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Social science and social capital in the Lamprey River Watershed: A resident survey for community and environmental planning and predicting support for innovative land use

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**SOCIAL SCIENCE AND SOCIAL CAPITAL IN THE LAMPREY RIVER
WATERSHED: A RESIDENT SURVEY FOR COMMUNITY AND
ENVIRONMENTAL PLANNING AND PREDICTING SUPPORT FOR
INNOVATIVE LAND USE**

BY

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DISSERTATION

Submitted to the University of New Hampshire
In Partial Fulfillment of
The Requirements for the Degree of
Doctor of Philosophy

In

Natural Resources and Environmental Studies

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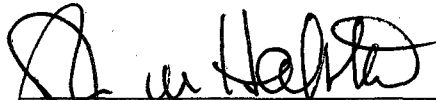
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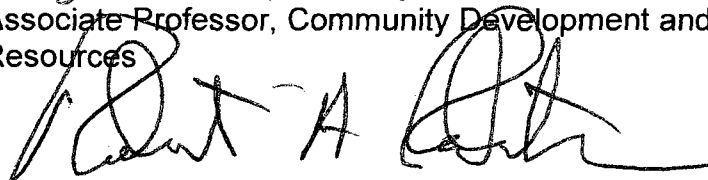
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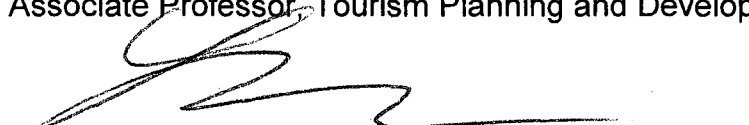
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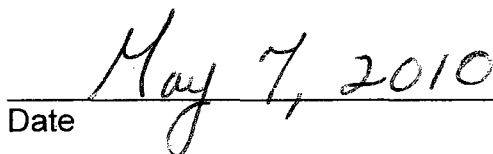
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ABSTRACT

SOCIAL SCIENCE AND SOCIAL CAPITAL IN THE LAMPREY RIVER WATERSHED: A RESIDENT SURVEY FOR COMMUNITY AND ENVIRONMENTAL PLANNING AND PREDICTING SUPPORT FOR INNOVATIVE LAND USE

By

Mary Adamo Robertson

University of New Hampshire, May, 2010

The Lamprey River Watershed is an important part of the Great Bay Estuary in southeastern New Hampshire. The region has experienced population growth, sprawl development, increased vehicle miles traveled, increased levels of air and water pollution, loss of critical habitat, and loss of sense of community. The Lamprey River Watershed Resident Survey was designed to bring attention to environmental and community issues in order to engage residents in long range, innovative, and regional planning. The survey was distributed to approximately 3,000 households in one mailing during National Community Planning Month, October, 2007. The data from the 768 respondents provide baseline information on residents' attitudes, opinions, knowledge, and behavior relevant to planning.

Social capital is examined to test for its use in community and environmental planning. Social capital is measured in the Resident Survey from information about both formal and informal social activities as well as measures of trust in various parts of society. The results of a binomial logistic regression indicate that social capital, in the forms of these selected activities and trust, increases the likelihood of a resident to support a policy of open space design (an innovative land use policy in New Hampshire). Other variables found to be related to support for open space design are positive environmental behavior, liberal and moderate political affiliations, and education beyond high school. The measurement of social capital might be simplified by assessing social activities and social trust, and research should continue to examine relationships to community level outcomes.

Both the descriptive and regression results lead to a conclusion that engagement with residents is important to garner support for community planning outcomes. This study shows that increasing levels of social activities, social trust, and positive environmental behavior lead to a greater likelihood to support open space design. Planners should work to increase social activities and trust in the community, as well as to continue to encourage positive environmental behavior. A resident survey can help planners with this task of monitoring progress in planning efforts.

CHAPTER 1

CURRENT TOPICS IN COMMUNITY AND ENVIRONMENTAL PLANNING

Sprawl is a Problem

Sprawl is a term used to describe a land development pattern that is dispersed rather than more compactly built. The term “leapfrog” is often used in association with sprawl to conjure up the image of unconnected developments across landscapes. The U.S. Environmental Protection Agency defines sprawl as “a pattern of low density development that is characterized by dependence on the automobile, large lot development, and strip commercial development” (U.S. Environmental Protection Agency 2007). The effects of sprawl are far ranging including a loss of critical environmental resources, increased environmental pollution, economic strain, social disconnectedness, and personal health impacts as people spend less time on sidewalks and bikeways.

In a list of environmental health problems in the United States, global warming is considered one of the most serious, and is in fact a problem related to sprawl. Global warming is caused by the “greenhouse gases” produced in the burning of fossil fuels; these gases then trap heat in the atmosphere. The increase in temperature raises sea levels and changes the existing biosphere. The carbon dioxide also affects ocean waters by increasing its acidity (carbonic acid is produced as the water uptakes carbon dioxide). This acidity changes the ocean environment and “puts at risk coral reefs, shellfish and the marine food

web generally” (Dean 2009, 12). It is estimated that 33 percent of greenhouse gases originate from the carbon dioxide from car emissions (Ewing et al. 2008). This means that at least part of the solution to the problem of global warming must come from the way communities are built for transportation. While technology is responding to improvements in fuel economy and in reducing the carbon content of fuel, another important part of the solution is a reduction in the number of vehicle miles traveled (VMT). Reducing the number of vehicle miles traveled must be addressed by planning professionals in the design of communities as well as by each individual making the choice to drive less.

The Brookings Institute found that “most metropolitan areas in the United States are adding urbanized land at a much faster rate than they are adding population” (The Brookings Institute 2001). This is especially true in the Northeast despite the idea that it is already densely developed around its historic core cities. Data show that the Northeast population growth was “slow” compared to the land consumption figures over the current ten year period; in the West, land consumption was “efficient” compared to a faster growing population (The Brookings Institute 2001). The Brookings Institute concludes that the West is better managing their land resources with less sprawl, and yet it is perceived that there is a sprawl problem; while the Northeast is consuming land at alarming rates (truly sprawling) there is a perception that sprawl is not a problem in this region. Acceptance that sprawl is a problem is the first step in providing a solution.

Sprawl in the Lamprey River Watershed

The Lamprey River Watershed is an area of southeast New Hampshire with important resources, both natural and built. This area, unfortunately, is affected by sprawl, poorly placed developments, and water pollution. Water pollution of the ocean and fresh water sources continues to be a primary global concern. The 2009 Gallup Poll's Environmental Survey found that water pollution is a top concern for U.S. residents. Over 50 percent of the respondents are concerned "a great deal" about the water quality of drinking water and water in lakes, streams, and reservoirs (Saad 2009). While the United States' waters have shown some improvements by the quality of released waters as measured by the Toxic Release Inventory program, hundreds of new threats are introduced regularly through non-point source pollution (Natural Resources Defense Council 2007). While point source pollution (from specific sources) is addressed by the US EPA Clean Water Act's guidelines for monitoring and waste water management, non-point source water pollution is too widespread and difficult to manage by such a program. The majority of non-point source water pollution comes from two activities, agriculture and urbanization. Urban areas contribute to water pollution through run-off following storm events from impervious surfaces such as roadways, parking lots, and roof tops. Non-point source pollution is especially a problem in the United States' estuary systems because these areas include rare habitat yet have been overdeveloped because of their high real estate value. The Lamprey River Watershed is part of the Great Bay Estuary of New Hampshire. Managing development properly in this area can minimize the

negative effects of development, especially on these critically important water resources.

Fortunately, oversight of the Lamprey River Watershed from researchers at the University of New Hampshire has afforded it some protection.

Furthermore, federal and state agencies, as well as local groups and non-profits have boosted these conservation efforts. In the past ten years the lower portion of the Lamprey River has been protected with state and federal river protection programs and managed by a local entity, the Lamprey River Advisory Committee. Another volunteer organization, the Lamprey River Watershed Association, has a broader focus of water and land protection at the watershed level. The upper portions of the river are managed differently than the lower, protected, section of the river. However, protecting the lower portion of a river does little to truly protect the resource overall. How development takes place in the Lamprey River Watershed, in both the upper and lower regions, is crucial to the health of the river, the resources, and inhabitants of the watershed.

Residents Can Be A Solution

Many planners believe that compact development, and the proper placement of these developments, is a primary objective to solving many of the environmental and community health problems today (Boarnet 2006). Compact designs are sustainable in that they accommodate immediate needs (i.e. housing) with regard for future need for resources. The Brookings Institute (2008) measures carbon footprints of homes of varying densities and finds that the

denser the area built within a community the smaller the carbon footprint. Smart growth is the popular idiom for this policy on landscape development and implies that there has been a period of not-so-smart growth in the past. Basically, smart growth is about increasing density of built environments. Smart growth reduces many infrastructure costs (less roads, pavement, utilities, etc.) and improves mobility (especially in terms of opportunities for public transportation). An additional benefit is that denser developments should produce increased opportunities for social interaction which allows social capital to develop (Putnam 2000, 2003; Engwicht 1993). Social capital is a measure of active engagement and trust in others in the community. Higher levels of social capital may mean increased involvement in the protection of the resources including support of innovative land development policy. The purpose of this study in the Lamprey River Watershed is to determine if social capital can be linked to positive outcomes for a complex community—one made up of multiple communities, yet sharing one critical ecosystem.

While science has provided solid evidence of the problem of carbon dioxide in the atmosphere and polluted waters, it cannot solve these problems without participation and buy-in from residents. The solutions must include action that involves changes in social attitudes and social behavior. For example, reducing the number of miles driven each and every day means a shift in values and behavior such as combining trips, carpooling, or choosing (supporting) public transportation. People also must accept designs that place work, home, services, and social activities closer together. The research presented here is an effort to

bring in the social sciences to help solve environmental problems. Survey research is a necessary component to resident involvement and successful community planning. One goal of survey research is to build a community's capacity for dialog among community members, and with planning agencies, while knowledge of planning topics is created and spread. These data provide insight to planning the Lamprey River Watershed and is a baseline of information regarding the public's involvement in community, perceptions of community, attitudes and behaviors with respect to the environment, and knowledge and concern for the future of the watershed. The theory is that communities with actively involved residents are more likely to understand and to therefore support smart growth planning efforts. The thesis in this research is that social capital, which is a product of the socially involved and trusting members of a community, can be used to support efforts that protect the environment.

The Lamprey River Watershed and a Resident Survey

The Lamprey River Watershed in southeastern New Hampshire consists of nine primary communities that are almost in their entirety in the watershed (Candia, Deerfield, Durham, Epping, Lee, Newmarket, Northwood, Nottingham, and Raymond - approximately 65,000 people in 28,000 homes) and four other communities that only partly contribute to the watershed (Barrington, Exeter, Fremont, and Newfield—approximately 15,000 people in 6,500 homes) (Sample Survey Inc. 2001). This watershed is a critical area of New Hampshire where the Lamprey River and its tributaries drain into the Great Bay Estuary. Many

estuaries throughout the United States have been ecologically compromised due to filling of wetlands and encroachment from roadways, residential, and commercial development. In 1997, the lower stretch of the Lamprey River (from Epping to Newmarket) was designated a Wild and Scenic River by state as well as National standards. This designation prohibits the building of dams along this 12.3 mile stretch of the river but does not afford it protection from other development impacts throughout the watershed. The Lamprey River Watershed Association and the Lamprey River Advisory Committee, two related volunteer committees, continue to work to protect the river and the watershed. Despite the education activities and water quality monitoring provided by the volunteer organizations, water quality continues to be a concern due to pollutants from existing land use practices, especially non-point source pollution. Additionally, the watershed is under considerable pressure to develop more land into housing, commercial, and institutional structures, as well as infrastructure to support development (i.e. roads, bridges, parking lots, etc.). The majority of development and proposed development in the region can be described as sprawling. Updating policies and regulations regarding development patterns is time consuming and often misunderstood by the public. The social science survey work being conducted in this study can help with the effort to highlight problems and introduce new community planning solutions with residents of the Lamprey River Watershed.

Each community in the watershed is faced with environmental challenges from these development pressures and each has a different philosophy about

population growth and corresponding development to accommodate that growth. Newmarket has had water quality problems for over ten years and continues to search for better sources of quality potable water. Nottingham recently lost a battle to USA Springs which was expected to extract 380,000 gallons of water a day from an interior ground water source (construction of the site began but was halted after the company filed bankruptcy papers in July 2008). Epping and Raymond have opened their doors to commercial development in the hopes of bringing jobs, services, and lower taxes to their residents. Deerfield, which houses Pawtuckaway State Park, is holding off development pressures through concerted conservation efforts to protect land and water. These communities adhere to different policies and regulations regarding resource protection within their borders. This is not a good overall strategy for regional-level resource protection. The region will need to come together in some fashion in order to address cumulative negative impacts.

In 2005, the Lamprey River Watershed Association conducted a public forum facilitated by the University of New Hampshire Cooperative Extension. The forum of fifty participants concluded that there was a need for more public awareness of the issues, and more involvement in coordinated efforts to protect the land and water within the watershed. It was also highlighted that the science of the water needs to be crafted in such a way that the residents can comprehend the state of the watershed (Lamprey River Watershed Association 2005). A regional approach to information dissemination would provide a better atmosphere for coordinated efforts within the watershed, which would likely

provide more protection for land, water, and overall quality of life. Research conducted by William McDowell, Ph.D., and Lauren Buyofsky, M.S., at the University of New Hampshire's Water Resource Research Center (WRRC), provided residents with this kind of information—the science of the local water was brought directly to the residents of the watershed. This involved collecting water samples at 187 residential wells throughout the Lamprey River Watershed with approval from the residents. The water samples provided measures of pH, conductivity, dissolved oxygen, nitrates, ammonium, dissolved organic nitrogen, dissolved organic carbon, phosphate, arsenic, copper, lead, and other metals (Buyofsky 2006). These pollutants (some naturally occurring) are exacerbated by human activities. Non-point source pollution is a complicated problem to address because of its multiple contributors. Residents are major contributors to the problems of the watershed through lawn care practices, automobile use and maintenance, and improper disposal of hazardous and other waste. The cumulative effect of all of these individual practices on-going in the watershed is often far more detrimental to the environment than commercial or industrial activities. In any event, it is at least as serious of a problem as other land use activities and is much more difficult to manage.

The research outlined in this presentation is part of this on-going attempt to discover and address problems, as well as to create awareness, of watershed-level issues. This social science investigation provided an opportunity for over 3,000 residents to increase awareness of regional-level problems as well as an opportunity to voice their concerns and opinions. It is an evaluation of residents'

knowledge, attitudes and behavior as they relate to measures that may improve water quality conditions in the watershed and environmental health overall. Water quality is an environmental issue that most people can and will relate to because they use it in their homes every day with the expectation that it is not a threat to their health. The Lamprey River Watershed survey prompts residents to respond to questions in a number of categories including: environmental awareness and attitudes about the environment; concerns about water pollutants; general concerns about their community; household behavior related to the environment, to their community, and to their own health; and social capital, an indicator of a community's capacity to accomplish collective benefits from social connectedness. Social capital is a term used here to describe a group's capacity to accomplish tangible group benefits—in this case, protecting the water and other resources in the watershed. Social capital is the fundamental theoretical foundation for this research because of its potential to aid in the sustainability movement. This research is an effort to support the theory that planners (in this case, in the Lamprey River Watershed) can treat social capital as a valuable community resource.

Funding the Lamprey River Watershed Survey Research

Funding for this research was secured through the University of New Hampshire Water Resources Research Center (Director, William McDowell, Ph.D.). The funding was primarily for conducting research that could relate previously collected data at water quality testing sites with residents' responses

regarding attitudes, behavior and knowledge in the Lamprey River Watershed. However, connecting the survey data with the water sample test sites was not possible due to confidentiality agreements made between the researchers and the homeowners. At that point, the research focus switched to attempting to provide a social capital explanation of residents' behavior and attitudes in the Lamprey River Watershed in order to make a case for improved social capital in environmental and community planning. Additional funding was also provided through Robert A. Robertson, Ph.D., and his work with the Cooperative Institute of New England Mariculture and Fisheries. Items were included so that the Lamprey River Watershed data results may be compared to results from Robertson's research on various watersheds on the east coast. Research compliance approval for the "Lamprey River Watershed Resident Survey" was conducted through the University of New Hampshire, Research Conduct and Compliance Services, Office of Sponsored Research, IRB # 3757.

Research Questions and Aims

This research is an investigation of a relatively new concept in the planning world, social capital, and how this may affect behavior, knowledge and attitudes of residents in the Lamprey River Watershed for the primary purpose of protecting land, resources, and especially water quality. Data were collected from residents on knowledge of environmental issues, attitudes and behavior toward the environment, and on a measure of social capital in the neighborhoods and communities in the watershed. This research establishes a psycho-demographic

profile of the residents with respect to social capital and environmental stewardship. For example, what are the people in this region concerned about? How are they involved in their communities? What are they willing to contribute to their community and to the watershed? These data may be used in a model of sustainability as indicators for future water quality and resource protection. Social science efforts should also inform residents of how their cumulative actions may affect their environment and their lives in general. The results may also be used to inform state, local, and regional governments and agencies about the use of social capital in planning for environmental protection.

The primary research question is, “does social capital help predict environmental stewardship and/or support for planning efforts in the Lamprey River watershed?” Additional research questions that may help in everyday planning include: What are the residents in the Lamprey River Watershed doing to protect the environment? What are they concerned about in their community? How active are they in community affairs? What prevents them from becoming involved in community? Who is likely to help in environmental stewardship efforts within the Lamprey River Watershed? Answers to these questions will help planners better utilize a critical resource in the protection of the Lamprey River Watershed—the residents. The goal of this research is to help establish a social capital model which may influence protection of land and water. These are indicators of acceptance of innovative planning techniques that protect the environment, such as open space development designs and foregoing household practices that contribute to the water quality problem. The proposed model tested

is as follows: higher levels of social capital activities and higher levels of social capital trust (the two primary components of social capital) can help predict good outcomes for the environment such as support for open space design and good environmental behavior. Social capital can be an indicator of potential to act in the interest of the group. If this is true, in planning for sustainable community and healthy environments, much more emphasis should be placed on projects and programs that promote the strengthening of social capital.

Rationale for a Theory of Social Capital

Social capital involves social interactions, trust, and reciprocity in social networks (Putnam 2000). It is referred to as a “metaconstruct” because “it is a collection of constructs” (Rohe 2004, 158) describing a phenomenon. Some of these constructs have been discussed in the fields of sociology and community development for many years and other constructs are additions to an improved social capital model. Simply stated, social capital is the product, or outcome of social connections. It is what people use from group connections to make gains for individuals, a subgroup, or a broader community. Some research has defined social capital as any group activities, whether or not the activities produced are positive or negative outcomes. For example, gangs can be defined as having social capital from their association in the group and outcomes that are not considered positive by society standards. However, in a field such as community planning, where the purpose is an improved state/public good, the definition of social capital does imply positive social activities overall. The purpose of the

Lamprey River Watershed research is only in terms of positive outcomes for groups, primarily in protecting the environment.

The social capital concept is being explored by the community and environmental planning profession as a means to meet community level goals such as improving the state of the environment. Social capital is better known to the sociology discipline for its benefits in reducing the impacts of poverty on individuals as well as communities. It has also been discussed more fully in the education, religion, and philosophy disciplines. The community development discipline is traditionally about improving the condition of people, especially in rural and poor urban areas, and much of this literature is outside the United States. The social capital concept has been used in this literature since the 1990's (Flora 1998). The Lamprey River Watershed survey applies the concept of social capital in the community and environmental planning discipline.

In this investigation, social capital is a measure of connectivity and potential action of a social group, and is being used to predict awareness of community and environmental issues and to produce positive outcomes for the environment in terms of support of policies that improve land and water health. In other words, a group's ability to connect socially should connect them as well to their surroundings and to collective action in order to produce positive outcomes for the shared environment. As the literature review here will reveal, community development and community planning theories, as well as theories from sociology and political science, give social capital the legs it needs in the community and environmental planning arena.

While it is a prominent school of thought that theory should precede research in order to advance knowledge, there is a counter idea, that research-then-theory allows a researcher to more freely investigate their research interests (i.e. exploratory research). The benefits of the latter instructs the research to (1) investigate a phenomenon and delineate its attributes, (2) measure the attributes in a variety of situations, (3) analyze the resulting data to determine if there are systematic patterns of variation, and (4) construct theory from these systematic patterns (Reynolds 1971). The investigation is then “allowed” to be more broadly defined in an attempt to uncover latent variables in new circumstances. This process may lead to newly formulated theory to be compared and contrasted with existing theory. The Lamprey River Watershed survey research allows for a better understanding of the social capital concept as a “theoretical system”, or as a set of ideas/propositions “that permit some propositions to be derived from others” (Frankfort-Nachmias 2000, 36). Included in this research is a broad spectrum of variables beyond those generally associated with social capital, from attitudes about community to behavior in the home that may influence environmental protection ideas and participation in collective practices. These variables chosen should help produce further research and a multivariate model of community and theoretical system for social capital in the context of environmental planning and protection. If the hypothesis holds true, that social capital is a critical component to sustainability, then a direct way to protect the future is by engaging people in their communities.

While many struggle to find more constructive and interesting ways to engage the public in complicated discussions about the environment, social capital (from often spontaneous and unplanned interactions) can serve as a primary catalyst to collective action. But some initial infrastructure must exist for this to happen. To date, the social capital concept has limited applicability to environmental protection. In a planning symposium focused entirely on social capital by the American Planning Association, Dr. Michael Woolcock confers four research aims regarding social capital as a new planning tool: “definitional clarity”, “theoretical coherence”, “conversational congruence”, and “learning by doing” (2004, 184). He implores planners to investigate social capital in a variety of contexts in order to meet these research aims. The more known about social capital within this discipline, the more likely planners are to “get the social relations right” (2004, 188); and, then to be able to use those social relations to produce collective goods. It is the product of social relations, social capital, that has the potential to produce collective or group outcomes and therefore to be a promising tool in the field of community and environmental planning. The Lamprey River Watershed survey contributes to this discussion of social capital within the planning discipline (in order to clarify the theory as it applies to planning), it provides more language to the conversation as it applies to environmental benefits, and it presents an opportunity of application in this important region of New Hampshire. Social capital is often referred to as being “high”, or “positive”, or “good”, in this study, and this implies that it exists and is being used for community level outcomes. The next chapters cover a literature

review of the primary concepts connected to social capital, the research methodology for the study of these concepts in the Lamprey River Watershed, the descriptive results of the research, an analysis of the social capital construct and other variables of interest which have an impact on support for innovative land use, and finally, a concluding chapter regarding how a social capital focus may help improve community outcomes in terms of policy support in the Lamprey River Watershed.

CHAPTER 2

LITERATURE REVIEW

Developing a Social Capital Model

Two related fields, community planning and community development, evolved separately over the years and although their methods and theories merge from time to time, and as they borrow methods and theories from the same outside disciplines, their respective publications, training, and professions have persisted as two distinct disciplines. But their primary goal is the same, to build healthy human communities. In the community development field, the medium to healthy communities has been through social resources, and in the community planning field it has been through technology and built resources. A newer concept to the community planning world, social capital, is a more familiar concept in the community development world. It is being examined as an explanatory tool and as a method of accomplishing multiple community goals for community and environmental planners. The community planning profession is once again reaching across disciplines to address complex community and environmental problems. The following literature review addresses social capital from the various disciplines' contributions to the social capital construct in order to show its applicability in the planning toolkit.

Building the Social Capital Concept through Multiple Disciplines

History has presented many theories of community over vast periods of time. Philosophers such as Aristotle (384-322 B.C.) and Thomas Hobbes (1588-1679) had opposite perspectives on why people form community. Aristotle believed that communities were formed due to an innate drive for humans to socialize and to create mutual benefits of social organization (primarily for the efficiency of community but also for the inspiration to the arts). Hobbes on the other hand believed that people formed communities in order to ease their individual burden and to advance themselves as individuals. For Hobbes, this self-interest was the innate motivator to create a union of people. German sociologist Ferdinand Tonnies (1855-1936) labeled these two compelling human wills as “*gemeinschaft*” and “*gesellschaft*”. The former translates as “community” and indicates that community is formed due to the human innate resolve to connect; and the latter translates as “society” to describe the motivation to be part of a broader group in order to gain from that association in some way, yet there is no innate sense of connection (Loomis 1957). This dual philosophy of community is evident in the Articles of the Confederation, and further in the US Constitution. John Locke, in the Two Treatises of Government (1689), argued that the individual was central and that there was a natural right to property, but also that “one must leave enough and as good” (in Laslett 1988, 31) as a responsibility to not spoiling the opportunity of others. This philosophy of community is extended through the founding fathers, including Benjamin Franklin, who saw property as a social convention and therefore the social as

central to the organization of community (Freyfogle 2003). While Franklin himself pursued his individual interests and rights, and discussed this in public forum, he supported, with great personal effort, the development of community. Beyond the creation of the Constitution, he, along with eleven other men, formed the first public library in the United States as well as the first all-volunteer fire department in Philadelphia (Chambliss 1996). His commitment to community was his will, as was the case for many throughout history.

According to Drew McCoy “[T]he Revolutionaries did not intend to provide men with property so that they might flee from public responsibility into selfish privatism: property was rather the necessary basis for committed republican citizenry” (1980, 55). Yet, as the industrial age advanced, the values of capitalism and the pursuit of the individual in a market economy took a greater hold in society. Adam Smith’s 1776 *Inquiry into the Nature and Causes of the Wealth of Nations* documents this circumstance. Eric Freyfogle’s *The Land We Share* (2003) also takes an historic approach to test the hypothesis that the industrial age had pushed the pendulum to the side of private interests. His primary purpose was to show that this had not always been the case—that working in the public interest was a fundamental belief early in the United States’ history. For example, public use of private property for hunting and recreation, and fishing in ponds of 10 or more acres was commonplace in the New England colonies. Also, he notes that “[s]everal New Hampshire towns restricted the right of town residents to cut wood near the town center. In New Hampshire and elsewhere, large trees suitable for ship masts were claimed as public property, even when

located on private land” (Frefogle 2003, 61). There is a history of law which was created not just to prevent public harm (which is often the case) but to solely create a public benefit.

Research on communities today is often attempting to decipher how some succeed when others fail. Mattessich and Monsey (2001) conducted a meta-analysis of the “community building” literature published from 1963 to 1999 in pursuit of understanding the factors that make a community “healthy”. Their analysis included the review of the results of 48 published research papers on 402 communities. The authors present five key definitions of community they believe to be the most salient in the meta-analysis. These definitions are printed in Mattessich and Monsey (2001) and copied here yet rearranged by the year of original publication to present an historic progression. In the first definition below, the general functionality of community is the theme. The definitions become more profound over the next 25 years. The definition of community introduced by Biddle and Biddle in 1965 includes that there is a perception of community. Proximity and mutuality as part of community is introduced by the National Research Council in 1975. The concept of trust is identified by McMillan and Chavis in 1986; and finally, the physical and psychological connections between people and with their surroundings is advanced in Christenson and Robinson in 1989.

1. Community is “that combination of social units and systems which perform the major social functions having locality relevance. The organization of social activities to afford people daily local access to those broad areas of activity which are necessary in day-to-day living” (Warren 1963).

2. Community is “whatever sense of the local common good citizens can be helped to achieve. This perception of community is an achievement, not something given by reason of geographic residence. It is not fixed; it changes as a result of experience or purposeful effort. It may even shift according to the problem that catches the attention of the citizens” (Biddle and Biddle 1965).

3. Community is “a grouping of people who live close to one another and are united by common interests and mutual aid” (National Research Council 1975).

4. “Community is a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan and Chavis 1986).

5. Community is “people that live within a geographically bounded area who are involved in social interaction and have one or more psychological ties with each other and with the place in which they live” (Christenson and Robinson 1989).

These definitions highlight the progression of the goals of community development – from functioning to provide services, to shared values and working toward improved conditions. Community development is a profession born out of the 1908 Country Life Commission under President Theodore Roosevelt. The Commission found that poverty persisted in rural areas of America due to the lack of organized participation and it began organizing local governments in these rural areas (Christenson and Robinson 1980). Community development expanded from this initial goal to a more pronounced goal of improving the condition of communities using “democratic conditions of participation” (Christenson and Robinson 1980). Land grant universities were given the directive and the Cooperative Extension Service was formed through the Morrill Act of 1866, and refined in the Smith-Lever Act of 1914. This gave

momentum to the community development movement, for as academic research was applied, knowledge and experience in the discipline grew. Profit and non-profit establishments became more prevalent in community development work. The more work that was being done, the more need there was to share information about the successes and failures of community development efforts.

In this early time period (1960 - 1970), community development became synonymous with community organizing. Roland Warren (1963) discusses four organization dimensions of American communities that could be laid out on polar scales: (1) local autonomy on a scale from independent to dependent; (2) coincidence of service areas, on a scale from coincide to differ; (3) psychological identification with locality on a scale from strong to weak; and (4) horizontal pattern on a scale from strong to weak. Warren saw the organizing structure of the community as key to its survival. He believed that the more independent a community was from outside influence, the more likely the community's service areas coincided with each other. Also, the stronger the psychological ties were to the locality, and the stronger the horizontal ties were within the community, the more likely the community was to function successfully as a whole.

Roland Warren's horizontal and vertical pattern of organization became an especially popular research topic in the field. An understanding of horizontal and vertical patterns supposedly helped predict decision making capacities and further to imply decision outcomes. This analysis was based on looking at the world as a set of patterns of power, such as hierarchical (vertical), meaning control of decisions was imposed from "above" or from someone or some group

other than those affected by the decisions, versus lateral (horizontal) power, meaning the decision making was equally shared among stakeholders (all those affected by the decisions). While this structural or organization theory was an important explanatory tool, it was too simple a model to explain the complex interactions in the majority of community decisions or outcomes.

Political models of community outcomes evolved into a more complex structural analysis of groups called *social network theory*. This is a diagrammatical evaluation of group structure, and it became a popular method of understanding communication in a number of interest areas (especially political science and sociology) where both internal and external influences were significant in decision outcomes. Social network theory was published first in 1954 by J. A. Barnes in a study of relationships in a parish organization in Norway. He referred to the individuals in his diagram as “nodes” and in the relationship to others, as “ties”. These types of models helped traditional community development practitioners strategically analyze social groups in order to identify barriers and gaps in communication. This was more prominent in international and rural studies. This basic theory has been used to analyze more and more complex groups ranging from inner-city neighborhoods to international networks. While the structural theory of communication and decision making has evolved from the reductionist horizontal and vertical arrangements to more accurate descriptions through complex network analyses, social network analysis is often outside of the reach of most applied research projects.

In 1987, Lackey, Burke, and Peterson asserted that the goal of community development is community health, in terms of a community's attitudes and values, capacities, organizations, and leadership (Lackey et al. 1987). These four components of community health are still major themes within the community development literature. Research by Mattessich and Monsey (2001) made an attempt to focus on the goals of community building. They believed that community building, such as in improving the social capacity to deal with problems, should be a separate and well defined area of study. This effort resulted in more diverse research in community organizing and leadership. In 2001, a collection of studies on "community capacity", "community attachment", and "community assets" were introduced to the field (Chaskin 2001). Community capacity referred to a community's decision making capabilities in solving community-level problems, i.e., does the community have the ability to address problems in an organized fashion—with leadership, experience, and rational processes?

Community attachment was a term used to capture the sense of ownership and affect felt for a community; the theory being, the more people there were that felt attached generally meant that there were more people involved. As research results began to indicate that there was less and less attachment in communities, less voting, less volunteerism, etc., researchers began searching for more discriminating variables of community change and action. "Community assets" was the next frontier. Studies regarding community assets ranged from looking at leadership and leadership qualities in a community

to infrastructure for people to use to conduct community business. This period helped broaden the theoretical basis of community development as well as strengthen the link to community planning.

Over the past ten years, community development and planning practitioners have used “community asset building” as a key method in developing community capacity in order to deal with community level problems. The Asset-Based Community Development Institute at Northwestern University opened its doors in 1995 with this mission. The term “Community Asset Mapping” is credited to Jody Kretzmann and John McNight (1993), faculty associated with the Institute. This mapping exercise involves creating an inventory of skills in both individuals in the community (the architects, carpenters, attorneys, daycare providers, etc.) and skills in the broader community context (communication networks, meeting places, administrative help, etc.). The idea that “mapping” could help people make assets more readily known led to distinctions such as “social mapping”, “conceptual mapping” and “temporal mapping” (Stinger 2007). Social maps are diagrams of social connections, mainly for visual representation and identification of gaps. Concept maps indicate how ideas may be related to one another. Temporal mapping may include the other forms of mapping yet adds the element of time. This helps with the conceptualization of how certain ideas and events may have evolved over a period of time. These are important research tools as well as techniques to inspire community engagement and action.

Meanwhile, in a sister discipline to community development, political science, more complex concepts were being developed. This included the study of deliberative democracy and deliberative discourse theory. Considerable contributions were made by Jurgen Habermas. Habermas brought attention back to the idea that inclusive and deliberate communication is the key to an informed and involved citizenry—the foundation for democracy (Cronin and De Greiff 2000). More specifically, “[d]eliberative democracy posits that by exchanging views with one another, citizens increase their reasoned attention to evidence” (Innes and Booher 2003, 61). The process of deliberation/communication leads people to raise awareness of complex issues in complex contexts. This is a precursor to coordinated efforts, and for Habermas, due to the complexity and inclusiveness of communication, this, the effort exchange information, should be the variable of interest. This idea of open dialog of multiple interests and coordinated efforts with a long term perspective, and public benefits, is also the basis to successful comprehensive planning and community development. Habermas’ critical theory is most closely linked to the theories in community development.

Habermas saw the advantages of emotion, irrationality, and conflict within group processes, and he proposed that a “critical theory” better explained the world than the previous explanations of organizational structure and “rational” (scientific) processes. In other words, Habermas placed emphasis on the theory that how we know and act upon things is derived from both a personal and cultural history. There are more than physical facts, but emotional ones too,

which cannot necessarily be described with a rational process. This complexity of knowledge for Habermas meant that social interaction and communication are too difficult to categorize, summarize, know, or control. They are anti-reductionist phenomena. Therefore, “communicative action” became the key to describing social organization for Habermas and more recently, for “action researcher” Ernest Stringer (2007). Stringer connects the sociological theories of Weber and Habermas to the discipline of community development through the methodological approach of action research. He proposes that action research leads to communicative action and social learning. Most importantly, the primary objective of action research is the creation of social capital.

Action research became most established in social work, human services, education, and community development as the objective to the research focused on finding *organic, unique, and creative solutions to real problems for marginalized groups of people*. The basis of action research was to use Habermas’s concept of communicative action to “unleash energy, stimulate creativity, instill pride, build commitment, prompt the taking of responsibility, and evoke a sense of investment and ownership” (Guba and Lincoln 1989, 227). Trust also plays a major role in action research by how much people scrutinized information during discourse and therefore can indicate how much interaction, involvement, and social learning will take place. Action research espouses that communicative action, action coming from democratic dialog, is only possible when social learning has transpired. This level of understanding of each other’s circumstances and concerns allows compromises to be made in the group

decision making process and action to best correspond to the most salient issues. When trust is established, communication is open and action is more representative of the dialog. In this case as well as the former, rational process and group structure are no longer the central variables of interest, or the theory behind the action. Instead, meaningful participation and action linked to communication are fundamental to community-level outcomes. This is referred to as the Hermeneutic dialectic process (Habermas 1984). This is the process of creating an environment for understanding multiple meanings in the dialog and focusing the dialog on actionable and broadly defined community outcomes.

When the literature on communicative action and the methods of measuring trust come together in the literature, the term “social capital” became discernable in community development research (Flora 1998; Aigner et al 1999). As will be discussed later, the methods of measuring social capital center on frequency and breadth of interaction and on levels of trust. The term “social capital” is generally credited to Pierre Bourdieu (1986), an applied sociologist mainly interested in the sociology of education. His description of capital closely follows a Marxian definition of capital as “accumulated labor”. This means that activities have taken place and some form of yield or profit has accumulated which can then be used or further stored for use at a later time. Karl Marx was concerned with the power differentials in society that came with the ownership of economic capital which led to political capital. Bourdieu expands the use of the term capital to describe advances that can be made by two other forms of capital: cultural capital and social capital. Bourdieu uses these forms of capital as a way

to make more tangible the multiple benefits derived from an education gained by the individual.

“Social capital is the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition – or in other words, to membership in a group which provides each of its members with the backing of the collectivity-owned capital, a ‘credential’ which entitles them to credit, in the various senses of the word” (Bourdieu 1986).

What stands out in this definition is that social capital requires a “durable network”. This implies repeated communication and action to maintain the network structure. Then it follows that there is recognition of entitlement in the network for either personal or collective advantages. The structural approach here is much more dynamic than the previous stated forms of group analysis; and the outcome as credential, or capital, is the tangible product of the interaction. However, Bourdieu’s use of the social capital concept focuses mainly on outcomes for individual gains, rather than collective gains, from this durable network of the social group.

Sociologist James Coleman, who also studied social capital and education, explores more thoroughly how social capital for the group as a whole accrues (1988). He describes three forms of social capital (which are also described as outcomes of social capital): information channels, social norms, and obligations/expectations. Coleman’s information channels, like Bourdieu’s durable networks, are the structure under which social capital is produced. “[I]nformation is important in providing a basis for action”; and because gathering information is time consuming, these existing social relations expedite the

gathering of information through a network which is trusted (Coleman 1988, 104). This network and process are collective, social capital, goods. Norms are another form of social capital according to Coleman, for example, norms that inhibit crime. He finds that a norm regarding the responsibility for the protection of children allows children to walk more freely at night in Jerusalem where the norm is that all adults are responsible for all children, than in the United States where the norm is that parents alone are responsible for their children (Coleman 1988, 99). These effective norms are prescriptive in that they direct people to behave in certain ways, and like the information channels, are a collective product. Finally, Coleman's third form of social capital is the obligations and expectations derived from the group norms. These obligations and expectations are what create and perpetuate exchanges among members of a group. This is the least clearly understood form of social capital according to Coleman. The group's information channels and norms provide a framework for members to exchange within, which creates further obligations and expectations among group members. Nan Lin describes social capital as "investment in social relations with expected returns" (1999, 30). The term "investment" is useful in capturing the concept that capital as obligations and expectations come from these investments in the network. This is what others in the field are currently referring to as "reciprocity" (Light 2004, 145).

What is of particular interest to Coleman is that the individual is not completely independent in decisions regarding his or her own behavior. For example, he looks at high school retention and drop-out rates to find that the

group influence is powerful in a student's choice of whether or not to stay in school. However, the social capital involved is "less tangible" than the human capital because "human capital is [at least] embodied in skills and knowledge acquired by an individual"; whereas social capital "exists in the relations among persons" and is a powerful force despite its difficulty in being measured (Coleman 1988, 100). This obscure nature of social capital makes it difficult to come to agreement on what exactly it is. Coleman decides that what is most tangible in social capital is what is most important and that is the action or outcome component of the social capital. In other words, the action from the information channels, norms, and expectations and obligations is measurable; and "[t]he conception of social capital as a resource for action is one way of introducing social structure into the rational action paradigm" (1988, 95). Like Habermas, Stringer, and others, Coleman explores the idea that the group outcomes, in the form of action, the products of social capital, are the defining research foci in community studies because the interactions preceding the outcomes are complex, dynamic, unknowable, and therefore, unpredictable. Coleman concludes that "social capital is defined by its function", in other words, the products or actions stemming from the group interactions (1988, 93).

Social Capital in Community and Environmental Planning

Today, social capital is a primary research concept in the fields of sociology (where it was born), economics, and political science; and a budding concept in the field of community and environmental planning. Robert Putnam is

a political scientist from Harvard University whose book, *Bowling Alone* (2000), popularized the term. Putman admits that “social capital is to some extent merely new language for a very old debate in American intellectual circles” (2000, 24). His extensive research of social capital in the United States followed similarly extensive research that he had conducted earlier in Italy. Similar to his findings in Italy, *Making Democracy Work*, Putnam found that volunteerism, philanthropy, voting, and group memberships were declining throughout the United States (1993; 2000). In his studies of the United States he reviews measures of social capital by way of institutions and organizations (everything from religious, work, and community groups) as well as through informal gatherings such as sporting events, bingo, picnics, and parties. As he analyzes trends in the National Elections Studies, the General Sociological Survey, the Roper Social and Political Trends research, the DDB Needham Life Style surveys, and other sources of archived data, he concludes that in both the political and community arenas, civic engagement has declined. The purpose of his research was to highlight these trends of declining civic engagement and to bring attention to the benefits of developing social capital for strengthening democracy in communities.

Putnam (2000) is advocating for the individual gains as well as the collective positive outcomes associated with civic engagement and social capital. According to his analysis, the primary cause of decline in social capital is that there is too little time to spend on community efforts outside of work, family, and television. Sprawl type development separates individuals from their communities, both mentally and physically, and television provides default

entertainment to an often exhausted population. The most significant factor in loss of participation in community though, he believes, is “generational change” (Putnam 2000, 247). This is described as “the slow, steady, and ineluctable replacement of the long civic generation by their less involved children and grandchildren” (Putnam 2000, 283). In other words, each generation passes on less and less of a culture of civic engagement to their children. While children today may be less involved and engaged in community, Putnam found that in high social capital states, children fared better in terms of both health and education (2000, 298). He writes that “neighborhoods with high levels of social capital tend to be good places to raise children” (2000, 307). Also interesting, is that Putnam finds that “lethal violence is endemic wherever social capital is deficient” (2000, 310). Social capital may reduce the risk of physical harm because *more eyes are watching in places where people interact regularly*. Unfortunately, Putnam avoids discussion of social capital and potential corresponding economic gains for communities (due to the complexity of interacting variables). It is unfortunate because often it is the economic terms that motivate people to pay attention. However, he does admit that since there are known individual monetary gains from social capital (i.e. getting the better paying jobs when you are more socially connected) one can surmise that there are broader social economic gains from it as well.

Putnam predicts that disengagement and declining social capital leads to reduced sharing of information, reduced voting, reduced volunteerism, and reduced involvement in government overall (2000). He sees this as the danger

to democracy as individualism and pluralism flourish in this atmosphere. Putnam reports that according to the DDB Needham surveys, one in five Americans move each year, and two in five expect to move in the next five years (2000, 204). This makes the task of public involvement much more challenging because there is a constant need to inform newcomers of the history through to the current status on community issues. However, information concerning the residents of an area can be relayed between residents through existing informal networks or if there are at least some opportunities to interact in order to establish connections. However, Putnam believes that it is the lack of trust that creates the greatest barrier to social capital. He concludes that the lack of trust between individuals and towards institutions causes civic engagement to decline which inevitably leads to the decline of social capital (Putnam 2000).

Pamela Paxton (1999) further explored social capital and the concept of trust by teasing apart various forms of trust—trust in institutions and organizations versus trust in individuals. She concludes through her research, that it is the lack of trust in individuals that is keeping people from interacting and getting involved in civic community. People were more likely to trust government, corporations, and organized groups than they were to trust individuals. This is an important finding in a discussion of social capital. When trust declines towards government and other organized groups there are processes in place for grievances. These organized groups can develop marketing and education campaigns to increase levels of trust. However, when trust in individuals declines there is no means to address grievances, no immediate remedy, no developed

method to patch the episodes of broken trust. This is what perpetuates the declining social and civic engagement according to Paxton's research. Without trust, there is a reduction in interactions, a reduction in civic engagement, and a reduction in creating community.

While the community and environmental planning field grew out of technology needs (such as waste water management, etc.) and land and fiscal management concerns, it has evolved over time to incorporate the aspirations of community development. This more eclectic nature of the community planning discipline in the United States has meant that planning educators attempt to teach students about balancing social goals (it shares with the community development discipline), and meeting technological, fiscal and aesthetic goals (it shares with the engineering and design disciplines). Community planners are community developers; this means that they must go beyond designing communities, to designing communities with residents of those communities. They must also go beyond token public involvement and attempt to create meaningful interactions in order to strengthen community ties and build the structure and the function of community (Arnstein 1999). The projects they propose within the community are attempts to build sustainable communities. The social capital concept discussed here is a more refined focus within community development, public involvement, or civic engagement, because it depicts the communication network, trust in the network, the reciprocal interactions maintaining the network, and the tangible outcomes from the network. Social capital is what makes the community. Therefore, in 2004, to

bring more attention to social capital as a tool for community development and community planning, a symposium on social capital was held by the American Planning Association (Hutchinson and Vidal 2004). Seminar contributor, Xavier de Souza Briggs, finds the social capital concept compelling but insists that for it to be useful in community planning that it must be practiced in a “wide variety of action sectors” - he refers to this as the “handles” for developing social capital (Briggs 2004, 152). This would require research to approach social capital in various parts of the country, in various levels of development (urban, suburban, rural), and in various levels of groups (national, international, community, neighborhood, etc.) within the planning arenas in these places. These various “handles” would produce a more refined definition of social capital and a means of focus for improving communities through various planning infrastructure (i.e. planning boards and commissions, local, state, regional and federal planning departments, planning education, and planning research). Improvements at the smallest scale (e.g. neighborhood) are the precursors to contributions to the largest scale (e.g. regional, or global).

As with early research on community group dynamics and decision making, much of the 2004 planning symposium papers discuss the structure of groups. In this case it is the structure of groups engaged in creating social capital through bonding and bridging (Putnam 1993 and 2000). Bonding is described as the interactions between members of a particular group (neighborhood, community, or organization), and bridging is the activity of one or more members creating a link to some resource outside of the group but for the group’s benefit.

These are the “nodes” and “ties” described earlier in social network theory, or the avenues for exchange between people or groups. The key difference from early research related to social capital and this symposium, is that the symposium was attempting to capture how social capital can be used to go beyond the measurement of individual gains, to the measurement of collective or public goods through planning institutions.

For symposium contributor Briggs, there is considerable use of social capital as “social leverage” (2004, 152). Briggs believes that community planners may use social capital as social leverage to partnership with private, public, and non-profit sectors of the community for the public benefit (2004, 153). If social capital is high in a community, a planner can use it for a variety of community level outcomes. Another important contribution from Briggs is the idea of the “social capital entrepreneur”; this is someone who services the group in its production and maintenance of social capital (2004, 157). Social capital entrepreneurs find ways to provide an atmosphere for interaction and group activities. These people are the ones, for whatever reason, that make sure these formal or informal places for group activities are maintained. Community planners and community development practitioners often serve this role as well as seek out these skills within the community.

An important and undeveloped area of the social capital literature according to Briggs is what he refers to as “actioning”. “Actioning...describes important social resources that facilitate action” (2004, 155). Briggs expects that these social resources, such as the ability to connect or understand others, are

critical skills to creating social capital for successful community outcomes. This was a prominent theme in community development literature in the 1980's under the umbrella of community capacity (Lackey et al 1987). Briggs warns that social capital can be a lofty goal, "[a]dvocates for smart growth and regionalism invoke social capital, hoping to create new bonds of identity and felt interdependence across jurisdictional and social divides" (2004, 155). Brigg's concern is that a focus on creating social capital may not be distinct enough and therefore should include an actioning component on how social capital is created. Making social capital a primary goal in community planning, such as in a smart growth campaign, involves public engagement that must be creating diverse and strong networks which transpire information that lead to social learning and ultimately to collective gains.

Ivan Light, also a contributor at the planning symposium, believes that the benefits of social capital are far reaching. He describes the value of social capital in terms of its "store of value that facilitates action" (2004, 145). Light also finds the mutual metamorphosis capability of social capital particularly powerful (2004, 147). These attributes of social capital help highlight unique features of capital in general—storing it for use at critical moments, and using it for a variety of purposes (including trading to other forms of capital). Looking at social capital's ability to be parlayed into other forms of capital as well as the ability to preserve that capital in times of need may shed light on how some communities survive crises and/or make innovative group decisions at critical junctures (Light 2004,

148). Understanding the multiple benefits of social capital may help bring it to the forefront of goals for sustainable communities of the future.

Social capital is described in the APA symposium literature as a complex set of constructs – or as a “metaconstruct” (Rohe 2004, 158). Each construct within a social capital model can be described by another set of variables. As stated earlier, new research efforts on social capital should help define it, clarify the theory, link it with related constructs, and show how it is linked to action; and all of this needs to be done in various environmental and community settings (Hutchinson and Vidal 2004). This is the attempt of the Lamprey River Watershed Survey, which is to better describe social capital and the environment in a watershed context in New Hampshire. This is a place where development pressures surround the area, where there is a mix of old New England values being challenged by the values of newcomers moving into the area. Can social capital be used, as the APA symposium suggests, in leveraging action for truly collective community benefits?

The Saguaro Seminar is an initiative by Robert Putnam which brings together 33 researchers of social capital on a regular basis in order to continue to develop the concept and to apply it in the real world. The National Social Capital Benchmark Survey is a product of the Saguaro Seminar, at the J. F. Kennedy School of Government, Harvard University. This 70-item telephone survey was conducted with over 30,000 residents in 28 states, first in the year 2000 and again in 2003. Lew Feldstein, Executive Director of the New Hampshire Charitable Foundation and former President of the Saguaro Institute, helped

develop the social capital measures in the survey. Feldstein believes that there is a need to view the world through a social capital lens. He believes that the concept of social capital is a building block for strong communities in New Hampshire (Putnam and Feldstein 2003).

There were 711 residents from several communities in New Hampshire that participated in the National Social Capital Benchmark Survey. These results indicate that the state is high in social capital but with interesting differences from the other states in the study. According to a 2003 report by the New Hampshire Charitable Foundation, “New Hampshire people trust one another, believe they can make a difference, see few barriers to getting involved in their communities, trust their local institutions, and get involved at all income and educational levels in civic life—all to an exceptional degree” (New Hampshire Charitable Foundation 2003). This is counter to the findings of national figures by Putnam’s earlier studies as well as Paxton, who found low trust in individuals overall in the United States (Putnam 2000; Paxton 1999). Another important difference was that New Hampshire residents were less likely to say that religion bonds them together with other people, 63 percent in New Hampshire compared to 84 percent nationally, and further, that New Hampshire residents have remarkably lower church attendance overall than the national numbers, 39 percent versus 61 percent (New Hampshire Charitable Foundation 2003). Since religious bonds are often the structure that holds many community members together, it is interesting that New Hampshire still ranked high in social capital compared to other states.

Social Capital and Smart Growth in the Lamprey River Watershed

Land development is often inevitable, yet how it is to be developed remains to be negotiated. New Hampshire is expected to grow by approximately 350,000 between the years 2000 and 2025—more than 28 percent (Society for the Protection of New Hampshire Forests 2005). A substantial portion of this growth is in the southern part of the state, in the seacoast region, with easy access from Interstate 95, Route 4, Route 16, and Route 125. The Lamprey River Watershed region lies within this growth node of the state. The area along Interstate 93 is another primary growth region in the state. The New Hampshire Department of Transportation is in the process of an expansion project of the I-93 Corridor. The communities in the I-93 Corridor will receive planning assistance to manage growth pressures related to the highway expansion. Unfortunately, none of this funding is directed to the seacoast region where much development pressure will take place due to the demand for housing located away from employment centers and among natural settings such as the rivers, lakes, ponds, forests, and ocean views of the seacoast (see Figure 1):

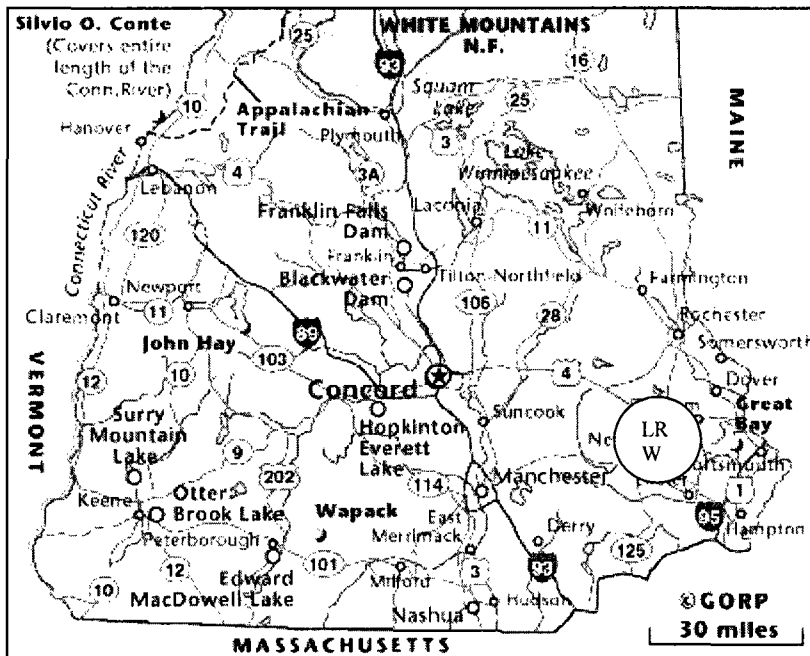


Figure 1. Southern New Hampshire and the Lamprey River Watershed (LRW)

The challenge for planning departments and planning boards is in figuring out how to accommodate development so that it fits in with the landscape, brings people, jobs and services in closer proximity to each other, reduces the need to travel by single occupant vehicle, and allows communities to exist for people, while maintaining the integrity of the natural environment. As case studies upon case studies have shown, residents' involvement through a participatory process is crucial to successful outcomes in community (Bosselman et al 1999; Hopkins and Zapata 2007). Social capital is what leads the members of a community to actively and regularly participate in community.

Smart growth according to the Sustainable Communities Network (funded in part by the U.S. Environmental Protection Agency) promotes ten principles to creating more sustainable communities: 1. Creating a range of housing

opportunities and choices; 2. Creating walkable neighborhoods; 3. Encouraging community and stakeholder collaboration; 4. Fostering distinctive, attractive communities with a strong sense of place; 5. making development decisions predictable, fair and cost effective; 6. Promoting mixed land uses; 7. Preserving open space, farmland, natural beauty and critical environmental areas; 8. Providing a variety of transportation choices; 9. Strengthening and directing development towards existing communities; and 10. Taking advantage of compact building design (Smart Growth Network 2008). These principles are the foundation of new urbanism—a comprehensive design model and an innovative approach to planning communities today. It is compact development with special attention to creating an environmentally sensitive, equitable, and aesthetically pleasing environment and connected community; this model for development is discussed in both national and international planning policy. The primary objective is to protect the environment. Automobile trips both inside and outside of the community are reduced, visibility of members of the community increases, and opportunities for inhabitants to become involved and to interact increases. It is believed that the opportunity for interaction should increase the amount of interaction and further increase the level of social capital. Step one in designing sustainable communities is to build compactly where the land can support the development and to prohibit development in sensitive ecosystems. Step two, which happens more naturally if step one is accomplished, is to create an atmosphere of community so that people will be involved in protecting and further crafting their community. This is how social capital can play a significant

role in the continued success of community. Showing the relationship of social capital to community outcomes, such as support for open space design (smart growth or new urbanism) can promote a social capital model to community and environmental planning.

CHAPTER 3

RESEARCH METHODOLOGY

Survey Design

This project is a social science investigation intended to describe the social environment around the topics of community and regional planning as well as to determine if support for open space design can be predicted by social capital. The study area is the Lamprey River Watershed and the subjects are the residents of the towns within the watershed. In action research, the researcher's primary objective is not the collection of data for the research but rather it is to provide an opportunity where communication and information is transferred between the subjects (Stringer 2007). The Lamprey River Watershed survey was designed to provide this opportunity for residents to report out as well as receive information about their watershed. This research should increase awareness within the watershed, of interrelated issues, and inspire involvement and action.

The survey design began with an interview with the Executive Director of the Lamprey River Watershed Association, Dawn Genes, on January 25, 2006. The following 10 concerns (as described by Genes and paraphrased below) are topics that the organization would like to address and therefore have been incorporated into the Lamprey River Watershed Survey:

1. Residents do not recognize that they are part of the watershed (especially those who do not see open water). A lack of awareness of a resource

means a lack of support for the resource. Efforts need to be made to increase awareness. Visuals, such as signage, should be used to promote the watershed and encourage residents to see it in its entirety. Residents need to see that the surface waters such as the Little River, North River, Bean River, North Branch River, and Picassic River are part of a larger water system. This visualization can help with an understanding of the more obscure ground water resources.

2. Residents do not understand the relationship between water quality and water quantity. Conservation efforts would advance if residents understood this interrelationship.
3. Residents do not understand how impervious surfaces impact water quality. The lack of awareness of non-point source pollution and impervious surfaces needs to be addressed.
4. Residents, town officials, and developers lack information on how various development designs impact water quality. Critical areas of the watershed should be identified and protected by the promotion of low impact development designs.
5. Residents see open space (land) programs and clustering of homes as conflicting rather than supporting conservation methods. Residents need to acknowledge the connections between open space protection, water health, and more compact development patterns.
6. There is a lack of volunteers for watershed protection. The Lamprey River Watershed Association continues to struggle to get and keep people

involved. What are residents doing now and what are they willing to do in their communities?

7. There is much overlap and uncoordinated efforts of organizations in watershed planning. There is a need to link organizations involved in regional resource planning. Where are people getting their information, from what organizations, and what type of information helps residents stay involved in local as well as regional issues?
8. There is a lack of awareness of the possibility of contaminants in residents' drinking water. This awareness is critical to the support and health of watershed resources and the inhabitants. Residents not on public water systems should be testing their water regularly.
9. It is unknown what the level of support is for regulations that aim to protect land and water. Will residents show up in support for regulations that may impact how development takes place and how resources are used in the watershed?
10. And finally, there is a lack of social science information about the residents in the watershed. Are there differences in how people think about issues related to the watershed based on whether they are abutters or non-abutters to open water, if they live on the lower or upper river, if they are well owners or public water users? Understanding differences within the watershed may shed light on how to structure information and programs for fuller participation by residents (Genes 2006).

Ms. Genes' overarching goal is to see uniformity of policy and regulations in the Lamprey River Watershed that protect the environment and offer quality places for residents to live, work, and recreate (Genes 2006). A model policy and ordinance document is a necessary step in the process to improve water quality at a watershed level. The precursor to a unified policy document is social science research to include the public and develop a baseline for future public involvement in planning. Furthermore, strong social capital is predicted to lead to support for these types of stewardship efforts (Putnam 2004).

The Lamprey River Watershed Survey was developed for distribution to residents in the Lamprey River Watershed communities (see Appendix 1). Analysis of other watershed studies and of social capital indicators was conducted in developing this instrument in order to improve reliability of the measures. Many of the environmental questions were used in the Chesapeake Bay, VA, watershed study (McClafferty 2002). The social capital indicators, a key concept in this study, are based on the National Social Capital Benchmark Survey (2000). The items in the survey are meant to be holistic in that together they encompass sustainability principles for long-term environmental and community health.

The survey was made into a booklet of 20 pages (8 ½ inch by 11 inch) with slip-stitching. The Lamprey River Watershed Survey is copied in Appendix 1. An 8 ½ inch by 11 inch envelope was hand-stamped and included the following: the survey booklet, a special coupon designed specifically for respondents of the survey for 20% off their next purchase at Ace Hardware, a self-addressed and

hand-stamped return envelope, and a pen. The pen served two purposes, it made the package unusually shaped in hopes that the recipient would be curious about its contents and more likely to open it, and it also made for a readily available instrument to fill out the survey. Don Dillman's Total Design Method suggests multiple mailings in order to increase response rates, for example, a pre-notification letter announcing the survey, and two weeks after the survey is mailed to send reminder postcards, and after four weeks to send another survey (1978). These constant reminders have been known to increase return rates considerably. However, an adaptation of the Total Design Method was necessary due to financial and time constraints. An incentive was arranged with Ace Hardware of Durham, Lee, and Newmarket, New Hampshire. Jim Houghton, owner of Houghton/Ace Hardware at all three locations, agreed to provide the 20% off discount for Lamprey River Watershed survey participants. The coupon could be redeemed at any of the three locations in the watershed. The coupon was designed and printed on 40 lb. glossy paper with a Houghton Hardware logo stating that the coupon was for Lamprey River Watershed survey participants. The coupons were printed with a copy of Jim Houghton's signature on them (see Appendix 2).

Sample Design

A stratified random sample of 3,000 people from the U.S. Census Blocks within the Lamprey River Watershed was purchased from Sample Survey, Incorporated, in Fairfield, CT. This included nine primary towns in the watershed

(Durham, Lee, Newmarket, Northwood, Nottingham, Deerfield, Epping, Raymond, and Candia) and four towns that are only partially within the watershed (Exeter, Newfields, Barrington, and Strafford). The sample was drawn from a list of U.S. Census Blocks in the watershed provided to Sample Survey, Incorporated, from comparing watershed boundary maps with U.S. Census tract and block level maps. The Strafford Regional Planning Commission in Dover, NH, provided a list of streets within the watershed so that comparisons could be made with the sample addresses to eliminate any streets that were in the Census Blocks but not within the watershed. There were no streets in the Census Blocks that were not on the watershed list of streets. The list of addresses from Sample Survey, Incorporated, is referred to as “the random sample”. In addition to this list, an observed sample was collected—a list of riparian land owners was collected with the help of University of New Hampshire students, and the Director of the Lamprey River Watershed Association. This is referred to as “the abutters list”. The abutters list was generated from town office tax maps and tax cards and included any parcels of land that abutted the Lamprey River or its tributaries within the watershed boundaries. Any duplication between the abutter’s list and the random sample list was eliminated and assigned to the abutter’s group only. The abutter’s list is being maintained by the Lamprey River Watershed Association. It was important to oversample the riparian landowners to allow results of the riparian owners to be compared to the results of the non-abutters from the random sample. This was also a critical group with whom to exchange information due to their direct access to open water.

Data Analyses and Management

The Statistical Package for the Social Sciences (SPSS 15 and 17) was used as the analytical tool. The data were entered in the SPSS database in June and July of 2007. Data cleaning and recoding was accomplished in August 2007. There are 768 cases (respondents) with 358 variables (items from the survey). The analysis attempts to bring environmental attitudes, household behavior, community engagement, social capital, trust, and personal health risks together for a comprehensive view of the residents in the Lamprey River Watershed. Descriptive statistics are used in hopes that the variety of summary statistics from this survey may be matched with pollution data, conservation easement data, housing data, and other data owned by organizations whose missions end up protecting the watershed. The results were presented to the Lamprey River Watershed Association Board of Directors in August 2007 and at a seminar for the University of New Hampshire Water Resource Research Center in April 2008. Tables were created for each item in the survey, in the order of the survey, with an explanation of the item and the results according to the responses to the item. Hard copies were delivered to Dawn Genes, Executive Director of the Lamprey River Watershed Association, and the UNH Water Resource Research Center.

The social capital and environmental attitude indicators from this survey can later be described in a number of ways including by town, Census block, region, watershed, and by the abutters versus the non-abutters of the watershed. These data are expected to help describe a civic spirit and intent to protect land

and water in the Lamprey River Watershed. Planners, both professional and lay, may use these data for further watershed planning. The results are presented in Chapters 4 and 5. Chapter 4 includes the descriptive results in the general order in which the survey was designed for the resident/respondent. Chapter 5 is the results of the analysis on social capital and its impact on community level, environmental sustainable outcomes.

CHAPTER 4

THE LAMPREY RIVER WATERSHED SURVEY: DESCRIPTIVE RESULTS

The Lamprey River Watershed Survey, with one mailing, produced 768 cases/respondents for a 23 percent response rate overall. There were 722 abutters on the “abutters list” and all were sent the survey. There were 213 completed surveys from the abutters list for a 30 percent response rate. The non-abutters, or random sample list, consisted of 3,000 names. Surveys were sent to 2,555 of these names (random and weighted by Census Block); 555 surveys were completed from this sample list for a 22 percent response rate. Financial constraints limited the mailing to one as it was seen as more important to have a wide mailing (reaching more individual households) than to increase response rates with multiple mailings. The following results reflect the responses by these 768 individuals who received the survey through the mail as the head of the household. Due to the random sampling method, oversampling of abutters, and a reasonable response rate, the results should represent percentages that reflect what is happening at the watershed level.

Each item is presented below in the general order it is presented in the questionnaire (see Appendix 1 for a copy of the instrument). The questions are ordered to give the respondent a holistic picture of the issues involved in the Lamprey River Watershed. This should allow the reader to look at the survey/questionnaire as a guide to the order of the descriptive results.

Table 1 shows the respondents by town and whether they are considered an abutter of the river or its tributaries, or are from a household not connecting to open water (non-abutter). This latter information comes from the sample list. Twelve of the respondents altered the survey to conceal their town location. The towns of Newmarket, Lee, and Durham are considered the lower river with 98 abutters and 182 non-abutters, and the upper river is the remaining towns with 114 abutters and 362 non-abutters (Table 2). The number of respondents to each question is listed with the tables and missing data are handled differently depending on how the data would be most useful for planning purposes. In most cases the missing data are due to respondents skipping those items and therefore those numbers have been removed from the percentage calculation.

Table 1. Respondents as abutters and non-abutters by town

Town	Abutter	Non-abutter	Total
Barrington/Strafford/Northwood	0	79	79
Deerfield/Candia	25	61	86
Raymond	30	77	107
Nottingham	22	39	61
Epping/Freemont	37	47	84
Exeter/Newfields	0	59	59
Newmarket	22	90	112
Lee	58	*	58
Durham	18	92	110
Unknown town	1	11	12
Total	213	555	768

* Lee non-abutters/sample could not be separated from Durham.

Table 2. Respondents by upper and lower river

Upper and Lower River Watershed Towns	Abutter	Non-abutter
Upper River: Newmarket, Lee, Durham	98	182
Lower River: Barrington/Strafford/Northwood, Deerfield/Candia, Raymond, Nottingham, Epping/Fremont, Exeter/Newfields	114	362
Unknown town	1	11
Total	213	555

Water and Waste Water Systems

The survey began with questions about home water and sewer/septic systems. This was intended to get the respondents to place themselves and their use of water within the watershed. Tables 3 and 4 show the responses to these items. The primary source of water for the respondents overall is the private well (73.6 percent). Over 28 percent of the respondents filter their water and 15.8 percent soften it. Similarly to the data on private wells, 78 percent of the respondents have septic systems and only 13 percent are on public sewer. These results are indicative of New Hampshire which is considered mostly rural and suburban with small pockets of urban development. The density of development makes public systems for water and sewer cost effective. This has not been the case for development in this region. The public systems in the watershed account for a small percentage of the household waste water treatment. There are public systems for the urban centers in Durham, Newmarket, Exeter, Epping, and Raymond. Shared septic systems are less than

5 percent of the sample. These are being installed in newer cluster developments where the costs are borne by the group of homes. This may become more common as larger public systems are becoming antiquated and expensive.

Table 3. "What is your main source of water at home, and do you filter or soften your water?"

Water Source:	Frequency (Percent)
Private well on property	562 (73.6%)
Shared well on property	45 (5.9%)
A public water system	136 (17.8%)
Purchase bottled water	128 (16.8%)
Home water filtering system	219 (28.7%)
Home water softening system	121 (15.8%)

N=743

Table 4. "How is waste water disposed of at your home?"

Waste water disposal:	Frequency (Percent)
Septic system	600 (78.1%)
Shared septic system	36 (4.7%)
Public sewer system	100 (13%)

N=736

The next item of the survey asks respondents who report having septic systems to determine the age and care of these systems. This is a critical item of interest to planners. Septic system health in New Hampshire is directly related to watershed health. Septic systems range from brand new to 200 years old. The

mean age of the septic systems in the watershed sample is 16.63 years (SD 13.92). Twenty-six percent of the respondents have septic systems under seven years old. Another 25 percent have systems between seven and 15 years old. Another 25 percent fall between 15 and 20 years old. The final quartile has septic systems ranging between 21 and 200 years old. The septic systems are reportedly cleaned on average every 2.90 years (SD 2.255). Recommendations for maintenance of septic systems vary due to the number of people in a household and the size of the system. To say the average for septic system cleaning for the respondents is just less than three years is a good sign that the systems are being maintained and are likely to be functioning properly. Septic system failure is one of the leading causes of water contamination. Increasing costs of repairs to systems that have not been maintained may have increased the likelihood of regular maintenance. These initial questions were designed to have the respondent thinking within their home about their own water source and waste water system.

Perceptions of Water Pollution

The next series of questions are prompting the respondent to think about water quality in several locations. The results are displayed in Table 5 and listed in order of frequency under “Yes, it is a problem”.

Table 5. “In general, do you think that water pollution is a problem in these following locations?”

Location	Yes, it is a problem	No, it is not a problem	I don't know if it is a problem
The United States (N=736)	622 (84.5%)	21 (29%)	91 (12.4%)
The Atlantic Ocean (N=722)	506 (70.1%)	51 (7.1%)	164 (22.7%)

Location	Yes, it is a problem	No, it is not a problem	I don't know if it is a problem
New Hampshire (N=733)	500 (68.2%)	77 (10.5%)	155 (21.1%)
The Great Bay (N=724)	410 (56.6%)	55 (7.6%)	258 (35.6%)
The Lamprey River (N=724)	368 (50.8%)	74 (10.2%)	281 (38.8%)
Your community (N=725)	328 (45.2%)	158 (21.8%)	238 (32.8%)
Your neighborhood (N=721)	229 (31.8%)	283 (39.3%)	208 (28.8%)
Your drinking water (N=731)	173 (23.7%)	409 (56.0%)	148 (20.2%)

What is striking about perceptions of water pollution at the various levels of community, from the broadest level of the U.S. waters to the closest, your drinking water, is that people associate water pollution as being a problem furthest from their homes. Only 23.7 percent of the sample report that water pollution is a problem in their drinking water, whereas 84 percent say it is a problem in U.S. waters. Notably though, 50 percent do believe that water pollution is a problem in the Lamprey River and only 10 percent do not believe there is a water quality problem in the Lamprey River. The highest percentage of uncertainty is with the quality of the Lamprey River water. Almost 40 percent are not sure if water quality is a problem in the Lamprey River.

In the next item on the survey, respondents report that they believe the Lamprey River groundwater quality is improved with treatment. Seventy-five percent believe that the groundwater is safe for drinking when it is treated and 43.3 percent believe that it is safe for drinking without treatment. Only two percent of the respondents believe that the surface water of the Lamprey River is safe without being treated, whereas their confidence increases substantially

when the surface water is treated with 43.6 percent believing it is then safe for drinking. A system of treatment to both ground and surface waters of the Lamprey River Watershed can increase the confidence people place in water quality.

The question, "Overall, how would you rate the quality of the water in the Lamprey River Watershed?" produced a significantly higher mean score of 3.43 (SD 1.12; N=742) than the follow-up question, "Overall, how would you rate the quality of the water in the Atlantic Ocean?" with a mean score of 3.12 (SD 1.21; N=740). Again, the pollution problem is considered most serious in the furthest away water sources. Twice as many people believe the Atlantic ocean is polluted (143 versus 282). Fifty percent view the Lamprey River water as clean or very clean. Tables 6 and 7 show the frequency results for these items.

Table 6. "Overall, how would you rate the quality of the water in the Lamprey River Watershed?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very polluted	8	1.0	1.1	1.1
	polluted	135	17.6	18.2	19.3
	clean	345	44.9	46.5	65.8
	very clean	36	4.7	4.9	70.6
	don't know	218	28.4	29.4	100.0
	Total	742	96.6	100.0	
Missing		26	3.4		
Total		768	100.0		

Table 7. "Overall, how would you rate the quality of water in the Atlantic Ocean?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very polluted	15	2.0	2.0	2.0
	polluted	267	34.8	36.1	38.1
	clean	257	33.5	34.7	72.8
	very clean	16	2.1	2.2	75.0
	don't know	185	24.1	25.0	100.0
	Total	740	96.4	100.0	
Missing		28	3.6		
Total		768	100.0		

After responding to the general questions about the health of the water, the respondents are asked if they think their own or their family's health is impacted by the quality of the water. They are also asked if they believe that their own actions impact the quality of the water. The two questions read: "Do you think the quality of the water in the ocean can impact your or your family's health? And, "Do you think that what you or your family do on your land can impact the quality of the ocean water?" Approximately 80 percent of the respondents believe both that the ocean can impact their health and that what they do on their land can impact the health of the ocean (N=755).

Awareness of Local Planning Board

The Planning Board is an important entity in the community. Its structure allows a process to take place for guiding development and conservation of resources in the area. This includes development of the Master Plan, regulations, ordinances, and rules of procedure. Planning board members are residents of

the community, volunteering their time to this community effort. Professional planners may be hired to help these volunteer boards. In New Hampshire this may be accomplished through a local hiring, through assistance from the regional planning commissions (Southern NH, Rockingham, or Strafford Regional Planning Commissions), or from the staff at the New Hampshire Office of Energy and Planning. Two questions in the survey allow residents to address the work of the planning board: “How important do you think the planning board’s work is in your community?” and, “How familiar are you with the planning board’s work in your community?” Frequencies and mean scores are presented in Table 8.

Table 8. Planning board importance and familiarity

		Importance of Planning Board work	Familiar with Planning Board work
	Frequency	751	754
	Missing	17	14
Mean		4.04	2.88
Std. Deviation		.861	1.033

A mean score of 4.04 indicates that respondents believe the work of the planning board is important (on an item with 1 being not at all important and 5 being extremely important). However, residents indicate that they are only somewhat familiar with the work of the planning board, with a mean score of 2.88 (1 being not at all familiar, 3 being somewhat familiar, and 5 being extremely familiar). This is an area that should be explored by the respective towns in the watershed. Residents need more information on what the planning board's

responsibilities are and how they conduct their business. In a later item in the survey (see Table 26) residents report that they trust local boards and governing bodies “little to somewhat”, but still more so than they trust state or federal agencies. The work of the local land use boards, such as the planning board, conservation commission, and zoning board of adjustment, “can fill existing gaps” not covered by the state regulations such as the NH Comprehensive Shoreland Protection Act (NH Planning Association 2009). Familiarity with the planning board, and other local boards, should increase as the community converses more frequently about these community level topics.

The next item on the survey is a map of the watershed and prompts respondents to draw on the map the location of their home and the locations of where they think different types of development should take place as well as where conservation efforts should take place. About 86 percent of the respondents provide their location on the map, 45 percent depict where commercial development should be located, 33 percent show where housing should be located, and 49.7 percent indicate where conservation efforts should take place. This was a difficult task due to the small scale of the map (the more important point was that they were challenged to look at the map and think about these things). In a preliminary review of the data, it appears that the respondents place commercial development the furthest away from where they are located on the map. Conservation areas are mostly placed around the water. The housing data had no apparent pattern and fewer responded to this item. That nearly 50 percent of the respondents had ideas about where land should be conserved is

an important finding. These areas should be analyzed further with geographic information systems software.

Household and Recreational Activities

An important item to most watershed studies reviewed for this survey was one which asked respondents to report about their household and recreational activities which may affect the watershed. The item read, "Various household and recreation activities are listed in these two tables. Please indicate how often you participate in these activities." Tables 9 and 10 display the results of these items by whether these activities are conducted "Never", "Seldom", or "Often".

Table 9. Household activities

Household Activities	Never	Seldom	Often
Use salt on driveway (N=743)	268 (36.1%)	387 (52.1%)	80 (10.8%)
Apply lawn chemicals/fertilizers (N=740)	269 (36.4%)	320 (43.2%)	136 (18.4%)
Apply garden pesticides (N=731)	370 (50.6%)	307 (42.0%)	29 (4.0%)
Water your lawn (N=733)	277 (37.8%)	326 (44.5%)	115 (15.7%)
Water your garden/flower beds (N=736)	76 (10.3%)	330 (44.8%)	318 (43.2%)
Change car oil at home (N=743)	545 (73.4%)	86 (11.6%)	95 (12.8%)
Use low phosphate detergents (N=689)	96 (13.9%)	136 (19.7%)	422 (61.2%)
Wash your car at home (N=741)	210 (28.3%)	392 (52.9%)	129 (17.4%)
Dispose of dog poop in garbage or toilet (N=740)	437 (59.1%)	55 (7.4%)	64 (8.6%)
Catch rain water to	534 (71.9%)	117 (15.7%)	69 (9.3%)

Household Activities	Never	Seldom	Often
use around the house (N=743)			
Use low-flow shower head (N=730)	159 (21.8%)	59 (8.1%)	492 (67.4%)
Use low-flow toilets 1.6 gallon (N=729)	173 (23.7%)	37 (5.1%)	495 (67.9%)
Check the septic system regularly (N=729)	33 (4.5%)	206 (28.3%)	382 (52.8%)
Remove trees and shrubs near the septic system (N=736)	98 (13.3%)	79 (10.7%)	270 (36.7%)
Store anti-freeze at home (N=730)	376 (51.5%)	194 (26.6%)	125 (17.1%)
Participated in household hazardous waste day (N=738)	179 (24.3%)	271 (36.7%)	220 (29.8%)
Send in water samples for testing (N=740)	305 (41.2%)	316 (42.7%)	84 (11.4%)
Compost kitchen scraps (N=740)	342 (46.2%)	114 (15.4%)	263 (35.5%)
Recycle cans, glass, or paper (N=743)	48 (6.5%)	53 (7.1%)	633 (85.2%)
Use environmentally-friendly household cleaning products (N=730)	50 (6.8%)	277 (37.9%)	394 (54.0%)
Participate in coastal clean-up events (N=742)	507 (68.3%)	178 (24.0%)	30 (4.0%)

(Percentage totals may not equal 100 % due to the “don’t know” category’s exclusion from the table).

Residents report good household practices overall with the use of low flow toilets and low flow shower heads (over 67 percent); only a small percentage water their

lawns on a regular basis (15.7 percent). Recycling “often” was reported by 85 percent of the respondents, although only 30 percent participate “often” in household hazardous waste day. Nearly 70 percent either seldom or never participate in household hazardous waste day. Catching rain water on a regular basis is practiced by a small percentage (9.3 percent) of the residents and this could be a helpful strategy for watering gardens and flowers during dry periods. These items can serve as baseline information to determine if progress is being made in changing household behavior over time.

Respondents were then asked to indicate at what level they participated in the following outdoor activities. It was hypothesized that those who spend more time in the outdoors are more likely aware of the issues and more likely to support protection measures for the Lamprey River Watershed. Richard Louv (2005) found that children who spend limited time outdoors have less respect for natural settings (besides having significant health impacts such as asthma and obesity). Table 10 displays these results:

Table 10. Recreational activities

Natural Resource Recreation Activities	Never	Seldom	Often
Use boat on the Lamprey River (N=747)	455 (60.9%)	152 (20.3%)	107 (14.3%)
Sail, canoe, or kayak in NH (N=745)	280 (37.6%)	236 (31.7%)	206 (27.7%)
Use a motor boat in NH (N=745)	495 (66.4%)	115 (15.4%)	103 (13.8%)
Go shell fishing in NH (N=747)	639 (85.5%)	66 (8.8%)	14 (1.9%)
Go fishing in salt	456 (61.1%)	203 (27.2%)	64 (8.6%)

Natural Resource Recreation Activities	Never	Seldom	Often
water (N=746)			
Go fishing in fresh water (N=747)	378 (50.6%)	213 (28.5%)	135 (18.1%)
Go hunting in the county (N=744)	579 (77.8%)	69 (9.3%)	71 (9.5%)
Take walks or bike rides in town (N=745)	89 (11.9%)	239 (32.1%)	406 (54.5%)
Hike in the woods or mountains in NH (N=746)	111 (14.9%)	315 (42.2%)	309 (41.4%)
Swim in a lake or river in NH (N=744)	175 (23.5%)	323 (43.4%)	236 (31.7%)
Swim in the Lamprey River or tributaries (N=745)	471 (63.2%)	191 (25.6%)	73 (9.8%)
Swim in the Ocean or Great Bay (N=748)	260 (34.8%)	350 (46.8%)	130 (17.4%)

(Percentage totals may not equal 100 % due to the “does not apply” category’s exclusion from the table).

The bold text in Table 10 highlights the three most popular activities in the outdoors for the respondents. This includes hiking and/or biking in or around town and in the woods or mountains of NH as well as swimming in a lake or river in NH (over 75 percent of the sample is spending some of their free time outdoors). This is another important aspect of sustainability. The United States’ population has become more sedentary due to the popularity of inactive recreation (television, video games, the Internet) and limited infrastructure for being outdoors (sidewalks, bikeways, paths). This trend leads to fewer and fewer hours spent in the outdoors. The lack of experience in the outdoors can lead to

less understanding of nature and less attachment to it. With only 10 percent of the respondents reporting that they swim in the Lamprey River and 14 percent doing recreational boating in the river there is certainly room to expand participation in these activities which may in turn increase awareness of the resource and its value and help protect the resource in the long run.

Potential Sources of Water Pollution

Asking respondents about their views of potential sources of water pollution is a common item on surveys addressing environmental pollution. Table 11 displays the results of a questionnaire item on potential sources of water pollution in the watershed. Out of a list of 25 potential contributors to water pollution, the items chosen by the respondents as the strongest contributors were population growth, illegal dumping, industry, litter, autos and trucks, gas stations, and landfills/garbage. In Table 11, mean scores are presented for items with scores of 2.0 or greater (0 = does not contribute, 3 = strongly contributes). The two strongest contributors according to the respondents are population growth and illegal dumping.

Table 11. "Generally speaking, how much do you think each of the following items contribute to a water pollution problem in your watershed?"

Potential Sources of Pollution	Medium or Strongly Contributes	Mean score of 2.0 or greater
Parking lots (N= 729)	487 (66.7%)	
Geese, ducks, birds (N=729)	326 (44.7%)	
Litter (N=730)	551 (75.5%)	2.1
Lawns and gardens (N=728)	434 (59.6%)	
Dog poop (N=724)	238 (32.9%)	

Potential Sources of Pollution	Medium or Strongly Contributes	Mean score of 2.0 or greater
Septic system (N=729)	334 (45.8%)	
Agriculture runoff (N=733)	504 (68.8%)	2.0
Gas stations (N=726)	531 (73.1%)	2.1
Illegal dumping (N=731)	590 (80.7%)	2.3
Air conditioning (N=712)	172 (24.2%)	
Autos and trucks (N=732)	549 (75.0%)	2.1
Construction (N=728)	496 (68.1%)	
Industry (N=726)	565 (77.8%)	2.2
Burning fuel for heat (N=730)	389 (53.3%)	
Businesses (N=715)	423 (59.1%)	
Waste water treatment facilities (N=715)	295 (41.3%)	
Livestock waste (N=719)	401 (55.8%)	
Landfills/garbage (N=717)	521 (72.7%)	2.0
The University of New Hampshire (N=692)	275 (39.7%)	
Loss of trees and plants (N=729)	478 (65.6%)	
Boats (N=733)	493 (67.3%)	
Population growth (N=736)	636 (86.4%)	2.4
Florescent light bulbs (N=689)	176 (25.6%)	
Prescription drugs (N=696)	125 (18.0%)	
Cigarette butts (N=723)	349 (48.3%)	

Major pollutants that were not recognized as such are septic systems, waste water treatment plants, and lawn and garden care. Septic systems were considered a strong contributor to water pollution by only 12 percent of the respondents, another 26 percent believed they are a medium contributor, and 37 percent believe these systems are only a slight contributor. Only 7.9 percent of the sample did not believe septic systems contribute at all to water pollution. More effort should be extended to increase awareness of just how serious of a threat faulty septic systems are to water quality. These data can be used to create awareness of water pollution problems over time and relative to willingness to be involved in improvements. The next section addresses this issue.

Concerns and Willingness to Improve Water Quality

Table 12. "Are there certain pollutants or threats to you or your family's health that you are especially concerned about?"

Are you concerned about pollutants? N=701	Frequency	Percent
Yes	304	43.4
No	397	56.6

Over 40 percent of the sample is concerned about a certain pollutant or threat to their own or their family's health (Table 12). In an open ended item following this question, "list those pollutants or threats and explain why you are concerned," 304 comments are documented including concerns about global warming, acid rain, heavy metals, MTBE, mercury, radon, and arsenic, among a variety of other concerns.

Next in the survey there are explanations of two major contributors to water pollution: stormwater runoff and septic system failure. The respondents are then prompted to answer, "How should the cost of upgrading these systems be split among the following groups? Show what percentage out of 100 percent should be paid by each of these groups." The mean scores of these percentages are presented in Tables 13 and 14 in descending order.

Table 13. Percentage of share in upgrading stormwater systems

Percentage of Cost Share to Upgrade Stormwater Systems:	Mean Score (Average Percentages)
1. Federal	33.65
2. Town/City	31.20
3. State	29.94
4. Property Owners	26.74
5. Other	21.60
6. County	19.66

Table 14. Percentage of share in upgrading septic systems

Percentage of Cost Share to Upgrade Septic Systems:	Mean Score (Average Percentages)
1. Property Owners	71.62
2. Federal	28.24
3. Other	28.00
4. Town/City	20.15
5. State	22.76
6. County	14.55

The mean scores indicate that a higher percentage of cost responsibility for stormwater system improvements is assigned to the federal government.

Respondents believe that 33.65 percent of the cost should be borne by the federal government with town/city government following closely with 31.2 percent of the cost improvement share (Table 13). Property owners are expected to pay an average of 26.74 percent of the cost of upgrading and the county had the least cost responsibility at 19.66 percent. However, the cost differential is less than 14 percent between the least and highest ranked groups. In the case of septic system upgrades (Table 14), the cost differential is much greater at 57.07 percent difference between the least and highest ranked groups. Property owners are considered the top ranked expected contributor to septic system upgrading at 71.62 percent of the cost. The federal government is the second ranked group with 28.24 percent of the cost responsibility. Again, the county is the least ranked in this cost sharing scenario.

It is important to keep in mind that New Hampshire does not have a strong county-level system and therefore residents do not have the expectation that

county governments should have greater responsibilities in upgrading either stormwater or septic systems. Could this attitude be a mistake when attempting to manage a regional resource such as the Lamprey River Watershed? This is a critical topic as federal assistance becomes strained and local governments in New Hampshire struggle to manage with revenues that come primarily from property taxes. The coordination of local governments in a regional capacity can improve the management of both capital and natural resources. The Lamprey River Watershed would certainly benefit from a coordinated effort. With regional coordination, a focused program could be established and would then be better situated for outside funding.

The survey asks the residents to consider what they themselves might do to help improve water quality in their communities. Items in Table 15 are listed in descending order of response. Respondents' most popular choices were following the rules for septic system maintenance (76.9 percent), and supporting controls for building permits in town (75.5 percent). Seventy-three percent were willing to limit the use of fertilizers and pesticides; however, only 28 percent were willing to eliminate fertilizer and pesticides completely.

Table 15. "What would you be willing to do to improve water quality in your community?"

Action to Improve Water Quality	Frequency (Percent)
Follow rules about regular septic system management	590 (76.9%)
Support controls for building permits in town	579 (75.5%)
Limit the use of fertilizers and pesticides	557 (72.6%)

Action to Improve Water Quality	Frequency (Percent)
Support local government to purchase land for conservation	532 (69.4%)
Support management of ocean resources	471 (61.3%)
Support dense development in some areas in order to preserve other areas	399 (52.0%)
Catch and use rain water for car washing, watering lawns and plants, etc.	366 (47.7%)
Support expenditures to implement projects to protect water quality	366 (47.7%)
Support expenditures for the preparation of long-range planning	319 (41.6%)
Support controls on water usage	295 (38.5%)
Support a tax to help pay for water quality improvements (such as storm water systems)	279 (36.4%)
Attend meeting with neighbors to discuss community issues	266 (34.6%)
Volunteer to do water quality sampling	265 (34.5%)
Attend town planning board meetings	243 (31.7%)
Completely stop using fertilizers and pesticides	215 (28.0%)
Volunteer on a local board to help make these decisions	139 (18.1%)
Attend regional planning meetings	124 (16.1%)
Join a local water conservation group	114 (14.9%)

N=767

There are 590 responses to the item, “follow rules about regular septic systems maintenance” as a means to improve water quality. Six hundred of the respondents report to having septic systems. This is nearly full agreement to compliance. However, the previous item on perceived water pollutants shows that only 12 percent believe septic systems are a serious problem. Making these connections for residents can lead to improvements in septic system

maintenance. The regular maintenance of septic systems in the Lamprey River Watershed would reduce the risks of water pollution.

Table 16 shows the results of cost share to upgrade septic systems by whether or not the respondent has a septic system. The results show that septic system owners and non-septic system owners have a similar percentage of cost share distribution for property owners, although the owners were more likely to assign a larger share of the cost responsibility to owners than were the non-owners (see highlighted row in Table 16). Upgrades and replacements of septic systems and leach fields can be a considerable cost. An understanding of the perceptions of cost responsibility should be helpful in attempting to garner support for public funding of systematic upgrades. Efforts should be made to inform residents that such a program has benefits that reach far beyond the home of the improved septic system.

Table 16. Cost share to property owners by type of waste system

Share of Cost to Upgrade	Does Not Own a Septic System Frequency (Percent)	Owns a Septic System Frequency (Percent)
50% or Less	44 (40%)	153 (33%)
51% or More	65 (60%)	304 (67%)
Total 566	109 (100%)	457 (100%)

N=768

There is a strong showing of support for local government expenditures for the conservation of land; 69.4 percent of the respondents support purchasing land for the conservation of land (see Table 15). This is a trend witnessed throughout New Hampshire. A slightly smaller number, 52 percent, support “dense development in order to preserve open space”. This is important to the

research at hand. Support for open space development can lead to significant improvements in the health of the environment and the community overall. The disconnect in people's minds regarding current development patterns which produce sprawl and its effects on land conservation needs to be remedied through community planning education. Respondents were also less likely to want to attend meetings or become more actively involved in protecting water quality in their community. Only 16.1 percent chose this answer. The hypothesis in this research is that a planner's best strategy to community and environmental protection is to get people engaged in their respective community. This creates what Smith (1979) refers to as a "planning attitude" and can only be developed over time through on-going active participation in community.

Rating General Community Problems

A common procedure in community surveys is to ask residents to evaluate a list of community issues. This helps planner's prioritize the goals and objectives in the Master Planning process but in this case helps determine how water quality may rate with other common community issues. Respondents were asked how concerned they were with the following community issues or problems. They chose between, "Not a problem", coded as "0", "Somewhat Concerned" coded as "1", "Concerned", coded as "2", and "Extremely Concerned", coded as "3". Table 17 shows the frequencies and percentages in each category as well as the means. The community problems are sorted in descending order by the means. The greatest concerns on this list are high property taxes, rising energy costs,

increasing population, and loss of open lands to construction. Controlling the budget, water pollution, and land pollution are also of major concern. Sixty-six percent of the sample is concerned or extremely concerned with water pollution. Again, all of the top concerns here can be more easily managed if development patterns are changed to more densely built areas with larger open spaces left intact. People are less concerned with long commutes, lack of public transportation, poor road conditions, recreation, and crime. They are less concerned with quality education and more concerned with over-crowding in schools. For change in development patterns to take place, many of these values will have to be challenged.

Table 17. "These are problems that can exist in a community. Is this a problem in your community? If so, how concerned are you? Please check your answers in these boxes for each community problem."

Community Problem	Mean	No, this is not a problem	I am Somewhat Concerned	I am Concerned	I am Extremely Concerned
High property taxes N=768	2.35	18 (2.5%)	101 (13.9%)	219 (30.0%)	391 (53.6%)
Rising energy costs N=726	2.29	17 (2.3%)	110 (15.2%)	246 (33.9%)	353 (48.6%)
Increase in population N=712	2.01	53 (7.4%)	156 (21.9%)	232 (32.6%)	271 (38.1%)
High cost of housing N=703	1.96	56 (8.0%)	156 (22.2%)	249 (35.4%)	242 (34.4%)
Loss of open lands to construction N=711	1.93	79 (11.1%)	158 (22.2%)	207 (29.1%)	267 (37.6%)
Controlling the budget N=675	1.93	40 (5.9%)	186 (27.6%)	230 (34.1%)	219 (32.4%)
Water pollution N=700	1.91	34 (4.9%)	207 (29.6%)	248 (35.4%)	211 (30.1%)
Land pollution	1.80	43 (6.2%)	218	270	165

Community Problem	Mean	No, this is not a problem	I am Somewhat Concerned	I am Concerned	I am Extremely Concerned
N=696			(31.3%)	(38.8%)	(23.7%)
Traffic congestion N=720	1.75	108 (15.0%)	161 (22.4%)	253 (35.1%)	198 (27.5%)
Air pollution N=690	1.67	97 (14.1%)	203 (29.4%)	219 (31.7%)	171 (24.8%)
Lack of affordable housing N=685	1.67	110 (16.1%)	184 (26.9%)	212 (30.9%)	179 (26.1%)
Lack of long-range planning N=656	1.61	121 (18.4%)	183 (27.9%)	182 (27.7%)	170 (25.9%)
Lack of skilled community leaders N=666	1.55	144 (21.6%)	188 (28.2%)	155 (23.35)	179 (26.9%)
Lack of local jobs N=649	1.47	122 (18.8%)	214 (33.0%)	198 (30.5%)	115 (17.7%)
Garbage/refuse management N=707	1.44	139 (19.7%)	237 (33.5%)	213 (30.1%)	118 (16.7%)
Overcrowded schools N= 664	1.38	179 (27.0%)	172 (25.9%)	196 (29.5%)	117 (17.6%)
Lack of sense of community N=686	1.32	182 (26.5%)	204 (29.7%)	197 (28.7%)	103 (15.0%)
Lack of safe walking or biking paths N=708	1.27	221 (31.2%)	196 (27.7%)	169 (23.9%)	122 (17.2%)
Lack of quality education N=688	1.26	231 (33.6%)	169 (24.6%)	164 (23.8%)	124 (18.0%)
Lack of businesses in town N=709	1.19	230 (32.45)	225 (31.7%)	141 (19.9%)	113 (15.9%)
Lack of public transportation N=693	1.14	251 (36.2%)	202 (29.1%)	133 (19.2%)	107 (15.4%)
Privacy at your home N=710	1.11	336 (47.3%)	105 (14.8%)	124 (17.5%)	145 (20.4%)
Town running out of water N=656	1.09	246 (37.5%)	201 (30.6%)	111 (16.9%)	98 (14.9%)

Community Problem	Mean	No, this is not a problem	I am Somewhat Concerned	I am Concerned	I am Extremely Concerned
How the town/city looks N=715	1.08	256 (35.8%)	223 (31.2%)	162 (22.7%)	74 (10.3%)
Poor condition of roadways N=712	1.05	248 (34.8%)	240 (33.7%)	163 (22.9%)	61 (8.6%)
Long commutes to work or shopping N=695	1.03	286 (41.2%)	185 (26.6%)	144 (20.7%)	80 (11.5%)
Crime and vandalism in town N=701	1.00	243 (34.7%)	273 (38.9%)	125 (17.8%)	60 (8.6%)
How the neighborhood looks N=724	0.98	344 (47.5%)	144 (19.9%)	145 (20.0%)	91 (12.6%)
Lack of recreation opportunities N=690	0.95	314 (45.5%)	161 (23.3%)	149 (21.6%)	66 (9.6%)
Lack of access to water for recreation N=690	0.94	319 (46.2%)	169 (24.5%)	124 (18.0%)	78 (11.3%)

Two related items in this list and for communities across the United States, the “lack of affordable housing”, and the “high cost of housing” should have produced similar responses here. Somewhat surprisingly though, the “high cost of housing” received more concern overall than “lack of affordable housing”; 57.1 percent are concerned or extremely concerned with lack of affordable housing and 69.8% are concerned or extremely concerned with the high cost of housing. However, two times as many people believed that the lack of affordable housing was not a problem as compared to the high cost of housing (8% versus 16%). What this may suggest is that planners needs to speak to the public in

these terms such that the problem with housing today is the high cost of housing rather than the lack of affordable housing. This may help separate the housing affordability issue from the public housing issue. Many workforce housing agencies and interest groups have battled with the affordable housing stigma and misnomer. Since the public does not generally support what they see as handouts, housing services and planning agencies might be better equipped in the struggle to create more affordable housing by using the flip side of the same coin—that is, referring to “high housing costs”, rather than “lack of affordable housing”.

Likelihood to Cooperate in Conservation

When asked how likely it was that people would cooperate with a directive to conserve water or electricity because of some emergency, 80 percent believed that it is “likely” or “very likely” that people would cooperate by conserving. This shows considerable trust in the community (Table 18). The remaining 20 percent said it was either “not very likely” that people would cooperate (9.1%) or they weren’t sure what their fellow community members would do. This item can be used in the measurement of social capital. Communities high in social capital would be expected to trust that other community members would act in the best interest of the group during times of emergency. This creates a sense of obligation between community members which can increase conformance for positive group outcomes.

Table 18. “If local officials asked everyone to conserve water or electricity because of some emergency, how likely is it that people in your community would cooperate?”

Not Very Likely to Cooperate	67 (9.1%)
Likely to Cooperate	323 (43.7%)
Very Likely to Cooperate	268 (36.3%)
I Don't Know	81 (11.0%)

N=739

Preferences in the Community

At this point in the survey, the respondent has spent from 15 to 20 minutes responding to the items on the survey. The process has taken him or her through thinking about water pollution in various places, household behavior, recreation activities, what they would be willing to do to prevent pollution, what they know about their planning board's work, who should pay for septic and stormwater improvements, and what they think about other problems in their community. (People are concerned about population growth and pollution, they need more familiarity with what planning boards are doing, and they trust that their community members will respond during crises.) The survey now prompts the respondent to rate other community assets. These items add reliability to previous responses as well as more detail. Table 19 displays a list of preferences within a community in order of importance. Respondents rated the items as very important, important, or not important. These items have been sorted from highest to lowest percentage in the category of “very important”. Clean drinking water is by far the highest community preference on this list. Parks, open space, and farmland are very important to approximately 50 percent of the respondents.

Table 19. "How important is it to you to have the following in your community?"

Resource	Very Important	Important	Not Important	Don't Know
Clean drinking water N=750	643 (85.8%)	100 (13.3%)	4 (.5%)	3 (.4%)
Parks/Open spaces N=748	404 (54.0%)	302 (40.4%)	34 (4.5%)	8 (1.1%)
Farmland N=743	375 (50.5%)	287 (38.6%)	65 (8.7%)	16 (2.2%)
Safe walkways N=741	301 (40.5%)	315 (42.5%)	109 (14.7%)	17 (2.3%)
Water for recreation N=745	286 (38.4%)	343 (46.0%)	99 (12.9%)	17 (2.3%)
Views of open water N=741	213 (28.7%)	288 (38.9%)	217 (29.3%)	23 (3.1%)
Affordable housing N=741	207 (27.9%)	389 (52.5%)	120 (16.2%)	24 (3.2%)
Downtown businesses N=742	171 (23.0%)	350 (47.2%)	211 (28.4%)	10 (1.3%)
Public meeting space N=741	152 (20.5%)	439 (59.2%)	131 (17.7%)	19 (2.6%)
Public transportation N=737	102 (13.8%)	250 (33.9%)	367 (49.8%)	18 (2.4%)
Your workplace N=706	91 (12.9%)	203 (28.8%)	362 (51.3%)	50 (7.1%)

As was identified earlier in Table 17, respondents are not as concerned with recreation and views of the water. They also do not appear to be as concerned with having their work place in the community where they live, public transportation, and downtown business centers in their communities. However, as there are demands for development, these are all components to preventing sprawl and the adverse effects of sprawl development. Denser development patterns help save open space, farms, and parks. They also help institute walk ways that residents would like to have in their communities. This may be a selling

point to adopting new urbanism/open space design development regulations. Showing the connection between clean drinking water to denser development patterns, and these other preferences is essential to support. Throughout the survey, respondents' preferences are with the status quo development regulations. Table 20 presents the next item in the survey.

Table 20. "Keeping in mind that you usually pay higher property taxes with more land, which of the following would you prefer to live on?"

Lot Size	Number	Percent
½ Acre Lot	67	9.1
1 Acre Lot	123	16.6
2 Acre Lot	168	22.7
3 to 9 Acre Lot	188	24.5
10 or More Acre Lot	201	27.2
Total	740	100%

N=768

Reminding respondents that taxes increase with the size of the property lot, the smallest percentage (9.1%) prefer to live on a ½ acre lot. Another 16.6 percent prefer the one acre lot size. Nearly 55 percent of the sample prefer the larger lot sizes of 3 or more acres, with 27 percent preferring over 10 acre lots. There is certainly a large lot bias in the region but there is clearly a preference by at least 25 percent of the population for one or less acre for home lots. Upon presenting this data to the Lamprey River Watershed Association, one board member commented that she believed the large acre holdings by abutters may afford the Lamprey River more protection. Furthermore, when there are fewer abutters to attend to, it is an easier task for resource planners to provide them with information about water protection.

Table 21 shows that non-abutters do prefer smaller lots sizes more often than abutters (11% versus 4%), and 41.4 percent of the abutters prefer 10 or more acres whereas on 22 percent of the non-abutters prefer the largest lot size. A Chi-Square test was statistically significant ($p < .000$) indicating that these results are not by chance alone. A Chi-Square statistic of 41.891 would be expected in less than 1 in 1000 samples.

Table 21. Preferences for lot size by abutter and non-abutter

Prefer Which Size Lot	Abutters	Non-Abutter	Total
½ Acre Lot	8 (3.9%)	58 (11.0%)	66 (9.1%)
1 Acre Lot	27 (13.3%)	95 (18.0%)	122 (16.6%)
2 Acre Lot	32 (15.8%)	131 (24.9%)	163 (22.6%)
3 to 9 Acre Lot	52 (25.6%)	126 (23.9%)	178 (24.5%)
10 + Acre Lot	84 (41.4%)	117 (22.2%)	201 (27.2%)
Total	203 (100%)	527 (100%)	730 (100%)

Another item which is frequently asked in community surveys is a rating of the community overall. When asked “Overall, how would you rate your community as a place to live?” 56.2 percent chose “good” and another 34.7 percent chose “excellent”. As far as negative responses, only 8.8 percent chose “only fair”, and .4 percent chose “poor”. Overall, residents are pleased with their communities; none of the abutters rated their communities as “poor”. Residents of Newmarket, Epping/Fremont, and Raymond made up the majority of the “only fair” responses.

When asked if the residents expected to be living in the community in the next five years, 10.1 percent said “no”, 73.1 percent said “yes”, and 16.8 percent did not know (N=753). A strong commitment to remaining in the community can

help solidify a sense of community overall. There was a follow up item to this, an open ended question that asked, “Is there a place where you would prefer to live? If so, where, and why would you choose to live there?” The diversity of the responses indicates that people expecting to move seek different things in their living environments. Some want more downtown services, walkable areas, and public transportation; some prefer to get away from traffic congestion, people, and taxes. There is a way that planners can design communities to meet multiple interests while maintaining a commitment to sustainability (rather than attempting to satisfy popular demands). Residents can help identify landscapes that must be protected from development, and in locating areas suitable to development that will allow for shorter commutes, as well as pedestrian, bike, and public transportation.

Open Space Design

A key question on the survey asks respondents to comment on the concept of open space design. At this point in the survey, by intended design, the respondents should be thinking about how these community and environmental issues may be related. The term, open space design, is the current phrase used in planning documents and regulations, meeting announcements, and the media when referring to compact development designs (especially in New Hampshire). Its predecessor was “cluster development” which was found to invoke an immediate negative response. The two-sided model of open space design comes about by the clustering of development so that open space areas can be preserved. This term, open space design, has received less instantaneous

rejection but there is still a long way to go in promoting this model. Most planners outside of New Hampshire refer to it as “new urbanism” which also has not been well received by the public. This item in the survey begins with an explanation of the concept of “open space design” in the following manner:

There have been discussions in many towns about changing land use regulations to require buildings to be built closer together in order to reduce costs of materials for roads and utilities and to also preserve larger tracts of land for open space. This is sometimes called “open space development”.

Table 22 shows the results of three questions that follow the explanation:

(1) “In general, do you support this development idea?” (2) “Do you think water quality in the Lamprey River Watershed can be improved by this type of development idea?” and (3) “Do you think water quality in the ocean can be improved by this type of development idea?”

Table 22. Open space design and water quality

Open space design	Support open space development?	Would water quality be improved in the LRW by this?	Would water quality be improved in the Atlantic ocean by this?
Yes	403 (54.1%)	308 (41.0%)	261 (34.7%)
No	217 (29.1%)	203 (27.0%)	212 (28.2%)
Don't Know	125 (16.8%)	241 (32.0%)	279 (37.1%)
Total	745 (100%)	752 (100%)	753 (100%)

Over 50 percent of the respondents support open space development, however fewer than this see a relationship between open space development and water quality in the local and ocean waters (41.0% and 34.7% respectively).

Twenty-nine percent of the respondents do not support open space design, and furthermore, do not see a relationship to water quality. Work obviously needs to

be done to show the relationship between environmental health and open space development as well as the other benefits to compact development. This may bring some of the disbelievers over to support as well as those who have not formed an opinion.

Regulations for Land and Water Protection

The next two items in the survey (Tables 23 and 24) ask respondents about the current regulations that are designed to help develop land as well as to protect land and water. Close to one-quarter of the respondents agree that the regulations to both protect water and land in general are “just about right”. Only a small percentage in each case, land in general (9.5%), and water (3.5%), believed that regulations were too restrictive. Nearly 40 percent believed that regulations were not restrictive enough to protect water and 33 percent to protect land in general.

Overall, there appears to be more room for regulation according to these respondents, especially for the protection of water. Local government and land use boards in these communities would likely have strong public support for more regulations designed to protect community resources—especially water. This is not obvious from the number of meetings witnessed where a resident who is seemingly affected by a new regulation is aggrieved and vocal. Planners need to be aware that there are other, maybe less vocal, residents who do understand the benefits of regulations and may offer their support if they are engaged in the process.

Table 23. "Do you think the land use laws/regulations designed to protect water are too restrictive, not restrictive enough, or are just about right?"

Regulations are...	Frequency	Percent
Just about right	186	24.8
Too restrictive	26	3.5
Not restrictive enough	293	39.1
Don't know	244	32.6
Total	749	100.0

N=768

Table 24. "Do you think the land use laws/regulations, in general, are too restrictive, not restrictive enough, or are just about right?"

Regulations are...	Frequency	Percent
Just about right	212	28.5
Too restrictive	71	9.5
Not restrictive enough	244	32.8
Don't know	217	29.2
Total	744	100.0

N=768

Social Capital

This section of the survey was designed to analyze the concept of social capital in the Lamprey River Watershed. These items are not generally part of community surveys as designed by planners, but it is proposed that they should be, first to create a baseline and further to develop, and monitor social capital over time. Many of these questions were developed from the Saguaro Seminar Social Capital Survey (2000) and were discussed in the Methodology section. Some adaptations were made in order to fit the questions into a paper survey (they were initially designed for a telephone survey). The items on race of friends were eliminated due to the small amount of racial diversity in New Hampshire.

Connections to Community. The first question to the social capital section asks respondents to identify items that make them feel like they are part of a community. The list of 14 options is presented in descending order in Table 25. The most popular responses are “friends”, “people in the neighborhood”, and “owning property in town”. Social connectedness is the key factor in creating social capital, therefore, the desire and opportunity to make friends, especially of neighbors, is critical to creating a sense of belonging to community. The items least likely to make someone feel like part of their community were, “place of worship”, “people that work in the community”, and “people at my work”. An opportunity to get involved and volunteer (42%) was higher than expected but there is still room for improvement. Getting community members involved in community is a primary goal in community planning (Hopkins and Zapata 2007). Sixty percent of the sample believed that the landscape and natural resources make them feel like part of the community. Both social and geographic connections are necessary components to a strong sense of community; planners must use both to tap into and alter behaviors which are detrimental to community and the environment.

Table 25. “What kinds of things make you feel like you are part of a community? Check the items in this list that make you feel like you are part of your community?”

Feel like part of a community through...	Frequency and Percentage saying “Yes”
Friends (N=766)	584 (76.2%)
People in the neighborhood (N=765)	575 (75.2%)
Owning property in town (N=765)	536 (70.1%)
The landscape and natural resources	457 (59.7%)

Feel like part of a community through...	Frequency and Percentage saying "Yes"
(N=766)	
Family (N=766)	424 (55.4%)
Activities in the community (N=766)	417 (54.4%)
Just by living in the community (N=766)	399 (52.1%)
Opportunities to get involved (N=766)	327 (42.7%)
The schools (N=766)	306 (39.9%)
Volunteers of the community (N=766)	301 (39.3%)
Place of worship (N=766)	215 (28.1%)
People that work in the community (N=766)	212 (27.7%)
People at my work (N=766)	167 (21.8%)
Other	49 (6.4%)

Trust. One of the major components of social capital is trust in groups and organizations that residents may associate with. Trusting people in the neighborhood received the greatest percentage of "trust them a lot" responses at 40.5 percent (see Table 26). Eighty three percent trust their neighbors a lot or somewhat. The next most popular category is trusting people in the community at 17.6 percent (a lot) and 61.0 percent (somewhat) for a total of 78.6 percent of the sample trusting people in the community.

Table 26. "Generally speaking, how much do you trust different groups of people that may be involved in some way in your community?"

Trust	Trust them a lot	Trust them somewhat	Trust them only a little	Don't trust them at all	Don't know or does not apply
People in your neighborhood (N=739)	299 (40.5%)	314 (42.5%)	56 (7.6%)	17 (2.3%)	53 (7.2%)
People in your community (N=731)	129 (17.6%)	446 (61.0%)	91 (12.4%)	18 (2.5%)	47 (6.4%)
People at work (N=704)	208 (29.5%)	235 (33.4%)	44 (6.3%)	11 (1.6%)	206 (29.3%)
School administrators(N=729)	113 (15.5%)	283 (38.8%)	134 (18.4%)	66 (9.1%)	133 (17.3%)

Trust	Trust them a lot	Trust them somewhat	Trust them only a little	Don't trust them at all	Don't know or does not apply
Local news media (N=730)	35 (4.8%)	259 (35.5%)	245 (33.6%)	117 (16.0%)	74 (10.1%)
Places of worship (N=719)	200 (27.8%)	182 (25.3%)	67 (9.3%)	30 (4.2%)	240 (33.4%)
Conservation Commission members (N=738)	139 (18.8%)	298 (40.4%)	115 (15.6%)	49 (6.6%)	137 (18.6%)
Planning Board members (N=738)	72 (9.8%)	307 (41.6%)	177 (24.0%)	87 (11.8%)	95 (12.4%)
Locally owned businesses (N=739)	111 (15.0%)	387 (52.4%)	143 (19.4%)	28 (3.8%)	70 (9.5%)
National/multinational Businesses (N=725)	17 (2.3%)	128 (17.7%)	233 (32.1%)	200 (27.6%)	147 (20.3%)
University/Cooperative Extension specialists (N=732)	230 (31.4%)	287 (39.2%)	74 (10.1%)	27 (3.7%)	114 (15.6%)
Town/local government officials (N=736)	64 (8.7%)	361 (49.0%)	190 (25.8%)	83 (11.3%)	38 (5.2%)
State Agencies (N=741)	44 (5.9%)	341 (46.0%)	218 (29.4%)	76 (10.3%)	62 (8.4%)
Federal Agencies (N=736)	27 (3.7%)	234 (31.8%)	256 (34.8%)	163 (22.1%)	56 (7.6%)

Table 27. "How much of the time do you think you can trust government to make good decisions?"

Trust	Just about always	Most of the time	Only some of the time	Hardly ever	Don't know
Local government (N=739)	22 (3.0%)	341 (46.1%)	302 (40.9%)	61 (8.3%)	13 (1.8%)
County government (N=739)	9 (1.2%)	274 (37.1%)	314 (42.5%)	58 (7.8%)	84 (11.4%)
State government (N=738)	9 (1.2%)	255 (34.6%)	383 (51.9%)	78 (10.6%)	13 (1.8%)
Federal government	6 (.8%)	131 (17.7%)	356 (48.2%)	236 (31.9%)	10 (1.3%)

On a scale of 0 to 3, with 0 being “no trust at all”, 1 being “trust them only a little”, 2 being “trust them somewhat”, and 3 being “trust them a lot”, the mean scores were produced according to the respondents on 14 different types of groups.

They are listed in Table 28 in rank order.

Table 28. Mean scores for trust

How much do you trust on a scale of 0 to 3?	Means
Trust in people in your neighborhood	2.30
Trust in people at your place of work	2.29
Trust in university and cooperative extension specialists	2.17
Trust in places of worship	2.15
Trust in people in your community	2.00
Trust in conservation commission members	1.88
Trust in locally owned businesses	1.87
Trust in school administrators	1.74
Trust in local government	1.58
Trust in planning board members	1.57
Trust in state government	1.52
Trust in local news media	1.32
Trust in federal government	1.18
Trust in national and multinational businesses	0.93

This table helps highlight the difference in levels of trust, from a higher level of trust for groups that would be considered more local, such as people in the neighborhood (mean score 2.3), to a lower level of trust for groups more distant such as the federal government (mean score 1.18), and big businesses (mean score .93). People are more likely to trust neighbors than local government (mean score 1.58) and planning boards (mean score 1.57), but these scores are still higher than other levels of government. This supports a local, and especially neighborhood level, social capital model for planners to engage in with residents. This indicates that creating opportunities for people to live in and engage at the neighborhood level is important for developing social capital.

The next question reads, “How much of the time do you think you can trust government to make good decisions?” Echoing previous results, respondents in general do not trust government to make good decisions all of the time. Local government does elicit more trust overall. The residents’ trust in a governing body’s ability to make good decisions decreases the further away that government is from home. There is very little confidence in federal government

Table 29. “How much of the time do you think you can trust government to make good decisions?”

Trust	Just about always	Most of the time	Only some of the time	Hardly ever
Local government N=726	22 (3%)	341 (47%)	302 (41.6%)	61 (8.4%)
County government N=655	9 (1.4%)	274 (41.8%)	314 (47.9%)	58 (8.9%)
State government N=725	9 (1.2%)	255 (35.2%)	383 (52.8%)	78 (10.8%)
Federal government N=729	6 (.8%)	131 (18.0%)	356 (48.8%)	236 (32.4%)

decision making—with only 18.8 percent agreeing to their ability to make good decisions “just about always” or “most of the time”. In fact, 32.4 percent indicate that the federal government “hardly ever” makes good decisions, whereas only eight percent say this of the local government. The mean scores displayed in Table 30 put the federal government, at a mean score of .87, far below the other levels of governance in its ability to make good decisions. Trust in government

seems dangerously low overall, yet local government and county government are rated more favorably with respect to making good decisions “most of the time”.

Table 30. Mean scores: “How much of the time do you think you can trust government to make good decisions?”

Trust to make good decisions...	Number of respondents	Mean (0,3)	SD
Local government	726	1.45	.690
County government	655	1.36	.659
State government	725	1.27	.661
Federal government	729	.87	.722

This supports policy for local government involvement in regional efforts such as the Lamprey River Watershed management. This model would likely be more approachable for residents. While much work needs to be done to improve the quality of government activities, much more work needs to follow to improve the perception of government. Since there is more trust for the local and county levels of government, efforts should be focused here. In the meantime, efforts can be made by local government to support/create regional level governance for coordinated local efforts toward watershed protection. Local government buy-in is critical to regional resource management.

Table 31. “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”

People can be trusted	195 (28.3%)
You can’t be too careful	214 (31.1%)
Depends	277 (40.2%)
Don’t know	3 (.4%)

N=689

The survey question displayed in Table 31 gives a trust benchmark for the population overall. Only 28.3 percent of the respondents believe that “generally speaking...people can be trusted”. Nearly three-quarters of the sample believe that “you can’t be too careful” or “it depends” when it comes to trust. The lack of trust in people in general can negatively affect social capital. However, too much trust in others can lead to idleness in community activities. In the next series of questions, people are asked to report about the community activities they have been involved in as well as other activities that are part of the measures for social capital. These measures of trust can be cross tabulated with various activities to determine if trust may be a factor in participation.

Community Activities and Involvement. Survey respondents were asked, “Were you involved with any groups that took local action for social or political reform in the past 12 months?” And, “Did you serve on a committee for a local club or organization in the past 12 months?”

Table 32. Involved in local action or committee work in the past 12 months

	Local action for social or political reform (N=743)	Served on a committee for a local club or organization (N=743)	Total (cumulative) responses Yes and No
Yes	195 (26.4%)	232 (31.2%)	427 (28.8%)
No	544 (73.6%)	511 (68.8%)	1,055 (71.2%)
Total	739	743	1,482

Activities in the past twelve months are a good indicator of future behavior. Table 32 is the first indicator in the survey of volunteer activities of the residents in the communities in the Lamprey River Watershed. Barely a third of the sample reports to having done one or both of these activities. This is similar to the

findings of Robert Putnam and others who have reported declining civic involvement, especially over the past ten years. One suspect for the decline in civic engagement is the increased time spent watching television, using the Internet, as well as long commutes to work (Putnam 2000). Isolated and spectator type activities do not inspire physical community involvement. Time spent in community affairs must compete with time spent on television, the Internet, demanding work schedules, and long commutes.

Respondents were asked about their reading of the newspaper, watching television, and Internet use. Summarized results are presented in Table 33.

Table 33. Mean time spent reading the newspaper, watching TV, and using the Internet

Measures of Central Tendency	Days in the week reading the newspaper	Hours per day watch TV	Hours per week on Internet
Valid	741	745	734
Missing	27	23	34
Mean	3.97	2.74	5.63

According to these data, residents are reading the newspaper on average four days per week. Thirty-five percent of the sample reports to reading the newspaper daily. Almost three hours per day are spent watching television. This is lower than the national figure of 6 hours per day (TV Free 2007). Respondents on average spend 45 minutes per day on the Internet. In Table 34, concerning politics, 75 percent report being either very interested, or somewhat interested in politics or national affairs. Only 5.7 percent report being not at all interested. On a

four point scale, 0 being not interested, and 3 being very interested, the mean value for interest in politics is 2.15 (see Table 35).

Table 34. Interest in politics and national affairs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very interested	327	42.6	44.0	44.0
	somewhat interested	246	32.0	33.1	77.0
	only slightly interested	126	16.4	16.9	94.0
	not at all interested	44	5.7	5.9	99.9
	don't know	1	.1	.1	100.0
	Total	744	96.9	100.0	
Missing	9	23	3.0		
	System	1	.1		
	Total	24	3.1		
Total		768	100.0		

Table 35. Mean score interest in politics and national affairs

N	Valid	744
	Missing	24
Mean		2.1492
Median		2.0000
Mode		3.00

Table 36 shows that 91 percent of the sample says that they are registered to vote. While this may be a case of over reporting, this is fairly consistent with a sample of heads of households in a relatively affluent area of the country and the state. Slightly less (89.6%) say that they voted in the last primary election in 2004. Here, the question read, "As you may know, around half the public does not vote in presidential elections. How about you – did you vote in the last presidential election, 2004, between George W. Bush and John Kerry?" This leaves only 10 percent not voting in the presidential election. This is a good

indication of a politically involved community and this can be used as an avenue to develop better social capital as well in the region.

Table 36. "Are you registered to vote?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	700	91.1	93.8	93.8
	no	44	5.7	5.9	99.7
	don't know	2	.3	.3	100.0
	Total	746	97.1	100.0	
Missing	9	21	2.7		
	System	1	.1		
	Total	22	2.9		
Total		768	100.0		

Table 37. "Did you vote in the 2004 presidential election?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	did vote	688	89.6	92.2	92.2
	did not vote	25	3.3	3.4	95.6
	I don't vote	22	2.9	2.9	98.5
	not a citizen	11	1.4	1.5	100.0
	Total	746	97.1	100.0	
Missing	9	21	2.7		
	System	1	.1		
	Total	22	2.9		
Total		768	100.0		

While the Lamprey River Watershed residents may be more likely to vote than the average American, they do not display much confidence in their ability to have an impact on bettering the community. Only 28.3 percent believe people can have a "big impact" in their community. The majority (40.2%) feel that only a moderate impact is possible and another 28.3 percent believe the impact to be

small to none (see Table 38). This could be a problem area for planners; if people do not believe that they can make a difference in community, than they may be less likely to take the time to be informed and to engage in the planning process.

The next series of questions prompt the respondent to think about their neighborhood, close friends and family, and the activities in which they were involved over the past 12 months. From Table 39, slightly over 50 percent of the respondents report spending some time with their neighbors at least several times per month; 29 percent talk with their neighbors either daily or several times a week. While this appears to be a considerable amount of interaction with neighbors, only 10.4 percent talk to a neighbor on a daily basis. A majority, 62.9 percent have little contact with their neighbors (from “several times per month” to “once a year”). Five percent of the respondents report that they do not talk or visit with neighbors. The mean number of contacts with neighbors is 7.75 times per month, with median and mode values of 5 per month (Table 40). Community and environmental planners might consider these social interactions as critical elements to successful and healthy community development.

Table 38. “Overall, how much impact do you think people like you can have in making a community a better place to live?”

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no impact	22	2.9	3.0	3.0
	small impact	195	25.4	26.2	29.2
	moderate impact	309	40.2	41.6	70.8
	big impact	217	28.3	29.2	100.0
	Total	743	96.7	100.0	

		Frequency	Percent	Valid Percent	Cumulative Percent
Missing	9	24	3.1		
	System	1	.1		
	Total	25	3.3		
Total		768	100.0		

Table 39. "Think about your neighborhood or the 10 to 20 houses that are closest to you. About how often do you talk to or visit with these neighbors?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	just about every day	76	9.9	10.4	10.4
	several times a week	144	18.8	19.6	30.0
	several times a month	190	24.7	25.9	55.9
	once a month	93	12.1	12.7	68.6
	several times a year	115	15.0	15.7	84.3
	once a year or less	63	8.2	8.6	92.9
	Never	38	4.9	5.2	98.1
	don't know	14	1.8	1.9	100.0
	Total	733	95.4	100.0	
Missing	9	34	4.4		
	System	1	.1		
	Total	35	4.6		
Total		768	100.0		

Table 40. Calculated contact with neighbors per month

N	Valid	719
	Missing	49
Mean		7.7455
Median		5.0000
Mode		5.00

Respondents reported having a great number of friends and close family members with whom to discuss important matters. This is another critical element in the development of social capital in a community. Skills gained from open discussions of important matters with friends and family can carry over to dialog with community members for community level outcomes. According to

Table 39, 82 percent have more than three people considered as close friends or family with whom to discuss important matters. Respondents were then asked, "Please estimate how many times in the last 12 months you did the following."

There are 15 items on the list displayed in Table 42:

Table 41. "How many close friends or family members can you discuss important matters with?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	12	1.6	1.6	1.6
	One or two	95	12.4	12.8	14.4
	Three to five	309	40.2	41.5	55.9
	Six to ten	188	24.5	25.3	81.2
	More than ten	134	17.4	18.0	99.2
	Don't know	6	.8	.8	100.0
	Total	744	96.9	100.0	
Missing	9	23	3.0		
	System	1	.1		
	Total	24	3.1		
Total		768	100.0		

Table 42. Percentage of people participating in social activities

Social Activity	Never	1 time month	2-10 times month	12 times month	1 per week	More than 1 per week
Attended a celebration, parade, local sport or art event in the area	15	16	49	9	4	3
Taken part in artistic activities with others	63	10	16	2	4	1
Attended a child's sport event	42	8	21	9	7	9
Participated in a sport event	60	5	13	5	5	5
Attended a club meeting	49	5	25	9	4	1
Visit with relatives	4	2	30	25	19	15
Had friends over to your home	3	3	43	23	17	6

Social Activity	Never	1 time month	2-10 times month	12 times month	1 per week	More than 1 per week
Played cards or board games with others	33	6	34	12	8	3
Attended a self-help or support group	82	4	5	2	3	1
Socialized with coworkers outside of work	28	6	44	6	4	2
Attended a meeting about town or school	36	20	31	6	1	1
Recreated outdoors with family/friends	7	5	42	19	14	9
Participated in an on-line discussion group	73	3	10	3	2	5
Volunteered for a non-profit	41	11	24	9	4	6
Volunteered for a community project	59	13	17	2	2	2

The greatest percentage of activity in Table 42 is the socializing surrounding friends, family, and coworkers (see numbers in bold print). For residents of the Lamprey River Watershed, more reports are for time spent with friends and family. In summing the percentages across the categories “2-10 times” through “more than 1 per week”, the highest occurrences are “visit with relatives”, and “friends over to the house” with 89 percent each. Recreating outdoors with family or friends follows closely at 84 percent. The next highest ranking is the item on attending a celebration, parade, local sport or art event in the area, with 65 percent of the respondents. The respondents report very little activity in on-line discussions. While more emphasis has been made over the last decade on using the Internet to connect people in community, this may not be the strategy for the

Lamprey River Watershed. According to these data, activities that allow family and friends to gather, especially outdoors, will engage residents of the Lamprey River Watershed. This is likely a factor in why social capital is strong in the area.

Another question in the survey asked respondents to report on whether or not they donated blood in the past 12 months. Thirteen percent of the sample reported having donated blood in the past 12 months (N=768). This is three percent more than the national average of 10 percent—note that only 38 percent of the population is considered eligible to donate blood (Riley et al. 2007). These residents are giving, active, and engaged community members with great potential for community-level outcomes. Again, friends, family, and the outdoors are vital segues to community level involvement and the creation of social capital. This should translate into better overall environmental and community outcomes.

Obstacles to Involvement in Community. Another important point for planners to consider in creating a sense of connection and involvement in communities is what the perceived obstacles are to participation in community. The question in the survey reads, “Many obstacles keep people from becoming involved with their community. Thinking about your own life, are there obstacles or barriers that make it difficult for you to be as involved with your community as you would like, or not?” The responses are displayed in Table 43:

Table 43. Obstacles to becoming involved

Obstacles to community involvement	Very important obstacle	Somewhat important obstacle	Not an important obstacle	Don't know
An inflexible or demanding work schedule (N=710)	304 (42.8%)	159 (22.4%)	221 (31.1%)	26 (3.7%)
Lack of childcare available (N=704)	52(7.4%)	98 (13.9%)	510 (72.4%)	44 (6.3%)
Lack of transportation available (N=711)	11 (1.5%)	37 (5.2%)	637 (89.6%)	26 (3.7%)
Feeling unwelcome (N=709)	39 (5.5%)	135 (17.6%)	503 (65.5%)	32 (4.5%)
Concerns for your safety (N=714)	13 (1.8%)	27 (3.8%)	652 (91.3%)	22 (3.1%)
Lack of information on community issues (N=720)	90 (12.5%)	272(37.8%)	333 (46.3%)	25 (3.5%)
Feeling that you can't make a difference (N=719)	56 (7.8%)	196 (27.3%)	439 (61.1%)	28 (3.9%)
Not knowing how to get involved (N=714)	73 (10.2%)	207 (29.0%)	411 (57.6%)	23 (3.2%)
Afraid that it will be more work (N=716)	111 (15.5%)	278 (38.8%)	306 (42.7%)	21 (2.9%)
Potential conflicts with people (N=715)	27 (3.8%)	152 (21.3%)	515 (72.0%)	21 (2.9%)
Feeling it would be a waste of time (N=718)	59 (8.2%)	186 (25.9%)	449 (62.6%)	23 (3.2%)
It isn't any fun (N=718)	46 (6.4%)	134 (18.7%)	505 (70.3%)	33 (4.6%)

N=768

An inflexible or demanding work schedule continues to be considered the greatest obstacle to community involvement, with 43 percent saying it is a “very important obstacle”. Being afraid that participation will only lead to more work is another important obstacle to involvement. Also important, is the perception that there is a lack of information on community issues and on how to get involved.

These concerns can be addressed by planners through good leadership,

organization, and information channels. Planners will have to be organized in such a way as to allow people the flexibility to get involved in projects around their work schedules, to get directed information to residents, and to tell them specifically how to be involved. The more positive experience residents have with community projects, the more likely they are to find ways around these obstacles.

An open ended question followed the scaled question above: "What do you think are the main reasons people do not participate in community decision making? Write your answer here." Five hundred and fifty-four of the 768 respondents (72%) answered this question. The answers follow many of the themes provided in the closed ended item (yet with elaboration), however, a few others are new and interesting to note. For example, "the lack of self confidence" emerged as an important obstacle. This is an issue that planners do not pay enough attention to in public involvement strategies. According to the American Planning Association Code of Ethics, planners are charged with the duty of being advocates for those with the least skills in public discourse (APA 2009). Those stakeholders with little time, information, know-how, and lack of confidence in their skills to participate, can be better informed about the issues and better assisted in participation. Another response that was repeated multiple times was the idea that people only get involved when an issue has an impact on them, and further, that this "selfishness" confuses the process. In other words, the point is that people need to be involved more regularly rather than only when they have a vested interest in the outcome.

Future Involvement. Table 44 displays the results to the next item in the questionnaire. Nearly 50 percent of the respondents (48.6%) believe it to be likely or very likely that they will participate in a community related activity in the next year, whereas, the remaining 50 percent respond that it is not likely (41.8%) or do not know if they will be involved (9.6%). It is disconcerting that 50 percent are not likely or don't know if they will be involved in a community related activity in the next year. Opportunities for involvement need to be sensitive to the obstacles to participate if future engagement in community is to continue.

Table 44. "How likely is it that you will be involved in some community related activity in the next year?"

Likelihood...	Frequency	Percent
Very likely	186	25.1
Likely	174	23.5
Not very likely	310	41.8
Don't know	71	9.6
Total	741	100

N=768

Information and Sources

Information about community events and issues is a precursor to involvement. It is helpful to planners to know where people get the majority of their information. This provides an avenue for information transference as well as a way to evaluate what kinds of information people are relying upon. The item used to query this issue read, "A number of potential sources of information are listed below. Please indicate how often you use each of these to find out about community issues." The top five sources of information are newspapers and magazines, television, radio, neighbors, and community newsletter (Table 45). Eighty-nine percent of the respondents use newspapers and magazines, 79

percent use television, 78 percent use the radio, 77 percent use neighbors, and 74 percent use a community newsletter. The use of the Internet was lower, at 64 percent. The sources of information least used according to this list are the community master plan (63% don't use it), UNH Cooperative Extension (56% don't use it), local public hearings (48% don't use it), and retail stores (47% don't use it).

The ability of neighbors to transfer information regarding community issues is valued here and yet is at risk as developments scatter across the landscape. Development plans must consider prospects for social interaction. If people have an opportunity to share information with their neighbors, there is a greater likelihood that critical information regarding the care of the land and water can take place in the neighborhoods of our communities. The Internet does not rate as highly in use as these other mediums of communication—which is likely the number one method of communication used by planners in communities. This may be an oversight by planners and could be addressed by either getting people more comfortable with using the Internet for community issues or by the planning departments not relying so heavily on the Internet. These results support efforts at the neighborhood and local levels with more frequent communication.

Table 45. Sources of information

Sources of Information	Use Frequently or Sometimes	Don't Use	Not Available
Kids bringing news from school	230 (30%)	90 (12%)	393 (51%)
Newspapers or magazines	683 (89%)	44 (6%)	5 (1%)
Attending meetings	366 (48%)	330 (43%)	22 (3%)
Government publications	391 (51%)	299 (39%)	31 (4%)
Neighbors	594 (77%)	128 (17%)	7 (1%)
Public officials	364 (47%)	326 (42%)	26 (3%)
Annual town meeting	391 (51%)	317 (41%)	18 (2%)
The community master plan	197 (26%)	480 (63%)	40 (5%)
Local public hearings	340 (44%)	365 (48%)	14 (2%)
UNH Cooperative Extension	253 (33%)	433 (56%)	30 (4%)
People at my work	427 (56%)	148 (19%)	128 (17%)
Environmental groups	347 (45%)	338 (44%)	33 (4%)
Work-related publications	284 (37%)	294 (38%)	126 (16%)
Retail stores	321 (42%)	362 (47%)	27 (4%)
Community newsletter	566 (74%)	118 (15%)	37 (5%)
Radio	602 (78%)	109 (14%)	9 (1%)
Television	605 (79%)	116 (15%)	10 (1%)
Internet sites	493 (64%)	178 (23%)	39 (5%)

N=768

Two open-ended items followed this list of information sources, which allowed respondents to write in answers. The first read, "How would you prefer to get information on community related issues?" This was answered by 545 of the 768 respondents (71%). The newspaper, community newsletter, flyers and e-mail were the most common responses. By "neighbors", "real live people", "small living room discussion", "educated and informed people" were also mentioned as preferences for information. Also noted was that the information needs to be "more specific/detailed" and that it has to come from a "reliable source" and be "honest" and "factual without inherent bias". "Community newsletter" was written in a considerable number of times as the best way to receive information. This

supports the earlier finding of there being more trust in local groups. Community newsletters are a great way to be specific to an area and yet provide a medium for multiple communities' issues, such as with the watershed. It might be helpful for the Lamprey River Watershed Association and the regional planning commissions to support community newsletters and to post stories and news in community newsletters rather than attempt to reach large audiences with their own mailings. A coordinated community newsletter program may be a way to serve multiple information purposes, could help solidify a regional perspective, and could be delivered in both digital and paper formats.

Preferences for Participation

The second open-ended question reads, "How would you prefer to participate in community related issues?" Half of the respondents (394) replied to this item. The responses can be divided in two primary categories, group work and individual work. Some people prefer to "work in groups", "serve on committees", and "attend meetings". Most of these statements included a qualifier that the commitments have to be limited. There is certainly a fear of being trapped into too much responsibility and too much work. A few of the respondents mention the need for a fair group process and one writes, "I want to be in an open, non-authoritative group where input and efforts are equal, not bossing people around." The other common response to this item was for people to have individual responsibilities such as financial consulting, construction and repair work, electronics, land work, donating land and money, writing letters, and

even “filling out surveys like this one”. A large number of the written responses were, “voting”. The elderly or home bound may prefer to read about the issues and then have an opportunity to vote whereas the parent of young children may prefer to work on projects from home. By understanding various preferences for involvement, more inclusive and creative techniques can be devised to allow residents to participate on their own terms and focused on their own talents.

Health and Personal Habits

The next section on the survey was designed to prompt the respondent to think about their own health, and hopefully make a connection to the health of the community, and to the environment. A few people wrote on the questionnaire that they did not understand why they were being asked about their personal health.

However, one respondent comments on the holistic nature of the survey:

This survey was very holistic—I respect and greatly appreciate the interwoven fabric of integrity and thought it must have taken to produce this survey as all of the information you see is interconnected and exemplifies an effort in understanding a complex interface between human and natural systems.

It is hoped that in the future, with continued efforts, more people can relate to how personal health habits, household behaviors, and attitudes overall, are related to outcomes in the environment.

Respondents were asked to “Please check if you do these things daily, never, or write in the number of times a week you typically do the following.” The mean scores are presented in Table 46. While these data are simplified by averages, residents in general are exercising at least three days a week, eating fruits, vegetables regularly, and organic foods

twice a week. They are eating seafood from the Atlantic Ocean on average one day a week. They are sleeping well most of the time. They are wearing their seatbelts almost all of the time and are having dinner with family and friends almost five times a week. The average for smoking is less than one day per week, and alcohol intake is at a level of two to three per week (that may actually have positive effects on health). Asking respondents to “describe your overall state of health these days”, revealed that 19 percent consider their health to be “excellent”, 38 percent to be “very good”, and 28 percent to be “good”. Ten percent believe themselves to be in either fair or poor health. Eighty-two percent visit a physician for “regular check-ups”. This perspective on personal health is a baseline and should be monitored as additional information on environmental health and personal health impacts are distributed. Earlier results show that residents do not make the connection of water pollution in local waters to water pollution in the Great Bay or the Atlantic Ocean. It is therefore likely that most do not see a personal threat from their immediate environment. Residents should be armed with more personal health impact information, without scare tactics, and with information they can act upon in order to develop that connection between the individual, the community, and the environment. These data may be used in further analyses to test the relationship between personal health habits and community health outcomes in the Lamprey River Watershed.

Table 46. Mean scores for respondent's health variables

Health Variables	Mean Score
I exercise at least 30 minutes... (N=725)	3.72 times a week
I eat out at a restaurant... (N=719)	1.59 times a week
I buy/eat fresh organic food... (N=724)	2.04 times a week
I buy/eat fresh fruit and vegetables... (N=742)	5.78 times a week
I buy/eat shellfish or fish from the Atlantic ocean... (N=732)	1.32 times a week
I drink bottled water... (N=731)	3.73 times a week
I drink unfiltered tap water... (N=737)	4.26 times a week
I smoke cigarettes... (N=743)	0.76 times a week
I sleep very well... (N=719)	5.32 times a week
I drink alcohol beverages... (N=737)	2.67 times a week
I wear a seatbelt... (N=740)	6.22 times a week
I have dinner around a table with family and friends... (N=729)	4.75 times a week

N=768

Demographics

The demographic related questions were at the end of the survey. The sample was 59 percent male and 37 percent female (four percent refused to answer this question). While the percentage of men taking the survey is high relative to the population (49 percent male), the sample was drawn from a list of names as "heads of household". It was expected that more women would fill out the survey even if it was not directly addressed to them. More effort should be made in the future to target woman as respondents when sample lists are

created this way. Names of woman in the households should be added to the database and oversampling of woman may be necessary.

Respondents' ages range from 23 to 98 years. The average age of the respondent is 53.5 years old (N=712). According to 2000 Census data, the median ages for Strafford and Rockingham counties of New Hampshire are 34 and 37 respectively. It is reasonable that the sample mean age is higher than current Census figures because the sample was of adult heads of households, and therefore does not include younger age groups of the population. A histogram of the respondents' age does display a slight positive skew but shows a relatively normal distribution about the mean age of 53.5 years old (Figure 2).

Table 47. Age of respondents

Age Statistic	#
Valid	712
Missing	56
Mean Age	53.5
Std. Error of Mean	.512
Median	53.0
Mode	56.0
Std. Deviation	13.67
Minimum	23.0
Maximum	98.0

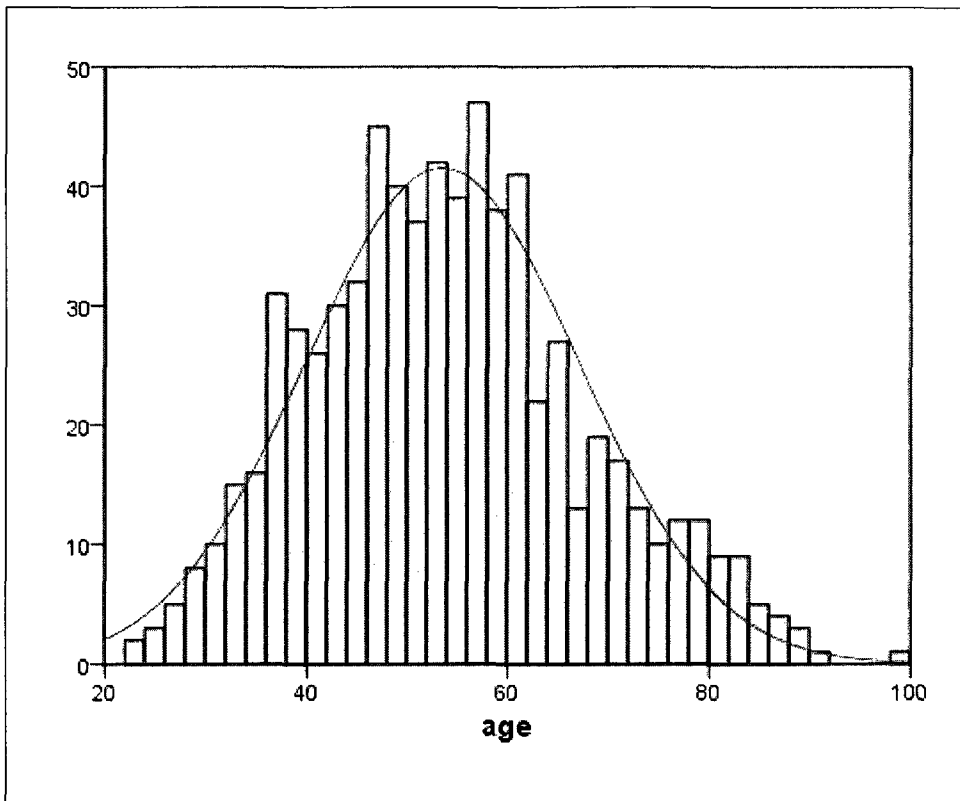


Figure 2. Histogram of respondent's age (N=712)

Homeownership was reported by 90 percent of the sample; another six percent identified themselves as renters (and an additional 4% are missing data). The homeowners reported property taxes ranging from 0 to \$30,000. Seventy-five percent of the respondents pay property taxes no greater than \$7,500, 50 percent pay no more than \$5,200, and 25 percent pay no more than \$4,000 annually. Twenty-five percent of the sample report to paying property taxes over \$7,500 annually. The mean annual property tax according to these data is \$6,032.58. One quarter of the sample did not respond to the item regarding the value of their property. Those responding to this item reported property values ranging from \$2,600 to \$1,500,000 (N=579). The quartiles break down in Table 49 show 25 percent of the sample with values of \$240,000 or less, 50 percent

with values of \$300,000 or less, and 75 percent with values of \$370,000 or less. Therefore, 25 percent of the respondents (N=145) report values greater than \$370,000, to a maximum of \$1,600,000. The mean property value is \$319,983.69.

Table 48. Central tendencies for reported annual property taxes

N	Valid	618
	Missing	150
Mean		\$6,032.58
Median		\$5,200.00
Mode		\$4,000.00(a)
Percentile	25	\$4,000.00
	50	\$5,200.00
	75	\$7,500.00

a Multiple modes exist. The smallest value is shown.

Table 49. Reported property values

N	Valid	579
	Missing	189
Mean		\$319,983.69
Median		\$300,000.00
Mode		\$300,000.00
Percentile	25	\$240,000.0000
	50	\$300,000.0000
	75	\$370,000.0000

The mean value of years lived in "town" (areas in the watershed) is 16.42 years (see Table 50). The median years lived in town is 11.5 years and the modal value is 2 years. There is a positive skew to the data meaning that there is a tendency towards fewer years lived in a community. Only 25 percent of the sample has five years or less tenure in their community and only 10 percent of the sample lived in their communities for two or less years. This reveals another level of stability in the watershed as the majority of respondents have been in the

watershed for over five years with 25 percent having tenure between 5 and 11.5 years, and 50 percent with over 11.5 years in their respective communities. The fact that new people are moving into the area is also a good sign as these people can bring new ideas and new energy with them.

Table 50. Central tendency of years lived in town

N	Valid	724
	Missing	44
Mean		16.42
Median		11.50
Mode		2
Percentile	25	5.00
	50	11.50
	75	22.75

Respondents were asked about their political affiliation, “Do you consider yourself politically as a liberal, moderate-liberal, moderate, moderate-conservative, or conservative?” The political affiliations reported by the respondents were evenly distributed between liberal and conservative (14% and 13% respectively). Sixty-four percent of the respondents chose to describe themselves as moderate, either, moderate-liberal (22%), moderate (17%), or moderate conservative (25%). Thirty-eight percent are conservative or moderate-conservative and 36 percent are liberal or moderate-liberal. This political diversity mirrors the political climate across the country. This diversity allows for balanced information because one political party cannot dominate the information or conversation when residents as a whole are scanning the spectrum of information coming from different political platforms. A balance in politics in a region helps keep community dialog better balanced, open, and honest.

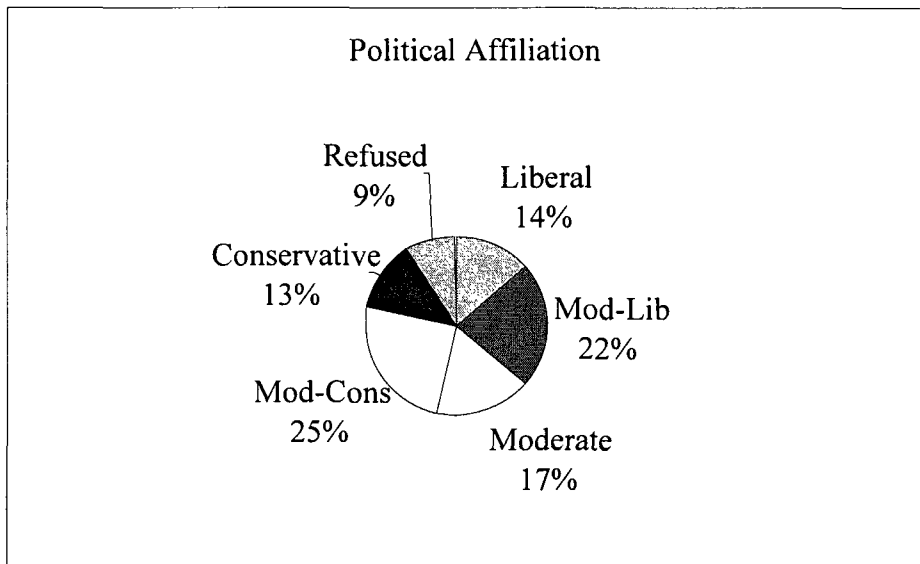


Figure 3. Respondents' reported political affiliation

Table 51. Reported total family income before taxes

Income Category	Frequency	Percent
\$20,000 or less	30	4.5
\$21,000 to \$40,000	74	11.1
\$41,000 to \$60,000	102	15.3
\$61,000 to \$80,000	131	19.7
\$81,000 to \$100,000	131	19.7
\$101,000 to \$200,000	174	26.2
\$201,000 to \$300,000	13	2.0
\$301,000 to \$400,000	2	.3
\$401,000 or more	8	1.2
Total	665	100

N=768

Percentages displayed by income categories in Table 51 are based on the number of responses to the question (N=665). Respondents are generally uncomfortable providing this type of information so it is not unusual that 13 percent skipped this question. Twenty percent report incomes of no more than \$40,000. Thirty-one percent of the sample report incomes of \$60,000 or less. Twenty percent report incomes between \$61,000 and \$80,000, and an additional

20 percent report between \$81,000 and \$100,000. Seventy percent report \$100,000 or less per year of family income. This leaves about 30 percent of the respondents reporting incomes above \$100,000. While this method of collecting income data does not allow for easy comparisons with the state or regional numbers, it does provide local planners with the ability to cross tabulate income with other variables in the database in order to determine if income might be a factor in some of the decisions that people are making. The case is the same for levels of education of the respondents. Only 4.6 percent did not answer the item, "What is your highest level of education?" The results are in Table 52.

Table 52. Levels of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high school	103	13.4	14.1	14.1
	some college	118	15.4	16.1	30.2
	2 year college	76	9.9	10.4	40.6
	4 year college	224	29.2	30.6	71.2
	masters	148	19.3	20.2	91.4
	phd	36	4.7	4.9	96.3
	jd	5	.7	.7	97.0
	md	8	1.0	1.1	98.1
	other	14	1.8	1.9	100.0
	Total	732	95.3	100.0	
Missing	99	35	4.6		
	System	1	.1		
	Total	36	4.7		
Total		768	100.0		

This is an educated group of individuals with the majority having more than a high school education. Well over half of the respondents report having four years of college or more. Approximately 75 percent of the sample reported that they are currently employed; three percent say they are unemployed, and 22

percent say they are retired. The employed are working an average of 41.28 hours per week; 20 percent say that they have the opportunity to telecommute when asked, “Do you ever telecommute—that is spend a whole day or more per week working at home instead of going to your main place of work?”

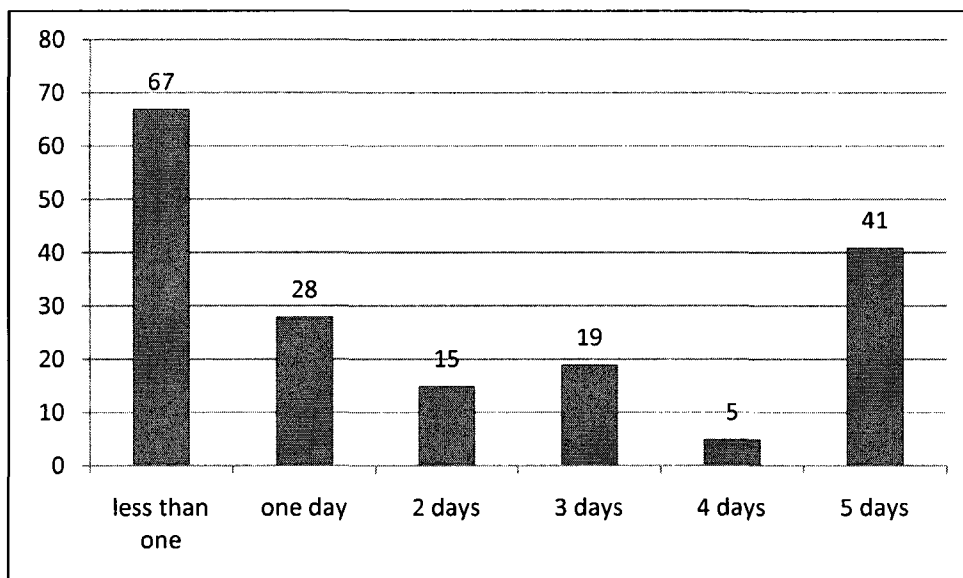


Figure 4. Number of telecommuters by how many days a week working at home

Less than one day of telecommuting is the most common response followed by five days a week. This is generally the case with telecommuting—it is an all or nothing phenomenon. Employers are not yet fully embracing this concept for a variety of reasons including problems with management oversight and data security issues. Telecommuting in the region might improve with a coordinated program focus and additional information to employees as well as employers of the residents of the region. These employees average 37 miles and 56 minutes each day commuting to work. This is nearly twice the average reported in the 2002 American Survey by the US Census at 24.4 minutes. Public

transportation and carpooling have already increased in demand with the increasing cost of fuel. However, planning has got to take a role in reducing the amount of vehicle miles traveled not only for environmental reasons but to also reduce the impact this type of commuting has on personal health, and on the time taken away from family, friends, and community.

The average number of people per household according to the sample is 2.69 compared to 2.57 for the United States (US Census 2000). Thirty-eight percent (271 out of 706) report having children less than 18 years of age. Eighty-four percent of the sample report to having access to the Internet in their home, 11 percent report to not having access from home and another five percent refused to answer. This is good news for those wanting to establish on-line discussion groups on community issues; however, efforts should still be made to give information to people in formats that they are asking for (such as a community newsletter) and in ways that everyone has access to the same information.

Exposure to Lamprey River Watershed Information

Finally, respondents are asked, "Have you or any members of your family seen any of the following materials regarding the Lamprey River Watershed? Please check the appropriate box." Table 53 lists these publications. By placing this item in the survey, residents are exposed to the availability of these resources which may increase viewership/readership.

Table 53. Frequencies and percentages that have seen the publications

Publication	No, I have not seen this.	I saw something similar to this.	Yes, I have seen this.
A book, <i>The Story of Little Bear</i> by David Allan and Leslie Hamilton. N=726	642 (88.4%)	14 (1.9%)	70 (9.6%)
Lamprey River Curriculum. Standard environmental curriculum for elementary schools with extensions to high school. N=725	666 (91.9%)	24 (3.3%)	35 (4.8%)
A Video – <i>A River Story: The Lamprey Through History</i> , with an emphasis on the human history of the river. 20 minutes long. N=725	662 (91.3%)	15 (2.1%)	48 (6.6%)
" <i>The Lamprey River, A Special Place.</i> " A pamphlet that includes a map, river conservation information and policies, and introduces the Lamprey River Advisory Committee. N=725	591 (81.5%)	48 (6.6%)	86 (11.9%)
" <i>Living on the Lamprey.</i> " A pamphlet prepared especially for landowners along the river with information about the Lamprey's history, vegetation, and what landowners can do to conserve and protect the river. N=721	616 (85.4%)	39 (5.4%)	66 (9.2%)
A presentation about the Lamprey River Watershed. N=724	609 (84.1%)	46 (6.4%)	69 (9.5%)
The Lamprey river wild and Scenic Management Plan. N=719	626 (87.1%)	51 (7.1%)	42 (6.3%)
The Lamprey River Watershed Guide. N=724	623 (86.0%)	50 (6.9%)	51 (7.0%)
The Importance of Streamside Buffers. N=715	633 (88.5%)	52 (7.3%)	30 (4.2%)
The Lamprey River Resource Assessment. N=718	670 (93.3%)	33 (4.6%)	15 (2.1%)

Publication	No, I have not seen this.	I saw something similar to this.	Yes, I have seen this.
Cross-Grained and Wily Waters: A Guide to the Piscataqua Maritime Region. 2002. W. Jeffrey Bolster, Editor. N=724	675 (93.2%)	9 (1.2%)	40 (5.5%)

N=768

As expected, Table 53 indicates that people are not seeing these published works that provide information about the Lamprey River Watershed. There is definitely a need to review mediums for information as well as distribution methods.

The last question on the survey asked, "Is there anything else you would like us to know?" There were 156 responses (20%) to this open ended item. A number of the respondents would like to know how to access the publications mentioned in the item above. Hopefully, the full titles and authorship helped those who wanted to find the materials. Surprisingly, 15 respondents wrote in "thank you" for conducting the survey; not so surprisingly, 14 wrote that the survey was "too long".

Summary of Descriptive Results

Twenty percent of the respondents to the Lamprey River Watershed Survey believe that the Lamprey River is polluted. Twice as many believe the Atlantic Ocean is polluted. While this indicates that respondents think the pollution problem is further away from home, half of the respondents are concerned about the effects of pollution on their family's health. Respondents

believe pollution is primarily caused by population growth, illegal dumping of waste, and industry. To improve water quality, respondents are willing to follow rules for septic system maintenance, support controls for building permits, limit the use of fertilizer and pesticide use, and support government purchases of land for conservation. Only 18 percent are willing to volunteer on a local board although a greater percentage would attend local meetings. Overall, the survey respondents report to having good household practices. Nearly 70 percent use low flow toilets and showerheads, and 85 percent recycle. The results of the logistic analysis presented in the next chapter do show that positive environmental behavior led to a greater likelihood of support for open space design (considered as an innovative planning and development technique by the planning discipline).

The respondents are equally divided on whether or not people in the community could make an impact in bettering the community, however, most trusted that others would cooperate by conserving water or electricity in the event of an emergency. Trust is greatest at the neighborhood level and there is less trust in state and federal levels of government, as well as in national corporations. Approximately half of the respondents planned to get involved in a community related activity in the next year. The respondents report to participating in an average 22 social activities per person per month (these ranged from both formal and informal activities). Here too, the logistic analysis shows that social activities and social trust led to a greater likelihood of support for open space design. The social activities and trust in a social unit are

important components in the creation of social capital to further community/planning outcomes. These should be nurtured as a valuable resource for planning.

The residents report that they connect to community through friends, people in the neighborhood, and by owning property. While 90 percent of the respondents rated their community as “good” or “excellent”, they are concerned about taxes, energy costs, and population growth. Further, they want clean drinking water, parks, open space, farmland, and safe walkways. They are not concerned about having their work place, downtowns, affordable housing, or public transportation in their communities. While fewer report that they are concerned with affordable housing and public transportation, the lack of these in communities will continue to create problems that further impact open areas, parks, farmland and safe walkways. Many of these issues can be addressed with open space design.

Open space design was supported by 54 percent of the sample; however, fewer understood its relationship to improvements to water quality. One-third of the sample believed that more regulations were needed for land and water protection. It seems the potential, through resident support, is there to do more to protect the social and environmental resources of the Lamprey River Watershed. Planning initiatives need to be connected to this type of descriptive (survey) information in order to discuss the issues with residents, to gather opinions, and to then direct the momentum to make improvements, at least in part, for the public good. The results of this survey may serve as baseline information for

watershed level planning for land and water protection and for the development of communities in the watershed. Engaged residents can make decisions that benefit the communities and resources in the Lamprey River Watershed.

The next chapter is an analysis of three variables of interest in predicting support for open space design (an innovative land use technique): social capital activities, social capital trust, and positive environmental behavior. There are also several demographic variables included in the analysis. Understanding the differences between supporters and non-supporters (on public policy) helps planners to begin to design programs and project which enhance characteristics related to support as well as to remove barriers to support. It is hoped that programs can be designed to create additional supporters of the open space design development concept and other planning initiatives.

CHAPTER 5

SOCIAL CAPITAL AND OTHER PREDICTORS OF SUPPORT FOR INNOVATIVE LAND USE: LOGISTIC REGRESSION RESULTS

This research was designed to determine if people with higher social capital are more likely to support innovative planning techniques in a community. The main planning technique in question is open space development and for this analysis is the proxy for innovative planning techniques in general. The results of the analysis are intended to provide a better understanding of how social capital may help improve planning outcomes in a community. Specifically, a social capital focus may help planners to increase the number of residents in support of the open space design concept. Open space design is a comprehensive land management technique which brings some of the most important elements of planning into one planning concept. These include, but are not limited to, reduced impervious surfaces, reduced time in vehicles and vehicle miles traveled, increased ability to manage non-point source pollution, increased inventory of affordable housing, conservation of built and natural resources, increased opportunities for neighbors to interact, and increased walkability of a community. This technique has been promoted by professional planners in the state of New Hampshire for well over ten years with limited acceptance by lay planners and the public.

The main variables of interest for this analysis are social capital (in terms of social activities and social trust), and positive environmental behavior, in determining support (or not) for open space design as a construction policy in the community. Other variables which have been determined to influence support for government programs and should therefore be included in this model are education level (higher levels indicative of support for government programs), political affiliation (liberal affiliation indicative of support for government programs), family income (family income levels have mixed results in research on support for government programs), and town of residence (which here is measured by upper or lower river and explained below). These demographic variables are included to determine if socio-demographic variables better explain support than the primary independent variable of interest (social capital, in terms of activities and trust, and environmental behavior). The chosen level of statistical significance in this research is $p < .10$. This is common in social science research when the risk of Type I error is more problematic than the risk of Type II error. In other words, it is more problematic to miss a statically significant result (support for open space design) because the error of reporting no difference when there is a difference has greater consequences (saying there is less support than there is) than an error of reporting differences when there are none (saying there is more support than there is). In other words, this level of significance allows the model to be less sensitive, in order to specify a finding in support of the hypothesis.

Binary logistic regression is explained more fully under the subheading of the same name below. It was chosen as the method of analysis in determining if social capital, environmental behavior, and the socio-demographic variables of interest, play a role in whether or not someone will support open space design. Social capital is the major focus of this investigation and is measured here as two separate variables, activities and trust. This is one of the simplest forms of measuring social capital, using a broad number of social activities and a variety of perspectives on trust (various levels of government, organizations, friends, etc.), in a cross sectional, self-report instrument (Grootaert and Bastelaer 2002).

Logistic regression, unlike linear regression, does not assume linearity or normally distributed variables (Capps and Kramer 1985). This limits to some degree what can be said about the effects of the variables, however, for this research it is an adequate assessment of relationships. The outcome variable in logistic regression is categorical and the predictor variables can be either categorical or continuous. Basically, a logistic regression model predicts the probability of an event occurring and compares it to the observed/actual data. For example, the model will calculate the odds of someone supporting or not supporting open space design depending on their score on the measures of social capital. The overall model (all variables included) is evaluated based on the percentage of the cases it predicts correctly. The model output is the relative odds of a respondent being in one of the outcome categories (support or do not support open space design). The reference category in this case is support for open space design and is recoded as 1; no support, and don't know if support,

for open space design is recoded as 0. The impact of predictor variables is usually explained in terms of odds ratios (North Carolina State University n.d.). Odds ratios of 1 indicate that there is an equal chance of being in either of the two groups (a 50/50 chance). Odds ratios statistically significantly less than one indicate a decreased likelihood of being in one over the other category. And, odds ratios statistically significantly greater than one indicate increased odds of being in one group over the other. (See Appendix 3 for the SPSS 17 results of the Binary Logistic Regression analysis.)

The Variables of Interest

The dependent variable is a two category variable indicating support (coded 1) or no support and don't know (coded 0). The primary independent variables of interest are two variables related to social capital, activities and trust. These are continuous variables. Another scaled variable, and also a primary research interest, is an item on environmental behavior. Five other independent variables, all categorical, are included in the model: town, upper or lower sections of the watershed, family income, education level, and political affiliation. Education level, family income, and political affiliation, are basic demographic variables that have been fairly well established in published research on environmental attitudes and behavior, such that the more education, the more income, and the more liberal, generally indicates more environmental involvement (Theodori and Luloff 2002). The town variable (respondent's town), as well as the upper versus lower watershed variable, are included to determine

if location is a factor in support for open space design. All of the variables in the binary logistic regression analysis are explained in more detail below.

The Dependent Variable: Support for Open Space Design

After an explanation of open space design in the survey, the respondent is asked to answer the survey question, "Do you support open space design?" The response categories are coded: Yes=1 (N=403), No=2 (N=217), and Don't know=3 (N=125). For the Binary Logistic Regression analysis, the Don't know group and the No group are combined to indicate "No Support". The analysis uses 584 of the cases (Yes support OSD= 336, and 248 No or don't know if support OSD); there were 184 cases dropped due to missing values.

Independent Variable: Social Capital Activities

The items in the survey concerning activities in the community, and used as measures of social capital, are from the Social Capital Survey (Putnam 2000). There are a total of 15 items which were then summed (sumactive15) to represent how active a respondent is in their community. There was no previous research or compelling reason to weight the items within the composite variable, however, this could be an area of further research. The variables used in the composite sumactive15 were ranked from 0 to 5 with 0 for never having participated in the activity to 5 being the most frequent (more than once a week over the last twelve months). The potential maximum score for a respondent is

75 (15x5). The data show a range of 0 to 59, and central tendencies are listed in Table 54.

Table 54. Scaled independent variables range and central values

Independent Variables of Interest		Social capital activities: sumactive 15	Social capital trust: sumtrust 18	Positive environmental behavior: environmentbehav
N	Valid	741	744	747
	Missing	27	24	21
Mean		21.55	25.17	22.31
SD		9.31	8.94	5.04
Median		21.00	26.00	23.00
Mode		22	30	21 ^a
Minimum		0	0	6
Maximum		59	50	34
a. Multiple modes exist. The smallest value is shown				

The activities listed in the survey include multiple ways of connecting with others in the community, they are broad in nature, things everyone can do, and not biased towards activities connected to planning: attended a celebration, parade, local sport or art event in the area; took part in artistic activities with others such as singing, dance, or acting with a group; attended a child's sport event; participated in a sports event; attended a club meeting; visited with relatives; had friends over to your home; played cards or board games with others; attended a self-help or support group; socialized with coworkers outside of work; attended a meeting about town or school issues; recreated with friends or family in the outdoors; participated in on-line discussion over the Internet; volunteered for a non-profit organization; and, volunteered for a community project. Figure 5 shows the frequency distribution of the data. The data appear approximately normally distributed yet bi-modal around the center and one outlier

of 60. This distribution may make some of the mean based tests inappropriate to apply. Non-parametric tests may be more appropriate (e.g. K-S test). However, logistic regression is asymptotically valid and therefore a normal distribution of independent variable data is not required.

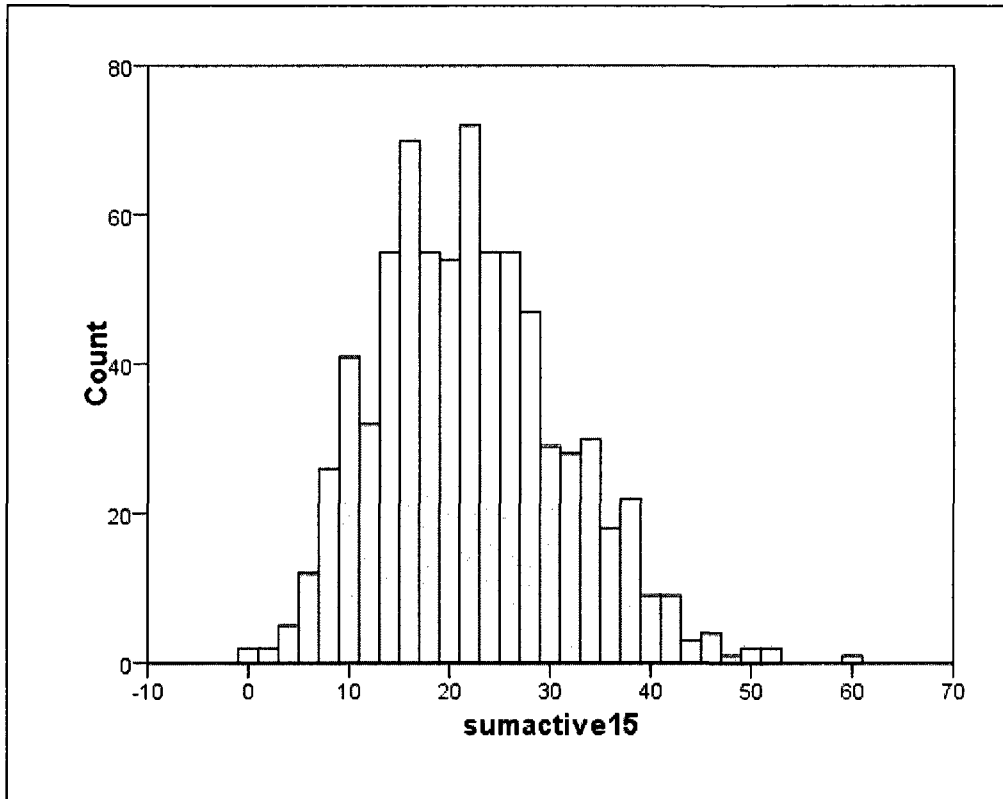


Figure 5. Distribution of social capital activities (sumactive15)

Independent Variable: Social Capital Trust

Eighteen of the trust variables from the Lamprey River Watershed Survey were incorporated from the Social Capital Survey (Putnam 2000). These too, like the social capital activities, were combined (by summing) into a variable sumtrust18. The items were recoded so that “trust them a lot” or “just about always” received a score of 3, “trust them somewhat” or “most of the time” was scored a 2, and “trust them only a little”, “trust them some of the time”, or “hardly

ever” was given a score of 1. The trust items included were: people in your neighborhood, people in your community, people at work, school administrators, local news media, places of worship, conservation commission members, planning board members, locally owned businesses, national/multinational businesses, University/Cooperative Extension specialists, town/local government officials, state agencies, and federal agencies. The maximum possible is 54 and the minimum is 0. The range for the sample is 0 to 50, with a mean of 25.7 (and SD 8.9). Table 54 shows the descriptive statistics for sumtrust18. The variable sumtrust18 is relatively normally distributed, but again, with bi-modal values that may skew results of means based tests (see Figure 6). Again, this is further support for the choice of the logistic regression analysis.

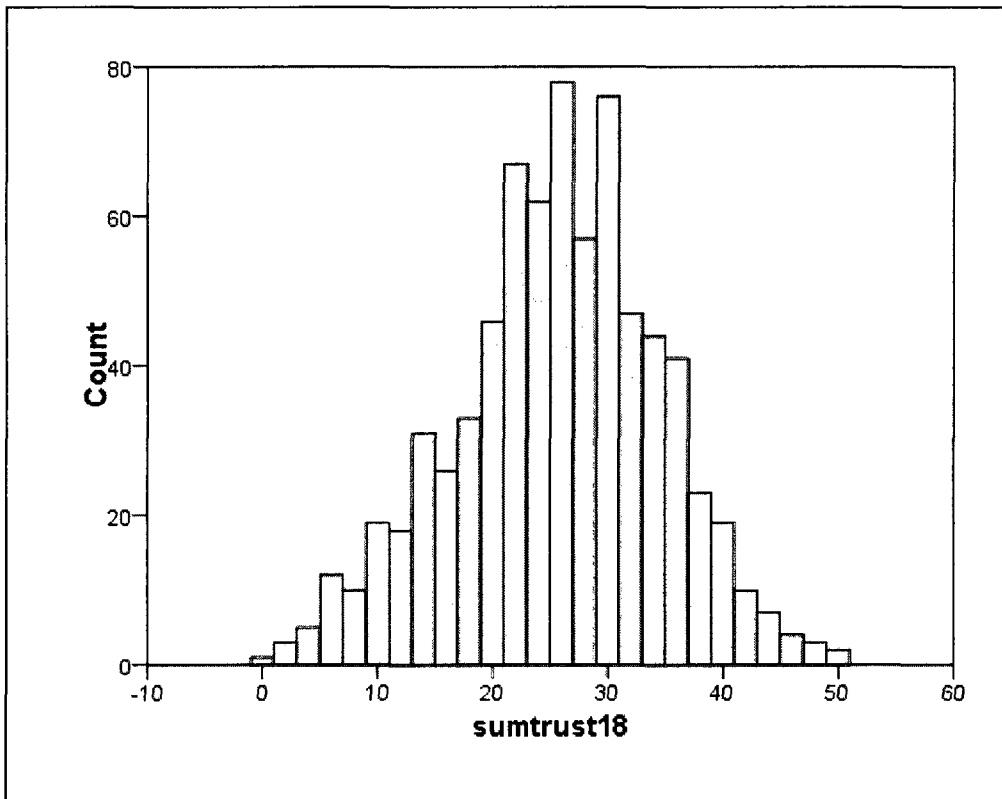


Figure 6. Distribution of social capital trust (sumtrust18)

Independent Variable: Environmental Behavior

Household environmental habits variables were also included in the analysis. There are 21 items for this summed variable: Use salt on the driveway or walkways in the winter; apply lawn chemicals/fertilizer; apply garden pesticides; water your lawn; water your garden/flowerbeds; change car oil at home; use low phosphate detergents; wash your car at home; dispose of dog poop in garbage or toilet; catch rain water to use around the house; use low-flow shower head; use low-flow toilets (1.7 gallon tank); check the septic system regularly; remove trees and shrubs near the septic system; store anti-freeze at home; participated in household hazardous waste day; send in water samples for testing; compost kitchen scraps, recycle cans, glass, or paper; use environmentally-friendly household cleaning products; participate in coastal clean-up events. Eight of the items were reverse coded in order to make all of the items high scoring for good environmental habits. The scores range from 0 to 2 with 1 being “seldom/some” and 2 being “often” engage in that environmental behavior. The highest possible value that could be scored on the environmental behavior scale is 42 and the minimum is 0. The range from the sample is 6 to 34. The histogram in Figure 7 shows a relatively normal distribution with a slight left skew (more positive values).

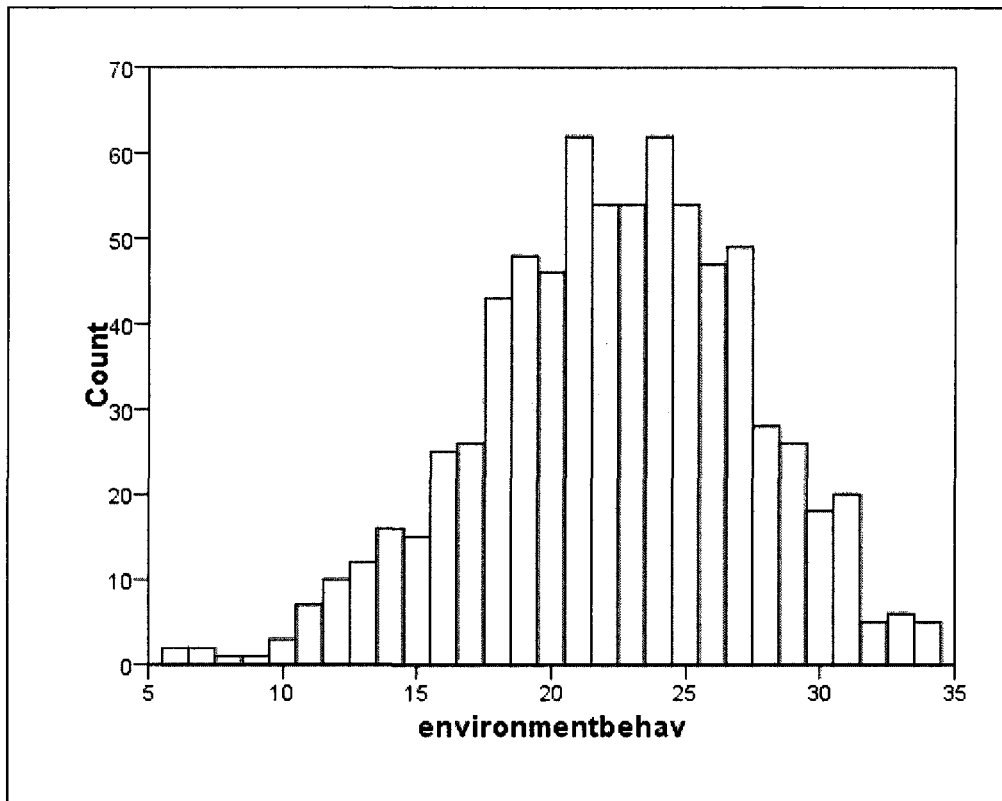


Figure 7. Distribution of positive environmental behavior (environmentalbehavior)

Independent Variables: Demographic Characteristics

The other independent variables of interest in the model are demographic variables that may better explain support for innovative land use techniques. Demographic variables such as family income, education, and political affiliation, are included and have been relatively well established in published research on environmental and community attitudes and behavior (Theodori and Luloff 2002). The variables, town2 (respondent's town) and lowerriver (upper versus lower watershed location) must be included in the model in order to determine if location is a factor in support for open space design. The Lamprey River Watershed Association Executive Director, Dawn Genes, believed that the lack of involvement from the upper watershed towns has to do with the lack of

knowledge and concern for environmental issues in that area (Genes 2006). The hypothesis is that location does matter and that the upper watershed towns are less aware and concerned with environmental issues and would therefore be predicted to not support open space design. Family income, along with education level, and political affiliation are categorical variables. It is hypothesized that the higher income levels lead to more support for open space design (nine levels of income from \$20,000 to \$400,000 or more); this is also the case for education—it is expected that as education level increases, support for open space design increases. The education variable was collapsed to three categories: high school education (1), some college (2), and 4 years or more of college (3). Finally, political affiliation, entered also as an ordinal/categorical variable, is on a five point scale from liberal to conservative. Political affiliation is expected to help explain support for open space design (liberal=1, moderate liberal=2, moderate=3, moderate conservative=4, and conservative=5). It is hypothesized that the more liberal a resident, the more likely they are to support open space design. There is common belief that the conservative platform advocates for a free market; a planning ordinance that would create the open space design development would involve government intervention to the free market which is generally more acceptable from the liberal platform.

Binary Logistic Regression Overview

Binary (or binomial) logistic regression allows the researcher to use categorical data as the dependent variable (two categories in this case, support

and no support for open space design), and independent variables in both categorical (family income, education level, political affiliation, town, and upper versus lower watershed) and interval scales (social capital activities, social capital trust, and environmental behavior). The binary logistic regression is used to determine the likelihood of group membership in one of two groups given a number of predictor variables. The analysis “attempts to model the odds of an event’s occurrence and to estimate the effects of independent variables on these odds” (O’Connell 2006, 41). Logistic regression allows for a transformation from probabilities (the probability of an outcome ranging between 0 and 1) to log odds (with a range from negative infinity to positive infinity). The log odds are exponentiated for the odds ratio (which is used for interpretation below).

In this research, the primary independent or predictors of interest are the two variables that make up social capital. These are social activities (Table 42) and trust (Tables 26 and 27). The primary hypothesis is that social capital helps predict support for open space design. Activities and trust are measured separately in this research to determine the strength of each on the outcome of support. The social capital concept is being reviewed by land use planners as a possible focus area for improved outcomes in land use planning (JAPA 2004).

In the language of logistic regression, the results will appear as the odds ratios of the likelihood of support for open space design given an additional (1) unit of the independent variable. The estimated regression model predicts the probability that the dependent variable takes a value of 1, based on a maximum likelihood estimation. The null hypothesis is that the findings will not be significant

at the $p < .10$ level concluding that the test of high social capital activities and trust leading to support for open space design fails. Another important variable of interest included in the model is environmental behavior. This variable is a measure of good environmental behavior so that a high score means good overall behavior towards the environment according to the items in the survey. The hypothesis is that good environmental behavior is a predictor of support for open space design. The null hypothesis is that environmental behavior will not be significant at the $p < .10$ level and therefore does not help predict support for open space design. The likelihood of supporting open space design based on these indicators may be instructive to land use planners to concentrate their efforts on projects that are more likely to increase social capital and further, good environmental behavior, because of their potential to increase community and environmental planning outcomes. The other predictors are demographic variables mentioned above in detail: family income, education level, political affiliation, town, and lower or upper watershed location.

The logistic regression works by transforming the dependent into a logit variable, which is the natural log of the odds of the dependent variable occurring or not occurring (Field 2005). (This presents a larger scale to the calculated odds in order to test for influences from the predictor variables). This method establishes the odds of predicting the dependent variable value, based on the observed values of the independent variables. The variables are added in one block in this analysis, instead of on a variable by variable, or block by block basis. This is recommended by Studenmund and Cassidy (1987) in Field (2005).

This is referred to as the “Forced Entry” method in SPSS 17 and based on the theory that all variables are entered into the model to test the theory that the full model is representative of the hypothesis, rather than stepwise, which would be testing for the value of the variable in the model as in exploratory research. While either method would apply here, for simplicity sake, the Entry method is applied indicating that social capital activities, social capital trust, environmental behavior, town, lower and upper watershed, family income, education, and political affiliation will explain support for open space design in the Lamprey River Watershed.

Binary Logistic Regression Results

Initially, two logistic regression models were run for comparison. In the first analysis, the dependent variable included only those grouped as “Yes” (those who support open space design) and “No” (those who do not support open space design). The “Don’t know” group was eliminated from the analysis. In the second analysis, the final, the dependent variable is grouped differently in order to include the “Don’t know” respondents with the “No” respondents. The results of the final model, with the combined No and Don’t know respondents, is reported here because of the number of cases that are allowed back into the analysis. The logic behind this decision is that this research is intended to distinguish support for open space design from all others (no and don’t know). However, future investigation with multinomial analysis may show that the Don’t know group and the No group are also different in their levels of support. The combined grouping

still resulted in a higher percentage of Yes responses in the sample (26 percent more) than No or Don't know responses (which is another important reason why the latter categories were combined).

The binary logistic regression analysis included 584 cases out of 768 (76 percent of the cases). Due to missing values in one or more of the variables of interest, 184 cases were eliminated from the analysis. (Future analyses could assess and set values for the missing items in order to increase the number of cases in the logistic regression.) The dependent variable, support for open space design includes two categories, "No and D/K" (coded 0, N=248); and "Yes" (coded 1, N = 336).

The first part of the analysis looks at the intercept-only model based on two decision outputs "No, D/K" and "Yes" (if none of the independent variables are included in the model). The intercept-only model correctly predicted 57.5 percent of the cases (336/548). The model also produced $\ln(\text{odds})=.304$, indicating there is a greater likelihood of support than non-support overall. The odds of .304 are considered moderate and difficult to interpret. By exponentiation, the odds ratio is generally easier to interpret, $[\text{Exp}(B)]=1.355$. This means that the predicted odds ratio of supporting open space design without the use of the independent variables is 1.355 ($336/248=1.355$). According to this intercept-only model, one could expect to find support for open space design 36 percent more often than non-support of open space design. This initial goodness-of-fit test holds all the coefficients at 0 and therefore the finding of significance here ($p=.000$) indicates that the null hypothesis that the intercept is 0

should be rejected. This is generally not a very meaningful analysis other than to highlight that there is a higher probability for a Yes response in the sample holding the independent variables constant. (Response bias can be problematic in questionnaires such as this if the majority of the respondents conform to the research intentions.) Continuing to explore the independent variables' affects should help clarify predictions and improve the model overall.

From the constant-only model to an all-independents model (using the Entry method) the chi-square goodness-of-fit tests the null hypothesis that this step is necessary to improve the model. Displayed in Table 55 are results of the Roa's efficient score statistic, a test of how significant the independent variables are that were not included in the intercept-only/null model. This initial test is used because it is more generous in its calculations than a Wald statistic. These results indicate that further model testing is appropriate—12 of the variables (or variable categories) are statistically significant at this initial state of the analysis: sumactive15, sumtrust18, environmental behavior, political affiliation (4 of 5 categories), education level (3 of 3 categories), family income (1 of 9 categories), and town (1 of 9 categories). The variables and variable categories that are not significant in this test will not prove to be significant in further model testing. However, some variables or variable categories may fall from significance in further testing. The variable regarding lower versus upper river watershed towns (a dichotomous variable) does not predict support for open space design, nor do several of the categories in the demographic variables. These are further discussed in the full model analysis.

Table 55. Roa's efficient score statistic

Variables	Roa's Score	df	Sig.
Sumactive15	17.716	1	.000
sumtrust18	11.947	1	.001
environbehavior	12.930	1	.000
politicaffil	28.405	4	.000
politicaffil(1)	2.802	1	.094
politicaffil(2)	15.522	1	.000
politicaffil(3)	.035	1	.852
politicaffil(4)	9.606	1	.002
edlevel3groups3	23.314	2	.000
edlevel3groups3(1)	10.042	1	.002
edlevel3groups3(2)	7.610	1	.006
famincome	7.596	8	.474
famincome(1)	.097	1	.755
famincome(2)	.942	1	.332
famincome(3)	.170	1	.680
famincome(4)	1.394	1	.238
famincome(5)	4.443	1	.035
famincome(6)	.110	1	.740
famincome(7)	.087	1	.768
famincome(8)	.047	1	.829
LowerRiver(1)	1.606	1	.205
town2	9.969	8	.267
town2(1)	.130	1	.718
town2(2)	.238	1	.625
town2(3)	.144	1	.705
town2(4)	5.383	1	.020
town2(5)	.224	1	.636
town2(6)	.087	1	.768
town2(7)	.676	1	.411
town2(8)	1.092	1	.296

The Omnibus Tests of Model Coefficients produces a Chi Squared of 85.011 (df=25; p=.000). The resulting Chi Squared value is statistically significant. This test of the null hypothesis determines that adding the

independent variables to the model have significantly increased the ability to predict support. The -2 Log likelihood statistic for the independent variable model is 711.274. This is a measure of how poorly the model predicts support for open space design (the smaller the statistic the better the model). In the original (intercept only) model, the -2 Log likelihood statistic was not produced in the output but can be computed by adding the Chi Squared of 85.011 to the -2 Log likelihood for the improved model (711.274) for a computed score of 796.285 (the -2 Log likelihood of the intercept only model). The smaller -2 Log likelihood score of 711.274 for the full model indicates that the statistically significant independent variables do help predict support of open space design. The smaller -2 Log likelihood statistic is an indication that more of the observations are explained and therefore predicted by this model.

Table 56 displays the independent variables model statistics. Included in this analysis are the Cox and Snell R^2 and the Nagelkerke R^2 measures. These statistics are attempts to explain how powerful these variables are in the model by how much of the variance is explained in the model (as done in OLS regression with R^2 and Adjusted R^2). However, with logistic regression and a categorical dependent variable, this is calculated in terms of the frequency distribution of the dichotomous dependent variable (varying from a 50-50 split leads to more variance in the model, yet it may also still be explained by the predictive model). In large samples, these statistics are often reported. Since the sample size is rather large (584 included cases), these statistics are presented. The Cox and Snell R^2 is .135 and while it is statistically significant, it is difficult to

interpret. The Nagelkerke R^2 attempts to allow interpretation of small Cox and Snell statistics by a transformation of the number to values that fall between 0 and 1 (similar to OLS R^2). This score of .182 does further support the finding of the statistically significantly reduced -2 Log likelihood score; the statistically significant variables within the model help predict support of open space design. These rather small statistics are common in social science research.

Table 56. Model summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	711.274	.135	.182

Another important test of the model goodness-of-fit is the Hosmer and Lemeshow Test. According to Field (2005) this is the most appropriate test of the logistic regression model. This test is more robust than the traditional Chi Squared Test. It is important to recognize that this test is not a test to determine how much variance is explained, but rather, it is a test of whether or not the model's predictions are different from what would be expected based on the odds of the data distribution among the dependent variable categories by the independent variable values. The Hosmer and Lemeshow Chi Squared Test of the model is 6.420, with $df=8$, and $p=.600$. This test divides subjects into deciles based on predicted probabilities; it then computes a Chi Squared Test from the observed and expected frequencies. The $p=.600$ ($df=8$) indicates that the logistic model is a good fit of the data. The null hypothesis is not rejected as there is no significant difference between the observed and the predicted model. In other words, this shows that the full model predictability is not different from the

observed data and therefore is a good fit to the data (again, non-significance on this test indicates a well fitted model).

The classification table (Table 57) displays the correct and incorrect estimates for the full model (independents and the constant).

Table 57. Classification table

Observed		Predicted		
		Support OSD		Percentage Correct
		No or D/K	Yes	
Step 1 Support OSD	No or D/K	132	116	53.2
	Yes	79	257	76.5
Overall Percentage				66.6

The columns present the predicted values, and the rows present the observed values, of the dependent variable. The model correctly predicted 53.2 percent (N=132) of the Nos/Don't knows regarding open space design. Out of 336 observed Yes responses, the model predicted 257 of them, or 76.5 percent. Wuench (2008) refers to these respectively as the "specificity" and "sensitivity" of prediction. Overall, the model correctly predicts 66.6 percent of the cases, or 389 out of 584 times.

The logistic regression model is used to estimate the independent variables' influence on support for open space design. The results are presented in Table 58. The Wald statistic is the ratio of the logistic coefficient to its standard error (the z statistic), squared. This is a more rigorous test of the variable's influence than the Roa's test used earlier and is appropriate for large samples. The Wald statistic tests the contribution of each predictor variable, holding constant all other independent variables. The corresponding significance level

shows the significance of each of the independent variables (dummy or covariates) in the model. The statistically significant variables are in bold text in Table 58. For this research, it is more important to show the support that exists and can exist for open space design than it is to be sensitive to the case of over reporting the results for support for open space design. Therefore, the preference here is to increase the risk of conducting a Type II error (essentially exaggerating the results) in order to reduce the risk of conducting a Type I error (missing statistically significant results). Results are acceptable by most standards, especially in social science research, at the .05 and .10 significance levels. While this reduces the rigor of the results and the associated power of the test, it is an acceptable standard held for this type of research. As stated earlier, the acceptance level of significance is $p=.10$.

Table 58. Wald statistic test of variables in the model

Variables in the equation	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Sumactive15	.029	.011	7.097	1	.008	1.029	1.008	1.051
sumtrust18	.028	.011	6.874	1	.009	1.029	1.007	1.051
environbehavior	.049	.019	6.405	1	.011	1.050	1.011	1.091
politicaffil			17.833	4	.001			
politicaffil(1)	.690	.343	4.049	1	.044	1.994	1.018	3.907
politicaffil(2)	1.003	.314	10.183	1	.001	2.728	1.473	5.052
politicaffil(3)	.523	.321	2.643	1	.104	1.686	.898	3.166
politicaffil(4)	.047	.300	.024	1	.876	1.048	.582	1.885
edlevel3groups3			10.773	2	.005			
edlevel3groups3(1)	-.761	.300	6.429	1	.011	.467	.259	.841
edlevel3groups3(2)	-.638	.223	8.181	1	.004	.529	.342	.818
famincome			8.454	8	.390			
famincome(1)	-.147	1.265	.014	1	.907	.863	.072	10.302
famincome(2)	-1.145	1.174	.953	1	.329	.318	.032	3.173
famincome(3)	-1.259	1.161	1.177	1	.278	.284	.029	2.761
famincome(4)	-1.238	1.154	1.151	1	.283	.290	.030	2.783
famincome(5)	-.860	1.153	.556	1	.456	.423	.044	4.056

Variables in the equation	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
famincome(6)	-1.334	1.146	1.355	1	.244	.263	.028	2.489
famincome(7)	-1.178	1.288	.836	1	.360	.308	.025	3.846
famincome(8)	-2.086	1.827	1.304	1	.254	.124	.003	4.459
LowerRiver(1)	-.180	.412	.192	1	.661	.835	.373	1.871
town2			8.558	7	.286			
town2(1)	-.049	.421	.014	1	.907	.952	.417	2.174
town2(2)	-.037	.423	.008	1	.930	.963	.420	2.209
town2(3)	.379	.408	.861	1	.353	1.461	.656	3.252
town2(4)	-.810	.456	3.152	1	.076	.445	.182	1.088
town2(5)	-.082	.414	.040	1	.842	.921	.409	2.075
town2(7)	-.136	.347	.153	1	.696	.873	.443	1.722
town2(8)	-.064	.426	.023	1	.880	.938	.407	2.159
Constant	-1.034	1.315	.618	1	.432	.356		

Of the 12 variables found to be significant in the first part of the analysis, one has been dropped following the Wald statistic test; the one category of family income, \$81,000 to \$100,000 compared to \$400,000 and up, does not differ on support for open space design. Eleven variables (or variable categories) are statistically significant following the Wald statistic test. These eleven statistically significant independent variable coefficients and their effects on support for open space design (a measure of innovative planning) are discussed in further detail below. These are sumactive15, the measure of social capital based on 15 activities (p=.008); sumtrust18, the measure of social capital based on 18 trust questions (p=.009); environbehavior, the measure of 21 positive environmental actions/behavior (p=.011); politic2, the measure of political affiliation has four of the five political categories as statistically significant from the conservative/reference category on support (p=.001, p=.044, p=.001, p=.104); edlevel3groups3, the measure of the amount of formal education is statistically significant for all three education groups (p=.005, p=.011, p=.004); and town2

shows that only one town, Nottingham, has a statistically significant coefficient different from Durham (the reference category). None of the nine categories for family income had statistically significant coefficients; nor did upper river towns versus lower river towns (Durham/Lee/Newmarket) produce any different outcomes on support. (In an early run of model testing, other independent variables were included but were not significant in the model. These were yearsintown, the measure of the number of years a resident has lived in the community, and propertytax, the measure of property taxes paid in the last tax year. They were eliminated in the final model to simplify the discussion of the effects of demographic variables.)

The B values in Table 58 are the values used in the logistic regression equation to predict support for open space design. These coefficients are in log-odds units and are used to predict the dependent variable (support or no support) from the independent variable's influence. The equation follows this format: $\log(p/1-p) = b_0 + b_1*x_1 + b_2*x_2 + b_3*x_3 + b_4*x_4$, etc. The estimated logistic regression equation for these data is as follows: $\log(\text{probability of support/probability of no/don't know support}) = -1.214 + .029*\text{sumactive15} + .029*\text{sumtrust18} + .049*\text{environbehav} + .690*\text{liberal} + 1.003*\text{liberal moderate} + 5.23*\text{moderate} + -.761*\text{high school} + -.638*\text{some college} + -.810*\text{Nottingham}$. This equation predicts support of open space design in the Lamprey River Watershed, however, this does not have much practical value for planners and policy makers. The use of odds ratios (generated from the coefficients which are in log odds) is generally more helpful.

The Exp(B), the odds ratios, column in Table 58 is used to interpret support for open space design. These numbers are the exponentiation of the B coefficient. Whereas the B coefficient is the parameter estimate for predicting each case based on the independent variable, it is difficult to interpret because it is in log odds. For example, for social capital activities (sumactive15) we could expect an increase of .029 in log odds of support for open space design with each one unit increase in social capital activities (holding all other independent variables constant). Exp (B), in this case is $e^{(.029)} = 1.029$, is the odds ratio (or the change in odds). An odds ratio that is equal to or extremely close to the value of one indicates that there is no significant influence of the independent variable on the dependent variable (it influences both groups equally). Odds ratios above 1.0 indicate a positive effect of the independent variable on the odds of the dependent variable (increased odds of supporting open space design). Finally, odds ratios below 1.0 indicate a decrease in the odds of the dependent variable (a negative effect from the independent variable on the support of open space design).

The coefficients of the three primary independent variables of interest in this study are found to be statistically significant, indicating that each contributes to the odds of support for open space design. The measure of social capital activities increases the odds of support for open space design by a small but statistically significant odds ratio of 1.029 ($p=.008$), meaning that for each additional one unit increase in social activities, the odds for support for open space design increases by a factor of 1.029, or by three percent (all other items

being held constant). An additional unit is one more social activity of the 15 listed in the survey. This finding supports the social capital activities hypothesis that the more social type activities a community member is involved in, the more likely they are to support this land use policy.

The measure of social capital trust also has an odds ratio of 1.029 ($p=.009$); it is statistically significant and indicates a small increase in odds of support. This equates to a three percent increase in the odds of support with each additional unit increase of trust. A unit increase in trust is one more increased level of trust in any of the 18 trust items listed in the survey. Similarly to the analysis above, if trust can be increased over time and through a variety of groups and organizations, both formal and informal, support for community policy does increase by a factor of 1.029, or three percent for each unit increase in trust (holding all other variables constant).

The measure of environmental behavior is also a positive contributor to support for open space design by an odds ratio of 1.050 ($p=.011$). This indicates that for each additional unit increase in environmental behavior, there is a corresponding positive, multiplicative effect of 1.050 on the odds of support for open space design. This is a five percent increase for each unit increase in positive environmental behavior (21 types listed in the survey) holding all other variables constant. This finding supports the hypothesis that positive environmental behavior corresponds to support for open space design.

Political affiliation was self-reported with a choice of liberal, liberal moderate, moderate, conservative moderate, or conservative. Categorical

variables in Logistic Regression must be reported by comparing two of the categories at a time. The comparison category here is conservative. The results indicate that political affiliation has a significant effect on support for open space design (all other variables are held constant). The odds ratio of 1.994 indicates that those who report themselves as liberal are two times as likely to support open space design as those who report themselves as conservative ($p=.044$). Somewhat surprisingly, liberal moderates are 2.728, or nearly 3 times as likely as conservatives to support open space design ($p=.001$). Those with politically moderate affiliations are barely statistically different from conservatives ($p=.104$) according to the standards set in this research. The odds ratio for moderates to conservatives in support for open space design is 1.686, meaning that moderates are 1.686 times more likely to support open space design than conservatives. Conservative moderates are not different from conservatives in support for open space design in this analysis.

Education level was recoded from nine to three levels, high school, some college, and four or more years of college. The collapsed categories helped with interpreting the results. The reference group for this categorical variable is the latter group, four or more years of college. Both other groups have statistically significant coefficients which differ from the reference group in support for open space design—both are less likely to show support. An $\text{Exp}(B)$ of .467 and .529 indicate that education levels at high school, and some college, lead to less likelihood of support for open space design compared to the group of four or more years of college. In other words, the odds of support decrease by a factor

of .467 as education drops from four or more years of college to high school level of education, and odds drop by a factor of .529 from four or more years of college to some college level of education. Those with a high school education are 63 percent less likely to support open space design and those with some college education are 47 percent less likely to support open space design. This does support the education hypothesis and confirm much of the literature on the topic of the positive effects of a four year degree on environmental attitudes and behavior, including support for measures related to such.

The town variable was not successful in discriminating support for open space development between towns except for the town of Nottingham, NH. All towns were compared to the reference town of Durham, NH, where there is a high percentage of educated residents, there are open views of the Lamprey River, and where the Lamprey River is designated a Wild and Scenic River by state and National standards. The significance level for this coefficient is $p=.076$ and again is acceptable by the standards set here. The odds ratio of .445 indicates that residing in Nottingham reduces the odds of support for open space design by 55 percent. Nottingham has undergone a barrage of development pressure in the past seven years, especially with a major industrial development proposal by USA Springs to extract 380,000 gallons of water a day. This created great concern in the community and a desire to stop all development. This is a critical issue for Nottingham and should be addressed following these research results.

Summary of Logistic Regression Results

The binary logistic regression model tested here moderately improves predictability of support for open space design in the Lamprey River Watershed from the intercept-only model of 57.5 percent, to the full model, predicting correctly 66.6 percent of the cases (76.5 percent of the Yes support cases, and 53.2 percent of the No/Don't know if support cases). The results maintain the theory that social capital, in the forms of social activities and social trust, do lead to a greater likelihood of support for the innovative planning technique of open space design in the Lamprey River Watershed. The finding of a relationship between these components of social capital and an important and controversial community level outcome is encouraging. As was expected, positive environmental behavior (21 self-reported items) also was an indicator of positive support (increased odds) for open space design. Political affiliation had the greatest influence on predicting support for open space design; liberals, moderate liberals, and moderates were far more likely to support open space design than conservatives and moderate conservatives. Education below a four year degree was also an indicator of reduced likelihood to support open space design. Further analysis should be to determine if there is an interaction between social capital and these demographic variables.

Confidence intervals are also presented in Table 58 (above). These provide upper and lower limits in the range of odds ratios for that variable 95 out of 100 times given the statistically significant coefficient. In 95 out of 100

samples, these results would be expected. These can help with an understanding of the range of findings in future sampling.

Diagnostics of the model are generally a major part of an analysis in logistic regression. The research at hand, the Lamprey River Watershed Survey, is exploratory in nature and conducted to discover relationships between the variables of interest. Complete diagnostics are beyond the scope of research intentions and results may be construed as implying more than what the survey data are capable of implying. The investigation is meant to be practical. That being said, the collinearity diagnostic (see Appendix 4) does not indicate a multicollinearity problem. Social capital activities, social capital trust, and environmental behavior load on different eigenvalues and they do not load on particularly small eigenvalues (see Field 2005, p. 260). The correlation tables are also included in Appendix 4. All of the correlations are weak (all less than .3). Again, while the diagnostics are not definitive here, it appears that there is not a major problem associated with multicollinearity.

The model results suggest that the supporters of such an innovative land use technique as open space design are more social, more trusting, more environmentally minded in their behaviors, more educated, and more politically liberal or moderate. It is also instructive to think of the non-supporters. The model suggests that this group is less active in community and less trusting overall. They are also politically conservative. Non-supporters also tend to have less than a four year college degree. The question then becomes, for the community and regional planner, how can these results be used to garner program, policy and

regulatory changes within the region in order to improve environmental and community outcomes? Public opposition to regulatory changes (such as the adoption of open space design regulations) can delay and eventually dissuade this type of development as the developer would rather invest less time in meetings and courtrooms and more time in construction work. It appears that innovative land use techniques, such as open space design, are palatable in the Lamprey River Watershed. Social capital is being considered within the planning field as a method to disseminate policy and regulatory changes throughout communities; social activities and trust in others, groups, and organizations, certainly can keep community members engaged in the process of community, and this is necessary in order to promote and support community level interests. In future analyses, the interaction between political affiliations and education levels should be examined more fully with the social capital activities and social capital trust variables. For example, do conservatives with higher levels of social capital activities and/or social capital trust support open space design more often than conservatives that do not? These answers may further highlight the strength of social capital in community level outcomes.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Study Purpose

The purpose of this study was twofold: to further the discussion of the value of the social capital concept in community and environmental planning, and to address the planning problems of the New Hampshire Lamprey River Watershed. This paper began with a discussion of a climate crisis and the need to reduce carbon dioxide levels in the atmosphere. According to research from the Brookings Institute, the Urban Land Institute, the Lincoln Institute of Land and Policy, Smart Growth America, and many others, sprawl creates an environment conducive to the continued production of carbon dioxide. Sprawl destroys the social, economic, and environmental structures of communities. The National Research Council conducted a meta-analysis of approximately 100 studies on sprawl and concluded that compact development would cut driving time, fuel use, and carbon dioxide emissions by as much as 11 percent (2009). The open space development design is a method to establish more densely built communities. This is not something that everyone supports. Many people still choose, and others have no choice, to live in areas which make them dependent on their automobiles. Many people hold to the premise that technology will solve the problems of land, air, and water pollution. But what technology will have a harder

time solving is the loss of larger expanses of open land, the loss of attachment to the environment as it degrades, and the loss of a sense of community as people spend more time in cars and unconnected to the places where they live.

The Lamprey River Watershed is a 212 square mile area of New Hampshire with valued natural resources being impacted by sprawl development. The Lamprey River Watershed Survey was an instrument designed to be spread widely throughout the region (with approximately 3,000 surveys distributed) in the hopes of gathering more than responses from the residents. According to Erik Smith, in a book published by the Lincoln Institute of Land and Policy, *Engaging the Future*, it is a planner's responsibility to "raise the regional consciousness to encompass the full geographic fact and intricate interdependencies" (Hopkins and Zapata 2007, 94). The survey was designed to aid in this deeper and broader connection between the residents, the resources, and the issues within the watershed. The data from the survey consists of 380 variables and 768 cases which may be used to continue to communicate with the public. These respondents indicate that they are environmentally conscious, socially active, and fairly trusting. At least one third of them support more regulations to protect land and water and 54 percent support the policy of open space design.

Social Capital and Open Space Design

Another primary goal of this research was to investigate the use of social capital in community and regional planning as requested in a series of articles in the 2004 edition of the *Journal of the American Planning Association*. The

measurement of social capital is complicated by the number of constructs involved in its definition (networks, bonding, bridging, linking, trust, and reciprocity). The measurement in this study was simplified to 15 diverse social activities and 18 diverse measures of trust. The results of the survey indicate that even with this simplified measure of social capital, there was a significant finding in its connection to a community level outcome of interest to planners (open space design). Involvement in social activities did lead to support for policy change. Specifically, the likelihood of support for open space design increases by 3 percent with each additional social activity (of 15 listed in the survey). Trust was also statistically significant in improving the odds of support for open space design. The likelihood of support for open space design increased by 3 percent with each additional unit of trust (on a 0 to 3 scale).

Social capital is the collective connections between individuals and groups which transpire into both individual and collective gains. The collective gains are what community and regional planners pursue and believe are more likely to transpire if social capital exists. Michael Neuman, also a contributing author to *Engaging the Future*, refers to a "planning culture" as "a composite of social, political, institutional, and place cultures, in which the multiple practices of planning occur" (Hopkins and Zapata 2007, 155). Woolcock, Briggs, and Rohe, among others, suspect that social capital is most critical in creating a planning culture (Hutchinson and Vidal 2004). The presence of social capital means that individuals experience the benefits of a community and look beyond present and self-interest to community and future interest (Myers 2007, 59). Vidal calls social

capital the “bread and butter” to environmental and community planning (2004, 167). The productive engagement of community members creates social capital that is the fuel for active democracy.

As planners work to engage community members in a continuous planning process to address an ever changing environment, social capital appears to provide parsimony to the task. The presence of social capital can improve public hearings from spouting places to productive discussions for community outcomes. Therefore, the creation and nurturing of social capital should be a priority in sustainability initiatives. An investment in social capital means that resources can be directed toward creating places, programs, and events that are conducive to the development of more and better social capital; which means that it is more inclusive and more directed at community level outcomes. Social capital, like financial capital, is the stored energy that when necessary, can be called upon to act for a collective good. Without this stored social capital, individual interests as well as groups which may be exclusive may prevent community interests from being met. Planners may need to distinguish between social capital and community social capital in order to capture the idea that the social capital needed for community improvements is broad in its reach and community focused in its outcomes.

Positive Environmental Behavior and Open Space Design

Another relationship of interest in this study is the practice of positive environmental behavior and support for open space design. Residents of the

survey reported to being involved in a number of positive environmental behaviors from a list of 21 included in the survey. As was expected, positive environmental behavior improved the odds of support for open space design. Holding all other variables constant, each additional positive environmental behavior led to a 3 percent increased odds of support for this innovative land use technique. Efforts should continue to be directed at programs which remove barriers and provide incentives to positive environmental behavior. The benefits of increasing positive environmental behaviors are at least twofold: immediate improvements are made at the household level, as well as the potential of increased likelihood of support for other planning initiatives.

Demographic Variables and Open Space Design

A number of demographic variables were examined to determine their relationship on support of the open space design policy. Findings indicate that political affiliation and education level are related to the odds of support for open space design. Those who distinguish themselves as conservatives are 1.5 to 3 times less likely to support open space design. This is an important finding yet falls outside of the realm of the planning profession's reach. For one who may adhere to the conservative platform, the immediate response to a question regarding support for government intervention of any kind is more likely to be negative. The planning profession can continue to deliver well balanced information which encourages individuals to make decisions based on the information before them. Having less than four years of college also reduced the

odds of support for open space design, and similar to the political affiliation explanation, can possibly be addressed with improved access to balanced information. It may also be possible that social involvement and social trust mitigate some of these effects of political affiliation and education and should be tested in further studies. Family income, property taxes, and location by upper and lower river designations did not discriminate between support and not support for open space design.

Planning in the Lamprey River Watershed

While trying to focus on a regional perspective in this study, town level analysis was less important. However, in testing the town variable in the logistic regression model, Nottingham, NH, was statistically different from the other communities in the watershed. Just coming off of its long battle with USA Springs Bottling Company, Nottingham residents may be less likely to support any form of development at this time—good development patterns included. Nottingham should be a special area of focus for local and regional planners as this is still a hot topic in the community. This would include education efforts about open space design and how to prevent damaging results from development at the regional level, and using the Nottingham case as an example. The bankrupt USA Springs bottling company had stalled development until recently when it was revived through a purchase by Martini and Rossi. By tapping into the social networks of Nottingham, as well as all the other communities in this region, action can be directed to support policies and regulations for planned

development patterns which preserve critical habitat and water resources while encouraging buildings to be appropriately placed and constructed.

The Lamprey River Watershed communities can be strengthened by the continued efforts of regional/watershed level planning. The first comprehensive river basin management program was demonstrated in 1933 when the Tennessee Valley Authority was created by Congress as a public corporation to manage regional (interstate) development. This was strictly a new layer of government whose responsibilities included dam construction for power and flood control as well as programs for soil erosion, reforestation, economic development, housing, schools, and recreation (White 1969; Platt 2004). Over the years, there have been many forms of regional planning, from regional land use, conservation programs, to transportation planning with metropolitan planning organizations. According to Koontz and Johnson (2004), the makeup of the various groups of stakeholders (government, organized groups, and residents) engaging in dialog regarding management of regional environmental resources does make a difference in the outcomes. In their study of 69 watershed groups in Ohio, they found that narrower group membership was more likely to result simply in requests to government for policy changes. They found that when there was broader level inclusion, these groups “excelled in watershed plan creation, identification and prioritization of issues, and group development and maintenance” (2004, 185). These results were statistically significant at $p < 0.000$ (2004, 192). While government policy changes are necessary components to resource protection, policy changes alone take time

and then must be followed by regulatory changes and financial backing. Conversely, the latter, broad level stakeholder involvement, can produce a myriad of measures (plans, programs and projects) which are more encompassing and likely to protect resources in both the short run and long run. Further, a number of communities coming together under one entity for regional management can be much more efficient with adherence to one overall plan and set of regulatory guidelines.

Massachusetts enacted the Cape Cod Commission in 1990 as a regional planning agency for 15 communities on Cape Cod (similar in size to the Lamprey River Watershed). Massachusetts and New Hampshire residents have long histories in valuing local authority over regional, state and federal governments. Yet after years of struggling with impacts related to the lack of coordination between communities on Cape Cod, the Cape Cod Commission was established for “preparation of a regional land use plan and the regulation of proposed development that has regional impacts” (Salkin 2004-2005, 91). If a permit is denied by the Commission, no other community may approve it (Salkin 2004-2005, 92). It is possible that this type of structure could work for the Lamprey River Watershed in that new boundaries are recognized by residents and landowners and broader level goals can be understood. By increasing the watershed level mentality, social capital can develop at this level as well.

Three NH regional planning commissions have communities in the Lamprey River Watershed: Southern New Hampshire Planning Commission, Rockingham Planning Commission, and the Strafford Regional Planning

Commission. The Lamprey River Watershed Association was created in 1980 as a nonprofit volunteer organization with the mission of coordinating efforts in protecting and conserving the resources in the watershed. It has continued to be successful in its work to protect resources with the help of the regional planning commissions, the NH Office of Planning and Energy, and the NH Department of Environmental Services. However, it may be that the Lamprey River Watershed Association needs to take on a greater role involving policy on construction and development patterns in the watershed in order to better protect the resources.

Research by Jules Pretty in, *Social Capital and the Collective Management of Resources*, shows that “some .4 to .5 million groups have been established since the early 1990s for watershed, forest, irrigation, pest, wildlife, fishery and microfinance management” (2003, 1912). Koontz and Johnson demonstrated that when government entities were part of networks in watersheds, research and science were more likely incorporated into the decision making and outcomes (2004, 192). A broad level of involvement in the Lamprey River Watershed will better assure its protection overall. The primary recommendation from these results is for efforts to be made to strengthen and use the social network in the Lamprey River Watershed for policy support to protect the watershed. This network should include government, organized groups, and residents. The Lamprey River Watershed Association, the regional planning commissions, state government, and local government and land use boards, form the formal network in the watershed. The residents of the Watershed are an important stakeholder group that should be included

continuously in this network. The work of the Lamprey River Watershed Association, as well as other research and outreach projects, enable the network to be productive. The residents of the Lamprey River Watershed are part of this network and they are an engaged, educated, and supportive group of residents who are willing to support innovative land use in their communities.

If a social capital focus for planners can lead to more support for community planning efforts, planners may find themselves spending more time developing programs and arranging activities to pull people out of their cars and homes and back into community events. An example of this is found in a newly formed program, Encorp Leadership, which targets Maine residents aged 50 and up to train to become smart growth advocates in their communities. The program is free of charge and will train 150 to 200 residents a year about smart growth techniques and how to become an advocate for these techniques in Maine communities. Following the training, these members go back into their communities and host events and programs to pass the smart growth messages on to their other residents. The Lamprey River Watershed Association and the regional planning commissions might consider the same type of program for the Lamprey River Watershed region. This would involve identifying the supporters of open space design, training them on the various smart growth measures promoted by the state of New Hampshire, and sending them back into their communities to work with their planning departments, land use boards, neighbors, and other important stakeholders on projects and programs that support measures such as clustered development patterns over sprawl.

This research has shown that supporters are socially active, trusting, environmentally minded citizens who by that alone give them credibility to conduct this type of work in their communities. Regional planners and current volunteers could use the help in spreading the word about how development should take place for an improved future. Concentrating on efforts to improve interaction of community members within their communities will improve support for open space design.

The Lamprey River Watershed can be visualized in the future as a place with less sprawl and more “village” clusters, mixed use downtowns, thus leaving larger areas of undeveloped property for wildlife to roam and water to filter through plant materials for cleansing and recharging of aquifers for cleaner water for the residents and wildlife of the Lamprey River Watershed. This vision may be promoted by a formal, recognized network, such as the Lamprey River Watershed Association, and an engaged resident population within the network.

Summary of Recommendations

1. Efforts should continue to be made at a watershed level for continued strengthening of the networks which can further unifying policy and regulatory changes.
2. Social capital should be considered an important goal in community and environmental planning.

3. Planners should be trained in social capital theory and methods for measuring, monitoring and improving social capital.
4. Beyond planning for social activities, planners should get involved in the social activities too in order to be in the network and to gain the public's trust.
5. Social capital building exercises should be wide-ranging opportunities, volunteer opportunities, and not more work (see Table 43 for obstacles to becoming involved in planning).
6. Activities should incorporate opportunities to build trust between members of the community, levels of government, and organizations (see Table 28 for a summary of levels of trust in the Lamprey River Watershed).
7. Use existing public support to pass regulations to protect land and water (see Tables 23 and 24).
8. Use existing support to promote open space design adoption at the watershed level.
9. Garner support from residents for planning initiatives overall by using social events to present planning issues and to make connections with stakeholders, and to understand and tap into existing social networks for support.
10. Build communities to proliferate social capital: Plan for compact developments that prevent sprawl and encourage walking; build neighborhoods allowing residents to interact others; build public spaces to provide places for the public to gather and be part of the broader

community; create downtown developments to prevent sprawling strip malls; encourage mixed use to improve opportunities for affordable housing, to keep young adults in the area, and to help retain businesses; plan for public events to allow community members to interact, exchange information, and confirm or reaffirm connections to others and the community.

11. Continue to communicate with residents through multiple sources, especially the preferred community newsletter (see Table 45). The Lamprey River Watershed Association may use a template to include individual community information to each town while still regularly delivering watershed level information which needs to be presented to the broader public.

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APPENDICES

1. Survey Instrument



*October is National Community Planning Month
This questionnaire is a way for planners in your region to
use information from you and other residents in planning for
the future.*

Your participation is important and it will be fun!

The Lamprey River Watershed Survey:

What residents are doing and thinking about in their communities.

Hello! My name is *Mary Robertson*. I am an instructor of community planning at the *University of New Hampshire* and currently conducting research on watershed planning. **You have been identified as a resident of the Lamprey River Watershed!** The Lamprey River Watershed consists of land and water within thirteen communities that (eventually) drain into the Lamprey River and then further into the Great Bay. The purpose of this study is to gather input from residents and property owners that can be used by planners to determine how to plan for the future. The *University of New Hampshire Water Resource Research Center* and the *Cooperative Institute of New England Mariculture and Fisheries* helped sponsor this survey.

You, along with 2,999 other residents, were randomly selected from a list of residents. The questionnaire asks you to share information about your activities and opinions regarding community resources. Your answers to the survey questions will be **completely confidential**. The data will only be presented in combined formats so that names and addresses can not be associated with answers to the questions.

Please take the time now to complete the survey. There is a pen in the envelope so that you don't have to hunt around for one in order to get started. There is also a **self-addressed and stamped envelope** so that you can get it back to me as soon as you are done.

As a thank you for participating in the survey, Jim Houghton, owner of Houghton/Ace Hardware stores, has donated a **20 % off coupon** to each survey participant. Please be sure to use it before the expiration date. It may be redeemed at the Durham, Lee or Newmarket locations.

I thank you most sincerely for your participation. I look forward to presenting the findings from this survey in local newspapers, on our website, and with your local officials. The information will help us design communities with you in mind and I'm sure you will enjoy knowing that you took part in that. If you have any questions, please contact me at the address, phone, or e-mail listed at the bottom of this letter. Also, Julie Simpson from the UNH Office of Sponsored Research may be contacted for questions regarding the protection of human subjects (862-2003).

Best regards,

Mary Adamo Robertson
University of New Hampshire
312 James Hall
Durham, NH 03824

Phone: 603-862-4456

e-mail: mary.robertson@unh.edu

**This is a way to be involved
in your community.**

**Please take the time now to
complete the survey.**

Thank you!

The Lamprey River Watershed Study: A watershed is an area of land where all water from the area drains into a stream, river, lake or other water body. The Lamprey River Watershed is one of several watersheds that drain into the Great Bay. As water travels across lawns, farm fields, roads, and parking lots, it picks up pollutants, referred to as non-point source pollution. The way we use our land is linked to the quality of our water in the watershed.



Confidentiality! Responses to the questions will not be associated with names or addresses. You have been chosen for this survey because the Lamprey River, or one of its tributaries, is in your town.

Thank you for participating in the survey. Its purpose is to help land use planners and water resource managers design programs and policies that reflect what residents are thinking about and doing in their communities. All of these answers will help us understand where there are problems and how we may go about solving those problems.

What is your main source of water at home, and do you filter or soften your water?

Check all that apply:

- A private well on my property
- A shared well with two or more households/buildings in a subdivision
- A public (town/city) water system
- Purchase bottled water
- Home water filtering system
- Home water softening system



How is waste water disposed of at your home? Check and answer all that apply:

- A septic system, which is _____ years old, and cleaned every _____ years.
- A shared septic system with two or more households/buildings in a subdivision
- The public (town/city) sewer system



In general, do you think that water pollution is a problem in these following locations? Check your answers in these boxes:

Location:	Yes, it is a problem	No, it is not a problem	I don't know if it is a problem
The United States	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Atlantic Ocean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Great Bay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Lamprey River	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your drinking water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Do you think the water quality in the Lamprey River Watershed is good enough for fishing and swimming?

Swimming _____ Yes _____ No _____ Don't Know
 Fishing _____ Yes _____ No _____ Don't Know

"Surface water" is the water you can see on the surface of the land. Do you think the surface water in the Lamprey River Watershed is good enough for drinking?

Surface water with treatment _____ Yes _____ No _____ Don't Know
 Surface water without treatment _____ Yes _____ No _____ Don't Know

"Ground water" is the water beneath the land or bedrock. Do you think the ground water in the Lamprey River Watershed is good enough for drinking?

Ground water with treatment _____ Yes _____ No _____ Don't Know
 Ground water without treatment _____ Yes _____ No _____ Don't Know

Overall, how would you rate the quality of the water in the Lamprey River Watershed?

Very polluted	Polluted	Clean	Very clean	I don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

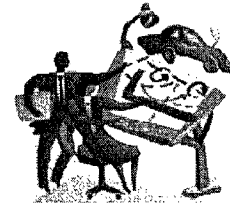
Overall, how would you rate the quality of the water in the Atlantic Ocean?

Very polluted	Polluted	Clean	Very clean	I don't know
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you think the quality of the water in the ocean can impact your or your family's health?

_____ Yes _____ No _____ Don't Know

Do you think that what you or your family do on your land can impact the quality of the ocean water? _____ Yes _____ No _____ Don't Know



How important do you think the planning board's work is in your community?

Not At All Important	Not Very Important	Somewhat Important	Important	Extremely Important
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How familiar are you with the planning board's work in your community?

Not At All Familiar	Not Very Familiar	Somewhat Familiar	Familiar	Extremely Familiar
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

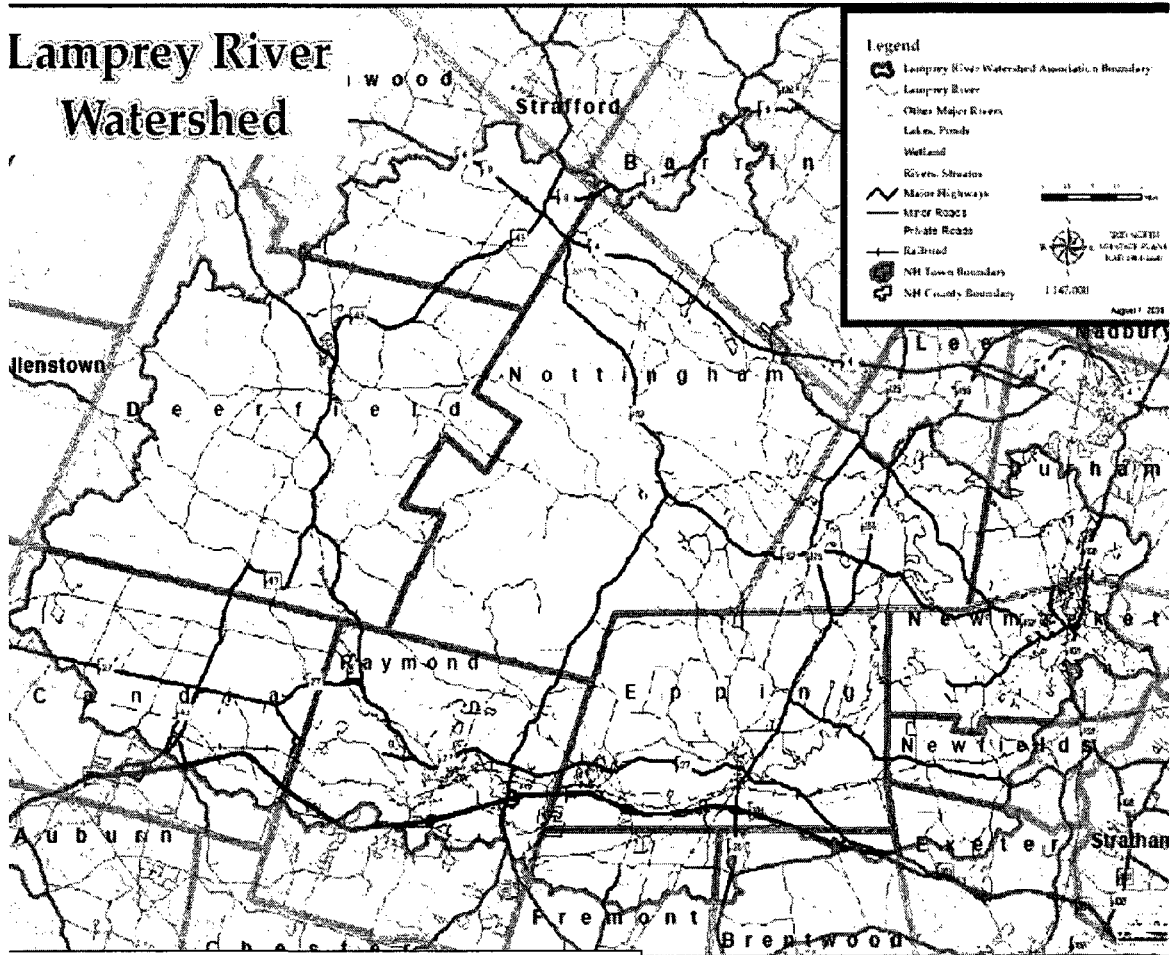
Here is a map of the Lamprey River Watershed area. How should we develop, or protect, the area? Please draw the following symbols on the map:

Draw **(X)** to show approximately where you live.

Draw **(C)** to show places where commercial development should be located.

Draw **(H)** to show places where housing development should be located.

Draw **(P)** to show places that should be protected from development.



Map provided by the Strafford Regional Planning Commission, Dover, NH



Various household and recreation activities are listed in these two tables. Please indicate how often you participate in these activities:



Household Activities	Never	Seldom	Often	Does Not Apply
Use salt on driveway or walkways in the winter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply lawn chemicals/fertilizer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apply garden pesticides	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water your lawn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water your garden/flower beds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Change car oil at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use low phosphate detergents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wash your car at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dispose of dog poop in garbage or toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catch rain water to use around the house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use low-flow shower head	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use low-flow toilets (1.6 gallon tank)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check the septic system regularly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remove trees and shrubs near the septic system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Store anti-freeze at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participated in household hazardous waste day	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Send in water samples for testing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Compost kitchen scraps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recycle cans, glass, or paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use environmentally- friendly household cleaning products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participate in coastal clean-up events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Natural Resource Recreation Activities	Never	Seldom	Often	Does Not Apply
Use a boat on the Lamprey River or its tributaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sail, canoe, or kayak in New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Use a motor boat in New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go shell fishing in New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go fishing in salt water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go fishing in fresh water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Go hunting in the county	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Take walks or bike rides in town	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hike in the woods or mountains in New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swim in a lake or river in New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swim in the Lamprey River or its tributaries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swim in the Ocean or the Great Bay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Generally speaking, how much do you think each of the following items contribute to a water pollution problem in your watershed?

Potential Sources of Pollution	Does Not Contribute	Slightly Contribute	Medium Contribute	Strongly Contribute
Parking lots	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Geese, ducks, birds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Litter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home lawns and gardens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dog poop	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home septic systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agriculture runoff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gas stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Illegal dumping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air conditioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Automobiles and trucks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Construction activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burning fuel for heat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste water treatment facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Livestock waste	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landfills/garbage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The University of New Hampshire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of trees and plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boats	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Population growth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Florescent light bulbs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Prescription drugs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cigarette butts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Are there certain pollutants or threats to your or your family's health that you are especially concerned about? NO YES

If YES, list those pollutants or threats here and explain why you are concerned?



Two major contributors to water pollution are stormwater runoff and septic system failure. Stormwater runs over land and paved areas (such as roads) and picks up pollutants (fertilizers, road salt, sand, automobile fluids, bacteria, and metals – to name a few!) Many storm drains discharge directly to surface waters without going to a waste water treatment facility. Septic system failures can also lead to pollutants seeping into waterways. These systems may go for years without notice that there is a problem. We know that improvements to stormwater systems and to septic systems will reduce water pollution but will also cost money.

How should the cost of upgrading these systems be split among the following groups? Show what percentage (%) out of 100% should be paid by each of these groups:

Percentage of costs for upgrading Stormwater Systems:	
Property Owners	_____ %
Town/City	_____ %
County	_____ %
State	_____ %
Federal	_____ %
Other()	_____ %
Total	= 100 %

Percentage of costs for upgrading Septic Systems:	
Property Owners	_____ %
Town/City	_____ %
County	_____ %
State	_____ %
Federal	_____ %
Other()	_____ %
Total	= 100 %



What would you be willing to do to improve water quality in your community?

Check all that apply:

<input type="checkbox"/>	Support a tax to help pay for water quality improvements (such as storm water systems)
<input type="checkbox"/>	Volunteer on a local board to help make these decisions
<input type="checkbox"/>	Support local government to purchase land for conservation
<input type="checkbox"/>	Follow rules about regular septic system management
<input type="checkbox"/>	Support controls for building permits in town
<input type="checkbox"/>	Support dense development in some areas in order to preserve other areas
<input type="checkbox"/>	Attend meetings with neighbors to discuss community issues
<input type="checkbox"/>	Attend regional planning meetings
<input type="checkbox"/>	Attend town planning board meetings
<input type="checkbox"/>	Volunteer to do water quality sampling
<input type="checkbox"/>	Support expenditures for the preparation of long-range planning
<input type="checkbox"/>	Support expenditures to implement projects to protect water quality
<input type="checkbox"/>	Join a local water conservation group
<input type="checkbox"/>	Support controls on water usage
<input type="checkbox"/>	Catch and use rain water for car washing, watering lawns and plants, etc
<input type="checkbox"/>	Limit the use of fertilizers and pesticides
<input type="checkbox"/>	Completely stop using fertilizers and pesticides
<input type="checkbox"/>	Support management of ocean resources



These are problems that can exist in a community. Is this a problem in your community? If so, how concerned are you?



Please check your answers in these boxes for each community problem:

Community Problem	No, this is not a problem	I am Somewhat Concerned	I am Concerned	I am Extremely Concerned	I Don't Know
High property taxes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overcrowded schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of open lands to construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of local jobs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High cost of housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increase in population	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rising energy costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of recreation opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Traffic congestion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of a sense of community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of safe walking or biking paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of access to water for recreation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garbage/refuse management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Poor condition of roadways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town running out of water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How the town/city looks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Privacy at your home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How your neighborhood looks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of public transportation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of businesses in town	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of skilled community leaders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of long-range planning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of quality education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crime and vandalism in town	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Long commutes to work or shopping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Controlling the budget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of affordable housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



If local officials asked everyone to conserve water or electricity because of some emergency, how likely is it that people in your community would cooperate? Check one:



Not Very Likely
to Cooperate

Likely to
Cooperate

Very Likely to
Cooperate

Don't Know

How important is it to you to have the following in your community?

	Very Important	Important	Not Important	Don't Know
Farmland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Downtown businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public transportation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your workplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Affordable housing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parks/Open spaces	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Safe walkways	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public meeting space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clean drinking water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water for recreation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Views of open water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Keeping in mind that you usually pay higher property taxes with more land, which of the following would you prefer to live on?

1/2 acre lot 1 acre lot 2 acre lot 3 to 9 acre lot 10 or more acre lot

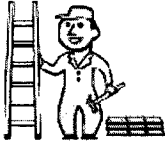
Overall, how would you rate your community as a place to live?

Excellent _____ Good _____ Only Fair _____ Poor _____

Do you expect to be living in this community in 5 years?

Yes _____ No _____ Don't Know _____

Is there a place where you would prefer to live? If so, where, and why would you choose to live there?



There have been discussions in many towns about changing land use regulations to require buildings to be built closer together in order to reduce costs of materials for roads and utilities and to also preserve larger tracts of land for open space. This is sometimes called "open space development"

In general, do you support this development idea?

Yes No Don't Know

Do you think water quality in the Lamprey River Watershed can be improved by this type of development idea?

Yes No Don't Know

Do you think water quality in the ocean can be improved by this type of development idea?

Yes No Don't Know

Please write here any comments that you may have about the advantages or disadvantages of this type of development:



Do you think the land use laws/regulations designed to protect water are too restrictive, not restrictive enough or just about right?

Just: about right Too restrictive Not restrictive enough Don't Know

Do you think the land use laws/regulations, in general, are too restrictive, not restrictive enough or just about right?

Just: about right Too restrictive Not restrictive enough Don't Know

This next section deals with the social parts of your community:

What kinds of things make you feel like you are part of a community? Check the items in this list that make you feel like you are part of your community.



Check all that apply:

- | | |
|--|--|
| <input type="checkbox"/> Friends | <input type="checkbox"/> Family |
| <input type="checkbox"/> People in the neighborhood | <input type="checkbox"/> Just by living in the community |
| <input type="checkbox"/> Place of worship | <input type="checkbox"/> Owning property in town |
| <input type="checkbox"/> People at my work | <input type="checkbox"/> The schools |
| <input type="checkbox"/> Activities in the community | <input type="checkbox"/> People that work for the community |
| <input type="checkbox"/> Volunteers of the community | <input type="checkbox"/> The landscape and natural resources |
| <input type="checkbox"/> Opportunities to get involved | <input type="checkbox"/> Other: _____ |

Generally speaking, how much do you trust different groups of people that may be involved in some way in your community? Check the appropriate box:



Trust →	Trust them a lot	Trust them somewhat	Trust them only a little	Don't trust them at all	Don't know or does not apply
People in your neighborhood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People in your community	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
School administrators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local news media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Places of worship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conservation Commission members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Planning Board members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Locally owned businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National/multinational Businesses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
University/Cooperative Extension specialists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town/local government officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State Agencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Federal Agencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How much of the time do you think you can trust government to make good decisions?

Trust →	Just about always	Most of the time	Only some of the time	Hardly ever	Don't know
Local government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
County government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
State government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Federal government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people? Check one:

- People can be trusted You can't be too careful Depends Don't know



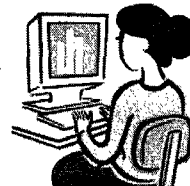
Were you involved with any groups that took local action for social or political reform in the past 12 months? ____ Yes ____ No

Did you serve on a committee for a local club or organization in the past 12 months? ____ Yes ____ No

How many days in the past week did you read a newspaper? ____ days per week.

How many hours a day do you spend watching television on an average weekday, that is Monday through Friday? _____ hours per day.

How many hours do you spend using the Internet or e-mail in a typical week, not counting the times you do so for work? _____ hours per week.



How interested are you in politics and national affairs?



Very interested	Somewhat interested	Only slightly interested	Not at all interested	Don't know
_____	_____	_____	_____	_____

Are you currently registered to vote? ____ Yes ____ No ____ Don't Know

As you may know, around half the public does not vote in presidential elections. How about you – did you vote in the last presidential election, 2004, between George W. Bush and John Kerry?

____ I did vote ____ No. I skipped that one ____ I don't vote ____ I'm not a U.S. citizen



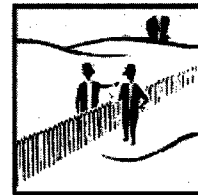
Overall, how much impact do you think people like you can have in making a community a better place to live?

- _____ No impact at all.
- _____ A small impact.
- _____ A moderate impact.
- _____ A big impact.

Think about your neighborhood, or the 10 to 20 houses that are closest to you. About how often do you talk to or visit with these neighbors?

Check one:

- Just about everyday Several times a week
 Several times a month Once a month
 Several times a year Once a year or less
 Never Don't know



Close friends or family members are people that you feel at ease with, can talk to about personal matters, or call on for help. How many close friends or family members can you discuss important matters with?

- No close friends or family One or two
 Three to five Six to ten
 More than 10 Don't know

Please estimate how many times in the last 12 months you did the following?

How many times? →	Never	One time	2 to 10 times	12 times	Once a week	More than once a week
Attended a celebration, parade, local sport or art event in the area	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taken part in artistic activities with others (such as singing, dance, or acting with a group)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended a child's sport event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participated in a sports event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended a club meeting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Visited with relatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Had friends over to your home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Played cards or board games with others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended a self-help or support group	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Socialized with coworkers outside of work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attended a meeting about town or school issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recreated with friends or family in the outdoors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Participated in on-line discussion over the Internet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volunteer for a non-profit organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volunteered for a community project	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Many obstacles keep people from becoming involved with their community. Thinking about your own life, are there obstacles or barriers that make it difficult for you to be as involved with your community as you would like, or not? Check how important these obstacles are for you:

Obstacles to community involvement:	Very important obstacle	Somewhat important obstacle	Not an important obstacle	Don't know
An inflexible or demanding work schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of childcare available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of transportation available	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling unwelcome	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concerns for your safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of information on community issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling that you can't make a difference	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not knowing how to get involved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Afraid that it will be more work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potential conflicts with people	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Feeling it would be a waste of time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It isn't any fun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What do you think are the main reasons people do not participate in community decision making? Write your answer here:



How likely is it that you will be involved in some community related activity in the next year? Check one:

___ Very Likely ___ Likely ___ Not Very Likely ___ Don't Know

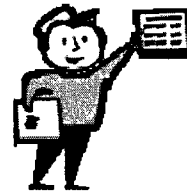


A number of potential sources of information are listed below. Please indicate how often you use each of these to find out about community issues:

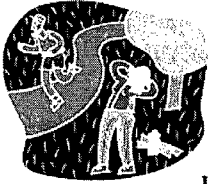


Sources of Information	I use this frequently	I use this sometimes	I don't use this at all	This is not available to me
Kids bringing news from school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newspapers or magazines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Attending meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Neighbors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public officials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Annual town meeting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The community master plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local public hearings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UNH Cooperative Extension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People at my work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Environmental groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work-related publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Retail stores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Community newsletter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

How would you prefer to get information on community related issues?



How would you prefer to participate in community related issues?



You are almost done...here are some questions asking about you!



Please check if you do these things daily, never, or write in the number of times a week you typically do the following:

I exercise at least 30 minutes...	___ Never	___ Daily	OR	___ Times a week
I eat out at a restaurant...	___ Never	___ Daily	OR	___ Times a week
I buy/eat organic food...	___ Never	___ Daily	OR	___ Times a week
I buy/eat fresh fruit and vegetables	___ Never	___ Daily	OR	___ Times a week
I buy/eat shellfish or fish from the Atlantic ocean	___ Never	___ Daily	OR	___ Times a week
I drink bottled water...	___ Never	___ Daily	OR	___ Times a week
I drink unfiltered tap water...	___ Never	___ Daily	OR	___ Times a week
I smoke cigarettes...	___ Never	___ Daily	OR	___ Times a week
I sleep very well...	___ Never	___ Daily	OR	___ Times a week
I drink alcohol beverages...	___ Never	___ Daily	OR	___ Times a week
I wear a seatbelt in the car	___ Never	___ Daily	OR	___ Times a week
I have dinner around a table with family and/or friends...	___ Never	___ Daily	OR	___ Times a week

Have you donated blood in the past 12 months? ___ Yes ___ No

How would you describe your overall state of health these days?

Excellent Very good Good Fair Poor

Do you go to the doctor for regular check-ups?

Yes No

Are you? Male Female

What year were you born? _____

Do you rent or own your residence? Rent _____ Own _____

If you own: How much do you pay in property taxes annually \$ _____

If you own: What is the approximate property value \$ _____

How many years have you lived in this town? _____

Do you consider yourself politically as a Liberal Moderate-Liberal
 Moderate Moderate-Conservative Conservative? (Check one.)

Please check the box that comes closest to your total family income before taxes:

\$20,000 or less \$21,000 to \$40,000 \$41,000 to \$60,000
 \$61,000 to \$80,000 \$81,000 to \$100,000 \$101,000 to \$200,000
 \$201,000 to \$300,000 \$301,000 to \$400,000 \$401,000 or more

What is your highest level of education? Check one:

High school Some college Completed 2 year college
 Completed 4 year college Masters Ph.D. J.D. M.D.
 Other: _____

What is your current employment status? Retired Unemployed
 Employed

If Employed: How many hours a week do you work for pay?

_____ per week Does not apply



Do you ever telecommute - that is spend a whole day or more per week working at home instead of going to your main place of work?

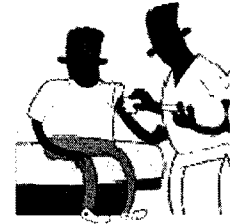
Yes No Does not apply

If Yes: In a typical 5-day work week, how many days do you normally work at home?

Less than once a week 1 day 2 days 3 days 4 days 5 days

How many miles do you travel to work and home again each day? _____ a day.


How much time does this roundtrip work commute take you? _____ a day.



How many people live in this household? _____

How many are children under 18 years old? _____

Do you have access to the Internet in your home? _____ Yes _____ No

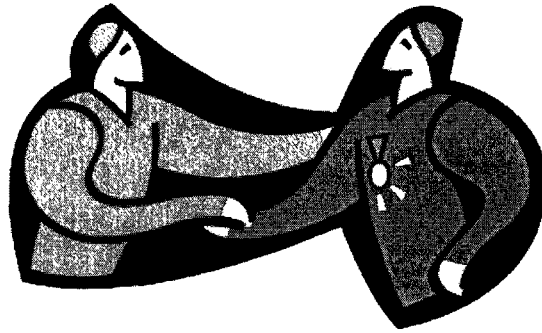
 Have you or any member of your family seen any of the following materials regarding the Lamprey River Watershed? Please check the appropriate box.	NO. I have not seen this.	I saw something similar to this.	YES. I have seen this.
A book, <i>The Story of Little Bear</i> by David Allan and Leslie Hamilton.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lamprey River Curriculum. Standard environmental curriculum for elementary schools with extensions to high school.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A Video - <i>A River Story: The Lamprey Through History</i> , with an emphasis on the human history of the river. 20 minutes long.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"The Lamprey River. A Special Place." A pamphlet that includes a map, river conservation information and policies, and introduces the Lamprey River Advisory Committee.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
"Living on the Lamprey." A pamphlet prepared especially for landowners along the river with information about the Lamprey's history, vegetation, and what landowners can do to conserve and protect the river.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A presentation about the Lamprey River Watershed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Lamprey River Wild and Scenic Management Plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Lamprey River Watershed Guide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Importance of Streamside Buffers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Riverwatch: A Handbook for Water Quality Monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The Lamprey River Resource Assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-Grained and Wily Waters: A Guide to the Piscataqua Maritime Region. 2002. W. Jeffrey Bolster, Editor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Is there anything else you would like us to know?

That's it! All done! Now all you have to do is fold it, place it in the self-addressed envelope, and put it in the mail to me!

Thank you so much for your participation!



Congratulations and thank you for completing the survey.

For questions or to be placed on a list to receive a summary report, contact Mary Adamo Robertson at mary.robertson@unh.edu, or 312 James Hall, Durham, NH 03824.

For concerns about the risk of this research to human subjects, contact the UNH Office of Sponsored Research at 603-862-3750, or 51 College Road, Durham, NH 03824.

2. Incentive Coupon

Take 20% Off Your Next Purchase



**At either of these locations:
Route 125 in Lee, NH
Jenkins Court in Durham, NH
Route 108 in Newmarket, NH**

This entitles the Lamprey River Watershed Resident to 20 % off their next purchase at Houghton Hardware.

Thank you for your participation!

The University of New Hampshire Water Resource Research Center

Authorized by:

Expires:

This coupon can not be used with any other sale, promotion or offer.

3. Logistic Regression in SPSS 17

```

LOGISTIC REGRESSION VARIABLES recodeOSDlogit
  /METHOD=ENTER Sumactive15 sumtrust18 environbehavior politicaffil
edlevel3groups3 famincome LowerRiver town2
  /CONTRAST (politicaffil)=Indicator
  /CONTRAST (edlevel3groups3)=Indicator
  /CONTRAST (famincome)=Indicator
  /CONTRAST (town2)=Indicator
  /CONTRAST (LowerRiver)=Indicator
  /SAVE=PRED PGROUP COOK LEVER DFBETA RESID LRESID SRESID ZRESID DEV
  /CLASSPLOT
  /CASEWISE OUTLIER(2)
  /PRINT=GOODFIT CORR CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

```

Logistic Regression

Notes

Output Created	26-Mar-2010 18:00:18	
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	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	768
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing

Notes

Syntax	<pre> LOGISTIC REGRESSION VARIABLES recodeOSDlogit /METHOD=ENTER Sumactive15 sumtrust18 environbehavior politicaffil edlevel3groups3 famincome LowerRiver town2 /CONTRAST (politicaffil)=Indicator /CONTRAST (edlevel3groups3)=Indicator /CONTRAST (famincome)=Indicator /CONTRAST (town2)=Indicator /CONTRAST (LowerRiver)=Indicator /SAVE=PRED PGROUP COOK LEVER DFBETA RESID LRESID SRESID ZRESID DEV /CLASSPLOT /CASEWISE OUTLIER(2) /PRINT=GOODFIT CORR CI(95) /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5). </pre>	
Resources	Processor Time	0:00:00.282
	Elapsed Time	0:00:00.280
Variables Created or Modified	PRE_1 PGR_1 COO_1 LEV_1 RES_1 LRE_1 SRE_1 ZRE_1 DEV_1 DFB0_1 DFB1_1 DFB2_1 DFB3_1 DFB4_1 DFB5_1 DFB6_1 DFB7_1	Predicted probability Predicted group Analog of Cook's influence statistics Leverage value Difference between observed and predicted probabilities Logit residual Standard residual Normalized residual Deviance value DFBETA for constant DFBETA for Sumactive15 DFBETA for sumtrust18 DFBETA for environbehavior DFBETA for politicaffil(1) DFBETA for politicaffil(2) DFBETA for politicaffil(3) DFBETA for politicaffil(4)

Notes

DFB8_1	DFBETA for edlevel3groups3(1)
DFB9_1	DFBETA for edlevel3groups3(2)
DFB10_1	DFBETA for famincome(1)
DFB11_1	DFBETA for famincome(2)
DFB12_1	DFBETA for famincome(3)
DFB13_1	DFBETA for famincome(4)
DFB14_1	DFBETA for famincome(5)
DFB15_1	DFBETA for famincome(6)
DFB16_1	DFBETA for famincome(7)
DFB17_1	DFBETA for famincome(8)
DFB18_1	DFBETA for LowerRiver(1)
DFB19_1	DFBETA for town2(1)
DFB20_1	DFBETA for town2(2)
DFB21_1	DFBETA for town2(3)
DFB22_1	DFBETA for town2(4)
DFB23_1	DFBETA for town2(5)
DFB24_1	DFBETA for town2(6)
DFB25_1	DFBETA for town2(7)
DFB26_1	DFBETA for town2(8)

[DataSet1] C:\Documents and Settings\mar3\Desktop\Lamprey All\Lamprey Daily\3_26_2010 380V.sav

Warnings

Due to redundancies, degrees of freedom have been reduced for one or more variables.

Case Processing Summary

Unweighted Cases ^a		N	Percent
Selected Cases	Included in Analysis	584	76.0
	Missing Cases	184	24.0
	Total	768	100.0
Unselected Cases		0	.0

Case Processing Summary

Unweighted Cases ^a	N	Percent
Total	768	100.0

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
No or D/K	0
Yes	1

Categorical Variables Codings

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
town2	BAR/STRAF/NORW	62	1.000	.000	.000	.000	.000	.000	.000	.000
	DEER/CAND	64	.000	1.000	.000	.000	.000	.000	.000	.000
	RAYMOND	79	.000	.000	1.000	.000	.000	.000	.000	.000
	NOTTINGHAM	46	.000	.000	.000	1.000	.000	.000	.000	.000
	EPP/FREM	71	.000	.000	.000	.000	1.000	.000	.000	.000
	EXE/NEWF	47	.000	.000	.000	.000	.000	1.000	.000	.000
	NEWMARKET	86	.000	.000	.000	.000	.000	.000	1.000	.000
	LEE	43	.000	.000	.000	.000	.000	.000	.000	1.000
	DURHAM	86	.000	.000	.000	.000	.000	.000	.000	.000
family income	20k or less	18	1.000	.000	.000	.000	.000	.000	.000	.000
	21 to 40k	60	.000	1.000	.000	.000	.000	.000	.000	.000
	41 to 60k	90	.000	.000	1.000	.000	.000	.000	.000	.000
	61 to 80k	114	.000	.000	.000	1.000	.000	.000	.000	.000
	81 to 100k	118	.000	.000	.000	.000	1.000	.000	.000	.000
	101 to 200k	163	.000	.000	.000	.000	.000	1.000	.000	.000
	201to300 k	13	.000	.000	.000	.000	.000	.000	1.000	.000
301to400k	2	.000	.000	.000	.000	.000	.000	.000	1.000	

Categorical Variables Codings

		Frequency	Parameter coding							
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	401k or more	6	.000	.000	.000	.000	.000	.000	.000	.000
political affiliation	liberal	90	1.000	.000	.000	.000				
	moderate-liberal	147	.000	1.000	.000	.000				
	moderate	108	.000	.000	1.000	.000				
	moderate-conservative	159	.000	.000	.000	1.000				
	conservative	80	.000	.000	.000	.000				
edlevel3	High School	78	1.000	.000						
	Some college	163	.000	1.000						
	4 years college or more	343	.000	.000						
LowerRiver	Durh/Lee/Newmarket	215	1.000							
	Other upstream	369	.000							

Block 0: Beginning Block

Classification Table^{a,b}

Observed	Predicted		
	OSDlogit		Percentage Correct
	No or D/K	Yes	
Step 0 OSDlogit No or D/K	0	248	.0
Yes	0	336	100.0
Overall Percentage			57.5

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)
Step 0 Constant	.304	.084	13.159	1	.000	1.355

Variables not in the Equation^a

	Score	df	Sig.
Step 0 Variables Sumactive15	17.716	1	.000
sumtrust18	11.947	1	.001
environbehavior	12.930	1	.000
politicaffil	28.405	4	.000
politicaffil(1)	2.802	1	.094
politicaffil(2)	15.522	1	.000
politicaffil(3)	.035	1	.852
politicaffil(4)	9.606	1	.002
edlevel3groups3	23.314	2	.000
edlevel3groups3(1)	10.042	1	.002
edlevel3groups3(2)	7.610	1	.006
famincome	7.596	8	.474
famincome(1)	.097	1	.755
famincome(2)	.942	1	.332
famincome(3)	.170	1	.680
famincome(4)	1.394	1	.238
famincome(5)	4.443	1	.035
famincome(6)	.110	1	.740
famincome(7)	.087	1	.768
famincome(8)	.047	1	.829
LowerRiver(1)	1.606	1	.205
town2	9.969	8	.267
town2(1)	.130	1	.718

Variables not in the Equation^a

	Score	df	Sig.
town2(2)	.238	1	.625
town2(3)	.144	1	.705
town2(4)	5.383	1	.020
town2(5)	.224	1	.636
town2(6)	.087	1	.768
town2(7)	.676	1	.411
town2(8)	1.092	1	.296

a. Residual Chi-Squares are not computed because of redundancies.

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	85.011	25	.000
	Block	85.011	25	.000
	Model	85.011	25	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	711.274 ^a	.135	.182

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.420	8	.600

Contingency Table for Hosmer and Lemeshow Test

	OSDlogit = No or D/K		OSDlogit = Yes		Total
	Observed	Expected	Observed	Expected	
Step 1 1	42	43.480	16	14.520	58
2	38	37.291	20	20.709	58
3	30	32.591	28	25.409	58
4	34	29.363	24	28.637	58
5	24	25.655	34	32.345	58
6	20	22.288	38	35.712	58
7	22	19.109	36	38.891	58
8	15	16.135	43	41.865	58
9	17	12.953	41	45.047	58
10	6	9.138	56	52.862	62

Classification Table^a

Observed	Predicted		
	OSDlogit		Percentage Correct
	No or D/K	Yes	
Step 1 OSDlogit No or D/K	132	116	53.2
Yes	79	257	76.5
Overall Percentage			66.6

a. The cut value is .500

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 ^a Sumactive15	.029	.011	7.097	1	.008	1.029	1.008	1.051
sumtrust18	.028	.011	6.874	1	.009	1.029	1.007	1.051
environbehavior	.049	.019	6.405	1	.011	1.050	1.011	1.091
politicaffil			17.833	4	.001			
politicaffil(1)	.690	.343	4.049	1	.044	1.994	1.018	3.907
politicaffil(2)	1.003	.314	10.183	1	.001	2.728	1.473	5.052
politicaffil(3)	.523	.321	2.643	1	.104	1.686	.898	3.166
politicaffil(4)	.047	.300	.024	1	.876	1.048	.582	1.885
edlevel3groups3			10.773	2	.005			
edlevel3groups3(1)	-.761	.300	6.429	1	.011	.467	.259	.841
edlevel3groups3(2)	-.638	.223	8.181	1	.004	.529	.342	.818
famincome			8.454	8	.390			
famincome(1)	-.147	1.265	.014	1	.907	.863	.072	10.302
famincome(2)	-1.145	1.174	.953	1	.329	.318	.032	3.173
famincome(3)	-1.259	1.161	1.177	1	.278	.284	.029	2.761
famincome(4)	-1.238	1.154	1.151	1	.283	.290	.030	2.783
famincome(5)	-.860	1.153	.556	1	.456	.423	.044	4.056
famincome(6)	-1.334	1.146	1.355	1	.244	.263	.028	2.489
famincome(7)	-1.178	1.288	.836	1	.360	.308	.025	3.846
famincome(8)	-2.086	1.827	1.304	1	.254	.124	.003	4.459
LowerRiver(1)	-.180	.412	.192	1	.661	.835	.373	1.871
town2			8.558	7	.286			
town2(1)	-.049	.421	.014	1	.907	.952	.417	2.174
town2(2)	-.037	.423	.008	1	.930	.963	.420	2.209
town2(3)	.379	.408	.861	1	.353	1.461	.656	3.252
town2(4)	-.810	.456	3.152	1	.076	.445	.182	1.088

4. Collinearity Analysis

```

GET
  FILE='C:\Documents and Settings\mar3\Desktop\Lamprey All\Lamprey
Daily\Working documents\3_26_2010 data base.sav'.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT recodeOSDlogit
  /METHOD=ENTER Sumactive15 sumtrust18 environbehavior politicaffil
famincome town2 LowerRiver edlevel3groups3.

```

Regression

		Notes
Output Created		31-Mar-2010 14:41:00
Comments		
Input	Data	C:\Documents and Settings\mar3\Desktop\Lamprey All\Lamprey Daily\Working documents\3_26_2010 data base.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	768
Missing Value Handling	Definition of Missing Cases Used	User-defined missing values are treated as missing. Statistics are based on cases with no missing values for any variable used.
Syntax		REGRESSION /MISSING LISTWISE /STATISTICS COLLIN TOL /CRITERIA=PIN(.05) POUT(.10) /NOORIGIN /DEPENDENT recodeOSDlogit /METHOD=ENTER Sumactive15 sumtrust18 environbehavior politicaffil famincome town2 LowerRiver edlevel3groups3.
Resources	Processor Time	0:00:00.063
	Elapsed Time	0:00:00.109

Memory Required	15444 bytes
Additional Memory Required for Residual Plots	0 bytes

[DataSet1] C:\Documents and Settings\mar3\Desktop\Lamprey All\Lamprey Daily\Working documents\3_26_2010 data base.sav

Variables Entered/Removed^b

Model	Variables Entered	Variables Removed	Method
1	edlevel3, environmentbehav, sumtrust18, political affiliation, town2, sumactive15, family income, LowerRiver ^a		Enter

a. All requested variables entered.

b. Dependent Variable: OSDlogit

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	sumactive15	.864	1.157
	sumtrust18	.937	1.067
	environmentbehav	.939	1.065
	political affiliation	.929	1.077
	family income	.859	1.164
	town2	.284	3.517
	LowerRiver	.284	3.526
	edlevel3	.774	1.292

a. Dependent Variable: OSDlogit

Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions									
				(Constant)	sumactive	sumtrust18	Environme n	Politi cal	family	town2	LowerRive	edlevel3	
1	1	8.163	1.000	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	2	.288	5.319	.00	.00	.00	.00	.07	.00	.11	.02	.00	.00
	3	.164	7.050	.00	.15	.01	.00	.51	.00	.05	.00	.02	.00
	4	.114	8.474	.00	.72	.00	.00	.12	.12	.00	.01	.04	.00
	5	.100	9.026	.00	.08	.49	.00	.03	.33	.01	.00	.01	.00
	6	.080	10.121	.00	.00	.43	.12	.04	.31	.03	.02	.01	.00
	7	.053	12.455	.00	.00	.00	.10	.09	.21	.02	.01	.80	.00
	8	.033	15.811	.01	.04	.04	.70	.08	.01	.21	.18	.03	.00
	9	.005	39.067	.98	.00	.02	.07	.05	.00	.57	.76	.09	.00

a. Dependent Variable: OSDlogit

Correlation Matrix

	Constant	Sumactive15	sumtrust18	Constant	Sumactive15	sumtrust18	Environme n	Politi cal	family	town2	LowerRive	edlevel3				
Constant	1.000			1.000												
Sumactive15	-.142	1.000		-.142	1.000											
sumtrust18	-.185	-.147	1.000	-.185	-.147	1.000										
Constant			.061	-.337			1.000									
Sumactive15			-.017	-.013	-.055		-.055	1.000								
sumtrust18			-.013	-.051	-.077		-.077	-.051	1.000							
Environme n			-.030	-.060	-.118		-.118	-.060	-.051	1.000						
Politi cal			-.039	-.126	-.081		-.081	-.126	-.081	-.081	1.000					
family			-.001	.109	-.037		-.037	.109	-.037	-.037	-.037	1.000				
town2			-.047	.045	.007		.007	.045	.007	.007	.007	.007	1.000			
LowerRive			.037	.091	-.796		-.796	.091	-.796	-.796	-.796	-.796	-.796	1.000		
edlevel3			-.006	.066	-.833		-.833	.066	-.833	-.833	-.833	-.833	-.833	-.833	1.000	
town2(1)			-.010	.055	-.847		-.847	.055	-.847	-.847	-.847	-.847	-.847	-.847	-.847	1.000
town2(2)			-.012	.060	-.855		-.855	.060	-.855	-.855	-.855	-.855	-.855	-.855	-.855	1.000
town2(3)			-.013	.057	-.852		-.852	.057	-.852	-.852	-.852	-.852	-.852	-.852	-.852	1.000
town2(4)			-.010	.048	-.856		-.856	.048	-.856	-.856	-.856	-.856	-.856	-.856	-.856	1.000
town2(5)			.004	.057	-.755		-.755	.057	-.755	-.755	-.755	-.755	-.755	-.755	-.755	1.000
town2(6)			-.040	-.051	-.518		-.518	-.051	-.518	-.518	-.518	-.518	-.518	-.518	-.518	1.000
town2(7)			-.070	-.002	-.169		-.169	-.002	-.169	-.169	-.169	-.169	-.169	-.169	-.169	1.000
town2(8)			.002	-.014	-.185		-.185	-.014	-.185	-.185	-.185	-.185	-.185	-.185	-.185	1.000
LowerRive			.035	.006	-.209		-.209	.006	-.209	-.209	-.209	-.209	-.209	-.209	-.209	1.000
edlevel3			.037	.048	-.259		-.259	.048	-.259	-.259	-.259	-.259	-.259	-.259	-.259	1.000
town2(1)			-.005	-.026	-.212		-.212	-.026	-.212	-.212	-.212	-.212	-.212	-.212	-.212	1.000
town2(2)			.008	.012	-.229		-.229	.012	-.229	-.229	-.229	-.229	-.229	-.229	-.229	1.000
town2(3)			.090	-.026	-.103		-.103	-.026	-.103	-.103	-.103	-.103	-.103	-.103	-.103	1.000
town2(4)			.023	-.101	.023		.023	-.101	.023	.023	.023	.023	.023	.023	.023	1.000

	famincome(2)	famincome(1)	edlevel3group ps3(2)	edlevel3group ps3(1)	politicaafil(4)	politicaafil(3)	politicaafil(2)	politicaafil(1)	environbeha vior	Constant Summative1
	-.833	-.796	.007	-.037	-.081	-.118	-.077	-.055	-.337	
	.066	.091	.045	.109	-.126	-.060	-.051	-.013	-.138	
	-.006	.037	-.047	-.001	-.039	-.030	-.013	-.017	.061	
	.000	.030	-.069	.009	.001	.036	.006	-.051	1.000	
	-.066	-.053	.101	.098	.581	.535	.571	1.000	-.051	
	-.061	-.064	.094	.092	.642	.581	1.000	.571	.006	
	-.031	-.021	-.001	.034	.614	1.000	.581	.535	.036	
	-.037	-.038	-.010	.012	1.000	.614	.642	.581	.001	
	-.099	-.121	.362	1.000	.012	.034	.092	.098	.009	
	-.092	-.122	1.000	.362	-.010	-.001	.094	.101	-.069	
	.882	1.000	-.122	-.121	-.038	-.021	-.064	-.053	.030	
	1.000	.882	-.092	-.099	-.037	-.031	-.061	-.066	.000	
	.951	.889	-.082	-.075	-.040	-.039	-.082	-.080	.018	
	.953	.892	-.082	-.053	-.033	-.037	-.066	-.065	.030	
	.953	.889	-.067	-.053	-.038	-.042	-.067	-.068	.019	
	.956	.892	-.053	-.036	-.051	-.044	-.067	-.072	.018	
	.853	.797	-.077	-.031	-.011	-.042	-.040	-.032	-.019	
	.588	.543	.017	.011	-.069	-.021	-.035	-.042	.049	
	.003	-.025	.137	.090	-.019	.074	-.042	-.045	-.038	
	.001	-.028	.023	.034	-.015	-.001	-.001	-.046	.020	
	-.002	-.031	-.005	-.007	-.050	.037	-.056	.009	.060	
	.015	.003	-.044	-.056	.036	.107	.043	.041	.068	
	.052	.017	.058	.013	-.023	.063	-.025	-.006	.006	
	.026	.023	-.022	-.051	-.045	.052	-.064	-.015	.070	
	.029	.068	-.064	-.043	.020	.000	.047	.039	.138	
	-.016	.002	-.058	-.025	-.038	-.013	-.029	.006	.017	

	town2(2)	town2(1)	LowerRiver(1)	famincome(8)	famincome(7)	famincome(6)	famincome(5)	famincome(4)	famincome(3)	Constant
	-209	-185	-169	-518	-755	-856	-852	-855	-847	Sumactive1
	.006	-.014	-.002	-.051	.057	.048	.057	.060	.055	
	.035	.002	-.070	-.040	.004	-.010	-.013	-.012	-.010	sumtrust18
	.060	.020	-.038	.049	-.019	.018	.019	.030	.018	envirobena
	.009	-.046	-.045	-.042	-.032	-.072	-.068	-.065	-.080	politicafil(1)
	-.056	-.001	-.042	-.035	-.040	-.067	-.067	-.066	-.082	politicafil(2)
	.037	-.001	.074	-.021	-.042	-.044	-.042	-.037	-.039	politicafil(3)
	-.050	-.015	-.019	-.069	-.011	-.051	-.038	-.033	-.040	politicafil(4)
	-.007	.034	.090	.011	-.031	-.036	-.053	-.053	-.075	edieve13gro
	-.005	.023	.137	.017	-.077	-.053	-.067	-.082	-.082	edieve13gro
	-.031	-.028	-.025	.543	.797	.892	.889	.892	.889	tamincome(
	-.002	.001	.003	.588	.853	.956	.953	.953	.951	tamincome(
	.007	.002	.003	.596	.862	.968	.964	.964	1.000	tamincome(
	.001	-.013	.003	.600	.865	.972	.968	1.000	.964	tamincome(
	.013	-.001	.003	.600	.865	.972	1.000	.968	.964	tamincome(
	.002	.008	-.004	.605	.871	1.000	.972	.972	.968	tamincome(
	-.002	.011	-.044	.532	1.000	.871	.865	.865	.862	tamincome(
	.005	.004	.015	1.000	.532	.605	.600	.600	.596	tamincome(
	.581	.578	1.000	.015	-.044	-.004	.003	.003	.003	LowerRiver(
	.562	1.000	.578	.004	.011	.008	-.001	-.013	.002	town2(1)
	1.000	.562	.581	.005	-.002	.002	.013	.001	.007	town2(2)
	.600	.584	.587	-.032	.006	.036	.032	.023	.029	town2(3)
	.532	.533	.551	.038	.048	.056	.047	.030	.049	town2(4)
	.589	.577	.588	-.027	.028	.031	.022	.017	.032	town2(5)
										town2(6)
	.004	.002	-.460	.028	.092	.058	.045	.046	.049	town2(7)
	.002	.004	-.356	.003	.021	.001	-.017	-.016	-.006	town2(8)

	town2(8)	town2(7)	town2(6)	town2(5)	town2(4)	town2(3)	
	.023	-.103		-.229	-.212	-.259	Constant
	-.101	-.026		.012	-.026	.048	Sumactive1
	.023	.090		.008	-.005	.037	sumtrust18
	.017	.138		.070	.006	.068	environbena
	.006	.039		-.015	-.006	.041	politicaffi(1)
	-.029	.047		-.064	-.025	.043	politicaffi(2)
	-.013	.000		.052	.063	.107	politicaffi(3)
	-.038	.020		-.045	-.023	.036	politicaffi(4)
	-.025	-.043		-.051	.013	-.056	edivevei3gro
	-.058	-.064		-.022	.058	-.044	edivevei3gro
	.002	.068		.023	.017	.003	tamincome(
	-.016	.029		.026	.052	.015	tamincome(
	-.006	.049		.032	.049	.029	tamincome(
	-.016	.046		.017	.030	.023	tamincome(
	-.017	.045		.022	.047	.032	tamincome(
	.001	.058		.031	.056	.036	tamincome(
	.021	.092		.028	.048	.006	tamincome(
	.003	.028		-.027	.038	-.032	LowerRiver(
	-.356	-.460		.588	.551	.587	
	.004	.002		.577	.533	.584	town2(1)
	.002	.004		.589	.532	.600	town2(2)
	-.001	.021		.614	.549	1.000	town2(3)
	.007	-.003		.549	1.000	.549	town2(4)
	.011	.013		1.000	.549	.614	town2(5)
							town2(6)
	.422	1.000		.013	-.003	.021	town2(7)
	1.000	.422		.011	.007	-.001	town2(8)

5. Institutional Review Board Approval Letter

University of New Hampshire

Research Conduct and Compliance Services, Office of Sponsored Research
Service Building, 51 College Road, Durham, NH 03824-3585
Fax: 603-862-3564

7/7/2006

Robertson, Mary
Resource Eco. & Dev., James Hall
Durham, NH 03824

IRB #: 3757
Study: Lamprey River Watershed Resident Survey
Approval Date: 7/7/2006

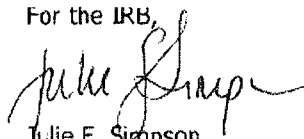
The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed and approved the protocol for your study as Exempt as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 101(b). Approval is granted to conduct your study as described in your protocol.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects*. (This document is also available at <http://www.unh.edu/csr/compliance/irb.html>.) Please read this document carefully before commencing your work involving human subjects.

Upon completion of your study, please complete the enclosed pink Exempt Study Final Report form and return it to this office along with a report of your findings.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,



Julie F. Simpson
Manager

cc: File
Robert Robertson