

LANDOWNER VALUES, WATER QUALITY, AND RECREATION IN THE LAKE CHAMPLAIN BASIN

Walter F. Kuentzel, 357 Aiken Center, School of Natural Resources, University of Vermont, Burlington, VT, 05405.

Donald F. Dennis, Northeastern Forest Experiment Station, P. O. Box 968, Burlington, VT, 05402.

Abstract: This study describes landowner values about water quality among resident landowners in the LaPlatte River watershed, tests whether suburbanization is producing a new mix of social values, analyzes the relationship between values and behaviors, and explores the link between recreation and water quality advocacy. Results showed that residents hold pro-environmental values, although the region is not a stronghold of environmentalism. There was a clear "flatlander" effect, with newcomers holding more pro-environmental values than long term residents. Long term residents used their land more intensively than newcomers. There was a weak relationship between values and land use behaviors, although long-term residents showed more consistency between values and behaviors. Finally, recreational preference was not related to one's values about clean water.

Water quality is an issue of widespread public concern in the Lake Champlain Basin of Vermont and Upstate New York. Ecologists, anglers, environmentalists, boaters, community officials, and other stakeholders want to improve the quality of fishing, drinking water, and recreational opportunities on the Lake. Water quality has traditionally been the domain of ecologists who treat human activity as an exogenous variable, and who focus on how people affect the integrity of natural systems. Less research, however, has analyzed the collective social processes that are linked to individual land uses that may affect water quality. This paper explores the relationship between the social values of landowners in the LaPlatte River watershed in Vermont and their land-use behaviors that may affect wetlands in the watershed and water quality in Lake Champlain. Further, no research has explored how contemporary recreational constituencies among residents in the region may influence the campaign for clean water in the Lake Champlain basin. This paper therefore explores whether social change in the LaPlatte River watershed may produce new recreational constituencies who are stronger advocates of clean water in the Lake Champlain basin.

Why Social Values?

Values and Social Conflict

Clean water in the Lake Champlain basin is a recreational amenity that has been an ongoing challenge as the region experiences social change. In the Burlington, Vermont region, large industries historically located on the waterfront have given way to green-space development and service sector development. Agriculture is giving way to

increasing suburbanization in the Burlington vicinity as population growth in surrounding rural areas outpaces growth in the urban center. This change has not occurred in an environment of public consensus, however (see, for example, the Pine Street Barge Canal controversy; Burlington Free Press, 1995, 1996).

One way of understanding public controversy is by analyzing the matrix of social values among stakeholders in water quality policy (Stankey & Clark, 1991). Many observers point to fundamental shifts in the values of society as the cause of emergent conflicts over natural resource use (Brooks and Grant 1992, Salwasser 1990, Williams 1991). Controversy can arise when different constituencies value amenities like water quality differently. Anglers may desire restrictions on agricultural runoff because they value clear water that favors lake trout, whereas farmers may resent such restrictions because they value productivity and profitability more than water clarity. Similarly, birders may value a productive wetland for wildlife habitat, while some local residents may fill wet areas on their property because they value an insect-free yard. In a society that encourages and enables litigation over environmental policy, divergent social values can produce controversies where public debate is more contentious and compromise is more difficult. Understanding these divergent social values may help to smooth the policy making process.

The "Flatlander" Effect

One factor closely associated with suburbanization is the "flatlander" effect. As in most regions of the country, those who claim the "native" label do so with pride. Their lineage that goes back several generations often makes them community leaders and gives them tacit authority to define the meaning and the character of the place. Newcomers to these places are often labeled outsiders, or "flatlanders" in Vermont. They bring new ideas and points of view that may or may not be compatible with local values. In other words, they bring a new mix of social values into communities with established routines and institutions.

The LaPlatte River watershed is a particularly appropriate site to study values and value conflict. It is a traditional agricultural region undergoing significant suburbanization pressure from nearby Burlington, Vermont - the largest metropolitan area in the state and region. Additionally, real estate in parts of this watershed has become some of the most expensive in the state. The watershed may be attracting the professional baby-boomer in the height of careers and earning power. The area may also be attracting a generation of newcomers whose land-use values were prompted by the environmental movement of the last 25 years.

Values and Behavior

If the mix of landowner values in the LaPlatte River watershed is changing because of an influx of "flatlanders" who are expanding the boundaries of Burlington's suburbs, are prevalent land-use behaviors in the watershed also changing? That is, do certain social values produce certain

kinds of behaviors that may affect water quality in the watershed and in Lake Champlain? This paper explores the relationship between landowner values and their intensity of land use behaviors (lawn and garden, woods, wetlands, and agricultural) that may affect water quality in the watershed.

This causal relationship between values and behaviors may be problematic. LaPiere's study of racial attitudes and behaviors, which showed no correlation between attitudes and behaviors (LaPiere, 1934), set in motion 60 years of attitude/behavior research. Overall, the attitude literature includes two theoretical traditions that help explain the attitude/behavior relationship. First is cognitive structure of attitudes. Attitudes are not simply isolated information bites stored in people's heads, and mechanically accessed to direct behavior. Instead, attitudes are a complex cognitive mix of values, beliefs, emotions, preferences, and intention (Heberlein, 1981; Fishbein & Ajzen, 1975). Attitudes with more elaborate cognitive structure are better crystallized (Sherif & Hoveland, 1961), more accessible, and more behaviorally relevant (Fazio, Chen, McDonel, & Sherman, 1982). Second is attitude specificity. General attitudes are poor predictors of specific behaviors (Heberlein & Black, 1976). For example, one may hold an attitude that ozone depletion is a serious problem facing the world, but this attitude may not cause that individual to drive his or her car less and take public transportation more.

Therefore, this may mean that values are even poorer predictors of behavior than attitudes. Attitudes require an attitude object, and are specifically linked to empirical objects or events in the world. Values are general orientations that provide an evaluative framework or lens to the world, and predispose one to react positively or negatively to the events. This paper therefore explores the degree to which one's wetland and water quality values affects their subsequent land use behaviors that may affect water quality.

Social Values and Recreation

Finally, this paper explores the relationships of landowner values to their preferences for certain types of wetland-related recreation activities and experiences. If suburbanization is attracting baby-boomer residents to the watershed who bring pro-environmental values, do they also prefer certain types of value-consistent recreational experiences? Do the natives, who may use their land in more traditional ways, prefer a consumptive mix of recreational experiences like hunting, fishing, and trapping? Conversely, do the "flatlanders" with pro-environmental values prefer a nonconsumptive mix of recreational experiences such as bird watching, cross country skiing, hiking, or photography? Could these outsiders also bring a stronger sense of advocacy to the clean water campaign in the Lake Champlain basin?

Methods

Study Area

This paper uses data from a survey administered during the fall of 1996 to landowners in the LaPlatte River Watershed

in Vermont. This watershed includes parts of 4 townships in Northwest Vermont: Charlotte, Shelburne, Hinesburg, and Williston. The area includes classic New England towns interspersed with rolling agricultural lands. The watershed is a glaciated strip of land sandwiched between the Green Mountains to the east and the shores of Lake Champlain to the west. This glaciation left an extensive system of wetlands throughout the watershed, and rich agricultural soils.

The watershed's close proximity to Burlington has brought this area under increasing suburbanization pressure. The views of the Green Mountains to the east and the Adirondacks across the Lake to the west create high demand for real estate. Consequently, farms are being subdivided and towns are struggling with rapid development and condominiumization. Property values and property taxes in the LaPlatte Watershed are some of the highest in the state, causing difficulty for long time residents. Land in the watershed is therefore undergoing considerable pressure for change.

Mailed Survey

Researchers compiled a list of property owners from the town offices for all parcels in the LaPlatte River watershed. There were more than 2200 parcels in the watershed. The goal of the research was to survey all resident landowners, so we excluded any parcels owned by the towns, by business or industry, and by absentee owners. This created a list of 1620 property owners were sent questionnaires. We used three mailings to generate our responses: the original questionnaire mailing, a reminder post card two weeks later, and a second mailing of the questionnaire to nonrespondents two weeks following the post card mailing. There were 155 undeliverable questionnaires among the original group of resident landowners. We attempted to locate the undeliverables using a CD-Rom phone book. We were able to locate 30 of the undeliverables in this way. If they still lived in the watershed, we sent them another questionnaire. Finally, 843 returned questionnaires representing a 57.5% response rate.

Questionnaire

The questionnaire included items designed to measure the intensity of an individual's land use behaviors that could have an impact on water quality. Specifically, the questionnaire asked about lawn care, gardening, and farming practices: 1) application of herbicides, pesticides and fertilizers 2) frequency of work on lawns, gardens or farms, and 3) money spent on lawn or garden upkeep. Additionally, the questionnaire asked farmers about manure management techniques, and if they had recently changed to more conservation oriented farming practices. Finally, the questionnaire asked if landowners had managed or altered any woodlands or wetlands on their property. The woodland behaviors included 8 items that asked respondents if they had cleared trees from their property to enlarge their yard, improve their view, part of a timber sale, to "clean up" overgrowth, for safety reasons, etc. The wetland behaviors included 6 items that asked respondents if they had altered the flow of water across their property

Table 1. Comparison of utility values among long term residents and more recent residents of the LaPlatte River watershed.

VALUE STATEMENTS	Native Vermonters (n=116)	Moved From Elsewhere in Vermont (n=517)	Moved From Another State or Country (n=210)	Overall Mean	F	p
<i>Utility Value - Wetlands are Useful Areas For:</i>						
Site for Scientific Study	3.78 _a	4.24 _b	4.23 _b	4.18	11.559	.000
Scenic Countryside.....	4.03 _a	4.41 _b	4.53 _b	4.39	12.978	.000
Livestock Water Source	3.69 _a	3.24 _b	3.24 _b	3.30	6.275	.002
Real Estate Investment	2.31	2.14	2.21	2.18	.904	ns
Floodwater Storage	3.96 _a	4.20 _b	4.33 _b	4.20	6.294	.002
Improving Water Quality.....	4.00 _a	4.29 _b	4.35 _b	4.27	6.180	.002
Nesting Ground for Birds.....	4.50 _a	4.66 _b	4.68 _b	4.64	3.848	.022
Home for Endangered Species	4.19 _a	4.47 _b	4.54 _b	4.45	6.746	.001
<i>Land Use Standards - How Wetlands in VT Ought to be Used:</i>						
The rights of landowners are more important than protection of wetlands.....	2.76 _a	2.20 _b	1.99 _b	2.22	15.331	.000
Residential development around VT wetlands needs to be controlled more.....	3.62 _a	3.78 _{ab}	4.01 _b	3.82	4.573	.011
Wetlands are nonproductive lands and do not deserve protection.....	2.25 _a	1.66 _b	1.52 _b	1.70	20.453	.000
My land use practices have no effect on water quality in Lake Champlain.....	3.18	2.91	2.95	2.96	1.513	ns
It is important to maintain wetlands in their natural state - they are key to clean water	3.93 _a	4.16 _b	4.30 _b	4.17	5.934	.003
Wetland protection should not stand in the way of agricultural productivity	2.83 _a	2.22 _b	1.92 _c	2.23	21.834	.000
<i>Global Environmental Values - Opinions on Water Quality Issues</i>						
I'd make personal sacrifices to improve water quality even though the results seem insignificant	3.80	3.87	3.98	3.89	1.533	ns
Pollution is not personally affecting my life.....	2.16 _a	1.92 _b	1.85 _b	1.93	3.297	.037
I would contribute time and/or money to a group that works to improve the quality of wetlands	3.15 _a	3.27 _a	3.54 _b	3.32	5.867	.003
Humans have the right to modify the natural environment to suit their needs.....	2.28	2.17	2.34	2.22	1.731	ns
Environmental organizations are more interested in disrupting society than improving water quality.....	2.50 _a	2.04 _b	1.94 _b	2.08	9.164	.000
The government need not regulate pollution since individuals will regulate their own behavior	2.04 _a	1.57 _b	1.52 _b	1.62	12.630	.000

a/ Subscripts denote significant differences between groups at the .05 level.

b/ 1=strongly disagree, 2=probably disagree, 3=neither agree nor disagree, 4=probably agree, 5=strongly agree.

by landscaping, adding dry-fill dirt, installing drainage tiles, etc. These behavioral measures were then combined into four land use intensity scales: a lawn and garden scale, a farming scale, a woodland scale, and a wetland scale.

The questionnaire also included social value scales that measured value from three different theoretical traditions (Kuentzel, Tritton, Dennis, & Wang, 1995). The functional tradition defines value as the usefulness of an object for a human purpose. Value from this tradition asked respondents how useful they believed wetlands were and included items such as "for floodwater storage," "improving water quality for lakes and streams," "as a migratory bird resting area," "as scenic countryside," "a real estate investment," etc. The social utility tradition defines value as a collectively shared standard of appropriate activity where individuals embrace values in ways consistent with group membership. Values from this second tradition included items such as "it is important to maintain wetlands in their natural state because they are the key to having clean water," "wetland protection should not stand in the way of agricultural productivity," and "residential development around Vermont wetlands needs to be controlled more." Value from the third tradition is defined as a broad world view or the characteristic orientations of individuals toward the world where values act as selective lens, or frames of reference, for perceiving and dealing with objects and events encountered in everyday life. This world view tradition included items such as "I'd make personal sacrifices to improve water quality even though the results seem insignificant," "pollution is not personally affecting my life," and "industry is trying its best to develop effective anti-pollution technologies."

This mix of value items addresses the value specificity question. The functional value statements are specific statements about utility outputs that wetlands provide people. The land use standard value items are more general than the functional value items, yet still specific to Vermont and water quality in the Lake Champlain region. Finally, the global environmental values are very broad value orientations toward the environment.

To measure people's preference for recreational experiences, we asked respondents if they felt wetlands were useful for the following types of activities: fur trapping, snowmobiling, cross country skiing, birdwatching, fishing, hunting, hiking, swimming, canoeing, and photography. These items were also measured on a 5-point Likert type scale from strongly disagree to strongly agree.

Finally, to measure the "flatlander" effect, we asked respondents if they had moved to their current residence from 1) somewhere else in Vermont, 2) from another state or country, or 3) if they had always lived at their current residence. The average years of residence for those who had always lived at their current residence was 34 years. The average years of residence for those who moved from somewhere else in Vermont was 11 years, and the average

years of residence for those who moved from another state or country was 10 years ($F = 354.62$; $p < .000$).

Analysis

This study used analysis of variance to compare value differences between "natives" and "flatlanders" in the LaPlatte River watershed. It also calculated zero-order correlations between value statements and land-use intensity scales to explore the value/behavior relationship. The analysis also looked at the correlations between value statements and recreational preference statements.

Results

Values in the LaPlatte River Watershed

The results showed little variation among respondents in the utility value statements (Table 1). On average, residents agreed strongly that wetlands provided good nesting grounds for birds ($\bar{x} = 4.64$), are a home for endangered species ($\bar{x} = 4.45$), are scenic countryside ($\bar{x} = 4.39$), are useful for improving water quality ($\bar{x} = 4.27$), are good areas for floodwater storage ($\bar{x} = 4.20$), and are a useful site for scientific study ($\bar{x} = 4.18$). Conversely they tended not to agree that wetlands make good real estate investments ($\bar{x} = 2.18$), and were neutral on whether wetlands provided a good livestock watering source ($\bar{x} = 3.30$). Standard deviations were relatively small on each of these items, and respondents uniformly recognized the usefulness of wetlands for various human and biological needs.

Table 1 also shows that respondents leaned toward wetland preservation values. They tended to agree with statements like "It is important to maintain wetlands in their natural state because they are the key to clean water" ($\bar{x} = 4.17$) and "residential development around Vermont's wetlands needs to be controlled more" ($\bar{x} = 3.82$). They tended to disagree with statements like "wetlands are nonproductive lands and do not deserve protection" ($\bar{x} = 1.70$), "the rights of landowners are more important than the protection of wetlands" ($\bar{x} = 2.22$), and "wetland protection should not stand in the way of agricultural productivity" ($\bar{x} = 2.23$). Standard deviations for these items were somewhat larger and average responses were not as extreme as were the utility value items.

Finally, respondents tended to hold pro-environmental values. They tended to agree with statements such as "I'd make personal sacrifices to improve water quality even though the results seem insignificant" ($\bar{x} = 3.89$), or "I'd contribute time and/or money to a group that works to improve the quality of wetlands" ($\bar{x} = 3.32$). The sample disagreed with statements like "the government need not regulate pollution since individuals will regulate their own behavior" ($\bar{x} = 1.62$), "pollution is not personally affecting my life" ($\bar{x} = 1.93$), and "environmental organizations are more interested in disrupting society than improving water quality" ($\bar{x} = 2.08$).

Values and Suburbanization

Table 1 also shows a "flatlander" effect. Native Vermonters were significantly less likely than the other 2 groups to

agree that wetlands are useful areas for scientific study, floodwater storage, nesting ground for birds, home for endangered species, or improving water quality. Conversely, they were more likely to agree that wetlands were a good livestock watering source. Native Vermonters were also less interested in wetland preservation. They were significantly more likely than the other 2 groups to agree with such statements as "the rights of landowners are more important than protection of wetlands," "wetlands are nonproductive lands and do not deserve protection," and "my land use practices have no effect on water quality in Lake Champlain." Conversely, native Vermonters were less likely than the other groups to agree that "residential development around Vermont wetlands needs to be

controlled more," and "it is important to maintain wetlands in their natural state because they are the key to clean water." Finally, native Vermonters were not as pro-environmental as the other 2 groups. They were significantly less likely to "contribute time and/or money to groups working to improve the quality of wetlands." Conversely, native Vermonters were more likely to agree that "pollution is not personally affecting my life," "environmental organizations are more interested in disrupting society," and "the government need not regulate pollution since individuals will regulate their own behavior." Overall, there were strong value differences between long-term residents of the LaPlatte River watershed all their lives and newcomers to the watershed.

Table 2. Comparison of the intensity of land use behaviors among long term residents and more recent residents of the LaPlatte River watershed.

LAND USE SCALES	Native Vermonters (n=116)	Moved From Elsewhere in Vermont (n=517)	Moved From Another State or Country (n=210)	Overall Mean	F	p
Lawn and Garden Use Scale	38.58	41.67	52.63	43.98	.859	ns
Woodland Use Scale	8.91 _a	3.05 _b	1.71 _b	3.52	7.765	.000
Wetland Use Scale	14.93 _a	2.71 _b	1.30 _b	4.04	4.098	.017
Farm Use Scale	19.40 _a	1.73 _b	1.20 _b	4.02	19.513	.000
Total Land Use Intensity Scale	77.98 _a	48.88 _b	45.90 _b	52.15	3.655	.020

a/ Subscripts denote significant differences between groups at the .05 level.

Suburbanization and Land Use

The pressures of suburbanization also lead to different land uses behaviors in the LaPlatte River watershed. Table 2 shows that long-term residents of the watershed used their land more intensively than more recently transplanted residents of the watershed ($F = 3.65$; $p = .02$). Native Vermonters were significantly more likely to clear trees on their property, fill wet areas or alter the flow of water across their property, and use their land for agricultural purposes. There were no significant differences between the 3 groups in the intensity of lawn and garden use of their land.

Values and Land Use

Table 3 shows that values were not a powerful predictor of land use behaviors among landowners in the LaPlatte River watershed. Roughly a third (32.5%) of the correlations between values and behaviors were statistically significant. The results shows virtually no correlation between one's values and the intensity of their lawn and garden practices. There was a weak relationship between respondent values and the use of woodlands and wetlands on their property. Those who used their woodlands and wetlands more intensively were less likely to agree that wetlands are good areas for scientific study and a nesting ground for birds. They also were less likely to agree that wetlands were scenic resources. Similarly, those who used their woodlands and wetlands more intensively were more likely to agree that "wetland production should not stand in the way of agricultural productivity", and "the rights of landowners are more important than protection of

wetlands." Conversely these woodland and wetland users were less likely to agree that "it is important to maintain wetlands in their natural state because they are the key to clean water." However, the more important message from these results is that one's values are not strongly related to the intensity of woodland and wetland uses by property owners.

Finally, values were more strongly related to agricultural uses of land in the LaPlatte River watershed. Those who used their land for farming were significantly less like to recognize the utility of wetlands for scientific study, for scenery, for floodwater storage, for improving water quality, as a nesting ground for birds, and as a home for endangered species. Similarly, they were significantly less interested in wetland preservation, and slightly less interested in pro-environmental causes.

The results in Table 3 also give some credence to the specificity argument. The more global environmental value statements were significantly correlated with only 2 out of 24 of the respondent's land use intensity scales. Conversely, a third of the utility value statement were significantly correlated with the land use behavior scales, and half of the land use standard statements were significantly correlated with the land use behavior scales (Table 3).

Overall, value statements were weakly correlated with land use behaviors. Values were more strongly correlated with more specific value statements. They were also more strongly correlated with agricultural practices.

Table 3. Zero-order correlations between value statements and scales measuring the intensity of land use behaviors.

VALUE STATEMENTS	LAND USE INTENSITY			
	Lawn & Garden	Woodland	Wetland	Farm
<i>Utility Value - Wetlands are Useful Areas For:</i>				
Site for Scientific Study	.006	-.091**	-.055	-.140**
Scenic Countryside.....	-.015	-.112**	-.106**	-.202**
Livestock Water Source	-.016	.013	.014	.022
Real Estate Investment.....	.009	-.033	.008	-.052
Floodwater Storage	.019	-.024	-.049	-.076*
Improving Water Quality.....	.021	-.035	-.052	-.096**
Nesting Ground for Birds.....	.020	-.083*	-.088*	-.077*
Home for Endangered Species	-.007	-.091**	-.059	-.140**
<i>Land Use Standards - How Wetlands in VT Ought to be Used:</i>				
The rights of landowners are more important than protection of wetlands.....	.005	.082*	.086*	.150**
Residential development around VT wetlands needs to be controlled more.....	.000	-.058	-.048	-.103**
Wetlands are nonproductive lands and do not deserve protection.....	.011	.030	.112**	.115**
My land use practices have no effect on water quality in Lake Champlain.....	.047	.021	-.009	.035
It is important to maintain wetlands in their natural state - they are key to clean water.....	.016	-.090*	-.084*	-.139**
Wetland protection should not stand in the way of agricultural productivity.....	-.030	.092*	.086*	.179**
<i>Global Environmental Values - Opinions on Water Quality Issues</i>				
I'd make personal sacrifices to improve water quality even though the results seem insignificant	-.032	-.022	-.029	-.058
Pollution is not personally affecting my life.....	-.022	.004	.030	.048
I would contribute time and/or money to a group that works to improve the quality of wetlands	.046	-.042	-.062	-.113**
Humans have the right to modify the natural environment to suit their needs.....	.017	.011	.037	.058
Environmental organizations are more interested in disrupting society than improving water quality.....	-.041	-.024	-.012	.023
The government need not regulate pollution since individuals will regulate their own behavior	-.028	.041	.059	.112**

a/ * - significant at < .05; ** - significant at < .01

Recreational Preference

Table 4 shows that the matrix of social values in the LaPlatte River watershed does not have a strong effect on recreational preference among residents. "Flatlanders," who hold stronger pro-environmental values are less likely than native Vermonters to perceive wetlands as an area for trapping, and more likely than native Vermonters to perceive wetlands as a place for birdwatching. There was not, however, a consumptive recreational emphasis among native Vermonters and a nonconsumptive recreational emphasis among "flatlanders."

Discussion

This has been an exploratory analysis of the relationship of landowner values and land use behaviors in an area of the Lake Champlain basin undergoing change through suburbanization. The data make four points that warrant further investigation.

First, on average, residents of the LaPlatte River watershed hold values that are environmentally favorable. They typically recognize the benefits wetlands provide for people and for ecosystems. They are generally in favor of wetland protection in the state and in the LaPlatte watershed. Finally, they generally hold pro-environmental attitudes and are attuned to the potential for human impacts on natural systems. These values among LaPlatte River watershed residents are consistent with a state that has a strong record of environmental protection, and consistent with a region of the state that has a history of environmental advocacy. The area, however, is not an environmentalist stronghold. There are enough long term residents who use the land in more traditional ways. There were 18 people among the respondents whose primary income still comes from farming. There were also several residents who expressed clear "property rights" values in comments written in the margins. Therefore, this

Table 4. Comparison of the recreational preferences in wetland regions among long term residents and more recent residents of the LaPlatte River watershed.

RECREATIONAL ACTIVITIES	Native Vermonters (n=116)	Moved From Elsewhere in Vermont (n=517)	Moved From Another State or Country (n=210)	Overall Mean	F	p
Fur Trapping.....	3.17 _a	2.66 _b	2.75 _b	2.76	6.047	.002
Winter Sports (Snow Mobile, XC ski).....	3.54	3.30	3.47	3.37	2.455	ns
Birdwatching.....	4.33 _a	4.49 _b	4.59 _b	4.49	4.251	.015
Fishing and Hunting.....	4.00	3.77	3.85	3.82	1.935	ns
Summer Sports (Hiking, canoeing).....	3.78	3.96	3.97	3.93	1.276	ns
Gathering Plants.....	3.53 _a	3.29 _b	3.26 _b	3.32	2.245	ns
Photography.....	4.05	4.18	4.16	4.16	1.006	ns

a/ Subscripts denote significant differences between groups at the .05 level.

suburbanizing region of the state is not an outlier in pro-environmental values, but instead contains a variety of values toward wetlands and water quality.

Second, there was a clear "flatlander" effect. Newcomers to the LaPlatte River watershed have brought different values to the area. These different values are indeed more pro-environmental. Conversely, native Vermonters who use their property in more traditional ways and who use their land more intensively hold values that are less consistent with contemporary environmental values. These native Vermonters were generally more opposed to regulatory solutions to water quality, and somewhat more mistrustful of environmental initiatives that would change their land use behaviors or threaten their profitability. As suburbanization continues, and former farmland continues to be subdivided, the values of native Vermonters and their traditional land uses may encounter increasing challenges.

Third, the relationship between values and land use behaviors was generally weak. Specifically, there was no relationship between lawn and garden use of land and one's value scores. Respondents generally did not make the link between water quality values and lawn care practices such as herbicide and/or fertilizer treatments. There was a moderately stronger relationship between values and woodland, wetland, and farming practices. Those who agreed less with pro-environmental statements were slightly more likely to use their woodlands and wetlands more intensively. Similarly, farmers were less likely to hold pro-environmental attitudes. This may mean that values are consistent with behaviors among more traditional types of land uses. Farmers and others who use their land more intensively may be more aware of their affects on the landscape and on water quality and therefore may be justifying their behaviors with appropriate value statements. For example, farmers must keep close track of fertilizer inputs and manure management systems because of their concerns about profitability. They may be more cognizant of their effect on water quality and must weigh the costs of water purity with economic survival. Conversely, values may be less consistent with the behaviors of new suburban residents in the watershed. Those who use their land for primarily residential purposes may be less aware of how their specific behaviors affect water quality in the region. Water quality values appear to

predict behaviors better for subsistence types of land uses, but values are less capable of predicting behaviors for residential land uses in the LaPlatte River watershed.

The results also confirmed that more global value statements had little to do with behaviors. The items that measure one's global orientation to the environment were correlated significantly with only 2 out of 24 items. On the other hand, items that measured specific wetland conservation initiatives and specific wetland utilities generally had more significant correlations with behaviors.

Finally, water quality values were not strongly related to recreation preference. The results offer little evidence that the new suburbanites are also the new non-consumptive recreationist who prefers birdwatching, wildlife photography, canoeing, or hiking, while long term resident are consumptive recreationists who prefer hunting, fishing or trapping. Part of this may have been due to the questionnaire design. Respondents were not specifically about the recreational activities they participate in and their recreational lifestyles. Instead they were asked if they thought wetlands were useful areas for a variety of differing recreational activities.

The results do suggest that recreation may not be the primary force in the call for improved water quality. In other words, it may not be the pro-environmental sailors who are leading the call for clean water in the Lake Champlain basin. Nor is it necessarily the traditional consumptive anglers who are the primary advocates for clean water in the basin. Recreationists may value clean water, but the movement toward improved water quality in the Lake Champlain basin probably has a much broader constituency than recreationists. Clean water advocacy is perhaps more closely linked to quality of life issues rather than to recreational preference.

Literature Cited

Brooks, D. J.; Grant, G. E. 1992. New Approaches to Forest Management: Background, science issues, and research agenda. *Journal of Forestry*. 90(1): 25-28 and 90(2): 21-24.

Burlington Free Press (1994). Superfund follies: Lack of fairness and adequate flexibility by the EPA, not attempts by polluters to shirk responsibility for past pollution, is by far the most serious problem. August 21, 1994. 4E:1.

Burlington Free Press (1995). Federal Environmental Protection Agency study says Pine Street Barge Canal water poses little threat. March 31, 1995. 1A:2.

Fazio, R. H., Chen, J., McDonel, E. C., & Sherman, S. J. (1982). Attitude accessibility, attitude-behavior consistency, and the strength of the object-evaluation association. *Journal of Experimental Social Psychology*. 18:339-357.

Fishbein, M., & Ajzen, I. (1975) *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Heberlein, T. A. 1981. Environmental attitudes. *Journal of Environmental Policy*. 2:241-270.

Heberlein, T. A., & Black, J. S. (1976). Attitudinal specificity and the prediction of behavior in a field setting. *Journal of Personality and Social Psychology*. 33:474-479.

Kuentzel, W. F., Tritton, L. M., Dennis, D. F., & Wang, D. (1996) Thinking about water quality management: Social values, wetland ecology, and landowner practices." In: *Proceedings: Integrating Social Science and Ecosystem Management: A National Challenge*. USDA Forest Service, General Technical Report.

LaPiere, R. T. (1934). Attitudes vs. action. *Social Forces*. 13:350-357.

Salwasser, H. 1994. Ecosystem management: can it sustain diversity and productivity? *Journal of Forestry*. 92:6-10.

Sherif, M., & Hoveland, C. I. (1961). *Social judgement: Assimilation and contrast effects in communication and attitude change*. New Haven: Yale University Press.

Stankey, G. H. & Clark R. N. 1991. Social aspects of new perspectives in forestry: A problem analysis. Consortium for the Social Values of Natural Resources, USDA Forest Service, PNW Research Station, 4043 Roosevelt Way, NE, Seattle, WA. 41 pp.

Williams, G. W. 1991. New Perspectives, New Forestry, or biological diversity: How did we get here? Paper presented to the Bureau of Land Management's Biological Diversity/Silviculture Workshop. Gleneden Beach, OR. May, 1991.