which AIS spread prevention measures they had taken since the last use of the boat. 216 (41% of 524 total groups) boat owners washed their boats before they launched and 45 (9%) of boat owners had dried their boats. The number of boat owners that had inspected their boat and boating equipment for any organic matter was 146 (28%). 24 (5%) boaters had drained their bilge after their last use and 7 (1%) of the boaters had drained their live wells. No boaters had drained their bait buckets and 3 (1%) boaters disposed of their unused bait. Of the total 524 groups 320 (61%) of them had taken some preventative measures before launching their boats. 78 boats of the total 678 (12%) had been washed using the boat wash at the boat launch either before or after use in the Rainbow Lake Waterway, which is up slightly from 7% in 2011. However this percent is down from 2010 when 22% of boaters used the boat wash.

Table 60-State of origin, motorboats, Buck Pond Campground Boat Launch.

State	# Visits
NY	232
MA	1
MI	1
NC	1
NJ	14
PA	3
QC	6
RI	1
VA	2
VT	2
total	263

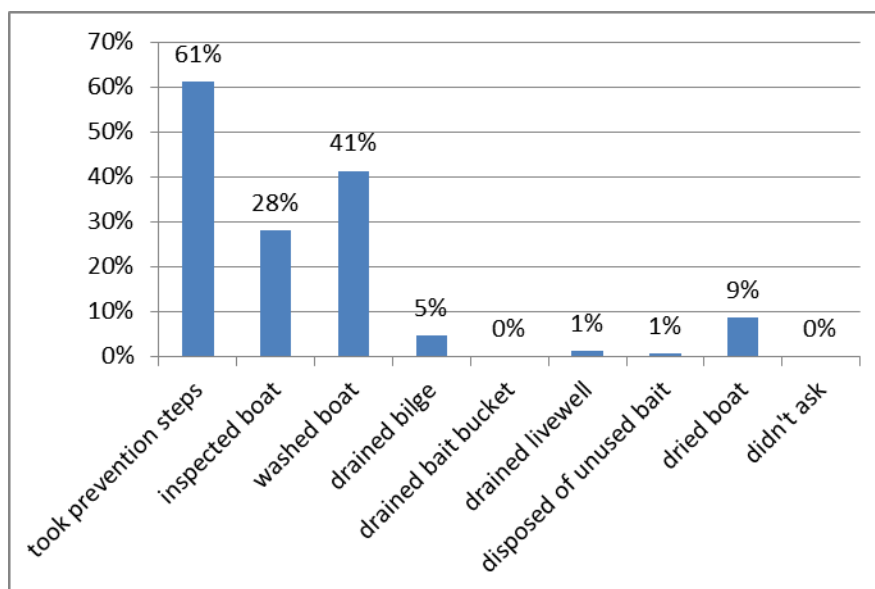


Figure 79- AIS spread prevention measures taken at Buck Pond Campground Boat Launch, 2012.

Stewards asked visitors where their boat had been in the preceding two week period. 149 groups had been in no waterway in the preceding two weeks. Of the 183 owners reporting a prior waterway, the most frequently mentioned water bodies were Rainbow Lake (102 visits), Buck Pond (47), the St. Regis Chain of Lakes (9) and Lake Champlain (16) which is a major concern because Lake Champlain contains a myriad of invasive species.

Organisms Removed From Watercraft

The overall organisms per inspection for boats using the Rainbow Lake Waterway access site at the DEC Buck Pond Campground was 90 of 525 groups (17%). One boat originating from Lake Champlain was found to be carrying curlyleaf pondweed (*Potamogeton crispus*). The majority of fragments found were Southern Naiad (*Najas guadalupensis*), which is localized within Rainbow Lake. Discounting the Naiad the percentage drops to 1% or 8 of 524.

Table 61- Waterways visited in previous two-week period, Buck Pond Campground Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Lake Champlain	Yes	16	Oneida Lake	Yes	1
Lake Kushaqua	Yes	15	Putnam Pond	Yes	1
Saranac Chain	Yes	14	Raquette Lake	Yes	1
Lake Placid	Yes	7	Red Lake	Yes	1
Lake Flower	Yes	5	Salmon River	Yes	1
Meacham Lake	Yes	4	Stark Reservoir PA	Yes	1
Taylor Pond	Yes	4	Susquehanna River	Yes	1
Fish Creek	Yes	3	Tupper Lake	Yes	1
Fourth Lake	Yes	3	None		149
Union Falls Reservoir	Yes	3	Rainbow Lake		102
Franklin Falls Pond	Yes	2	Buck Pond		47
Hudson River	Yes	2	Upper St. Regis Lake		9
Lake Colby	Yes	2	Osgood Pond		6
Sacandaga Lake	Yes	2	Rollins Pond		6
Saranac River	Yes	2	Rental		4
St. Lawrence River	Yes	2	Moose Pond		3
Cazenovia Lake	Yes	1	Grass Pond		2
Chateaugay Lake	Yes	1	Raquette River		2
Chazy Lake	Yes	1	Blue Mountain Lake		1
Clear Pond	Yes	1	Green Pond		1
Forked Lake	Yes	1	Harris Lake		1
Great Sacandaga Reservoir	Yes	1	Lake Clear		1
Lake Erie	Yes	1	Lake Lila		1
Lake Ontario	Yes	1	Limekiln Lake		1
Lake St. Francis QC	Yes	1	Moose River		1
Lincoln Pond	Yes	1	Oregon Pond		1
Mountain View Lake	Yes	1	South Sandy Creek		1
			Total		444

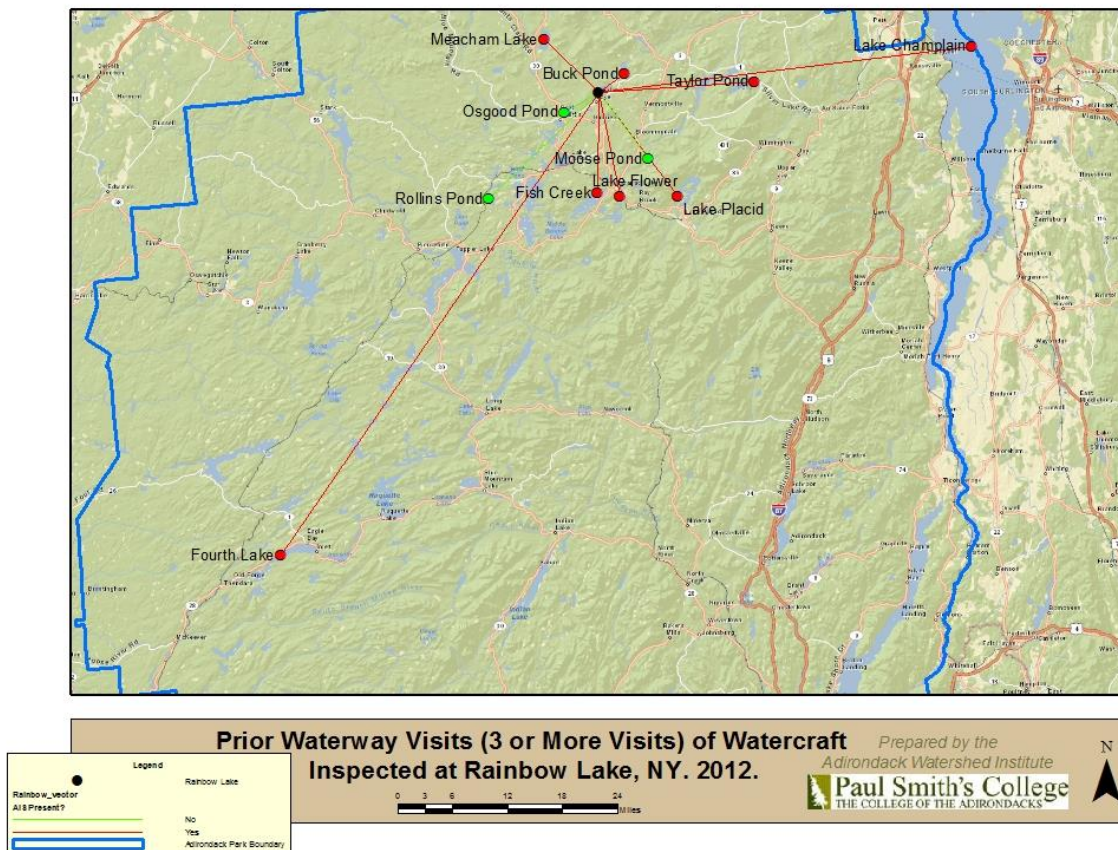


Figure 80- Prior waterway visits, Buck Pond Campground Boat Launch.

Service projects

Rainbow Lake Shore Owners are a close knit community working to protect and manage the lake they live on. This, “hands on” community approach produces the highest level of management and leads to well thought out decisions made by the stake holders themselves. Paul Smith’s College strives to use Watershed Stewards to more closely link shore owners with the resources of the Adirondack Watershed Institute and Paul Smith’s College.

Watershed stewards used a weekly project day to pursue a wide range of projects, including maintaining a Microsoft Excel database, construction of aquatic plant rakes, searching remote parts of the waterway for invasive species, assisting in the AWI Lab with milfoil research, and attending shore owner meetings to answer questions and receive directives for future projects.

When reports of possible new infestations of invasive species on Rainbow Lake are reported to watershed stewards at the boat launch, samples are taken and then analyzed at the Adirondack Watershed Institute lab.

Discussion

2012 was the eighth season that the Paul Smiths College Watershed Stewardship program has been stationed at the Rainbow Lake boat launch, preventing the spread of southern naiad and the introduction of any other aquatic invasive species. With the expansion of the program 2012 Watershed Stewards were able to be on duty at the Rainbow lake boat launch five days a week.

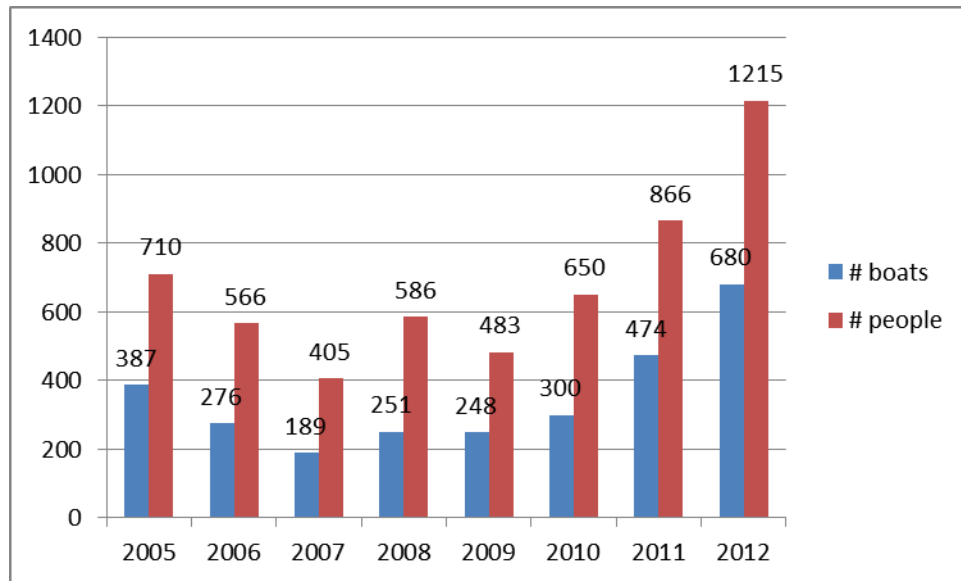


Figure 81- Historical usage data, Buck Pond Campground Boat Launch, 2005-2012.

Stewards saw more boaters and inspected more watercraft than they ever have at the DEC Buck Pond Campground Boat Launch. The increase in coverage in 2012 from previous years resulted from grant support to the Rainbow Lake Association from the Lake Champlain Basin Program. This funding allowed the RLA to hire Paul Smith's College stewards and to supplement the paid coverage with volunteers. Rainbow Lake remains a comparatively pristine waterway, with high quality ecosystems and uninfested waters. The stewards enjoyed the support and collaboration of the Rainbow Lake property owners, particularly Jim Hauber. Mr. Hauber provided a detailed boat tour for the benefit of the stewards. Mr. Hauber's sharing of the rich history of Rainbow Lake is a valuable and unique gift to the stewards. His passion energized the stewards that stand watch over the precious waterway with a sense of pride and the profound meaning to their job. The Rainbow Lake Association's love of the lake demonstrates how residents who care can impact the regions in which they live. There is no substitute for this form of stewardship. The WSP would like to gratefully recognize the Rainbow Lake Association and the Lake Champlain Basin Program for underwriting the 2012 program.

Table 62- Buck Pond Campground Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/2 strk DI= equipped with four-stroke or two stroke direct injection outboard motor.

Rainbow Lake Recreation Study 2012														
Week	Boat Type								total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of visitors	# groups launching	# groups retrieving
	M	PWC	S	C	K	B	R							
5-26-12 to 5-27-12	13	0	0	6	6	0	1	26	68	3	66	20	12	
5-31-12 to 6-6-12	4	0	0	0	1	0	1	6	51	3	12	6	0	
6-7-12 to 6-13-12	7	0	0	1	5	0	0	13	65	4	22	10	2	
6-14-12 to 6-20-12	10	0	0	10	5	0	1	26	57	2	43	16	10	
6-21-12 to 6-27-12	15	0	0	6	19	0	0	40	37	1	80	26	17	
6-28-12 to 7-4-12	24	0	0	9	16	0	0	49	30	7	81	37	17	
7-5-12 to 7-11-12	27	0	0	14	11	0	3	55	50	7	107	36	31	
7-12-12 to 7-18-12	15	0	0	5	20	0	1	41	63	0	72	21	17	
7-19-12 to 7-25-12	10	0	0	9	22	0	2	43	37	5	73	30	15	
7-26-12 to 8-1-12	17	0	0	17	22	0	1	57	37	3	108	37	18	
8-2-12 to 8-8-12	21	1	0	13	37	0	3	75	77	7	128	51	25	
8-9-12 to 8-15-12	13	2	0	14	23	0	4	56	39	4	97	37	25	
8-16-12 to 8-22-12	20	0	0	12	29	0	2	63	46	8	105	35	23	
8-23-12 to 8-29-12	22	0	0	13	30	0	5	70	39	9	113	30	20	
8-30-12 to 9-3-12	17	3	0	9	30	0	1	60	45	6	108	30	22	
totals	235	6	0	138	276	0	25	680	Summer Avg = 48	69	1215	422	254	
									Median HP = 30					

Table 63- Buck Pond Campground Boat Launch, 2012. Key: EWM = Eurasian watermilfoil; BW = native bladderwort; NM = native milfoil; GRS = grass; WC = water chestnut; ZM = zebra mussel; VLM = variable leaf milfoil. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Rainbow Lake Recreation Study 2012																							
Week	organisms found		organism type										Boat Wash	# groups taking AIS spread prevention measures									
	entering	leaving	BW	CL	FE	WM	GRS	NM	VLM	WC	ZM	other		yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	# groups
5-26-12 to 5-27-12	0	0	0	0	0	0	0	0	0	0	0	0	10	12	7	11	0	0	2	2	3	0	23
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	2	0	0	0	0	0	0	6
6-7-12 to 6-13-12	0	0	0	0	0	0	0	0	0	0	0	0	1	7	2	6	1	0	1	0	2	0	11
6-14-12 to 6-20-12	0	0	0	0	0	0	0	0	0	0	0	0	5	9	2	8	0	0	0	0	1	0	21
6-21-12 to 6-27-12	1	0	0	0	0	0	0	0	0	0	0	1	7	16	6	13	0	0	1	0	3	0	30
6-28-12 to 7-4-12	1	3	0	0	0	1	0	0	0	0	0	3	5	32	16	18	7	0	0	1	13	0	41
7-5-12 to 7-11-12	2	5	3	1	0	0	0	0	0	0	0	3	3	28	12	21	2	0	0	0	3	0	49
7-12-12 to 7-18-12	2	3	0	0	0	1	0	0	0	0	0	4	4	18	12	12	2	0	1	0	1	0	28
7-19-12 to 7-25-12	1	3	1	0	0	0	0	0	0	0	0	3	4	22	10	15	1	0	1	0	3	0	33
7-26-12 to 8-1-12	2	5	1	0	0	1	0	0	0	0	0	5	6	28	10	18	2	0	0	0	2	0	39
8-2-12 to 8-8-12	6	9	2	0	0	4	0	0	0	0	0	9	5	24	8	18	1	0	0	0	3	0	58
8-9-12 to 8-15-12	3	4	0	0	0	1	0	0	0	0	0	6	11	32	13	26	2	0	0	0	4	0	47
8-16-12 to 8-22-12	2	11	0	0	0	5	0	0	0	0	0	8	5	26	10	17	2	0	0	0	4	0	45
8-23-12 to 8-29-12	4	9	0	0	0	3	0	0	0	0	0	10	8	35	21	20	0	0	0	0	2	0	51
8-30-12 to 9-3-12	3	11	0	0	0	1	0	0	0	0	0	13	4	28	16	12	4	0	1	0	1	0	43
totals	27	63	7	1	0	17	0	0	0	0	0	65	78	321	147	217	24	0	7	3	45	0	525

Raquette Lake Boat Launches Use Study

By: Emma Horton, Watershed Steward



Figure 82- Raquette Lake Village Boat Launch. I-LIDS system is the steel cylinder to the right of the red sign.

Introduction

The Paul Smith's College Watershed Stewardship Program (WSP) was established in 2000 and over the past decade it has grown in size and reputation to become a recognized and appreciated part of the Adirondacks vast lake networks. The program has grown and expanded in recent years due to federal grants and now covers more than 20 lakes within the Adirondack Park stretching from the Eastern High Peaks Region through the Western Adirondacks. The WSP provides boat inspections, knowledge of local and invasive plant and animal species, and educational materials to boaters and visitors in the park.

The summer of 2012 is the second consecutive year the Raquette Lake Village boat ramp has been monitored by the WSP. Previously the launch was monitored by volunteers from the Raquette Lake Property Owners Association (RLPOA) and a steward hired by the Town of Long Lake. The RLPOA paid for steward coverage of the lake five days a week in the summers of 2008-2010 while the other two days a week property owner volunteers monitored the boat launch. The WSP provided stewards in 2008. In 2009 and 2010 Burke's Marina also had volunteers inspecting boats (Aronow). Recently, the Raquette Lake Village boat ramp has been repaired and

resurfaced to allow larger boats to be launched with ease. Raquette Lake is the largest natural lake in the Adirondacks with over 99 miles of shoreline making it a popular destination for boaters across New York State and surrounding states (Raquette Lake Navigation Company). With its increased accessibility due to the new launch and the lake's many attractions, from bass fishing tournaments to the popular Quaker Beach at the lake's north end, monitoring Raquette Lake is immensely important to protect it from invasive plants and animals whose impacts on the lake would come at a cost both economically and environmentally. Because of the awareness of the community prior to the WSP's involvement, Raquette Lake only contains variable leaf milfoil, which is currently being treated with benthic matting by the RLPOA. At present, the lake has remained clean of other invasive species due to the ever-increasing diligence and awareness of the community and the WSP.

Methods

The Raquette Lake boat ramp was covered seven days a week by three individual stewards. Coverage was from 7AM to 4PM every day except Fridays which were covered from 9AM to 6PM. Burkes' Marina Launch on Raquette Lake was also covered by volunteers and WSP stewards several times a week. When stewards were on duty they collected data on incoming and outgoing boats and recreational vehicles. The data acquired included boat type (options included motorboat, canoe, kayak, sailboat, rowboat, work barge, and personal watercraft/jet ski), group size, and launching and retrieval times. Additionally it was noted if any aquatic organisms were collected and what they were identified as. Boaters were asked if their watercraft had been in any other bodies of water within the past two weeks and if they did anything to prevent the spread of aquatic invasive species. Since the Raquette Lake boat ramp is located in the center of the town, stewards provided information to many non-boaters as well including town residents and tourists/visitors. Stewards educated the public about current issues involving invasive species such as hydrilla management in Cayuga Lake and the recent discovery of spiny water fleas in Lake George and Lake Champlain. There were several incidents this summer where boats arrived at Raquette Lake immediately after boating in a lake that is known to contain invasive species that are not present in Raquette Lake (such as Lake George). Knowledge of what species are present in water bodies around New York and the East Coast is vital to maximizing the protection of the lake and minimizing its exposure to invasive species. A unique responsibility of Raquette Lake Town launch stewards is the reviewing of data recorded by the motion activated surveillance camera called an Internet Landing-Installed Device Sensor (I-LIDS). Beginning on June 15, stewards would review the I-LIDS videos on a daily basis and record information relevant to the questions on the WSP data collection sheets including the video's unique identification code. At the culmination of each day data was transcribed from the data sheet to the Excel database by the steward. The data was then reviewed for accuracy by the Data Manager and a Staff Manager on a weekly basis.

Results

Between the seven day steward coverage at Raquette Lake village, coverage at Burke's Marina, and I-LIDS monitoring the WSP monitored a grand total of 1,717 boats over the summer. Motorboats were the most commonly inspected watercraft, and account for 58% of all inspections, followed by kayaks at 20% and canoes comprising 16% of the total number of boats inspected. There were 3,021 visitors to the lake throughout the summer.

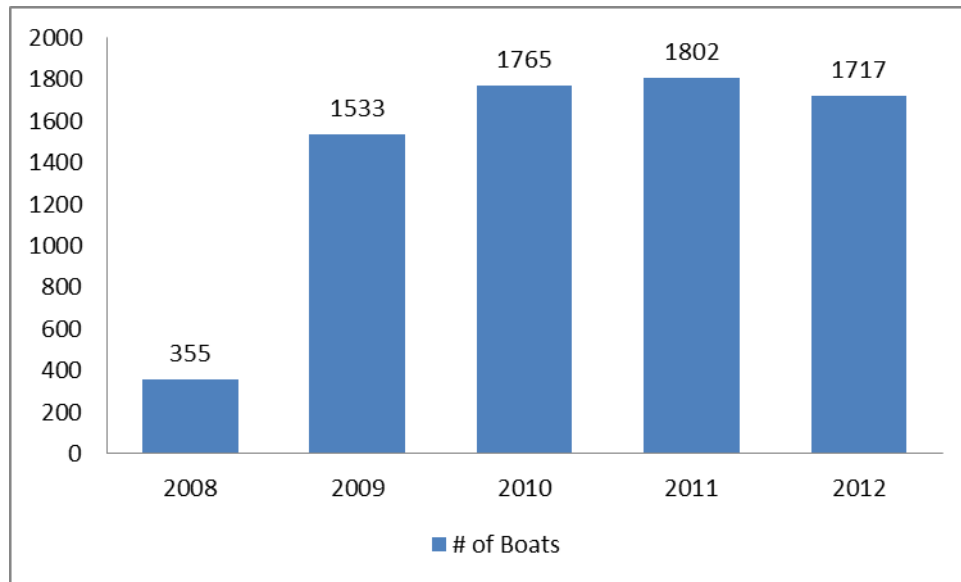


Figure 83- Number of boats inspected by stewards, Raquette Lake, 2008-2012.

The busiest days of the summer were on the weekends, including Fridays. The busiest weeks were July 12–July 18, July 26–August 1, and June 28–July 4 with 156, 124, and 117 inspections, respectively. There was a general increasing trend in the traffic as the summer progressed.

The horsepower of boats varied greatly and averaged out to 51 with a mean of 40. This statistic however does not take into account the horsepower of inboard motors which would likely have significant affect on the numbers. 545 of the boats inspected in the summer of 2012 were from New York State with the next most frequent visitors coming from Vermont with 16 inspections.

Table 64- State or province of registration of motorboats using Raquette Lake Village Boat Launch, 2012.

State	# boats	State	# boats
CT	5	NJ	15
FL	2	NY	545
IL	2	OH	4
MA	7	PA	3
MD	2	TX	1
MI	1	VA	4
NC	4	VT	16
		Total	611



Figure 84- Steward E. Horton at Raquette Lake Village boat launch.

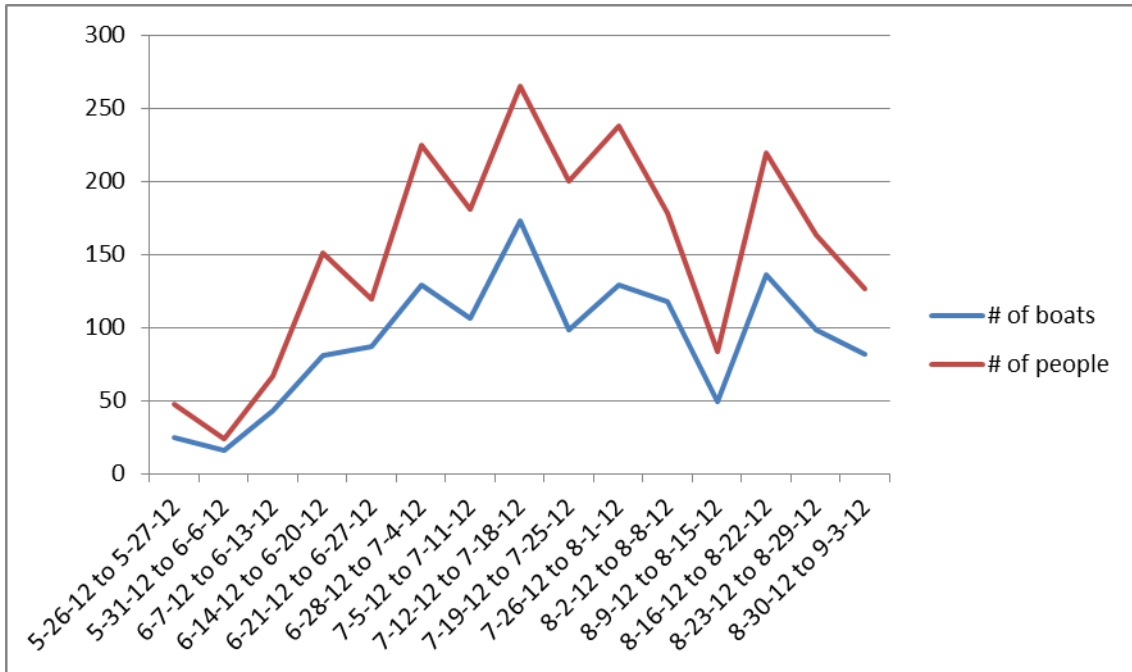


Figure 85- Raquette Lake Village Boat Launch use, 2012.

Of the boats inspected this summer, 35% took preventative measures against spreading aquatic invasive species. The most common prevention method was washing the boat prior to launching which 23% of boaters doing, followed by boat inspection which 11% of boaters reported performing. The least common measure utilized was proper bait disposal including emptying bait buckets and disposing of unused bait which no boaters reported doing. 2% of boaters were not asked about their AIS prevention methods.

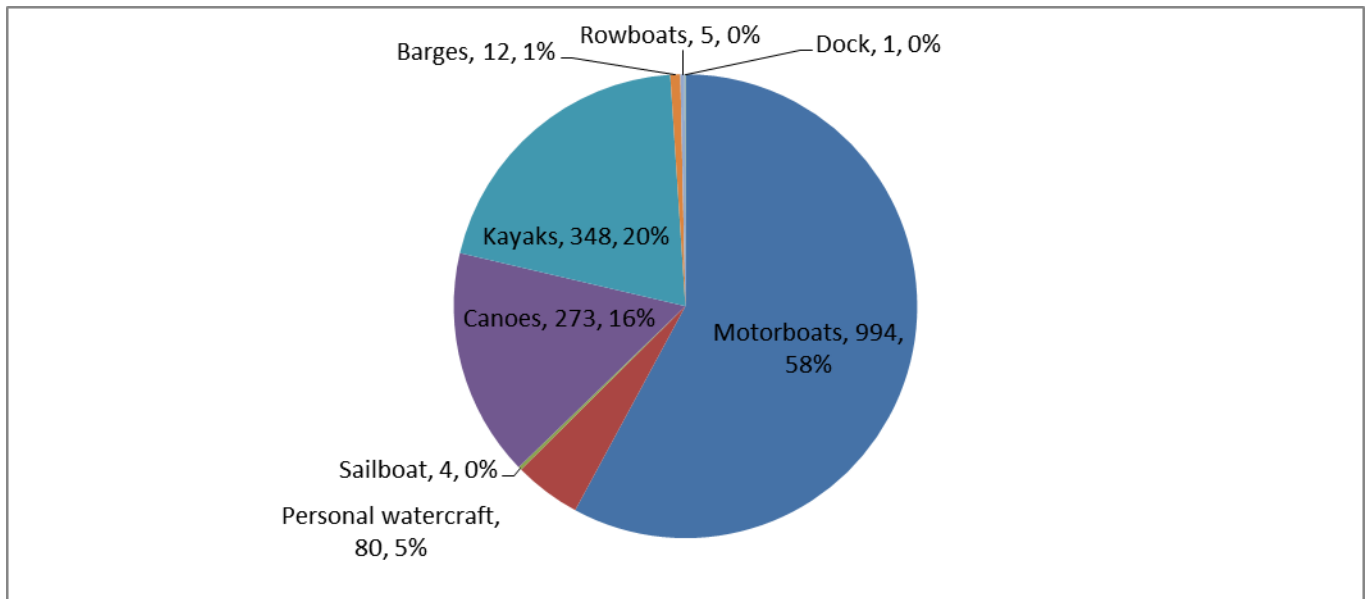


Figure 86- Types of Watercraft Launched, Raquette Lake Village Boat Launch, 2012.

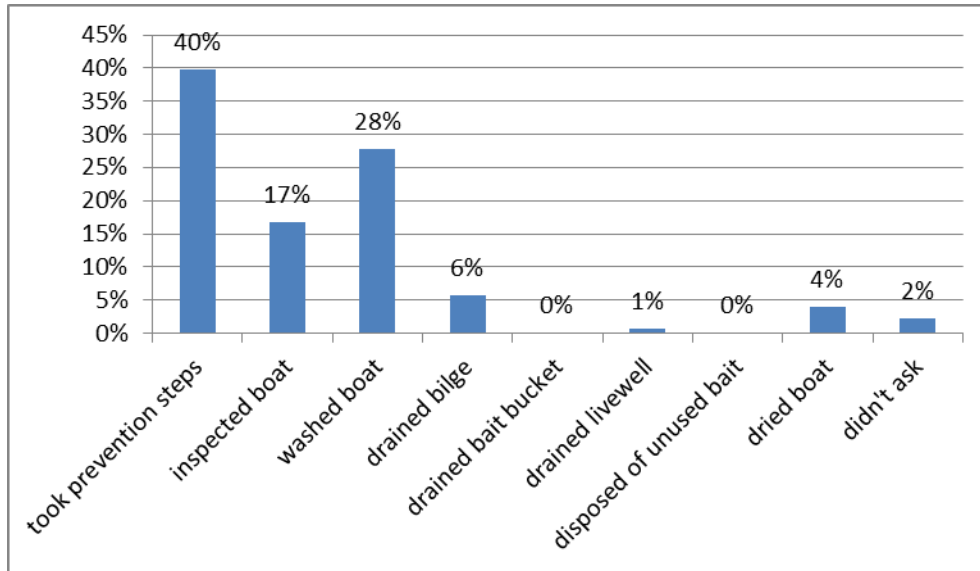


Figure 87- AIS spread prevention measures taken by visitors, Raquette Lake Village Boat Launch, 2012.

The majority of boaters that stewards questioned (300) had not been in a water body within two weeks of entering Raquette Lake. Of those that had, Raquette Lake was the most common response (114) and second was Fourth Lake with 22 reports. There were a total of 95 previous water bodies that boaters had been present in within two weeks of coming to Raquette Lake. 44 boats (recorded from I-LIDS and boaters who were not surveyed) were labeled as unknown and 6 boats were rentals. Of the 95 water bodies, 43 have recorded invasive species present in them including Fourth Lake which has an established population of Eurasian watermilfoil. In the summer of 2012 there appeared to be a strong connection between Raquette Lake and Fourth Lake; 44 boaters launching at Raquette Lake town launch had visited Fourth Lake in the previous two weeks.



Figure 88- Protecting Raquette Lake.

Table 65- Waterways visited in previous two-week period, Raquette Lake Village Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Raquette Lake	Yes	114	Rental		6
Fourth Lake	Yes	22	Big Moose Lake		4
Seventh Lake	Yes	11	Eighth Lake		4
Hudson River	Yes	6	Redfield Reservoir		4
Long Lake	Yes	6	Erie Canal		3
Lake George	Yes	5	Indian Lake		3
Oneida Lake	Yes	5	Fulton Chain		2
Lake Champlain	Yes	4	Lake Adirondack		2
Lake Ontario	Yes	4	Lake Memphremagog		2
Lake Placid	Yes	4	Lelands Pond NY		2
Niagara River	Yes	3	Limekiln Lake		2
Saratoga Lake	Yes	3	Stillwater Reservoir		2
Skaneateles Lake	Yes	3	Wallkill River		2
Tupper Lake	Yes	3	Bagaduce River ME		1
White Lake	Yes	3	Black Lake		1
Ballston Lake	Yes	2	Bog River		1
Copake Lake	Yes	2	Box River IL		1
Erie Canal	Yes	2	Canada Lake		1
First Lake	Yes	2	Candlewood Lake CT		1
Hinckley Reservoir	Yes	2	Cazenovia Lake		1
Nassau Lake	Yes	2	Connecticut River		1
Seneca River	Yes	2	Delaware River		1
Braddock Bay	Yes	1	Eaton Brook		1
Canadarago Lake	Yes	1	Gilford Lake		1
Cayuga Lake	Yes	1	Grafton Lake		1
Chateaugay Lake	Yes	1	Henderson Lake		1
Conesus Lake	Yes	1	Hitchins Pond		1
Cranberry Lake	Yes	1	Lake Abanakee		1
Eagle Lake	Yes	1	Lake Anna VA		1
Galway Lake	Yes	1	Lake Balfour		1
Grasse River	Yes	1	Lake Beltzville PA		1
Great Sacandaga Rese	Yes	1	Lake Bonaparte		1
Irondequoit Bay	Yes	1	Lake Kanacto		1
Keuka Lake	Yes	1	Lake Pleasant		1
Lake Bonaparte	Yes	1	Lake Wallenpaupack PA		1
Little Long Lake	Yes	1	Moraine Lake, AB		1
Mohawk River	Yes	1	North Lake		1
Moraine Lake, AB	Yes	1	OK Slip Pond		1
Otter Lake	Yes	1	Piseco Lake		1
Saranac Lake	Yes	1	Rutfield Reservoir		1
Sixth Lake	Yes	1	Sagamore Lake		1
St. Lawrence River	Yes	1	South Lake		1
Upper Saranac Lake	Yes	1	Sterling Lake		1
None		300	Upper St. Regis Lake		1
Unknown		44	Utowana Lake		1
Blue Mountain Lake		14	Waterbury Reservoir VT		1
Brown Tract Pond		11	Total		679
Delta Lake		8			

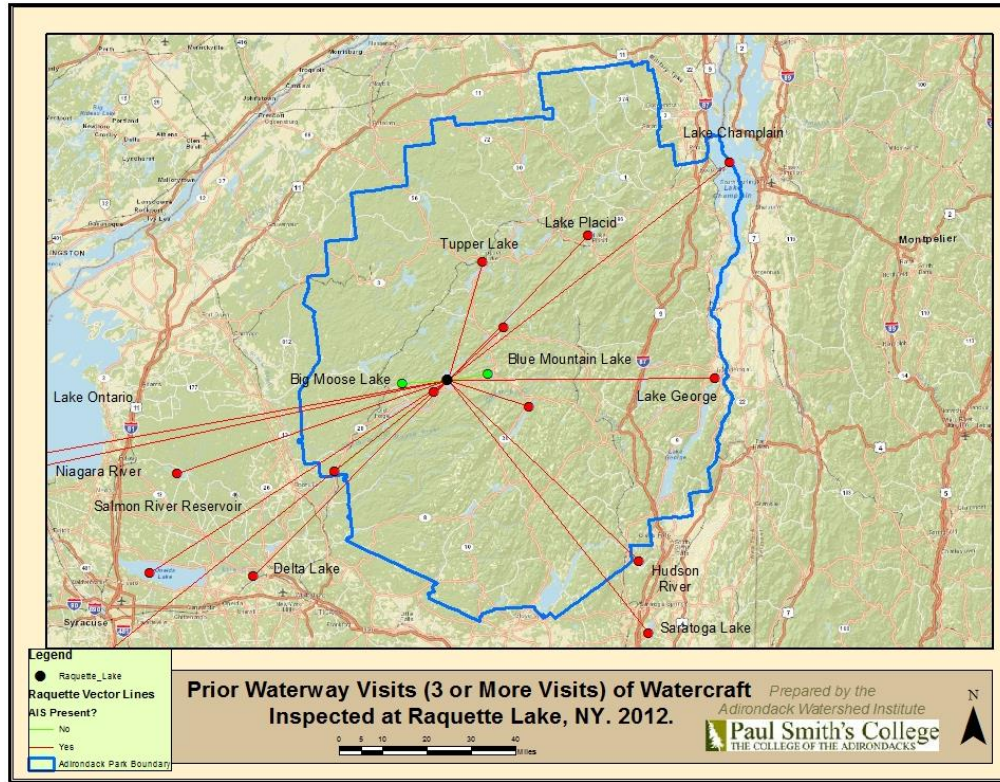


Figure 89- Prior waterway visits, Raquette Lake Village Boat Launch.

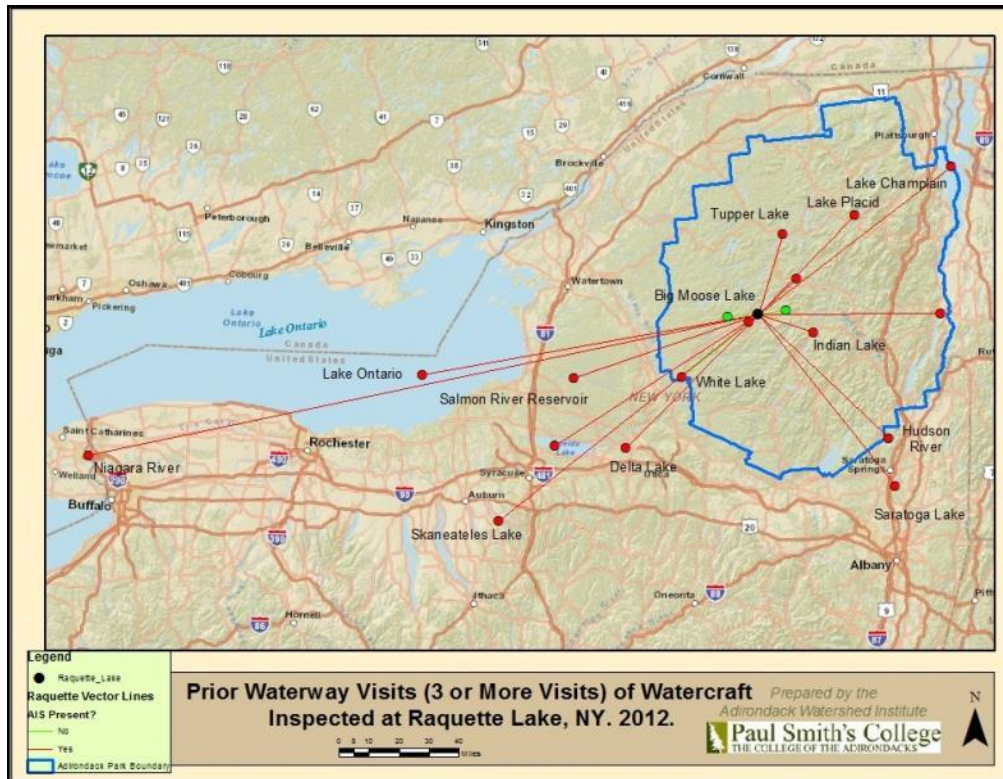


Figure 90- Wider view of prior waterway visits, Raquette Lake Village Boat Launch.

Table 66- Waterways visited in previous two-week period, Raquette Lake Village Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits
Raquette Lake	Yes	56
Fourth Lake	Yes	15
Oneida Lake	Yes	11
Long Lake	Yes	10
Sacandaga Lake	Yes	7
First Lake	Yes	5
Cayuga Lake	Yes	4
Seventh Lake	Yes	4
Kayuta Lake	Yes	3
Canadarago Lake	Yes	2
Candlewood Lake CT	Yes	2
Connecticut River	Yes	2
Hinckley Lake	Yes	2
Hudson River	Yes	2
Lake Champlain	Yes	2
Black Lake	Yes	1
Canandaigua Lake	Yes	1
Deruyter Reservoir	Yes	1
Eighth Lake	Yes	1
Erie Canal	Yes	1
Lake Durant	Yes	1
Lamoka Lake	Yes	1
Lebanon Reservoir	Yes	1
Mohawk River	Yes	1
Oswego River	Yes	1
Otisco Lake	Yes	1
Owasco Lake	Yes	1
Saratoga Lake	Yes	1
Sixth Lake	Yes	1
Skaneateles Lake	Yes	1
Snyders Lake	Yes	1
St. Lawrence River	Yes	1
Susquehanna River	Yes	1
None		150
Delta Lake, Rome NY		10
Blue Mountain Lake		3
Abanakee Lake		2
Redfield Reservoir		2
Rental		2
Beaver River Flow		1
Blue Marsh PA		1
Brantingham Lake		1
Cedar River Flow		1
Mullica River, NJ		1
Piseco Lake		1
South Holston Lake TN		1
Total		321

Previous waterway visits for boats launched at Burke's Marina

Stewards worked together with volunteer stewards to interact with visitors launching watercraft at Burke's Marina, a private business along Route 28 along the south shore of Raquette Lake. At this location, stewards inspected 347 boats and interacted with 735 visitors. Visitors reported a total of 45 different waterways visited in the preceding two weeks. Fourth Lake, Oneida Lake, Long Lake, Delta Lake and Sacandaga Lake were the most frequently mentioned waterways. Unsurprisingly, the majority of these waterways are known to harbor AIS, presenting a clear risk of AIS transport via watercraft using Burke's Marina.

Invasive species spread prevention- Organisms removed from watercraft

Stewards removed 103 organisms from 94 watercraft or 9.6% of the total number of boats inspected. 60 of these organisms were collected from watercraft retrieving from Raquette Lake while the remaining 43 were obtained prior to the boats' launch (see Table 67). Of the organisms found, 19 (or 18.4%) were invasive, including 15 specimens of variable leaf milfoil (3 entering and 12 leaving) and 4 water chestnuts (all entering). No organisms were ever able to be identified via the I-LIDS footage.

Discussion

This is the second consecutive year that WSP has monitored Raquette Lake and the number of boats decreased slightly from the previous year. Raquette Lake is proud of its minimal problems with invasive species, and is a tight knit boating community as a whole. Many of the boaters who were inspected reported that they never use their boats in any other water bodies, which is an effective means of preventing the spread of AIS. However, because of the nature of the WSP study, these boaters were recorded as taking no precautions. The new data entry system that was employed in the summer of 2012 was effective in letting individual stewards enter their data on a daily instead of weekly basis, however inconsistencies in data entry must be addressed early in the season to prevent confusion and inaccurate data. Weekly review of this data by a supervisor to ensure consistencies and accuracy between stewards' entry methods could be employed to prevent these issues in the future. An

example an inconsistency in data entry was when boats were retrieving from Raquette Lake some stewards recorded Raquette Lake as the prior lake whereas others entered the lake previous to Raquette as the prior lake into the database. This potentially inflated the numbers of references to Raquette Lake in previous waterways table.

I-LIDS is a unique component of the Raquette Lake stewarding responsibilities. In the stewards' opinion, the videos are generally not high enough resolution to show invasive species on trailers. The physical placement of the camera on the launch ramp is not ideal for viewing the underside of the boat, the boat motor or the trailer. However, the system does successfully capture the registration number on many of its videos which will be useful if the RLPOA ever decides to follow up on boats found transporting AIS. I-LIDS is programmed to record data during all daylight hours when the motion sensor camera is able to detect movement. However, throughout the season I-LIDS captured only about half of all launches that the stewards recorded. By fine tuning the I-LIDS system during future seasons the camera could become a huge asset to the stewardship program. Currently its presence acts as an effective reminder to boaters to check their boats and trailers before and after launching.

Table 67- Organisms removed from watercraft and trailers at Raquette Lake Village Boat Launch, 2012

Organism	Entering	Leaving	Prior Waterway
Bladderwort	2	25	
Grass	22	18	
Native Milfoil	1	1	
Other	18	9	
Variable-leaf Milfoil	3	15	Lake Durant, Old Forge Pond, Seventh Lake
Water Chestnuts	4	0	Eighth Lake, Seneca River, Saranac Lake
Totals	50	68	

The WSP would like to thank Kenneth Hawks for his support time and energy in making the WSP familiar with the I-LIDS system as well as other technical aspects of stewarding duties at the Raquette Lake Launch. Pat Deyle for his efforts in AIS mitigation as well as keeping the program informed on activities and opportunities that were occurring, Lou Burke, for his assistance in the weekly staff meetings as well as many other things. Jim Dillon for facilitating the WSP and allowing us to use his facilities to store program supplies. Mike and Nora Burke as well as the entire Burke's Marina staff for all their help and understanding.

Works Cited

Aronow, Jaden. Recreation Use Study: Raquette Lake Village Boat Launch. Watershed Stewardship Program Summary of Programs and Research 2011. Paul Smith's College. 2011.

Table 68-Raquette Lake Village Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Raquette Lake Recreation Study 2012																	
Week	Video		Boat Type									total # boats	Weekly Avg HP outboard	Four stroke	Group Size	# groups launching	# groups retrieving
	ILIDS	M	PWC	S	C	K	B	R	SUP	Dock							
5-26-12 to 5-27-12	0	15	2	0	3	5	0	0	0	0	25	26	13	47	19	5	
5-31-12 to 6-6-12	0	8	1	0	1	5	0	0	0	1	16	19	1	24	13	8	
6-7-12 to 6-13-12	18	25	0	0	9	6	2	1	0	0	43	49	11	67	29	15	
6-14-12 to 6-20-12	35	64	0	1	4	12	0	0	0	0	81	63	22	151	50	32	
6-21-12 to 6-27-12	40	47	0	0	8	32	0	0	0	0	87	40	9	119	45	27	
6-28-12 to 7-4-12	42	77	6	0	7	37	1	1	0	0	129	37	7	225	85	29	
7-5-12 to 7-11-12	50	62	9	0	11	24	0	0	0	0	106	48	11	181	53	38	
7-12-12 to 7-18-12	46	74	2	1	71	24	0	1	0	0	173	51	7	265	64	51	
7-19-12 to 7-25-12	20	54	2	0	21	21	0	0	0	0	98	67	11	200	42	31	
7-26-12 to 8-1-12	37	71	3	0	25	29	1	0	0	0	129	89	21	238	50	56	
8-2-12 to 8-8-12	24	53	7	2	18	38	0	0	0	0	118	68	6	178	50	43	
8-9-12 to 8-15-12	10	25	3	0	12	9	0	0	0	0	49	41	4	83	26	20	
8-16-12 to 8-22-12	23	35	0	0	44	56	1	0	0	0	136	58	8	219	54	54	
8-23-12 to 8-29-12	17	33	9	0	28	28	0	0	0	0	98	67	5	163	36	34	
8-30-12 to 9-3-12	15	51	2	0	10	19	0	0	0	0	82	48	8	126	36	36	
totals, Village Boat Launch	377	694	46	4	272	345	5	3	0	1	1370	Summer Avg = 52	144	2286	652	479	
												Median HP = 40					
totals, Burke's Marina	300	34	0	1	3	7	2	0	0	0	347		88	735	257	116	
grand totals	994	80	4	273	348	12	5	0	1	1717			232	3021	909	595	

Table 69- Raquette Lake Village Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Raquette Lake Recreation Study 2012																				
Week	organisms found		organism type											# groups taking AIS spread prevention measures						
	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	4	1	0	0	0	1	0	1	1	0	2	14	3	12	4	0	0	0	0	0
5-31-12 to 6-6-12	2	0	0	0	0	2	0	0	0	0	0	13	4	6	1	0	1	0	3	0
6-7-12 to 6-13-12	1	1	1	0	0	0	0	0	0	0	1	19	4	12	0	0	0	0	3	1
6-14-12 to 6-20-12	3	5	2	0	0	2	0	3	0	0	1	49	19	32	2	0	0	2	1	1
6-21-12 to 6-27-12	0	3	2	0	0	0	0	1	0	0	0	31	10	18	2	0	1	0	7	5
6-28-12 to 7-4-12	5	4	2	0	0	2	0	1	1	0	3	54	17	33	3	0	0	0	7	3
7-5-12 to 7-11-12	6	8	2	0	0	3	0	3	1	0	5	37	9	27	0	0	2	0	5	3
7-12-12 to 7-18-12	6	5	1	0	0	5	0	2	1	0	2	39	7	31	6	0	0	0	0	2
7-19-12 to 7-25-12	7	8	3	0	0	5	2	0	0	0	5	38	11	25	2	0	1	0	2	3
7-26-12 to 8-1-12	3	12	3	0	0	5	0	3	0	0	4	57	18	36	8	0	2	0	6	1
8-2-12 to 8-8-12	6	10	5	0	0	8	0	0	0	0	3	34	15	19	4	0	0	0	5	0
8-9-12 to 8-15-12	3	2	1	0	0	3	0	1	0	0	0	15	10	9	0	0	0	0	1	0
8-16-12 to 8-22-12	1	4	1	0	0	1	1	0	0	0	2	2	48	23	31	2	0	1	0	4
8-23-12 to 8-29-12	3	7	2	0	0	3	1	3	0	0	1	27	8	19	0	0	0	0	3	1
8-30-12 to 9-3-12	7	2	4	0	0	4	1	0	0	0	0	22	7	14	2	0	0	0	1	2
totals, Village Boat Launch	57	72	29	0	0	44	5	18	4	0	29	451	190	316	65	2	7	1	45	26
												40%	17%	28%	6%	0%	1%	0%	4%	2%
totals, Burke's Marina	43	18	5	2	4	30	2	2	0	1	15	206	59	120	48	0	19	0	19	0
grand totals	100	90	34	2	4	74	7	20	4	1	44	657	249	436	113	2	26	1	64	26

St. Regis Canoe Area: Hoel and Little Clear Ponds Use Study

By Elena Capaldi, Watershed Steward

Introduction

2012 was the second year that Paul Smith's College's Watershed Stewardship Program (WSP) stationed a Watershed Steward at two waterway access points in the St. Regis Canoe Area (SRCA), located off Floodwood Road about 10 miles southwest from Paul Smith's College. Stewards stationed at the SRCA (Little Clear and Hoel Pond) were present from Friday to Sunday each week, and presented boaters with information on aquatic invasive species (AIS) and inspected watercraft for AIS presence. The SRCA is a unique management area in New York State, comprised of 58 ponds that are reserved for non-motorized recreation and protected fisheries. Further, the ponds in the SRCA to date have no AIS populations. This combination of the potential for high quality recreation, the size and diversity of the SRCA's aquatic wilderness resources, and the comparatively pristine ecology of the ponds and streams mark the SRCA as a valuable resource that warrants a high level of protection and interpretation. The SRCA steward presence was funded through the United States Environmental Protection Agency's Great Lakes Restoration Initiative grant program.

Methods

A Watershed Steward was on duty at the both Hoel Pond and Little Clear (SRCA) canoe launch from 7 in the morning to 4 in the afternoon every weekend between the week of May 27th to Labor Day weekend. Each boater when entering or leaving the boat launch site, was given an introduction to WSP by the Steward on duty, followed by asking the boater if their watercraft had been in another boater of water in the last 2 weeks and where, and if they have taken any steps to prevent the spread of AIS. The steward would record the type and number of boats, horsepower of motor (if applicable), motor type (if applicable), group size, and the state of registration indicated on any motorized boat's sticker. The steward would then inspect each boat for possible traces of AIS. The steward inspected boats both launching and retrieving. If any species of concern were found by the steward, they would be identified and recorded, before being appropriately disposed of away from any water source.

During the visual inspection of the boat and trailer, the steward would take the boat owner around the boat to point out key places that plants can easily become trapped upon retrieval from one body of water, so that boat owners understand how to conduct an efficient inspection. Also, if the boat owner did not know the proper prevention types for AIS, the steward would educate them about inspecting, washing and/or drying the boat, emptying live wells, and draining the bilge. The steward would then offer educational materials including various brochures and a sticker as a reminder to always check a boat before and after use for AIS.

Results

From the weekend of May 26th through Labor Day Weekend, the steward at SRCA inspected 489 watercraft and educated 736 boaters during each 8-hour shift on Fridays through Sundays. Between June 4 and July 9, a steward was also present on Mondays. This shift was discontinued due to low visitation and staff availability. Several of the low use weekends (see chart) coincided with missed shifts due to staff obligations and illness. There were no stewards on duty on July 20 (Friday), August August 11 (Saturday), August 12 (Sunday), August 18 (Saturday), and September 3 (Sunday). The peak for both number of visitors and watercraft was the weekend of August 24 with 68 boats and 104 people present at the Hoel and Little Clear Pond launches. August was the most-visited month; this trend can be partially explained by the fact that overall use at the boat launch was affected by the overall good weather in August.

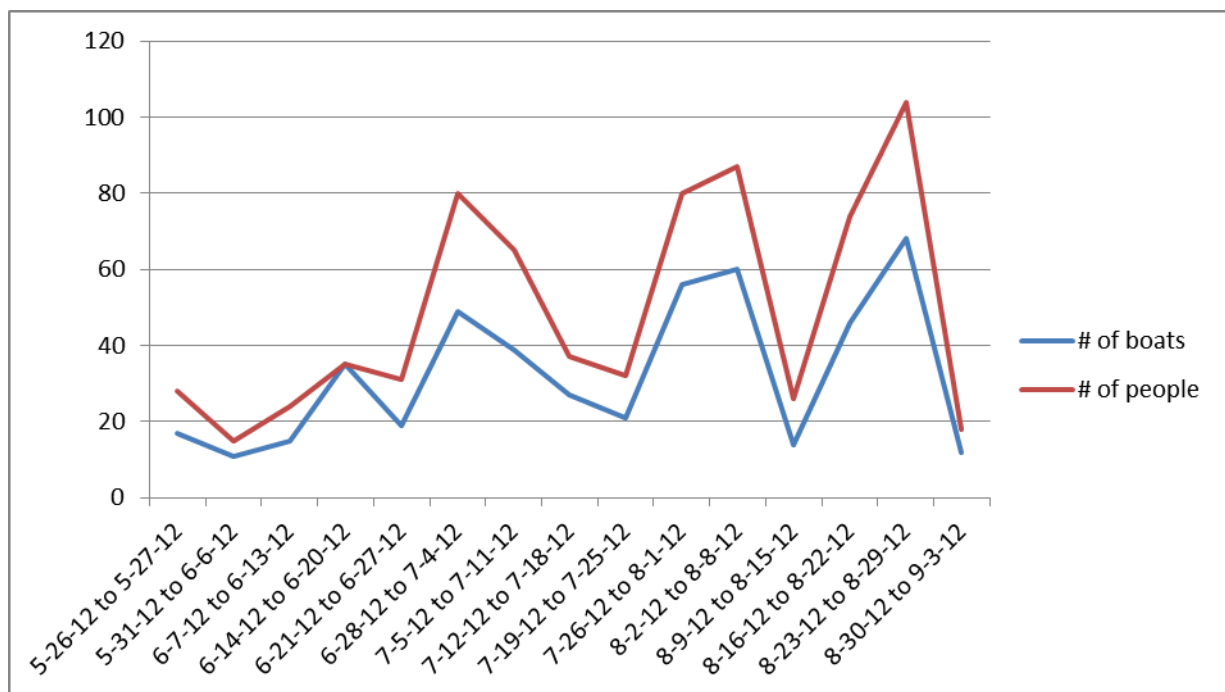


Figure 91- Hoel and Little Clear Ponds Boat Launch use, 2012.

The majority of watercraft inspected at the two SRCA launches in 2012 were canoes (349, 71% of total watercraft), with kayaks (133, 27%) being the next biggest group. Motor-vehicles are not permitted to launch from either Little Clear or Hoel Pond. The numbers of visitors and watercraft are very similar to what stewards encountered in 2011. In that year, stewards inspected 474 watercraft and educated 791 people.

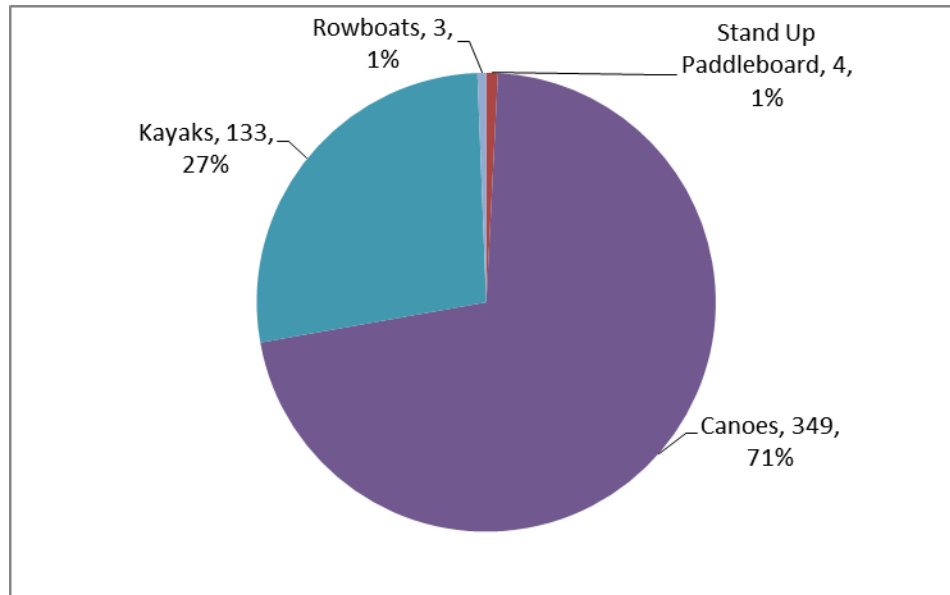


Figure 92- Types of Watercraft Launched, Hoel and Little Clear Ponds Boat Launches, 2012.

206 out of the 294 watercraft-groups (70%) inspected by stewards at the two SRCA boat launch sites reported using their watercraft during the last two weeks. 216 of 294 watercraft-groups (73%) reported prior use in a body of water other than SRCA. 47 of groups (16%) were in bodies of water known to be infected with AIS. A considerable number of watercraft entering/exiting SRCA (32, or 11%) were rental boats, which have unknown prior waterway use. Knowing this, we can assert the importance of asking the boater where they have launched in the last two weeks. Boats coming from infected waterways can then be more carefully scrutinized upon inspection by the stewards. However the majority of canoe and kayaks coming into and leaving the launch pose less of a risk for the spread of AIS, compared to watercraft with motors, which have a greater risk of spreading AIS, due to the action of the propeller and structure of the hull, anchor lines, etc.

Table 70- Waterways visited in previous two-week period, Hoel and Little Clear Ponds Lake Boat Launches, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Saranac Chain	Yes	8	Long Pond		3
Follensby Clear Pond	Yes	6	Lower St. Regis Lake		3
Floodwood Pond	Yes	4	Bone Pond		2
Lake George	Yes	4	Did Not Ask		2
Raquette Lake	Yes	3	Grass Pond		2
Fish Creek	Yes	2	Green Pond		2
Lake Champlain	Yes	2	Mirror Lake		2
Raquette River	Yes	2	Osgood Pond		2
St. Lawrence River	Yes	2	Rollins Pond		2
Allegheny State Park	Yes	1	Spitfire Lake		2
Candlewood Lake CT	Yes	1	Unknown		2
Green Lake	Yes	1	Ausable Point		1
Hudson River	Yes	1	Bear Pond		1
Irondequoit Creek	Yes	1	Black Pond		1
Kiawassa Lake	Yes	1	Black River		1
Lake Colby	Yes	1	Chocorua Lake NH		1
Lake Iroquois VT	Yes	1	Deer Pond		1
Lake Luzerne	Yes	1	East Pine Pond		1
Lake Newboro ON	Yes	1	Fern Lake		1
Otsego Lake	Yes	1	Grampus Lake		1
Potomac River	Yes	1	Lake Clear		1
Saranac River	Yes	1	Lake Jean PA		1
Tupper Lake	Yes	1	Little Green Pond		1
None		86	Lowe's Lake		1
Little Clear Pond		44	Middle Pond		1
Rental		32	Moose River		1
St. Regis Pond		10	Mountain Pond		1
Hoel Pond		9	Rainbow Lake		1
Turtle Pond		8	Rat Pond		1
Polliwog Pond		7	Slang Pond		1
Upper St. Regis Lake		7	The Berkshires MA		1
			Total		294

Another way for the steward to determine the likelihood of AIS presence on watercraft is by asking the boater if they regularly take steps to reduce the spread of aquatic hitchhikers. Not only will this question help the steward to determine how carefully to inspect the watercraft, it also helps them to educate boaters on the common, simple prevention measures they can take to reduce the spread of AIS in the future. These preventative steps include a visual inspection, washing the boat, draining the bilge water, emptying the bait buckets and live wells, and disposing of live bait away from the waterway, as well as drying the boat off completely. All of these steps drastically improve the chances of AIS not remaining on the boat between launches.

When posed the question, stewards did their best not to lead the interviewee to a response. For example, if a steward asks a boater, “Did you wash your boat before launching?” they might be more likely to respond affirmatively since they know the watershed program is promoting this AIS spread prevention method. The steward will ask instead a more open-ended question, such as, “Did you take any steps to prevent the spread of AIS?”. This way the steward will be able to gauge the boaters’ level of knowledge specifically as to AIS, and the mission of our program and educational component.

Stewards at SRCA found that 57% of the groups interviewed (169 of 294 total groups), answered “yes” to taking at least one of the preventative measures against transporting AIS. The most common measure taken was washing of their boat (36%), followed by a visual inspection (20%). Upon visual inspection by the steward on duty, plant material was removed from 4 boats entering, and 9 boats leaving from the launch. This material was then recorded in the data as 10 instances of grass, 2 of native milfoil, and 1 in the “other” category.

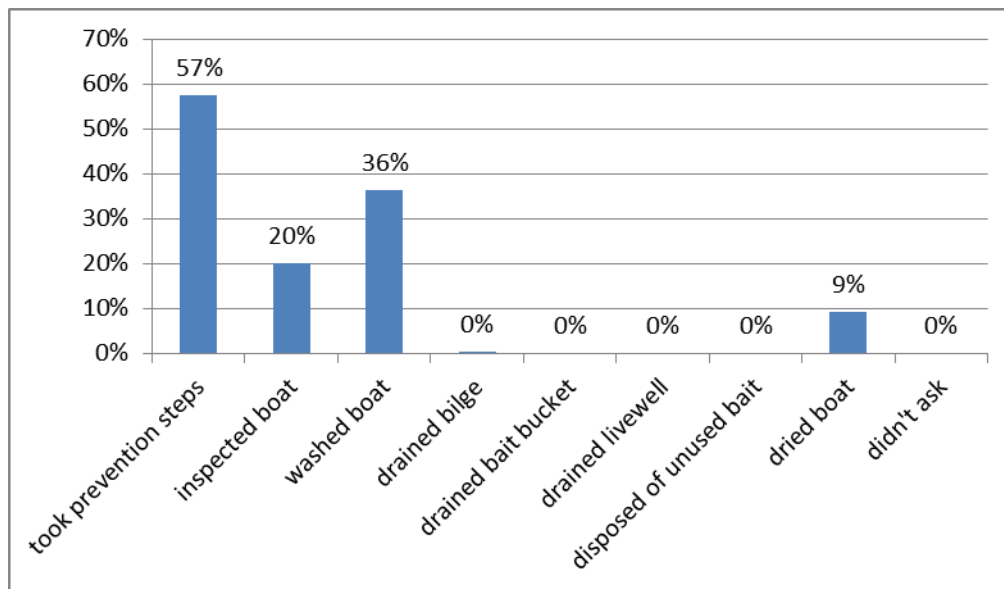


Figure 93- AIS spread prevention measures taken by visitors, Hoel and Little Clear Ponds Boat Launches, 2012.

Discussion and Conclusion:

The location, number of days the steward was on duty (i.e., weekends), and the relatively easy accessibility of the boat launch at SRCA are all factors which contribute to the comparatively small number of visitors encountered by stewards of the WSP in 2012. Number of visitors and results of the AIS inspections were very comparable between 2011 and 2012. While stewards did not intercept

AIS at the boat ramps, the pristine nature of the SRCA resource warrants steward presence and outreach to a user group that is likely to be distinct from that encountered at the busy, motorized boat launches comprising the main portion of WSP activity.

Table 71- Hoel and Little Clear Ponds Boat Launches use figures, 2012. Key: M=motorboat; SUP= stand-up paddleboard; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

St. Regis Canoe Area Recreation Study 2012														
Week	Boat Type							total # boats	# of people	# groups launching	# groups retrieving	organisms found		
	M	SUP	S	C	K	B	R					entering	leaving	
5-26-12 to 5-27-12	0	0	0	12	5	0	0	17	28	8	6	0	0	
5-31-12 to 6-6-12	0	0	0	10	1	0	0	11	15	7	7	0	1	
6-7-12 to 6-13-12	0	0	0	12	2	0	1	15	24	10	7	0	0	
6-14-12 to 6-20-12	0	0	0	20	14	0	1	35	35	16	11	0	0	
6-21-12 to 6-27-12	0	0	0	16	3	0	0	19	31	6	7	1	0	
6-28-12 to 7-4-12	0	0	0	38	11	0	0	49	80	21	16	0	2	
7-5-12 to 7-11-12	0	2	0	27	10	0	0	39	65	13	6	0	0	
7-12-12 to 7-18-12	0	2	0	17	8	0	0	27	37	10	12	0	0	
7-19-12 to 7-25-12	0	0	0	17	4	0	0	21	32	13	7	0	1	
7-26-12 to 8-1-12	0	0	0	38	18	0	0	56	80	18	15	1	0	
8-2-12 to 8-8-12	0	0	0	43	17	0	0	60	87	22	17	0	0	
8-9-12 to 8-15-12	0	0	0	13	1	0	0	14	26	4	5	0	2	
8-16-12 to 8-22-12	0	0	0	36	10	0	0	46	74	16	10	1	1	
8-23-12 to 8-29-12	0	0	0	44	23	0	1	68	104	37	19	1	2	
8-30-12 to 9-3-12	0	0	0	6	6	0	0	12	18	7	2	0	0	
totals	0	4	0	349	133	0	3	489	736	208	147	4	9	

Table 7– Hoel and Little Clear Ponds Boat Launches use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

St. Regis Canoe Area Recreation Study 2012																		
Week	organism type									# groups taking AIS spread prevention measures								
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	0	0	0	0	0	0	0	0	0	9	2	6	0	0	0	0	3	0
5-31-12 to 6-6-12	0	0	0	1	0	0	0	0	0	6	4	3	0	0	0	0	1	0
6-7-12 to 6-13-12	0	0	0	0	0	0	0	0	0	5	2	3	0	0	0	0	1	0
6-14-12 to 6-20-12	0	0	0	0	0	0	0	0	0	10	2	8	0	0	0	0	2	0
6-21-12 to 6-27-12	0	0	0	0	1	0	0	0	0	6	1	5	0	0	0	0	0	0
6-28-12 to 7-4-12	0	0	0	2	0	0	0	0	0	20	7	12	0	0	0	0	6	0
7-5-12 to 7-11-12	0	0	0	0	0	0	0	0	0	10	6	4	0	0	0	0	1	0
7-12-12 to 7-18-12	0	0	0	0	0	0	0	0	0	9	2	7	0	0	0	0	1	0
7-19-12 to 7-25-12	0	0	0	1	0	0	0	0	0	12	11	6	0	0	0	0	0	0
7-26-12 to 8-1-12	0	0	0	1	0	0	0	0	0	18	1	17	1	0	0	0	1	0
8-2-12 to 8-8-12	0	0	0	0	0	0	0	0	0	22	7	13	0	0	0	0	3	0
8-9-12 to 8-15-12	0	0	0	1	0	0	0	0	1	2	1	1	0	0	0	0	1	0
8-16-12 to 8-22-12	0	0	0	1	1	0	0	0	0	14	5	7	0	0	0	0	2	0
8-23-12 to 8-29-12	0	0	0	3	0	0	0	0	0	23	6	15	0	0	0	0	4	0
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	1	0
totals	0	0	0	10	2	0	0	0	1	169	59	107	1	0	0	0	27	0

Saratoga Lake Boat Launch Use Study

By Greg Redling and Cody Rickman



Figure 94- Saratoga Lake Boat Launch.

Introduction

Beginning in 2010, the Saratoga Lake Protection and Improvement District (SLPID) has sponsored boat launch stewards at the New York State boat launch on the north end of Saratoga Lake. Each year, Paul Smith's College's Watershed Stewardship Program (WSP) hires, trains, and supervises the steward. SLPID provides a volunteer liaison that provides weekly contact, support and mentorship for the stewards. Saratoga Lake is the only lake in the program that is not part of the Adirondack State Park. The boat launch on Saratoga Lake has the highest boat traffic of any of the lakes in the WSP. The lake is visited by a mix of sports fishermen, athletic rowing teams, and pleasure boaters. Many weekend tournaments happen there throughout the summer which attracts a steady volume of people and boats in and out of Saratoga Lake.



Figure 95- Watershed Steward Greg Redling at Saratoga Lake Boat Launch.

Saratoga Lake is home to four invasive species including Eurasian watermilfoil, curly-leaf pondweed, water chestnuts, and zebra mussels. Chemical herbicides are being used that specifically target curly-leaf pondweed and Eurasian watermilfoil. Two mechanical harvesters are also being used to control the general weed population around the lake. SLIPD members are willing to take the necessary steps in not only managing the already present invasive species but also in preventing new species from entering the Lake. Saratoga Lake's location and popularity places it under stress from the possibility of contamination from numerous boaters and or fisherman. Saratoga Lake is a convenient distance both from the Mohawk and Hudson Rivers and also larger popular lakes such as Lake George and Great Sacandaga Lake. SLIPD is concerned with the prevention of invasive species that could potentially travel from one of these water sources into Saratoga Lake, and also in preventing Saratoga Lake's current populations of aquatic invasive species from infesting other water bodies. For this reason, stewards attempt to inspect all boats both entering and departing from the boat ramp.

Methods

Paul Smith's College's WSP provided two Saratoga Lake stewards that worked from Memorial Day through Labor Day at the State Boat Launch on Saratoga Lake along Route 9P. They worked eight-hour shifts usually arriving sometime around seven o'clock in the morning and leaving at four o'clock in the afternoon, and covered all seven days of the week. Both WSP stewards were on duty on Saturdays, but had single coverage on the other days. Fortunately, Cornell University Cooperative Extension provided an intern again this year to help the stewards inspect boats on Sundays. Volunteer students from local high schools made intermittent visits to the launch during the week to also help with boat inspections.

The stewards inspected boats arriving at the launch to enter Saratoga Lake and also those leaving the lake. Before approaching the boat owner the stewards recorded the type of watercraft (e.g. motorboat, canoe or personal watercraft), the state of registration if it was a motorboat, the horsepower of the engine, and the number of people using the watercraft that day. This could all be done visually without any verbal contact with the boat owner. The stewards then approached boat owners and introduced themselves. They described the intent of the Watershed Stewardship Program to those who were visiting the lake for the first time and then asked a series of questions. Stewards asked boat owners what body of water the boat was in last and if any preventative steps were taken to mitigate the chances of spreading invasive species. Such steps include inspecting the boat for macro invertebrates, washing the boat, draining the bilge or live wells, dumping bait buckets, or drying it with a rag. The stewards then proceeded to visually inspect each boat and remove any flora or fauna found on the boat or trailer. Stewards recorded the answers given by the boat owners on paper forms which were entered into an Excel spreadsheet on a weekly basis.

Special Project

The Saratoga Lake Stewards were also required to do special research or projects throughout the summer. One such project was the acquisition of volunteers from a local high school. The stewards had three seniors from Ballston Spa Central High School that helped at the launch during busy hours. This project involved young students with the program and educated them on the growing issues that face an ecosystem connected with their own lives “close to home.” Another project the stewards took part in was providing three local newspapers with information to write about the program. The newspapers involved were the *Shoreline*, *Spotlight*, and *The Saratogian*. All three newspapers published photographs of the boat inspection along with a description of what boaters could expect when they met the stewards at the launch as well summaries of the challenges posed by aquatic invasive species (AIS).



Figure 96- Watershed Steward Cody Rickman inspecting a boat at Saratoga Lake Boat Launch.

Another project the stewards undertook was producing a GIS map of water chestnut beds in Saratoga Lake. The stewards used a GPS unit to trace large beds of water chestnut in the lake. This data was later used to produce a map in order to assist with a planned water chestnut pull in the near future. The stewards also removed a sizeable bed of the invasive weed that was on the north side of the main boat launch.

Saratoga Lake Water Chestnut Survey

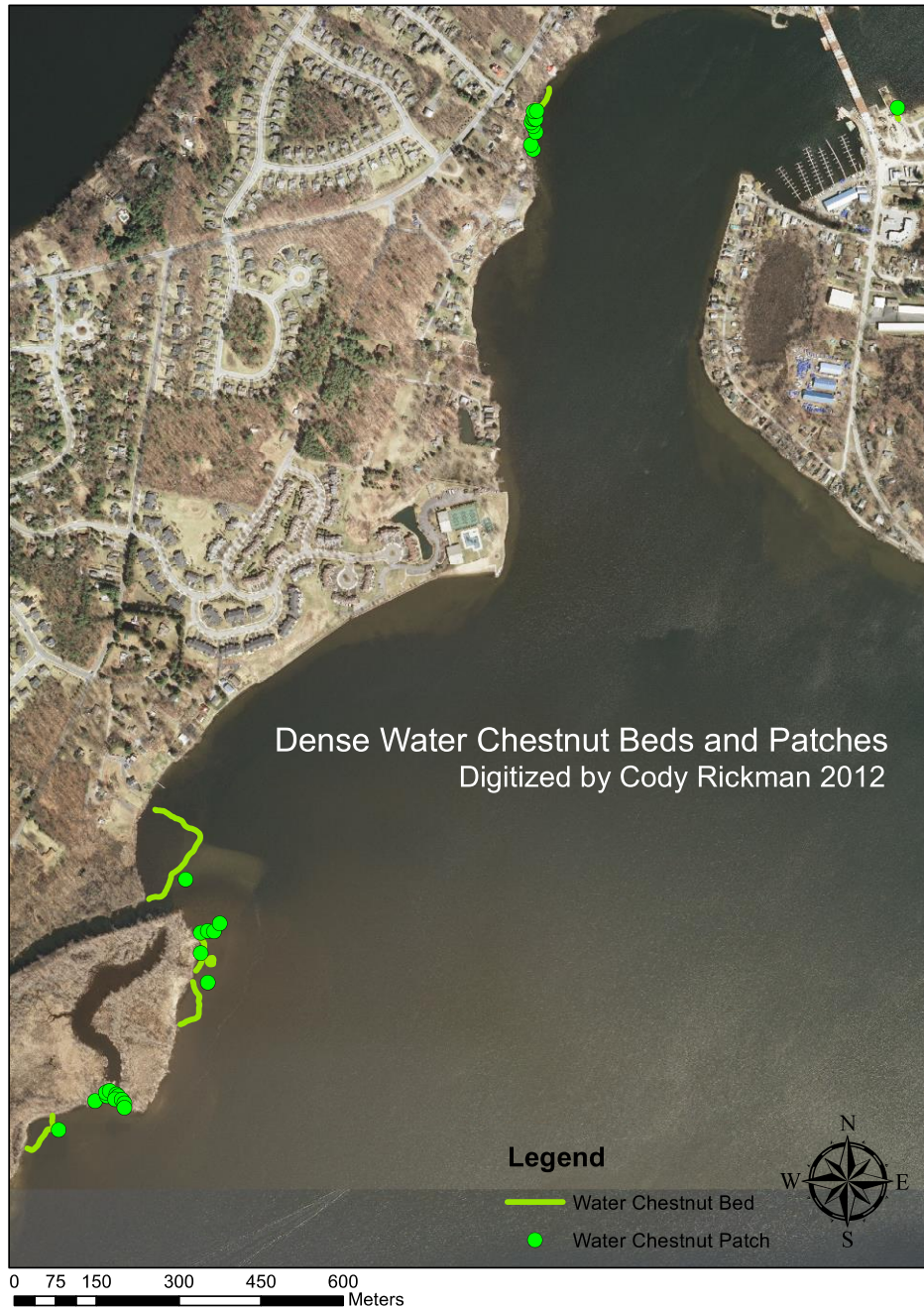


Figure 97- Map of north end of Saratoga Lake and water chestnut presence. Outlines represent large dense beds, dots represent scattered patches.

Results

At the Saratoga Lake State Boat Launch stewards collected data from 3,665 boats and 8,076 people between May 26 and September 3, 2012. The busiest day of the summer was Saturday, June 16th, on which the stewards inspected 140 boats. Throughout the summer, attendance varied depending on the day of the week and the current weather conditions.

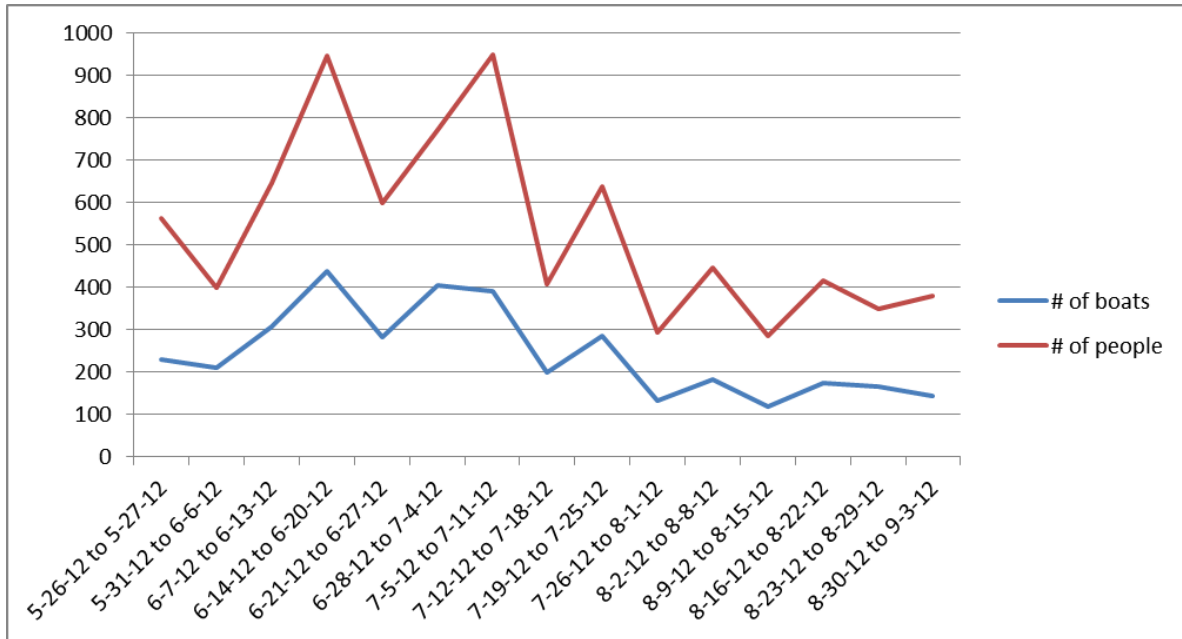


Figure 98- Saratoga Lake Boat Launch use, 2012.

Saturday was the busiest day of the week with 1,045 boats, Sunday was second with 1,038 boats and Friday was third with 478 boats. According to the data Wednesday was the slowest day of the week with 219 boats, followed closely by Tuesday with 268 boats and Monday with 295 boats. The average number of boats inspected on any given day over the summer was 39.



Figure 99- Fishermen on Saratoga Lake. (Credit: *The Saratogian*)

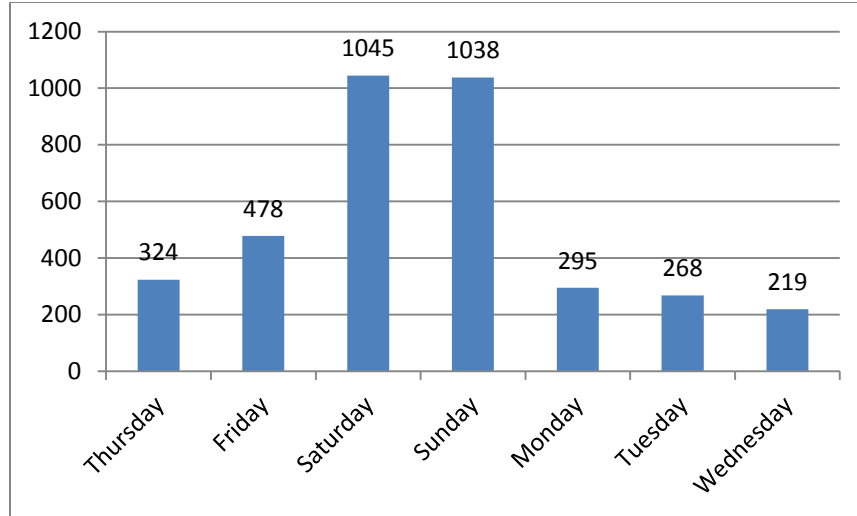


Figure 100- Use by day of the week at Saratoga Lake Boat Launch, 2012.

Out of the 3,665 boats stewards encountered in 2011, 3,460 were motorboats, 71 were personal watercrafts, 71 were kayaks, 18 were sailboats, 34 canoes, 11 were rowboats. Many boaters attached small motors to canoes, kayaks, and rowboats; for data purposes we consider these motorboats.

Stewards also asked many of the 3,665 boaters where their boats had been in the last two weeks. Stewards received 2,184 usable responses (60% response rate). It is unclear if the blanks on the data forms indicated no prior waterway visit, or that the steward had not asked the question. 83% or 1,822 were returning to Saratoga Lake. 69 boats came out of the Hudson River, 53 boats had been in Lake George, 42 from Lake Champlain, 41 from Great Sacandaga Reservoir, 41 from the Mohawk River, and 16 boats out of Schroon Lake. 4 boats had traveled to Saratoga Lake after being in the Atlantic Ocean in the past two weeks.

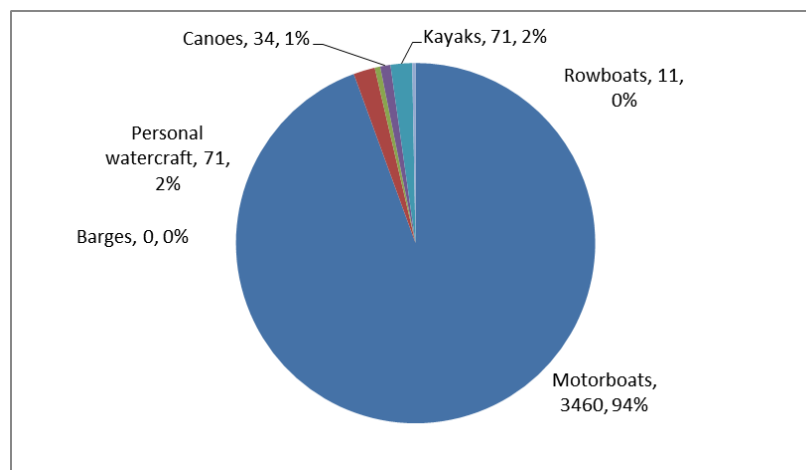


Figure 101- Types of Watercraft Launched, Saratoga Lake Boat Launch, 2012.

Table 72- Waterways visited in previous two-week period, Saratoga Lake Boat Launch, 2012.

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Saratoga Lake	Yes	1822	Kayaderosseras Creek	Yes	1
Hudson River	Yes	69	Kayuta Lake	Yes	1
Lake George	Yes	53	Lake Erie	Yes	1
Lake Champlain	Yes	42	Lake Oneida	Yes	1
Great Sacandaga Reservoir	Yes	41	Lake St. Catherine VT	Yes	1
Mohawk River	Yes	41	Massachusetts	Yes	1
Schroon Lake	Yes	16	Ocean	Yes	1
Ballston Lake	Yes	12	Onondaga Lake	Yes	1
Cossayuna Lake	Yes	12	Orange Lake	Yes	1
Round Lake	Yes	12	Owasco Lake	Yes	1
Oneida Lake	Yes	7	Saranac Lake	Yes	1
Brant Lake	Yes	5	Second Pond	Yes	1
Sacandaga Lake	Yes	4	Summit Lake	Yes	1
Atlantic Ocean	Yes	3	Thompson's Lake	Yes	1
Canadarago Lake	Yes	3	Waneta Lake	Yes	1
Burden Lake	Yes	2	Watervliet Reservoir	Yes	1
Cape Cod MA	Yes	2	West Lake	Yes	1
Caroga Lake	Yes	2	White Lake	Yes	1
Cayuga Lake	Yes	2	Wisconsin	Yes	1
Grafton Lake	Yes	2	None		1198
Lake Bomoseen VT	Yes	2	Lake Lonely		10
Lake Ontario	Yes	2	Rental		8
Lake Placid	Yes	2	Canada Lake		3
Lake Winnepesaukee	Yes	2	Harriman Reservoir		2
Moreau Lake	Yes	2	Lake Harris		2
Paradox Lake	Yes	2	Dunham Reservoir		1
Schroon River	Yes	2	Dyken Pond		1
Seneca Lake	Yes	2	Farmington River CT		1
St. Lawrence River	Yes	2	Lake Abenaki VT		1
Tupper Lake	Yes	2	Lake Adirondack		1
Butterfield Lake	Yes	1	Long Pond		1
Carry Falls Reservoir	Yes	1	Lowe Lake, PA		1
Connecticut River	Yes	1	Newfound Lake		1
Crooked Lake	Yes	1	Onota Lake MA		1
Delaware River	Yes	1	Rainbow Lake		1
Featherstone Lake	Yes	1	Silver Lake		1
Fish Creek Pond	Yes	1	Stewarts Pond		1
Glass Lake	Yes	1	Swinging Bridge Reservoir		1
Great Sacandaga Reservoir	Yes	1	Thirteenth Lake		1
Hedges Lake	Yes	1	West Canada Lake		1
Indian Lake	Yes	1	Whaley Lake		1
			Total		3441

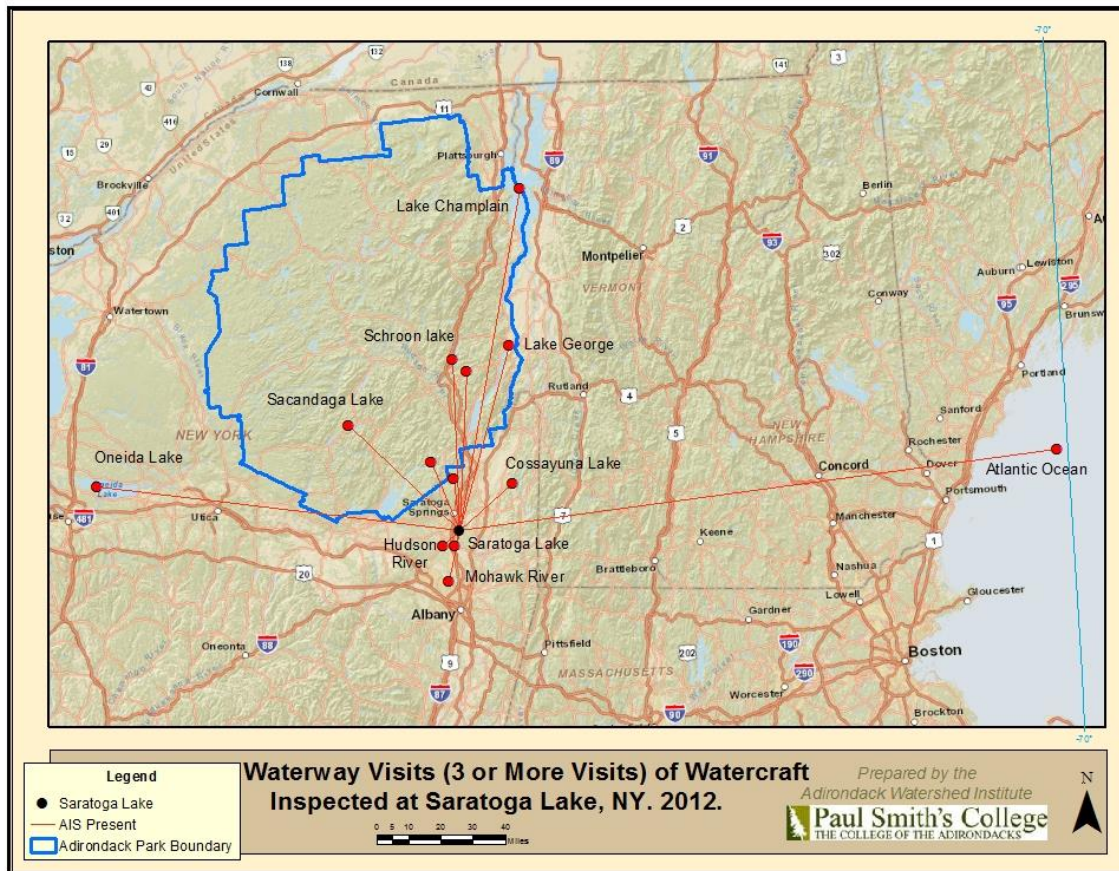


Figure 102- Prior waterway visits, Saratoga Lake Boat Launch.

Once again, because of the high number of boats visiting from Saratoga Lake, the Hudson River, The Great Sacandaga, Lake Champlain, The Mohawk River and Lake George, it became evident that most boaters lived in the area. Out of 3,489 boats providing state of origin information, 3,440 (99%) were registered in the state of New York. Boats did come as far away as California, Texas, Virginia, and Missouri. 18 states were represented.

Table 73-State or province of registration of motorboats using Saratoga Lake Boat Launch, 2012.

State	# Boats	State	# Boats
AZ	2	MT	2
CA	1	NC	1
CT	2	NH	1
DL	1	NJ	5
IL	1	NY	3440
MI	6	PA	4
MD	3	TX	2
MO	1	VA	2
MA	8	VT	7
		Total	3489

Boaters visited the Saratoga Launch in a total of 3,442 groups. Stewards asked 56% of these groups whether they had taken steps to prevent the spread of AIS prior to arriving at the boat ramp. One of this year's stewards did not consistently ask this question for an undetermined reason. 82% of the boaters queried claimed to have taken some sort of invasive species prevention measure prior to entering Saratoga Lake. Out of the 1,920 visitor groups queried, 471 inspected their boats before launching, 1,073 boaters washed their boats before entry, and 157 boaters drained bilge water before entry. 1,522 groups were not asked if they took AIS spread prevention steps.

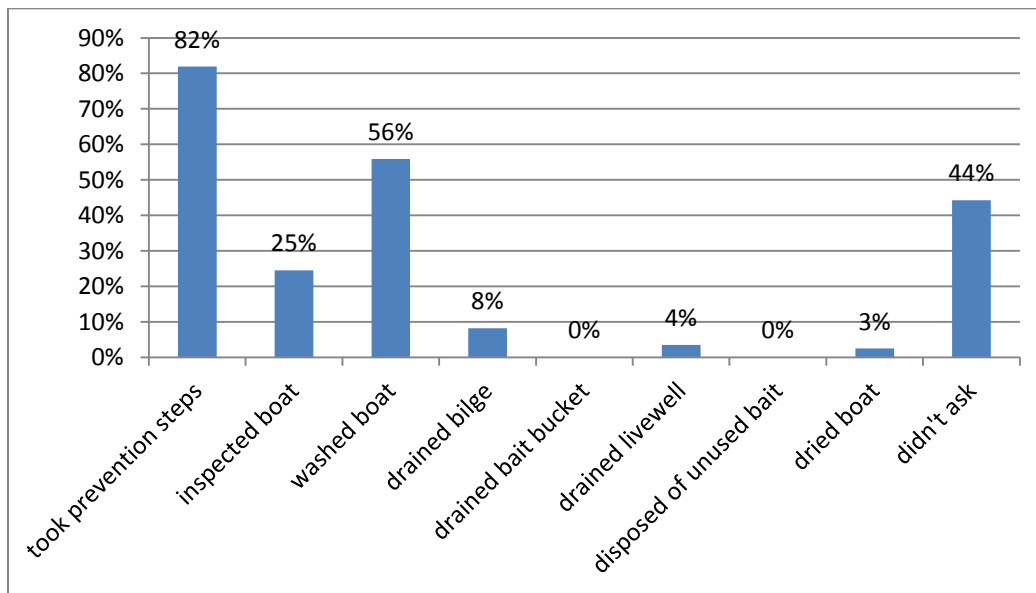


Figure 103- AIS spread prevention measures taken by visitors, Saratoga Lake Boat Launch, 2012.

Organisms removed from watercraft

322 organisms or fragments were found on boats entering Saratoga Lake State boat launch while 720 were found leaving. Eurasian water milfoil was found 228 times, Grass was found 283 times, curly-leaf pondweed

was found 159 times, zebra mussels were found 19 times, water chestnuts 19 times, native milfoil was found eight times, and other unidentified/miscellaneous organisms and fragments were found 332 times. Watercrafts departing the boat ramp were the sources of more than twice the number of organisms compared with watercraft entering the lake. This suggests that Saratoga Lake might be a source of AIS infested watercraft that pose a risk of transporting materials to other waterways.



Figure 104- Aquatic macrophytes, Saratoga Lake, 2012

Discussion

Returning to the Saratoga State Boat Launch for a third summer allowed the WSP to compare data from the 2012 summer to the summers of 2011 and 2010. The number of boats and people encountered was down from 2011, approaching 2010 levels.

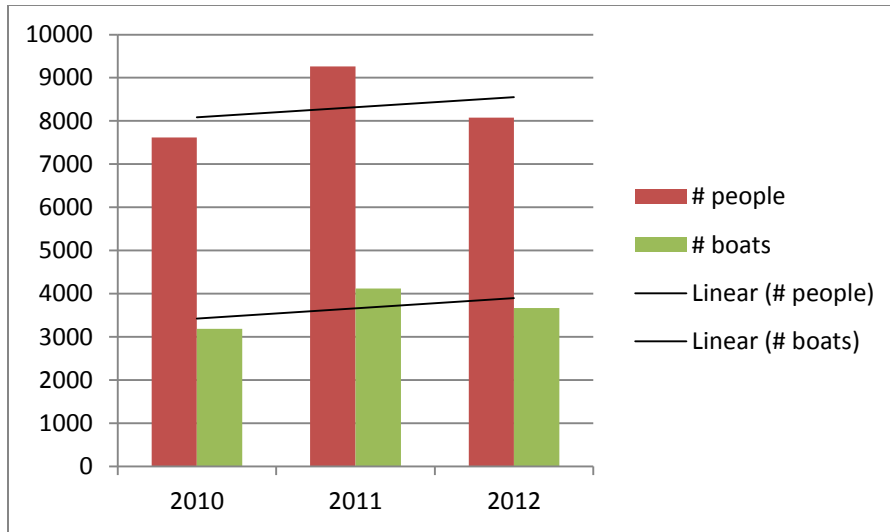


Figure 105- Historical usage data Saratoga Lake Boat Launch, 2010-2012.

The number of boater groups taking spread prevention measures is comparable to that found in past years. The percent of groups not asked this question, however, was much greater in 2012.

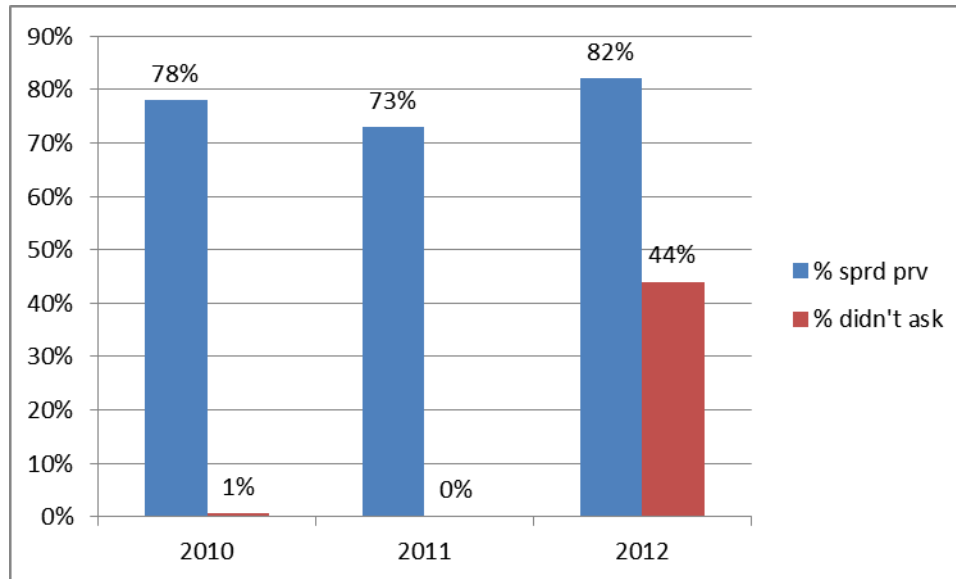


Figure 106- AIS spread prevention measures taken by visitors to Saratoga Lake, 2010-12.

The other remarkable change in 2012 was in the number of organisms removed from watercraft. The steward team in 2012 was extremely active in this regard, removing orders of magnitude more organisms from boats entering and leaving Saratoga Lake. It is unlikely that the boats were especially dirty this year as opposed to the last two years. It is more likely that this year's team of stewards were much more motivated, vigilant, persistent and thorough with their boat inspections, compared with past stewards. While this is admirable, this year's team did not do as good a job gathering the spread prevention information from the public.

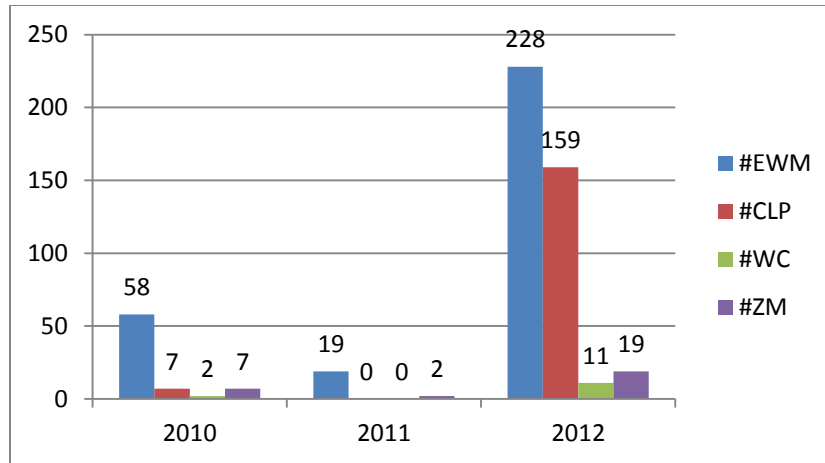


Figure 107- Number of AIS specimens found by Watershed Stewards at Saratoga Lake Boat Launch.

Table 74- 3 year comparison, spread prevention and organisms removed, Saratoga Lake, 2010-12.

Saratoga Lake 2010-2012								
Year	# people	# boats	% sprd prv	% didn't ask	#EWM	#CLP	#WC	#ZM
2010	7615	3190	78%	1%	58	7	2	7
2011	9264	4121	73%	0%	19	0	0	2
2012	8076	3665	82%	44%	228	159	11	19

Most of the invasive species found on incoming boats were Eurasian watermilfoil and curly-leaf pondweed. On incoming trailers there was a significant amount of other species; mostly this included twigs, leaves, and moss that was on the boat trailers from winter storage. While at the launch the stewards did not encounter invasive species that were not already present in Saratoga Lake. Most of the visitors were compliant with our survey and educational program. Boaters became more aware of the stewards presence as the season progressed and became more welcoming of the boat inspections. There was a fairly even split of lake users, with one-third being recreational users, another fisherman, and lastly non-motorized watercraft users. A majority of the weeds found were usually on recreational user vessels as fisherman kept their boats cleaner for their own reasons and non-motorized watercraft usually didn't contain weeds.

Conclusion

The stewards at Saratoga Lake worked a full summer inspecting boats and trailers. In total the two stewards with help from the volunteer high school seniors inspected over thirty six hundred boats. The task at times became very challenging when a rush of many boats would arrive at the launch at the same time, but the stewards worked diligently to inspect boats and record what they found.

The summer of 2012 quickly became distinguished from the program at Saratoga Lake during the previous year because of the added special projects. The special projects mentioned in an earlier section of this report was an attempt by the stewards to become more involved in both public education regarding invasive species and the creation of maps and news articles regarding AIS as a public resource. These projects are something that can be built upon in the future if stewards continue to work at Saratoga Lake.

Although the stewards' main task was to inspect boats and remove any organisms entering or exiting the lake and launch, Greg Redling and Cody Rickman also educated those who were completely unaware of the existence of invasive species. The stewards found that even though there had been stewards at that launch for three consecutive years, there were still a large number of boat users who had little to no knowledge about what an invasive species was or how to prevent spreading them. Fortunately the stewards possessed enough background knowledge about target invasive species and their impacts on ecosystems to communicate it effectively. The stewards also possessed pamphlets and other literature to aid in communicating information. The stewards found educating someone who had no previous knowledge about the subject to be the most rewarding aspect of inspections. This was especially true when the boaters thanked the stewards and were appreciative of what they learned. In the future it might be of some importance to keep track of those people who have no knowledge about invasive species so that this data can be organized as a function of knowledge over time.

The stewards found a considerably larger amount of organisms entering and exiting the lake than in previous years. Some of this data might be attributed to the increased presence of invasive species in the lake over the years. It might be attributed to the increased fragments floating on the surface water due to the mechanical harvesting frequently done on the lake where un-harvested fragments float to the surface, or it might be attributed to the steward's rigorous boat inspections which occurred more efficiently than in other years.

This report suggests the reasons for why the Watershed Steward Program should continue at Saratoga Lake. The large number of boaters inspected in the summer of 2012 shows that the popularity of Saratoga Lake is increasing and therefore so is stress from outside ecosystems where potential invasive species might live already. The large number of people who are still unaware of this growing problem shows that further education and outreach is needed. There should be no reason why a large number of boaters have never heard of invasive species or any prevention steps. The growing number of organisms found on boats coming in or out means that more species are mobile and signals the need for boaters to be knowledgeable and for stewards to inspect boats diligently. Lastly the data and findings in the report show that people do care about preventing the spread of invasive species and are willing to take extra preventative steps. That is why it is important that stewards are at public launches educating the public and are participating in projects where information can be synthesized through newspapers, reports and other sources.

The WSP and the stewards wish to acknowledge the mentoring support offered by Alan McCauley of the Saratoga Lake Protection and Improvement District. Mr. McCauley both attended a portion of the training at Paul Smith's College and supported the stewards on a weekly basis throughout the summer. Once again, SLPID has invested in a high-profile public education and AIS spread prevention program that both benefits the ecology of Saratoga Lake as well as providing residual benefit to all the lakes in the Adirondack and Hudson region.

Table 75- Saratoga Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Saratoga Lake Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of People	# groups launching	# groups retrieving	organisms found		
	M	PWC	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	202	13	0	6	8	0	1	230	86	1	563	194	66	10	27	
5-31-12 to 6-6-12	193	1	5	5	5	0	0	209	81	29	400	157	98	17	73	
6-7-12 to 6-13-12	293	5	1	5	3	0	1	308	88	49	646	237	148	26	61	
6-14-12 to 6-20-12	411	10	3	3	7	0	4	438	89	67	944	314	181	33	107	
6-21-12 to 6-27-12	265	7	1	4	5	0	1	283	105	74	597	215	110	36	76	
6-28-12 to 7-4-12	387	8	2	1	5	0	2	405	84	78	771	315	155	59	110	
7-5-12 to 7-11-12	371	2	2	2	12	0	0	389	79	66	947	287	150	36	125	
7-12-12 to 7-18-12	187	5	1	3	2	0	1	199	106	35	408	114	71	23	34	
7-19-12 to 7-25-12	276	5	1	0	2	0	0	284	88	50	636	238	80	23	46	
7-26-12 to 8-1-12	130	1	1	0	1	0	0	133	82	31	294	111	35	13	14	
8-2-12 to 8-8-12	179	2	0	1	0	0	1	183	108	31	445	170	18	17	12	
8-9-12 to 8-15-12	115	1	0	1	2	0	0	119	82	23	285	106	18	9	17	
8-16-12 to 8-22-12	162	5	0	1	7	0	0	175	79	39	414	166	16	10	16	
8-23-12 to 8-29-12	151	3	1	1	9	0	0	165	84	37	348	154	23	3	2	
8-30-12 to 9-3-12	138	3	0	1	3	0	0	145	90	23	378	144	3	7	0	
totals	3460	71	18	34	71	0	11	3665	Summer Avg = 88 Median HP = 70	633	8076	2922	1172	322	720	

Table 76- Saratoga Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Saratoga Lake Recreation Study 2012																		
Week	organism type									# groups taking AIS spread prevention measures								
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask
5-26-12 to 5-27-12	0	23	5	3	3	0	0	0	3	190	122	167	70	0	12	0	0	17
5-31-12 to 6-6-12	0	34	22	10	0	0	1	3	20	124	54	88	12	0	11	0	2	56
6-7-12 to 6-13-12	0	19	26	19	1	0	0	2	20	140	47	104	8	0	15	0	3	132
6-14-12 to 6-20-12	1	26	30	40	0	0	0	4	39	204	55	149	6	0	9	0	8	166
6-21-12 to 6-27-12	0	18	28	24	0	0	0	1	41	109	13	75	8	0	3	0	6	140
6-28-12 to 7-4-12	0	22	33	41	2	0	6	2	63	181	44	126	10	0	8	0	2	172
7-5-12 to 7-11-12	0	8	35	55	0	0	3	1	59	169	53	87	8	0	3	0	13	169
7-12-12 to 7-18-12	0	6	8	28	0	0	0	1	14	67	25	42	1	0	2	0	2	67
7-19-12 to 7-25-12	0	2	16	17	2	0	0	1	31	99	15	65	7	0	2	0	1	109
7-26-12 to 8-1-12	1	0	5	10	0	0	0	0	11	49	10	26	3	0	1	0	1	67
8-2-12 to 8-8-12	0	0	9	12	0	0	0	1	7	75	9	51	7	0	0	0	2	80
8-9-12 to 8-15-12	0	1	5	9	0	0	0	0	11	28	5	15	5	0	0	0	3	64
8-16-12 to 8-22-12	0	0	5	9	0	0	0	2	10	59	3	38	5	0	2	0	1	81
8-23-12 to 8-29-12	0	0	0	4	0	0	1	0	0	47	6	23	3	0	0	0	3	98
8-30-12 to 9-3-12	0	0	1	2	0	0	0	1	3	32	10	17	4	0	0	0	1	104
totals	2	159	228	283	8	0	11	19	332	1573	471	1073	157	0	68	0	48	1522

Seventh Lake Boat Launch Use Study

By Katie Metz, Watershed Steward



Figure 108- Entrance sign at Seventh Lake Boat Launch.

Introduction

Paul Smith's Watershed Stewardship Program (WSP) assigned stewards to the New York State Department of Environmental Conservation boat launch at Seventh Lake for the second year in a row this summer. A grant provided by the United States Environmental Protection Agency supported 27 stewards throughout the Adirondack Park. Watershed Stewards were trained to identify aquatic invasive species (AIS) as well as the proper way to check several different types of watercrafts. Also, these stewards were there to teach the public how to take different steps to try to help prevent further spread of AIS.

Seventh Lake State Boat Launch is located on New York State Route 28 in Hamilton County, three miles east of the Hamlet of Inlet, and allows access to the Fulton Chain of Lakes. The facilities are wheelchair accessible and the parking lot can hold boaters and non-boating recreators alike. The Sixth and Seventh Lake Association is composed of residents (both seasonal and permanent), businesses, and repeat vacationers on both lakes. Sixth and Seventh Lake both are infested with Eurasian watermilfoil, and efforts to eradicate it have been implemented by the Adirondack Watershed Institute through hand-pulling methods.

The Watershed Steward Program is ever expanding since its start in 2000. Seventh Lake is very calm in the morning but the strong winds in the afternoon often transform the lake into a challenging waterway for boaters. This wind causes currents to move sand from Sandy Beach to the launch ramp, which needs to be excavated at the beginning of each boating season in an effort to make it easier for visitors to back their boat trailers into the lake. Payne's Seaplanes and Air Service is located on Seventh Lake, taking off and landing several times a day. The seaplanes take visitors to the remote lakes for exciting Adirondack adventures. Seventh Lake is known to have landlocked salmon, lake trout, rainbow trout, brook trout, small and large mouth bass, and new this year, smelt. Day-trippers, weekend visitors, and permanent residents all use the launch. People come from far and wide to go camping, try their luck at water sports, bird watching, and fishing.

The Sixth and Seventh Lake Association is very involved and knowledgeable of the Eurasian milfoil in the lakes. They are concerned with its spread into other lakes and want to make sure all boaters visiting this lake are aware and understand the problems with milfoil.



Figure 109- Stumps on the beach near the boat launch on Seventh Lake.

Methods

The Seventh Lake steward was on duty from 7:00 am to 4:00pm with one total hour of breaks, 5 days a week June through August. Stewards first greeted boaters by asking if they could check their boat for invasive species. The steward asked the boater what the last body of water in the past two weeks the boat has been on as

well as asking if the boater takes any steps to prevent the spread of AIS. These steps include washing of the boat, inspecting it, drying the boat, draining the bilge, cleaning all live wells and bait buckets, and disposing of all bait. The steward also noted the time they launched, the boat type, and the number of people in the group. If the boat type was a motorboat, the steward then also recorded the horsepower and engine type (outboard motors only) as well as state registration. After these steps were taken, the steward would then check the boat and trailer for any invasive species that may have gotten chopped up by the boat's propellor, caught in between the bottom of the boat and its trailer, entangled in mooring and anchor lines, or adhered to the side of the boat itself. If species were unidentifiable, samples were taken to Paul Smith's college for identification. If the steward found milfoil on a boat or trailer coming in, this sample was also bagged and taken to Paul Smith's for Dr. Celia Evans' milfoil degradation study.

Table 77- Watershed Steward coverage at the NYS DEC Seventh Lake Boat Launch, summer 2012 (Thursday's coverage was only half a day due to weekly staff meetings).

	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.
5-26-12 to 6-1-12	X	X				X	
6-2-12 to 6-8-12	X	X			X		
6-9-12 to 6-15-12	X	X			X	X	X
6-16-12 to 6-22-12	X	X			X	X	X
6-23-12 to 6-29-12	X	X			X	X	
6-30-12 to 7-6-12	X				X	X	X
7-7-12 to 7-13-12		X			X		X
7-14-12 to 7-20-12			X			X	X
7-21-12 to 7-27-12	X	X			X	X	
7-28-12 to 8-3-12	X	X			X	X	X
8-4-12 to 8-10-12	X	X			X	X	X
8-11-12 to 8-17-12	X	X			X	X	X
8-18-12 to 8-24-12	X	X			X	X	
8-25-12 to 8-31-12							
9-1-12 to 9-7-12							



Figure 110- Overlooking Seventh Lake from roadside pulloff.

Results

Between May 26th and August 24th, stewards collected data for 555 boats and 1,236 people. The peak week for boating on Sixth and Seventh lake was July 19th through July 25th with 74 boats and 173 people. Stewards were not available to work the very end of August or very beginning of September.

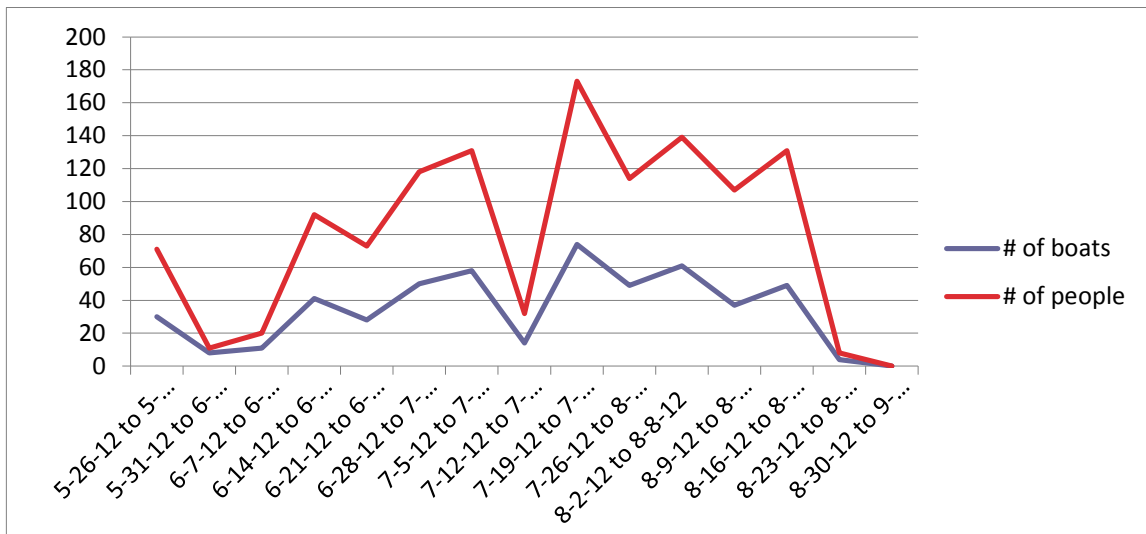


Figure 111- Seventh Lake Boat Launch use, 2012.

Out of 555 boats inspected during the summer of 2012, 253 were motorboats, 182 were kayaks, 89 were canoes, 19 were personal watercrafts, 2 were sailboats, 3 were barges, and 6 were rowboats.

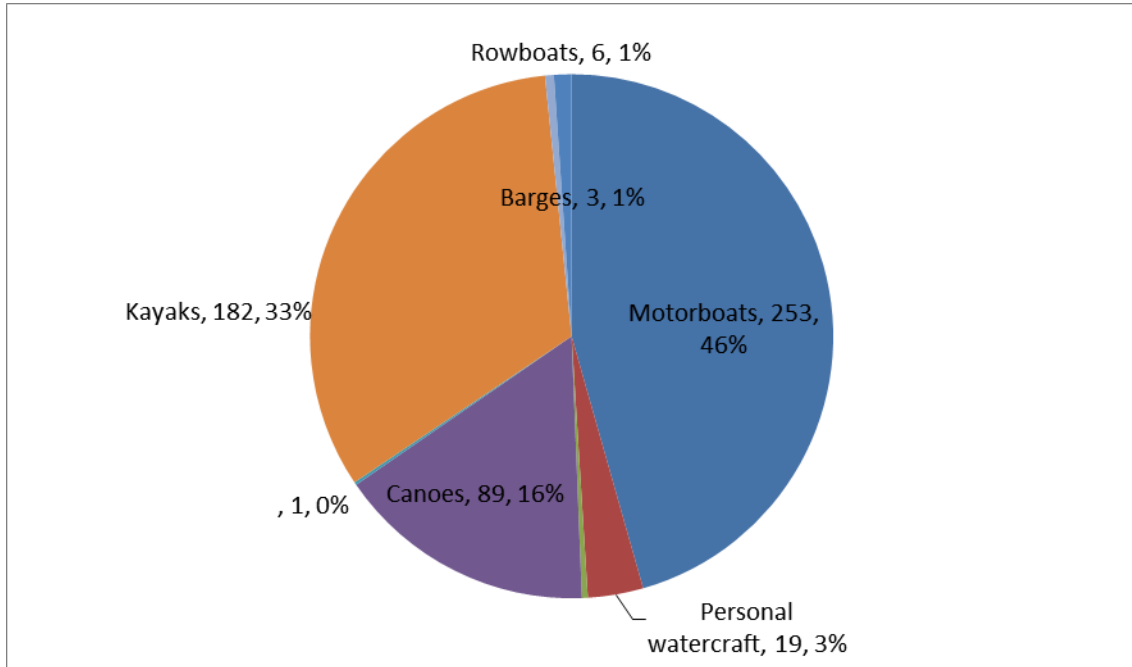


Figure 112- Types of Watercraft Launched, Seventh Lake Boat Launch, 2012.

Stewards asked boaters what body of water their boats had last been in the past two weeks. A total of 176 boats had not been in the water in the past two weeks. Out of the remaining boats, 139 had been within the Fulton Chain of Lakes, 83 had been in Seventh Lake, 38 had been in 4th Lake, and 11 had been in Raquette Lake.



Figure 113- View of Sixth Lake from bridge.

Table 78- Waterways visited in previous two-week period, Seventh Lake Boat Launch, 2012.

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Seventh Lake	Yes	83	New Boat		3
Fourth Lake	Yes	38	Old Forge Pond		3
Raquette Lake	Yes	11	Rental		2
Sixth Lake	Yes	5	Big Moose Lake		1
Lake Ontario	Yes	4	Black Creek		1
Irondequoit Bay	Yes	2	Black River		1
Long Lake	Yes	2	Blue Mountain Lake		1
Saranac Chain	Yes	2	Boquet River		1
Buck Pond	Yes	1	Canada Lake		1
Canadarago Lake	Yes	1	Chester River MD		1
Canandaigua Lake	Yes	1	Delta Lake		1
Chenango River, Sherburne, NY	Yes	1	Erie Canal		1
Cranberry Lake	Yes	1	Fourth Lake		1
Cross Lake	Yes	1	Glimmerglass Lake		1
Eaton Brook Reservoir	Yes	1	Henderson Lake		1
First Lake	Yes	1	Lake Jean PA		1
Honeoye Lake	Yes	1	Lake Lila		1
Indian Lake	Yes	1	Lake Rondaxe		1
Kayuta Lake	Yes	1	Lake Superior		1
Lake George	Yes	1	Mays Pond		1
Oneida Lake	Yes	1	Middle Bay		1
Otsego Lake	Yes	1	Moss Lake		1
Seneca Lake	Yes	1	Nick's Lake		1
Skaneateles Lake	Yes	1	Sagamore Lake		1
Tully Lake	Yes	1	South Lake		1
None		176	Squam Lake NH		1
Eighth Lake		9	Stillwater Reservoir		1
Big Moose Lake		6	Storrs Pond NH		1
Brown Tract Pond		4	Thirteenth Lake		1
Limekiln Lake		3	Twitchell Lake		1
			Total		397

The steward on duty recorded the state registration every time a motorized boat would launch at the Seventh Lake Boat Launch. If the boat had already entered that day, the state was not recorded twice. Therefore, two hundred and nine boats were from New York, seven boats came from Pennsylvania, five boats were from New Jersey, one boat was from Vermont, two from Connecticut, one from Mississippi, and one from New Hampshire.

Table 79-State or province of registration of motorboats using Seventh Lake Boat Launch, 2012.

State	# boats
CT	2
MA	1
NH	1
NJ	5
NY	209
PA	7
VT	1

Every boater who was approached was asked if they took any preventative steps to help stop further spread of invasive species. Out of six hundred and eleven groups, three hundred and twenty eight of them said they took steps to help stop the spread of invasive species. 209 said they washed their boat/s after use, 113 said they inspected after use, 21 said they drained their bilge after use, 28 said they dried their boat after use, and 6 did not respond to the question.

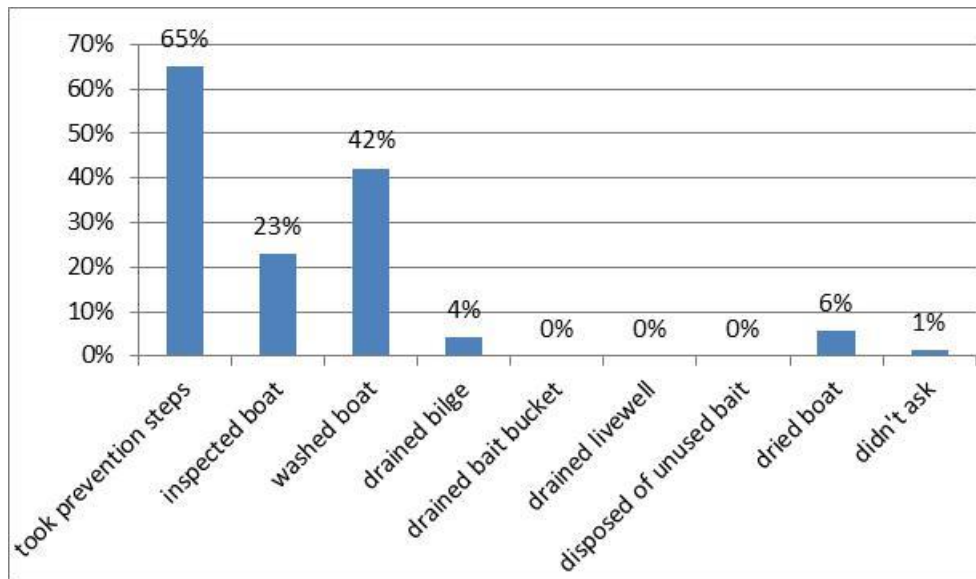


Figure 114- AIS spread prevention measures taken by visitors, Seventh Lake Boat Launch, 2012.

Seventh Lake is known to have Eurasian watermilfoil. 19 organism fragments were found on boats entering. 18 organisms were found on boats leaving the lake of which only 6 were identified as EWM. The stewards ultimately had stopped 36 organisms from either entering or leaving Seventh Lake.

Table 80- AIS removed from watercraft and trailers at Seventh Lake Boat Launch, 2012.

Organism	# Entering	# Leaving	Prior waterway
Eurasian watermilfoil	4	2	None (4), Norwich Lake, MA; Skaneateles Lake, NY

When organisms were found on boats they were recorded picked off and discarded away from the lake and its shores. 20 pieces of grass were found and 6 other organisms were found. 6 pieces of Eurasian Watermilfoil were found coming in or out of Seventh Lake.

Discussion

This was the second year a steward was stationed at the New York State DEC Seventh Lake Boat Launch. Boaters and visitors were overall very receptive to the steward being there and the message they were trying to present. The boaters that used the Seventh Lake State Boat Launch were very diverse in their chosen activities, ranging from pleasure boaters, to sport fishermen. Stewards learned that the questions and concerns of these diverse boaters would also range in topic.

Boaters with young children were approached with a method which depended on the mood of the child. Getting the child's attention with the handouts and visual aids was a great teaching method; on the other hand, if the child was not cooperating for his or her parents/ guardians, the steward made the encounter as quick and painless as possible.

When approaching fishermen, the message was usually delivered fairly quickly. For the most part, this group of boaters would be fairly receptive to the WSP message and want to know more if they were not in a hurry to get out on the Lake. Leisure boaters were almost always extremely receptive to the WSP message. Boaters using kayaks and canoes took the time to ask what they should do to prevent the spread of AIS. They would express their appreciation for stewards being here and checking their boats. Usually this group of boaters would take more time to discuss the issue at hand rather than ignoring it or brushing it off. They really wanted to take the prevention into their own hands instead of leaving it to the stewards.

Many campers were eager to show the steward their permits for firewood and their concerns for the Asian Long Horned Beetle and the Emerald Ash Borer. Many campers and boaters would express their concern towards not bringing invasive species they have in their surrounding areas into the picturesque Adirondack Park. Many visitors come to the Park to get away from these species and enjoy the crystal clear lakes.

As mentioned before, the Seventh Lake Boat Launch parking area is used for many different things. It served as a rest area for visitors driving through the area, hikers and backpackers, campers, beach goers, sightseers, and of course boaters and their trailers. A few large-group, organized canoe trips headed onto Seventh Lake; these groups were very knowledgeable of the problems invasive species caused and group leaders wanted the younger paddlers to pay attention to what the steward was checking for and how to check so they could do they same when they took their boats out of the water. Stewards noticed that Seventh Lake was a great boat launch for public education. Many visitors even just passing through showed much interest in what the stewards were doing and the message they were trying to convey. Stewards believe that the many discussions they had with boaters and passers-by left very educational impacts on them.

Throughout the summer the sand build up in the launch itself became an issue for boaters with bigger boats and/or less experience launching. The sand building up caused the launch to become increasingly shallow. Stewards were told they would receive a lot of complaints about the two stumps that were pulled onto the beach. Not one complaint was received. A few visitors mentioned the stumps (which stewards soon would come to learn were named Remus and Romulus) but none of these visitors made complaints. The last concern of boaters and visitors alike was the size of the parking lot. On Sundays, which were usually the busiest days, boaters would not have a place to park their trailers because there were so many people that the beach or camping. The DEC officer

stewards had been in contact with mentioned making a “higher” parking lot just for swimmers and keeping the “lower” parking lot for boaters and trailers.

Recommendation

Stewards did not have trouble manning this station by themselves. The launch was busy on certain days but was not extremely overwhelming. Although, it would be nice to spend a little more time with the people who are curious rather than having to run off to another boat.

The biggest and best recommendations stewards that were stationed at Seventh Lake could give to future stewards would be to know facts and rules about the boat launch and the surrounding area. Get to know how far Raquette Lake and Sagamore are from the boat launch, as well as Inlet. Know what stores and gas stations are around you. When the Forest Ranger and DEC officer come to visit ask as many questions as possible. Ask about the camping, overnight parking, fishing off the docks, swimming, know about the fish in the lake, where they stock them, where to get a camping permit, where the Eurasian Milfoil is and so on. These are only some of the frequently asked questions of the steward at Seventh Lake. The Seventh Lake steward is not only checking boats but also kind of a tour guide/ information center. Stewards recommend future stewards know this information before hand and be able to present it. Of course this knowledge will present itself throughout the summer but it is nice to know ahead of time. Lastly, remember to look up from a book, keep a smile on your face no matter what, and do not get discouraged.

Since many visitors bring their dogs to the boat launch, there should be baggies or signs that say pick up after your dog. Many times the stewards and other visitors stepped in what the dog had left. One of the biggest concerns of boaters mentioned above was the lack of parking. Stewards recommend the Hamlet of Inlet create that “upper” parking area for quick visits and swimmers and allow for the “lower” parking lot to be for overnight parking for camping and trailers.

A recommendation that cannot be expressed enough by the stewards of Seventh Lake is for future stewards to have a sample of the Eurasian watermilfoil or other AIS you have found safely available at the steward interpretive table. The public loves to touch and feel real samples. It is also hard to explain what milfoil looks like. Children love touching the AIS as well. Lastly, the pamphlets and brochures are there for a reason; make sure to let people know they are there for them to take. Once again, children love things they can take away from an experience.

Conclusion

As Paul Smith’s College expands their Watershed Program, people in the area and visitors alike are becoming more and more used to the stewards being around. Keeping lakes like these as pristine as they are now is the goal of many different people. Once one sees a body of water in the Adirondacks, one would never imagine harming it in any way. By stewards being stationed full time at Seventh Lake State Boat Launch the message of the Adirondack Watershed Institute and the Paul Smith’s Watershed Steward Program was conveyed every day of the summer. Overall the public was very concerned about the invasive species and keeping these waters clean. Many boaters appreciated the steward being at the launch and ended up thanking them. We believe with the knowledge we have spread this summer about invasive species, many people will continue to try to prevent the spread on their own without the guidance of the stewards. We also appreciate all the cooperation from the Sixth and Seventh Lake Association as well as Dr. Dan Kelting’s dive team from the Adirondack Watershed Institute.

Table 81- Seventh Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; SUP= stand-up paddleboard; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Seventh Lake Recreation Study 2012																
Week	Boat Type								total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people	# groups launching	# groups retrieving	organisms found	
	M	PWC	S	C	SUP	K	B	R							entering	leaving
5-26-12 to 5-27-12	11	3	0	5	0	11	0	0	30	79	2	71	29	7	0	1
5-31-12 to 6-6-12	3	0	0	2	0	3	0	0	8	63	1	11	7	2	0	2
6-7-12 to 6-13-12	6	0	0	1	0	3	1	0	11	77	2	20	10	7	0	1
6-14-12 to 6-20-12	23	0	0	3	0	15	0	0	41	75	9	92	31	16	1	2
6-21-12 to 6-27-12	16	1	0	4	0	5	0	2	28	76	7	73	26	11	1	2
6-28-12 to 7-4-12	28	0	0	8	0	11	1	2	50	82	11	118	36	19	2	1
7-5-12 to 7-11-12	25	5	1	10	0	17	0	0	58	72	7	131	40	25	4	4
7-12-12 to 7-18-12	9	0	0	5	0	7	0	0	21	54	3	48	9	15	0	1
7-19-12 to 7-25-12	27	2	0	11	0	34	0	0	74	53	8	173	54	33	1	0
7-26-12 to 8-1-12	24	5	0	13	1	18	1	0	62	72	9	114	34	24	2	0
8-2-12 to 8-8-12	32	2	0	6	0	32	0	2	74	41	7	139	40	28	3	1
8-9-12 to 8-15-12	25	0	1	7	0	12	0	0	45	47	6	107	29	29	3	0
8-16-12 to 8-22-12	22	1	0	14	0	12	0	0	49	68	1	131	37	26	1	2
8-23-12 to 8-29-12	2	0	0	0	0	2	0	0	4	100	0	8	2	4	1	1
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
totals	253	19	2	89	1	182	3	6	555	Summer Avg = 66	73	1236	384	246	19	18
										Median HP = 50						

Table 82- Seventh Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Seventh Lake Recreation Study 2012																				
Week	organism type									# groups taking AIS spread prevention measures								# groups		
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry		didn't ask	
5-26-12 to 5-27-12	0	0	0	1	0	0	0	0	0	20	7	10	3	0	0	0	5	0	30	
5-31-12 to 6-6-12	0	0	1	0	1	0	0	0	0	4	2	3	1	0	0	0	0	0	7	
6-7-12 to 6-13-12	0	0	0	1	0	0	0	0	0	6	3	5	2	0	0	0	1	0	11	
6-14-12 to 6-20-12	0	0	0	0	0	0	0	0	3	32	8	22	5	0	0	0	4	0	41	
6-21-12 to 6-27-12	0	0	0	1	0	0	0	0	2	18	8	10	2	0	0	0	1	2	35	
6-28-12 to 7-4-12	0	0	1	2	0	0	0	0	0	32	11	21	1	0	0	0	5	0	50	
7-5-12 to 7-11-12	0	0	2	6	0	0	0	0	0	42	12	28	2	0	0	0	1	0	57	
7-12-12 to 7-18-12	0	0	0	1	0	0	0	0	0	12	7	6	0	0	0	0	2	0	14	
7-19-12 to 7-25-12	1	0	0	0	0	0	0	0	0	41	13	29	0	0	0	0	2	0	73	
7-26-12 to 8-1-12	0	0	1	0	0	0	0	0	1	31	10	21	2	0	0	0	0	2	46	
8-2-12 to 8-8-12	0	0	0	3	1	0	0	0	0	38	14	22	2	0	0	0	5	0	57	
8-9-12 to 8-15-12	0	0	1	1	0	0	0	0	1	25	9	18	1	0	0	0	1	1	35	
8-16-12 to 8-22-12	0	0	0	3	0	0	0	0	0	26	10	18	0	0	0	0	2	1	47	
8-23-12 to 8-29-12	0	0	0	2	0	0	0	0	0	3	2	1	0	0	0	0	0	0	4	
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
totals	1	0	6	21	2	0	0	0	7	330	116	214	21	0	0	29	6	507		
										65%	23%	42%	4%	0%	0%	0%	6%	1%		

Stillwater Reservoir Boat Launch Use Study

By Michael Bicknell, Watershed Steward



Figure 115- View of Stillwater Reservoir from Boat Launch.

Introduction

Paul Smith's College's Watershed Stewardship Program (WSP) was initiated 13 years ago, with the purpose to educate recreational boaters on the threats of invasive species transportation in the Adirondacks. In 2011, the Watershed Steward program expanded its program into the Western Adirondacks, thanks to a U.S. Fish and Wildlife grant for the restoration of the Great Lakes watershed. Under the same Initiative, the U.S. Environmental Protection Agency funded the program for the 2012 season.

Stillwater Reservoir is a 6,700-acre reservoir, located 18 miles from Eagle Bay and 28 miles from Lowville. Stillwater Reservoir is surrounded by the 5 Ponds Wilderness, Independence River Wild Forest, limited private lands, and adjacent to the Pepper Box Wilderness area. The area provides 46 designated primitive campsites on islands and adjacent shorelines, which make it a very popular camping destination. In 2011, Stillwater Reservoir was monitored by the WSP for a total of four days, and due to the high use on those days, it was determined that Stillwater Reservoir should have a Watershed Steward on duty Wednesday through Sunday for the 2012 season.

Stillwater Reservoir proved to be one of the busiest sites in the Western Adirondack region, with numerous campers and day users. There are no aquatic invasive species (AIS) currently in Stillwater, but several of the surrounding lakes have confirmed AIS. Raquette Lake, the Fulton Chain of Lakes, Lake Bonaparte, and Lake Ontario all have confirmed AIS and are readily accessible by to Stillwater by boaters. Due to the lack of AIS in Stillwater Reservoir, its proximity to infested lakes, and its high use by the public, Stillwater Reservoir has proven to be an important lake to monitor.

Methods

Stillwater Reservoir had a Watershed Steward on duty from Memorial Day Weekend (May 28), until August 26th. The steward was on duty from 7:00AM-4:00PM with one hour of breaks, Thursdays-Sundays. The stewards duty was to approach any boaters using the State boat launch and inform them of the Paul Smith’s Watershed Program. The steward would determine the boater’s knowledge on AIS and express the negative impacts of AIS and the threat of transporting invasive species on recreational boats.

An array of handouts and pictures were used by the steward to inform the boater of what AIS are, what they look like, and they negatively affect watershed, and what the boater can do to decrease the risk of transport. The steward would also conduct a visual inspection of the boat. While showing the boater how and where they should inspect their boat when leaving or entering any body of water, if any invasive species were found during the inspection the steward would inform the boater and reiterate the threat of transporting them.

Boaters were also asked if they took any steps to prevent the spread of invasive species. The steps included inspecting boat, washing boat, draining their bilge, disposal of their bait, and drying their boat. However, this question was asked in a non-leading way, so we could know the boater was taking the steps for invasive species specifically. The watershed program feels that there is a fundamental difference between a boater washing their boat so it will look nice and washing it to prevent the spread of invasive species.

Other data was also taken by the steward like the type of boat, horsepower, two or four stroke, group size, state of registration, what lakes the boat has been in within the last two weeks, and if the boater takes and preventative steps in stopping the transport of AIS.

Results

From 5/28/12 to 8/26/12 the Stillwater Watershed Steward inspected 1,011 boats and educated 2,097 boaters. The busiest weeks were 6/21/12 – 6/27/12, with 213 individuals and 91 boats and 7/5/12 – 7/11/12, with 211 individuals and 106 boats. These weeks were especially busy due to the opening of bass season in early May, and the 4th of July holiday.

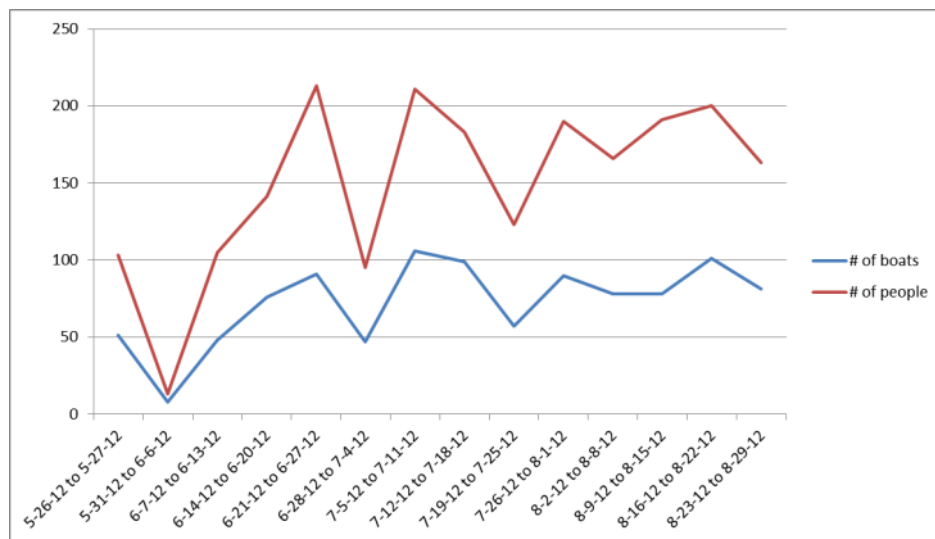


Figure 116- Stillwater Reservoir Boat Launch use, 2012.

Motorboats were by far the most common boat type used in Stillwater, 590, accounting for 58% of the total boats. Kayaks were the second most used boats at still water, 233, representing 23% of the total boats. Canoes were the third most abundant boat type, 140, accounting for 14% of the total boats. There were also 32 personal watercraft, 10 rowboats, 6 sailboats, and 0 barges. In addition to recording the type of boats using the boat launch, the steward also recorded the number of 4-stroke engines and average horsepower. There were 195 four-stroke or two stroke direct injection outboards. The average horsepower of the boat engines was 53 HP.

The state of origin of motorboats was also recorded to determine where boaters are coming from. The last lake the boater used within two weeks was also recorded, which is crucial to determine the potential risk of invasive species entering the lake. There were boaters from a total of 6 states, New York being the majority.

The boaters were also asked whether or not they took prevention steps in the transport of invasive species on their boats. There were 195 groups that took prevention steps out of 785 groups resulting in 27% of boaters taking prevention steps.

Table 83- State or province of registration of motorboats using Stillwater Reservoir Boat Launch, 2012.

State	# boats
CT	4
DL	1
IN	3
NJ	5
NY	481
PA	13
Total	507

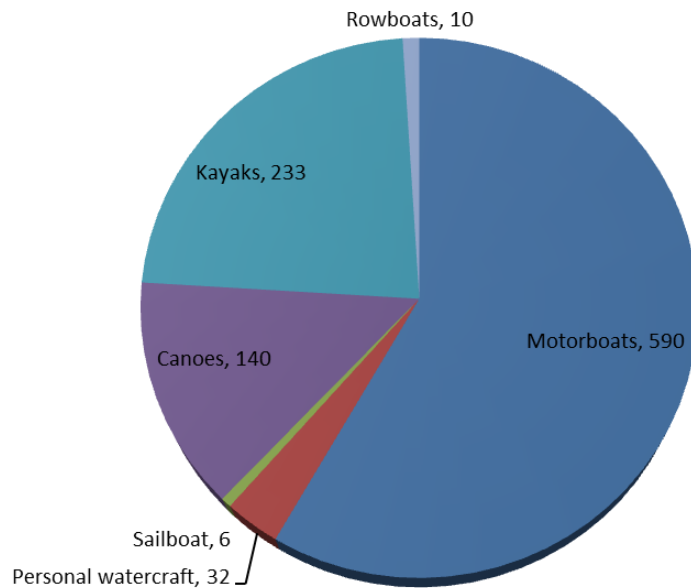


Figure 117- Types of Watercraft Launched, Stillwater Reservoir Boat Launch, 2012.

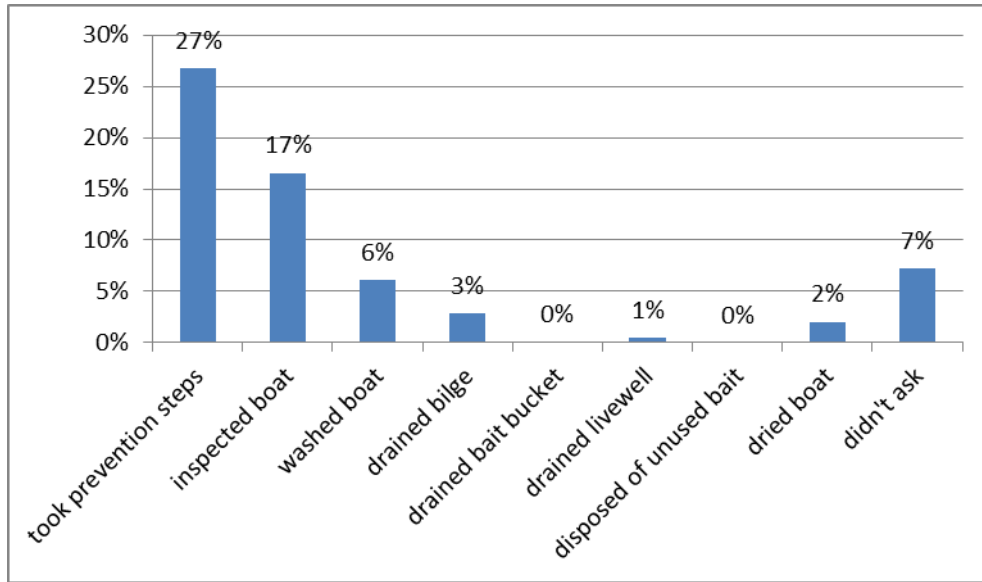


Figure 118- AIS spread prevention measures taken by visitors, Stillwater Reservoir Boat Launch, 2012.

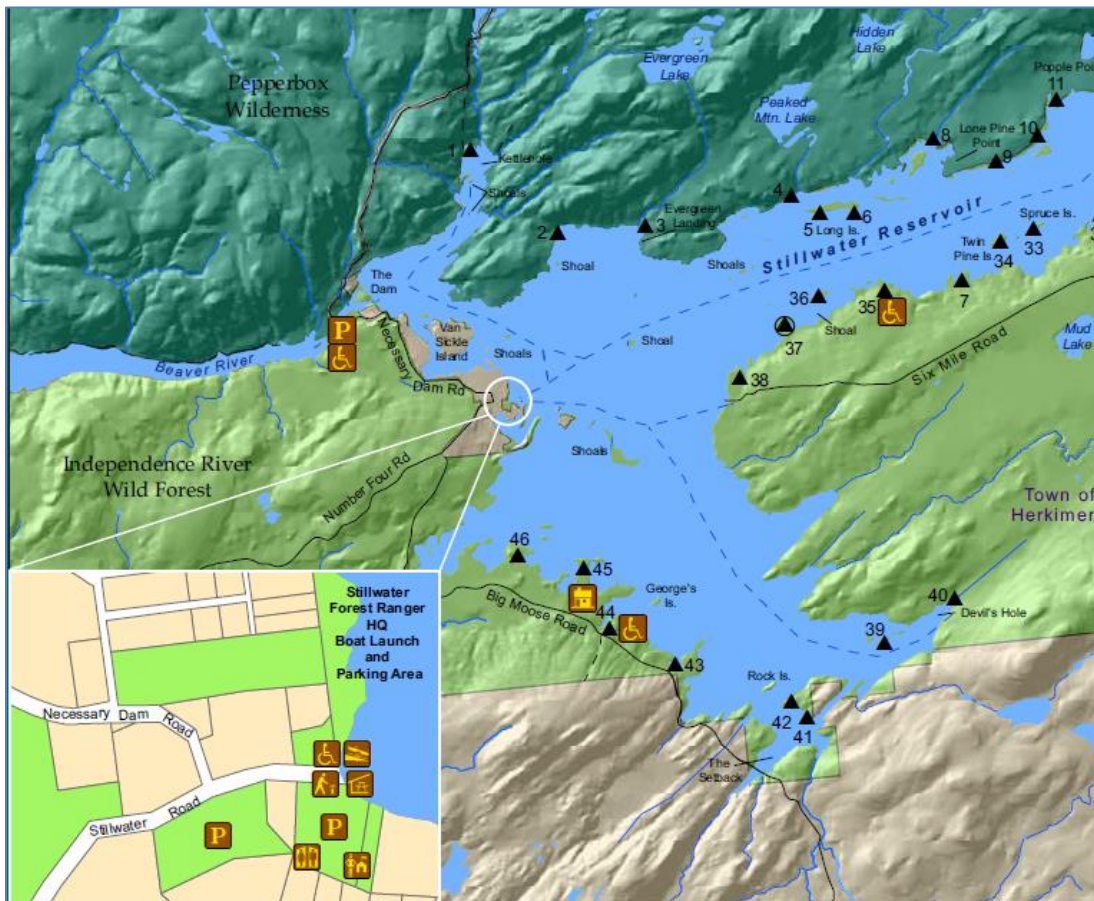


Figure 119- Portion of Stillwater Reservoir (NYSDEC map).

Table 84- Waterways visited in previous two-week period, Stillwater Reservoir Boat Launch, 2012.

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Lake Ontario	Yes	6	Seneca Lake		4
Fourth Lake	Yes	5	Cazenovia Lake		2
Oneida Lake	Yes	5	Owasco Lake		2
Cayuga Lake	Yes	4	Black Lake		1
Irondequoit Bay	Yes	4	Canadarago Lake		1
Lake Bonaparte	Yes	3	Delta Lake		1
St. Lawrence River	Yes	3	Francis Lake		1
Chaumont Bay	Yes	2	Hammond Lake		1
Harper's Ferry WV	Yes	2	Indian River		1
Seventh Lake	Yes	2	Keuka Lake		1
St. Lawrence River	Yes	2	Lake Placid		1
Cranberry Lake	Yes	1	Lake Pleasant		1
Eighth Lake	Yes	1	Moose River Park		1
Oswego River	Yes	1	Moss Lake		1
Raquette Lake	Yes	1	Mud Lake		1
Sixth Lake	Yes	1	Onondaga Lake		1
Skaneateles Lake	Yes	1	Oswegatchie River		1
Susquehanna River	Yes	1	Oxbow Lake		1
None		376	Red Lake		1
Stillwater Reservoir		202	Silver Lake		1
Black River		22	Tioughnioga River		1
Beaver River		5	Twitchell Lake		1
Soft Maple Reservoir		5	Unadilla River		1
Big Moose Lake		4	Total		687

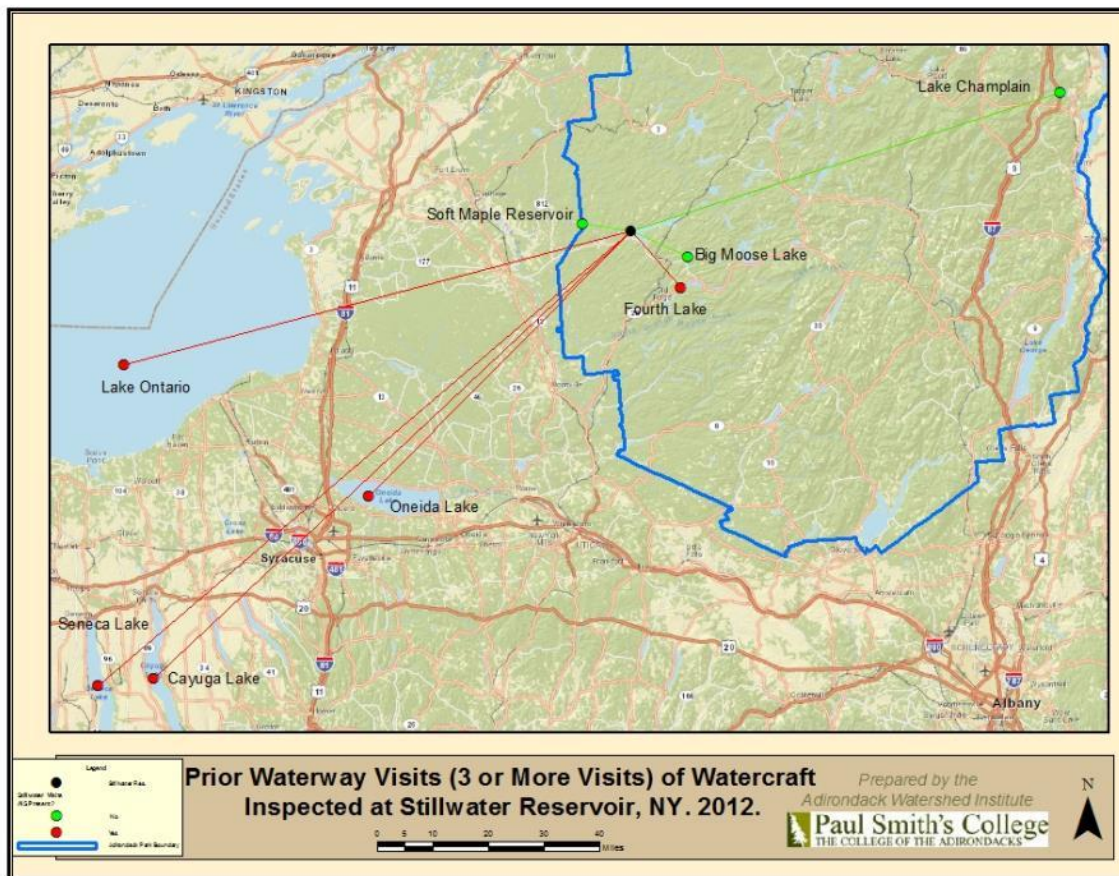


Figure 120- Prior waterway visits, Stillwater Reservoir Boat Launch.

There were a total of 83 organisms found on boats entering and leaving Stillwater Reservoir in the 2012 season. Of those 83 organisms, 55 were discovered upon entering the reservoir and 28 leaving the reservoir. 11% of inspections yielded an organism, with 2% of boats having an invasive organism attached to them. However, Stillwater Reservoir is believed to be free of invasive species, so boats returning from the reservoir had very little risk of carrying invasive species. 55 organisms were found upon entering the reservoir of which 35% were determined to be AIS.

Table 85- AIS removed from watercraft and trailers at Stillwater Reservoir Boat Launch, 2012

Organism	# Entering	# Leaving	Prior waterway
Curly-leaf pondweed	4	0	None (2); Oswego River; Stillwater Res.
Eurasian watermilfoil	13	0	Genesee River; Irondequoit Bay; Lake Ontario (2); None (5); Oneida Lake (2); Oswego River
Variable-leaf milfoil	1	0	Seneca River
Water chestnut	1	0	Seneca River
Totals	19	0	

The portion of visitors taking AIS spread prevention steps was very low at 27% and some times, people who claimed to take steps, had organisms on their boats. There were several more people who said they washed their boats or drained their bilge, but these steps were taken for different reasons than AIS spread prevention. The very low prevention rate also adds more to the risk of invasive species entering Stillwater Reservoir. On the other hand, visitors were very likely to report either Stillwater Reservoir or “none” as the last waterbody visited, indicating that it can be thought of as a “repeat-visit” lake with arguably lower risk of AIS introduction. 578 of 687 groups queried reported either Stillwater Reservoir or None as previously visited waterbodies (84%).

Conclusion

Overall the experience at Stillwater Reservoir was a positive one. The public seemed to be very satisfied with having a Watershed Steward on duty. The area was very busy throughout the summer, due to the popularity of the campsites. There were several boaters from Pennsylvania and Connecticut that were annual users of the reservoir, which increases the threat of AIS. Numerous boaters came from Southern NY, Lake Ontario, and St. Lawrence River, all of which have invasive species problems.

This was the program’s first full summer at Stillwater Reservoir, so there is not sufficient data to compare the 2012 summer. However, the data for the 2012 summer seems to support the future stewarding of the area. The WSP would like to thank New York State Forest Ranger Luke Evans and the United States Environmental Protection Agency for making this program possible.

Table 86- Stillwater Reservoir Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Stillwater Reservoir Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people	# groups launching	# groups retrieving	organisms found		
	M	PWC	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	26	0	0	4	20	0	1	51	55	17	103	26	13	0	1	
5-31-12 to 6-6-12	5	0	0	1	2	0	0	8	40	3	13	2	5	0	0	
6-7-12 to 6-13-12	27	0	0	6	15	0	0	48	57	12	105	22	14	1	0	
6-14-12 to 6-20-12	55	3	0	2	14	0	2	76	58	16	141	54	15	4	3	
6-21-12 to 6-27-12	59	4	1	15	12	0	0	91	59	28	213	45	34	5	3	
6-28-12 to 7-4-12	31	0	0	2	11	0	3	47	68	12	95	30	12	6	4	
7-5-12 to 7-11-12	57	7	0	12	30	0	0	106	54	21	211	44	36	2	5	
7-12-12 to 7-18-12	56	2	1	15	25	0	0	99	42	14	183	43	40	4	2	
7-19-12 to 7-25-12	40	4	0	3	10	0	0	57	52	5	123	25	29	2	2	
7-26-12 to 8-1-12	45	0	1	20	23	0	1	90	44	7	190	36	36	0	3	
8-2-12 to 8-8-12	54	2	0	5	15	0	2	78	49	19	166	47	17	8	0	
8-9-12 to 8-15-12	47	6	0	12	13	0	0	78	45	14	191	35	32	7	2	
8-16-12 to 8-22-12	50	3	1	27	20	0	0	101	66	13	200	39	31	13	2	
8-23-12 to 8-29-12	38	1	2	16	23	0	1	81	50	14	163	34	28	3	1	
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
totals	590	32	6	140	233	0	10	1011	Summer Avg = 57 Median HP = 40	195	2097	482	342	55	28	

Table 87- Stillwater Reservoir use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Stillwater Reservoir Recreation Study 2012																			
Week	organism type									# groups taking AIS spread prevention measures									# groups
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	
5-26-12 to 5-27-12	0	0	0	1	0	0	0	0	0	12	5	8	0	0	1	0	0	0	38
5-31-12 to 6-6-12	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	0	0	7
6-7-12 to 6-13-12	0	0	0	1	0	0	0	0	0	15	8	3	2	0	0	0	0	1	39
6-14-12 to 6-20-12	0	0	0	7	0	0	0	0	0	21	14	9	4	0	0	0	0	4	65
6-21-12 to 6-27-12	0	1	1	4	0	0	0	0	2	22	13	5	3	1	2	0	0	5	79
6-28-12 to 7-4-12	0	0	1	4	0	0	0	0	5	8	3	2	3	0	0	0	1	7	40
7-5-12 to 7-11-12	0	0	1	4	0	0	0	0	2	11	6	4	1	0	1	0	1	8	69
7-12-12 to 7-18-12	0	0	2	3	0	0	0	0	1	8	5	2	0	0	0	0	1	9	81
7-19-12 to 7-25-12	0	0	1	2	0	0	0	0	1	8	8	0	0	0	0	0	0	7	50
7-26-12 to 8-1-12	1	0	0	2	0	0	0	0	0	29	11	3	9	0	0	0	5	5	67
8-2-12 to 8-8-12	0	2	3	1	0	1	1	0	0	19	14	2	0	0	0	0	3	8	63
8-9-12 to 8-15-12	0	0	2	4	0	0	0	0	3	19	11	7	0	0	0	0	1	1	62
8-16-12 to 8-22-12	0	1	2	5	0	0	0	0	7	21	16	2	0	0	0	0	4	2	69
8-23-12 to 8-29-12	0	0	0	2	0	0	0	0	2	15	14	1	0	0	0	0	0	0	56
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
totals	1	4	13	40	0	1	1	0	23	210	130	48	22	1	4	0	16	57	785

Tupper Lake Boat Launch Use Study

By Wesley Bates, Watershed Steward



Figure 121- Tupper Lake Boat Launch (1).

Introduction

Paul Smith's College Watershed Stewardship Program has been engaging boaters at Tupper Lake since 2010. Tupper Lake is frequented by boaters primarily from the surrounding area. Stewards were stationed at the boat launch from seven in the morning until four in the afternoon. These hours were decided upon to be the times at which the most boaters would be recreating. Throughout the summer the area was manned by stewards who educated boaters on the hazards of invasive species and provided courtesy boat inspections. The inspections checked the boat, props, live wells, bilges and trailers for aquatic organisms. Stewards removed any organisms that were found and provided a brief educational talk for the boaters. The Tupper Lake location proved to be an ideal location for public outreach and education as its location in town proved to be a busy area for recreationists on the water and on land.

Tupper Lake is known to possess variable leaf milfoil (*Myriophyllum heterophyllum*), considered to be invasive by the Adirondack Park Invasive Plant Program. What makes this species so dangerous to native waters is its ability to aggressively reproduce from small fragments when introduced to water. Once introduced, variable leaf milfoil can quickly outcompete other plant species within the lake, transforming the native ecology. It forms thick mats of vegetation which then chokes out other species and hampers recreation. The Tupper Lake boat

launch is a potential source of invasive species moving to other bodies of water and therefore a high priority for preventing the spread of species.

Methods

From May 26th to September 3th a steward was on site at the Tupper Lake boat launch four days a week (Friday through Monday) from approximately 7:00AM to 4:00PM. Stewards provided boaters and visitors with interpretive information concerning invasive species. Boaters were surveyed by the stewards concerning where the most recent body of water their boat had been in. Data was additionally collected on what steps the visitor took to prevent the transport of invasive species from lake to lake. Information was also collected concerning the group size, horsepower of outboard engines, state registration and if the outboard engine was an 2-stroke direct injection or 4-stroke, both of which are comparatively clean-burning sources of motive power.

All stewards provided a courtesy inspection for boats entering and leaving Lake Flower. Propellers, outdrives, trailer bunks, axles, standing water, and any other notable edges were areas of high focus due to the potential for harboring invasive hitchhikers. Boaters were then offered informational literature on invasive species and how to prevent them from infecting other waterways. Although stewards performed inspections for visitors they also recommended that boaters take responsibility for washing and inspecting their own boats. All usable boater responses were recorded in a Microsoft Excel database for future study and determination of use and risk.

Results

During the summer months of 2012, the Watershed Stewardship Program observed and inspected a total of 1,136 boats that were recreating on Tupper Lake. From Labor Day to Memorial Day stewards interacted with 2,448 visitors accompanying the vessels. Of the 1,136 entering and exiting the lake many boats stated that their boats exclusively stayed on Tupper Lake. 863 boaters recreating on Tupper Lake possessed motorboats, accounting for three quarters (76%) of the total visitors.

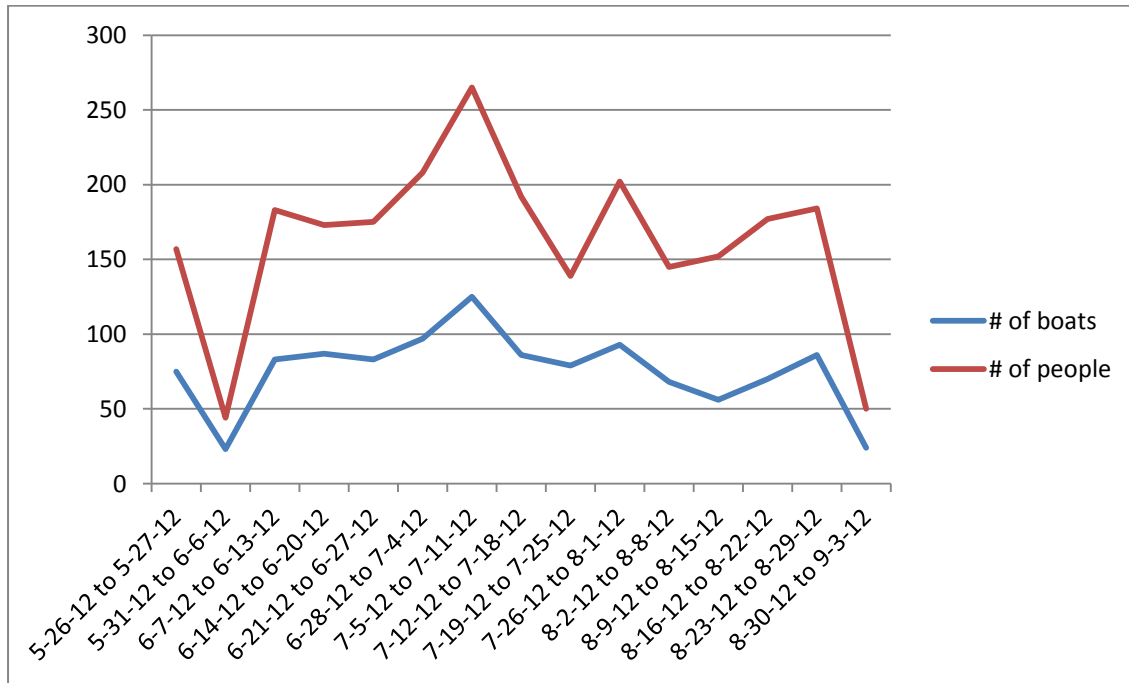


Figure 122- Tupper Lake Boat Launch use, 2012.

The majority of boats launched at Tupper Lake during the summer of 2012 were motor boats (863 for 76%). After motorboats, canoes totaled 11% (125) of launches, followed by kayaks at 7% (79). The remaining percentage of boats was divided between personal watercraft (42 for 4%), rowboats (3 for 0%) and finally barges (4 for 0%).

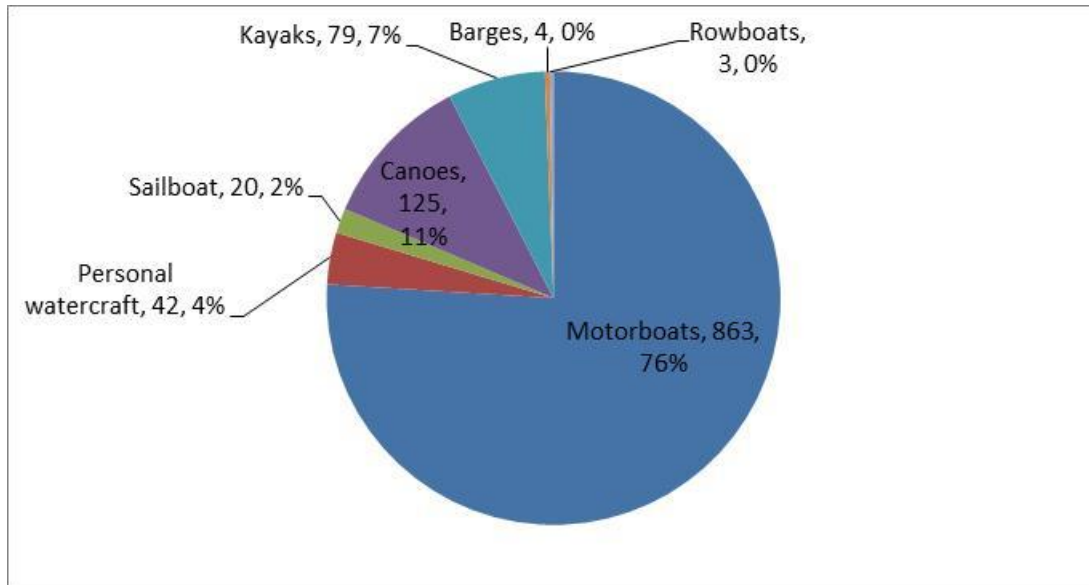


Figure 123- Types of Watercraft Launched, Tupper Lake Boat Launch, 2012.

During the season 81% of boaters said that they took some prevention step before launching or after retrieving their vessel. Most of these boaters washed (53%) and/or visually inspected their boat (34%) for invasive aquatic species. 4% of boaters allowed their boats to dry up to two weeks between launches, an important threshold for killing invasive species. 6% of boaters drained their bilge between visits. It is important to note that many visitors took multiple steps while others took no actions at all, often citing that they never switched waterways with their boats.

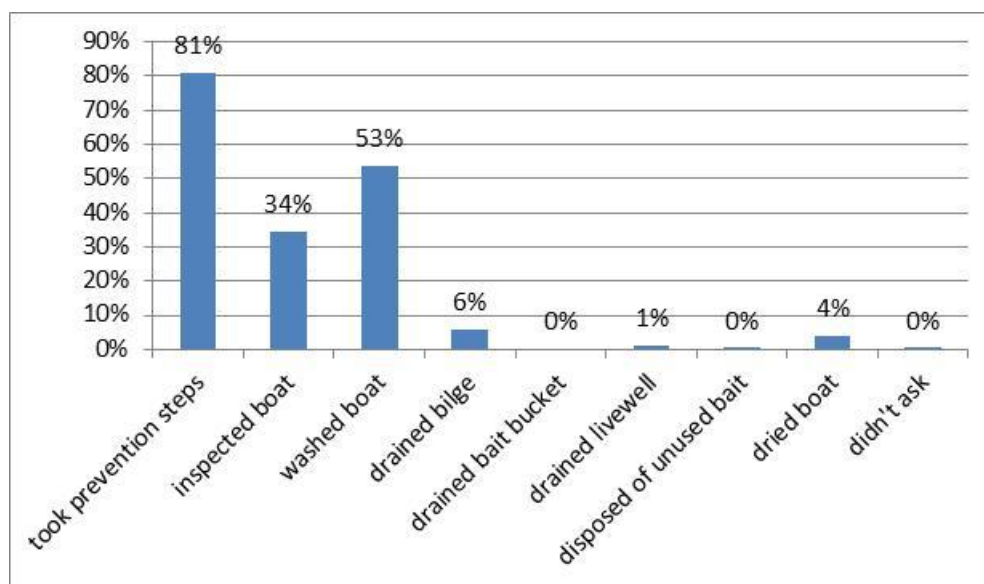


Figure 124- AIS spread prevention measures taken by visitors, Tupper Lake Boat Launch, 2012.

During the summer of 2012 watershed stewards removed a total of 138 aquatic plant species from vessels entering and/or leaving Tupper Lake. The majority of the species found were from boats that were departing from Tupper Lake. These 96 incidents accounted for 26% of the 371 boats leaving. Of the 818 groups entering the waterway only 5% (42) had organisms attached to the boat or trailer. The invasive species that were found on boats throughout the summer were primarily species other than the main culprits such as Eurasian watermilfoil and zebra mussels. For the 2012 summer there were no recorded instances of water chestnut, down from two the previous summer. Many of the recorded organisms found were common indigenous grasses (129) but were still removed.

Discussion

During Tupper Lake's summer of monitoring it continues to be a concern for the health of Adirondack lakes. Lake stewardship worked effectively to prevent the infection of many new introductions to the waterway while also thwarting organisms that could have potentially been removed and introduced to other lakes. Although most boats visiting claim to exclusively recreate at Tupper Lake the organisms removed was each a possible vector for other pristine lakes around the Adirondacks.

The mixed composition of out of state versus instate boaters provided a great demographic for the continuing education of the public. Since its inaugural year in 2011 there was an increase in the percentage of boaters who took preventative steps. In 2011 68% of boaters employed some method to prevent the spread of invasives, during the 2012 season that number increased to 81% did so. The lake had less recorded potential invasives, both leaving and entering. This positive shift is heartening and shows a positive trend for the lake although continued outreach will hopefully further decrease the spread of potential invasives.

Table 88-State or province of registration of motorboats using Tupper Lake Boat Launch, 2012.

State	# boats
NY	745
NJ	26
PA	17
CT	7
FL	6
MA	5
MD	2
OH	2
TX	2
DK	1
DP	1
MI	1
ME	1
NH	1
VT	1

Table 89- Waterways visited in previous two-week period, Tupper Lake Boat Launch, 2012. (Note: The Saranac Chain includes Lake Flower, Oseetah Lake, Second Pond, and Lower, Middle, and Upper Saranac Lakes)

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Tupper Lake	Yes	514	Long Island Sound	Yes	1
Long Lake	Yes	30	Loon Lake	Yes	1
Saranac Chain	Yes	29	Mountain View Lake	Yes	1
Fish Creek	Yes	9	Oneida Lake	Yes	1
Lake Placid	Yes	9	Otisco Lake	Yes	1
Oneida Lake	Yes	6	Thompson's Lake	Yes	1
Great Sacandaga Reservoir	Yes	5	None		286
Lake Champlain	Yes	4	Rental		10
Lake George	Yes	4	Did Not Ask		7
Schroon Lake	Yes	3	Cranberry Lake		5
St. Lawrence River	Yes	3	Raquette River		5
Carry Falls Reservoir	Yes	2	Blue Mountain Lake		2
Cayuga Lake	Yes	2	Rollins Pond		2
Franklin Falls Pond	Yes	2	Simon Pond		2
Hudson River	Yes	2	Spruce Run NJ		2
Raquette Lake	Yes	2	Upper St. Regis Lake		2
Seventh Lake	Yes	2	Bog River		1
Black Lake	Yes	1	Bone Pond		1
Caroga Lake	Yes	1	Cherry Falls		1
Erie Canal	Yes	1	Grampus Lake		1
Follensby Clear Pond	Yes	1	Henderson River		1
Forked Lake	Yes	1	Hoel Pond		1
Fourth Lake	Yes	1	Jones Pond		1
Fulton Chain	Yes	1	Lake Abanakee		1
Goodyear Lake	Yes	1	Lake Clear		1
Hinckley Reservoir	Yes	1	Lake Harris		1
Honeoye Lake	Yes	1	Little Tupper Lake		1
Indian Lake	Yes	1	Middle Pond		1
Lake Bonaparte	Yes	1	Silver Lake		1
Lake Erie	Yes	1	Soft Maple Reservoir		1
Lake Ontario	Yes	1	Stark Reservoir PA		1
Lake Ontario	Yes	1	Stillwater Reservoir		1
			Total		988

Conclusion

Through the summer of 2012 the Tupper Lake boat launch continues to be one of the most highly visited sites in the Tri-Lakes region. Tupper Lake's proximity to the town and its potential for access to many other waterways make it a crucial point for detecting invasive species. Visitation has been steadily declining over the past few summers and the boaters seem to be coming from the local community. The program's boat inspections continue to be the most cost effective way to prevent the spread of invasive species and the lake's high visitation

make this an ideal location for furthering outreach. The continued education of the Paul Smith’s Watershed Stewardship Program have had a positive impact on the waterway through furthering education of the problem and deepening community commitment to the cause. Partnership between Paul Smith’s Watershed Stewardship Program and the visitors of the lake make the protection of this beautiful waterway possible for the present and the future.

Works Cited

- (1) http://www.dec.ny.gov/images/lands_forests_images/tupperlakebls.jpg
- (2) Jamieson, Paul and Morris, Donald, *Adirondack Canoe Waters, North Flow*, Lake George, NY: Adirondack Mountain Club, 1987.

Table 90- Tupper Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Tupper Lake Recreation Study 2012																
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 stroke/ 2 strk DI	# of people	# groups launching	# groups retrieving	organisms found		
	M	PWC	S	C	K	B	R							entering	leaving	
5-26-12 to 5-27-12	65	1	1	6	3	0	0	76	70	18	159	70	12	2	8	
5-31-12 to 6-6-12	22	0	0	0	0	0	1	23	60	8	44	21	9	1	3	
6-7-12 to 6-13-12	66	0	1	8	6	2	0	83	66	24	183	69	27	4	6	
6-14-12 to 6-20-12	63	3	0	15	6	0	0	87	55	16	173	70	32	2	9	
6-21-12 to 6-27-12	66	5	0	7	5	0	0	83	80	16	175	65	30	3	8	
6-28-12 to 7-4-12	74	8	0	9	4	1	1	97	69	13	208	71	28	4	2	
7-5-12 to 7-11-12	102	6	0	9	7	1	0	125	64	24	265	83	43	15	20	
7-12-12 to 7-18-12	74	1	0	8	3	0	0	86	68	31	192	67	23	3	0	
7-19-12 to 7-25-12	56	1	3	10	8	0	1	79	66	17	139	47	31	2	11	
7-26-12 to 8-1-12	70	5	1	9	8	0	0	93	55	24	202	62	36	1	10	
8-2-12 to 8-8-12	46	4	0	8	10	0	0	68	59	13	145	37	29	2	11	
8-9-12 to 8-15-12	37	1	0	10	8	0	0	56	68	11	152	36	25	0	3	
8-16-12 to 8-22-12	40	7	0	19	4	0	0	70	52	13	177	40	19	1	2	
8-23-12 to 8-29-12	62	0	14	4	6	0	0	86	63	19	184	60	20	2	3	
8-30-12 to 9-3-12	20	0	0	3	1	0	0	24	70	13	50	20	7	0	0	
totals	863	42	20	125	79	4	3	1136	Summer Avg = 65 Median HP = 50	260	2448	818	371	42	96	

Table 91- Tupper Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Tupper Lake Recreation Study 2012																			
Week	organism type									# groups taking AIS spread prevention measures									
	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	# groups
5-26-12 to 5-27-12	0	0	0	10	0	0	0	0	0	46	14	41	2	0	1	1	3	0	72
5-31-12 to 6-6-12	0	0	0	4	0	0	0	0	0	11	7	6	2	0	1	0	0	0	23
6-7-12 to 6-13-12	0	0	0	9	0	0	0	0	1	54	29	38	3	0	0	0	6	0	2
6-14-12 to 6-20-12	1	0	0	9	0	0	0	0	1	48	17	33	5	0	1	0	2	0	78
6-21-12 to 6-27-12	0	0	0	11	0	0	0	0	0	48	11	40	6	0	1	0	4	0	52
6-28-12 to 7-4-12	0	0	1	4	0	1	0	0	0	52	17	40	2	0	0	0	1	0	86
7-5-12 to 7-11-12	0	0	0	33	0	0	0	0	2	87	26	76	1	0	1	0	1	0	72
7-12-12 to 7-18-12	0	0	0	3	0	0	0	0	0	43	11	38	8	0	1	0	0	0	51
7-19-12 to 7-25-12	0	0	0	13	0	0	0	0	0	25	6	17	2	0	0	0	1	0	61
7-26-12 to 8-1-12	0	0	0	11	0	0	0	0	0	53	29	28	0	0	0	0	2	0	83
8-2-12 to 8-8-12	0	0	0	13	0	0	0	0	0	39	21	18	5	0	1	1	3	0	55
8-9-12 to 8-15-12	0	0	0	3	0	0	0	0	0	35	18	16	4	0	0	0	2	0	52
8-16-12 to 8-22-12	0	0	0	1	0	0	0	0	2	38	26	8	2	0	0	0	4	1	55
8-23-12 to 8-29-12	0	0	0	5	0	0	0	0	0	53	26	31	3	0	0	0	2	1	66
8-30-12 to 9-3-12	0	0	0	0	0	0	0	0	0	21	19	2	0	0	0	0	0	0	0
totals	1	0	1	129	0	1	0	0	6	653	277	432	45	0	7	2	31	2	808

Upper St. Regis Lake Boat Launch Use Study

By: Andrew Bull



Figure 125- Kayak being launched at Upper St. Regis Lake Public Boat Launch.

Introduction

The Paul Smith's College Watershed Stewardship Program (WSP) has been working for the past 13 years to aid in the prevention of the spread of Aquatic Invasive Species (AIS) within the Adirondack Park. This has been accomplished through the education of the public and performing courtesy watercraft/trailer inspections at various state boat launches. AIS in question are non-native species that have the potential to negatively affect the ecosystem by outcompeting native species for resources found within the environment. All stewards underwent a two-week training program that was designed to familiarize them with identification techniques, preventative steps, inspection methods and natural history of the park itself. The Upper St. Regis boat launch which is located on St. Regis Carry Road is very important, not only for the protection of an AIS free lake. But also because it provides a model for the prevention of AIS since so many nearby lakes and ponds are infested with AIS. There is a boat wash station on the property which the stewards ask all boaters to use on the way in and out. Upper St. Regis Lake is used to access Spitfire Lake, Lower St. Regis Lake as well as the St. Regis Canoe Area. Stewardship at Upper

St. Regis Landing provides protection for the entire St. Regis Canoe Area. All of these waterbodies are excellent for both fishing and recreating, and as such, continue to be popular with visitors.

Methods

Saturday May 26th was the first official day of the 2012 season where a steward was at an assigned launch; this was continued daily up until September 4th. Upper St. Regis Lake is one the launches where a steward is stationed seven days per week. Stewards are on duty starting at 7am and work until 4pm with one hour taken out for breaks and a lunch. When a watercraft would launch or when one is being retrieved the steward on duty was responsible for the collection of data. This was taken on a lake-specific data sheet because some of the lakes had unique questions that pertained to that specific launch or water body. Data collected included type of watercraft, state of registration, if it is an inboard or an outboard, horse power of motor if it is an outboard. Other questions included if the motor is a four stroke or two strokes, group size, the time the vessel is being launched or retrieved and if the boater has taken any preventative steps to prevent the spread of AIS since launching last. While the steward was conversing with the boater a visual inspection of the craft and trailer would take place along with the boater to inform them on the most common points of attachment for AIS. If a species is found it is identified and then discarded in an appropriate location. All boaters were encouraged to take all proper steps when launching between waterways and given informational materials that provided the proper prevention steps and pictures of the most common invasive species they may come across.

Results

During the 2012 season the stewards located at Upper St. Regis boat launch encountered 983 boats and 1,525 people, an increase in traffic from last year. Among the various types of watercrafts launched at Upper St. Regis canoes were the most abundant (349, 35%) then kayaks with (313, 32%), and motorboats rounded out the top three with (297, 30%).

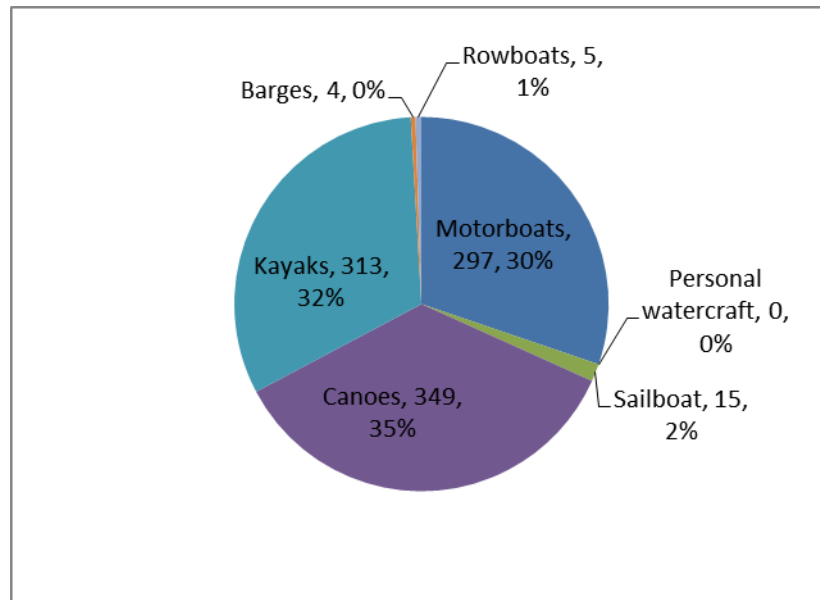


Figure 126- Types of Watercraft Launched, Upper St. Regis Lake Boat Launch, 2012.

The peak usage was from 8-2-12 to 8-8 12 (110 boats and 147 people), there was no trend showing that weekends or weekdays were a more popular, the numbers were quite constant for all seven days of the week.

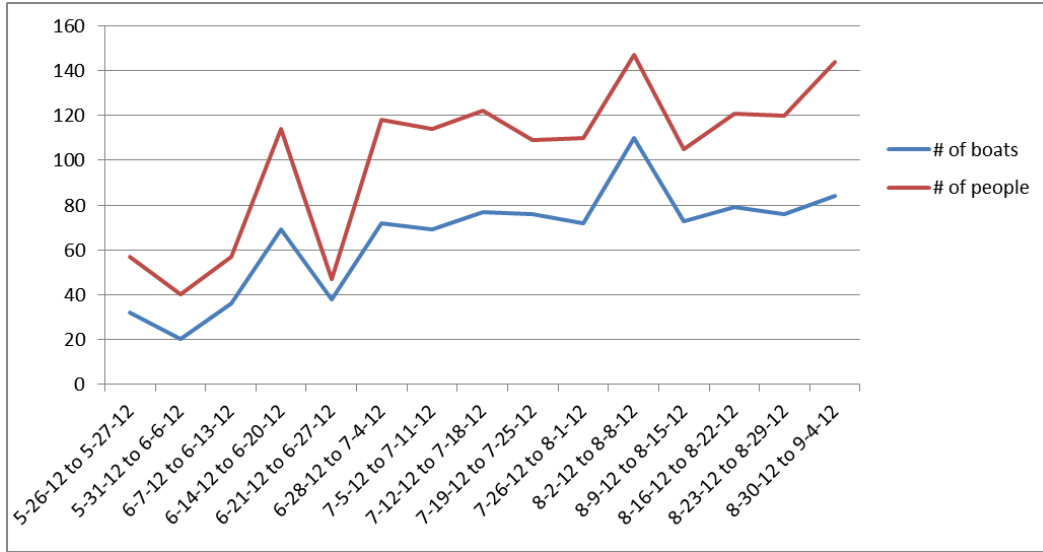


Figure 127- Upper St. Regis Lake Boat Launch use, 2012.

State/ Providence of Origin

The St. Regis chain of lakes is located in the Northern Adirondack Mountains in the state of New York, so it is not unlikely that a majority of the use would be from watercrafts registered in NY State (253 boats). This is a count of just motorized boats this does not take into account canoes and kayaks since they are not in need of registration in New York.

Table 92-State or province of registration of motorboats using Upper St. Regis Lake Boat Launch, 2012.

State	# boats
AR	1
CT	6
FL	1
MD	1
MA	4
NH	1
NJ	1
NY	253
PA	7
VT	1
Total	276

Prevention steps of AIS taken by Visitors

Stewards asked visitors if they usually take any steps to prevent the spread of aquatic invasive species (AIS) when moving from one water body to another, or prior to coming to their launch that day. 63% of groups

encountered at Upper St. Regis reported to have taken at least one AIS prevention step, such as visually inspecting, washing/drying boat, draining of bilge and live wells, and the disposal of bait properly.

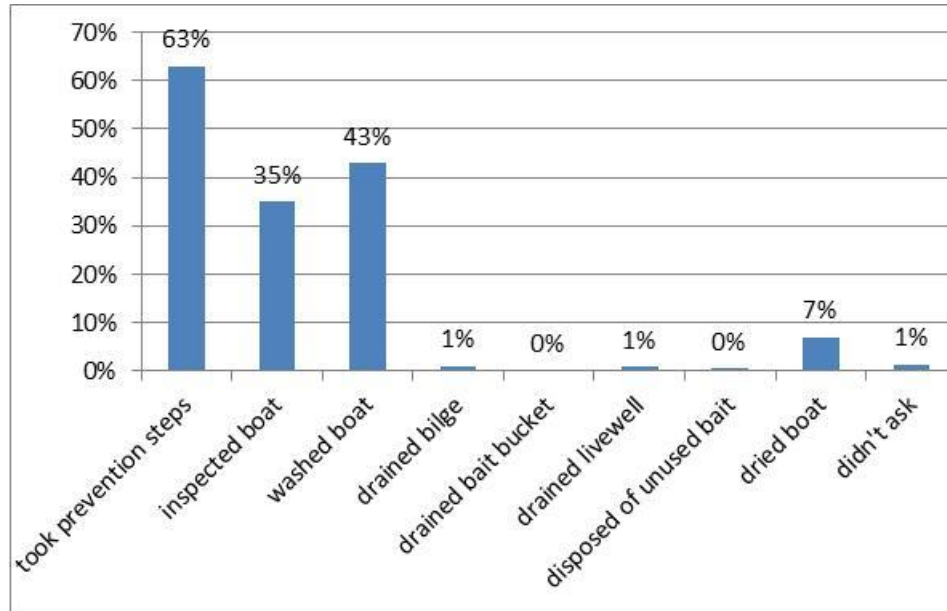


Figure 128- AIS spread prevention measures taken by visitors, Upper St. Regis Lake Boat Launch, 2012.

Previously Visited Water Bodies

What makes the AIS such a problem for waterways is that many species are able to survive out of water for an extended period of time. By asking boaters where the last body of water their watercraft was in during the preceding two weeks, a steward on duty could make a more accurate assessment if the boater had a higher probability of transporting AIS.

Table 93- Waterways visited in previous two-week period, Upper St. Regis Lake Boat Launch, 2012.

Body of Water	AIS Present	# Visits	Body of Water	AIS Present	# Visits
Lake Placid	Yes	14	Mirror Lake		7
Lower Saranac Lake	Yes	14	Rainbow Lake		7
Upper Saranac Lake	Yes	12	Lower St. Regis Lake		5
Lake Flower	Yes	11	Hoel Pond		4
Lake Clear	Yes	10	Buck Pond		3
Round Pond	Yes	7	Green Pond		3
Saranac Chain	Yes	7	Long Pond		3
Follensby Clear Pond	Yes	6	Moose Pond		3
Lake Colby	Yes	6	Raquette River		3
Chateaugay Lake	Yes	5	Black Pond		2
Fish Creek	Yes	5	Jones Pond		2
Long Lake	Yes	5	Silvia Lake		2
St. Lawrence River	Yes	5	Barnum pond		1
Tupper Lake	Yes	4	Black Lake		1
Atlantic Ocean	Yes	3	Bog Pond		1
Indian Lake	Yes	3	Bog River		1
Lake Titus	Yes	3	Bone Pond		1
Loon Lake	Yes	3	Boquet River		1
Meacham Lake	Yes	3	Chub Pond		1
Middle Saranac Lake	Yes	3	Connery Pond		1
Schroon Lake	Yes	3	Crystal Lake CT		1
Chazy Lake	Yes	2	Field Pond MA		1
Franklin Falls Pond	Yes	2	Grass Pond		1
Cazenovia Lake	Yes	1	Grass River Flow		1
Cranberry Lake	Yes	1	Great Patterson Swamp		1
Fern Lake	Yes	1	Lake Everest		1
Floodwood Pond	Yes	1	Lake Kushaqua		1
Fourth Lake	Yes	1	Lake Lonely		1
Horseshoe Pond	Yes	1	Lake Ozonia		1
Kayuta Lake	Yes	1	Little Clear Pond		1
Lake Ontario	Yes	1	Little Green Pond		1
Long Lake	Yes	1	Little Moose Lake		1
Mill Pond	Yes	1	Merrimack River NH		1
Paradox Lake	Yes	1	Mt. Arab Lake		1
Raquette Lake	Yes	1	Oswegatchie River		1
Second Pond	Yes	1	Pine Pond		1
Square Pond	Yes	1	Polliwog Pond		1
Turtle Pond	Yes	1	Sinkhole Pond VT		1
None		214	Spitfire Lake		1
Upper St. Regis Lake		156	St. Regis river		1
Rental		38	St. Regis River		1
Osgood Pond		11	Sylvia Lake		1
Lake Champlain		9	Waneta Lake		1
Little Clear Pond		7	Wolf Pond		1
			Total		662

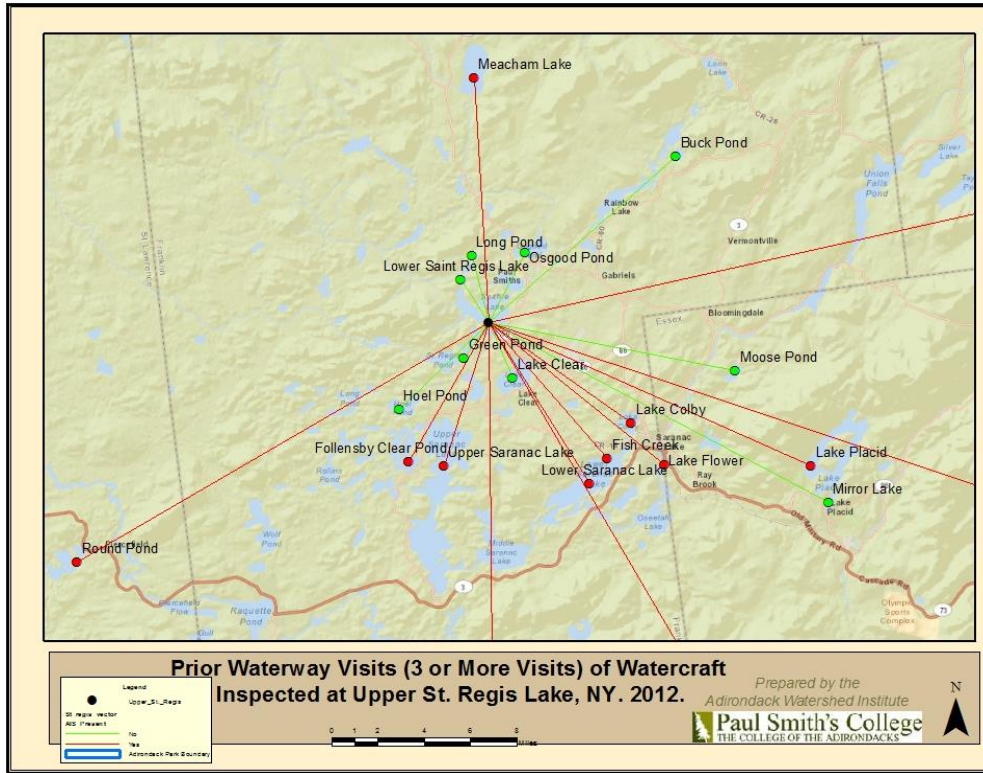


Figure 129- Prior waterway visits, Upper St. Regis Lake Boat Launch.

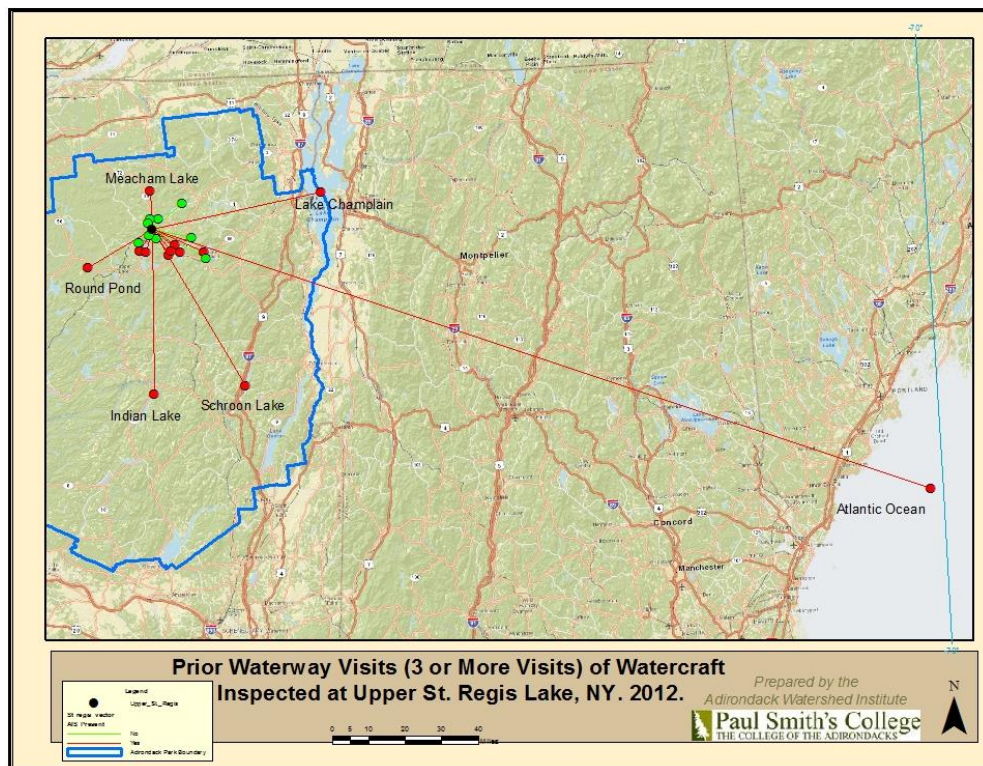


Figure 130- Wider view of prior waterway visits, Upper St. Regis Boat Launch.

AIS Spread Prevention- Organisms Removed from Watercraft

Stewards removed a total of 28 organisms from watercrafts entering and exiting the Upper St. Regis boat launch. Stewards removed only one invasive species off of a vessel on the very first week of launch duty it was Eurasian Water Milfoil and it resided on a 150 hp motor boat. More species were found on boats exiting the waterway and grasses were the most prevalent species found on the watercrafts.

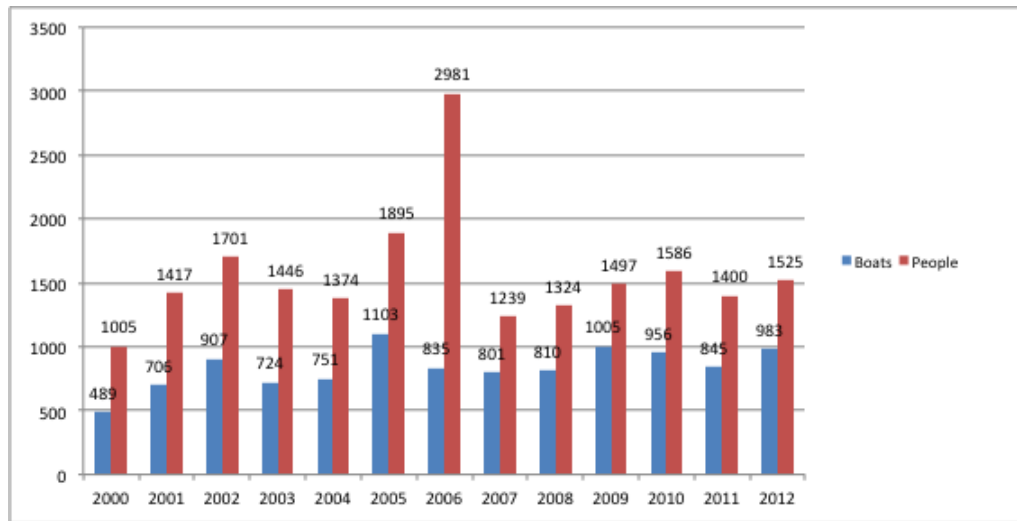


Figure 131- Historical usage data Upper St. Regis Lake Boat Launch, 2000-2012.

Special Projects on the St. Regis Chain of Lakes

Stewards worked with the DEC and APIPP (Adirondack Park Invasive Plant Program) to control Purple Loosestrife (*Lythrum salicaria*), Stewards also monitored the Common Loon (*Gavia immer*), for banded birds, eggs laid, chicks hatched and fledgling success. Also a steward was stationed on summit of St. Regis Mountain on Sundays to encourage the leave no trace method of hiking.

Conclusion

During the summer of 2012, while on duty a total of 1,525 people and 983 boats used the Upper St. Regis launch to either launch or retrieve their watercraft. As the public is becoming more aware of AIS boaters should engage in more prevention methods. Stewards removed a total of 28 organisms from watercrafts.

Next season the program hopes to again work at the Upper St. Regis Launch to help protect such a great resource, this has been accomplished in the past by generous funding by the St. Regis Foundation as well as the St. Regis Property Owners Association. The stewards from the 2012 season would like to thank these groups for their contributions and continued support of the Watershed Stewardship Program.



Figure 132- Bulletin board on property owners' boat house, St. Regis Landing.

Table 94- Upper St. Regis Lake Boat Launch use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

Upper St. Regis Lake Recreation Study 2012															
Week	Boat Type							total # boats	Weekly Avg HP outboard	4 Stroke/ 2 strk DI	# of people	Private Side	# groups launching	# groups retrieving	
	M	PWC	S	C	K	B	R								
5-26-12 to 5-27-12	14	0	0	13	5	0	0	32	53	8	57	2	28	7	
5-31-12 to 6-6-12	14	0	0	2	3	1	0	20	47	2	40	5	15	9	
6-7-12 to 6-13-12	15	0	1	10	9	1	0	36	27	6	57	3	29	11	
6-14-12 to 6-20-12	24	0	3	20	20	0	2	69	57	6	114	0	44	21	
6-21-12 to 6-27-12	18	0	0	13	6	0	1	38	54	6	47	0	27	16	
6-28-12 to 7-4-12	34	0	1	23	14	0	0	72	66	8	118	4	55	23	
7-5-12 to 7-11-12	21	0	0	26	22	0	0	69	49	6	114	7	36	16	
7-12-12 to 7-18-12	18	0	1	37	21	0	0	77	63	6	122	1	40	23	
7-19-12 to 7-25-12	16	0	0	28	30	1	1	76	88	4	109	8	47	16	
7-26-12 to 8-1-12	21	0	3	26	21	1	0	72	46	6	110	6	42	22	
8-2-12 to 8-8-12	20	0	0	43	47	0	0	110	57	5	147	3	60	25	
8-9-12 to 8-15-12	19	0	1	24	28	0	1	73	96	7	105	3	43	18	
8-16-12 to 8-22-12	20	0	2	28	29	0	0	79	75	2	121	6	50	26	
8-23-12 to 8-29-12	15	0	0	28	33	0	0	76	71	4	120	3	39	17	
8-30-12 to 9-4-12	28	0	3	28	25	0	0	84	37	10	144	5	43	17	
totals	297	0	15	349	313	4	5	983	Summer Avg = 5	86	1525	56	598	267	
									Median HP = 40						

Table 95- Upper St. Regis Lake Boat Launch use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel. I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

Upper St. Regis Lake Recreation Study 2012																							
Week	organisms found		organism type										Boat Wash	# groups taking spread prevention measures									
	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes		I	WB	DB	BB	LW	Dis	Dry	didn't ask	# groups	
5-26-12 to 5-27-12	1	0	0	0	1	0	0	0	0	0	0	4	18	12	11	1	0	1	0	0	29		
5-31-12 to 6-6-12	1	1	0	0	0	2	0	0	0	0	0	7	14	8	9	0	1	0	0	1	19		
6-7-12 to 6-13-12	2	0	0	0	0	1	0	1	0	0	0	6	17	11	11	0	0	0	0	1	31		
6-14-12 to 6-20-12	0	2	0	0	0	1	0	0	0	0	1	7	28	14	22	0	0	0	0	1	53		
6-21-12 to 6-27-12	1	0	0	0	0	1	0	0	0	0	0	4	26	18	20	0	0	0	2	4	48		
6-28-12 to 7-4-12	1	1	0	0	0	2	0	0	0	0	0	12	40	25	24	2	0	1	1	4	61		
7-5-12 to 7-11-12	1	1	0	0	0	2	0	0	0	0	0	11	32	21	21	0	0	1	0	2	43		
7-12-12 to 7-18-12	1	0	0	0	0	1	0	0	0	0	0	13	38	21	24	0	0	0	0	8	48		
7-19-12 to 7-25-12	2	0	0	0	0	2	0	0	0	0	0	18	33	18	22	0	0	0	0	5	52		
7-26-12 to 8-1-12	0	3	0	0	0	2	0	0	0	0	1	18	32	13	30	1	0	1	0	4	52		
8-2-12 to 8-8-12	0	0	0	0	0	0	0	0	0	0	0	15	42	22	36	1	0	0	0	1	66		
8-9-12 to 8-15-12	1	0	0	0	0	1	0	0	0	0	0	12	23	9	16	1	0	1	0	1	48		
8-16-12 to 8-22-12	0	3	0	0	0	3	0	0	0	0	0	14	37	17	23	0	0	0	0	10	62		
8-23-12 to 8-29-12	0	1	0	0	0	1	0	0	0	0	0	10	22	9	15	1	0	0	0	2	49		
8-30-12 to 9-4-12	2	3	0	0	0	5	0	0	0	0	0	11	50	33	24	0	0	1	0	6	56		
totals	13	15	0	0	1	24	0	1	0	0	2	162	452	251	308	7	1	6	3	50	717		
													63%	35%	43%	1%	0%	1%	0%	7%	1%		

West-Central Adirondack Region Boat Launches Use Study

By: Stacey Judge, Jeffrey Sann; Watershed Stewards



Figure 133- Watershed Steward Stacey Judge.

Introduction

The Watershed Stewardship Program of Paul Smith's College (WSP) was developed in 2000 as a community based service program to educate the public about conservation and environmental issues facing Adirondack watersheds. The main focus of the program is to prevent the spread of aquatic invasive species (AIS) through educational messages and courtesy boat inspections at local boat launches throughout the Adirondacks. Thanks to a grant awarded by the United States Environmental Protection Agency, the WSP was able to station 27 Watershed Stewards at 24 boat launches throughout the park in the summer of 2012.

The WSP added a few more lakes to its list this summer. Great Lakes Restoration Initiative (GLRI) West sites are typically low-use and see most of their activity on the weekends. For this reason, these sites were covered as staff availability allowed or on weekends. Stewards covered the following launches on a rotating, opportunistic basis: White Lake, Forked Lake, 8th Lake Campground, and Limekiln Lake State Campground.

White Lake is the first lake one encounters when entering the Adirondack Park if entering from the west along New York State Route 28. The community is composed of two separate lake associations, the White Lake Landowners' Association, and the White Lake Shores Association. There is no public access to the lake, however it has been noted by residents that a number of unauthorized users have used the boat launch in the past. Forked Lake State Campground is located near Long Lake, NY and has 80 campsites with a picnic area and fireplaces. There is a state boat launch and the public can rent boats from the campground. Many of the boats encountered by the stewards there were rental boats provided by the campground. Eighth Lake Campground is located just miles north of Inlet, following Route 28. The campground offers fishing, hiking, biking, and boating, is forested and secluded, and offers two points of access to the 314 acre lake. Limekiln Lake campground offers 271 campsites for tents and trailers. The lake is remote, filled with loons, and is one of the few fisheries that are stocked with splake (brook trout/lake trout hybrid) in New York. The campground is located just outside of Inlet NY and is a very busy attraction for campers and waterway recreation enthusiasts alike.

Methods

The stewards attended a week-long training on the Paul Smith's College campus. During this time they were trained how to approach boaters, where to look for AIS, and how to identify aquatic plants. Stewards were stationed at GLRI West launches as available between the dates of 5/26/12 to 9/3/12. Hours of stewards on duty varied to accommodate the needs of each launch as well as the programs weekly staff meeting.

The White Lake steward was on duty from 8:00 am until 5:00 pm. This is one hour later than the typical hours of stewards at other launches. However White Lake is not the only lake that uses these hours on weekends due to a difference in use trends. Stewards assigned to both Limekiln Lake and Eighth lake were on duty from the time they arrived following the weekly staff meeting until 4:00 p.m. Staff meetings commenced at 7:00 in Raquette Lake and would run anywhere from 1 to 2.5 hours typically.



Figure 134- Watershed Steward EJ Borchert at Forked Lake Campground Boat Launch.

Stewards would engage waterway users in a friendly and non-invasive manner. Stewards would record information such as boat type, horsepower of outboards and group size without asking questions. Once the party was engaged, stewards would ask if the group had taken any steps to prevent the spread of AIS with their boat since they had used it last. The steward would also inquire about the last body of water the boat had been in in the past two weeks, if any. All information was recorded manually at the boat launch during this time. With the party's consent the steward would inspect the watercraft for invasive species; paying particular attention to possible problem areas such as bilge water, live wells, trailer bunks and fishing gear. If any aquatic plants were discovered they were removed, recorded and disposed of properly. Stewards answered any questions boaters may have regarding AIS and many other topics. The steward provided user groups with literature and flyers with information regarding AIS as well as terrestrial invasive species, diseases and other possible hazards. The above procedure was followed for boats both launching and retrieving.

Results

The combined total for boats inspected at the GLRI West sites was 670. The total number of people interacted with during these inspections was 1,325. As with most launches, the greatest volume of use when stewards were on duty was achieved during the Memorial Day, Fourth of July and Labor Day holidays.

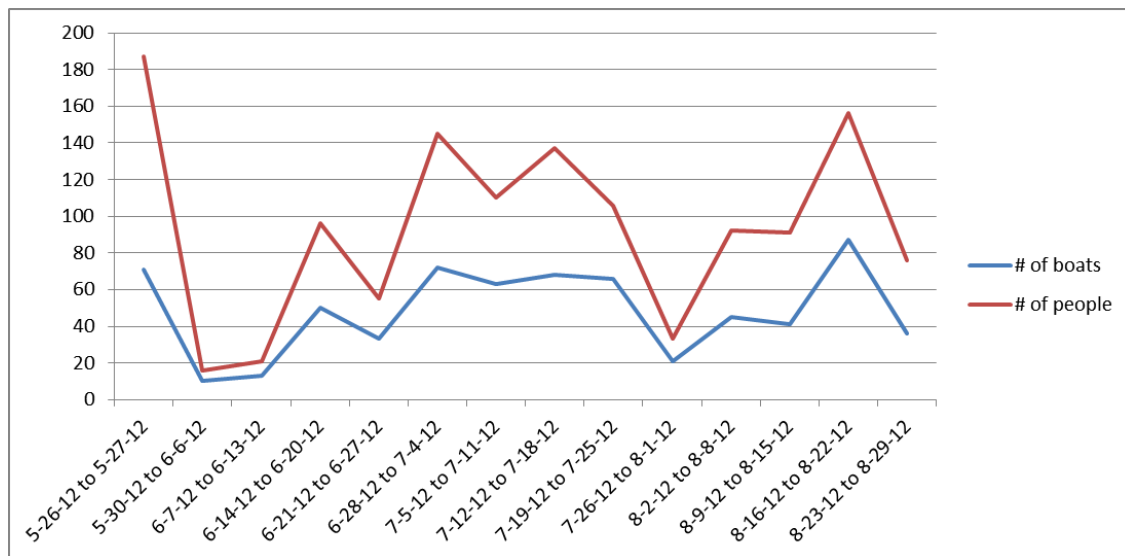


Figure 135- WSP West-Central Adirondacks Boat Launches combined use, 2012

Boat type majority for these sites was 219 canoes at 33% followed by 191 motorboats at 28% and 165 kayaks at 24%. 18 rowboats, 2 barges, 71 personal watercraft, 2 docks, and 2 stand-up paddleboards were also inspected and recorded. The mean horsepower for outboard boats inspected at these sites was 81.

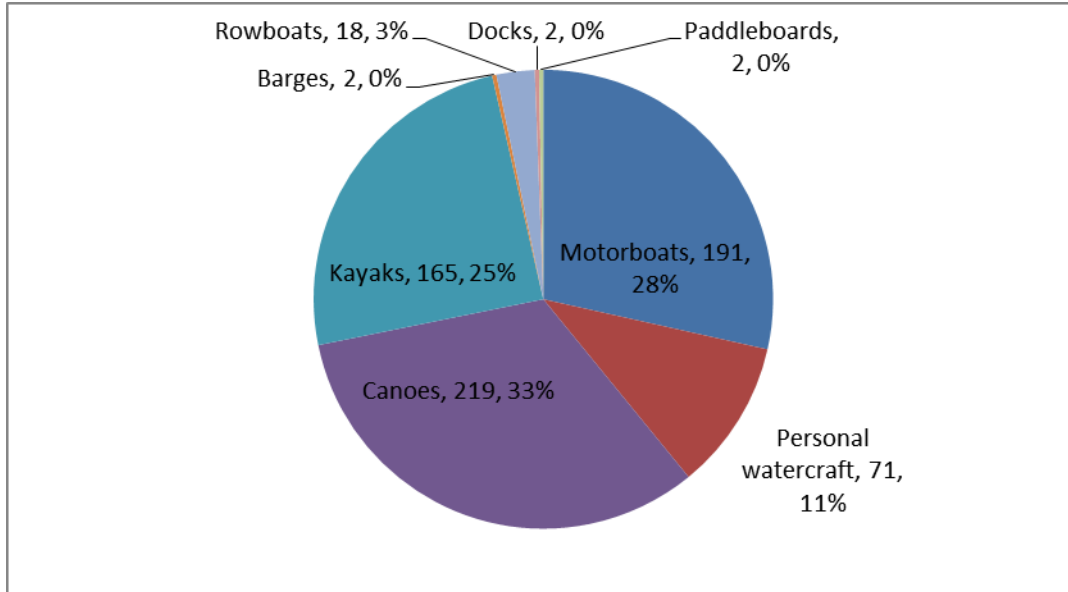


Figure 136- Types of Watercraft Launched, West-Central Adirondack Regional Boat Launches, 2012.

During inspections, stewards removed 85 total organisms from boats entering (47) and leaving (38) these sites. Of these only 2 were confirmed invasive species.

Table 97- Waterways visited in previous two-week period, Limekiln Lake Boat Launch, 2012

Body of Water	AIS Present	# Visits
Fourth Lake	Yes	2
Erie Canal	Yes	1
Forest Park Lake	Yes	1
Genesee River	Yes	1
Lake Ontario	Yes	1
Niagara River	Yes	1
Oneida Lake	Yes	1
Seventh Lake	Yes	1
Susquehanna River	Yes	1
Third Lake	Yes	1
None		16
Limekiln Lake		4
Delta Reservoir		2
Eighth Lake		1
Little Moss Lake		1
Moss Lake		1
Salmon River Reservoir		1
Tennessee River TN		1
Unknown		1

Table 96-- Waterways visited in previous two-week period, Eighth Lake Boat Launch, 2012

Body of Water	AIS Present	# Visits
Seventh Lake	Yes	5
Fulton Chain	Yes	2
Conesus Lake	Yes	1
First Lake	Yes	1
Fourth Lake	Yes	1
Great Sacandaga Reservoir	Yes	1
Lake Durant	Yes	1
Oneida Lake	Yes	1
Raquette Lake	Yes	1
Sacandaga Lake	Yes	1
None		24
Eighth Lake		14
Rental		3
Limekiln Lake		1
Long Lake		1
South Lake		1
Total		59

Table 98-Waterways visited in previous two-week period, Forked Lake Boat Launch, 2012

Body of Water	AIS Present	# Visits
Forked Lake	Yes	5
Raquette Lake	Yes	2
West Lake	Yes	2
Atlantic Ocean	Yes	1
Canandaigua Lake	Yes	1
Cazenovia Lake	Yes	1
Deruyter Reservoir	Yes	1
Fish Creek	Yes	1
Fulton Chain	Yes	1
Harris Lake	Yes	1
Indian Lake	Yes	1
Lake Durant	Yes	1
Northern Forest Canoe Trail	Yes	1
Oneida Lake	Yes	1
Seventh Lake	Yes	1
Susquehanna River	Yes	1
Rental		83
None		72
Blue Mountain Lake		2
Black River		1
Did not answer		1
Harriston Lake NJ		1
Lake Eaton		1
Mirror Lake MA		1
New boat		1
Nick's Lake		1
Total		186

Table 99-Waterways visited in previous two-week period, White Lake Boat Launch, 2012

Body of Water	AIS Present	# Visits
White Lake	Yes	42
Oneida Lake	Yes	5
Kayuta Lake	Yes	4
First Lake	Yes	3
Fourth Lake	Yes	3
Conesus Lake	Yes	2
Fulton Chain	Yes	2
Hinckley Reservoir	Yes	2
Hudson Canal	Yes	2
Mohawk River	Yes	2
Cazenovia Lake	Yes	1
Fifth Lake	Yes	1
Keuka Lake	Yes	1
Lake George	Yes	1
Niagara River	Yes	1
Seventh Lake	Yes	1
St. Lawrence River	Yes	1
Twin Lakes CT	Yes	1
None		168
Moose River		2
Black River		1
Brantingham Lake		1
Delta Lake		1
Didn't Know		1
Little Long Pond		1
Lone Pine Pond		1
Rental		1
Seneca River CT		1
Total		253

Discussion

The data collected at these western Adirondack sites is valuable because it allows the program to look into waterways with launches that are popular with a different user group. For instance, all other launches in the West-Central Adirondacks area of the program have a majority of motorboat use as opposed to these launches where the canoes were the majority and kayaks were a close third behind motorboats. This data can be useful when comparing organisms per inspection as well as prevention measures taken. Preserving these lakes is crucial because they are at the headwaters of many rivers, and streams that provide a resource to local lands, wildlife and human stakeholders alike. It is important to note that both the AIS discovered this year were on a water ski jump at the White Lake boat launch on the same day (August 5, 2012). This detection is a perfect example of the possibility of overland transport of AIS on not only boats but all types of structure that occupy the water such as stationary or floating docks and piers.

Table 100- AIS removed from watercraft and trailers at White Lake Boat Launch, 2012

Launch	AIS Detected	Prior Waterbody
White Lake	Variable Leaf Milfoil	The Hudson Canal
White Lake	Curly Leaf Pondweed	The Hudson Canal

The low total number of boats at these launches is expected because they are not high use sites with large boat launches. However, it should be noted that stewards were placed at these sites when availability allowed. This means that when the program overall was short staffed due to illness or steward personal needs, stewards were shifted away from these sites to higher-priority sites like Fourth Lake, Long Lake and Raquette Lake.



Figure 137- Watershed Steward Jennifer Breen at Eighth Lake Campground Boat Launch.

Conclusion

With the help of many concerned community members, the WSP has enjoyed another successful summer in the West Central Adirondack Park. The work of the program seems more familiar to users and our message is more abundant and better received. Preventing the spread of AIS in these water bodies is crucial work to preserving the current ecosystem functions which provide the beautiful views and spectacular recreation opportunities. The work Stewards do is a pro-active response in an area where prevention is feasible and the support of community members is well appreciated.

Table 101- West-Central Adirondack Regional Boat Launches use figures, 2012. Key: M=motorboat; PWC=personal watercraft; S=sailboat; C=canoe; K=kayak; B= construction barge; R=rowboat; 4 stroke/ 2 strk DI = Four-stroke or two-stroke direct-injection outboard motor.

West-Central Adirondack Region Boat Launch Use Study 2012																
Site	Boat Type										total # boats	Average HP outboard	Four stroke	# of people	# groups launching	# groups retrieving
	M	PWC	S	C	K	B	R	D	SUP							
Eighth Lake	12	1	0	39	25	0	4	0	0		81	26	2	157	39	36
Forked Lake	16	0	0	160	73	2	10	0	0		261	29	3	467	100	93
Limekiln Lake	16	0	0	11	26	0	2	0	0		55	35	5	87	32	18
White Lake	147	70	0	9	41	0	2	2	2		273	100	58	614	203	87
totals	191	71	0	219	165	2	18	2	2		670	All avg: 81 HP	68	1325	374	234

Table 102- West-Central Adirondack Regional Boat Launches use figures, 2012. Key: BW = native bladderwort; CLP = Curly-leaf pondweed; EWM = Eurasian watermilfoil; GRS = grass; NM = native milfoil; VLM = variable leaf milfoil; WC = water chestnut; ZM = zebra mussel; I = Inspected boat; WB = washed boat; DB = drained bilge; BB = emptied bait bucket; LW = drained livewell; Dis = discarded unused bait; Dry = dried boat.

West-Central Adirondack Region Boat Launch Use Study 2012																					
Site	organisms found		organism type										# groups taking AIS spread prevention measures								
	entering	leaving	BW	CLP	EWM	GRS	NM	VLM	WC	ZM	other	yes	I	WB	DB	BB	LW	Dis	Dry	didn't ask	# groups
Eighth Lake	1	0	0	0	0	1	0	0	0	0	0	29	8	14	0	0	0	0	6	1	60
Forked Lake	31	34	1	0	0	26	1	0	0	0	37	72	10	44	0	0	0	0	11	1	188
Limekiln Lake	2	0	0	0	0	1	0	0	0	0	1	19	7	11	2	0	0	0	3	0	39
White Lake	13	4	0	1	0	11	1	1	0	0	3	146	46	132	7	0	0	0	13	1	243
totals	47	38	1	1	0	39	2	1	0	0	41	266	71	201	9	0	0	0	33	3	530

Special Projects

Education and Outreach Programming Tri-Lakes Region

By: Emily Martin and Kearsten Cubit

Introduction

The Watershed Stewardship Program (WSP), now in its twelfth year of existence, is a community-based education and outreach program based out of the Paul Smith's College Adirondack Watershed Institute. The main goal of this program is to develop awareness and educate the public about the importance of maintaining healthy water ecosystems and preventing the spread of aquatic invasive species (AIS). This objective is accomplished through the careful monitoring of boat launches within the tri-lakes region. Along with boat inspections and recreational surveys, each steward educates boaters and the general public through interpretive messages, informational materials, discussion and knowledge of problematic species. Not only is this an excellent venue for spreading the knowledge of AIS, but it also serves as a means to better understand recreational watershed usage for a more complete understand of the potential for AIS contamination and spread throughout the region.

In addition to boat launch education, the WSP enables each of its employees to dedicate some of their time away from the boat launch working on a special service project related to the goals of the program. Being a key component of the WSP, educational outreach was offered as a project this summer. Thanks to a generous grant from the Lake Champlain Basin Program (LCBP), two stewards were deemed Environmental Issues Educators (EIE) and took on the role of furthering the message of the WSP and the LCBP in order to educate more of the public about such an important issue.

One of these educators was stationed at the Paul Smith's College Visitors Interpretive Center (the VIC) two times per week. This location is an attractive choice due to its frequent visitation (about 50,000 people annually) that includes both locals and tourists alike. The college has also recently acquired the VIC, so this presented a great opportunity to incorporate the goals of the WSP and the LCBP into the interpretive media at the VIC. The other EIE traveled around the tri-lakes region one day a week and delivered our message to campgrounds, farmers' markets, community events and other events that presented an opportunity for outreach. Some of these locations included Fish Creek Pond State Campground, Saranac Lake Public Library, The Wild Center, Franklin County Fair, and the Saranac Lake and Plattsburgh farmers' markets. Throughout the summer, the two educators were able to reach a large portion of the public not typically seen at the boat launches and shared our message through presentations, interpretive walks, kids programs, models and various other educational experiences.

Emily Martin's Summary Reflection

One of the most rewarding aspects of being involved in the Watershed Stewardship Program was the opportunity to be involved in a wide range of activities based on individual interests. Through my involvement in the program, I could be stationed at the VIC on the weekends as an Environmental Issues Educator. As a student pursuing environmental education, this was an amazing opportunity to immerse myself in something that I am already so passionate about.

My weekends spent at the VIC quickly became my favorite days of the week as they were filled with unique experiences that allowed me to reach a different audience than the one I normally talked to at the boat launches. I was able to involve myself in many ways and it was a great venue to spread the knowledge of aquatic invasive species, as well as the messages of both the Watershed Stewardship Program (WSP) and the Lake Champlain Basin Program (LCBP). The audience at the VIC was very receptive and consisted of locals interested in learning more about the program, as well as visitors from other areas that were amazed at this type of involvement and concern for the local watersheds.

Throughout the summer I took on several projects, some of which involved environmental education for the VIC and some of which displayed the messages of the WSP and LCBP. I created an interactive table display to allow visitors to see and learn about some of the flora and fauna they may see around the property, helped the VIC program manager re-create and run the Little Bobcats program for young children, and I updated the Barnum Brook Tree Game as a way for visitors to have a more interactive learning experience. I also had the opportunity to interact with a majority of the visitors at the front desk, do trail maintenance work, and assist with other special events at the VIC.



Figure 138- Interactive display designed by E. Martin, located in the VIC lobby.

The most fulfilling projects I took on at the VIC were those that involved educating visitors about the importance of protecting our watersheds and preventing the spread of invasive species. Through the creation of a semi-permanent table display and presentation board, the messages of both the WSP and the LCBP were displayed to visitors throughout the summer, even on the days that I wasn't at the VIC. This display was a huge success as the focal point of the exhibit room and the brochures and informative materials had to be restocked every week! When I was at the VIC on the weekends, I used this display, along with various samples, to educate visitors that passed by the table.

I also held a few 'Steward on Site' days in the VIC and on the trails throughout the summer. This allowed me to get out on the trails and share our message about preventing the spread of aquatic invasive species. I typically held the 'Steward on Site' days along the Heron Marsh Trail, which is frequented by the majority of visitors and also served as a great introduction to discussing the importance of wetlands and keeping these unique areas a healthy, functioning ecosystem.

One of the most successful means of educating visitors about our program and the message of the LCBP was the weekly 'Native and Invasive Species' interpretive walk. Though this was my first experience giving

interpretive walks, I came to really enjoy teaching people in such an interactive way and every visitor that attended my walk commented on how much they learned about invasive species that they didn't know before. The topics covered terrestrial, aquatic and forest pest species and the importance of doing all that we can to protect our native ecosystems from potential invaders. I think this style of teaching our message was very successful. On the downside, I usually only got a few attendees that happened to be at the VIC at 1:00. It would be nice in the future to have the advertisement for the walk reach a wider audience to bring in more attendees or to do the walk more than just once a week and possibly several times throughout the day. I also think it would be really popular to do a version of the Native and Invasive species walk in other areas and for different audiences.



Figure 139- WSP display, designed by Environmental Issues Educator Emily Martin, in the VIC lobby.

While I enjoyed interacting with guests and educating visitors, I do wish that my children's programs were more successful. The purpose of writing the lesson plans was to incorporate the messages of preventing invasive species, as well as using the Watershed Model to teach kids about the importance of keeping our waters clean. Despite advertising the free events around the community, I did not get any participants. In the future, I think it would be really beneficial to take these events outside the VIC to summer camps or campgrounds where there is a guaranteed audience.

Despite the setbacks, my experiences at the VIC allowed me to further my passion for environmental education and proved to be a great place to get the word out about protecting our wetland ecosystems, preventing the spread of aquatic invasive species, and being good stewards of the environment. I definitely believe having a steward working at the VIC is an integral part of the program as it allowed me to spread the message of the WSP and the LCBP to hundreds of visitors, from near and far, in just one short summer. I am very grateful for

this opportunity and would like to thank the VIC staff, the Watershed Stewardship Program and the Lake Champlain Basin program for making this experience possible.

Kearsten Cubit's Summary Reflection

I was excited to be designated an Environmental Issues Educator as it is so closely tied to my Environmental Psychology major. It enabled me to discuss a topic that I was passionate about to others who showed similar enthusiasm. Being able to discuss with the public, particularly the children, became ideal, as the community's support is essential to the success of managing our waterways.

Saturday became my designated education day on which I was instructed to draw up a calendar of events that would be suitable for educational purposes. I was able to find a significant number of events that looked promising to attract a good amount of people. For instance, the Plattsburgh Farmers' Market brought approximately 30 community members to my station. They were all immensely interested in the topic of invasive species and adored the watershed model provided by LCBP.



Figure 140- Demonstration of watershed model at the Saranac Lake Bioblitz with Educator Kearsten Cubit.

I used the watershed model to illustrate how soil erosion and human-used chemicals such as pesticides can pollute a watershed. This, along with a stand-up bulletin board displaying pictures and data collected by previous stewards, helped illuminate my station. Additional pamphlets, samples, and stickers also helped catch the eye of a passerby.

Once drawn to my station, people seemed pleased with what the program was doing and often thanked me for being there. Sometimes I would find myself in a discussion that lasted over 30 minutes. It even seemed that throughout the summer, people were becoming more aware of the issues that the program is dealing with. Many of them also seemed more than eager to play their part in helping keep our waters clean. This was one of the most

rewarding aspects of the job. Witnessing the care by those who share this waterway gave hope that this daunting task is not as impossible as some may think.

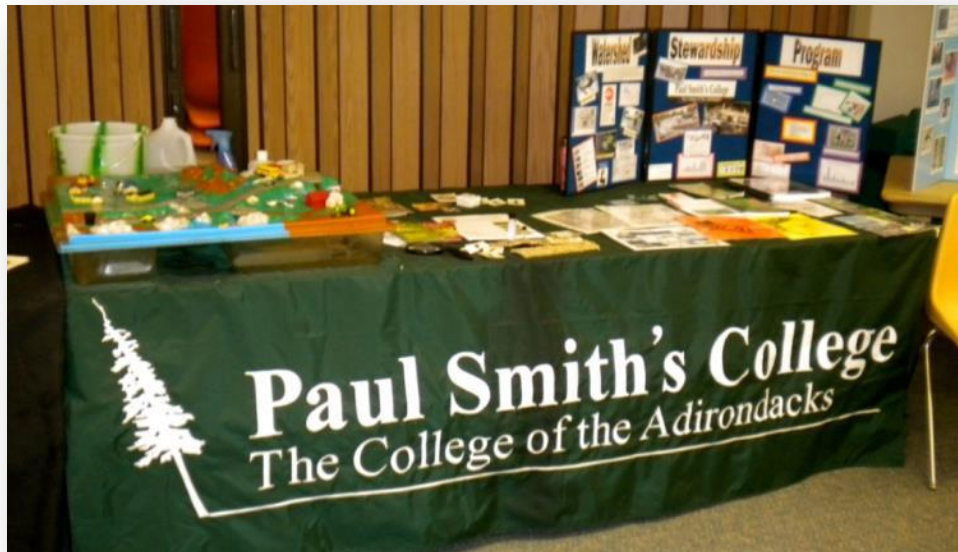


Figure 141- Traveling display table for the Education Program by Kearsten Cubit.

Overall, my experience with the educational sector of the WSP was phenomenal. Not only do I hope that my words meant something through the ears of my listeners, but I wish them to understand how they have helped me. Through their constant questioning, I was forced to keep up with a lot of the information that the WSP is dealing with. Therefore, I was placed in an environment that was conducive to learning and pushed me to higher limits. I am now ending this job with a far greater understanding of our ecosystem than when I began. I want to thank both the WSP and LCBP for providing me with such an experience. Also, I wish to thank again all those who I have come across while venturing from event to event.

Environmental Issues Educators: Combined Visitor Contacts

The two EIE's worked together and independently to contact the public at a variety of venues across the Lake Champlain Basin. They educated visitors in both formal and informal formats. Typical formal programs included structured lessons and/or demonstrations with assigned visitor groups, promoted and titled programs advertised to visitor groups with durations of 20 minutes to an hour, and pre-planned interpretive programs offered on trails. Informal educational opportunities included walk-by contacts in which the public stopped by prepared tabletop displays at public venues including the VIC, farmers' markets, county fairs, and other public venues. The two EIE's kept a record of the number of public contacts they made throughout the summer. This inventory gives some indication of the impact of the program. It should be noted that the EIE's wore the Watershed Stewardship Program uniform and displayed the logos and materials of three cooperating organizations: Paul Smith's College, the Watershed Stewardship Program, and the program sponsor, the Lake Champlain Basin Program.

In total, the two EIE's contacted almost 4,000 members of the public through their formal and informal programming, extending important environmental education information of the WSP and LCBP into new venues, and presumably to new groups of constituents. The WSP would like to recognize the Lake Champlain Basin Program's Education and Outreach Grant Program for their support of this important effort to protect the quality of both the Lake Champlain watershed and water everywhere.

Table 103- Total public contact for Education and Outreach Programing in Tri-Lakes Region.

Day of Week	Date	Program Venue	Type of program	Number of Visitors
Saturday	26-May	VIC	Informal	206
Sunday	27-May	VIC	Informal	116
Saturday	2-Jun	VIC	Informal	200
Sunday	3-Jun	VIC	Informal	90
Tuesday	5-Jun	VIC	Informal	39
Saturday	9-Jun	VIC	Informal	59
Tuesday	12-Jun	VIC	Informal	29
Saturday	16-Jun	VIC	Informal	166
Tuesday	19-Jun	VIC	Informal	179
Saturday	23-Jun	VIC	Informal	100
Saturday	23-Jun	SUP Festival	Formal	15
Sunday	24-Jun	VIC	Informal	100
Saturday	30-Jun	VIC	Informal	175
Saturday	30-Jun	Fish Creek Pond Campground	Formal	11
Sunday	1-Jul	VIC	Informal	140
Saturday	7-Jul	VIC	Informal	200
Saturday	7-Jul	Paul Smiths College Scavenger Hunt	Formal	15
Saturday	7-Jul	Runabout Rendezvous Boat Show	Formal	10
Sunday	8-Jul	VIC	Informal	190
Saturday	14-Jul	VIC	Informal	155
Saturday	14-Jul	Saranac Lake Bioblitz	Formal	26
Sunday	15-Jul	VIC	Informal	150
Saturday	21-Jul	VIC	Informal	138
Saturday	21-Jul	Plattsburgh Farmer's Market	Formal	35
Sunday	22-Jul	VIC	Informal	150
Saturday	28-Jul	VIC	Informal	200
Saturday	28-Jul	Wild Center	Formal	25
Sunday	29-Jul	VIC	Informal	100
Saturday	4-Aug	VIC	Informal	225
Saturday	4-Aug	Clinton County Fair, Malone	Formal	60
Sunday	5-Aug	VIC	Informal	156
Saturday	11-Aug	VIC	Informal	122
Saturday	11-Aug	Essex County Fair, Westport	Formal	29
Sunday	12-Aug	VIC	Informal	253
Saturday	18-Aug	Adirondack Mountain Club	Formal	20
Saturday	25-Aug	Second Pond Boat Launch	Formal	55
Saturday	1-Sep	VIC	Formal	10
Total Public Contact for Formal Programs				301
Total Public Contact for Informal programs				3648
Grand total				3949

Education and Outreach Programming West-Central Adirondack Region

By: Katie Metz, Watershed Steward

Introduction

This year marks the thirteenth consecutive year of steward presence at boat launches and public education throughout the Adirondacks. Although most of the Watershed Steward's time is spent inspecting boats at a launch, the steward must also dedicate himself or herself to a project that is of interest to them. A newer form of public education was brought about this year in the most recent form of social media. Although a side project of this capacity was brought upon a few stewards last summer, the Watershed Stewardship Program thought in this day and age and with the ever popular and growing attention towards social media, this should be a whole new separate project.

This special project involved manning and updating a brand new Facebook page, Twitter page, and added this summer, a Wordpress blog. Additionally, two times during the summer the steward was also responsible for writing both Tri-Lakes and Western July and August Newsletters.



Figure 142- Adirondack Watershed Stewardship Program Facebook Page.



Figure 143- Adirondack Watershed Stewardship Program Twitter Page.

The Adirondack Watershed Steward

*Paul Smith's College Watershed
Steward Program: Summer 2012*

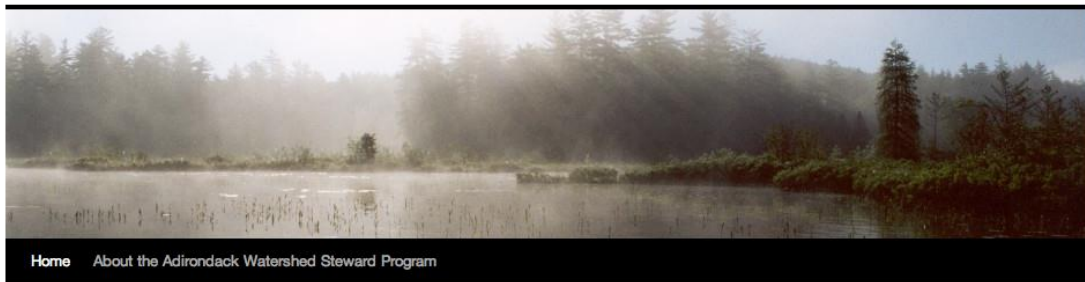


Figure 144- Adirondack Watershed Stewardship Program Wordpress blog.

Methods

The steward met with Kathleen Wiley each Friday at the beginning of the summer, then each Thursday towards the end of the summer. Every Friday posts and updates were scheduled for the following week. After a first few meetings a schedule was thought up as to what each weeks posts would consist of. The schedule was as follows:

Table 104- Weekly social media schedule.

Mon.	Profile day: Each week 3 stewards are highlighted
Tues.	Site Profile day: Each week a new boat launch was highlighted
Wed.	News of the week
Thurs.	General news: Outbreaks, trends, species found

The WSP had also hired a new addition to the team to help all of us understand better how to communicate with the public through these social media sites. Jack K. Drury is the Vice President and CFO of Leading E.D.G.E.'s North Country office. Jack has specialized in experimental learning for 25 years as well as providing training to educators all over the world. Jack was a great asset to have throughout the summer and without him, our social media posts and blog would not be half as successful.

At the beginning of the summer Kathleen, myself and Jack would meet via Skype conference calling and discuss posts, what was appropriate for the sites, how to update our Facebook, what to post on what days, what days we should post on, and so on. After scheduling posts for the following week, we had to figure out how to get

them on to each and every site. Through trial and error throughout the summer we learned that our best option was making a post to Wordpress and linking that site to the Twitter and Facebook page.

As for the newsletter, posts throughout the months eventually wrote the newsletter for us. We would include recent news, and updates on species spread as well as articles written by stewards when they were attending special festivals or gatherings. Newsletters had been written in the past so we mostly went with the same theme and outline of recent newsletters. Two were written each month, one for the Eastern Stewards and one for the Western. For the most part these newsletters were similar except for biographies of the stewards and if an article was pertaining to or written by a specific location of the Adirondacks.



Figure 145- The Channel newsletter (Eastern Adirondacks) July 2012 front page.

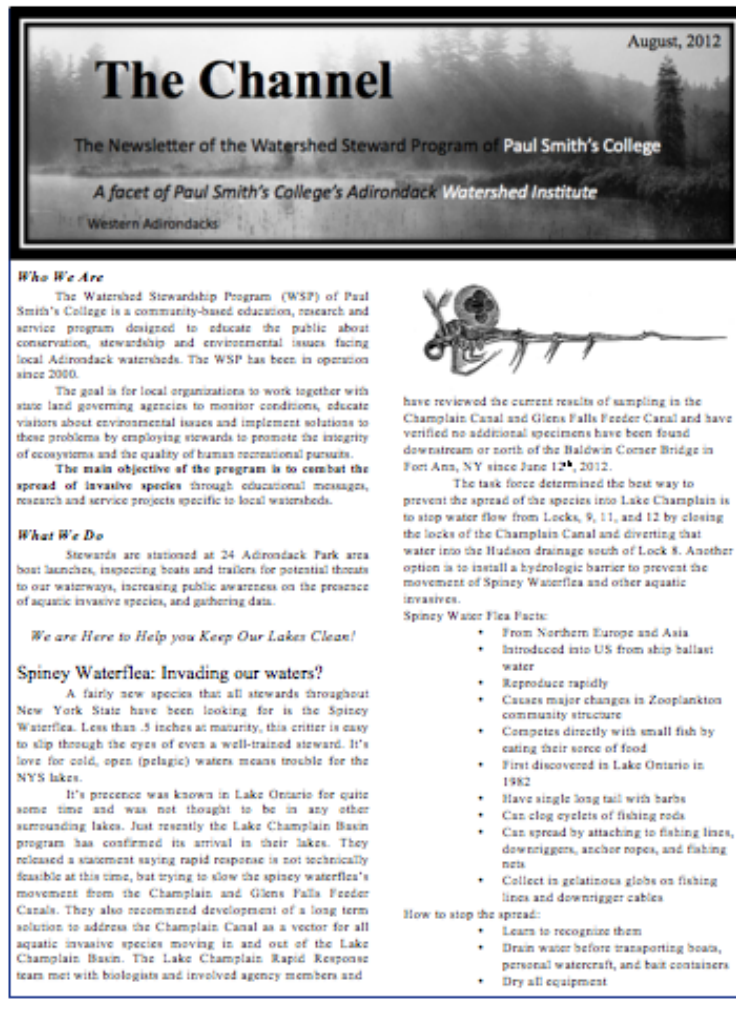


Figure 146- The Channel newsletter (Western Adirondacks) July 2012 front page.

The Watershed Stewardship Program works closely with many local organizations in the towns and villages in which stewards are stationed. As part of this co-operative effort, stewards attend meetings and other functions to show the programs support as well as present new material, identify samples, and answer questions. A staple of the steward's visit is often a presentation on information that the organization inquires about. This years presentations varied based on the audiences prior involvement with the Watershed Stewardship Program. The topics included, 2011 data, graphs and maps, Eurasian Watermilfoil (*Myriophyllum spicatum*), Spiny Waterflea (*Bythotrephes longimanus*), and Hydrilla (*Hydrilla verticillata*). Audiences seemed very receptive to the messages and often had questions relating to the prevention and management of these invasive species.

Table 105- Number of people attending Watershed Steward presentations in west-central Adirondack Region.

Organization Name	Approximate Number in Attendance
Fulton Chain Of Lakes Association	20
Big Moose Association	75
Raquette Lake Preservation Foundation	35
Long Lake Association	15
Twitchell Lake Fish and Game	

In addition to the meetings held where stewards were presenting, a number of other meetings and functions were attended. These functions included 2 Fulton Chain of Lakes Association board meetings, the Adirondack Chapter of the Antique and Classic Boat Associations boat show.

Results

Overall with this being the first summer to truly focus on social media, the project went fairly smoothly. There were a lot of challenges to work out in the beginning. This project was definitely a trial and error run for this special project. We saw what worked and what didn't, what flowed and what did not.

Throughout the summer we gained a new seamless Facebook "like" page and eighty-two likes to go with it. At the beginning of the summer, our Twitter page was just a side project but now is a fully functioning website with forty nine people interested in what we have to say and or put out there for the public to see. Our Wordpress blog, which was non-existent before this summer, has helped us jump a lot of hurdles that we came across this summer.

Meetings were also attended throughout the summer by a numerous amount of stewards as part of the public outreach portion of the project.

Conclusion

As this project and social media grows even further, I believe the public will understand more about the message we are trying to convey and how we are trying to do it through these sites. Social media is a great power and this program is smart by learning how to harness that power and allow for not just boaters to know about our program, but for everyone to know about our program. The more people know about this program, the less strange looks and side glances we will get at the boat launches and the more perceptiveness and eagerness we will receive instead.

Public awareness is one of the best forms of education. People want to know what is happening to their surroundings. With this social media and public outreach program, nothing is left to the imagination; everything you want to know and learn about can be publically accessed by anyone who truly cares. The program would like to thank Jack Drury and all the stewards who contributed to posts, thoughts, and so on.



Figure 147- Social media promotion.

Ecological Monitoring and Conservation Assistance

Introduction

In addition to their standard special projects a few stewards assisted with other conservation projects occurring in the west-central Adirondacks. This included conducting invasive aquatic species surveys for Paul Smith's College Adirondack Watershed Institute (AWI) along with surveying local waterbodies for frogs for the Adirondack All Taxa Biodiversity Inventory (ATBI), and assisting the DEC Forest Ranger at Stillwater Reservoir.

The mission of the Adirondack Watershed Institute is to create scientifically-sound knowledge of terrestrial and aquatic ecosystems and human relationships with the environment while creating educational opportunities for undergraduate students and engaging the Adirondack community to promote stewardship of our natural resources (Adirondack Watershed Institute). One of the many tasks the AWI the mapping and removal of milfoil (Eurasian watermilfoil and variable-leaf milfoil). Watershed Stewards were able to assist with milfoil mapping at both Lake Eaton and Long Lake this summer. Variable-leaf milfoil had been found previous years in Long Lake but had never been detected in Lake Eaton before.

The Adirondack ATBI seeks to survey the diversity of life within the Adirondack Park and connect people to the land of which they are the stakeholders through participating in biological inventories (Milewski & McNulty, 2006). The stewards were able to assist with this through conducting frog call surveys at local waterbodies. New York State contains fourteen species of frogs and toads (Order Anura) nine of which can be found in the

Adirondacks (DED; ESF). Special emphasis was put on mink frogs (*Lithobates spetentrionalis*) since they are typically found in northern areas and can be rare in warmer locations (DeGraaf, 1983). A shift in their range northward could be caused by climate change. The data that the stewards are providing is presence-absence data and will be useful when conducting future inventories.

A steward also helped the New York State Department of Environmental Conservation at Stillwater Reservoir.

Methods

While assisting the AWI with milfoil mapping on Lake Eaton and Long Lake the stewards would paddle a canoe or kayak around the 10-15 foot depth contour line based off of DEC depth charts. If any species of milfoil was found the position was marked and a sample was taken and placed in a Zip-lock bag for future analysis by the aquatic plant experts at the AWI.

The watershed stewards helping with the Adirondack ATBI were trained by Paul Smith's College Professor David Patrick Ph.D. in the identification of mink frogs and the calls of common Adirondack frogs. The stewards practiced identifying the frog calls using the USGS frog call quiz (<http://www.pwrc.usgs.gov/Frogquiz/index.cfm>). While conducting frog surveys for the Adirondack ATBI the stewards would go to a waterbody and wait 10-15 minutes for the area to settle. Then they would listen intently for a three minute time period during which they would listen for the number of species present and estimate how many individuals of each species were present.

The steward at Stillwater Reservoir assisted the Forest Ranger and Assistant Forest Ranger with trail maintenance near Shallow Lake in the Five Ponds Wilderness Area. He also helped repair, replace campsites signs and help fight a forest fire.

Results

Steward EJ Borchert:

Lake Eaton has no invasive species

Mink frog data:

Long Lake Boat Launch- 8 green frogs

Canoe Carry into Forked Lake- 0 frogs

Utowana Lake- 0 frogs

Steward Tim Grossman

Found Variable leaf milfoil in Long Lake. This led to AWI doing an official survey and finding it.

Mink frog Data:

Steward Mike Bicknell

Helped with trails, campsites, and put out a forest fire.

Shallow Pond- 2 mink frogs



Figure 148- Mink frog (<http://www.paulsmiths.edu/ATBI/amphibian.php>).

References

Adirondack Watershed Institute. Retrieved from http://adkwatershed.com/about.asp?pages_name=mission

DeGraaf, R.M., & Rudis, D.D. (1983). *Amphibians and reptiles of New England: Habitats and natural history*. Amherst, Massachusetts: The University of Massachusetts Press.

Milewski, C., & McNulty, S. (2006). *Project plan for the all taxa biodiversity inventory*.

Loon Monitoring

Lead Author: Andrew Bull, Co-authors: Timothy Grossman, Emma Horton, Matthew James and Kyle Milner



Figure 149- Adult loon with chick on Upper St. Regis (A. Bull).



Figure 150- Adult presenting chick with fish held crosswise in bill (A Bull).

Common loons are thought to be monogamous by remaining with the same partner for life; they breed once per year with mating and rearing of chick happening in the summer. They arrive in the territory of choice in

early spring together and usually establish a territory of 60 to 200 acres in size that they patrol with regularity (Kirschbaum, Rodriguez 2002). The courtship begins as soon as the pair is on their territory and may continue up through June pending that the nesting has not begun. The nest of the loon is usually built in a sheltered location and can be situated on islands or peninsulas projecting into the water, nests may be artificial or of natural material and reconstructed each year. The same nest site may be used by the same pair year after year. Once the nest is completed the courtship display is what is sure to follow, the display varies in duration from a minute or two up to forty-five minutes, most lasting from three to ten minutes. The copulation that follows will begin with the female sitting on the nest, the male will climb onto her back with his feet on her shoulders and this allows for cloacal contact. She will raise her tail and move it to one side and copulation follows, this will last a few minutes and then the male will walk over her shoulders and enter the water to preen, the female will sit with her tail up for two to three minutes more before she will enter the water and also preen (McIntyre 1988). The female will lay 1-3 eggs with the usual number being 2; the eggs are light brown and are laid one to two days apart. The incubation last for 29 days and is done by both the male and female. The chicks will hatch asynchronously usually one to two days apart and will stay in the nest for a day or two following hatching. The developmental phase for the chick will last two to three months, during which the young will be escorted by the parents around the territory by either riding on the parents back or by swimming along side of the parent. They are able to dive short distances after only 3 days of age and are able to fly after two to three months thus reaching the fledgling phase (Kirschbaum, Rodriguez 2002).



Figure 151- Loon Eggs in a bowl style nest on Upper St. Regis 2012 (A Bull).

The success of the chicks reaching the fledgling age is dependent upon many contributing factors. Predation of not only the eggs but of the juvenile loons is of great concern; the threat can come from one of many fronts such as avian predation like in the case of eagles, osprey and various gulls have been known to take young chicks. The risk may also come from mammalian predation like mink, raccoon, skunk and fisher or it may yet come from reptilian and fish predation in the case of snapping turtles and large fish such as muskellunge, pike and bass. But the biggest threat to their well-being has to be the ever constant threat from the deposition of particulate

matter coming from industrial pollutants in the western states that accumulates in the aquatic systems that the loons annually reside in (Kirschbaum, Rodriguez 2002). The bioaccumulation of mercury (Hg) can affect behavior, physiology, and survivorship in both chicks and adults. The affects can include lethargy in adults, compromised immune systems and changes in blood biochemistry. Studies showed that individuals high in Hg spend less time incubating eggs which may lead to clutch failure. Lead (Pb) found in the aquatic system that comes from the use of lead sinkers from the fishing industry are ingested by the loons mistakenly for pebbles that are used to aid in digestion. Lead poisoning affects the nerve impulse transmission with clinical signs such as head-shaking, wing and eye droop and gaping; long term affects will lead to decreased weight, body fat and muscle mass and can lead to death (Barr et al. 2010). Acid rain is also of concern when talking of loon fledgling success since it affects the overall chemistry of the lake by releasing aluminum ions into the water that are then taken up by the fish through their gills, it increases the release of mercury into the water column and permits faster uptake through the food chain. The plankton and vegetative communities are also affected slowly changing the dynamic of the lake making the productivity degrade and making it a less hospitable place for loons to find food and raise their young (McIntyre 1988).

The Biodiversity Research Institutes Adirondack Center for Loon Conservation or BRI annually capture Common Loons in the Adirondack Park, for banding as well as the collection of blood and feather samples that will be used to determine blood mercury levels, gender identification if unknown and other aspects such as weight and size of the bird. The principal undertaking of the BRI's annual field staff is to monitor the progress and reproductive success of the loons both banded and un-banded across the Adirondack Park. Their goal is to supervise the population and verify the effect of the heavy metal populations in aquatic ecosystems and how it is affecting the common loon its behavior and reproductive success in the Adirondack Park.

Methods

The Biodiversity Research Institutes Adirondack Center for Loon Conservation has had the help of the Watershed Stewards to perform loon monitoring for some time now. Each year the stewards are responsible for monitoring the Common Loon (*Gavia immer*) on the lakes that are assigned to them by the BRI in relation to where they will be stationed for their primary duties of work. The monitoring began on June 6th, 2012 and ended on September 2nd, 2012. Monitoring was done 1-2 days per week, on the same day each week dependent on weather conditions.

Using kayaks, observations would begin at 6-7am in order to take advantage of calmer waters and slow boat traffic, observation time was dependent upon number and size of territories but usually lasted from 5 to 6 hours. Observations and the behaviors were obtained at a distance using 10 x 42 binoculars when close proximity to the loons was not an option. Data recorded into a field notebook included time of day, weather, Beaufort scale, water conditions, number of loons present, is the territorial and or nesting pair present, nest location, nest type, clutch size, and number of chicks to hatch and fledge. The loons were observed for colored bands on the legs; the left leg and right legs would both have colored bands that are associated to that bird only. The right leg would also contain a number on the bands that like the colors signifies who the bird is and other information taken from the bird at the time of its banding. All data collected each week was then entered into the BRI's data forms given to the steward at the loon monitoring training that was provided by the local BRI representative.



Figure 152- The bands on this bird are orange/yellow as seen on the left leg (A Bull).

Results

Tri-Lakes Region Lakes

Upper St. Regis Lake

During the summer of 2012, Upper St. Regis contained six territories, five of which were either shared or occupied by loons. Two territories were occupied by nesting pairs both having one chick fledge. One pair nested in the Pearl Island territory it was first observed on June 6th and consisted of a female that was banded with orange/yellow on the left leg and the band number of #898-091-14, and her un-banded male mate. They had one chick that was first observed on June 20th it was able to fledge at the end of the season. Though it cannot definitively be said it is the same male as last year, this is the same female that occupied the Pearl Island territory last year. This year they were able to successfully have a chick as opposed to last season when they did not hatch a chick.

The Spring Bay pair both of whom are un-banded loons were both spotted on June 6th in their chosen territory; they are also a repeat nesting pair that has occupied the southeastern corner of Spring Bay for the last couple of seasons. Last season this pair hatched and reared to chicks to the fledgling phase. This season however they had a clutch of two eggs both hatched and were first observed on July 22nd, one chick was predated some time after hatching. The remaining chick was able to make it to the fledgling phase of its life and should migrate with its parents at the end of the season.

Spitfire Lake

Spitfire Lake contained one territorial pair that has nested on this same lake for many years. The pair first observed on June 6th had built a scrape nest on the rocky island that has been the only nesting location on Spitfire for the loons. The pair produced a clutch of two eggs, but for unknown reasons the pair abandoned the nest leaving the eggs behind shortly after on the 9th of July the eggs also went missing. From that point on the pair was only rarely seen on Spitfire and not on every outing to that territory. The male was an un-banded bird and the female was banded with orange/green on the left leg and a band number of # 649-088-50. This is the same female from this territory last year the male being un-banded is believed to be the same mate but that cannot be proved.

Lower St. Regis Lake

Lower St. Regis Lake had two territories both with mated pairs; one pair nested near the Paul Smith's College Forestry Cabin. This pair first observed on July 4th included a banded male with colored bands yellow/red on the left leg and band number of #898-090-98. This male had an un-banded mate they produced two eggs both of which hatched; the young were able to be raised to the fledgling stage of life and should be able to migrate with

the parents. The second pair was both un-banded they nested close to the channel on the opposite side of the lake they were first observed on June 16th; they were able to hatch two chicks but one was predated upon shortly after hatching the remaining chick was able to survive to the fledgling phase and should migrate with the parents also.

Rat Pond

Rat Pond is located within the Eastern Adirondack Park, near the Rollins Pond, Fish Creek canoe area off of route 30. This pond was home to one nesting pair of common loons. On 6/15/12 the pair built a, "scrape" style nest along the access road. The pair sat on the nest for about a week until it was abandoned for unknown reasons. One small shell fragment was found around the nest the following week suggesting predation.

The Rat Pond nesting pair never did return to that nest or any other nest on the pond for the remainder of the summer. One of the pair was un-banded while the other was banded with the colors: white over green left leg and white/orange right leg.

Green Pond

Green Pond is also located within the Eastern Adirondack Park, near the Rollins Pond, Fish Creek canoe area off of route 30. This pond was home to one nesting pair of common loons. This pair never made a nest all summer. Both loons were un-banded as well.

West-Central Adirondack Region Lakes

North Bay Territory

North Bay, the Largest Bay on Big Moose Lake, provides optimal habitat for nesting loons. In 2011 a pair of unknown loons was observed on 2 occasions with no evidence of a nesting attempt. In 2012 a pair was observed weekly from June 8th through July 19th. On the 15th of June a scrape nest was observed on the eastern corner of Retter Island, two eggs were observed on the nest. Upon the next visit on the 22nd of June both eggs successfully hatched. The chicks were observed on a weekly basis until the 13th of August. The steward continued weekly visits without observing either adult loons or chicks. There is no conclusive evidence to explain the disappearance of the four loons, fatality of the chicks could be a possibility if the adults were observed without them. The vastness of North Bay may have played a role in the fact the pair was not observed, increased personal watercraft use may also have disturbed the pair. Both legs were observed on one adult in the North Bay pair, this loon was un-banded. No legs were observed on the other adult loon.

South Bay

Located on the south end of Big Moose Lake is South Bay, based on past research from BRI South Bay was historically a prime location for nesting loons. The first visit occurred on the 22nd of June, on that visit a floating artificial nesting platform was observed with two eggs. The nest was located in the eastern corner of South Bay at the mouth of Constable Creek. A pair of adult loons was observed close by. Upon the second visit on the 29th of June the eggs that were previously observed were gone. There was no trace of eggshell fragments suggesting a large predator consumed them. The artificial nesting platform showed damage in the form of Styrofoam fragments scattered around. The pair of adults were observed on a weekly basis through the 27th of August it is unknown if either of the birds was banded or made a re-nest attempt.

West Bay

On the 29th of June a pair of Adult Loons was observed with two chicks on West Bay, at the western tip of Big Moose Lake. Visits occurred weekly until the 3rd of August with the exception of the 19th of July. It was undetermined if either adult loon was banded due the presence of chicks, and a high volume of boat traffic. The Loons on West Bay dealt with enough disturbances including boats driving close for photo opportunities.

Big Moose Inlet

The Big Moose Lake Inlet pair of loons successfully hatched one chick in 2011. The pair consisted of one banded loon first observed on the 19th of July 2012. Loon # 669-205-03 was paired with a loon in which it was unknown if the loon was banded or not. Due to the absence of these loons on previous visits it was undetermined if they laid eggs. The nest site of 2011 was first discovered on June 15th 2012 on a previous visit with no eggs present.

Main Lake

The main lake territory on Big Moose Lake is where the public dock is located. A pair of loons was observed June 8th and appeared to have a territorial dispute with another single loon. The pair was again observed on the 22nd of June. After the June 8th visit a single loon was observed on every visit with the exception of the 22nd and 29th of June and the 3rd of August. Due to the close proximity of the public dock and the North Bay territory and the Big Moose Lake Inlet territory it is possible that the pair observed on two occasions may have belonged to a different territory. Due to the high volume of boat traffic at the public dock it was undetermined if the single loon observed was banded or not.

Seventh Lake

In the summer of 2012, Seventh Lake was inhabited by one territorial pair. The pair consisted of two un-banded birds, but the previously recorded female (938-261-20) was not present. The un-banded territorial pair was first observed on June 20 and last on August 15th. Observations took place on a weekly basis. The pair nested on the island in the channel between Eighth Lake Campground and the main lake body. Two chicks hatched on July 8th and a volunteer collected the remaining eggshells for the BRI program. One hatchling died between July 25 and August 1 but the other survived for the entirety of the observation period. Another single loon was sporadically observed near the mouth of Sixth Lake. This bird was never consistently observed and is suspected to be part of the Sixth Lake nesting pair as it was seen entering from Sixth Lake on multiple occasions.

South Pond

South Pond is a small pond on Route 28 halfway between Blue Mountain Lake and Long Lake. South Pond was surveyed for loons in the 2012 season during the dates of June 8th and August 19th. No territorial pairs or nesting pairs were observed, however multiple loons were observed. Many legs were observed throughout the season, however all were found to be un-banded.

Discussion

The BRI and its offshoot the Adirondack Center for Loon Conservation focuses the majority of its research on the effects that environmental pollutants have on aquatic ecosystems and the wildlife that inhabit them. Each season at the end of July and the beginning of August the BRI and members of the New York State Department of Environmental Conservation team up for two to three nights to capture loons that are previously banded, un-

banded as well as juvenile loons to band if necessary. They collect blood and feather samples and examine overall health. The BRI analyzes the samples for toxins such as lead and mercury in order to gain a tighter grasp on the effects that these pollutants have on loon behavior and reproductive success. Lower levels of blood mercury results in greater reproductive success and therefore loons will have a greater ability to perpetuate the species into lakes that are currently unpopulated by loons. If high mercury levels are allowed to continue it will further disrupt the already delicate nature of Common Loon reproductive levels, which may be evident by the number of nest failures and pairs that continue to have difficulty raising young to fledgling levels constantly year after year. This year the numbers of failed nest and young predated upon had increased from last year more one pair this year had a nest failure and more than one pair had young predated upon. These numbers are not optimistic but it is difficult to say why this is the case without future study.

Conclusion

Within the 2012 season on all the lakes and ponds monitored there were 13 territorial pairs as well as many loner or visiting birds being seen as well. The 13 pairs were cumulatively able to have 9 chicks fledge but also lost 5 eggs and 5 chicks most likely to predation from one source or another. It is always essential to stress the importance of the anthropogenic impacts that humans can have on the Common Loon and its habitat. The splendor and beauty of the loons should be observed from an appropriate distance as to not interfere with their behavior or disrupt their habitat.

With so many people determined to aid in the protection and longevity of the Common Loon through the monitoring of its health and population levels their survival in the Adirondack Park is a very possible goal. The population levels are similar to last year as to say that some loon pairs had chicks that did not last season as well as pairs that fledged two chicks that lost both eggs and did not re-nest. These events cannot be explained without further study but it is positive to see more loons at least nesting and producing eggs that hatch unfortunate enough it is when the young are predated upon so early on in life. Just as long as we stay diligent on protection and monitoring the Common Loon we are taking the proper steps in steps to ensure the call of the loon will be heard by generations to come on the lakes of the Adirondacks.

Literature Cited

Evers, David C., James D. Paruk, Judith W. McIntyre and Jack F. Barr. 2010. Common Loon (*Gavia immer*), *The Birds of North America* (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology;

Forbush, E.H. 1925. *Birds of Massachusetts. Part I.* Mass. Dep. Agriculture.

Kirschbaum, K. and Rodriguez. 2002. "Gavia immer" *Animal Diversity Web*. Accessed August 15th 2011

McIntyre W. Judith. 1988. *The Common Loon Sprit of Northern Lakes* University of Minnesota Press.

Judith W. McIntyre., Jack F. Barr., Evers, David C., and James D. Paruk. 2010. *Conservation and Management. GAVIIDAE online Journal Issue No.313*

The effect of temperature and pH on the growth of Variable-leaf Milfoil (*Myriophyllum heterophyllum*)

By Claire Baker and Michelle Berrus, Watershed Stewards
and Dr. Celia Evans, Science Director

Introduction

Biological diversity is important for an aquatic ecosystem's health and resiliency (Balvanera, Pfisterer, Buchmann, He, Nakashizuka, Raffaelli and Schmid, 2006), especially in this time of a changing climate (Parmesan and Yohe, 2003). The combined effects of invasive species, global climate change (Patrick, Boudreau, Bozic, Carpenter, Langdon, LeMay, ... Quinn, 2012), and interactions among climate, species and other abiotic factors (pH for example) may lead to shifts in ecosystem structure and function, and ultimately a reduction in biological diversity.

Invasive non-indigenous species refer to certain species, non-native to an ecosystem, that undergo a rapid spread after establishing strong, self-sustaining populations (Argue, Kiah, Denny, Deacon, Danforth, Johnston and Smagula, 2005). Invasive species are often correlated with negative ecological, economic and human-health effects (Ruiz and Carlton, 2003). These effects include – but are not limited to – reducing native plant diversity, altering sediment and nutrient processing, disturbing natural wildlife habitat, interfering with recreational activities, and decreasing property values (Pimentel, Lach, Zuniga and Morrison, 2000). A rise in invasive species on a global level has been observed to cause a decline or extinction in many indigenous species populations (Lovell and Stone, 2005).

Variable-leaf milfoil is a submersed aquatic plant, that grows rapidly and spreads easily by fragmentation, making it an extremely aggressive invader. It is able to form dense mats at a lake's surface, blocking sunlight from reaching other submersed aquatic plant species (Glomski and Netherland, 2008). These mats tend to reduce circulation in shallow waters, causing an increase in temperature (Argue et al., 2005). Variable-leaf milfoil (*Myriophyllum heterophyllum*) is considered invasive in the Adirondacks in northern New York, but is native to southwestern Quebec, North Dakota, New Mexico and Florida (Glomski and Netherland, 2008). VLM has only been identified in 25 of more than 3,000 lakes in the Adirondack Park, and has only recently been labeled as invasive species to the Adirondacks. The date of origin of Variable-leaf Milfoil in the Adirondack Park is unknown; however, it was first listed as an invasive species by the Adirondack Park Invasive Plant Program (APIPP) in 2009.

Climate change threatens the planet's ecosystems in a dynamic way that is difficult to predict (Hellmann, Bryers, Bierwagen, and Dukes, 2008). In the Northeastern region of the United States, the temperature is expected to increase 2.5 to 4 degrees Fahrenheit in the winter season, and 1.5 to 3.5 degrees Fahrenheit in the summer. If this trend continues until the end of the century, Northeastern winters are expected to shorten by half, providing for a longer growing season and earlier first-leaf and first-bloom dates for terrestrial plants (Frumhoff, McCarthy, Melillo, Moser and Wuebbles, 2007). These changes in the length of the growing season will also be reflected in lakes with earlier ice out times warmer water, and longer growing season for aquatic plants (Fang and

Stefan, 1999). Very little published research exists that examines the effect of temperature change on aquatic macrophyte growth, particularly invasive species, in the Northeastern United States. Some research has led to the hypothesis that an increase in temperature may be disadvantageous for native species that are adapted to historical conditions, and may give a competitive advantage to invasive species from warmer climates (Patrick et al 2012; Byers 2002; Dukes & Mooney 1999; Thuiller et al. 2007; Vilà et al. 2007). The details of community response, however, will depend on the plasticity and environmental tolerance of individual species that make up different macrophyte communities. Based on the native presence of VLM in Florida and more southern lakes, it is reasonable to hypothesize that increased temperature in Adirondack lakes would likely increase the growth of VLM

New York State's waters (specifically in the Adirondack Mountains and forests) have, since the mid-1970's, been recognized as seriously threatened by acid rain (Roy, Kretser, Simonin, Bennett, 2000). The majority of lakes in the Adirondack Mountains tend to have low buffering capacity and have been specifically identified as sensitive to acid deposition (NYS DEC, 2012). Although legislative actions have effectively reduced acid-rain causing emissions of the mid-west, the goal of protecting sensitive areas from the effects of acid rain requires more stringent legislation (Roy et. al, 2000). VLM is native in locations with alkaline waters, and it is possible that high pH inhibits the growth of variable-leaf milfoil, which has led to the hypothesis that low pH may be a reason for the recent rapid spread of the plant Adirondacks lakes (Argue et al., 2005).

In order to predict the effect of climate change on the invasive potential of VLM across a range of acidity in Adirondack lakes, this research tested two variables that have been suggested to increase the growth and overall health of this high-risk invasive: temperature and pH. Based on available information regarding the ideal habitat for VLM, we hypothesized that there would be an increase in growth in water with a warmer temperature and more acidic pH. The combined effects of these variables on viability and vigor were examined.

Methods

Experimental Design

In this laboratory experiment, 2 temperatures and 10 different pH treatments were applied in a split plot design to measure the effects on Variable-leaf Milfoil (VLM) for 6 weeks. Four replicates of each temperature and pH treatment combination were created, resulting in a total of 80 containers with each containing 1 strand of VLM.

Temperature and pH treatments were based on data from field studies that represent limnological characteristics of north and central Florida lakes, as well as Raquette Lake, which is located in the Adirondack Park in Northern New York (De Angelo, Laxson and Yerger, 2012; Shannon and Brezonik, 1972). These areas were chosen to simulate both temperature and pH levels of lakes where VLM is native, such as in Florida lakes (Glomski and Netherland, 2008), and where VLM is invasive, such as in Raquette Lake (Holmlund, Wiley, Paul, Haynes, Martin, Milner, ... Potel, 2011). Water baths within two 41qt. bins were left at room temperature, averaging $23.1 \pm 0.6^\circ\text{C}$ (cool). The other 2 bins were heated, averaging a temperature of $33.1 \pm 0.6^\circ\text{C}$ (warm) using submersible water heaters. Aquarium pumps were used to circulate water and equilibrate temperature. The warm temperature treatment was based on a study determining the average temperature levels of Florida lakes, with the warmest extreme reported at 35°C (Beaver, Crisman and Bays, 1981).

Twenty quart-sized Mason jars in each water bath were filled with 800mL of water from Middle Saranac Lake (near Saranac Lake, NY), which had a pH of approximately 7.0. Hydrochloric acid was added to the water to make each of the experimental pH treatments in these respective amounts: 0.0mL, 0.5mL, 0.9mL, 0.11mL, 0.13mL, 0.15mL, 0.17mL, 0.19mL, 0.21mL, and 0.26mL. These treatments were designed to create a range of pH levels

from 4 to 7, with the lower pH representing acidic lakes of the Adirondacks, and the greater pH representing alkaline lakes of Florida (De Angelo, Laxson and Yerger, 2012; Shannon and Brezonik, 1972). However due to an unexpected buffering capacity of the Middle Saranac Lake water we used the range of pH levels actually obtained averaged between just over 5 up to just over 7 (Figure 1). Note that the variability in each treatment increased with increasing hydrochloric acid (more acidic treatments had higher variability). Each pH treatment was applied to two of the jars in each bin, for a total of 4 in the warm water baths and 4 in the cold water baths. Individual jars included one fragment of VLM, and was aerated using an aquarium pump, tubing, and an air stone. Daylight was simulated using 2 grow lights, 400 watts each, timed to turn on at 4:00 a.m. and off at 8:00 p.m.

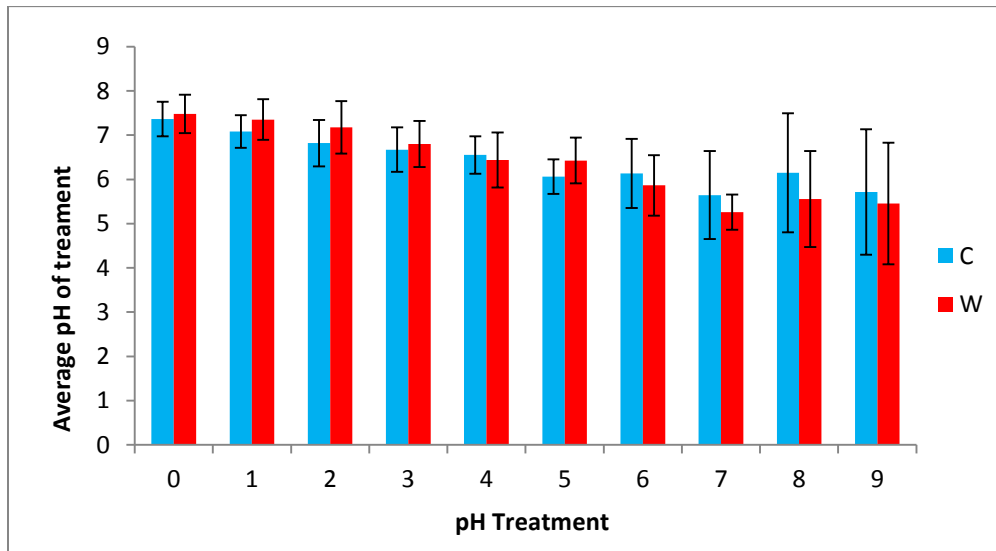


Figure 153- Average pH values for each temperature and pH treatment. The bars on the graph represent +/- 1 standard deviation of the mean (n=2 for each pH treatment paired with temperature).

VLM strands were collected from a well-established bed at the Lake Flower boat launch in Saranac Lake, NY in July 2012. Initial physical characteristics were collected from each strand. These were: total length, apex length, number of nodes with rootlets, and wet mass (strands were patted dry using paper towels to remove external water). Each strand used in the experiment had 20 focal nodes and an apex. In determining what constituted the apex, nodes separated by $\frac{1}{2}$ cm or less were considered the apex of the strand. We located the beginning of the apex and then counted down the stem 20 additional nodes to make the strands more similar in structure; however, the number of nodes on the apices varied greatly. Once data were collected on a strand, it was arbitrarily placed in one of the 80 jars.

Weekly and bi-weekly, the pH of jars and bin temperatures were measured. Plexiglass was used to cover the jars to reduce excessive evaporation. Jars were topped off weekly with the correct pH treatment to compensate for loss by evaporation which inevitably occurred. The jars were rotated under the lights and air stones were rotated among jars, weekly. After 6 weeks, strands were removed from the jars and the following measurements were taken: total length, apex length, number of nodes with rootlets, and wet mass. Samples were then oven dried at 60°C for 4 days, then weighed to determine final dry mass to be used in biomass growth determination. Final measurements were compared with the initial measurements for each strand.

To calculate biomass growth, we estimated the initial biomass of the experimental VLM strands. Biomass and length were measured for 20 Variable-leaf Milfoil fragments of similar structure. These strands were then dried and weighed again and we used these to determine the best model that would predict the initial fresh

biomass from the dry mass. The linear model that best described initial biomass was the product of wet mass and stem length with an R^2 value of 0.80. The following equation was used to calculate the initial fresh mass of experimental strands: $(0.0035 * (\text{wet mass} * \text{stem length}) + 0.0008)$, which provided the linear biomass growth (final dry biomass – modeled initial dry biomass).

Data for the total number of nodes with rootlets, total number of nodes with lateral growth and total number of apical nodes with rootlets were converted to a proportion of the total number of nodes cause total number of nodes per strand varied due to differences in the number of apical nodes. Proportion data were transformed using an arcsine square root transformation to make the distributions more normal. Two-sample T-Tests assuming unequal variances were used to determine differences in populations due to temperature treatment. Single factor ANOVA'S were used when looking for differences among pH treatments and the interaction between temperature and pH.

Results

Biomass Growth – Effect of Temperature and pH

Average biomass growth of Variable-leaf Milfoil was significantly greater in cooler water than in warm water treatments (Figure 2, $p=0.00$). As shown in Figure 3, there is no apparent pattern in biomass growth with pH treatments.

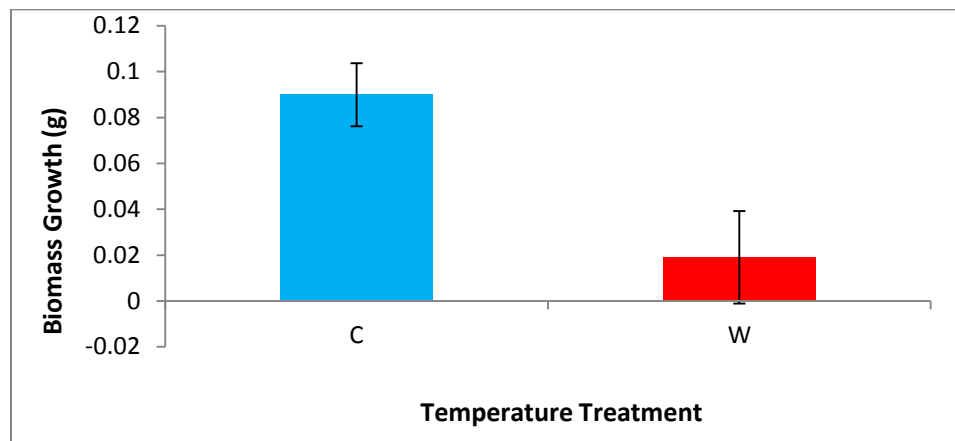


Figure 154- Average biomass growth of Variable-leaf Milfoil (*Myriophyllum heterophyllum*) experimental strands in cold water (23.135°C) and warm water (33.1275°C) for a total of 6 weeks in the months of July and August, 2012. The bars on the graph represent +/- 1 standard error (n=40 for each temperature treatment).

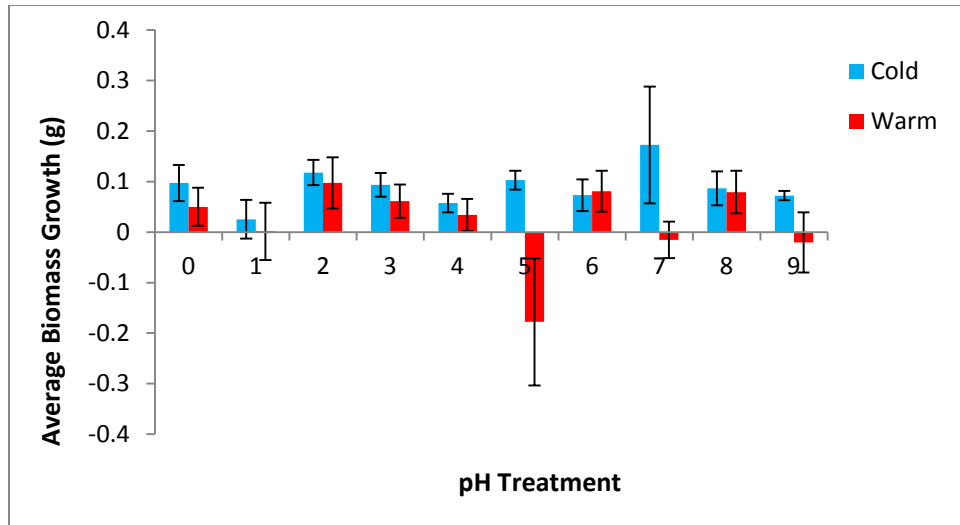


Figure 155- Average biomass growth of Variable-leaf Milfoil (*Myriophyllum heterophyllum*) experimental strands in cold water and warm water after 6 weeks in 10 pH treatments. The bars on the graph represent +/- 1 standard error of the mean (n=4 for each pH treatment). The range in pH for each pH treatment in the cold and warm temperatures are as follows: cool (0= 6.868-8.233, 1= 6.508-7.937, 2= 5.6-7.894, 3= 5.772-7.68, 4= 5.718-7.727, 5= 5.391-6.838, 6= 4.937-7.839, 7= 4.439-7.441, 8= 4.111-8.121, 9= 3.939-7.722), warm (0= 6.706-8.363, 1= 6.562-8.0, 2= 6.122-8.019, 3= 5.95-7.927, 4= 4.309-7.648, 5= 5.509-7.296, 6= 5.143-8.194, 7= 4.48-6.008, 8= 4.281-7.832, 9= 3.944-7.592).

Effect of pH on fragment morphology

There are marginally significant differences in the number of apical nodes with rootlets in different pH treatments (Figure 4, $p=0.1$); however, there is no trend associated with pH. In contrast with Figure 4, Figure 5 does seem to display a trend of increasing lateral buds on focal nodes in more acidic pH treatment, but the variability in the data is too large for the trend to be statistically significant ($p=0.69$).

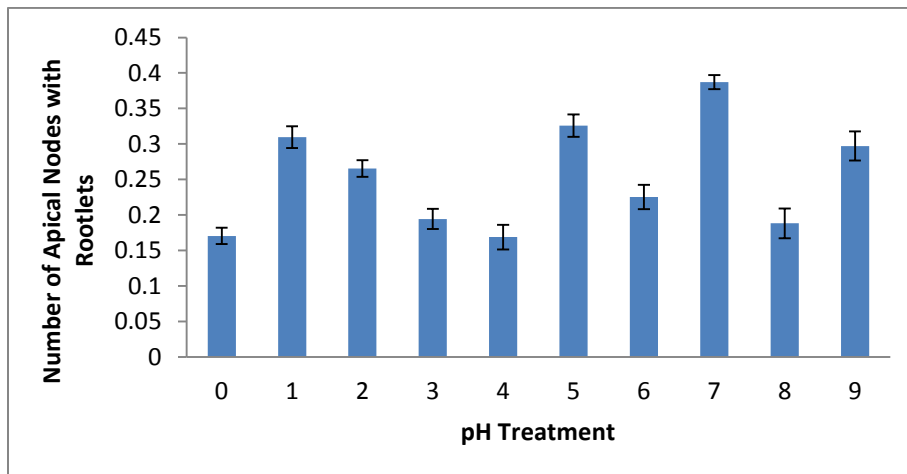


Figure 156- Average number of apical nodes with rootlets grown on Variable-leaf Milfoil (*Myriophyllum heterophyllum*) experimental strands in 10 pH treatments after 6 weeks. The bars on the graph represent +/- 1 standard error of the mean (n=8 for each pH treatment).

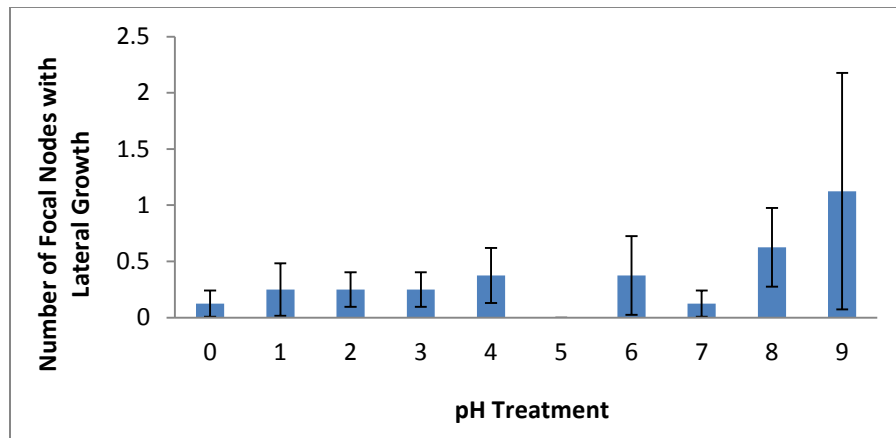


Figure 157- Average number of focal nodes with lateral growth for Variable-leaf Milfoil (*Myriophyllum heterophyllum*) experimental strands in 10 pH treatments after 6 weeks. The bars on the graph represent +/- 1 standard error of the mean (n=8 for each pH treatment).

Effect of Temperature on fragment morphology

While there was growth in apex length in both cool and warm temperature treatments, there were no significant differences between temperature treatments for apex growth (Table 1, $p=0.17$). This was also the case when examining the difference in the average number of focal nodes with lateral growth between temperature treatments (Table 1, $p=0.17$). Fragments also showed no difference in the number of focal nodes that developed rootlets throughout the experiment ($p=0.70$). In general, the 20 (older) focal nodes showed little growth relative to the apices of fragments over the experimental time frame. Stems elongated marginally slightly more in cool water than in warmer water ($p=.06$). The negative value for stem growth in warm water is likely due to measurement error, but indicates that the temperature of the warm water was likely stressful to VLM fragments.

The average proportion of apical nodes with rootlets ($p=0.01$), the average proportion of all nodes with rootlets ($p=0.02$), and the average proportion of all nodes with lateral growth ($p=0.02$), were significantly greater in fragments grown in cool water than those grown in warmer water. The average length of lateral growth per strand was marginally significantly influenced by temperature with increased growth in the cool temperature treatment ($p=0.06$).

Discussion

The results of this study did not support the hypothesis that growth of VLM would be greater in a combination of warmer temperatures and acidic pH levels. In fact, there was no significant effect of pH and the warmer temperature treatment used in this experiment significantly reduced biomass growth over the 6 week period as compared to the cool treatment. Additionally, the average proportion of apical nodes with rootlets, the average proportion of all nodes with rootlets and the average proportion of all nodes with lateral growth were significantly greater in the cool water treatment compared to the warm water treatment.

Due to unexpected buffering of the lake water there was a high degree of variability in pH within a pH treatment. Variance in average pH increased with acidity of the treatments which may have made it difficult to see significant differences due to pH, although there was an apparent increase in the lateral growth initiated on focal nodes in more acidic waters. None of the other measurement variables showed any trend with pH, and it is reasonable to conclude from this study that pH of the water has no effect on biomass accumulation or most aspects of plant morphology.

Table 106- Eight different variables of growth for Variable-leaf Milfoil (*Myriophyllum heterophyllum*) experimental strands in both cold (23.135°C) and warm (33.1275°C) temperature treatments for 6 weeks. The sample size for each variable is represented in this table, and both the P-Value and Standard Errors are included for each variable.

Variable	Cold Treatment ± Standard Error	Warm Treatment ± Standard Error	Sample Size	P-Value
Average Proportion of Nodes with Lateral Growth	0.06 ± 0.01	0.05 ± 0.01	80	0.02
Average Proportion of Nodes with Rootlets	0.54 ± 0.03	0.41 ± 0.03	80	0.02
Average Proportion of Apical Nodes with Rootlets	0.30 ± 0.04	0.20 ± 0.04	80	0.01
Average Total Length of Lateral Growth	5.40cm ± 0.66	3.55cm ± 0.68	80	0.06
Average Growth in Stem Length	0.30cm ± 0.52	-0.71cm ± 0.17	80	0.06
Average Growth in Apex Length	4.26cm ± 0.78	2.91cm ± 0.56	80	0.17
Average Increase in Number of Focal Nodes with Rootlets Throughout the Experiment	2.20 ± 0.93	2.38 ± 0.82	80	0.70
Average Number of Focal Nodes with Lateral Growth	0.30 ± 0.10	0.40 ± 0.24	80	0.70

There are few published studies about the effects of increased temperature on the growth of aquatic macrophytes; however, those studies show that different aquatic plants, even within the same genus (see Riis et al, 2012) may have different physiological responses to warming water temperatures (Barko et al. 1986; Santamaria et al. 1997; Gillooly et al. 2001; Hussner, 2009; Riis et al. 2012). Some aquatic plant species experience stress under the influence of warmer temperatures, causing decreasing populations. (Weltzin, Bridgham, Pastor, Chen and Harth, 2003). Because all experimental containers were constantly aerated, we are confident that results of temperature treatments were not confounded with the negative effect of increased temperature on the availability of dissolved oxygen. We did not manipulate light availability in the experiment so that our outcomes represent the response of VLM to temperature in a high light scenario.

Conducting the experiment in a laboratory without the aid of refrigeration resulted in the cool treatment being 'room temperature' and the warm treatment approaching the maximum temperature reported for the waters in Florida where VLM is native. While this scenario seems fairly extreme for aquatic plants adapted to Adirondack lakes, it is within the range of habitat variables that VLM is exposed to in other parts of its geographic

distribution. In a study by Robinson, Josephson, Weidel, and Kraft (2010) water temperatures in an Adirondack lake with a maximum depth of 5.5 meters regularly exceeded 21 °C with maximum temperatures often recorded between 23 and 25 °C (at or above the cool water treatment in our experiment). Additionally, a study that predicted water temperature increases in the contiguous U.S. in the face of a 2 X CO₂ scenario, Fang and Stefan (1999) predicted that temperature increases in will be as great as 5.2 °C. Given this information, a scenario in which future plants in some shallow Adirondack lakes would experience water in the range of 30 to 35 °C is not out of the question.

It is clear that stress and associated growth responses on macrophytes in warming waters will be species specific. In a 6 week laboratory experiment where strands are placed immediately into a much warmer environment than the one from which they were collected, acclimation over seasons and adaptation over generations are not taken into account, nor are the responses of the non-invasive competitors, and so changes in plant communities or relative competitive status of VLM due to warming water is unknown. We can conclude from our data that VLM vigor is relatively unaffected by pH, but is reduced by water temperatures in the upper range of what might be expected under a climate change warming scenario.

Literature Cited

Adirondack Park Invasive Plant Program (APIPP) (2011). Retrieved September 20, 2012 from APIPP, Aquatic Invasive Plant Locations website, <http://www.adkinvasives.com/Aquatic/Maps/Maps.asp>

Argue, D.M., Kiah, R.G., Denny, J.F., Deacon, J.R., Danforth, W.W., Johnston, C.M. and Smagula, A.P. (2005). Relation of lake-floor characteristics to the distribution of variable leaf water-milfoil in Moultonborough Bay, Lake Winnepesaukee, New Hampshire. Reston, VA: U.S. Geological Survey.

Balvanera, P., Pfisterer, A.B., Buchmann, N., He, J., Nakashizuka, T., Raffaelli, D. and Schmid, B. (2006). Quantifying the evidence for biodiversity effects on ecosystem functioning and services. *Ecology Letters*, 9: 1146-1156.

Barko, J.W. and Smart, R.M. (1986). Sediment-related mechanisms of growth limitation in submersed macrophytes. *Ecology*, 67: 1328-1340.

Beaver, J.R., Crisman, T.L. and Bays, J.S. (1981). Thermal regimes of Florida lakes. *Hydrobiologia*, 83: 267-273.

Byers, J. E. (2002). Impact of non-indigenous species on natives enhanced by anthropogenic alteration of selection regimes. *Oikos*, 97: 449–458.

De Angelo, M., Laxson, C., Yerger, E. (2012). Adirondack Lake Assessment: Raquette Lake. Adirondack Watershed Institute

Department of Environmental Conservation (DEC) (2012). Retrieved September 20, 2012 from DEC, Sources and Environmental Impacts of Acid Rain and Acid Deposition in New York State website, <http://www.dec.ny.gov/chemical/283.html>.

Dukes, J.S. and Mooney, H.A. (1999). Does global change increase the success of biological invaders?. *Trends Ecol. Evol.* 14(4): 135-139.

Fang X. and Stefan, H.G. (1999). Projections of climate change effects on water temperature characteristics of small lakes in the contiguous U.S. *Climatic Change* 42: 377-412.

- Frumhoff, P.C., McCarthy, J.J., Melillo, J.M., Moser, S.C., and Wuebbles, D.J. Confronting climate change in the U.S. northeast: Science, impacts and solutions. Cambridge, MA: Union of Concerned Scientists, 2007.
- Gillooly, J.F., Brown, J.H., West, G.B., Savage, V.M. and Charnov, E.L. (2001). Effect of size and temperature on metabolic rate. *Science*, 239: 2248-2254.
- Glomski, L.M. and Netherland, M.D. (2008). Effect of water temperature on 2,4-D ester and Carfentrazone-ethyl applications for control of variable-leaf milfoil. *J. Aquat. Plant Manage*, 46: 119-121.
- Hellmann, J. J., Byers, J. E., Bierwagen, B. G. and Dukes, J. S. (2008). Five Potential Consequences of Climate Change for Invasive Species. *Conservation Biology*, 22: 534–543.
- Holmlund, E., Wiley, K., Paul, E., Haynes, K., Martin, W., Milner, K., Potel, M. (2011). Watershed Stewardship Program: Summary of Programs and Research. Adirondack Watershed Institute: Report # AWI 2012-01.
- Hussner, A. (2009). Growth and photosynthesis of four invasive aquatic plant species in Europe. *Weed Research*, 49: 506 – 515.
- Lovell, S.J. and Stone, S.F. (2005). The economic impacts of aquatic invasive species: A review of the literature. Washington D.C.: National Center for Environmental Economics.
- Parmesan, C. & Yohe, G. (2003). A globally coherent fingerprint of climate change impacts across natural systems. *Nature*, 421, 37–42.
- Patrick, D.A., Boudreau, N., Bozic, Z., Carpenter, G.S., Langdon, D.M., LeMay, S.R., Martin, S.M., Mourse, R.M., Prince, S.L. and Quinn, K.M. (2012). Effects of climate change on late-season growth and survival of native and non-native species of watermilfoil (*Myriophyllum* spp.): Implications for invasive potential and ecosystem change. *Aquatic Botany*, 103: 83-88.
- Pimentel, D., L. Lach, R. Zuniga, and D. Morrison (2000). Environmental and economic costs of nonindigenous species in the United States. *BioScience* 53:53-65.
- Riis, T., Olesen, B., Clayton, J.S., Lambertini, C., Brix, H. and Sorrell, B.K. (2012). Growth and morphology in relation to temperature and light availability during the establishment of three invasive aquatic plant species. *Aquatic Botany*, 102: 56-64.
- Roy, K., Krester, W., Simonin, H. and Bennett, E. (2000). Acid rain in the Adirondacks: A time of change!. *Adirondack Journal of Environmental Studies*: 26-32.
- Robinson, J.M., Josephson, D.C., Weidel, B. C., Kraft C.E. (2010). Influence of variable interannual summer water temperatures on brook trout growth, consumption, reproduction and mortality in an unstratified Adirondack lake. *Transactions of the American Fisheries Society* 139: 685-699.
- Roy, K., Krester, W., Simonin, H. and Bennett, E. (2000). Acid rain in the Adirondacks: A time of change!. *Adirondack Journal of Environmental Studies*: 26-32.

Ruiz, G.M., and Carlton, J.T. (2003). *Invasive species: Vectors and management strategies*. Washington D.C.: Island Press.

Santamaria L., van Vierssen, W. (1997). Photosynthetic temperature responses of fresh- and brackish-water macrophytes: a review. *Aquatic Botany*, 58: 135-150.

Shannon, E.E. and Brezonik, P.L. (1972). Limnological characteristics of north and central florida lakes. *Limnology and Oceanography*, 17(1): 97-111.

Thuiller, W., D. M. Richardson, and G. F. Midgley. (2007). Will climate change promote alien invasions? Pages 197–211 in W.Nentwig, editor. *Biological invasions*. Springer-Verlag, Berlin

Vilà, M., J. D. Corbin, J. S. Dukes, J. Pino, and S. D. Smith. (2007). Linking plant invasions to global environmental change. Pages 93–102 in J.Canadell, D.Pataki, and L.Pitelka, editors. *Terrestrial ecosystems in a changing world*. Springer-Verlag, New York .

Weltzin, J.L., Bridgham, S.D., Pastor, J., Chen, J., Harth, C. (2003). Potential effects of warming and drying on peatland plant community composition. *Global Change Biology* 9: 141-151.

Odonate Abundance and Diversity and Relationships among Habitat Characteristics

By Jessica Wenke and William Martin, Watershed Stewards

Introduction

Monitoring species over time can reveal natural fluctuations or instabilities in population dynamics that occur due to pressures from competition, predation, or human alteration of the environment. Odonate populations have been experiencing declines in the past few decades in North America and Europe (Korkeamaki & Suhonen, 2002). Among insects with similar life histories, odonate biomass is greater than any other taxa, which emphasizes the ecological importance of the group as predators and prey in both wetland and terrestrial ecosystems (Butler & deMaynadier, 2007). Species distributions are highly diverse and habitat specific in terms of tolerances to pollution and watershed degradation. These characteristics, along with the phenotypic attributes that allow them to be captured, observed, and monitored relatively easily by the scientific community make them ideal biological indicators of freshwater ecosystem integrity (Butler & deMaynadier, 2007).

Odonate life histories involve an aquatic larval stage as well as riparian, littoral and upland stages during adulthood. The order Odonata can be broken down into two suborders of particular interest to this study: Anisoptera (Dragonflies) and Zygoptera (Damselflies) (Figure 1). Species of the order Odonata can be recognized by their long and slender abdomen, globular eyes which often make up a significant portion of the head, short antennae, and long wings. Species of the suborder Damselflies are recognizable by their broad head and widely separated eyes. Their fore and hind wings are similarly shaped and will often be closed when at rest. Species of the suborder Dragonflies are generally larger and more robust than Damselflies. In most Dragonfly species, their large eyes touch on the top of their head. Their hind wings are usually significantly broader at the base than their fore wings and will remain separated when at rest (Kalkman, Clausnitzer, Dijkstra, Orr, Paulson, & van Tol, 2007).

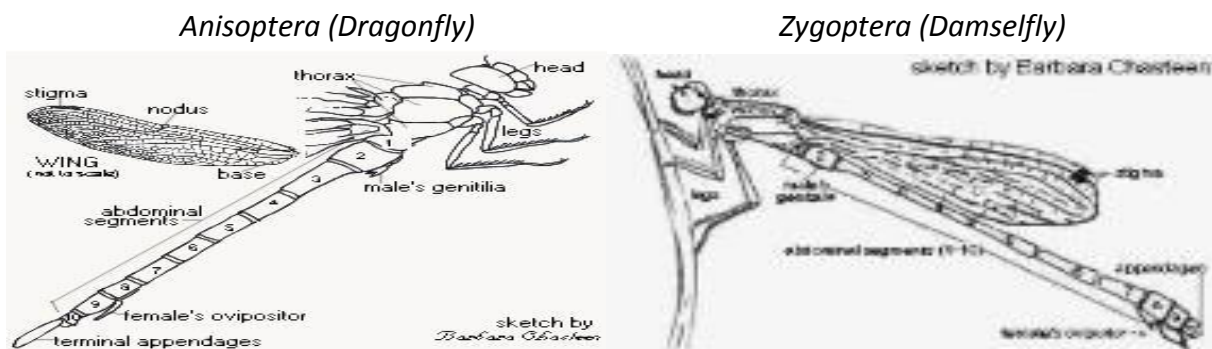


Figure 158 - Descriptive images of Odonata suborders (Chasteen).

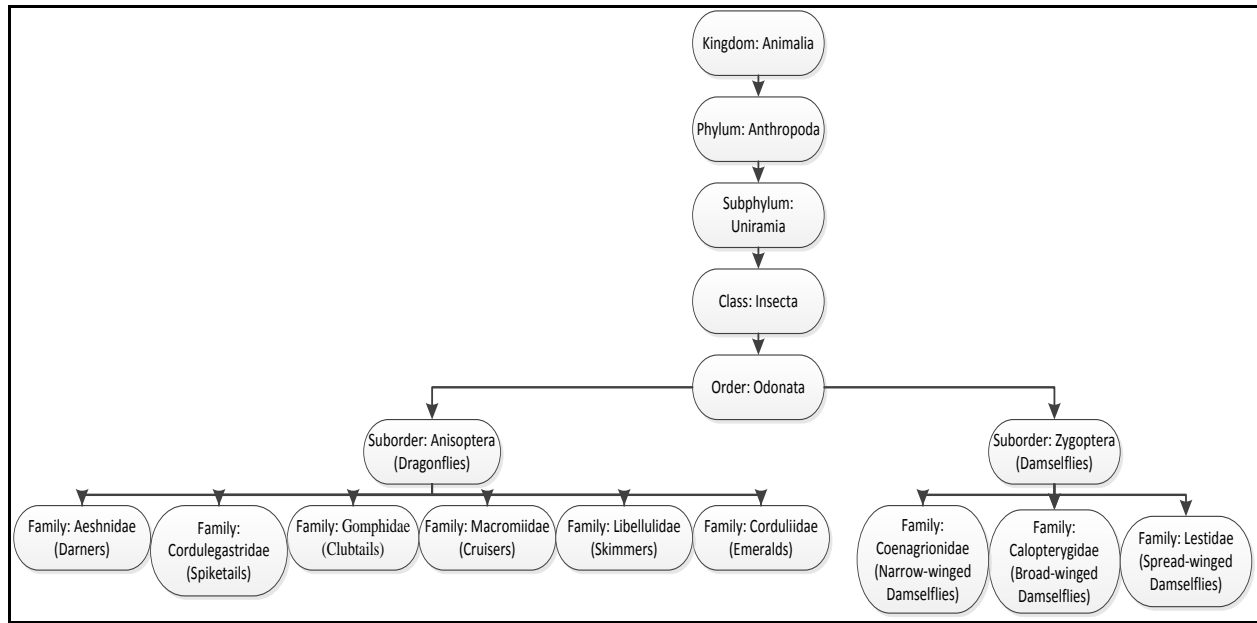


Figure 159 - Family level classification flowchart of Odonata pertaining to samples collected.

Of the approximate 20,000 species of odonates in the United States, at least 1/3 are of conservation concern. The extinction rates of freshwater fauna are 5 times greater than those of terrestrial species. It is estimated that 11%-18% of the 456 species of damselflies in the United States are vulnerable to extinction or extirpation (Butler & deMaynadier, 2007). Odonate distribution at the family level is due primarily to the historical breaking apart of continents, while current species distributions are more influenced by ecological factors (habitat) and climate (Kalkman, Clausnitzer, Dijkstra, Orr, Paulson, & van Tol, 2007). Globally, increases in temperature correspond to increases in diversity, while higher precipitation corresponds to decreases in diversity (Kalkman, Clausnitzer, Dijkstra, Orr, Paulson, & van Tol, 2007). By studying dragonfly and damselfly diversity at specific sites, we can observe relationships among odonates and habitat variables that may be altered as a result of exurban development and/or climate factors.

Humans have been changing ecosystems since the beginning of the first human settlements and development of agricultural practices (Ruddiman, 2010). When habitats are altered, the biotic world that inhabits those areas must adjust and species differ in their vulnerability to habitat degradation (Swihart, Lusk, Duchamp, Rizkalla, & Moore, 2006). Areas that have been drastically altered by human activity tend to have lower species diversity, in general, because habitat diversity is reduced (Pimm & Raven, 2000).

We are interested in the abundance, species diversity and the spatial distribution of odonate populations compared to differences in habitat. Our study is based in the Northern Adirondack region and for 3 years the Adirondack Watershed Institute (AWI) of Paul Smith's College has been collecting data on odonates that will be used to answer questions in combination with the data collected this summer. Each of the nine boat launch sites visited this summer (Second Pond, Little Clear Pond, Buck Pond, Tupper Lake, Hoel Pond, Upper St. Regis, Lake Flower, Raquette Lake, and Long Lake) have different habitat characteristics that appear to attract different families of odonates. Some boat launch sites such as Tupper Lake, Raquette Lake, and Upper St. Regis have obviously been more altered or fragmented than others through the construction of roads and development, which may have a large effect on abundance and diversity of odonate species. We predict that the relative

abundance and diversity of odonate families will be related to the type of habitat and extent of development in the areas we studied. We specifically: 1) Examined relative abundances in association with habitat characteristics across three years 2) Examined family level diversity in associations with habitat characteristics across three years 3) Examined diversity and abundance at the level of genus and species for 2012 data.

Methods

From June to August in 2010, 2011 and 2012 odonates were sampled at a total of nine different launch sites. In 2010 Buck Pond and Upper St. Regis were sampled. In 2011 Lake Placid, Meacham Lake, Osgood Pond, Buck Pond and Upper St. Regis were sampled. In 2012 Second Pond, Little Clear Pond, Buck Pond, Tupper Lake, Hoel Pond, Upper St. Regis, Lake Flower, Raquette Lake, and Long Lake were sampled. Watershed stewards were trained, by Paul Smiths College Professor, Janet Mihuc at the beginning of each season, to capture or observe odonates and identify them down to the genus and species using specific techniques. These techniques include observing the species wing patterns, color, and markings on their abdomens.

Once a week stewards responsible for the odonate study would travel to each launch record the weather and sample for forty minutes or more. In 2011 and 2012 stewards posted at launches collected data as well. When an odonate was seen, we identified it to the most specific level of taxonomy in which we had confidence (family, genus, species). We recorded relative abundance (few, frequent, common or abundant) and four habitat. These were: the type of habitat in which the odonate was observed (road, path/trail, pond, lake, etc.), the surrounding habitat (mixed woods, coniferous woods, etc.); the type of vegetation (grass, emergent, sedge, etc.) and height category of vegetation on which the odonate was found (0-10 cm = 1, 10-30 = 2, 30-70 = 3, 70-100 = 4, > 1meter tall = 5).

Once all of the data were compiled, we analyzed only the data collected during sunny periods because it has been shown that odonates rarely fly in the rain (Angelibert & Giani, 2003). We focused our analysis on four launches: Buck pond, Tupper Lake, Little Clear Pond and Upper St. Regis, because they had enough data to likely represent odonate diversity and abundance. We used Microsoft excel to summarize our data.

Results

The odonate families Libellulidae and Coenoagrionidae were the most common families recorded at all four of the study sites. Buck Pond had the highest diversity of all of the launches with six different families. Upper St. Regis and Tupper Lake had the second highest diversity with three different families. At Little Clear Pond only two most common families were observed (Table 107).

Table 107- The various habitat types, odonate families, and vegetation heights on which odonates were found at each of the four launches. (Habitat types = R- Road, PL- Pond/Lake, T- Trail, M- Marsh, F- Field, S- Swamp, and BF- Bog/Fen) (Vegetation Heights= 0-10 cm = 1, 10-30 = 2, 30-70 = 3, 70-100 = 4, > 1meter tall = 5).

LAUNCHES	Tupper Lake	Buck Pond	Little Clear Pond	Upper St. Regis
HABITAT TYPE	R	R, PL, T, F	R, T, PL	R, M, S, BF
FAMILIES	Coenagrionidae	Coenagrionidae	Coenagrionidae	Aeshnidae
	Gomphidae	Corduliidae	Libellulidae	Coenagrionidae
	Libellulidae	Gomphidae		Libellulidae
		Lestidae		
		Libellulidae		
		Macromiidae		
VEGETATION HEIGHT	1, 2	1, 2, 3, 4	1, 2, 4	1, 2, 3

Vegetation height on which or near where odonates were observed varied among launches. No odonates were captured on vegetation over 100cm tall in our study. We found odonates on the most variable vegetation heights at Buck Pond (four height categories). At Upper St. Regis and Buck Pond we recorded odonates in highest diversity of habitat types. At those sites we recorded odonates on roads at both locations and over lakes, on trails, and in the field at Buck Pond; and over the marsh, swamp, and bog at the upper St Regis site. Odonates were observed on road habitat at all sites. It is noteworthy that the site with the greatest diversity of recorded odonates was at Buck Pond where we recorded them in the most different types of habitat and on vegetation of different heights.

Odonates were observed most on vegetation in the height range of 0-10cm with 22 occurrences across the recorded families. We recorded 15 occurrences of odonates associated with vegetation in the range of 10 to 30 cm and only 8 and 2 families on vegetation that was 30 – 70 and 70 – 100 cm high, respectively.

Table 108- Genus and Species of odonates observed and recorded in 2012.

Genus	species	Total
Argia	fumipennis violacea	2
	moesta	10
Argia Total		12
Celithemis	elisa	1
Celithemis Total		1
Didymops	Transversa	1
Didymops Total		1
Dromogomphus	spinosus	1
Dromogomphus Total		1
Enallagma	carunculatum	9
	ebrium	18
	geminatum	1
	hageni	1
	vernale	2
Enallagma Total		31
Epitheca	cynosura	1
Epitheca Total		1
Gomphus	exilis	12
	spicatus	18
Gomphus Total		30
Ischnura	verticalis	18
Ischnura Total		18
Ladona	julia	31
Ladona Total		31
Iestes	rectangularis	2
Iestes Total		2
Leucorrhinia	frigida	3
	intacta	2
	proxima	7
Leucorrhinia Total		12
Libellula	pulchella	1
	quadrimaculata	4
Libellula Total		5
Somatochlora	elongata	1
somatochlora Total		1

Libellulidae was the only family found in abundance (100+ individuals), at any site this summer. The habitats and vegetation heights associated with this family were Roads at 10-30cm, Bog/Fen and Field at 30-70cm, However they were recorded as abundant only over Bog/fen and in fields on vegetation between 30 and 70cm.

Estimated abundance was relatively mixed throughout all other species, vegetation heights and habitats. Blank boxes represent a lack of any observation for that family in that specific habitat and vegetation range. Boxes that have a representation of abundance had at least one observation within those categories. Roads and Ponds and Lakes had the highest amount of odonate occurrences (14 and 11 respectively).

We summarized the 2012 data to the level of genus and species. *Enallagma* and *Ladona* (Genus) were most abundant for the 2012 season each with 31 recorded observations (Table 3). Within those genres the most abundant species were *Enallagma ebruim* (18 occurrences) and *Ladona Julia* (31 occurrences).

The genus *Libellula* was observed only five times for the entire 2012 season. *Somatochlora*, *Dromogomphus*, *Epithecica*, *Didymops* and *Clithemis* had the least occurrence with one sighting each.

Discussion

There is a well-accepted relationship between area size and species variability and biodiversity, which, in large part stems from the idea that larger areas often have greater diversity of habitat (Wilson, 1969). We did observe odonates on the widest range of habitats and vegetation heights at Buck Pond, which might suggest a wider range of habitats surrounding that boat launch, but since vegetation diversity was not sampled independently of where we found odonates, our data does not allow us to firmly conclude that greater diversity of habitat within the sampling area correlates with our greater odonate diversity. In future seasons it would be valuable to sample habitat type and vegetation characteristics, independent of odonate sightings at each boat launch so that we can really examine the habitat variability/species diversity relationship.

We conclude that the family Libellulidae is a generalist species due to the wide range of habitats and vegetation types on which members of the family were found. Libellulidae was frequently and commonly found throughout vegetation heights from 0 to 40+ cm and across the habitat types we recorded. Conenagrionidae, also a relative generalist, was especially abundant in vegetation from 10 to 30 cm tall but was commonly found in a variety of habitats. Libellulidae and Conenagrionidae were the only two families observed within the fourth vegetation height range associated with Pond/Lake and Road habitats. Aeshnidae was only observed on vegetation from 0-10 cm tall and only associated with roads and water edges in our study suggesting that this family may be more specialized on low vegetation and edges habitats. The two families recorded on the tallest vegetation were most commonly recorded in the study and therefore do not represent specialist on taller vegetation.

Pond/Lake was the most common habitat in which odonates were observed. Foote et al. (2005) reported that odonates prefer lentic (lake and pond) to lotic (moving water) habitats, and so the association with the edges of lakes and ponds is not surprising. We found it interesting that there were more odonates sampled in the road habitat than any other habitat besides ponds and lakes, because roads generally mean more disturbance. However, since odonates avoid shaded areas (Remsburg, Olson, & Samways, 2008), the positive relationship between odonates and road (and pond/lake) habitats may be because these areas are generally more open and less shaded. Somewhat contradictory to this, odonate populations have been shown to decrease with the removal of vegetation (Foote, Hornung, & Christine, 2005).

The 2012 data provides a different perspective on the overall abundance of odonate groups by looking at the levels of genus and species. There were far less observations of *Libellula* (most common genus in the family

Libellulidae) in the current year then there were in previous years. However there were 22 different species observed during the season in 13 genera (Table 3).

Another interesting point of this study was that odonates seemed to prefer shorter vegetation. This may or may not be also a human altered aspect. Bogs and fens and emergent vegetation in lakes and ponds will often naturally be low lying. However, areas at the edge of roads, and roads themselves may have low vegetation due to mowing, for example. Therefore from our study, it is difficult to conclude the effects of human disturbance on odonate populations. In order to address this further, we would need to add a column in the data set to record whether the vegetation height and other aspects of habitat were apparently influenced by human activity. In future studies, if possible, it might be useful to record odonate and habitat variables numerically rather than categorically so we can look at relationships using regression and correlation. We suggest that in future years the AWI program should continue this study and pick four or more specific sites to heavily sample throughout the summer so that long-term data sets can be accumulated. Additionally it would be interesting to map the sampled sites possibly using GIS techniques and examine habitat variables at a larger spatial scale to understand how the proximity of or distance to surrounding habitats may or may not influence abundance and taxonomic composition of odonates in an area.

Literature Cited

- Angelibert, S., & Giani, N. (2003). Dispersal characteristics of three odonate species in a patchy habitat. *Ecography*, 13-20.
- Butler, R. G., & deMaynadier, P. G. (2007). The significance of littoral and shoreline habitat integrity to the conservation of lacustrine damselflies (Odonata). *Journal of Insect Conservation*, 23-34.
- Chasteen, B. (n.d.). *Dragonflies (Odonata) of the Southwest*. Retrieved August 27, 2012, from Dragonflies and damselflies of the Southwest: <http://southwestdragonflies.net/>
- Foot, L. A., Hornung, R., & C. L. (2005). Odonates as biological indicators of grazing effects on Canadian prairie wetlands. *Ecological Entomology*, 273-283.
- Kalkman, V. J., Clausnitzer, V., Dijkstra, K.-D. B., Orr, A. G., Paulson, D. R., & van Tol, J. (2007). Global diversity of dragonflies (Odonata) in freshwater. *Hydrobiologia*, 351-361.
- Korkeamaki, E., & Suhonen, J. (2002). Distribution and habitat specialization of species affect local extinction in dragonfly Odonata populations. *Ecography*, 459-465.
- Pierce, C. L., Crowley, P. H., & Johnson, D. M. (1985). *Behavior and Ecological Interactions of Larval Odonata*, 1-10.
- Pimm, S. L., & Raven, P. (2000). Biodiversity: Extinction by numbers. *Nature*, 843.
- Remsburg, A. J., Olson, A. C., & Samways, M. J. (2008). Shade Alone Reduces Adult Dragonfly (Odonata: Libellulidae) Abundance. *Insect Behavior*, 460-468.
- Ruddiman, W. F. (2010). *Plows, Plagues, and Petroleum*. Princeton University Press.
- Swihart, R. K., Lusk, J. J., Duchamp, J. E., Rizkalla, C. E., & Moore, J. E. (2006). The roles of landscape context, niche breadth and range boundaries in predicting species responses to habitat alteration. *Diversity and Distributions*, 277-287.
- (1899). In E. B. Williamson, *The Dragonflies of Indiana* (pp. 233-235). San Francisco, California: William B. Burford.
- Wilson, E. O. (1969). The nature of the taxon cycle in the Melanesian ant Fauna. *The American Naturalist*, 169-193.

Summit Steward Report: St. Regis and Bald Mountains

By Kyle Milner and Stacey Judge, Watershed Stewards

Background

In 2000, the Paul Smith's College Watershed Stewardship Program initiated steward coverage at the Upper St. Regis Lake boat launch in an effort to prevent the introduction of aquatic invasive species in the St. Regis Lake chain. Simultaneously, the program's funding supported seven-day per week coverage on the summit, trail and trailhead of St. Regis Mountain. Since then, funding levels have limited both the number of days per week the program posts stewards on the summit of St. Regis, and whether there will be summit stewards in a particular year at all. In 2012, the WSP posted summit stewards both on St. Regis Mountain and for the first time, Bald Mountain near the Fulton Chain of Lakes. Program administrators decided to post stewards on a limited basis on Bald Mountain as an additional source of outreach to benefit the aquatic invasive species (AIS) spread prevention program at area boat ramps, and also to provide education regarding Leave No Trace (LNT) principles of trail and mountaintop conservation.

St Regis Mountain Summit Steward Report

Table 110- Historical summit steward coverage of St. Regis Mt.

Year	# days coverage on St. Regis Mountain
2000	7 days/week
2001	2
2002	2
2003	2
2004	2
2007	2
2011	1
2012	1

Introduction

St. Regis Mountain is perhaps one of the best known smaller mountains within the Adirondack Park. Located within the St Regis Canoe Area and close to Paul Smith's College, the St. Regis Mountain trail is heavily used year-round. The mountain's popularity makes it a site of concern for adverse effects of soil erosion and degradation of summit vegetation. Over the course of the summer, the combination of heavy rains and drought along with hiker traffic have taken their toll on the trail as well as the summit.

Methods

Every Sunday, starting May 27th, The Watershed Stewardship Program stations a steward on the summit to interact with and educate the public on "Leave No Trace" policies and other outdoor principles. Stewards

started the day at 8:00 am at the trailhead and generally reached the summit by 10:00 am. From 10:00 am until 2:30, stewards were on the summit engaging with the public. The 8 hour shift ended at 4:00 pm back at the base of the mountain. While on the summit, stewards conducted a recreation study that revolves around collecting data to attempt to determine hiker behavior and usage levels week in and week out. The study included collecting information such as group size, gender, time spent on the summit, pets, overall preparedness, and behavior regarding summit vegetation. Stewards also often answered visitor questions about points of interest, many of which generally lead to discussions about the Adirondack Park itself.



Figure 160- Top of St. Regis Mt.

Results

Over the course of the summer, stewards encountered a total of 257 people in 98 different groups. The weekend of August 26th of was the busiest day on the summit (40 people). The gender ratio of hikers was 57% male to 43% female. Average group size was two to three individuals with the majority of hikers spending roughly 30 minutes on average on the summit.

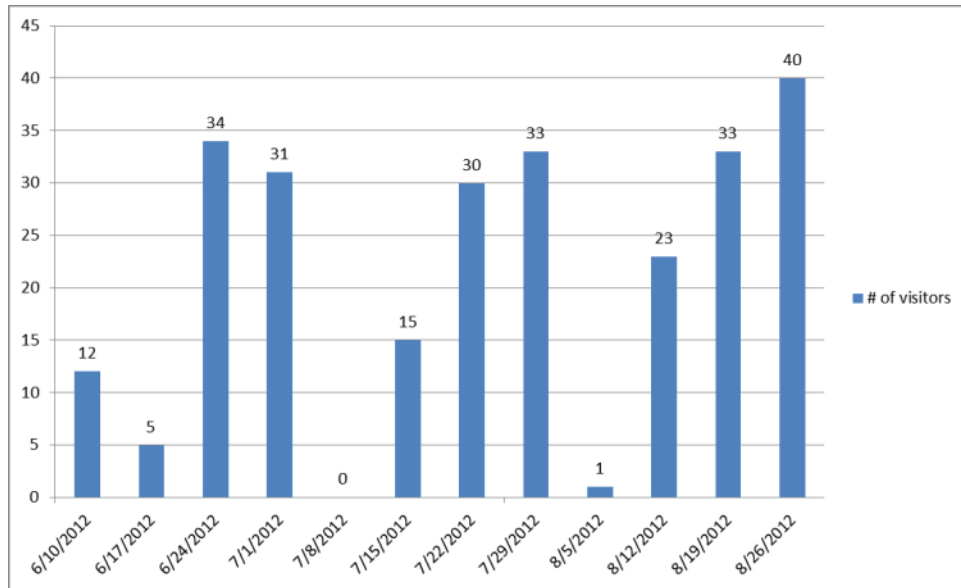


Figure 161- Weekly usage, St. Regis Mt., 2012.

Overall visitor hiking behavior and preparation were mixed. Preparation was defined as hikers wearing non-cotton clothes, hiking boots, and having a backpack (presumably with food, water, and first aid). Hikers who did not meet these requirements were considered unprepared. Of the 98 groups observed, more than a quarter (32%) of all groups were wearing sneakers rather than hiking boots up the mountain. 16% of the groups had no backpack with them and 43% were wearing cotton clothes. 27% of all groups brought pets to the summit, all of which were dogs.

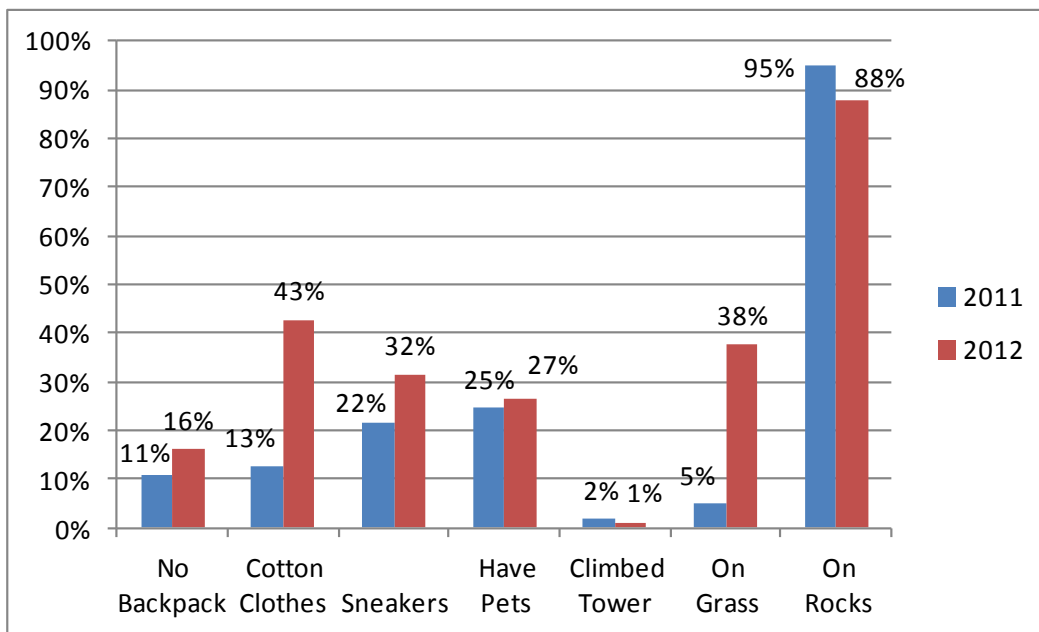


Figure 162- Observations of hikers on St. Regis Mt., 2011 and 2012.

Part of the summit steward's message was conveying the importance of the concept of "Leave No Trace." The summit of St Regis Mountain is quite bare, and can be attributed to the frequency of use. Although the bareness provides a spectacular view, the vegetation is threatened by hiker activity and soil erosion as a result of increased surface run-off velocity. The message shared by the summit steward is parallel in that of the Summit Steward program in the Adirondack High Peaks: to avoid further damaging any vegetation due to the importance of the little that remains. Overall, 88% of hikers respected the philosophy by walking and resting on the exposed rock and avoiding trampling summit vegetation and grasses. 38% of hikers were seen walking on or resting in areas with vegetation. The overlap percentage is due to hikers being seen on both the exposed bedrock and summit vegetation, although most times it was walking over it rather than resting.

Discussion

The weekend of August 5th had the fewest number of people on the summit with 0; despite the fact that the weather was rather pleasant. Thunderstorms moved through the area on the weekend of June 3rd which resulted in no ascent being made that week. In total, Steward Derek Scott completed 10 days of summit coverage with Stewards Jessica Wenke and Kelli Quinn each completing 1 day.

This summer, hikers were significantly less prepared than the previous year. A few more groups wore sneakers and lacked backpacks but the number of hikers in cotton clothes was more than triple (13% to 43%). Roughly the same number of hikers was seen with pets between 2011 and 2012. In terms of hiker behavior, roughly the same amount of hikers respected the summit vegetation and rested in areas where bedrock was exposed. The number of hikers seen trampling vegetation between 2011 and 2012 had gone up significantly from

Table 111- Number of hikers counted by WSP Summit Stewards.

St. Regis Mountain	
Year	# Hikers
2001	632
2002	554
2003	689
2004	859
2007	562
2011	283
2012	257

5% in 2011 to 38% in 2012. It should be noted that a good percentage of hikers seen on grass were also seen on bedrock, especially with larger groups of hikers.

Overall, the number of hikers seen in 2011 was slightly higher than the number seen in 2012. In previous years, stewards saw significantly more hikers on the summit. However, in the past stewards were on the summit both Saturday and Sunday. With stewards only being present on Sundays in both 2011 and 2012, the lower hiker counts are to be expected.

Table 112- 2012 St. Regis Mt. data.

St. Regis Mt. Data Summer 2012													
Dates	Average	# of	Total	Avg. Time	Gender		Equipment			Pets	Behavior		
of coverage	group size	groups	visitors	on summit	Male	Female	NBP	CC	S		climb twr	on grass	on rocks
6/10/2012	2.00	6.00	12.00	20.33	6.00	6.00	1.00	5.00	3.00	2.00	0.00	3.00	5.00
6/17/2012	1.67	3.00	5.00	27.00	2.00	3.00	1.00	1.00	0.00	1.00	0.00	0.00	3.00
6/24/2012	2.62	13.00	34.00	24.70	22.00	12.00	2.00	5.00	4.00	3.00	0.00	7.00	8.00
7/1/2012	3.44	9.00	31.00	41.10	18.00	13.00	2.00	6.00	5.00	2.00	0.00	5.00	9.00
7/8/2012	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7/15/2012	3.75	4.00	15.00	31.00	8.00	7.00	0.00	2.00	1.00	1.00	0.00	2.00	4.00
7/22/2012	2.14	14.00	30.00	26.40	18.00	12.00	3.00	8.00	5.00	3.00	0.00	7.00	13.00
7/29/2012	3.00	11.00	33.00	28.60	22.00	11.00	1.00	5.00	4.00	2.00	1.00	5.00	9.00
8/5/2012	1.00	1.00	1.00	15.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00
8/12/2012	2.30	10.00	23.00	30.80	12.00	12.00	2.00	2.00	2.00	4.00	0.00	2.00	10.00
8/19/2012	3.00	11.00	33.00	35.50	17.00	16.00	1.00	4.00	4.00	2.00	0.00	3.00	10.00
8/26/2012	2.50	16.00	40.00	37.40	23.00	16.00	2.00	4.00	3.00	5.00	0.00	2.00	14.00
Totals	2.28	98.00	257.00	26.49	148.00	109.00	16.00	42.00	31.00	26.00	1.00	37.00	86.00

Bald Mountain Summit Steward Report

Introduction

Bald Mountain is the local favorite hike in Old Forge, NY attracting both locals and visitors alike. It is located on State Route 28 just outside of town. Since it is a short hike, just over a mile, a lot of families tend to hike to the summit, which has a fire tower. Due to the many picturesque viewpoints it takes most groups 30-45 minutes to reach the summit at 2500 ft. above sea level.

The fire tower on the summit was used to spot forest fires. The old tower was made of wood, and there was also a cabin on the summit that the ranger's family lived in. However the tower was reconstructed in 2005 and the cabin is gone. Since the advent of helicopter-based fire observations, the fire tower is no longer used to spot fires, and instead offers a piece of local history in a beautiful location.



Figure 163- View from summit of Bald Mt.

Methods

The summit steward would hike up the mountain once a week and would remain on the summit until 4:00. Usually the summit stewarding was done on Thursday after the weekly staff meeting and WSP data entry. The steward would count how many groups visited the summit, how many people were in that group, male and female, if they were properly prepared, (backpack, non-cotton clothing, and hiking boots), whether they went up the tower or not, and how long they remained on the summit.

The steward would greet the hikers and answer any questions they had. Most often, their questions were about the tower, and the Fulton chain of lakes. The steward would also give them a short lesson on the practices of Leave No Trace, specifically focusing on trail erosion, carry in carry out, treading on summit bedrock rather than vegetation, and respecting natural habitats. The summit steward focused on these ethics because the trail has been greatly eroded and the exposed rock is scraped from improper use of trekking poles. Many individuals and families enjoy eating lunch on top of the mountain and hikers were encouraged to carry out everything they brought with them. They were also encouraged to not feed the wildlife, and to leave living flowers and other plants where they were.

Results

The summit steward encountered 182 total groups on the summit of Bald Mountain during the summer of 2012. The busiest day was July 5th. There were a total of 641 people who hiked to the summit. Of those 641 people 456 hiked with no back pack, 569 wore cotton clothing, and 465 people wore sneakers. 40 people brought pets with them, and 129 went up the fire tower.

Discussion and Conclusion

Most hikers encountered would be considered unprepared, if they were hiking a larger mountain. However, due to the smaller size of Bald Mountain hikers tend to not carry as much. This could also be a danger because most hikers did not have a backpack. If something were to go wrong they would be in serious trouble. The cotton clothing and sneakers, however, are appropriate for the hike. I usually hiked in a pair of sneakers, a t-shirt and jeans. Many hikers followed suit with the exception of shorts.

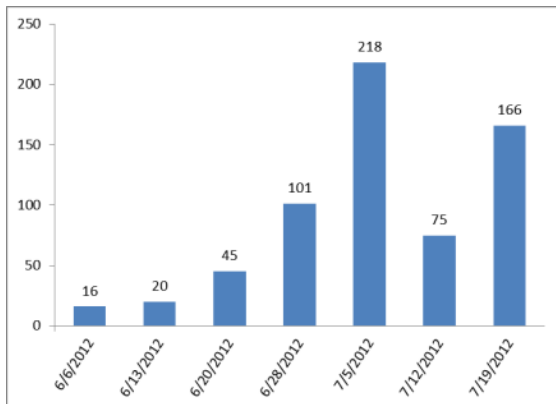


Figure 164- Weekly usage, Bald Mt., 2012.

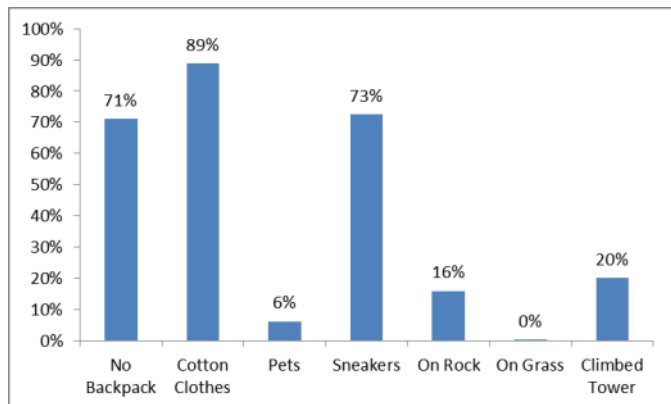


Figure 165- Observations of hikers on St. Regis Mt., 2012.



Figure 166- Garlic mustard.



Figure 167- Pale swallowwort.



Figure 168- Japanese knotweed.

Terrestrial Invasive Plant Monitoring and Control Garlic Mustard, Pale Swallowwort, and Japanese Knotweed

By: Jennifer Breen

Invasive plant species (IS), both aquatic (water) and terrestrial (land) are a problem in the Adirondack Park. IS are organisms that are non-native to our local environment. They outcompete native species because they do not have any natural predators in the invaded landscape and/or have reproductive advantages such as early bud-burst, rapid early-season growth, vegetative reproduction, and/or copious seed production and dispersal mechanisms. IS can disrupt and ruin the native ecosystem which organisms depend on to live and thrive. With invasive plants present, the native scenery is compromised which can turn away tourists and in due course disrupt the economies of towns that depend on the busy tourist season. Invasive plants, if they become well established, can cost thousands of dollars to manage and may even take years to fully eradicate the species.

Watershed stewards, in addition to their stewarding at the boat launches, worked on special projects in which they were assigned different tasks to either help the spread the aquatic invasive species (AIS) spread prevention message of the stewards, loon monitoring, mountain stewarding, or even helping the fight with terrestrial invasive species. This summer, four stewards were able to participate in the eradication in different regions of the Adirondack Park of three different terrestrial invasive plant species including Japanese knotweed, garlic mustard, and pale swallow-wort. Watershed Stewards Mike Bicknell, EJ Borchert, and Eric Paul worked with



Figure 169- Japanese Knotweed site along the Moose River Road in Mckeever, NY.



Figure 170- Volunteers including Watershed Stewards to help treat Japanese Knotweed. Photo from *Adirondack Express*.

knotweed canes in 150 sites were treated with additional sites in Piseco Lake, Lake Placid, Long Lake, and Speculator. For the summer of 2012, prior sites were being retreated as well as new sites in these areas as well as additional sites in Chestertown, Saranac Lake, and Tupper Lake. Sites along or near wetlands require Adirondack Park Agency approval. There are several more sites that need to be treated and with the help of volunteers to collect permission slips of property owners, these sites will be able to be treated sooner rather than later.

RIIPP is headed by Douglas Johnson, M.D. and Patty Wittmeyer, Inlet Town Clerk. There are several coordinators scattered throughout the Adirondack Park including Elizabeth Mangle from the Hamilton County Soil and Water Conservation District, Ellen Collins of Blue Mountain Lake, and Terry DeArmas from Indian Lake. RIIPP also coordinates with APIPP to help treat Japanese Knotweed with region-wide efforts. This summer four watershed stewards were able to volunteer with RIIPP in helping with identifying sites, educating property owners, and obtaining permission slips to give to Patty Wittmeyer and the applicators to rid of the knotweed from homes. Eric Paul covered areas around Cranberry Lake and Star Lake; Mike Bicknell observed areas around Stillwater

the organization Regional Inlet Invasive Plant Program (RIIPP) to help with controlling the spread of Japanese Knotweed. Jennifer Breen also helped with the organization but her focus was on garlic mustard and pale swallowwort.

RIIPP began in 2008 and is based out of Inlet, NY. It is an organization that focuses on the eradication of several invasive species including Japanese Knotweed. RIIPP works with many other organizations in the Adirondacks including the Hamilton County Soil and Water Conservation District and the Adirondack Park Invasive Plant Program in a combined effort to eliminate knotweed from the Adirondacks. From 2008 to 2010, members of RIIPP and several volunteers injected and sprayed tens of thousands of knotweed canes in over 80 sites including Blue Mountain Lake, Inlet, and the Town of Webb. The year after treatment 90-95% of plants showed no growth and only a few plants remained in 2010. In 2011, 75,000

Reservoir and Big Moose Lake, and EJ Borchert covered areas from Long Lake to Tupper Lake. If the property owners were not home, a door hanger with information about Japanese Knotweed as well as the phone number for RIIPP was left on their door. EJ Borchert was able to identify 12 sites of Japanese Knotweed with 5 of them having permission to treat. Door hangers were left on the rest of the residences. Treatment will occur at the five sites from late August to until the first frost. On July 1, a meeting was held in Blue Mountain Lake at Ellen Collins home in which 15 people attended including the stewards to discuss the plans for this year in treating Japanese Knotweed and identifying new sites that need to be treated. Also, new herbicides were discussed that kill the knotweed more effectively.

There are several plants that are a threat to the ecosystem of the Adirondacks. Invasive plants take over an area and choke out the ecosystem of the natural habitats by not allowing native plants to grow. Some of these plants are a main focus of the Adirondack Park Invasive Plant Program (APIPP) and include garlic mustard and pale swallowwort. Garlic mustard is often found along major roadsides and is often spread by vehicles and the transportation of dirt. Pale swallowwort was introduced as an ornamental plant for gardens but then soon escaped. These two plants can take over an area quickly and disrupt the ecology in any environment so it is important to exterminate these plants as soon as possible. Sometimes these can appear in areas that are more rural and further away from urbanized areas and this is undesirable for our ecosystem. When this happens, as in the case for garlic mustard and pale swallowwort, APIPP tries to take care of these areas first before they become unmanageable.

Watershed Steward Jennifer Breen's special project was to monitor Farr Road near Remsen for garlic mustard and pale swallowwort. Farr Road is a **seven-mile** dirt road in the outskirts of the Adirondack Park. Along this road there was a lot of garlic mustard and two pale swallowwort plants growing in one spot along the side of the road. It was very odd to have the pale swallowwort growing in the middle of the woods for this plant prefers open fields. This road is located in a very rural area, away from any busy roads and towns so it was odd to see the pale swallowwort growing in this area. It was made a priority to eliminate the garlic mustard and pale swallowwort in this more natural habitat. The job of the steward was to pull out the garlic mustard plants near the base of the stem to **REMOVE** not just the plant but the roots of the plant as well. The plants were then bagged and disposed of at a town transfer station. She was also to look along the road for anymore pale swallowwort plants and to GPS the spot where the plants are found. Luckily, there were no more pale swallowwort plants found on this road. Also, over half of the garlic mustard plants were pulled before they went to seed. This road will have to be monitored again next year for some garlic mustard plants went to seed before being pulled. Once the road had been surveyed, an employee for the Adirondack Park Invasive Plant Program came to Farr Road to demonstrate to the steward how to treat pale swallowwort and common reed grass for there were also two sites of this plant on this road. The pale swallowwort and common reed grass were sprayed with the herbicide Aquamaster until the leaves were coated but not dripping with this herbicide. Some of the stalks of the common reed grass were also injected with this herbicide.

References:

- Adirondack Park Invasive Plant Program Invasive Plant Profile. Garlic Mustard *Allaria petiolata*. Retrieved August 8, 2012 from <http://www.adkinvasives.com/terrestrial/PlantID/documents/PlantProfileGarlicMust.pdf>.
- Adirondack Park Invasive Plant Program Invasive Plant Profile. Japanese Knotweed *Polygonum cuspidatum*. Retrieved August 8, 2012 from <http://www.adkinvasives.com/terrestrial/PlantID/documents/PlantProfileKnotweed.pdf>.
- Lawlor, F. (6 April, 2006). Fact Sheet: Pale Swallow-wort. Retrieved August 8, 2012 from <http://www.nps.gov/plants/alien/fact/pdf/cyro1.pdf>.
- NoKnotweed-In Adirondacks. Regional Inlet Invasive Plant Program. *How to effectively Treat Japanese Knotweed*. Retrieved August 8, 2012 from <http://www.noknotweed.org/treat-knotweed.html>.
- Remaley, T. (20 May, 2005). Fact Sheet: Japanese Knotweed. Retrieved August 8, 2012, from <http://www.nps.gov/plants/alien/fact/pdf/faja1.pdf>.
- Rowe, P. (20 May, 2005). Fact Sheet: Garlic Mustard. Retrieved August 8, 2012, from <http://www.nps.gov/plants/alien/fact/pdf/alpe1.pdf>.

Purple Loosestrife Monitoring and Control

By: William Martin and Stephanie Korzec, Watershed Stewards



Figure 171 - Image of Purple Loosestrife taking hold in a wetland area (Purple Loosestrife).

Introduction

Lythrum salicaria or purple loosestrife is a terrestrial/wetland invader, not only in the Adirondack Park, but throughout the country. This perennial, purple flowering plant is native to Eurasia and arrived in North America during the early 1800's (Chun, Nason, & Moloney, 2009). In its native setting, purple loosestrife is controlled by a diverse arthropod community. Unfortunately, there are no known native species to restrict the growth of purple loosestrife in its new setting (Albright, Harman, Fickbohm, Meehan, Groff, & Austin, 2004).

Purple loosestrife's competitiveness for habitat space and nutrient availability is unmatched by native species. Once established, it can lead to reductions in overall plant biodiversity resulting in the degradation of wetland wildlife habitat. By altering the native flora composition that waterfowl and other wildlife feed upon,

purple loosestrife's effects cascade along the food chain ultimately leading to alterations of overall wetland function (Chun, Nason, & Moloney, 2009).

The plant was originally transported to the United States through the ballast water of European ships and also as a medicinal herb for treatment of diarrhea, dysentery, bleeding wounds, ulcers and sores. Through these vectors, purple loosestrife was well established along the New England sea board by the 1830's. The construction of inland canals in the 1880's favored the expansion of the plant to the interior of New York State (Malecki, Blossey, Hight, & Schroeder, 1993).

The capacity of purple loosestrife to compete has increased in disturbed areas. Horticulturists and bee-keepers further aided the spread of purple loosestrife through its sale for ornamental and pollination purposes. Also, in western states, the invasion was encouraged through advancements in irrigation systems ultimately leading to disruptions in the flow of water resulting in economic and agricultural losses. Other agricultural losses include the non-palatable purple loosestrife outcompeting hay and feed grass for livestock in areas suitable for its growth (Malecki, Blossey, Hight, & Schroeder, 1993).

One adult purple loosestrife plant can produce over 2 million seeds per year, and can grow to over 200 cm in height (Albright, Harman, Fickbohm, Meehan, Groff, & Austin, 2004). The seeds are long lived and easily dispersed by water and mud that adheres to wildlife, livestock and people. Seedling growth rates have been known to exceed 1 cm/day and adults can harbor anywhere from 30-50 stems that dominate the herbaceous understory canopy. Under natural conditions, seedling densities can approach 10,000-20,000 plants/m². The hardy root stock of adult plants serves as a nutrient storage dump which can be used to jump start growth in the spring growing season and help establish regrowth if the above ground stems are cut, burned or killed (Malecki, Blossey, Hight, & Schroeder, 1993).

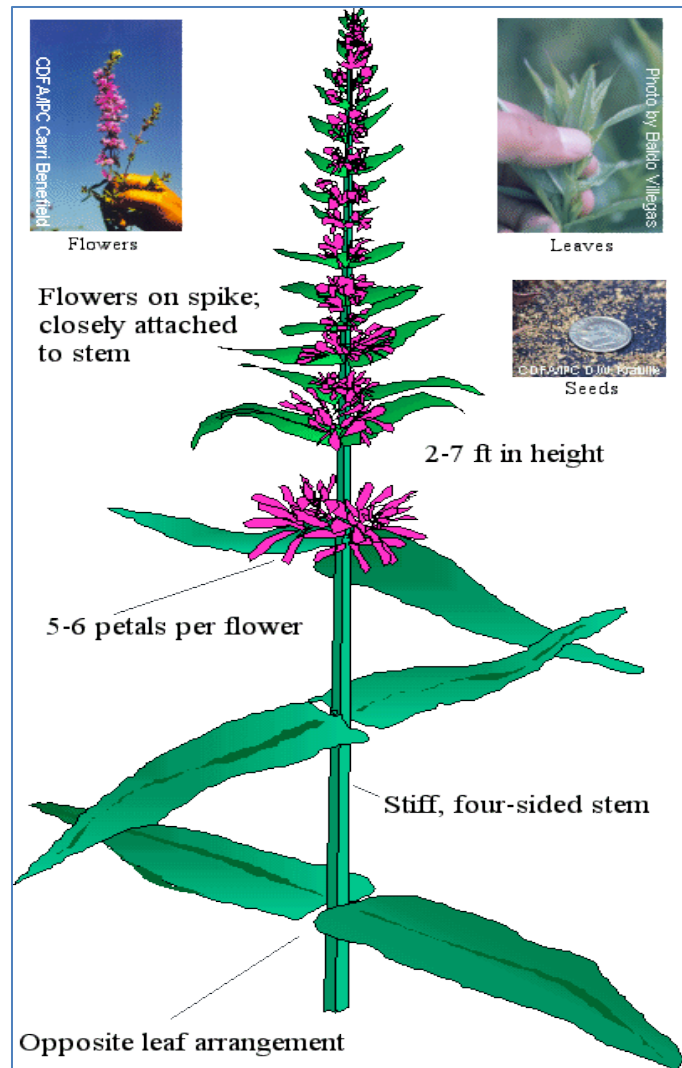


Figure 172 - Descriptive image of Purple Loosestrife parts (California Department of Food and Agriculture, 2012).

Attempts at controlling the invasion of purple loosestrife using methods such as cutting, herbicidal treatment, water manipulation, and burning have historically been unsuccessful. More recent use of biological control agents such as *Galerucella spp.* (leaf-eating and root boring beetles) have been documented as successful means of management and eradication for larger, densely populated stands (Albright, Harman, Fickbohm,

required decomposition period the purple loosestrife-filled garbage bags were placed in the facilities on-campus dumpster to be disposed of with the rest of the campus's waste.

Harvesting occurred over 5 days in late July and August, 2012. On July 30th plants were harvested along the shores of Spitfire Lake and the Slough into Lower St. Regis Lake. August 3rd harvesting took place on Upper St. Regis Lake, Spitfire Lake, and the channel between the two lakes via motor boat. Additionally Stewards removed plants from some new locations on the shores of the Saranac River by Moose Pond as well as a new site near the Lake Flower State Boat Launch. On August 6th, Stewards returned to the shores of Spitfire, Upper St. Regis, and Lower St. Regis Lakes looking for purple loosestrife that may have gone unnoticed on the previous visit. Many purple loosestrife seedlings were also removed from a known site on the property of Camp Regis-Applejack located on the shore of Upper St. Regis Lake's Penfold Bay. On August 10th a previously known purple loosestrife site just east of the college's Forestry Club Cabin was inspected but no resurgence of growth was found. August 20th two known loosestrife infestations on Lake Placid were checked and managed. The first was on the shore of Lake Placid near the Canoe Club. The second was at Camp Sunshine on the shore of Buck Island.

Results and Discussion:

Overall, 383 purple loosestrife plants were harvested throughout the management area in 2012, with 303 harvested from the St. Regis Lakes area. For the St. Regis Lakes area this is similar to the harvest from 2011 and approximately ½ the number of plants harvested in 2010. In many previously infested sites we found no new growth, while loosestrife at other sites seemed to have spread and new sites were identified.

The work of the Watershed Stewardship program appears to have reduced numbers of new plants since 2002 and helped to stabilize the population of loosestrife since 2008 in our management area. In 4 of 5 years since then, the total number of harvested plants has been less than 500 (Figure 4). While some sites appear to have continual low abundances of new plants in a year, others have large number of new plants each year (Table 1). It would be worthwhile to examine the sites which have been resistant to eradication and determine the characteristics that they all have in common which may lead to greater growth or reproductive success of purple loosestrife.

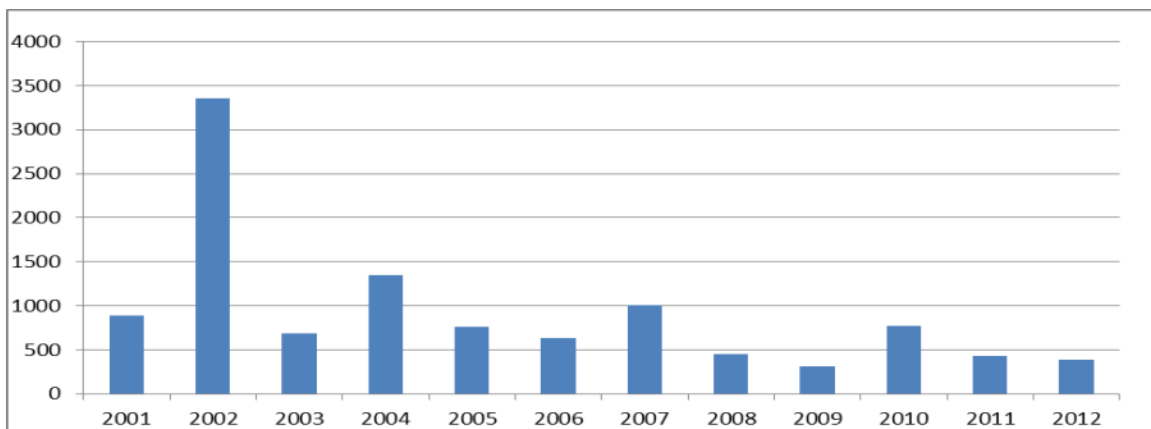


Figure 174 - Quantity of Purple Loosestrife plants harvested per year of management.

Table 113- Quantity of Purple Loosestrife plants removed from each location in the St. Regis Lakes area (2001-2012). Data not shown here for Lake Flower and Lake Placid. Across the bottom are totals of plants harvested within a year. The far right hand column are totals harvested overall per site across all years of the monitoring effort.(L.St.Reg= Lower St. Regis lake; Spitfire = Spitfire lake; Slough = the slough that runs between Spitfire Lake and Lower St. Regis Lake; U.St.Reg = Upper St. Regis Lake).

Lake/ Site	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	TOTAL (site)
L.St.Reg	0	0	0	0	4	0	0	0	0	0	16	0	20
Spitfire	0	0	0	0	10	0	0	3	0	3	8	0	24
Spitfire	0	437	143	116	25	117	107	87	0	72	30	67	1201
Spitfire	0	0	0	0	0	0	0	0	25	305	20	91	441
Slough	0	0	0	0	0	15	0	4	0	0	9	0	28
Slough	30	8	16	42	40	0	4	9	0	25	11	21	206
Slough	0	0	0	0	0	3	0	0	0	3	0	0	6
Slough	0	0	0	1	0	0	0	0	0	0	0	0	1
U.St.Reg	0	14	0	0	0	0	0	0	1	0	0	0	15
U.St.Reg	0	0	0	0	0	0	1	0	0	0	0	0	1
U.St.Reg	450	1400	430	742	130	14	380	123	195	222	197	103	4386
U.St.Reg	5	63	5	26	5	0	7	10	0	0	10	21	152
TOTAL (year)	485	1922	594	927	214	149	499	136	221	630	301	303	6481

Lower St Regis Lake:

The infestation sites on Lower St. Regis Lake, designated as sites 18 and 19 were condensed last year into just one site known as site number 18. Last year 16 plants were removed from the area just east of Paul Smith's College's Forestry Club Cabin, which was a significant jump from previous years. However, this year no new plants were yielded from this site implying that last year's management was a great success.

Spitfire Lake and the Slough:

The sites found along the shore of Spitfire had greatest number of purple loosestrife plants. Site eleven yielded no new plants, but purple loosestrife seedlings and mature adults were harvested in great quantities from sites 9 and 22.

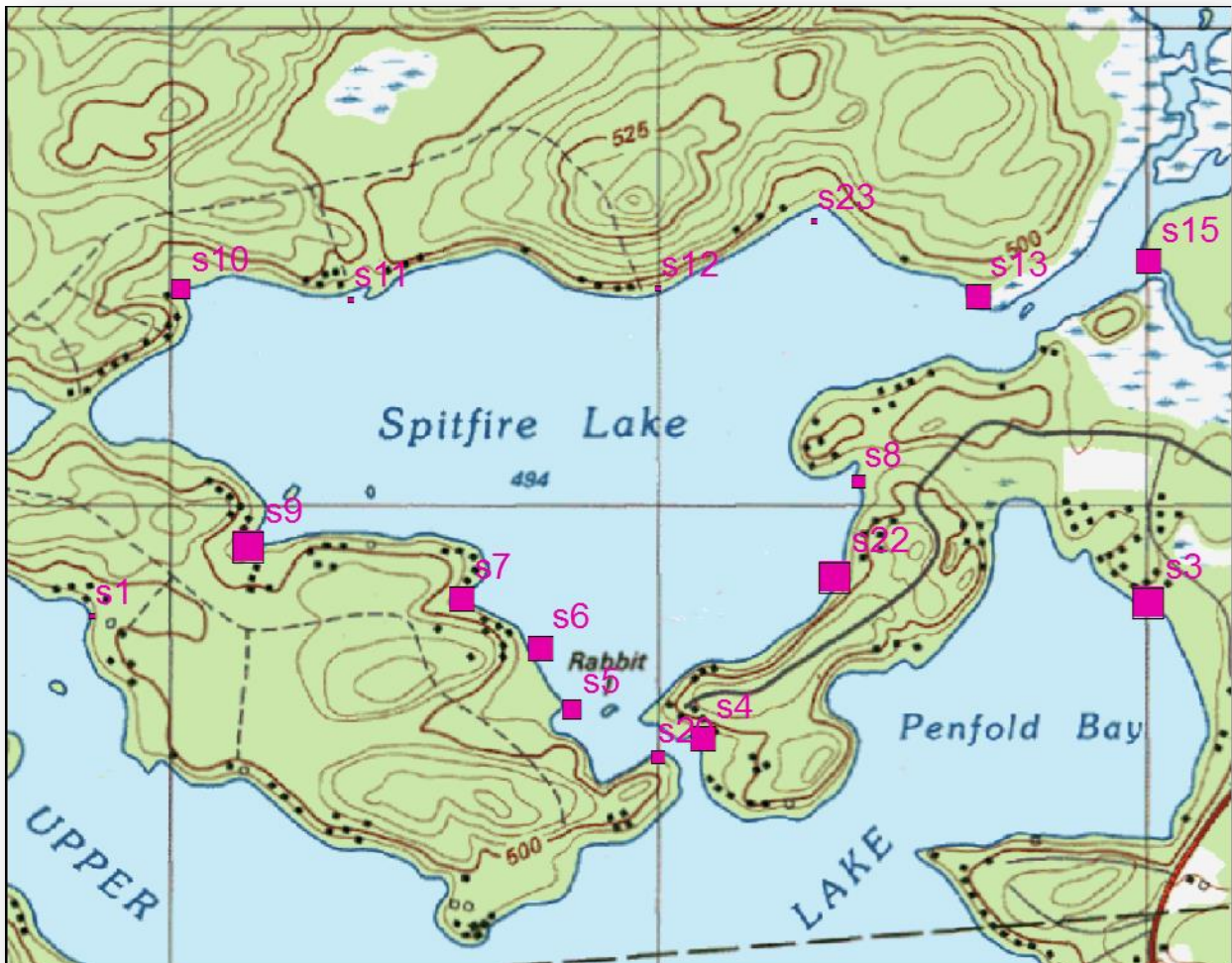


Figure 175 - Map of sites where Purple Loosestrife was removed in the St. Regis Lakes area (2012).

The Slough showed significant improvement from previous years yielding plants from only site 15. Sites 14, 16, and 17 showed no signs of plant regrowth, indicating great success by last year's management.

Upper St. Regis Lake and the Channel:

This area includes purple loosestrife sites 1-4. This is another representation of success from last year in that no plants were found at site 1 or 2, while significantly fewer and less mature plants were found at site 3 on the property of Camp Regis-Applejack. Site 4 still yielded 21 plants with a small, new infestation found directly across the channel from this site.

Lake Placid/ Camp Sunshine:

The sites that have historically been managed by the WSP can be found on the property of Camp Sunshine on Buck Island and the Canoe Club in Paradox Bay. No plants were found at the Canoe Club property this year indicating the long-term effectiveness of our management. The site at Camp Sunshine, however, yielded 45 juvenile plants. None had flowered prior to harvesting so reproduction by seeds did not occur in this site which is

optimistic, but the presence of 45 new plants suggests a need for more intense, root-level or perhaps bio-control agents in the future.

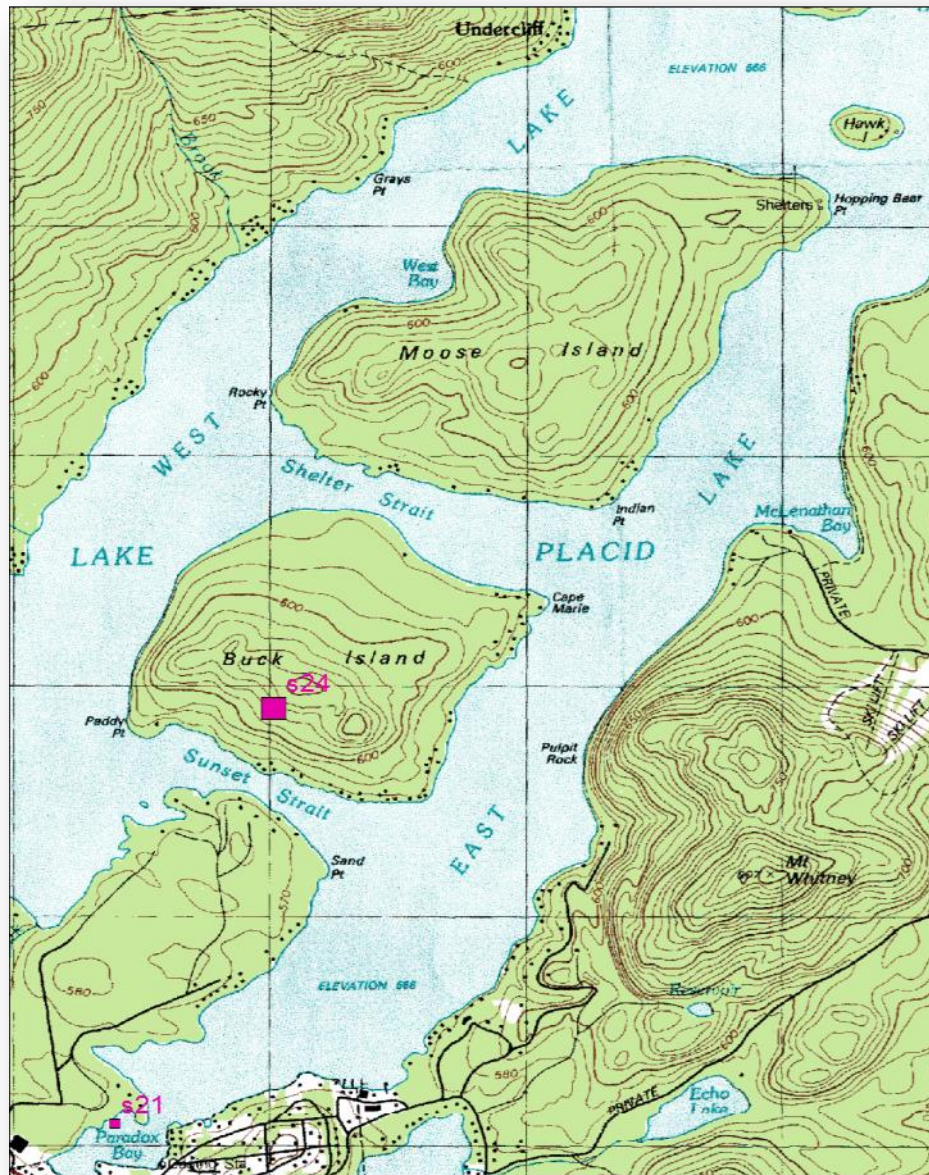


Figure 176. Map of the location of Camp Sunshine on Buck Island in Lake Placid.

Lake Flower:

A new site was discovered this year near the State Boat Launch in the Village of Saranac Lake. Six plants were harvested from the shore of Lake Flower just south of the main boat ramp.

Conclusion:

Overall, the management techniques employed by the Adirondack Watershed Institute's Watershed Stewardship Program have been a success. The number of plants harvested from sites is down from last year, but not by a substantial margin. There were several sites that showed no regrowth, though new small and scattered sites have the potential to spread further. The manual, hand-pulling method used by Watershed Stewards seems to be working sufficiently at the smaller sites, but others may require additional management techniques to quell the spread of this invasive plant. One Site on Spitfire lake seems to have spread the most from the previous year, but no severely dense stands were identified; rather there are several small stands reoccurring along the shoreline near the actual GPS denoted site. Therefore, our current methodologies should be maintained with further monitoring and closer inspection and other treatment options for sites that continue to be problematic regardless of intensive hand pulling.

Literature Cited

- California Department of Food and Agriculture*. (2012). Retrieved August 27, 2012, from Purple Loosestrife: What Does It Look Like?: http://www.cdfa.ca.gov/plant/ipc/purpleloosestrife/pls_looklike.htm
- Albright, M. F., Harman, W. N., Fickbohm, S. S., Meehan, H., Groff, S., & Austin, T. (2004). Recovery of Native Flora and Behavioral Responses by *Galerucella* spp. Following Biocontrol of Purple Loosestrife. *American Midland Naturalist*, 248-254.
- Chun, Y. J., Nason, J. D., & Moloney, K. A. (2009). Comparison of quantitative and molecular genetic variation of native vs. invasive populations of purple loosestrife. *Molecular Ecology*, 1-18.
- Eastern Forest Threat Center*. (n.d.). Retrieved August 27, 2012, from Purple Loosestrife: <http://threatsummary.forestthreats.org/threats/threatSummaryViewer2.cfm?threatID=186>
- Malecki, R. A., Blossey, B., Hight, S. D., & Schroeder, D. (1993). Biological Control of Purple Loosestrife. *Bioscience*, 680-687.
- Purple Loosestrife*. (n.d.). Retrieved August 27, 2012, from The Nature Conservancy's Purple Loosestrife Fact Sheet: http://www.norcrossws.org/invasie%20plants/invasive/purple_loosestrife.htm

Appendix: Education and Outreach Programs, Tri-Lakes Region, 2012

A. Visitor Contacts and Outreach Programs—Visitor Interpretive Center, Paul Smiths, New York, 2012

Table 114- Combined Visitor Tallies for Education Program with Emily Martin and Kearsten Cubit

Attendance for Environmental Issues Educator Programs, 2012				
Day of Week	Date	Program Title	Informal or Formal Contact	Number of Visitors
Saturday	26-May	VIC	Informal	206
Sunday	27-May	VIC	Informal	116
Saturday	2-Jun	VIC	Informal	200
Sunday	3-Jun	VIC	Informal	90
Tuesday	5-Jun	VIC	Informal	39
Saturday	9-Jun	VIC	Informal	59
Tuesday	12-Jun	VIC	Informal	29
Saturday	16-Jun	VIC	Informal	166
Tuesday	19-Jun	VIC	Informal	179
Saturday	23-Jun	VIC	Informal	100
Saturday	23-Jun	SUP Festival	Formal	15
Sunday	24-Jun	VIC	Informal	100
Saturday	30-Jun	VIC	Informal	175
Saturday	30-Jun	Fish Creek Pond Campground	Formal	11
Sunday	1-Jul	VIC	Informal	140
Saturday	7-Jul	VIC	Informal	200
Saturday	7-Jul	Paul Smiths College Scavenger Hunt	Formal	15
Saturday	7-Jul	Runabout Rendezvous Boat Show	Formal	10
Sunday	8-Jul	VIC	Informal	190
Saturday	14-Jul	VIC	Informal	155
Saturday	14-Jul	Saranac Lake Bioblitz	Formal	26
Sunday	15-Jul	VIC	Informal	150
Saturday	21-Jul	VIC	Informal	138
Saturday	21-Jul	Plattsburgh Farmer's Market	Formal	35
Sunday	22-Jul	VIC	Informal	150
Saturday	28-Jul	VIC	Informal	200
Saturday	28-Jul	Wild Center	Formal	25
Sunday	29-Jul	VIC	Informal	100
Saturday	4-Aug	VIC	Informal	225
Saturday	4-Aug	Clinton County Fair, Malone	Formal	60
Sunday	5-Aug	VIC	Informal	156
Saturday	11-Aug	VIC	Informal	122
Saturday	11-Aug	Essex County Fair, Westport	Formal	29
Sunday	12-Aug	VIC	Informal	253
Saturday	18-Aug	Adirondack Mountain Club	Formal	20
Saturday	25-Aug	Second Pond Boat	Formal	55

		Launch		
Saturday	1-Sept	VIC	Formal	10

F. Images from summer programs



Figure 177- Stand-Up Paddleboard (SUP) Festival- EIE Kearsten Cubit present at display.



Figure 178- EIE booth at SUP festival.