Recreation Conflicts And Compatibility Between Motorboat Owners, Personal Watercraft Owners, And Coastal Landowners Along New York's Great Lakes Coast

July 1, 2000

Cheng-Ping Wang
Graduate student, State University of New York, College of Environmental Science and Forestry, 211 Marshall Hall, One Forestry Drive, Syracuse, NY 13210

Chad P. Dawson
Professor, State University of New York, College of Environmental Science and Forestry, 211 Marshall Hall, One Forestry Drive, Syracuse, NY 13210

Introduction

The popularity of personal watercraft has stirred controversy both for and against their use in state and National Parks, as well as across many waterways and lakes of the United States. How you view personal watercraft use and operator behavior depends, in part, on whether you own and operate a personal watercraft or not. Both recreation conflict and compatibility have been reported between personal watercraft users, motorboaters, and landowners in a variety of circumstances. Some of the recreation conflicts arise from personal watercraft users interfering with the experience of motorboaters by speeding, jumping their boat wakes, or crossing their boating path. Reportedly personal watercraft users interfere with coastal landowners because of the noise of the personal watercraft, potential safety problems near other recreational users, and some privacy issues of landowners.

Recreation conflict is defined as interference to a user, who is trying to achieve a goal in a recreation activity, and the interference is due to another recreational user's behavior (Jacob and Schreyer 1980). Such recreation conflicts involve several major components: the user's motivations or goals in engaging in a recreation activity, the user's activity style, resource dependence by the user, the mode or means of experience, the lifestyle tolerance of other users, and the user's sensitivity to conflict. These conflict components were verified by numerous research studies across different user groups and recreation activities, as well as the study reported here (see Wang and Dawson 2000).

Previous studies identified the potential conflict groups as specific activity participants, and did not mention that people engaging in single or multiple activities may have different patterns or different values for the components of recreation conflict. For example, researchers pointed out recreation conflict between motorboating and nonmotorboating users, but users with both experiences may have different recreation conflict sensitivity levels from those with only one type of recreation use experience. Furthermore, users with both motorboating and nonmotorboating experiences may react differently when participating in motorboating and nonmotorboating activities. Personal watercraft users are newer users in the New York Great Lakes in comparison to the traditional users, such as motorboaters and coastal landowners. The

potential for interference between personal watercraft owners, motorboats and landowners was studied to compare the conflict factors among the different users and across groups with different activity combinations, such as landowners who owned a personal watercraft.

Methods

New York's Great Lakes (NYGL) in this study included the U.S. side of the St. Lawrence River, Lake Ontario, Niagara River, and Lake Erie. Compared to many inland bodies of water in New York State, NYGL have a larger water surface area and less public access overall. However, the potential recreation conflict problems usually do not happen in the middle of a lake, but in the coastal areas with public access, such as in bays, harbors, or near public beaches.

This study involves three major user groups along NYGL: personal watercraft owners, motorboat owners, and landowners with residential property on the shoreline. In order to get a sufficient sample size for each user and combination or users (e.g., landowners who own a motorboat), personal watercraft owners (n=1000) and motorboat owners (n=3000) were selected systematically from the New York State watercraft registrations in the 10 coastal counties along the NYGL including: Jefferson, St. Lawrence, Oswego, Wayne, Monroe, Niagara, Orleans, Erie, Chautauqua, and Cayuga counties. Landowners with residential property (primary or secondary residences) on the NYGL shoreline were selected (n=634 and about 100 for each site) from the tax maps of six study sites including: Alexandria Bay, Sandy Pond, Sodus Bay, Olcott, Niagara River, and Hanford Bay. These six sites were selected because of their access to the Great Lakes and the significant use for boating, personal watercraft use, other water-based recreation activities, and the number of landowners with residential property on the shoreline. Using ax maps this study selected only those owners with residences (primary and secondary) adjacent to the NYGL, but omitted those with vacant lands.

Three mail surveys with parallel questions were designed for personal watercraft owners (PWC), motorboat owners, and coastal landowners to measure the recreation conflict components and compatibility among users with various activity combinations. Each of the three mail surveys was designed from the research literature around nine reported dimensions of recreation conflict and measured by multiple questions. The surveys to users asked about their: recreation motives (19 questions), recreation activity style (11 questions), resource specificity for their recreation activity (10 questions), lifestyle tolerance (30 questions), mode of recreation experience (8 questions), norms for distance from other recreational users (8 questions), problems from personal watercraft users and motorboaters (20 questions), sensitivity to recreation conflict (13 questions), and visitor values for recreation activities (13 questions). In addition, any actual recreation conflict perceived by the survey respondents was measured by an open-end question that asked respondents to describe the interference they had experienced while recreating in NYGL during the past year.

An exploratory factor analysis was conducted on the data using orthogonal varimax rotation to reduce the 132 questions down to meaningful factors to more concisely describe the results. To reduce the number of user groups within each survey, ANOVA with Least Significant Distance was conducted to combine the similar groups together. The analysis standards and procedures to establish the factors and the 8 unique activity groups were reported in Wang and Dawson (2000). The Statistical Package for the Social Sciences (SPSS version 10.0 for windows) was used to conduct this analysis.

Study Results

A total of 4,641 surveys were sent out to the three study groups in the early fall of 1999. After two follow up reminder mailings, an overall adjusted response rate of 42% was achieved (personal watercraft owners = 33%, motorboat owners = 41% and landowners = 63%). Respondents were asked to report their ownership of motorboats, jet skis, and coastal lands adjacent to the NYGL. Because each of the three surveys had four possible ownership combinations, the three surveys produced a total of 12 types of owner group combinations (e.g., landowners with personal watercraft and a motorboat). To reduce the number of groups, a statistical analysis was conducted within each type of survey to combine the similar groups together based on the 132 questions in the survey. Motorboat owners with a PWC and land and motorboat owners with a PWC were grouped together because they only differed in 9 of the 132 items. In addition, PWC owners with a motorboat and land, PWC owners with a motorboat and PWC owners with land were combined into the same group because they had less than 15 items different of the 132 questions. Landowners with a motorboat and a PWC were similar to landowners with PWC because only 4 of the 132 items differed. Therefore, the 12 potential ownership groups were reduced to 8 ownership groups with similar responses (Table 1).

Please note that the results from similar ownership groups in the three different surveys can not be added together since each survey was designed from the perspective of owning either a motorboat, PWC, or coastal land. Thus, the PWC-m-l group is different from the L-m-pwc group because the first group answered the PWC survey and the second group answered the Landowner survey. In an effort to make it clear which survey a ownership group completed, capital letters on the group abbreviation will denote the type of mail survey for those respondents. For example, PWC-m-l denotes a Personal Water Craft survey respondent who also owns a motorboat and/or coastal land along NYGL's.

Table 1. Group ownership[a] combinations based on results from NYGL mail survey respondents [b].

Group Combination	Group Symbol	Respondent Group Size (n)
Motorboat Owner Survey		
Motorboater with pwc and/or land	M-pwc-l	49
Motorboater with land only	M-l	244
Motorboater only	M	694
PWC Owner Survey		
PWC with motorboater and/or land	PWC-l-m	204
PWC only	PWC	82
Landowner Survey		
Landowner with pwc and/or motorboat	L-m-pwc	49
Landowner with motorboat only	L-m	189
Landowner only	L	76

a Ownership groups include: Landowners = L; Personal Water Craft owners = PWC; Motorboat owners = M.

b Capital letters denote the type of mail survey for those respondents.

Recreational Motivations of Users

In the analysis, two of the 19 motive questions were eliminated because of their low statistical reliability, and the remaining 17 questions were grouped into five factors including: Nature Enjoyment, Relax, Rest & Get Away, Social Interaction, Excitement & Exercise, and Skill & Equipment (Table 2). All ownership groups, especially landowners, reported that they enjoyed the NYGL's natural setting and the chance to relax, rest & get away. Social Interaction was moderately important for all groups. Landowners liked to get their family together or make friends with their neighbors or visitors; PWC owners and motorboat owners liked to see others and be seen during their boating. Although Excitement & Exercise and Skill & Equipment were not important for all groups, PWC owners enjoyed the excitement more and focused on their skill more than the other groups. Landowners had low interest in Skill & Equipment, probably because they did not report owning a motorboat or PWC.

Table 2. Recreation motives and average importance [a] by responding ownership groups in the NYGL surveys.

Motives	Group							
	PWC Owner		Motorboat Owner			Landowner		
	PWC-l-m	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L
Nature Enjoyment								
To see the scenic beauty; To be outdoors; To be in natural surroundings	3.6	3.5	3.8	3.7	3.6	4.3	4.3	4.2

Relax, Rest & Get Away								
For relaxation and rest; To experience peace and quiet; To get away from job stress; To get away from daily routines; To get away from others	3.0	3.0	3.4	3.2	3.2	3.7	3.6	3.3
Social Interaction								
To be with my family; To meet new people like myself; To be with people who have similar values; To be with friends	2.7	2.8	3.0	2.9	2.8	3.6	3.0	2.8
Excitement & Exercise								
For excitement; For exercise	2.6	3.0	1.6	1.6	1.6	2.8	2.1	2.1
Skill & Equipment								
To improve my boating skills; To teach my skills to others; To test my equipment	2.2	2.3	1.9	2.1	2.2	1.9	1.7	0.2

[a] The number shown in the table is the mean value of importance for the motives from 0 = not important to 5 = very important.

Activity Style

The style used by the recreational users in engaging in their activity was measured by respondent reactions to 11 statements, printed in the survey, and based on a scale from strongly disagree (-2) to neutral point (0) to strongly agree (2). Two of the 11 statements were dropped because of their low statistical reliability and the remaining 9 statements produced two factors, Self-identity (e.g., do PWC users identify with other PWC users?) and Value Sharing (e.g., what values do PWC users share with other PWC users) (Table 3). Landowners somewhat identified themselves with other landowners. PWC owners without other ownerships more identified themselves as PWC owners than those PWC owners with a motorboat or land. However, landowners without boats or PWC's identified themselves as landowners less than those with a motorboat or a jet ski. PWC owners disagree with the Value Sharing concept; however, motorboat owners and landowners somewhat share their values with other motorboat owners and landowners respectively.

Comparing the activity style factors within ownership groups, it was found that PWC owners identified with other PWC owners but reportedly didn't strongly share values with other PWC owners. On the other hand, landowners strongly identified with other landowners and they also reported that they shared common values with other landowners. Motorboat owners identified with other motorboat owners and they also reported that they shared common values with other motorboat owners.

Table 3. Activity style dimension and average response [a] to statements by responding ownership groups in the NYGL surveys.

	Group							
	PWC Owner		Motorboat Owner			Landowner		
Activity Style	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L

Self-identity								
I am proud to be a PWC owner, motorboat owner, or landowner.								
I often describe my self to others by saying, "I am a PWC owner, motorboat owner, or landowner."	0.4	0.9	0.5	0.5	0.5	1.0	0.8	0.6
I am glad I chose to participate in PWC use, motorboating, or landownership rather than another activity.								
I become irritated when I hear others criticize PWC use, motorboating, or landownership.								
I talk up PWC use, motorboating, or landownership to my friends as a great activity.								
Value sharing								
The PWC owner, motorboat owner, or landowner image in the community represents me well.	-0.3	-0.2	0.4	0.3	0.3	0.7	0.5	0.5
I find that my values and the values of other PWC owners, motorboat owners, or landowners are very similar.								
I find it is easy to identify my self with other PWC owners, motorboat owners, or landowners.								
I have a lot in common with other PWC owners, motorboat owners, or landowners on the coast of NYGLs.								

[a] The number shown in the table is the mean value of agreement with the statement, from –2=strongly disagree to 2=strongly agree.

Resource Specificity

Respondents were asked to evaluate how strongly they agreed or disagreed with 11 questions to measure their specific need for or use of a resource. Analysis of the 11 specific resource need questions produced two factors: Best Place and Place Dependence (Table 4). Although most respondents did not strongly agree that the NYGL was the best place for water-based recreation, landowners more often agreed it was the best place compared to motorboat and PWC owners. PWC owners and motorboat owners probably realized that, due to their mobility, they had the option to use other areas to enjoy their recreational activities. The factor Place Dependence indicated all owners were somewhat dependent on the NYGL area for their experiences, especially landowners. Generally, landowners depended more on the NYGL area because of their properties, whereas motorboat and PWC owners could more easily alternate their activities to other bodies of water.

Table 4. Resource specification and average response [a] to statements by responding ownership groups in the NYGL surveys.

	Group							
	PWC Owner		Motorboat Owner			Landowner		
Factor	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L

Best Place								
No other places can be compared with that area. Being there makes me more satisfied than visiting any other places. I would not substitute this place with any other place for PWC use, motorboating, or landownership.	0.3	0.0	0.4	0.5	0.1	0.8	0.7	0.5
Place Dependence								
The area means a lot to me. I identify strongly with the area. I feel attached to the area. Much of my life centers on this area. New York's Great Lakes is my favorite place in my time off. Being on New York's Great Lakes is very important to me. When I use my PWC, motorboat, or own land there I can really be myself. Being there is one of the most pleasant things I can think of.	1.0	0.7	0.9	1.1	0.7	1.3	1.3	1.1

[a] The number shown in the table is the mean value of agreement with the statement, from –2=strongly disagree to 2=strongly agree.

Lifestyle Tolerance

Respondents were asked to evaluate their own group and the other two ownership groups to measure their tolerance of the lifestyle of others. One of the 10 questions was eliminated because of its low statistical reliability. The remaining 9 questions statistically aggregated into one factor for each survey (Table 5). In the evaluation for PWC, all owners with PWC's evaluated PWC owners as somewhat good, but other landowners or motorboat owners without a PWC had negative evaluations of PWC owners. This response pattern did not reoccur in the evaluations for motorboat owners and landowners, all users have relatively positive images for those two ownership groups. Comparing the values within each survey group, PWC owners thought they were similar to motorboat owners, but not too similar to landowners. All motorboat owners thought they were similar to landowners but not to PWC owners; however, landowners did not agree they were similar to the other two groups. Interestingly, PWC owners with land or a motorboat were similar to both PWC owners and motorboat owners. For example, their evaluation for PWC owners was the same as PWC owners, but like motorboat owners they thought motorboaters were similar to landowners. The possible reason is many respondents in this PWC group had motorboats. Also landowners had the highest self-evaluation, while PWC owners were not so confident in their self-evaluation. These results suggest a series of asymmetric interferences among those three groups—both PWC owners and motorboat owners affected landowners; motorboat owners were affected by PWC owners, but not much by landowners; and PWC owners were not affected by the other two groups.

Table 5. Lifestyle tolerance and average response [a] to paired word comparisons by responding ownership groups in the NYGL surveys.

	Group							
	PWC Owner		Motorboat Owner			Landowner		
Lifestyle Tolerance	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L

Evaluation of jet skiers								
Respectful–Risky; Quiet–Noisy; Similar to me–Different from me; Polite–Impolite; Courteous–Discourteous; Friendly–Unfriendly; Responsible–Irresponsible; Good–Bad; Unthreatening–Threatening.	0.3	0.3	0.2	-0.3	-0.2	0.4	-0.5	-0.2
Evaluation of motorboaters								
Respectful–Risky; Quiet–Noisy; Similar to me–Different from me; Polite–Impolite; Courteous–Discourteous; Friendly–Unfriendly; Responsible–Irresponsible; Good–Bad; Unthreatening–Threatening.	0.7	0.3	0.9	0.8	0.8	0.6	0.6	0.3
Evaluation of landowners								
Respectful–Risky; Quiet–Noisy; Similar to me–Different from me; Polite–Impolite; Courteous–Discourteous; Friendly–Unfriendly; Responsible–Irresponsible; Good–Bad; Unthreatening–Threatening.	0.7	0.5	0.9	1.0	0.8	1.1	1.0	1.2

[a] The number shown in the table is the mean value of agreement with the paired words, from –2=negative to 2=positive.

Focus on Experience

PWC owners and motorboat owners were asked to evaluate how they focused on the 8 questions about their recreation experience. Only four of the 8 questions were used in the landowners' survey because they answered questions based on their enjoyment of their properties (Table 6). Both PWC owners and motorboat owners responded that they focused on safety seriously. PWC owners seemed more focused on speed and skill than motorboat owners. Although PWC owners reported they moderately focused on social and nature settings, motorboat owners and landowners had a slightly higher response than PWC owners. These results indicate that PWC owners are strongly speed and skill oriented and both PWC owners and motorboat owners care about safety issues and enjoy nature and social settings. Compared to PWC owners, motorboat owners reported that they were seeking social and nature enjoyment, but are not as focused on high speed and fun.

Table 6. Focus of experience and average response [a] to statements by responding ownership groups in the NYGL surveys.

	Group							
	PWC Owner		Motorboat Owner			Landowner [b]		
Focus of Experience	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L
Focus on safety								
I operate the jet ski (or motorboat) safely and comfortably	4.6	4.5	4.4	4.5	4.4	n.a.	n.a.	n.a.
I pay attention to the distances from other boats, jet skis, docks, etc.								
Focus on speed and skill								
I pursue high speed and fun on jet skiing or boating	3.4	3.6	2.7	2.9	2.8	n.a.	n.a.	n.a.
I practice my jet skiing or motorboating skill								

Focus on social and the nature								
I enjoy talking to or making friends; I enjoy PWC use, motorboating, or landownership with my family I enjoy the scenery during PWC use, motorboating, or landownership; I look for fish, plants or wildlife	3.4	3.3	3.6	3.7	3.7	3.7	3.7	3.4

[a] The number shown in the table is the mean value of focus for the experiences from 0 = never focused to 5 = extremely focused.

[b] n.a. = not available for the landowner survey.

Perceived problems from PWC use and motorboat use

Respondents were asked to evaluate 10 statements about potential problems caused by PWC use and motorboat use (Table 7). The 10 potential problem statements related to PWC use were statistically grouped into two factors: Operator Behavior & Machine Impact Related Problems and Environmental Related Problems. Potential problem statements related to motorboat use were statistically grouped into three factors: Operator Behavior Related Problems, Machine Impact Related Problems, and Environmental Related Problems. Operator Behavior & Machine Impact Related Problems were grouped into the same factor for PWC use but separated for motorboating and that may indicate that when considering problems, respondents consider PWC's and PWC use together but consider motorboats and motorboat use separately. Generally, the perceived problems from both PWC use and motorboating were reported as low to moderate in the NYGL area. Respondents perceived PWC users as having higher levels of Operator Behavior & Machine Impact Related Problems than Environmental Related Problems. In addition, motorboaters perceived Operator Behavior & Machine Impact Related Problems from PWC use as higher than landowners did. All groups perceived Machine Impact Related Problems from motorboating more significant than Environmental Related Problems and Operator Behavior Related Problems from motorboating. Landowners seemed to perceive more trouble from motorboating than the other groups and they considered Machine Impact Related Problems from motorboats as serious as those from PWC's. Again, these results suggest a series of asymmetric interferences among the three groups—both PWC owners and motorboat owners affected landowners; motorboat owners were affected by PWC owners, but not by landowners; and PWC owners were not generally affected by the other two groups.

Table 7. Perceived problems from PWC use and motorboat use and average response [a] to statements by responding ownership groups in the NYGL surveys.

Perceived Problems From PWC Use And Motorboating	Group							
	PWC Owner		Motorboat Owner			Landowner		
	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L
Operator behavior & machine impact related problems from PWC use Speeding; Noise; Wakes; Distance Problems; Crowding; Meeting a PWC.	1.4	1.0	2.0	2.8	2.9	1.4	3.1	2.4
Environment related problems from PWC use Coast erosion; Impacts on wildlife; Impacts on fish; Water pollution	0.9	0.7	1.5	1.9	2.0	0.9	2.1	2.2
Machine impact related problems from motorboating Speeding; Noise; Wakes	1.9	1.9	1.9	2.5	2.6	2.0	2.7	2.5
Environment related problems from motorboating Coast erosion; Impacts on wildlife; Impacts on fish; Water pollution	1.3	1.5	1.5	1.7	1.8	1.1	2.1	2.2

Operator behavior related problems from motorboating Distance Problems; crowding; Meeting a PWC.	1.1	1.1	1.2	1.6	1.5	2.0	1.9	1.7

[a] The number shown in the table is the mean problem level from 0 = not problem to 5 = serious problem.

Visitor Values

Thirteen statements were used to evaluate the compatibility between motorboating and PWC use. Two statements were eliminated because of their low statistical reliability. The remaining 11 statements were grouped into three factors: Positive Statements, Negative Statements, and Regulations (Table 8). All ownership groups, even PWC owners, disagree with the positive statements for PWC use, especially motorboat owners and motorboat owners with land. However, PWC owners disagree with the negative statements about PWC use, whereas people without PWCs agree with the negative statements about PWC use. Interestingly, evaluations from people without PWCs were negative towards PWC use and people with PWCs perceived they were not compatible with other users, but not as serious as other ownership groups thought. Although NYS speed and distance from fixed object regulations are the same for motorboat use and PWC use, all groups did not strongly agree with these true statements. This suggests that respondents were not completely familiar with NYS boating regulations.

Table 8. Visitor values and average response [a] to statements by responding ownership groups in the NYGL surveys.

	Group							
	PWC Owner		Motorboat Owner			Landowner		
Visitor values	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L
Positive Statements								
PWC users are experienced.	-0.2	-0.1	-0.3	-0.8	-0.8	0.0	-0.8	-0.3
Motorboaters do not mind boating in sites used by PWC's.								
Meeting a PWC makes a boat trip more interesting.								
Negative Statements								
PWC users **do not** pay attention to their impacts on other users.								
When motorboats meet a PWC, boating safety problems become significant.	-0.5	-0.7	-0.1	0.6	0.5	-0.4	0.6	0.4
PWC use causes more environmental impact than motorboat use.								
PWC causes more impacts on other visitors than motorboat use.								
Seeing a PWC seems out-of-place.								
Motorboats are more appropriate than a PWC in the coastal area of NYGL's.								
Regulations								
Boating regulations are the same for motorboats and PWC's.	0.8	0.7	0.8	0.4	0.5	0.7	0.4	0.1
Speed limits for motorboats are the same as for PWC's.								

[a] The number shown in the table is the mean value of agreement with the statement, from –2=strongly disagree to 2=strongly agree.

Sensitivity to Recreation Conflict

Respondents were asked to evaluate their sensitivity to interference when they encountered 11 recreation activities. Factor analysis produced three factors: High Sensitivity, Medium Sensitivity and Low Sensitivity (Table 9). All groups were highly sensitive to jet skiing, motorboating and water skiing. Water skiing was probably grouped with jet skiing and motorboating because of its high speed and large space requirements. Although all the 8 groups studied had low sensitivity to interference from scuba diving, snorkeling, swimming and windsurfing, it is believed that users in those activities would be sensitive to the conflict from motorboating and jet skiing. Generally, all values in the table were less than 2.0, indicating recreation conflict was not significant in NYGL. However, all motorboaters and those landowners without jet skis had higher sensitivity for interference from jet skiing, motorboating and water skiing than jet skiers.

Table 9. Recreation conflict sensitivity and average response [a] to statements by responding ownership groups in the NYGL surveys.

Recreation Conflict Sensitivity	Group							
	PWC Owner		Motorboat Owner			Landowner		
	PWC-m-l	PWC	M-pwc-l	M-l	M	L-m-pwc	L-m	L
High sensitivity PWC use; Motorboating; Water skiing	0.9	0.9	1.5	1.9	1.9	0.9	1.9	1.7
Medium sensitivity Boat fishing; Bank or shore fishing; Canoeing & kayaking; Sail boating	0.5	0.6	0.5	0.5	0.5	0.3	0.4	0.3
Low sensitivity Scuba diving; Snorkeling; Swimming; Windsurfing	0.4	0.6	0.4	0.4	0.4	0.2	0.3	0.2

[a] The number shown in the table is the mean value of sensitivity level, from 0=never interferes to 5=extremely interferes.

Preferred Distances from Other Users

Respondents were asked to report their preferred distance from their own activities to personal watercraft use. The 5 categories for preferred operating distance ranged from 100’ to 1000’ or above (Figure 1). The current NYS regulation is that personal watercraft and boats must operate at 5 m.p.h or less when within 100 foot of shore or any other fixed object. Although many users with PWC’s reported that a 100’ distance was acceptable to them, most motorboaters and landowners without PWCs preferred more distance from operating PWC’s. About 45% of PWC users preferred longer distances from other PWC users. In addition, a noticeable proportion of non-PWC users reported 1000 feet or more was needed from PWC users and this might indicate their negative experiences from PWC use.

Figure 1. Preferred operating distances from PWC users.

Respondents were asked to report their preferred distance from their own activities to motorboating and their responses seemed more consistant than for PWC use. For all groups, more than 60% reported a preferred distance of more than 100 feet from operating motorboats (Figure 2). Even 65% of motorboaters (M) preferred longer distances from other motorboats. And 24% of landowners (L) preferred 1000 feet or more from motorboating activities. These results indicate that landowners were affected by motorboating activities and the current NYS regulation for motorboats to allow a 100 foot zone of 5 m.p.h. from the shore and other fixed objects may not be sufficient from their perspective as coastal users.

Figure 2. Preferred operating distances from motorboats.

Motorboat and PWC operators were asked to report their preferred distance from their own activities to shore line (Figure 3). The results were constant among most groups and about 70% of PWC users and motorboaters cumulatively reported preferred distances of more than 100 feet. These results indicate that the current NYS regulation for motorboaters and PWC operators to allow a 100 foot zone of 5 m.p.h. from the shore and other fixed objects may not be sufficient from the motorboaters and PWC operators perspectives as coastal users.

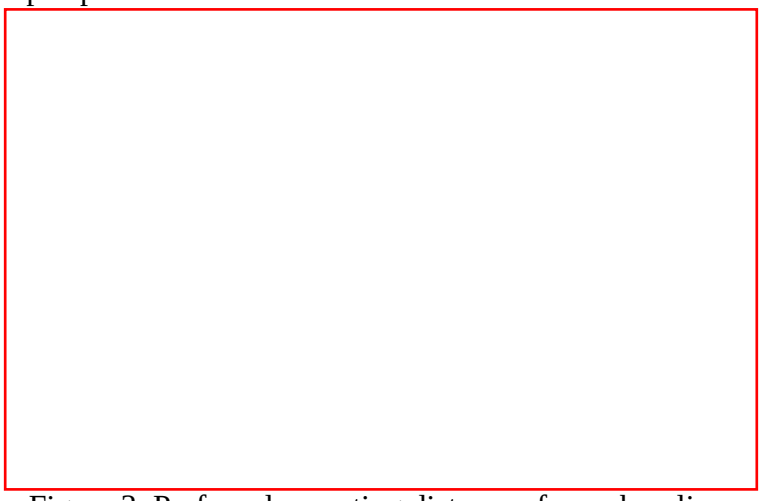

Figure 3. Preferred operating distances from shoreline.

Activity Interference

Recreation conflict was measured by asking respondents if they had any perceived activity interference during their recreational use of NYGLs. If respondents answered “yes”, they were asked to describe their experiences. The experiences described were organized into four categories: physical problems and situations, interference from motorboaters, interference from PWC users, and interference from both motorboaters and PWC users (Table 10). Physical problems and situations referred to such issues as low water levels in the lake, limited boating access, enforcement issues, water pollution, and other problems. PWC users were somewhat bothered by physical problems. Motorboaters were

bothered by PWC use and physical problems. Landowners were more strongly affect by both motorboat and PWC use (31% to 59%).

Table 10. Percent of respondents with perceived interference with water-based recreation activities in NYGL.

	No Problems	Physical Problems	Motorboat Use	PWC Use	PWC and Motorboat Use
PWC-m-l	85	7	3	5	0
PWC	74	14	5	4	3
M-pwc-l	78	8	2	8	4
M-l	60	11	4	16	9
M	80	9	2	1	8
L-m-pwc	69	0	12	5	14
L-m	40	1	6	25	28
L	61	1	4	11	23

Observations and Implications

The study results suggest several important implications and issues. First, a series of “asymmetric conflicts” were evident: between landowners who were bothered by both PWC users and motorboaters; motorboaters who were bothered by PWC users, but not much by landowners; and PWC users who did not seem to be affected by either motorboaters or landowners. Resource dependence is one possible reason to explain this situation. Landowners are more dependent on the NYGL because of their property ownership and this area is more meaningful for them and hard to substitute with other resources. However, PWC users and motorboaters are more flexible when using this area because alternative areas are available in NYGL or inland in NYS for their activities. PWC use usually interferes with motorboaters by speeding, jumping their wakes to close to the boat, or causing motorboaters to have to alter their boat direction to avoid PWC. However, both PWC use and motorboating interfered with landowners because of motor noise, concerns for safe PWC and boat operation, and privacy issues when using their coastal property at the waterfront.

The series of asymmetrical conflicts points out a potential problem in multiple use areas when several conflicting uses maybe present at the same time. Recreation planners and managers may have to identify the groups experiencing more interference and minimize potential conflict for the affected groups. Failing to maintain the recreation quality for users and landowners who are sensitive to interference and conflict may cause the affected groups to be dissatisfied and increase their sensitivity to interference and conflict.

The study results indicate that education programs may help to reduce the conflict. In this study, PWC users perceived they were not appreciated by other users; however, they thought safety issues and their behaviors were not as bad as other groups thought. Motorboaters perceived interference from jet skiing, but did not perceive that they also caused problems to landowners. Interestingly, both motorboaters and landowners with PWC had more sympathy for PWC use and users, possibly because these people had similar recreational motivations as PWC users and perceived what PWC users were experiencing during their activities. A similar situation happened between motorboaters and landowners. Landowners with motorboats were not against motorboating as much as landowners without watercraft. This indicates that people participating in multiple activities, with the potential conflicts, may have more empathy and tolerance for other types of visitors. Therefore, recreation managers may reduce some perceived recreation conflict by increasing users’ tolerance through understanding or “experience sharing” among different user groups.

There are more common experiences and motivations between PWC users, motorboaters and landowners than previously thought. For example, all users were reportedly motivated by social interaction and nature enjoyment. Education programs could enhance users’ perceptions about activity impacts on the social and natural environments and provide appropriate strategies or suggest behaviors to avoid conflict, such as selecting a quieter 4-cycle PWC motor, participating in suitable areas for PWC that minimize impacts, and acting courteously and appropriately to other users to reduce

potential conflicts.

User's perceptions of boating regulations (Table 8) suggest that many users do not understand the current NYS regulations for motorboating and PWC use. In addition, the landowner's responses indicate not only their unfamiliarity with NYS boating regulations, but also their strong feelings against some types of PWC use. Education programs can offer opportunities to enhance user's knowledge of boating regulations and increase tolerance among different user groups (e.g., understand other user's motivations, be aware of the difficulty of maneuvering larger boats, know the rules of navigation for all types of boats).

Study results indicate that although the preferred operating distances between PWC, motorboats and coastal lands were different, the majority of users preferred more than 100 feet between these activities and with shore. Those respondents preferring more distance between users may feel this way because of motor noise, concern for safety, perceptions of crowding, disruptive or unsafe behaviors, and privacy issues. Coastal landowners, for instance, felt noise and speeding from PWC use and motorboating disturbed their daily life and this type of use close to their properties caused privacy problems and safety concerns for their families when wading, swimming, or fishing. PWC users reportedly bothered motorboaters by following them too close, jumping their boat wakes, or interrupting their boating course. Overall, most respondents in this study preferred longer distances between recreational activities and this may be due, in part, to the perception that NYGL has a large water surface area for users to participate in various activities.

Although some changes are suggested by this study based on the distances preferred, other alternatives need more consideration, such as noise reduction through mechanical technology and changes in boat and PWC operator behavior. For example, studies about the impacts of motors on the natural environment or wildlife could help users to understand how these issues are directly related to distance from shore and other users activities (e.g., observing wildlife or fishing). New boat designs and motor engineering could help to reduce noise levels and minimize the impacts to the natural environment. The types of water bodies and various bank or shoreline situations, are important considerations in distance regulations because large distances may be appropriate for open water areas like NYGL, but not in narrow rivers or bays because such distance restrictions may limit the use of PWC and motorboats in some areas altogether.

In summary, recreation conflicts among PWC use, motorboating and landowners are low to moderate in most NYGL areas probably because of its large water surface area. However, problems emerged near coastal areas because of more interaction among those different users. There are many similarities between PWC users, motorboaters and landowners in the pattern of responses to the study questions – that is, there is more shared in common about these recreation experiences than previously expected. Study results reveal a series of asymmetrical conflicts that may imply current multiple use recreation, at the same site, may not be a good strategy as it can lead to recreation conflict (i.e., separating PWC users from other users maybe one approach to reducing conflict). The study also suggests education programs were needed to reduce conflict and increase compatibility between different user groups. However, preferences for large distances between users during their activities, and the implication that users may accept increases in the NYS 100 foot limit in which boats must operate at 5 m.p.h or less from shore, should not be generalized to inland lakes or river systems because the physical environment (e.g. area, waves, wind, shoreline and adjacent lands) of the NYGL is different from those other inland NYS water areas.

Acknowledgements
This study was funded by New York Sea Grant Institute, New York Sea Grant Extension and State University of New York College of Environmental Science & Forestry at Syracuse, NY. The input of David White, an Extension Specialist with New York Sea Grant Extension, is especially appreciated.

Literature Cited

Jacob, G.R. and Schreyer, R. 1980. Conflict in outdoor recreation: A theoretical perspective. Journal of Leisure

Research, 12(4): 368-380.

Wang, C. P. and Dawson, C. P. 2000. A comparison of recreation conflict factors for different water-based recreation activities. *In* Kyle, Gerard (compiler), Proceedings of the Northeastern Recreation Research Symposium at Bolton Landing, NY; April 2-4, 2000. USDA, Forest Service, Northeastern Forest Research Station, Gen. Tech. Rep. NE-(forthcoming); Radnor, PA.

 Marine Facilities Page