

AN ABSTRACT OF THE DISSERTATION OF

Kelli L. Larson for the degree of Doctor of Philosophy in Geography presented on December 1, 2004.

Title: Residents' Attitudes Toward Water Resource Protection in Metropolitan Portland, Oregon

Abstract approved:



Aaron T. Wolf



Mary V. Santelmann

Three research questions are addressed in this study: (1) To what degree do residents support/oppose various aspects of water resources protection? (2) What factors explain residents' attitudes? and, (3) How do attitudes vary between participants and non-participants of place-based groups (watershed councils and neighborhood associations)? The population of interest is residential property owners and participants of place-based groups in the Johnson Creek Watershed of the Portland metropolitan region, Oregon. Data were collected via preliminary interviews and a mail questionnaire, and both qualitative and quantitative analyses were conducted. Four unique aspects of attitudes toward water resource protection were evaluated – *general* importance, support/opposition to *government, regulations, and economic* measures, in addition to an *overall* index comprising these dimensions.

Substantial support exists for water resource protection with regard to water quality protection, education and restoration, particular regulations, and funding mechanisms that 'make the polluter pay.' Opposition is strongest towards income/property taxes and government efforts. Significant explanatory factors for attitudes are subjective cognitive factors including environmental and political beliefs and affective attachment to conceptual regions. Distance to water is not an important explanatory variable, yet attitudes do differ among residents in varying proximities to water. Analyses indicate that residents within one-quarter to one-half mile of streams are

most supportive of protection efforts, while people with water on or bordering their property are most opposed to regulations and economic support diminishes at a decreasing rate away from streams. Watershed council participants are more supportive than non-participants on most attitudinal dimensions, and neighborhood association participants are more supportive than non-participants economically, which may be due to higher income and education levels among group participants.

Based on research findings, balanced programs emphasizing education, restoration, and stewardship, along with specific, enforceable regulations and funding mechanisms that 'make the polluter pay' are recommended. Equity issues are critical, especially in terms of impacts on residential-business land uses and upland-downstream residents. Subjective understanding of resource issues and normative beliefs must also be considered in developing environmental protection programs. Active solicitation emphasizing the benefits of participation is suggested to increase involvement of residents and place-based groups in water resource protection activities.

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**Residents' Attitudes Toward Water Resource Protection
in Metropolitan Portland, Oregon**

by
Kelli L. Larson

A DISSERTATION

submitted to

Oregon State University

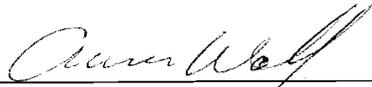
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degree of

Doctor of Philosophy

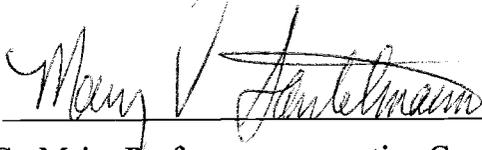
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Doctor of Philosophy dissertation of Kelli L. Larson presented on December 1, 2004.

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.



Kelli L. Larson, Author

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Beyond my committee, I am enormously grateful to several professionals in the Portland area who provided valuable input to my research. First, my sincere thanks to Dr. Noelwah Netusil of Reed College. Noelwah could have served as a seventh advisor on my committee, but instead has become a valued colleague and friend. I would also like to thank Roberta Jortner and Marie Johnson from the City of Portland's Bureau of Planning, and Maggie Skenderian and Jim Gladson from the Bureau of Environmental Services, whose feedback greatly improved the relevance of my research to real-world problems. Much gratitude to my colleagues at Metro, particularly Gina Whitehill-Baziuk, Karen Withrow, Chris Deffebach, and Mark Bosworth, and to Metro in general for contributions to my doctoral work. I would also

like to acknowledge the National Science Foundation for funding this research, and for recognizing the value of regional and behavior sciences in geography.

My sincere thanks to the people who were most critical in making this study possible, that is, the people who took the time for an interview or to complete the survey. In a time and place where altruism and helping behavior are sometimes lacking, I am forever indebted to these individuals. Moreover, I greatly appreciate David Reid and the Johnson Creek Watershed Council for their cooperation in this study. Thanks to Meg Merrick at Portland State University's Institute of Metropolitan Studies for providing census and other information for this study. My deep gratitude and respect also to Laura Lincoln, whose prompt replies to my inquires were incredibly helpful in guiding me through the OSU Institutional Review Board process.

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DEDICATION

This dissertation is dedicated to
my parents, Vicki and Darrell Larson,
who have given me the wings of love
that allow my soul to take flight;
and to all others who
“did not know they could not fly,
and so they did.”

(Quote from “The Cape” by Guy Clark)

CHAPTER 1. INTRODUCTION

“Your property has been targeted for new Metro [regional government] and local government property restrictions. You have two chances to act – the first is right now, the second is on Election Day this November!” This statement was the opening of a letter sent to over 90,000 property owners in the Portland metropolitan area of Oregon in August 2004 by a political interest group, Oregonians In Action, whose primary objective is to protect private property rights (OIA 2004). The property restrictions referred to in this letter involve regulations that are under consideration in order to protect riparian areas near water resources and other habitat for fish and wildlife.

Across the United States, programs that include regulations and other natural resource protection measures have been implemented or are being considered. While widespread evidence of general environmental values exists in the U.S. (Dunlap and VanLiere 1978; Theodori and Luloff 2002; Dutcher et al. 2004), specific natural resource programs and policies face opposition and criticism (Brinckman 2002; Dutcher et al. 2004). Research into the nature of opposition and support for resource protection efforts advances the social sciences aimed at understanding environmental values, attitudes and behavior, and assists natural resource protection by improving the effectiveness of related programs that depend on the acceptance and participation of people that use and impact resources.

The protection of water resources is critical for human and ecosystem health. Water is essential to life, and also possesses cultural, historic, aesthetic, recreational, economic, functional and ecological value. However, human activity has degraded aquatic systems. Water resources can have tremendous value in urban areas because they have the potential to mitigate pollution, stormwater runoff and flooding problems that harm human life and property; provide places of refuge and recreation in the fast-

paced urban environment; aid protection of whole river basins and interconnected systems of habitat for fish and wildlife that cross jurisdictional boundaries; and, afford aesthetic, cultural, educational and economic benefits to life in urban areas and elsewhere.

Despite the fact that three-fourths of the American population lives in cities, policy-makers and researchers have directed greater attention to understanding and protecting aquatic systems in rural areas (Kusler 1988). This is due, in part, to the large amount of land covered by rural land uses and, therefore, the greater perceived impacts to water resources from these. In addition, the views that urban areas are human habitat and that resource protection should be focused on more rural and wild areas also seem to influence resource perceptions and policy. Nevertheless, research and policy attention to natural resources in metropolitan areas has increased in the last couple of decades as their value has become more apparent (Kusler 1988; Riley 1998).

Interest in urban environmental research is on the rise as people realize that, “In livable cities is preservation of the wild” (Houck and Cody 2000: xiii). This perspective recognizes that ‘greenspaces’ within metropolitan regions can foster increased protection of natural resources beyond the urban fringe by providing residents with “natural” areas to enjoy in the city. These interactions can deepen peoples’ connections to nature, along with awareness of and support for ecosystem protection in both urban and rural areas. In a sense, heightened emphasis on metropolitan areas is also a matter of fairness because, as one activist notes, “Urban landowners are getting a taste of what rural landowners have been facing for years” (Brinckman 2002:B5). Additionally, from an ecosystem perspective, resources in urban areas are tied to those beyond municipal boundaries and must be considered and protected holistically.

Numerous policies have been enacted from the local to national level that recognize the need to protect and restore water resources in a variety of environments. Foremost among these in the United States is the Clean Water Act (CWA), first enacted in 1948. Originally, resource managers and policy-makers focused on ameliorating point-source pollution from industrial and other sources. By the late 1970s and into the 1980s, policy attention shifted to non-point source pollution from diffuse sources (Dzurik 2002). While much focus has been placed on non-point source pollution from agricultural fields, focus in urban areas has been on industrial pollution and, more recently, pollutants in stormwater runoff. Beyond the Clean Water Act, the Endangered Species Act (ESA) has a significant impact on urban natural resource policy. Recent salmonid listings (Chinook salmon and steelhead trout) in the City of Portland, for example, have directed attention to habitat protection. The migration of salmon upstream from the oceans for reproduction and life cycle completion underscores the importance of a basin-wide approach that is inclusive of urban areas.

Urban ecosystem research and policy are incomplete without consideration of humans, as they are an inherent part of urban systems. Information on human-environment relationships is essential for the development of effective, democratic management plans. Knowledge of human perceptions, attitudes and behavior relating to natural resources is critical to developing culturally acceptable and sustainable policies and programs (McKenzie-Morh and Smith 1999; Nassauer et al. 2001). Such information is required to meet government standards for responsive public policy, and can improve the design and implementation of natural resource protection measures (Mitchell 1989).

Geography has contributed much to the study of water resources and human-environment interactions. Historically referred to as the “man-land” tradition, human-environment relations have been recognized as one of four dominant areas of study among geographers since the 1960s (Pattison 1964). The study of human perception,

attitudes and behavior in relation to natural resources has been a significant field of inquiry by geographers and other social scientists since the mid-1900s. The applied nature of water resource geography, in particular, emphasizes the important role of attitudes and behavior in water resource management and planning (Kates and Burton 1986; Mitchell 1989). Indeed, both the spatial perspective and interdisciplinary nature of geography provide a useful point of view from which to study human interactions with the environment. The research presented in this dissertation has been conducted within this disciplinary context, and focuses on residents' attitudes toward water resource protection in the Johnson Creek Watershed of the southeast Portland metropolitan region in Oregon.

Research Problem

Planning and management efforts are currently underway in the study area of metropolitan Portland, Oregon to address the conservation, protection and restoration of water and other natural resources. Although residents in the study area express significant support for water resource protection in general, real-world evidence and previous studies indicate that significant opposition to particular water resource protection measures exists (Davis and Hibbits, Inc. 2001; BES 2002; Brinckman 2002). In the study area, regulations that mandate set-backs from water bodies and other land use activities are currently in place and new ones have recently been proposed to protect the condition of water resources. These regulations are opposed by residents and other stakeholders in the region. Generally, people express varying levels of support for natural resource protection measures. Research is needed to better understand the nature and extent of attitudes toward various water resource protection efforts, in order to develop democratic programs that reflect the will of the people and improve program effectiveness by increasing acceptance and participation in

environmental programs and activities (McKenzie-Morh and Smith 1999; Korfmacher 2001; Nassauer et al. 2001).

Many surveys have been conducted to assess various aspects of water and other natural resource issues (Gillmore Research Group; Metro 1999; Metro 2000; Metro 2001; Riley Research Associates 2002; Davis, Hibbits and McCaig, Inc. 2002). Much of this work has included only a small focus on water resources and related policy issues (Metro 2001) or has been narrowly focused on specific aspects of water resources (Gillmore Research Group 1999; Davis, Hibbits and McCaig 2002; Riley Research Associates 2002). Little attention has been focused on understanding support and opposition toward water resource protection efforts overall, despite significant controversy over recent planning efforts involving regulations and substantial emphasis placed on the importance of water resource protection in the region. Social scientists suggest that attitudes are multidimensional and complex (Thurstone 1928; Dutcher et al. 2004), yet the nature and structure of environmental attitudes are not well understood (Heidmets and Raudsepp 2001).

Scholars from various disciplines including geography, environmental sociology and philosophy provide theoretical reasons for varying environmental attitudes (Bell 1998), and many empirical investigations have focused on explanatory factors such as sociodemographics (Vaske et al. 2001; Johnson et al. 2004), knowledge (Arcury 1990), or place attachment (Brandenburg and Carroll 1995). However, additional research on the nature of environmental attitudes is needed for the advancement of social sciences and improvement of policies and programs aimed at resource protection.

Knowledge about environmental attitudes can aid resource managers and planners in tailoring programs and policies to the social context of an area, thereby improving the acceptance and implementation of environmental protection strategies (McKenzie-

Mohr and Smith 1999). One question that has risen among public participation analysts and practitioners is that of who should participate in decision-making processes (Chess et al. 2000; McCormas 2001). Participants are often members of organized groups with access to financial and other resources. Members of these groups often share similar demographic characteristics (e.g., they are wealthier and more educated), and are not representative of the public as a whole (Chess et al. 2000). These circumstances raise concerns about the degree to which the interests and opinions of these groups represent those of the individuals directly impacted by decisions as well as those of the general public. Yet little research has been conducted to assess the nature and extent of differences in the interests and opinions among people who do and do not participate in these groups. Understanding these differences will increase awareness of the representativeness of public participation processes that largely rely on organizations for public input.

Two types of place-based organizations in the Portland metropolitan area are involved with land use planning and water resources issues: neighborhood associations and watershed councils. The former are an established component of the citizen involvement structure of municipalities throughout Oregon, while the latter are state-supported, voluntary entities aimed at addressing watershed health. In addition to interest-based groups, these place-based organizations are involved in land use planning and water resource issues to varying extents. The frequent involvement of such groups in land use planning and decision-making raises questions about the extent to which their views and activities represent the interests of the general public. The research described here compares the water-related attitudes of individuals involved in these place-based groups with those of non-participants.

Research Questions and Hypotheses

The research presented in this dissertation addresses three research questions:

- (1) To what degree do residents support or oppose various water resource protection efforts (in metropolitan Portland)?
- (2) What factors explain residents' attitudes about water resource protection?
- (3) How do attitudes differ between participants and non-participants of watershed- and neighborhood-based organizations?

Based on past opinion polls and research, substantial support for water resource protection is expected, with varying levels of opposition for different aspects of resource protection. The most support is expected for general attitudinal expressions, while opposition is expected to be greatest for more concrete attitudes relating to regulations and financial measures. Several factors are hypothesized to influence attitudes toward water resource protection including beliefs about the environment as well as politics and government, proximity to water resources, level of civic involvement, political orientation, and sociodemographics, among others. Since several of these factors vary across space, geographical patterns in attitudes will be considered, particularly in relation to proximity to water. Participants in place-based groups and people who are more civically involved, in general, are expected to exhibit greater support for water resource protection, given their greater orientation toward and engagement in community organizations and events.

Research Methods

A questionnaire mailed to residential property owners and participants of place-based groups was the primary data collection instrument for this research. The survey measured the level of support/opposition toward various aspects of water resource

protection and several independent variables that are hypothesized to influence attitudes (e.g., environmental ideology, political views, sociodemographics). Preliminary interviews were also conducted to better understand water-related attitudes and public involvement in environmental decision-making in the study area. Information gained from interviews aided the research design and provided background and contextual information for this study. The mail questionnaire collected mostly quantitative data, which were entered and analyzed in SPSS. The following analytical methods were the primary techniques employed for the three questions posed this research.

- (1) Descriptive statistics and ranking of percent negative attitudes for various aspects of water resource protection were evaluated to investigate the nature of environmental attitudes.
- (2) Bivariate correlations and multiple regression analyses were employed to assess the significance and magnitude of factors that explain attitudes about water resource protection.
- (3) T-tests and analyses of variance (ANOVA) were used to assess differences between participants and non-participants of place-based groups.

Qualitative analyses of preliminary interviews and written survey comments supplemented quantitative analyses of the survey data.

Significance of Research

This research advances social science understanding of environmental attitudes and the efficacy of public participation strategies, especially those that rely on representative democracy (i.e., group participation), in environmental decision-making. The question of representativeness, which has been raised in the public participation literature, is addressed in the exploration of attitudinal differences

between people who do and do not participate in local watershed and neighborhood organizations. The results of this research will inform natural resource policy-making and management in the Portland metropolitan area and elsewhere, through improved understanding of urban residents' attitudes toward water resource protection and the degree to which place-based groups are representative of the individuals they are thought to serve. Information about the degree of support for and opposition to various types of water resource protection measures will allow policy-makers and resource managers to better tailor resource policies and programs to the views of residents, and may thus increase the acceptance and effectiveness of measures aimed at protecting water resources in a metropolitan region.

CHAPTER 2. LITERATURE REVIEW AND BACKGROUND INFORMATION

This chapter presents the theoretical context and background information for the research presented in this dissertation. In order to address the first two research questions, which are aimed at understanding the nature of attitudes toward water resource protection and explanations underlying them, scholarly work on the nature of environmental attitudes and explanations for them is first presented. Next, literature on participatory environmental decision-making is presented, with particular focus on the involvement of groups in decision-making processes and the characteristics of people who participate in such activities. This literature provides the background for investigating the third research question in this study, which addresses the degree to which environmental attitudes vary between participants and non-participants of place-based groups involved in environmental decision-making. Finally, the study area is described in terms of water resource policy in the Portland metropolitan area and the geography of the Johnson Creek watershed.

The Nature and Degree of Environmental Attitudes

Environmental perceptions, attitudes and behavior have been studied for decades (Heberlein and Black 1976; Weigel and Newman 1976; Ajzen and Fishbein 1977; Dunlap and VanLiere 1978; Albrecht et al. 1982; Arcury 1990; McAndrew 1993; Whitehead and Thompson 1993; Luzar and Assane 1999; Blanchard 2000; Bright et al. 2002; Brody et al. 2004; Johnson et al. 2004). Much of this work has been targeted toward natural resource conservation and management, and has been conducted during and since the modern environmental movement of the 1960s-70s (Buck 1991; Bell 1998). Research has been undertaken by geographers, psychologists, sociologists, anthropologists, and political scientists on a variety of resource issues including

recycling, agricultural and forest conservation, outdoor recreation, energy and water. Water resource geographers, in particular, have placed significant attention on understanding human perceptions, attitudes and behavior in relation to resource problems and related solutions (White 1973; Kates and Burton 1986; Martin and James 1993). Understanding people's attitudes as well as perceptions and behaviors allows resource managers and planners to tailor programs and policies to the people who affect and are affected by them, thereby improving their acceptance and effectiveness (McKenzie-Mohr and Smith 1999).

Scholars describe three components of environmentalism: the cognitive, the affective, and the behavioral (Heidmets and Raudsepp 2001). The cognitive component relates to people's understanding of the way the world works and includes knowledge, perceptions, and beliefs. Attitudes are a part of the affective element, which is evaluative and includes position-taking, values, and emotional attachment to nature. A prominent scholar defines attitudes as, "the sum total of man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and conviction about any specified topic" (Thurstone 1928: 531). More simply, attitudes can be conceived as positive or negative judgments about some object or phenomena. The third, behavior, includes not only observable behavior but also behavioral intentions and commitments. Environmental values influence and are expressed through all of these components, and some social scientists contend that the cognitive influences the affective, which in turn influence behavior. Affective, attitudinal judgments about water resource protection efforts comprise the dependent variable in this study, and cognitive components are conceptualized as independent variables that influence these attitudes.

Many surveys have been done in the Portland area to assess various aspects of water and other natural resource issues, including residents' values, perceptions, attitudes and behavior (Gillmore Research Group; Metro 1999; Metro 2000; Metro 2001; Riley

Research Associates 2002; Davis, Hibbits and McCaig, Inc. 2002). However, much of this work has included only a limited focus on water resources and related policy issues (e.g., Metro 2001), or has focused on particular aspects of water resources such as perceptions about and awareness of water quality (Gillmore Research Group 1999), generally expressed values (Davis, Hibbits and McCaig 2002), or homeowner behavior (Riley Research Associates 2002). None of these studies have focused explicitly on attitudes about water resource protection and related policy measures, despite significant controversy over recent planning efforts involving these matters and substantial emphasis placed on the importance of water resource protection by residents of the region.

Research has shown that the American public exhibits a high degree of environmental values and concern, in general (Dunlap and VanLiere 1978; Theodori and Luloff 2002; Dutcher et al. 2004), yet research also indicates that most people are inactive in matters relating to environmental conservation (Theodori and Luloff 2002; Dutcher et al. 2004). Social psychologist and other scholars have highlighted a significant disconnect between what people value or believe and how they behave as well as between general and specific attitudes (Heberlein and Black 1976; Dunlap and VanLiere 1978; Arcury 1990; Bell 1998; Dutcher et al. 2004). Theorists suggest that the weak link between attitudes and behavior is partly due to the fact that the relationship between attitudes and behavior is many-to-many; that is, a single attitude may relate to multiple behaviors and a single behavior may relate to several different attitudes (Dawes and Smith 1985; Gilbert et al. 1998). Similarly, a single attitude can relate to multiple other attitudes and vice versa.

Environmental attitudes are multi-dimensional in part because the actual management and protection of natural resources involves various factors such as the type of policy or program undertaken, the entity(ies) involved with protection efforts, as well as the type(s) of resource(s) and location(s) under consideration. Researchers have

investigated attitudes about the environment and other matters at varying levels of specificity, in large part to evaluate whether specific attitudes are more highly correlated with behavior than general ones (Heberlein and Black 1976). General and specific attitudinal expressions can also be investigated to understand the various dimensions of attitudes about environmental protection. Such studies are important because, as some scholars note, the nature and structure of environmental attitudes are not well understood, and in particular, it remains unclear whether environmental attitudes are one phenomenon (as generalized attitudes) or many different specific attitudes (Heidmets and Raudsepp 2001). Moreover, general and specific attitudes are important to study because they are an important part of the cognitive system and are related to a variety of beliefs and behaviors (Heberlein and Black 1976).

Attitudes are complex and cannot be described wholly by any single numerical index (Thurstone 1928). Social science techniques exist to evaluate attitudinal measures in terms of reliability and dimensionality. Specifically, reliability (or scale) analysis is commonly employed in attitudinal research as a way to assess the internal consistency of individuals' responses to a group of attitudinal measures, especially for the purpose of combining individual measures into a scale to be used for further analysis (Kim and Mueller 1978; Kruskal and Wish 1978; Carmines and Zeller 1979; Albrecht et al. 1982; Spector 1992). Reliability analysis addresses whether individuals respond consistently to a group of individual measures that are conceived of as a single phenomenon, for example, support/opposition toward water resource protection. If the statistic (e.g., Cronbach's alpha) meets certain criteria, which will be discussed further in the survey findings chapter, then these measures can be combined into a single, more reliable measure of that phenomena. Analytical methods such as factor analysis and multidimensional scaling are also regularly used to assess dimensionality in scale construction (Kim and Mueller 1978; Kruskal and Wish 1978; Carmines and Zeller 1979; Spector 1992). These techniques look for commonalities and differences among

attitudinal data and can aid in the construction of indices or sub-indices that capture various aspects of peoples' attitudes.

Several factors are presented below that have been found to significantly influence attitudes about environmental protection or other expressions of environmental values. These include beliefs about the environment and political matters. Perceptions about resources have also been found to be important, and some scholars suggest that place attachment and proximity may also influence environmental attitudes. Knowledge and sociodemographic factors are also commonly linked to environmental attitudes. These explanatory factors will be discussed in the following section.

Explanatory Factors for Environmental Attitudes

Environmental beliefs

Environmental attitudes, which involve positive/negative judgments about some attitudinal object, are related to peoples' values and beliefs about nature and environmental protection (Heidmets and Raudsepp 2001). While values capture normative views on the importance of a particular issue, beliefs are cognitive understandings of the way the world works that are accepted as truth (Bell 1998). Values are culturally derived and, therefore, widely shared among members of particular groups or societies. Values underlie beliefs and attitudes about nature and the environment, and are expressed through them. The New Environmental Paradigm (NEP) scale has been used since the seventies to evaluate environmentalism or environmental values as express through a series of belief statements (Dunlap and Van Liere 1978; Albrecht et al. 1982; Arcury 1990; Trumbo and O'Keefe 2001; Johnson et al. 2004). Such beliefs are thought to influence attitudes about environmental protection (Schwarz and Thompson 1999; Heidmets and Raudsepp 2001).

The New Environmental Paradigm consists of several belief statements with which respondents agree or disagree. The individual statements stress, for example, the finite nature of resources (e.g., “the earth is like a spaceship with limited room and resources”) and the need to consider ecological values along with human ones (e.g., “humans have an ethical obligation to protect plants and animals”). The NEP is contrasted with the Dominant Social Paradigm (DSP), which emphasizes anthropocentric values (e.g., “plants and animals exist primarily to be used by humans”) and limitless growth and technological solutions to environmental problems (e.g., “technology will find a way to solve shortages of natural resources”). The repeated use of the NEP scale ensures reliability (Arcury 1990), and facilitates investigations of “the basic values and beliefs on which more specific environmental attitudes and actions are based” (Trumbo and O’Keefe 2001: 892). Consistent with other research, the general public exhibits a significant degree of acceptance of the New Environmental Paradigm, though environmentalists exhibit a stronger degree of acceptance (Dunlap and Van Liere 1978). Very few people do not exhibit environmental values or oppose environmental protection efforts in general, with one source reporting that such “opponents” comprise less than five percent of the American population (Theodori and Luloff 2002). Research has cited a ‘humans first’ mentality among individuals who are indifferent about environmental problems, and denial of environmental problems among people who favor ‘business as usual’ (Brand 1997).

Some scholars suggest that a paradigm shift is occurring toward a more environmentally aware view of the world; that is, people are shifting from the Dominant Social Paradigm to the New Environmental Paradigm (Bell 1998). This can be seen in the widespread acceptance of the NEP scale among the general population in the US (Dunlap and Van Liere 1978). However, such shifts are long-term and complex and may be difficult to assess with relatively short-term survey analyses (Bell 1998). Regardless, the notion of a paradigm shift in society generally, and the widespread

expression of environmental values in American society specifically, highlight the cultural and social nature of such values and beliefs.

In addition to value-based beliefs that comprise world views, researchers indicate that more specific beliefs about how nature works influence people's attitudes about environmental protection and related matters (Schwarz and Thompson 1990; Dutcher et al. 2004). One researchers' interviews with landowners documented how their beliefs about stream functioning (e.g., "the stream quickly purifies itself," "streams take care of themselves") influence their relationships with streams on their property, and provide a challenge to addressing non-point source pollution (Dutcher et al. 2004). Scholars have described four myths of nature that capture various ways of viewing nature and the environment (Schwarz and Thompson 1990). The *nature benign* view is that nature is forgiving and maintains a balance, while the *nature ephemeral* view is that nature is fragile and easily disturbed. The *nature capricious* myth is that nature is random and unpredictable. Lastly, the *nature perverse/tolerant* view is that nature can withstand and recover from many negative impacts but also has limits beyond which recovery is impossible. Each of these views is linked to a corresponding environmental management approach: (1) nature benign emphasizes a global equilibrium and is associated with a laissez-faire attitude towards environmental action; (2) nature ephemeral sees the earth as sensitive and unforgiving and demands immediate action; (3) nature capricious emphasizes randomness and sees environmental problems as something to be coped with, rather than managed, mitigated, or controlled; and, (4) nature perverse/tolerant recognizes nature's resilience as well as limits and is linked with a management approach that emphasizes keeping environmental problems under control (Schwarz and Thompson 1990).

The management element of the Schwarz and Thompson (1990) theoretical framework is the result of combining the myths of nature with Mary Douglas' typology of social relationships (or sociality). Douglas' grid-group framework

measures a sense of belonging and connectedness with others on the group (x) axis and "extent of social prescription" on the grid (y) axis. While the group axis represents a individual versus collective orientation, the grid axis depicts the degree to which an individual is bound by societal rules and institutions. The group axis will be addressed further below in the discussion of civic involvement. The importance of grid/group elements is also emphasized by Brand (1997), who suggests that some people believe environmental issues are to be dealt with at higher levels (e.g. the government), which stems from the perception that individual action does not matter.

The four political cultures translate into differences in attitudes and in modes of learning (Schwarz and Thompson 1990), which have implications for the perceived efficacy of various policy measures aimed at managing natural resources as well as related strategies for public participation. While the hierarchist emphasizes procedural rationality and order and coincides with the nature perverse/tolerant view, the individualist possesses a substantive rationality (i.e., a utilitarian perspective) and is associated with a nature benign view. Meanwhile, the egalitarian emphasizes cooperation among people and a critical "tread lightly on the earth" rationality and is linked to a nature ephemeral view, whereas the fatalist possesses a rationality in which they have no power or control over random events or outcomes and coincides with the nature capricious view. Although this cultural framework is not applied to individuals, and individuals may possess all of these rationalities, peoples' orientations on the grid or group axes, or toward a particular rationality, are worthy of evaluation.

Sociologists describe three bases for environmental concern – the moral, material, and democratic – which help explain environmental attitudes (Bell 1998). The moral argument stems from ancient beliefs that rural areas, or the country, provide more ideal places to live, and that concern about nature is a matter of moral, social interest. In modern times, such views are linked to crime and blight in early industrial cities, and establishing 'natural areas' or parks in urban areas to improve living conditions.

The voluntary simplicity movement also embodies the moral component of environmental concern and some people emphasize the personal or spiritual values associated with a less materialistic lifestyle. Still others view environmental protection as a civic duty or moral obligation (Brand 1997). The material basis of environmental concern, by contrast, emphasizes the practical matters associated with the degradation and depletion of resources, such as impacts to human health from pollution and toxic waste or businesses and activities that depend on resources (Bell 1998). Lastly, the democratic foundation of environmental concern emphasizes the equal rights of nature as well as the rights of all humans to a healthy environment. Together, these theoretical foundations of environmental concern provide insight about environmental attitudes. While the material basis is practical, both the moral and the democratic are ideological in that they relate to ideas and beliefs about the rights of people versus nature and the ethical responsibility to protect nature. Such beliefs about nature are linked to social values and attitudes about environmental protection efforts, as are beliefs about political matters, which are discussed further below. As Schwarz and Thompson (1990) note, broad beliefs about nature, politics and society can influence the cognitive structure of individuals and, accordingly, their understanding of the world, which in turn affects their attitudes about environmental protection efforts.

Political beliefs and American culture

Scholars note that certain values embedded in American culture such as liberty, equality, democracy and private property rights challenge environmental conservation (Lunch 2001; Waage 2001; Freyfogle 2003). Land ownership and private property rights are strong ideals in American culture, as they relate to other cultural values such as economic opportunity, personal liberty and individualism, and even notions of equality or fairness. These values are embedded in our history and have been fueled by government policies dating back to early European settlers establishing homes and

farms on the eastern seaboard and the settlement of the western United States, when land was given free of charge to pioneers who claimed land and made ‘improvements’ upon it. As the National Parks Service (2004) reminds visitors with respect to the Homestead National Monument, “By granting 160 acres of free land to claimants, [the Homestead Act] allowed nearly any man or woman a chance to live the American dream” (1). Cultural and personal values associated with landownership relate to natural resource protection and related policies, since activities on private land influence the health of natural resources, from animals that may find refuge on private land to water quality conditions downstream of private land. Thus, the debate often becomes one of private property rights versus public benefits associated with natural resources.

The strength of private property rights in America relates not only to cultural values such as individualism and opportunity embodied in the American dream, but also to constitutional law. The fifth amendment to the US Constitution states that private property shall not be taken for public use without just compensation. Court rulings have determined that a constitutional “taking” includes not only outright acquisition of land (“possessory takings”), but also to reductions in property values or elimination of reasonable economic uses due to government regulations (“regulatory takings”) (Beatley 1994; Crean and Taylor 2004). Previous court cases have ruled in favor of the landowner, requiring the government to compensate private landowners for regulatory takings due to land use laws aimed at resource protection that diminish the economic value or use of their land. Two questions that remain with respect to regulatory takings are: how much of a property must be “taken,” and how much must property value decrease before government compensation is required (Crean and Taylor 2004). These questions continue to be debated in the courts as well as by interest groups and land use planners. Meanwhile, attachment to private property rights and landownership remains strong in the minds of many Americans and in U.S. institutions.

Individualism is also a strong American value (Lunch 2001; Waage 2001; Freyfogle 2003). The grid-group framework (Schwarz and Thompson 1990) highlights the importance of people's orientation towards individuals or their self, as compared to their orientation toward groups or community. By contrast, utilitarianism, a founding principle of capitalist economies, suggests that individuals will act in their own self-interest to maximize utility or satisfaction (Beatley 1994; Weddell 2002). This perspective is emphasized in traditional economic theory arising from Adam Smith's views that: (1) people are motivated by self-interest; (2) individual pursuit of self-interests will result in the maximum good for society; and (3) the best government policy for the economy is to allow individuals the freedom to pursue self-interests (Gowdy and O'Hara 1995). Indeed, the utilitarian perspective is pervasive in American ideals such as personal freedom and independence and relates to political views about private property rights and government intervention in the free market economy (Hurley et al. 2002; Freyfogle 2003). Economic theory based on utilitarianism also provides the foundation for the traditional model of decision-making, which assumes that humans are rational beings who seek to maximize utility (or net benefits), economic or otherwise (Checile and Carlisle 1991). Other decision-making theories, which will be discussed later, emphasize constraints on utility maximization such as limited knowledge and subjective views.

From a utilitarian perspective, the pursuit of self-interest can be seen in "not-in-my-backyard" (NIMBY) situations in which people oppose projects such as a landfill or toxic waste site in their community. Another perspective of NIMBY cases, however, raises the issue of social justice, since hazardous waste sites and other undesirable land uses appear disproportionately in minority and low income communities (Bullard 2000). This is an instance where environmental issues relate to other values, in this case, social justice and equity. These values are underscored by the moral and democratic bases of environmental concern discussed previously. They are also related to social values discussed in greater detail below. Hibbard and Madsen (2002) further

note that environmental values are often associated with social values such as those relating to poverty and indigenous cultures. Indeed, humanitarian values are associated with attitudes about environmental protection, and egalitarianism is a founding value of American society.

Another prominent American value is skepticism of government, which is rooted in the European settlers who fought for independence from Britain in the American Revolution (Lunch 2001). This sentiment can be seen in bumper stickers that read, "I love my country, but I fear my government." Political scientists report, for example, that in the Western U.S., skepticism of government led to a political system with initiatives and referenda that allows citizens to challenge governmental decision-making (Lunch 2001). Skepticism or distrust of government may be more pervasive in the West, where residents live their daily lives far away from the nation's capital. Regardless, political theory and empirical research suggest that (dis)trust in government influences concern about and support for environmental protection measures, even those that are voluntary (Raedeke et al. 2001). For example, Raedeke et al. (2001) found trust in government to be the strongest variable explaining fear of future regulations associated with an existing voluntary program in Missouri.

Some values and ideologies vary across political parties, or a conservative-liberal continuum, in the United States (Lunch 2001). For example, while liberals tend to see equality as the most important value in American society, conservatives view opportunity in the market as the central American value. Many political beliefs concern two major issues: how much government should interfere in the economy, and to what degree government should intervene in personal lives. Political conservatives tend to oppose restrictions in the free market economy and support greater "social control" such as bans on abortion. Alternatively, liberals tend to support greater regulation of the free market economy compared to conservatives, and oppose government intervention in personal lives. Political views about government

intervention in the free market are critical to attitudes about environmental policies, as they relate to support for subsidies, regulations and other governmental means of resource protection. Since political conservatives are more opposed to government intervention in the free market than are liberals, they are often opposed to regulatory policies aimed at environmental protection. Libertarians go beyond the views of more traditional conservatives and liberals and oppose government intervention in society, in general. Finally, while Republicans commonly critique “big government,” Libertarians go a step further in exhibiting anti-government sentiment as a whole.

Regionalism in American politics is prevalent and is seen in political beliefs related to environmental protection (Lunch 2001). One study found that regionalism in the Southern US – specifically in the Mississippi Delta – significantly influenced participation in environmental activities (Parisi et al. 2004). In the American West, the rural mountain states tend to favor conservative/Republican viewpoints, in part due to opposition toward government regulation of resource-based economies for environmental protection (or other) reasons (Lunch 2001). Further west along the Pacific Coast, liberal/Democratic views prevail, and are largely explained by an urban-concentrated population and sociodemographic characteristics of urban residents (who are more educated, wealthy and ethnically diverse compared to rural residents). Indeed, political affiliation consistently explains variation in environmental attitudes, as do other sociodemographic variables which will be discussed further in a subsequent section (Massey 1993; Raedeke et al. 2001; Theodori and Luloff 2002; Brody et al. 2004; Johnson et al. 2004).

Related to regionalism are notions of identity and cultural values that are unique to a particular area. The Pacific Northwest in general, and the Portland metropolitan area specifically, are regions characterized in the media and among professionals as environmentally conscious (Callenbach 1978 Garreau 1981; Walton 2004). “Ecotopia” was a term coined by Callenbach (1978) in a novel about the nation of the Pacific

Northwest and its achievement of a stable state economy and society based on quality of life factors. Among professional planners, the state of Oregon and the City of Portland are often held up as models for their urban growth boundaries and other land use planning and sustainability initiatives (Walton 2004). Moreover, although old and new residents in this rapidly growing region may be attached to the values espoused by the ecotopia view of the region, the Portland metropolitan area of Oregon is situated within the more conservative and rural-dominated region of the Western US, which is better known for its cowboy spirit and rogue individualism (Garreau 1981). Here in the West, among much federally owned land, property rights are paramount and locals have fought to gain control since organized resistance to federal policies began in the 1880's and continued through the Sagebrush Rebellion of the 1970s (Graf 1990).

Private property rights and environmental protection are common topics of debate in the study region, since regulatory set-backs from water resources exist and are under consideration in the Portland metropolitan area of Oregon. Opposition to such policies is often linked to property rights advocates (Brinckman 2002), including those who have initiated state ballot measures relating to government compensation for regulatory takings. While political beliefs are important to understanding people's attitudes towards resource protection, including regulations on private property, so too are other factors including proximity to waterways or other natural resources.

Proximity to natural resources

Proximity to waterways may indeed explain attitudes about water resource protection, since people who live close to them are often more affected by policies aimed at their protection. Several theoretical explanations aid understanding of the relationship between proximity to resources and environmental attitudes. From a utilitarian or

NIMBY (not-in-my-backyard) perspective, for example, one might expect a riparian landowner impacted by regulatory set-backs from water bodies to express a negative attitude toward regulations. An alternative perspective from the utilitarian viewpoint is that proximity may lead to positive attitudes towards water resource protection, since people who live near waterways may benefit more from their protection (e.g., due to recreation use, aesthetic enjoyment, increased property values). This second hypothesis is consistent with the place attachment literature, which suggests that symbolic connections with natural areas can increase support for their protection (Altman and Lowe 1992; Conley and Moote 2001). Proximity to streams has been linked to higher levels of environmental concern in previous research (Brody et al. 2004), yet further research is called for to understand the role of proximity and related issues in environmental attitudes (Bright et al. 2002; Brody et al. 2004).

Place attachment and regionalism

Place attachment is another factor that has been linked to environmental attitudes towards natural resource protection. Place attachment has been described as the symbolic relationship that people form with a particular space or piece of land and provides a foundation for human-environmental relations (Altman and Low 1992). Yi-fu Tuan (1977) coined the term “topophilia” to describe the “affective bond between people and place” (4). In his book *Topophilia*, Tuan describes how intimate experiences of particular places and environments lead to place attachment. Sense of place is a similar phenomenon that embodies the emotional meanings people attach to places largely due to experience and related to memory and nostalgia (Relph 1997). Sense of place and place attachment may be linked to values associated with particular places or regions, as Judy Walton (2004) illustrated as she set out to discuss the challenges of “sustaining the livable city” (Portland), at Portland State University for the Annual Meeting of the Pacific Coast Geographers in 2003. At the outset of her

presentation on the livable city, Walton stated, "Let me come clear with my position on Portland: frankly, I'm passionate about the place. I'm convinced that it's the best place to live in the United States. My husband and I moved here even in spite of having no jobs, and soon found ourselves among legions of others who had done the same!" Connectedness to the ideals embodied in regions such the Pacific Northwest or the Western United States indeed relate to environmental perceptions and attitudes (Saarinen 1976).

One empirical study reported different environmental views among groups that were and were not emotionally attached to a particular drainage basin and nearby national forest in the western US (Brandenburg and Carroll 1995). This study found stronger environmental views among the residents who lived close to the drainage area compared to those who lived further away, and the researchers also reported significant differences between "back-to-landers" who moved to the area in the 1970s and newcomers in the 1990s. While the earlier group of immigrants moved to the area seeking a rural way of life, the more recent newcomers have moved to escape the poor environment of (sub)urban areas. While both groups intermingled in local environmental groups, the newcomers did not focus on forest management issues specific to the nearby national forest, but rather viewed the river drainage and local national forest as examples of a larger struggle over national forest lands. In other words, the newcomers "extended their general views of either environmental preservation or multiple use to the management of the river drainage as non-site specific" (Brandenburg and Carroll 1995: 390).

Research has been conducted on the link between place attachment and recreational use of natural areas (Eisenhauer et al. 2000; Vitterso et al. 2001). Since experience and intimacy with place often lead to feelings of attachment and connectedness, recreational users of natural resource areas may be more attached to them. As a result, they may also be more concerned about and supportive of their protection. A typology

of recreational users of public forests that included attachment-oriented and user-oriented classifications was developed in one study (Mitchell et al. 1993). While recreational use may lead to feelings of attachment, which in turn influence environmental attitudes, the utilitarian perspective suggests that recreational users may exhibit more supportive attitudes toward resource protection than non-users because they receive greater benefits from them. Regardless, scholars indicate that both place attachment and recreational use of natural areas are related to attitudes about environmental protection. Perceptions of resources and places also influence environmental views and are discussed below. Related to recreation, people may possess positive or negative perceptions about living close to resource areas that are accessible to the public, for example, due to benefits associated with recreational access or negative perceptions about increased crime and safety issues.

Perceptions

Geographers and others suggest that perceptions significantly influence environmental attitudes and behavior (Saarinen 1976; Mitchell 1979; Golledge and Stimson 1997). Perceptions are not easily defined, but are a part of the cognitive structure and can be thought of as how things are recalled by people, especially through the senses (Golledge and Stimson 1997). Perception is subjective, and not synonymous with objective reality and knowledge. Perceptions that influence environmental attitudes include those relating to environmental conditions and the aesthetic quality of various places and regions, which are influenced by experiences involving senses such as such as sight and smell (Tuan 1974; Saarinen 1976).

Perceptions about resources may influence attitudes about their protection such as those related to environmental conditions (House and Sangster 1991), safety concerns (Brody et al. 2004) and aesthetic qualities (Prince 1997; Nassauer et al. 2001).

Perception-based aesthetic preferences for landscape features such as open water and sinuous rivers have previously been linked to environmental protection efforts (Prince 1997; Nassauer et al. 2001). Likely associated with aesthetic preferences, different types of water resources (e.g., open water wetlands versus stream channels) have been found to have different impacts on the prices of nearby housing (Mahan et al. 2000). Perceptions also vary regarding peoples' views of how property values are impacted by proximity to resources. While some see economic, aesthetic and other values associated with living near water resources, others perceive living near resources negatively due to, for example, reduced property values associated with increased regulations near water. Indeed, these perceptions are related to beliefs and values associated with resources, and may also be linked to attitudes about their protection.

Perceptions regarding the condition of water resources are important and vary across individuals (House and Sangster 1991). People who view the condition of water resources as bad are likely to exhibit greater concern and support for protection compared to those people who view conditions as good. Such perceptions may or may not be related to knowledge or actual conditions of resources as measured by objective criteria. While perceptions are influenced by beliefs, they may also be linked to knowledge, another factor commonly expected to explain environmental attitudes (Arcury 1990; Blachard 2000).

Knowledge

A long-time assumption is that environmental knowledge translates into awareness and concern, which in turn influence human attitudes and behavior that relate to environmental resources (Arcury 1990; Blachard 2000). In other words, knowledge is seen as a cause of environmental concern and attitudes that favor environmental conservation, which influence pro-environmental behavior. Indeed, many

environmental education programs are undertaken based on the assumption that increased knowledge will lead to behavioral change (Arcury 1990). Research has shown, however, that the link between knowledge and attitudes or behavior is weak (Roder 1961; Brand 1997; Trumbo and O'Keefe 2001; Bright et al. 2002).

Still, theory suggests that knowledge and associated factors are linked to people's attitudes and behavior, though the relationship is not as simple as increased knowledge leading to greater support for environmental protection. Both the theory of bounded rationality (Simon 1947) and cognitive dissonance theory (Festinger 1957) help explain the weak relationship between knowledge and environmental attitudes. The theory of bounded rationality suggests that rational decisions (e.g., maximization of net benefits) are constrained by such things as knowledge and mental capacity. One study evaluated various models of decision-making (including economic optimization, subjective utility, and bounded rationality) and found bounded rationality to be the best in explaining human settlement in floodplains, highlighting the importance of information and knowledge on decisions to live in a floodplain (White 1973).

Cognitive dissonance theory also relates to knowledge and information acquisition. Festinger (1957) proposes that people seek consistency among their attitudes and behavior, and will attempt to minimize discomfort associated with perceived inconsistencies. One way in which this is done is by selectively acquiring information to match their beliefs, such that information that supports an individual's pre-existing beliefs is accepted and that which does not is rejected (Meseke 1998). Uncertainties in the environmental sciences in particular, and inconsistent findings in the world of research in general, facilitate the selective acquisition of scientific information to suit one's beliefs. Such complexities in environmental science underscore the importance of bounded rationality theory, since the general public may possess limited capabilities to understand the complicated interconnections that exist in human-environmental systems. These theories emphasize that the relationship between knowledge and

attitudes is not merely about objective measures of knowledge and their influence on attitudes or behavior. Moreover, one factor related to knowledge – that is, education – often influences environmental attitudes, as do other sociodemographic factors.

Sociodemographics

Sociodemographic characteristics have been investigated in relation to environmental beliefs, values and attitudes. Much of this research has incorporated the New Environmental Paradigm scale as a measure of environmentalism (Dunlap and Van Liere 1978; Arcury 1990). Consistent significant correlation among sociodemographic variables and orientation to the NEP scale confirm theoretical reasons for the expected relations. Educated individuals are expected to exhibit stronger environmental leanings, since they are more likely to be exposed to ecological concepts and environmental issues and to comprehend the complex concepts that constitute the NEP. With regard to age, younger people are thought to be more flexible in their views, less exposed to the Dominant Social Paradigm (DSP) and, thus, less resistant to the New Environmental Paradigm. Liberal political orientation is also associated with environmentalism because of decreased commitment to the status quo and various aspects of the DSP. Related to political views, urban residents also express stronger environmental views compared to rural residents (Albrecht et al. 1982; Arcury 1990).

Additional sociodemographics are associated with environmental attitudes including income, gender, and ethnicity. The relationships between income and environmental views is not as pronounced as other variables (Brody et al. 2004), and some suggest that the lack of significant correlations are due to a non-linear relationship (Vaske et al. 2001). Indeed, different hypotheses can be developed based on theoretical rationale including that of a non-linear relationship. Maslow's hierarchy of needs suggests that individuals and entire societies must first take care of basic needs such as food, water

and shelter before their interest turns to other matters (Bell 1998). From this perspective, wealthier people or societies should be more concerned about environmental degradation and conservation. This perspective, however, does not explain indigenous cultures around the world who may be poor by Western standards, but who possess strong environmental values and beliefs and have developed sustainable agricultural and other practices. Moreover, research in the United States has found that lower income people exhibit greater environmentalism in such matters as water conservation compared to wealthier people (Trumbo and O'Keefe 2001), which is not surprising given the explicit cost factor and basic human needs involved with certain conservation practices. Regarding the (non)linear nature of the relationship between income and environmentalism, some scholars suggest that environmental views strengthen as income levels rise but taper off or decline at very high income levels (Vaske et al. 2001). The diminishing of environmental values at higher income levels may be related to conservative political views and materialism among the wealthy.

In addition to income, gender is frequently associated with environmentalism. Feminist geographers and others describe linkages between gender and environmental domination, highlighting disturbing metaphors such as clearing "virgin forests" and "raping the Earth," along with the images of Earth as female (e.g., as in "Mother Earth" or "Mother Nature"). These scholars link the patriarchal ideals of domination of nature and domination of women. Others suggest that because women have more caring natures, in general, they also tend to exhibit greater environmental concern. Overall, results from previous research suggest that females do tend to exhibit greater concern and support for environmental protection (Bell 1998; Vaske et al. 2001; Theodori and Luloff 2002; Johnson et al. 2004; Brody et al. 2004). However, the results of research are mixed, and sometimes men exhibit greater environmentalism (Vaske et al. 2001; Johnson et al. 2004). One study, for example, found that men engage in certain environmental behaviors more than women (Vaske et al. 2001). This

particular study found men to be significantly more involved in an environmental organization, which not only relates to environmentalism but also to civic involvement. Factors that affect organizational or civic involvement, including sociodemographics, are discussed further below.

Differences in environmentalism have also been found among different cultures across the world and among different ethnic groups in the United States (Bell 1998; Johnson et al. 2004). Scholars point to the influence of Judeo-Christian foundations that emphasize (hu)man's domination and control over nature. In the Bible, for example, writings about the creation of Earth for humans and dominion of humans over nature have been cited as a cause for lower environmental values among Christian and western cultures. By contrast, philosophies in eastern religions (e.g., Taoism, Buddhism) and societies emphasize living in harmony with nature (Bell 1998; Johnson et al. 2004). In the United States, one important factor may be the degree to which ethnic immigrants adapt to American ideals such as materialism (Johnson et al. 2004). The relationship between environmental attitudes and modern religions in general is complicated, however, since beliefs about nature and the environment vary across and within religions. For example, religious leaders of specific congregations or particular worshippers may emphasize environmental ethics more or less than the religious organization as a whole. Moreover, recent actions by religious leaders have stressed the importance of environmental protection, which may signal a shift in religious beliefs and activities relating to the environment. Specifically, a declaration signed in 2002 by Pope John Paul II and the leader of Orthodox Christians states that environmental protection is a moral and spiritual duty (Catholic News 2002).

Although sociodemographics are consistently related to environmental attitudes and behavior, the results of research are mixed. Indeed, theoretical reasons exist for expecting differential effects between some sociodemographic variables and environmental attitudes. Inconsistent findings may be due to issue- and context-

specific factors such as whether the topic is water conservation or global climate change, or whether the expression of environmentalism is with regard to support for policy measures or environmental activism. In any case, past studies indicate that, overall, relationships among sociodemographic variables and environmentalism are weak, albeit consistent. Researchers regularly report low R-squared values for sociodemographic variables in the ten percent range, suggesting that other factors play a more significant role in environmentalism (Brody et al. 2004; Johnson et al. 2004).

Civic involvement and social values

The common expression of environmental values in the United States is often attributed to the fact that such values are culturally based (Vaske et al. 2001). The widespread presence of values among society establishes a social norm, and thereby influences individuals' normative beliefs about how they ought to think, feel and act (Fishbein 1967; Weigel and Newman 1976; Trumbo and O'Keefe 2001; Vaske et al. 2001). Subjective norms are influential because people may possess or express attitudes that conform to the beliefs they think others hold (Weigel and Newman 1976; Trumbo and O'Keefe 2001). These pressures may influence attitudes and behavior themselves, and/or the expression or reporting of them (Schwarz and Thompson 1990; Gilbert et al. 1998). Schwarz and Thompson (1990) suggest that group orientation (sense of belonging and connectedness) as well as grid orientation (the extent of social prescription) influence views on environmental matters. While the former dimension relates to the individual interests versus the public good, the grid dimension relates to the degree to which people prescribe, or are bound by, societal rules and institutions. The way in which people view their role in society and their relationships with others may also affect environmental attitudes and behavior (Ajzen 1985; Schwarz and Thompson 1990). Given the importance of these factors in understanding environmental attitudes, people who are more civically involved may possess stronger

attitudes than others about environmental protection due to greater orientation to social norms and the public good.

Public Participation in Natural Resource Decision-Making

This section describes public participation in natural resource decision-making, especially in terms of group participation and calls for representativeness. Civic involvement in organizations in general is then discussed. Findings from past research that highlight differences between participants and non-participants of organizations are presented, in addition to differences among organizational structure and objectives.

Group participation in environmental decision-making

The demand for public participation in natural resources decision-making in the US has increased significantly over the past several decades, particularly in response to federal mandates for public involvement in the National Environmental Policy Act of 1969 (Chess et al. 2000; Blatner et al 2001). In general, three arguments exist for involving the public in environmental decision making (Korfmacher 2001). First, the democratic argument emphasizes the inherent value of public participation in any decision-making process that potentially affects the public. Next, the substantive rationale claims that because citizens possess values and technical knowledge that are relevant to decision-making, they should be included in the process. Finally, the pragmatic rationale stresses that public involvement can increase public support for the outcome and facilitate implementation. Each of these arguments has a corresponding target population – representatives of the general public, citizens who possess information that is useful to decision-making, and educators and opinion

leaders, respectively. These different arguments and audiences raise the question of who should be involved in natural resource decision-making.

Several authors have recently addressed the need for representativeness in public participation processes (Berry et al. 1993; Chess et al. 2000; Korfmacher 2001; McComas 2001). The primary advantage of ensuring a representative audience is so that decision-makers get an accurate picture of what citizens know, think and feel about a particular issue (McCormas 2001). Chess et al. (2000) discuss various types of representation (specifically in relation to participatory watershed management efforts), and argue that all of these approaches should be considered to achieve equity in public involvement. These include: demographic and geographic diversity, positional and/or reputational representation, and inclusion of disinterested parties who are not particularly interested in the issue at hand, but are committed to addressing the common good. Different theories about democracy and public involvement also emphasize different goals and target audiences. While representative democracy (or pluralism) focuses on the involvement of volunteer-based groups, participatory democracy (or direct participation) focuses on the mass participation of individuals in decision-making (Berry et al. 1993; Laird 1993; Conley and Moote 2001).

The question of who is and should be involved in environmental decision-making is particularly important given the strong influence of special interest groups in the political process, in addition to calls for community-based conservation efforts (Western and Wright 1994; Conley and Moote 2001). Agrawal and Gibson (1999) have criticized the conceptualization of "communities" as small spatial units and homogeneous social structures. Viewing community as a small spatial unit has led to the assumption that because place-based communities share a common space, they also share the same interests and concerns. In other words, communities of place have been viewed as homogenous. Matzke (1997) notes that community-based resource management initiatives often cannot satisfy all members of the involved community,

given disparate and conflicting sectors within them. As a result, such initiatives entail defining whose voice(s) will be heard and given priority. Often times, place-based communities (e.g., those that are attached to a specific geographical space) must compete with well-developed network communities, which are spatially unbound social units linked by information flows between people who share common experiences, values, interests, or goals (Matzke 1997). Network-based communities may not represent local perspectives and may supersede them, given substantial access to resources. Both interest- and place-based groups are often involved in natural resource decision-making in the United States.

Involvement in civic organizations

Overall, civic involvement in organizations and the government in America has declined significantly over the past several decades. As Putnam (1995) states, "By almost all measures, Americans' direct engagement in politics and government has fallen steadily and sharply over the last generation" (67). One area of declining civic engagement is organizational membership, which has decreased by about one-quarter from 1970-1995. Putnam also notes the decline in neighborhood interactions and social trust, and suggests that perhaps American's distrust of and disgust with government has influenced withdrawal from politics and civic life. Other potential reasons for the decline in civic involvement are increased mobility and reduced rootedness, demographic transformations in family structure and lower wages, and technological changes resulting in the privatization of communication and leisure time (e.g., television, the internet, etc.). Webber (1963) suggests that the advent of transportation and communication technologies and the corresponding increase in human mobility and transcendence of long distances has decreased the relative importance of place-based communities and resulted in "communities without propinquity" across America. Countertrends to the decline in civic engagement

include the establishment of vibrant new organizations such as national environmental organizations and the increase in nonprofit organization (Putnam 1995). However, much of this newer civic involvement is in tertiary associations, which do not offer opportunities for social networking and engagement. One example of these is the abundance of environmental organizations that have paying members who do not participate in group activities.

Although people widely express environmental concerns and values, most people are inactive in environmental conservation matters (Theodori and Luloff 2002; Dutcher et al. 2004). Some scholars propose a five-layered circular model for social movements in which the inner core is comprised of activists, the outer layer is opponents and the attentive, sympathetic, and neutral public lie in between (Theodori and Luloff 2002). Opinion polls identify the sympathetic public as the largest group in society. The sympathetic group exhibits concern for environmental issues, but do not do much about these issues. Researchers report that approximately one-half to two-thirds of the population falls into this category, while about one-tenth or less of the population constitutes the activist category, and an even smaller portion (less than five percent) makes up the opposition.

Many scholars suggest that people involved in civic organizations share certain characteristics such as higher incomes (Manzo and Weinstein 1987; Beatley 1994; Martinez and McMullin 2004). Regarding income, Keller (1968) reports mixed findings and suggests that lower income, working class communities may exhibit greater neighborliness, because people of lower financial means may rely more on community members for support. Another explanation shown in one study is that higher income residents have greater desires for privacy and higher fences, which reduce neighborliness (Keller 1968). Research in general suggests that participation increases with higher income, and Smith (1994) suggests that voluntary participation peaks at middle incomes and at middle ages.

Participants and non-participants of organizations appear to differ based on demographic and other characteristics (Beatley 1994; Smith 1994; Chess et al. 2000; Martinez and McMullin 2004). Income, age, education, gender, marital status, homeownership and length of residence have all been found to influence participation (Manzo and Weinstein 1987; Beatley 1994; Smith 1994; Martinez and McMullin 2004). Although these variables have been reported as significant in at least some studies, education is said to be the most influential demographic characteristic across studies reported in the literature (Smith 1994). Type of participation appears to be important with regard to demographics, as one study found that age, gender, social status and employment affect the likelihood of people *joining* the Sierra Club but *not volunteering* for group activities (Manzo and Weinstein 1987). With regard to income, rich members have been found to be more inactive, which Martinez and McMullin (2004) explain a sort of “sweat equity” in which lower income participants make-up for their inability to pay through volunteer labor.

As is seen from the discussion of the grid-group framework, orientation towards community may relate to differences in political rationalities and views of nature (Schwarz and Thompson 1990). Specific factors relating to social-orientation and volunteerism have been discussed more in the literature including social networks, social goals and needs, and broader social circumstances (Martinez and McMullin 2004). With regard to social networks and goals, involvement in other organizations, personal contacts in organizations, and/or interests in socializing and outings are important determinants for participation in organizations (Manzo and Weinstein 1987). Competing time commitments are important in terms of broader personal circumstances, as is being asked to join. Feelings of self-efficacy and perceptions about the value of activism are other factors that influence involvement in organizations, and some suggest that these feelings may change through participation (Manzo and Weinstein 1987; Martinez and McMullin 2004).

The values of members in organizations have also been found to differ from those of non-members (Manzo and Weinstein 1987; Martinez and McMullin 2004). One study reports differences in environmental concerns and experiences among participants in environmental organizations including that active members have experienced more personal harm from environmental problems compared to non-active members (Manzo and Weinstein 1987). In addition, while some members express broad concerns about the environment, others express concerns about specific local problems. The broad concerns are said to reflect altruism or broader notions of self-interest, whereas concerns about specific local problems are attributed to self-interest.

Overall, a review of the literature from 1975 to 1992 on the determinants of voluntary participation in organizations and activities describes five types of factors: sociodemographics, personality, situational factors, context and social participation variables (Smith 1994). Sociodemographics and social participation were already discussed above. The latter relates to the fact that people who participate in groups tend to be “joiners,” though type of groups to which an individual is drawn may vary (e.g., religious versus environmental). Personality factors include those that relate to social orientation including efficacy, self-esteem, empathy and morality. Additional variables include perceived effectiveness of the group, benefits and costs of participation, altruism about participation, incentives for personal growth, adherence to group ideology, and sense of civic duty. Situational factors include immediate conditions such as being asked to participate or specific concerns relevant to the group. Lastly, context variables are those that relate to territory or geography as well as organizational type. With regard to the former, small, rural communities are known to have greater participation than larger, urban ones. Parisi et al. (2004), for example, found that community size and regionalism (i.e., location inside the Mississippi Delta) related to environmental activism in the southern U.S.

With regard to organizational type, Smith (1994) reports that clarity of goals and orientation toward change positively affect participation. Moreover, Martinez and McMullin (2004) suggest that tenure for participants is greater and turnover is lower for multiple-objective groups. Organizational structure also influences who becomes members and how many become active in the group. One distinction made in the literature is between community self-help organizations and more bureaucratic voluntary organizations (Smith 1994). Other important factors include organizations' outputs, ideologies, and inter-group linkages. Indeed, the nature of involvement varies in terms of the amount of time and physical labor involvement, in addition to opportunities for social networking. For example, qualitatively different activities include donating money and writing letters, participating in activities and working on projects, some of which require physical labor, and attending meetings and assisting with organizational and administrative tasks (Martinez and McMullin 2004). While some people are oriented to managerial and administrative tasks, others are more interested in on-the-ground projects and activities.

With regard to context variables, greater organizational involvement not only relates to individuals who tend to be "joiners" but also to the presence of social capital in a particular community. Civic involvement in organizations is one form of social capital, which can be described as the social networks, norms, and trust that facilitate coordination and cooperation for the mutual benefit of people (Putnam 1995). Social capital influences information flows and communication within and among people and organizations, and has been linked to activeness including in environmental organizations (Parisi et al. 2004). For example, in an investigation of social capital in the American South, Parisi et al. found that communities with a larger number of community groups also had higher levels of engagement in environmental initiatives. Thus, communities with greater civic involvement and social capital tend to be more active in environmental and other matters.

The following section describes the study area for this research. Background information is presented on the water resource and land use policies in the Portland metropolitan region, followed by a description of the geography of the Johnson Creek watershed.

The Study Area

Located at the confluence of the Columbia and Willamette Rivers in northwest Oregon, Portland is the largest city in the state with over a half-million residents (Census Bureau 2004). The greater metropolitan area is home to approximately two million people, more than half the state population. Proximity to two major waterways made the location an ideal site for urban development in the early 1800s. These river systems remain central to the regional economy by providing water for agriculture, industry, transportation, hydroelectricity, and recreation. The river systems also provide cultural and amenity values as well as habitat for salmon and other wildlife. Water resource planning efforts in the Portland area are oriented toward stormwater management, water quality concerns, and preservation of salmonid species.

This research focuses on the Johnson Creek watershed in the southeastern portion of the Portland metropolitan area (Figure 2-1). The use of a single watershed in this research facilitates a case study approach that considers the regional geography of the watershed. As Golledge (2002) suggests, a regional geographic perspective is particularly valuable in resource studies given its focus on the integration of information about place, culture, politics, economics and the biophysical environment. The following sections describe the policy context of the Portland metropolitan area and the human and physical geography of the Johnson Creek watershed.

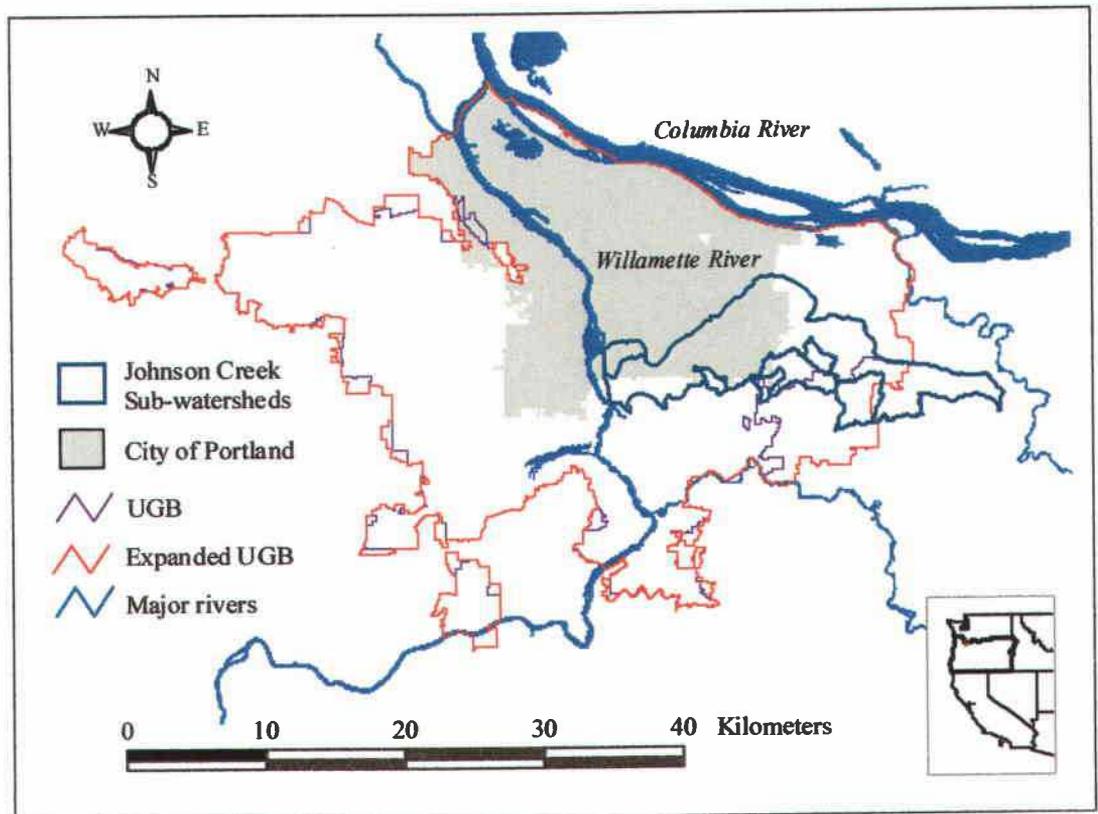


Figure 2-1. The Johnson Creek Watershed in the Southeastern Portion of the Metropolitan Region of Portland, Oregon (Metro RLIS data 2003).

Policy context in metropolitan Portland, Oregon

At the federal level, three policies significantly influence the management of water resources in the greater Portland area: the Endangered Species Act, the Clean Water Act, and the Comprehensive Environmental Response, Compensation, and Liability Act. The listing of Steelhead and Chinook salmon as threatened under the Endangered Species Act in the late 1990s increased attention to protection of salmonoids and their habitat in the metropolitan region. Clean Water Act requirements such as those for total maximum daily loads (TMDLs) focus regional efforts on reducing pollutant loads, especially those from combined stormwater/sewer overflows (CSO) into the Willamette River in the central Portland area. The CSO problem has resulted in

greater attention to diffuse stormwater management techniques including the Downspout Disconnect Program managed by the City of Portland's Bureau of Environmental Services. Lastly, the designation of the Portland Harbor as a "Superfund" hazardous waste clean-up site, first legislated in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Buck 1991), has increased attention to pollution reduction and mitigation as well as to health issues associated with eating fish out of Portland's rivers.

Statewide, the Oregon Department of Land Conservation and Development (DLCD) governs land use policy that includes nineteen goals (DLCD 2003), several of which are relevant to water resource issues. Goal 5 requires planning for significant natural resources, scenic and historic areas and open spaces. In the Portland metropolitan area, focus is placed on fish and wildlife habitat for Goal 5 planning (Metro 2001). Goal 6 addresses water quality and other environmental quality issues, and Goal 7 deals with natural hazards including floods. Local municipalities are required to address these land use goals, and Metro, the regional government for the greater Portland metropolitan area, is given the option to also undertaken planning for these goals. Ultimately, the DLCD approves local and regional plans, and local jurisdictions must come into compliance with any regional standards established by Metro.

The regional and local governments in the Portland area have recently addressed Goals 6 and 7 through the adoption and implementation of "Title 3" standards for water quality and flooding, which was included as one of twelve titles in Metro's Urban Growth Management Functional Plan. Metro's Title 3 standards, adopted in 1998, apply in water quality and flood management areas delineated by the following buffer widths: 50-feet for wetlands or primary streams (that drain 100 acres or more), and 15-feet for secondary streams (that drain 50-100 acres) (Metro 1998). In steeply sloped areas, the widths for primary and secondary streams increase to 200-feet and 50-feet, respectively. The entire 100-year floodplain is also protected under Title 3.

Performance standards apply in Title 3 areas for maintaining flood storage capacity and preventing erosion and pollution of water across the Metro region. Cities and counties are responsible for implementing these standards at the local level, and many local jurisdictions have adopted Metro's regional maps for Title 3 resource areas, with minor adjustments made based on local knowledge.

Though many local jurisdictions in the Portland metropolitan have had Goal 5 programs in place since the late 1980s, Metro is currently pursuing a program for region-wide protection of fish and wildlife habitat. Oregon land use policy guides the Goal 5 planning process through the following steps: (1) inventory resources; (2) identify land uses that conflict with resource protection and conduct an analysis of Economic, Social, Environmental, and Energy (ESEE) impacts of allowing or prohibiting 'conflicting uses;' and, (3) develop a program to meet Goal 5 objectives (DLCD 2003). This procedural rule requires public outreach and involvement at each stage of the decision-making process. In general, civic involvement in land use planning is required statewide by Goal 1.

Metro completed an inventory of riparian and upland habitat in 2002 and recently finished the Economic, Social, Environmental, and Energy (ESEE) analysis. In Fall 2004 to Winter 2005, Metro will enter the program development phase for the regional habitat protection program. The Metro Council is considering regulatory and non-regulatory means to protect the regional resources including development restrictions, land acquisition, habitat restoration, and education- and incentives-based programs. Once a regional program is adopted, local jurisdictions will have two years to revise their local plans and land use codes to comply.

The City of Portland has one of the most protective Goal 5 programs in the study area, and has been working recently to improve the protection of water resources, in part due to recent endangered species listings of salmonids. This Bureau of Planning

initiative, named Healthy Portland Streams (HPS), is one component of the larger River Renaissance project, which is a collaborative effort to revitalize the Willamette River system throughout Portland (City of Portland 2004c). River Renaissance emphasizes the value of the river in terms of giving shape and character to the city and seeks to integrate the natural, economic, urban and recreational roles of the river. The HPS initiative entails protecting streams, riparian vegetation, and flood zones in Portland watersheds by both regulatory and non-regulatory means. Potential non-regulatory actions include voluntary land acquisition, conservation-oriented tax policies, and education programs. The major regulatory component of the HPS proposal, which has received substantial attention, is the expansion of areas protected by environmental overlay zones as well as heightened regulations in the land use code that applies to these areas.

As a part of Goal 5 planning, environmental overlay zones (e-zones) were adopted by the City of Portland in 1989 to protect environmentally sensitive areas such as wetlands, upland forests, steep slopes, and riparian areas (Bureau of Planning 2001). As the term “overlay” implies, e-zones are an added layer to the base zones (i.e., residential, industrial, commercial). Proposed changes to regulations in 2001 would change the level of protection for approximately one-fifth of the land currently in environmental overlay zones and would increase the area of protected streams and wetlands by one-quarter, from approximately 19,000 to 24,000 acres (7,700 to 9,700 hectares) (Bureau of Planning 2001; Brinckman 2002). In the initial proposal, the required setback from streams and wetlands for new buildings would increase from 30-50 feet (9-15 meters) to 75-200 feet (23-61 meters), depending on the water body and slope. If adopted, this regulation would affect about ten percent of Portland landowners (or 13,000 people). However, public opposition to this proposal has led the Bureau to step back and reconsider this proposal.

Many residents in the Portland area oppose the draft regulations included in the HPS proposal (Brinckman 2002). In fact, some landowners organized a campaign against the proposed regulations, named United We Stand, claiming that the proposed rules are an unjust infringement on their property rights. The first round of public input on the HPS proposal saw significant criticism, which was partly attributed to, and aggravated by, the tactics of the United We Stand group. Opposition to HPS and related public involvement processes will be discussed further in Chapter 4, which presents the findings of preliminary interviews conducted for this research.

The United We Stand group, based in the southwest hills portion of Portland, is linked to Oregonians In Action (OIA), the statewide political interest group whose efforts are aimed at upholding property rights statewide. OIA has successfully placed two ballot measures that would require government compensation for any regulatory takings. Oregon voters passed Ballot Measure 7 in 2000, but the rule was found unconstitutional in 2002 on the grounds that it made too many changes to the state constitution (DLCD 2002). OIA has revised the ballot measure, now number thirty-seven, to address this problem. The new land use rule, if passed, would require compensation for any diminution in the value of any land from regulations passed after the acquisition of property (Stacey 2004). An article in the *Oregon Planners' Journal* suggests that implementing such a law would be very difficult, and would be the end of Oregon land use law.

Statewide requirements for citizen involvement in land use planning are laid out in Goal 1 (DLCD 2003). In response to the state mandate for engaging the public in land use decision-making, many jurisdictions have developed neighborhood association structures. The City of Portland has a bureau, the Office of Neighborhood Involvement, and seven regional coalition offices that work with and support local neighborhood groups. The regional offices serve as liaisons between the City and neighborhood associations (NBA), which are defined as "...a group of people

organized for the purpose of considering and acting upon any of a broad range of issues affecting the livability and quality of their neighborhood” (ONI 2002). Through this network, citizen volunteers participate in community activities and government affairs to address land use, transportation and other issues of local importance. Neighborhood groups exist beyond the City of Portland, and are often referred to as Community Planning Organizations (CPO) in other areas of the region. This title reflects the groups’ orientation to land use planning, though the activities of neighborhood groups extend to issues including crime and safety and community building, among others. Neighborhood-based groups exist in all the municipalities in the study area as well as in some unincorporated areas. These groups do not exist, however, in more rural parts of the watershed.

Another set of place-based organizations relevant to public involvement in land use planning and water resources are watershed councils. Oregon supports watersheds as a unit of assessment and management through the state-wide establishment of watershed councils under the Oregon Watershed Enhancement Board’s watershed council program, which began in 1993 (G-WEB 1997). This effort is a part of the larger Oregon Plan for Salmon and Watersheds. Watershed councils focus on voluntary measures aimed at improving salmon habitat and watershed health and undertake activities such as watershed-wide planning and monitoring, restoration projects and outreach efforts. In Oregon and elsewhere, watershed councils vary greatly in terms of their administrative structures, participant demographics, and project scope (Griffin 1999).

The origin of the Johnson Creek Watershed Council (JCWC), which covers the study area, stems from citizen-based initiatives beginning in the late 1970s (Johnson 2003). Community groups developed in response to plans by Metro, the newly formed (at the time) regional government, to address stormwater and flooding issues in the watershed. This focused citizen group eventually became the “Friends of Johnson

Creek,” which in turn became the Johnson Creek Watershed Council in 1996 (Riley 1998; Johnson 2003). The JCWC now functions as a non-profit organization led by a Board of Directors including various representatives from throughout the watershed (JCWC 2004). Three committees meet monthly to address land use issues, restoration efforts, and outreach endeavors in the watershed. People also participate in restoration projects, community events and other activities sponsored by the watershed council. The Action Plan for the watershed was completed in 2003 and prioritizes activities for the watershed council and its residents. The following section further describes the geography of the Johnson Creek Watershed.

The Johnson Creek watershed

The focal study area for this project is the Johnson Creek watershed in the southeastern portion of the Portland metropolitan area (Figure 2-2). The Johnson Creek watershed was chosen because it possesses considerable riverine and wetland resources, which are the focus of water management activities in the Portland area. The watershed also contains substantial variability in characteristics such as sociodemographics, land use context, and topography and surface location of water resources. These geographical factors of the watershed provide the human and physical context for this research and are considered in interpreting and discussing the findings from this research.

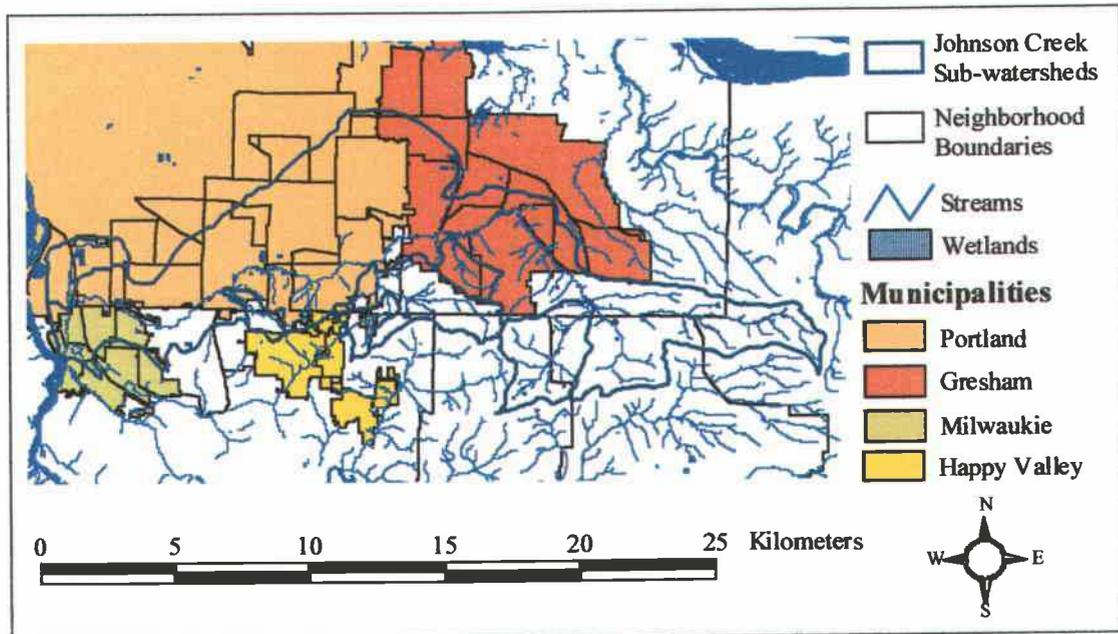


Figure 2-2. The Johnson Creek Watershed, Neighborhood Boundaries and Municipalities (Data from Metro RLIS 2003).

Johnson Creek flows westward from the Boring Hills in the vicinity of the eastern border of the urban growth boundary (UGB) to the stream's confluence with the Willamette River. The watershed is roughly 140 square kilometers (54 square miles) and encompasses six political jurisdictions including the City of Portland, three suburban municipalities (Milwaukie, Happy Valley, and Gresham) and two counties (Multnomah and Clackamas) (Davis 1996). The current population of the watershed is approximately 165,000, about two-thirds of which live in the City of Portland, one-quarter in the suburban municipalities, and less than one-tenth in more rural, unincorporated areas (Table 2-1) (Meross 2000). Happy Valley occupies a very small portion of the watershed (specifically, less than one percent of the land area and one-quarter of one percent of the population), and therefore was effectively omitted from data collection efforts conducted for this research.

**Table 2-1. Population and Size of the Study Area by Jurisdiction
(Data from Meross 2000).**

Jurisdiction	Population in watershed [% of total]	Land area (acres) in watershed [% of total]	Stream miles watershed [% of total]
Portland	109,134 [66.5%]	14,075 [41%]	42 [34%]
Gresham	32,334 [20%]	5,541 [16%]	30 [25%]
Milwaukie	9,391 [5.7%]	4,127 [12%]	8 [7%]
Happy Valley	340 [0.21%]	111 [<1%]	1 [<1%]
Unincorporated Clackamas County	10,967 [6.7%]	8,750 [26%]	32 [26%]
Unincorporated Multnomah County	1,948 [1.2%]	4,127 [12%]	9 [8%]
<i>TOTAL</i>	<i>164,115</i>	<i>34,035</i>	<i>122</i>

The Johnson Creek watershed is relatively flat with a peak elevation of 750 feet in the Boring Hills of the headwater region (Meross 2000). The slope of the creek is atypical in that steeper slopes characterize the downstream segments of the stream relative to upper portions. Lower slopes in the middle and lower sections of the watershed (within the City of Portland) result in more flooding, which is a significant issue of concern in the watershed. Engineered solutions to flood problems (e.g., channel straightening, rock lining) were undertaken from the 1930-1950s. Flooding problems persisted, however, and the 1996 floods in the Willamette Basin caused \$700,000 in damage in Portland. Amelioration of flooding problems continues, though current efforts emphasize non-structural approaches to flood mitigation including a buyout program that will be further described below.

The majority of the Johnson Creek watershed resides within the UGB, though rural areas beyond are located in the headwaters to the east. The largest planned expansion of the UGB, approved by Metro Council in 2003, is located in the Damascus area of the watershed in the headwater region (Metro 2003). Current and future planning in

this area is critical due to the potential impacts of development on natural resources as well on existing rural communities. In general, rural land uses in the watershed include cropland, cattle grazing, horse farms and several nurseries, greenhouses, and Christmas tree farms. Recent planning efforts have involved stakeholders in rural areas, especially Damascus. Many residents value their rural lifestyles and are concerned about the urbanization of these areas.

To the north of the headwaters and Damascus area in the northeastern portion of the watershed resides the City of Gresham, which is a rapidly growing suburban town of which about half lies in the watershed. The main stem of Johnson Creek flows through southwest Gresham, and the Kelly Creek sub-watershed is located in southwest Gresham near unincorporated areas in the new UGB expansion area. Much of the new development in Gresham is higher-density, multi-family residential housing as well as single-family homes on the buttes of southern Gresham. This development, along with recent planning for light rail, urban renewal and future development in the vicinity of the UGB, raise issues about the density of development and the impacts of development on natural resources and the livability of local communities. Gresham has recently implemented standards relating to tree removal and development on steep slopes, but some residents claim that these efforts are not stringent enough (Mortenson 2003).

The City of Milwaukie, the other major suburban community in the southwestern portion of the watershed, lies downstream at the confluence of Johnson Creek and the Willamette River. Only the northern half of Milwaukie resides within the watershed. Kellogg Creek occupies a significant part of south Milwaukie but flows directly into the Willamette River. As a longer established city closer to Portland's central business district, Milwaukie has not been experiencing the same rate of growth as Gresham in recent years. New development in this area is mostly occurring as infill. Density is somewhat of an issue in Milwaukie, since some residential lots are large enough to be

subdivided and further developed. Substantial industrial land uses are located in Milwaukie along major highways in the northwest and south. A major thoroughfare – Highway 99 East – is located in west Milwaukie and effectively disconnects downtown and much of Milwaukie from the Willamette River to the west. A Waterfront Plan has been developed, one aspect of which is to provide better access to the waterfront by creating a pedestrian friendly crossing. Funding is currently being sought by the City of Milwaukie to implement the plan. Johnson Creek flows in north Milwaukie along the border with the City of Portland. The river serves as a boundary between the two jurisdictions, and divides the Ardenwald-Johnson Creek neighborhood into two parts.

The Portland portion of the watershed includes southeast Portland. Southeast Portland can be divided into east and west along Interstate 205, the loop highway around the central city. To the west, residents tend to be middle-to-upper income, more liberal politically, and more oriented to the central city given their closer proximity to it. Residents in the east generally have lower incomes and are more disconnected from central Portland. The western communities include Sellwood and Eastmoreland, which are middle and upper class neighborhoods that include a commercial district well known for its antique shops, the infamously liberal Reed College campus and the Oaks Bottom Wildlife Refuge, a regional park of substantial size and ecological value along the Willamette River. The community of Lents is unique in the watershed, and illustrates differences between inner east and outer east Portland.

Lents is a predominantly “working class” community with a history of animosity towards the City of Portland. Formerly a farm community, Lents was annexed by the City in 1912 (City of Portland 2004b). After annexation, the community was forced to pay for a sewer system that it mostly did not want. A few decades later, Interstate 205 was built in east Portland and bisected the Lents neighborhood. The process of acquiring, and condemning, land for highway construction has left residual hostility

towards the City of Portland government among long-time Lents residents. Beyond these events, Lents experiences significant flooding during periods of heavy rain, as Johnson Creek and its floodplain are located in the southern portion of the neighborhood. As infrastructure and other development have occurred in Lents, shifts in flooding problems have been observed by residents in the region. Because of flooding problems in this area, the City of Portland's Bureau of Environmental Services established a Willing Seller's Program to acquire land in the floodplain. The ultimate goal for the acquired property is restoration of the water resources in the area.

The last geographical subdivision of the Portland portion of the Johnson Creek watershed is the triangular shaped region in east Portland in which surface water has been piped underground. This area – east of the Willamette River, south of the Columbia Slough, and to north of Johnson Creek – is devoid of surface water except for a few reservoirs. The north-central section of the watershed encompasses part of this area. If proximity to water is a significant factor influencing attitudes about water resource protection, as is hypothesized in this research, this area will be important in interpreting the geographical distribution of expressed support for and opposition to water resource protection in the Johnson Creek watershed.

Conclusion

This chapter presented the theoretical context for the research presented in this dissertation. First, environmental attitudes were discussed including several explanatory factors that are hypothesized to influence attitudes about water resource protection in the study area. These include broad beliefs about the environment, politics and society as well as knowledge, perceptions, sociodemographics, place attachment and social values and related factors. The relevance of assessing differences in participants and non-participants of place-based groups is discussed,

along with findings from previous research. The final section of this chapter presented the policy context for the greater Portland metropolitan area, and described the geography of the Johnson Creek watershed. The next chapter discusses the methods used to address the research questions: (1) To what degree do residents support or oppose water resources protection, (2) What factors explain residents' expressed level of support/opposition?, and, (3) How and to what degree do the views of participants of watershed- and neighborhood-based organizations differ from those of non-participants? The two methods used to address these questions were preliminary interviews and a mail questionnaire, the findings from which will be presented in Chapters 4 and 5, respectively.

CHAPTER 3. RESEARCH METHODS

The analytical objectives in this research, which coincide with the three research questions, are: (1) to assess and *describe* the nature and degree of support for and opposition to water resource protection, and develop dependent variable indices that capture different dimensions of water resource protection; (2) to identify, measure and evaluate potential factors that *explain* attitudes about water resource protection; and, (3) to examine involvement in place-based groups and test for *differences* in attitudes among participants and non-participants of neighborhood and watershed-based groups. A mixed-model research design, which incorporates complementary quantitative and qualitative techniques at different stages (Dutcher et al. 2004), was employed. Semi-structured preliminary interviews were conducted with key informants to better understand water resource issues in the study area and to provide background and contextual information for the quantitative analysis. Through a mail questionnaire, quantitative data on attitudes about water resource protection, involvement in place-based groups, and explanatory variables were systematically collected to achieve the research objectives, along with written comments prompted by an open-ended question at the end of the survey. The survey and sampling design as well as response rates and the survey sample are described in this chapter. Finally, the methods of analysis used to address the three research questions are briefly presented.

Preliminary Interviews

Interviews were conducted in the first stage of this research to provide background information and investigate water resource planning and management in the study area. The interviews focused on understanding residents' attitudes about water resource protection, in addition to how residents' and place-based groups are involved

in water resource issues and land use planning. Themes identified in the interviews are presented in the following chapter according to the questions posed to informants, which are described below. With the regard to the research questions, information gained from interviews helps understand the nature of water resource attitudes (question one) and related explanatory factors (question two). In addition, interviews aid understanding attitudinal differences between participants and non-participants of place-based groups (question three) by providing information on how place-based groups are (and are not) involved in water resource activities and land use planning as well as who participates in these groups. References to information from preliminary interviews will also be made throughout the presentation of survey findings in Chapter 5 as they relate to particular research questions.

Approximately twenty preliminary interviews were conducted with planners, outreach specialists and other key informants familiar with water resource issues in the study area. A snowball sampling technique (Bryman 2001) was employed in which initial interviews were conducted with professionals related to the research topic, and subsequent interviews were sought based on informant referrals. Planning and outreach staff at Metro and the cities of Portland, Milwaukie and Gresham were interviewed, in addition to a few people who are involved with water issues or community involvement in the study area. Semi-structured interviews with these informants were guided by questions that focused on residents' attitudes about water resource protection, especially opposition to particular policy measures, and public involvement processes, particularly those related to water resource planning and watershed or neighborhood groups.

Semi-structured interviews were also conducted with personnel from the Johnson Creek Watershed Council and the chairs of twelve neighborhood associations (NBA) in the City of Portland, in order to better understand the activities of these place-based groups, especially in terms of how they are or are not involved in water resource

decision-making and other activities. The interviews with NBA chairs provide information about the activities of neighborhood groups, in general, and the degree to which and how they deal with environmental and water resource issues specifically. Focus was placed on neighborhood associations in Portland to assess how neighborhood groups have addressed, if at all, the City's controversial Healthy Portland Streams proposal.

Interviews lasted approximately one hour. Research participants completed informed consent forms approved by the Institutional Review Board at Oregon State University (Appendix A). Hand-written notes were taken by the interviewer and then typed into Microsoft Word and read to identify themes, which were then organized according to the interview topics described above and the sections to follow in the next chapter. The key themes arising from the interviews are summarized collectively in the following chapter to maintain the anonymity and confidentiality of individual research participants. Similar to previous research, the qualitative part of this study involved "pragmatic discovery of phenomena" and, thus, no hypotheses were tested in the first stage of this research (Dutcher et al. 2004).

Preliminary interviews improve understanding of attitudes about water resource protection and the activities of place-based groups in the study area. Information from interviews further knowledge of attitudes about water resource protection and public involvement in land use planning, especially that which relates to water resources and place-based groups. Moreover, the interviews provide important background and contextual information for interpreting survey results and understanding implications for water resource protection and public involvement in land use planning. The key themes from the interviews are presented in the following chapter by interview question, and will also be referenced in Chapter 5 as they relate to the three research questions analyzed systematically with the survey data.

Survey Design and Implementation

A mail questionnaire was used to gather information from a random sample of residential property owners and place-based group participants in the Johnson Creek Watershed. The self-administered format was used to reduce response bias due to administration by the researcher and was also more appropriate for the nature of survey questions. A web-based survey was not employed so as to avoid potentially biasing responses toward computer users, who may be younger and wealthier than the population of interest for this research (Dillman 2000), a particularly important consideration given the demographics of the study area. Available resources also influenced the choice to use a mail questionnaire rather than a phone survey.

The survey collected data about water-related attitudes, civic involvement, sociodemographics and other independent variables (See Appendix B and C for cover letters and survey questions). A variety of scale-type questions were designed to measure the degree of: concern and support for water resource protection in general; perceived importance for protecting water resources for specific purposes (i.e., wildlife habitat, water quality, flood control, etc.); support for different institutions involved in protecting water resources (e.g., different levels of government versus non-profits); support for specific water resource protection policy tools (regulations, economic incentives, educational programs, etc.); and, support for various program funding mechanisms and expressed willingness to contribute financially to water resource protection. Support for regulations was measured in general and in relation to land use types and specific types of regulations (e.g., set-backs from water, restrictions on tree removal, etc.). Water-related behaviors were also investigated, including landowner practices, recreational usage of water areas, and participation in watershed council activities.

Civic involvement (e.g., attendance at public meetings, participation in non-governmental organizations) was measured as an independent variable and to distinguish participants of place-based groups from non-participants. Additional independent variables assessed included environmental ideology (e.g., with the widely used NEP scale), political beliefs (e.g., regarding property rights, trust in government), and place attachment (e.g., to the Portland metro area, Western U.S.). Reliance on lessons learned from past research is critical to the development of reliable attitudinal-behavioral measures, thus established measures were built upon and utilized in the survey (e.g., the NEP scale from Dunlap and Van Liere 1978, a place attachment scale from Vitterso et al. 2001). Six-point Likert scales were employed in the survey, and “don’t know” and “no opinion” options were offered throughout to minimize non-response.

One open-ended question completed the questionnaire and simply asked respondents to explain their support or opposition to government efforts aimed at protecting the condition of water resources such as streams, rivers, lakes and wetlands, and/or note their views on specific water resource policies and programs in the Portland metropolitan region. Space was provided on the back of the survey for additional comments about the issues addressed in the survey. A total of 475 respondents (fifty-eight percent) wrote additional comments on their returned survey. Written responses were evaluated collectively to gauge residents’ dominant views on the research topic, especially in terms of explaining their attitudes about water resource protection. Some research participants also wrote comments next to individual questions. Respondents’ comments are included throughout the analyses of survey data (Chapter 5) and discussion of research results (Chapter 6) to provide richness and examples that aid understanding of the quantitative findings.

A modified version of Dillman’s Total Survey Design Method was used for the survey implementation as this technique commonly results in response rates of 50 percent and

higher (Dillman 1978; Salant and Dillman 1994; Dillman 2000). After Dillman's method, the booklet-formatted questionnaire was mailed with a personalized cover letter twice (on February 4 and February 24, 2004), and a reminder/thank you postcard was sent between mailings (on February 11). Self-addressed, stamped envelopes were provided with the questionnaires and were returned to the Oregon State University Department of Geosciences. Several cash awards of fifty dollars, drawn at random, were offered to respondents who completed the survey, in order to encourage participation and as a token of gratitude. The survey instrument, cover letters, and postcards (Appendix B-D) were approved by the OSU Institutional Review Board (i.e., for Human Subjects Approval) on December 2, 2003.

Sampling design: populations, sampling frames, and samples

Due to interest in the effects of proximity to water resources and participation in watershed and neighborhood groups, this research incorporated four populations: (1) general residents of the Johnson Creek watershed; (2) residents that live near water resources; (3) participants of neighborhood associations; and, (4) people involved with the watershed council. Both the literature and preliminary interviews suggest that attitudes may vary by jurisdiction, thus the random sample was stratified to reach residents in three jurisdictional categories: City of Portland, suburban municipalities (Gresham and Milwaukie), and more rural, unincorporated areas (of Multnomah and Clackamas counties). Though jurisdiction may not be the best characterization for a urban-suburban-rural stratification, the approach is relevant due to the policy-oriented nature of this research and the fact that different jurisdictions in the study area have different policies and politics as well as different relationships with the residents within their boundary.

A statistically valid sampling frame for all residents of the watershed was sought, but the availability of such lists is insufficient for this research. A primary source of sampling frames for social science research is Survey Sampling International (SSI). The name/address lists sold by SSI for the study region included, on average, only one household record per eight people, rendering the sampling frame inadequate for a scientifically valid sample. Given this methodological problem, as well as theoretical reasons, the population of interest for the random sample was limited to residential property owners. The water resource and related policy issues in the region justify this approach. Specifically, property owners are more directly affected by land use regulations and planning efforts and, thus, are worthy of interest. Recent research and debate (especially those relating to the “takings” issue) over how resource protection policies affect property values highlight the need to better understand landowners’ attitudes about these issues. The state of Oregon in particular, affords special attention to property owners by requiring that all potentially affected property owners be notified when making land use decisions (DLCD 2003).

The random sample was stratified three ways to reach a large enough sample of residents that reside in each jurisdictional category (urban, suburban, rural). Approximately 384 completed surveys were needed to achieve a ninety-five percent confidence interval, accepting a five percent sampling error and assuming a more variable population (e.g., a fifty/fifty split) (Salant and Dillman 1994; Dillman 2000). Divided equally among the three jurisdictional stratifications, approximately 128 completed surveys were needed in each group. At the stratum level, a higher sampling error (between five-ten percent) is accepted. Assuming that ninety percent of addresses would be deliverable, fifty percent of surveys would be returned, and ten percent of the returned surveys would be incomplete or illegible, approximately 948 names were randomly drawn overall, which amounts to about 316 names and addresses for each of the three stratification categories. These estimates are standard, and even somewhat conservative (Salant and Dillman 1994; Dillman 2000).

Both the random sample and the near-water sample were drawn from the tax lot database available on Metro's RLIS CD-ROM (Metro 2003). Since this research is concerned with residents' attitudes, public property owners and owners of commercial and industrial properties were omitted from the sampling frame. Moreover, the population of interest is those residents who own property and live in the watershed, thus vacant land was omitted from the sampling frame. Absentee property owners were also eliminated from the sampling frame, in addition to a small number of tax lots with no zoning category noted in the database. The tax lot databases were also sorted to remove duplicate entries for people who own more than one tax lot in the study area, so as to not over sample residents who own multiple properties. The random sample was drawn from the remaining property owners who live in the watershed on land zoned residential (single- or multi-family), agriculture, rural, or forest.

Since proximity to water resources is a key variable of interest in this research, residents who live in close proximity to resources are another relevant population. Different rationales exist for defining close proximity, including a policy-oriented approach (which considers such factors as riparian functioning) incorporating set buffer widths from water bodies (e.g., 100-200 feet) as well as a more human-oriented approach that considers travel and recreation behavior. With the latter approach, a half-mile buffer would be appropriate based on a planning framework for urban parks that considers recreation travel behavior (Wojtanik 2003). However, in this research, a 200-foot distance for the near-water sample was employed due to its relevance for policies in existence and under consideration in the region. The sampling frame for residents in close proximity to water was obtained by selecting the tax lots within 200 feet of a stream or wetland within the Johnson Creek watershed using ArcView GIS and data from Metro (2003). A random sample was drawn from these records once the database was sorted, as described above. Returned surveys from all samples were geo-coded and the distance between each respondent and the nearest surface water

resource was calculated and analyzed as an explanatory variable. The survey also measures perceived proximity to water resources, so these two variables can be compared.

The sampling frame for watershed council participants was the Johnson Creek Watershed Council mailing list. The mailing list was geocoded in ArcView GIS using street addresses and zip codes. The database included 1,136 people, but only 440 (thirty-nine percent) live within the watershed. Only residents that live within the watershed were used, and the database was sorted to eliminate entries for business owners and other non-residents. A random sample was drawn to achieve a large enough sample size to achieve the ninety-five percent confidence level with a five percent sampling error, assuming a less variable population.

A map of people on the watershed council mailing list (Figure 3-1) illustrates that participants are concentrated in certain areas of the watershed. Notice, in particular, the three clusters in the west, middle, and east portion of the watershed, all of which surround surface water features. The westernmost cluster is around the Crystal Springs area near Westmoreland Park and Reed College. The central cluster is located in the 100-year floodplain in the area of Lents and Powellhurst-Gilbert neighborhoods. The last cluster is located in Gresham around the bend of the main stem Johnson Creek, in addition to a smaller cluster in the Butler Creek subwatershed. In general, there appears to be more participants near streams than away from streams within the watershed, and this pattern seems strongest in more rural, unincorporated areas.

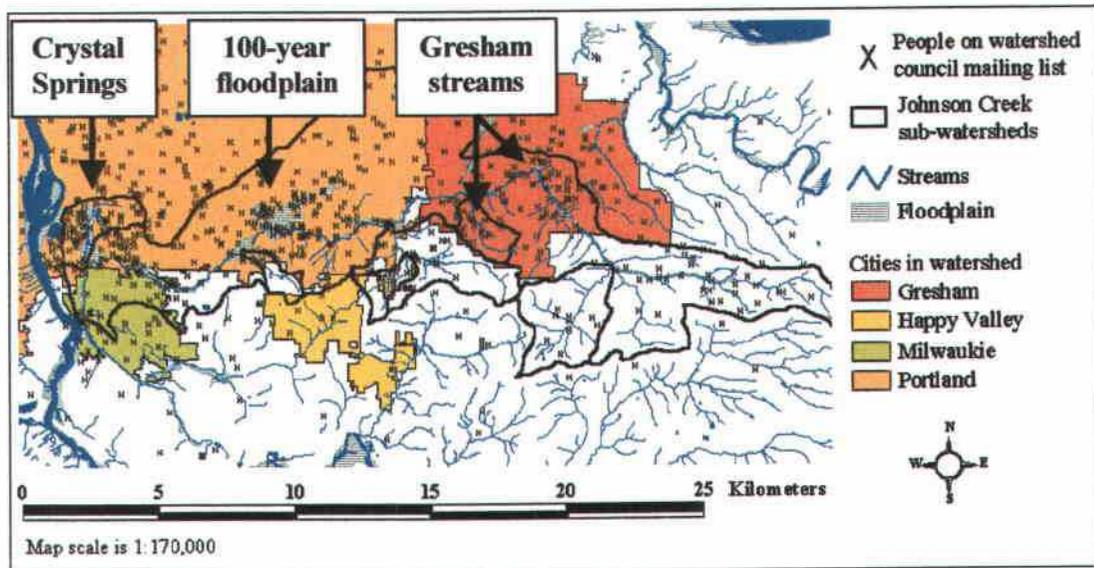


Figure 3-1. Spatial Distribution of People on the Johnson Creek Watershed Council Mailing List (Data from the JCWC and Metro 2003).

The sampling frame for neighborhood association participants was compiled from the contact lists for neighborhood activists obtained from the various jurisdictions in the watershed (Table 3-1). These directories include the names and contact information for the staff members (e.g., chair, secretary, etc.) of individual neighborhood associations. Participants of neighborhood associations that are located at least partly within the Johnson Creek Watershed were used. Since the numbers in these databases are small, all of the neighborhood participants were sent a survey. Some rural areas in the watershed do not have neighborhood associations and, therefore, are not included in this sample. Compared to the watershed council sampling frame, the sample for neighborhood associations included qualitatively more active participants. However, respondents were re-classified into groups based on their responses to survey questions about participation in both place-based groups.

Table 3-1. Number of Neighborhood Associations By Jurisdiction and Size of Associated Sampling Frames.

Jurisdictions	# of Neighborhood Associations	# of Participants on Contact Lists
City of Portland	16	75
City of Gresham	8	26
City of Milwaukie	5	29
Unincorporated areas of Multnomah and Clackamas Counties	4	4
TOTAL	33	134

Table 3-2 summarizes the sampling design for the four populations of interest for this research in terms of their size and the starting and final sample sizes needed to achieve a ninety-five percent confidence interval with a five percent sampling error. A starting sample size of 2,067 yielded 1,944 deliverable surveys to eligible participants. The following section reports the response rates achieved for the survey samples, and discusses the representativeness of the sample in relation to the survey population.

Table 3-2. Survey Sampling Frames and Sample Sizes.

Populations of Interest	Size of Sampling Frame (before sorting)	Final Sample Size Needed (1)	Starting Sample Size (2)
Residential property owners (with three jurisdictional groupings)	56,266	381	948
Residential property owners within 200 ft. of a stream or wetland	4,783	234	578
Watershed council participants (who live in the watershed)	478	165	407
Neighborhood association participants	134	71	134
TOTAL (1st mailing)	--	--	2,067
TOTAL (2nd mailing, 80% re-mail)	--	--	1,653
GRAND TOTAL (both mailings)	--	851	3,720
(1) These figures accept a +/- 5% sampling error at the 95% confidence interval. The random sample assumes a more variable population (i.e., a 50/50 split) while the other samples assume a less variable (i.e., 80/20 split) (Dillman 2000).			
(2) These calculations assume that 90% of addresses are usable, 50% of those respond, and 10% are returned illegible or incomplete (Dillman 2000). The formula is: starting sample = needed sample (based on population) / 0.9/ 0.5 /0.9.			

Survey sample: response rates, sample sizes, and representativeness

Overall, a forty-two percent response rate was achieved for the mail questionnaire, with a total of 816 completed surveys returned. Not surprisingly, the largest response rates were obtained for the neighborhood association staff/board members (sixty-seven percent) and the watershed council sample (fifty-two percent) (Table 3-3). The response rate for both the general sample of residential tax lot owners and the near-water general tax lot sample was approximately thirty-six percent. The City of Portland portion of the sample was slightly higher (approximately forty percent) than the suburban sample (thirty-four percent) and the rural sample (thirty-six percent). A small number of respondents (less than one percent) removed the identification

number on their survey and, thus, are only included in the overall response rate. Moreover, approximately sixty surveys were returned blank, the majority of which were from the more general samples of tax lot owners. If these surveys are considered as refusals and included in the response rate calculations, the overall response rate would be slightly above forty-four percent and the tax lot samples would be close to forty percent. Written notes on returned surveys and other contact with survey participants suggest that several people felt they lacked the knowledge to complete the survey.

Table 3-3. Survey Sample Information and Response Rates.

Sample	Returned Undeliverable, Deceased, Ineligible	Total Deliverable, Eligible	Total Returned, Eligible	Response Rate	Final Sample Size Target
General taxlots owners	27	914	335	36.65%	381
Urban taxlot owners	11	303	122	40.26%	127
Suburban taxlot owners	6	308	105	34.09%	127
Rural tax lot owners	10	304	108	35.53%	127
Near water tax lot owners	11	540	197	36.48%	234
JCWC mailing list	32	361	187	51.80%	165
NBA staff/board members	1	126	84	66.67%	71
Unknown (id #s removed)	-	-	13	0.67%	-
TOTAL	71	1944	816	42.04%	851

The lower than desired response rates (i.e., less than fifty percent) for the general and near-water samples are not necessarily surprising given recent research (Connelly et al. 2003; Joireman et al. 2004). One study, in particular, suggests that response to mail questionnaires on natural resource topics implemented with the Dillman method has declined over time (Connelly et al. 2003). Reasons cited for this decline include the increase in junk mail and non-scientific surveys (e.g., marketing research), eroding public trust (e.g., due to the existence of computer profiles that are often seen as a breach of privacy) and relatively recent terrorist events involving mail. Statistically

significant factors that partially explain the decline in response rates over time in one study include the saliency of the research topic and the survey population and length and complexity of the survey (Connelly et al. 2003), both of which may be relevant here. The former factor is particularly important given that general survey populations have been shown to exhibit lower response rates. Moreover, although recent water resource planning efforts in the study area increase the saliency of this topic, the survey topic may seem unimportant in relation to issues such as a slowed economy and high unemployment rates as well as terrorist activities and the current war being waged in Iraq. Feedback from survey participants who declined to complete the survey due to their expressed lack of knowledge also concurs with the survey complexity explanation for low response rates. The difficulty of the survey relates both to the complex nature of the topic as well as to question format, both of which were addressed in the design of the questionnaire and, to some extent, could not be avoided.

Low response rates require special attention to potential non-response bias. Studies have shown that low response rates result in less representative samples; however, recent research suggests that effects from non-response may not be as pronounced as once thought (McCarty 2004). Nevertheless, the samples with lower response rates (general and near-water tax lot samples) were compared to the samples with higher response rates (group participants) to understand how these groups differ from each other. Comparisons to demographic information available for the study area are also presented below. These factors will be considered when making statistical inferences to the study populations in the analyses presented in the following chapters.

In general, it is important to reiterate that the population of interest for this research is residential property owners and participants in place-based groups. As a result, ninety-seven percent of the survey respondents are homeowners, while only three percent are renters. The majority of renter respondents are from the watershed council sample, which is not surprising given the sampling design for this research,

along with the fact that most people who participate in their neighborhood association are homeowners. For comparison, homeownership rates for Multnomah and Clackamas Counties are 56.9 and 71.1 percent, respectively (Census Bureau 2004).

The general and near-water samples of residential tax lot owners are similar demographically to respondents in the group participant samples. T-tests illustrate that the samples are similar in age, income, household size, and years residence in the Portland metropolitan area and Oregon (Table 3-4). Statistically significant differences exist between the two groups on educational attainment, political orientation, and number of (grand)children; specifically, the more general tax lot samples are less educated, more conservative politically and have more (grand)children. These differences do not necessarily indicate a biased sample, however, since participants of organizations have been found to be dissimilar from non-participants on such variables (Beatley 1994; Chess et al. 2000).

Table 3-4. T-test Comparisons of Demographic Characteristics for Samples with Low and High Response Rates.

Variable	Means for Group Participants (samples with higher response rates)	Means for Taxlot Owners (samples with lower response rates)	P-values for T-tests
Age	53.75	53.48	0.805
Education	2.82	2.35	0.000
Income	4.90	4.70	0.134
Number in household	2.57	2.63	0.491
Political orientation	3.27	4.18	0.000
Years lived in Portland metro	31.65	34.53	0.054
Years lived in Oregon	36.07	38.90	0.080
Number of children	1.83	2.10	0.030
Number of grandchildren	1.55	2.32	0.003

Note: Gray-shading highlights statistically significant differences between the two sample groups based on a significance level of at least 0.05.

Overall, the sample of survey respondents obtained for this research is comparable demographically to the study area population based on 2000 census data (Census Bureau 2004) (Table 3-5). The average age of respondents is 53.7 years, while the mean ages of adult residents in Multnomah and Clackamas Counties are 52.9 and 55.5 years. The proportion of the population in the study area that is female (50.6 percent) is the same for the sample of respondents (50.3 percent). Though available statistics on level of educational attainment are difficult to compare, the sample population has a mean education level of 2.51, half-way between some college or trade school and achievement of a bachelor's degree. About 30.7 and 28.4 percent of the Multnomah and Clackamas County residents (twenty-five years and older) have a bachelor's degree, whereas 26.3 percent of the sample (eighteen years and older) has a bachelor's degree. The lower percentage for the sample may be due to the different age cohorts for the two statistics, or to the fact that some areas in the Johnson Creek watershed of southeast Portland are less educated than the rest of Multnomah County (Institute of Portland Metropolitan Studies 2003). Regarding household income, the average reported was 4.78, which is between the \$35,000-49,999 (4) and \$50,000-74,999 (5) ordinal response categories. By comparison, the average household income for Multnomah and Clackamas Counties are \$52,080 and \$41,278. Overall, the sample statistics appear quite similar to available information about the population.

Table 3-5. Comparison of Demographics for Study Population and Survey Sample.

Variable	Survey Sample Statistic	Population Statistic for Multnomah County	Population Statistic for Clackamas County
Gender	50.3% female	50.6% female	50.6% female
Age	53.7 years	52.9 years	55.5 years
Education	26.3% Bach.	30.7% Bach.	28.4% Bach.
Household income	~ \$50,000+	\$52,080	\$41,278
Race: proportion white	93%	79.2%	91.3%
Note: Cell values are means for age and race.			

The demographic variable of greatest concern regarding representativeness of the sample population is “race,” as classified by the US Census (2004). Ninety-three percent of survey respondents reported their race as white, whereas the population of study area is approximately seventy-nine and ninety-one percent white in Multnomah and Clackamas Counties, respectively (Table 3-6). The other racial categories that vary substantially between the sample and population figures are black/African American, Hispanic and other/multi-racial. The latter differences may be due to the fact that a multi-racial option was not explicitly included on the questionnaire. This may have forced multi-racial respondents to choose another category. In fact, the majority of respondents who reported “other” indicated they are multi-racial. Several respondents made comments such as “human race” or “I’m not a racist,” and more than thirty did not complete the question.

Table 3-6. Percent of Population and Sample in Various Racial Categories (Data from 2000 Census, 2004).

Racial Category (from US Census)	Survey Sample	Multnomah County Population	Clackamas County Population
White/Caucasian/Anglo	93%	79.2%	91.3%
Hispanic/Latino/Spanish	1%	7.5%	4.9%
Asian/Pacific Islander	3.5%	5.7%	2.5%
Black/African American	0.3%	5.7%	0.7%
American Indian/Eskimo/Aleut	0.3%	0.4%	0.2%
Other (survey) /multi-racial (Census)	1.5%	4.1%	2.5%

The probable reason underlying the discrepancy between the percentages for the black population in the sample and the population of Multnomah County are straightforward. Specifically, the black population in the City of Portland (and Multnomah County) is substantially concentrated in North and Northeast Portland, while the Johnson Creek Watershed is located in Southeast Portland. Similarly, the Hispanic population in the watershed is concentrated in Gresham, particularly the

neighborhood of Rockwood. Only half of the Rockwood neighborhood lies within the watershed, and most of this area is comprised of mixed use and high-density residential land, suggesting that many residents of this area are living in apartments or other multi-unit dwellings. The sizable Hispanic community in the study area is also a recent change, with growth rates of 170 and 135 percent between 1990 and 2000 for Multnomah and Clackamas Counties (Chuang 2001). Given that many newly immigrated Hispanic residents are likely renters, coupled with the focus on homeowners in this research, the differences in the demographic figures for the survey sample and populations of Multnomah and Clackamas Counties may not indicate an unrepresentative sample. However, the demographic make-up of the survey sample should and will be considered when making inferences to the general population.

Survey respondents were geocoded in ArcView GIS using tax lot addresses as the reference field. The tax lot addresses were used instead of the more traditionally used street addresses, given that a significant portion of the sample was drawn from tax lot databases. Indeed, this process better matched respondents with the correct location. Some respondents were not automatically matched with an address and were located individually. A total of 803 respondents were mapped, while thirteen respondents who removed their survey identification number were not included on maps.

The survey sample is distributed across the study area in expected patterns when considering physiography (topography and water features), population density and land use zoning (Figure 3-2). Spatial gaps in respondents exist in the Gresham Buttes, which are largely undeveloped, and on Powell Butte, which is a publicly owned park. The population density map helps illustrate the relationship between these features and density in relation to the distribution of survey respondents. Research participants are clustered around water features, which was anticipated given the near-water stratification of the sample as well as the distribution of participants in the watershed council. Also as expected, a small group of respondents from neighborhood

associations is located outside the watershed boundary. Since there is no theoretical reason to expect these respondents to differ from those within the boundary, these participants will be included in analyses. Finally, the land use zoning map explains the lack of respondents not only in areas with parks and open spaces but also in industrial and, to a lesser extent, commercial, mixed use and multi-family residential areas.

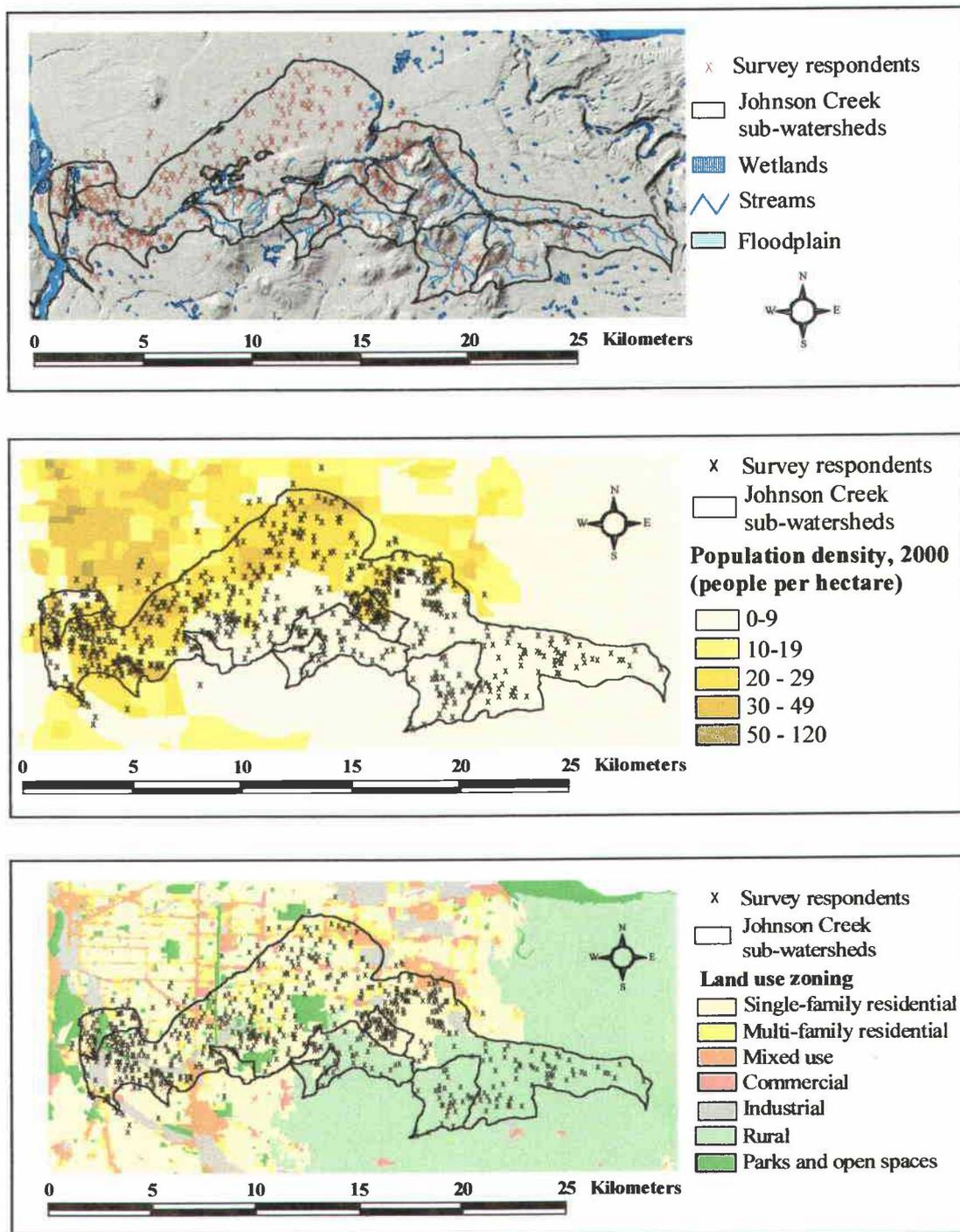


Figure 3-2. Survey Respondents and Physiography (Hillshade Topography and Surface Water) (top), Population Density By Block Group (2000) (middle), and Land Use Zoning (bottom) (Data from Metro 2003).

Data Analysis

The survey data were entered into a database and analyzed with SPSS, a Windows-based statistical software package that is commonly used in social science research. Quantitative and qualitative data analysis will be described further in the following chapters. First, the key findings from preliminary interviews are presented. Next, quantitative analyses are presented for the survey instrument, along with written comments on questionnaires. Given the targeted geographic (e.g., Johnson Creek watershed) and demographic (e.g., property owners) selection of the sample populations, inferences will not be made to the entire Portland metropolitan population. Rather, generalizations are made to the select target populations as well as to the theories tested with the survey instrument, as is common in case study research (Yin 1994). To the degree possible, nonresponse bias and sampling error are considered in the interpretation and discussion of results.

Chapter 5 presents the analyses and findings by research question (Table 3-7). First, descriptive statistics are reported to assess the nature of attitudes about water resource protection, with various aspects of protection efforts (e.g., regulatory versus non-regulatory policy options, local versus federal government efforts, etc.) ranked from most to least supported. Reliability and factor analyses were conducted to aid the construction of indices for the dependent and some independent variables analyzed for the second and third questions posed in this research. The second question involves addressing which factors best explain attitudes about water resource protection. Bivariate correlations and multiple linear regression were used to assess the relative importance of various independent variables in explaining variation in attitudes about water resource protection. Five dependent variable indices are evaluated including an overall measure that includes four unique components of attitudes about water resource protection: expressed importance of general values and support/opposition for government, regulations, and funding mechanisms. Preliminary interviews and

written comments on surveys also further understanding of factors that explain environmental attitudes. Third, t-tests and ANOVA were employed to investigate differences between participants and non-participants of place-based groups on the five dependent variables indices representing different aspects of water resource protection. Before these analyses are presented, the next chapter will summarize the major themes arising from preliminary interviews.

Table 3-7. Analytical Methods Employed for Each Research Question.

Research Questions	Analytical Methods
<p>1. What is the <i>nature and degree</i> of support/opposition toward water resource protection among residents?</p>	<p>Descriptive statistics and rankings for dimensions of water resource attitudes.</p> <p>Qualitative review of themes and points in written responses.</p> <p>[Creation of reliable, factor analysis-based indices for analysis of dependent variables.]</p>
<p>2. What factors <i>explain</i> residents' expressed level of support/opposition?</p>	<p>Bivariate correlations coefficients (Pearson's rho).</p> <p>Multiple linear regression: full and condensed models.</p> <p>Qualitative analyses of interviews and written comments.</p>
<p>3. How do attitudes about water resource protection <i>differ</i> among participants and non-participants of watershed and neighborhood organizations?</p>	<p>T-tests and ANOVAs, with Tukey's as post-hoc comparison test.</p> <p><i>Back up:</i> Mann-Whitney U and Kruskal-Wallis non-parametric tests.</p>

CHAPTER 4. THEMES FROM PRELIMINARY INTERVIEWS

Interviews served as the first stage of this research and provide contextual information for interpreting survey results and understanding the implications of survey findings. As discussed in the previous chapter, preliminary interviews focused on two main issues. First, attitudes about water resource protection and related issues were explored and key themes identified. Second, interviews provided important information about civic involvement in water resource and land use decision-making in the study area. The themes that arose from interviews related to civic involvement include how the public and place-based groups are involved in land use decision making, what activities are undertaken by place-based groups, and who is involved in place-based groups. Interview notes were read repeatedly and key findings were organized by each of these topics. Table 4-1 summarizes the primary findings from the interviews according to these topics, which are elaborated on below. The results are presented collectively in the sections that follow in order to maintain the anonymity and confidentiality of research participants.

Table 4-1. Summary of Findings from Preliminary Interviews.

Residents' Attitudes about Water Resource Protection
<ul style="list-style-type: none"> • <i>Attitudes are complex and multi-faceted.</i> Most people support water resource protection, yet sometimes oppose specific efforts such as regulations or government. • <i>Broad beliefs and ideologies</i> and/or <i>affectedness</i> explain attitudes. • <i>Political beliefs</i>, specifically about property rights and trust in government, matter. • <i>Views of government</i> are critical and relate to specific personal <i>experiences</i> and the <i>history</i> of government-community relations. • <i>Views vary geographically</i> from inner to outer Portland and beyond, in part due to urban-rural differences and attachment to Portland. • <i>Equity issues</i> exist between low-to-middle income residents downstream, near protected waterways, and middle-to-higher income residents upstream on the hills.

Table 4-1. Summary of Findings from Preliminary Interviews (*continued*).

Place-Based Groups and Public Involvement
Participatory decision-making for water resources
<ul style="list-style-type: none"> • <i>Public involvement processes influence attitudes</i> about water resource protection policies (e.g., how and when people are involved). • <i>Interest group activities</i> (specifically opposition) can affect attitudes through a variety of means including increased media attention. • <i>Complexity of planning efforts</i> exacerbate public communications and involvement. • <i>Public reactions to new policies</i> relate to existing policies and previous planning efforts, in addition to the level of impact in communities.
Activities of place-based groups
<p><u>Neighborhood associations</u></p> <ul style="list-style-type: none"> • <i>Primary drivers of group activities include</i> individuals' interests and initiatives, impacts within neighborhood, and effective outside requests for participation. • <i>Livability and quality of life issues dominate</i> NBA agendas, especially transportation and traffic, safety and crime, parks and schools. • <i>Land use/development permits are reviewed</i>, especially by NBA in areas of rapid growth or with in-fill potential, and many are concerned about high densities. • <i>Community events are common</i> such as neighborhood clean-ups and block parties. • <i>Region-wide policies are dealt with at higher levels</i> such as committees of NBA Chairs, unless there are direct impacts on neighborhood. • <i>Controversial matters are avoided</i>, and neighbors tend to "agree to disagree." <p><u>Watershed council</u></p> <ul style="list-style-type: none"> • <i>Focus on voluntary measures</i>, but sometimes support the mission of regulatory measures that are broader in scope than the watershed. • <i>Board of Directors and three committees meet regularly</i> to plan and undertake activities. The latter deal with restoration, outreach/education and land use matters. • <i>Different types of activities include</i> planning meetings, restoration projects and work parties, and educational and other community awareness events.
Who participates in place-based groups
<p><u>Neighborhood associations</u></p> <ul style="list-style-type: none"> • <i>Core group of staff/board members</i> and a few others includes about 10-15. Some meetings or events can draw larger groups (e.g., over one hundred). • <i>Participants are commonly middle-aged</i> (or older), often homeowners with kids, but NBA leaders report a variety of interests represented by participants. • <i>Neighbors generally get involved due to specific concern</i>, or through a request or invitation. Many NBA Chairs were asked to serve on the NBA staff. • <i>Participants tend to be "joiners"</i> and can "agree to disagree." <p><u>Watershed council</u></p> <ul style="list-style-type: none"> • <i>Core group of staff/board/committee members are environmentally-oriented</i>. • <i>Some people participate in particular activities</i>, while others are on mailing list to receive information or because they included their contact info on a sign-up sheet at an event. • <i>Rural areas and businesses are under-represented</i> in the Johnson Creek Council.

Residents' Water-Related Attitudes

Preliminary interviews revealed the complex and multi-faceted nature of attitudes about resource protection. Informants suggest that although people support water resource protection in general, there is substantial opposition to certain aspects of protection efforts such as regulations. Interviews suggest that residents' attitudes are influenced by their values, specific experiences, especially with government agencies, and beliefs and views about land and the environment as well as about government involvement in such matters. While some informants stressed the dominant role of ideology in shaping attitudes, others expressed a more utilitarian perspective that emphasizes the degree to which residents are affected by particular actions. For example, residents may support or oppose a policy measure (such as land use regulations) because they are positively or negatively impacted by it. Residents not directly impacted may still support or oppose policy measures, yet the people expressing their views on such matters are often those directly affected by (proposed) policy measures, especially individuals who are concerned about or oppose the proposed policy. Interviewees described varying levels of impact, as property owners may be affected by existing and/or newly proposed regulations, and perceived impact depends on the specific type of regulation (e.g., restrictions on gardening versus building near waterways), the current and planned uses of the property (e.g., whether or not landowners intend to build on or subdivide their property), and the spatial extent of regulatory zoning on a particular property (e.g., a portion of versus the entire property). Thus, opposition based on impact is not as clear-cut as whether or not regulations apply to a person's property.

In addition to affected property owners, ideologs who hold environmental protection and private property rights above other values strongly express their views on water resource planning in the study area. One informant describes these people as advocates existing at two ends of a spectrum (e.g., proponents-opponents). While a portion of the

population falls in these groups, most people are in the middle with “no absolute position.” In recent efforts, property rights advocates have been particularly vocal and active. Property rights activists certainly include affected property owners, but reasons for opposition to land use regulations aimed at protecting water resources extend beyond direct personal impacts to strong property rights ideologies, anti-government sentiment, and Libertarian-oriented political views. Informants not only mentioned opposition among non-affected individuals (including renters), but also support for water resource protection among individuals affected by proposed regulations. Environmental interest groups, on the other hand, are typically involved in planning processes and tend to express support for the greatest levels of resource protection, which sometimes makes them critical of plans because they are not protective enough.

A few informants commented on the spatial distribution of political and related views in the region. As can be seen in maps of voting patterns, there is a clear shift toward more conservative political views as distance from central Portland increases. This pattern is particularly evident in the study area, as significant differences exist in the character of inner southeast Portland and areas further east, even within the City of Portland’s jurisdiction. Informants note that Interstate 205 effectively splits the more Portland-focused areas to the west from those to the east. The relatively recent history of annexation in East Portland may result in weaker environmental attitudes among residents in these areas, who are less oriented toward the City of Portland and associated environmental values. One interviewee suggests that some longer-term residents of relatively recently incorporated areas remember the rural past and still have a “semi-rural” orientation, in contrast to newer residents with a more suburban or urban mindset. Such orientations may relate to attitudes about resource protection; for example, as an informant commented, rural-minded people tend to have a “mind your own business” mentality and, thus, may be more opposed to regulations or top-down management regimes. More generally, the urban-rural divide and regionalism in American politics (Lunch 2001; Raedeke et al. 2001) also suggest that city-oriented

residents will exhibit more liberal views, including support for environmental protection, compared to more rural-oriented residents.

Regarding regionalism in politics, the environmental ethic and notions of “ecotopia” associated with the Pacific Northwest and the Portland metropolitan area may play a role in understanding environmental attitudes (Callenbach 1975; Garreau 1977). For example, newer residents may have moved to the region because they are drawn to the values presented by this view of the area. Alternatively, long-term residents may possess these values because of their connection to the region. People more intimately familiar with the region know, however, that these values are not necessarily as strong as some people perceive them to be, or, at least, are far more complicated than the idealistic view of the region as an environmental utopia (Walton 2004). As one informant who migrated to the Portland area from the Northeast stated, “the mythology of environmentalism [in this region] is really a myth.” This view of the region often stems from observing the rural-urban politics of Oregon and the strong Libertarian-type views that continue to challenge Oregon’s land use laws and other environmental protection measures in regional politics.

Interviews indicate that an important political sentiment when considering attitudes about water resource protection is trust in government. Informants associate distrust or dislike of government with broad political beliefs (e.g., anti-big government) and with specific experiences with government entities. As one informant noted: “distrust is an American phenomena, but local government has fueled the fire.” This comment was made in relation to the history of poor government relations with the Lents community. The annexation and the development of sewers and Interstate-205 (which involved condemnation of property) in this area have resulted in residual animosity and distrust of government. Many people opposed to water resource protection measures or distrustful of government fear regulations, involuntary acquisition of their property or other potential impacts of government decisions. Interviews suggest that

the socioeconomic structure of the Lents area may intensify distrust and fears, and some informants describe a sort of “victim mentality” that may be associated with the lack of resources often available to wealthier, more educated areas (e.g., money, policy-relevant skills, political or legal contacts, etc.). While the (potential) importance of these factors should not be underestimated, it is important to note that a couple of informants did point to improvements in government relations with Lents as well as the organizational strength of the Lents neighborhood association.

Informants commented on the upstream-downstream inequity of recent land use and water-related activities. Specifically, residents have noted the unfairness and ineffectiveness of acquiring and restoring land in low lying areas to mitigate floods, while the development of houses on hills upstream are increasing runoff downstream and, thereby, contributing to flooding problems. This is an issue of both downstream-upstream and socioeconomic equity, given that the new homes on the hills are being occupied by higher income residents who can afford the premium paid for the view, while the homes bought out downstream are in lower income, working class areas. This perspective also highlights the seemingly contradictory activities of the government in terms of the degradation of resources in one area (i.e., tree removal and increased runoff on hill sides) and the protection and restoration of resources in another area (i.e., through land acquisition and planned restoration in the floodplain). Indeed, such inconsistencies can result from the division of government tasks across agencies and programs as well as the lack of coordination among them.

Issues of equity and effectiveness of government activities have also been raised by residents with respect to the possible addition of new land use polices that disproportionately affect residents compared to businesses and developers. As one informant notes, people have asked why the City is moving forward with Healthy Portland Streams while the clean-up of Superfund sites is lagging. These residents often see businesses resisting responsibility for environmental clean-up or protection,

and taxpayers as unfairly impacted. Moreover, many residents see themselves as responsible stewards who take care of the resources and, thus, do not understand the imposition of regulations on residential property owners. Another important factor here, noted less by interviewees, may be that residents do not see their actions as having a significant impact on water resources, especially compared to industry, developers and/or other businesses.

Overall, the interviews strongly suggest that historical, political and spatial context influence residents' attitudes about water resource protection. Though most residents substantially support the protection of water resources in theory, other factors moderate attitudes such as the impact of proposed policies, environmental and political ideologies, specific experiences with government, and the larger policy context. The example of Lents, in particular, illustrates that history is also important. Geography plays a role in terms of the spatial patterns of socioeconomics and local politics, differences among urban-suburban-rural residents, the likelihood of impact, and the hydrological connections between upstream-downstream areas in relation to land use policies and water-related management activities. In addition, several informants suggest that sentiments about resource protection are sometimes not about the content or outcome of specific policies, but rather, are more about the public involvement processes undertaken in developing them. This last factor will be discussed further below in the presentation of interview findings regarding public participation planning for water resources and land use matters.

Public Involvement and Place-Based Groups

This section presents findings from interviews that relate to place-based groups and their involvement in water resource and land use planning and decision-making. The degree to which neighborhood and watershed-based groups have been involved with

the development of Healthy Portland Streams (HPS), Goal 5 and Title 3 policy measures was assessed in preliminary interviews and is discussed in this section. Special attention is given to the City of Portland's Healthy Portland Streams proposal, given that this research began with interest in understanding recent opposition toward HPS planning efforts. Though the focus of this research has expanded beyond HPS, preliminary investigation revealed important factors affecting residents' attitudes about water resource protection efforts with respect to this particular (draft) policy. Beyond public involvement in specific policy measures, the activities of the watershed council and neighborhood associations will be considered in general, and in terms of their level of interest and involvement in resource planning and water and environmental issues. Lastly, insights about who participates in place-based groups are presented.

Public involvement for water resource planning in the Portland area

The City of Portland's Healthy Portland Streams proposal was initiated to update existing environmental overall zones, which were developed to address Oregon land use Goal 5, in order to address potential requirements of the Endangered Species Act. As the HPS project progressed, the project goals broadened to relate to watershed health and compliance with the Clean Water Act and state land use planning goals. The City's planning and public involvement process began in 1999 with the establishment of a Citizen Review Committee (CRC) comprised of affected property owners, economic interests, environmental advocates and neighborhood leaders. The CRC reviewed preliminary natural resource inventory maps, proposed zoning regulations, and plans for public involvement. The City revised the draft inventory maps after a series of open houses in the Fall of 2000, and subsequently produced draft amendments to the City's Comprehensive Plan and Zoning Code as well as environmental zone maps.

The result of these planning efforts was the Healthy Portland Streams Discussion Draft, a lengthy compilation of reports and maps released for public review and comment in November 2001. The City provided a four-month period for public comments on the Discussion Draft, in recognition of the complexity and controversial nature of the topic. With regard to the controversy over this and similar projects, a couple of informants commented on the broader political context in the wake of debates over Oregon Ballot Measure 7 (which required government compensation for any loss in property value resulting from government actions). Seven open houses were held to gather public input on the proposed plan. The City also responded to hundreds of inquiries and a number of requests for briefings from local neighborhood associations (NBA).

Informants commented that the release of the substantial Discussion Draft, which was compiled by City planners in consultation with the Citizen Review Committee, led to suspicion among some residents that planning and decision-making were conducted “behind closed doors.” Once the draft was released, the sheer magnitude of the numerous reports led the public to feel as if a lot of work had been done without their review and input. Moreover, some residents viewed the draft reports as complete, and the proposed policy as a “done deal,” and felt there was no opportunity to participate in the process or provide input to influence the outcome.

Interviews highlighted that although residents tend to support a science-based approach, it is sometimes difficult to involve the general public in scientifically complex policy matters. The complexity of both the science underlying the draft HPS proposal (e.g., riparian science) and the proposed land use code changes, combined with the number and length of the reports released for public comment, posed significant difficulties for involving the public. Informants noted that even if residents have the knowledge to sift through the reports, many have neither the time or interest to fully understand the proposals. Moreover, some suggested that the public’s attention

span wanes over long timeframes involved in such planning processes, and there is a general desire for simplicity that is sometimes lacking in natural resource planning.

The United We Stand property rights group formed as the HPS Discussion Draft was released, and employed tactics that were effective in arousing community interest and concerns regarding the draft proposal. Opponents to HPS stated that the proposed plan was based on “junk science.” The group conducted mailings to all potentially affected property owners, approximately 15,000 people, that included postcards pre-addressed to the Mayor expressing opposition to the plan. Informants reported that opponents attended NBA meetings at which the City was presenting, and “heckled” planners and incited debates over the proposal. Several newspaper articles were printed by *The Oregonian* that highlighted the opposition to and controversy over the project, including opinion editorials from opponents. Proponents tuned in later, once interest was sparked by opponents. One informant suggested that environmental interest groups are commonly involved in planning issues, and usually show up to public hearings and other meetings. At neighborhood association meetings, debates occurred between property rights opponents and environmentalist proponents.

Several interviewees noted the need for more dialogue and greater involvement of the public upfront and throughout the planning process, rather than at the end of each planning stage. One commented that the community needs a sense of dialogue, and to feel that they have a hand in determining their destiny. Another person commented that nobody from the City took notes at public meetings, but instead encouraged people to mail in their comments, which led to the impression that the City was not truly interested in or listening to public input. Informants emphasized that many people simply want to feel like they are being heard and considered.

Ultimately, the City responded to public feedback and has slowed down and revised the process for decision-making. In response to about 1,400 comments on the draft proposal, the City is focusing on improving the inventory maps with new, more

accurate data on local streams and vegetation and information gained during visits to specific sites (at the request of property owners), in addition to simplifying existing environmental codes to make the regulations easier to understand and implement. At this point, the City is not intending to propose any major changes to environmental zone boundaries until the public has had a chance to review and comment on the revised Natural Resources Inventory Update (Bureau of Planning 2004).

As stated earlier, the City of Portland established environmental overall zones to meet state land use planning Goal 5 to protect significant natural resources, beginning in 1989. Portland's environmental zoning program combined with some additional zoning provisions also provide the basis for Portland's compliance with Metro's Title 3 requirements for water quality and flood management, adopted in 1997. Informants noted that the initial establishment of environmental zones in Portland was controversial, but did not generate the level of contention generated with the Health Portland Streams proposal to update the environmental zoning program.

Similar planning processes have been undertaken for Oregon's statewide natural resource protection (Goal 5) rule and Metro's regional water quality and flood management (Title 3) standards in Milwaukie and Gresham, two suburban cities southeast and east of Portland. Milwaukie and Gresham adopted Goal 5 programs in 1987 and 1988, respectively, prior to the adoption of Title 3 standards (in 1997). Informants noted that neither project raised the degree of public concern or controversy generated in response to the more recent HPS proposal.

Informants suggested that the lack of opposition to these natural resource programs, may be largely due to minimal direct impacts on residents, especially with regard to Title 3 in Milwaukie. One interviewee noted that by the time Title 3 came along, residents were already used to Goal 5 standards. Since the differences between the two programs were minor, the transition was easy and "no hairs were raised" for Title 3 in

either suburban jurisdiction. In Milwaukie, one property rights advocate went door-to-door circulating flyers with misinformation to provoke residents' concerns over Title 3. This resulted in a small group of concerned residents showing up at a public meeting. Once the City explained the impacts of the program to these residents, thereby easing fears, they slowly left one-by-one. A few concerned property owners did come out in opposition to Title 3 in Gresham, as did supporters, which included representatives of a local watershed council.

Overall, informants highlight the importance of public involvement processes in shaping public perceptions and opinions on water resource and land use planning matters. Factors that are important to public perceptions include the complexity of the issue and the role of science, timeframe for planning and events, (perceived) openness of the decision-making process, and dialogue among planners and residents. Indeed, place-based groups are involved to various degree in water resource issues, which will be discussed in the following section.

Activities of place-based groups

In general, there seems to be a balance between cities approaching neighborhood associations and vice versa on land use and related matters. Interviews suggest that the former occurs mostly when a particular neighborhood is directly affected by a local project, and the latter happens when an individual (or individuals) takes a particular interest in or is (are) concerned about a policy matter. Individual initiative may be due to personal values and interests, or direct effects on individuals or the neighborhood. NBA chairs report that they receive a substantial amount of mail on numerous issues relevant to the community and, thus, must selectively choose issues on which to focus based on community interest and perceived importance.

Despite the fact that neighborhood associations are a formal part of the public involvement structure for city- and region-wide land use and other planning measures, NBAs tend to focus on local issues with direct impacts on the neighborhood. Regarding land use planning, particular neighborhood associations appear to deal more frequently than others with new and re-development projects in their neighborhoods due to greater (perceived) impacts on residents. The focus on such projects is related to the development history and geography of a particular area, since neighborhoods with vacant land and large lots suitable for subdivision and higher density development are susceptible to new and re-development. As a result, neighborhoods with large lots and vacant land (e.g., in Milwaukie, East Portland and parts of Gresham) tend to focus on development issues more than other areas. The City informs NBAs of land use permits filed in their neighborhood, and so affected neighborhoods are prompted to respond. As will be discussed below, neighborhood associations focus on a variety of issues influenced by the physical and human geography of the neighborhood (e.g., water resources, parks, crime), as well as by the interests and concerns of individual neighborhood activists and the influence of government agencies and non-profit organizations.

Overall, the issues addressed most by neighborhood associations in the Portland metropolitan area relate to livability. Foremost among these are transportation and traffic, safety and crime, and quality of life issues such as parks. New transportation projects including road construction and light rail development are addressed by several NBAs. Traffic congestion and transportation-related safety issues such as traffic calming and crime are often central to neighborhood activities. Crime prevention is also important, particularly neighborhoods with high crime rates and new light rail development. Some neighborhoods have been interested in and concerned about the establishment of the Springwater Corridor trail, a 40-mile “rail-to-trail” which is a converted railroad used for recreation that runs along Johnson Creek for much of its length. While some neighborhoods have supported trail

development due to recreational and bicycle-commuter benefits, others are concerned with the increased people traffic and associated litter and crime. Other common activities include a variety of school projects and programs in addition to neighborhood events such as festivals, garage sales, and neighborhood clean-ups.

Environmental activities undertaken by neighborhoods often relate to livability or serve a practical purpose. Many informants comment that neighborhoods are pro-parks, although occasionally concerns about safety arise in relation to parks and greenspaces. Another important issue, especially where new development is occurring, is density. Many people dislike high density development because of aesthetic, crime-related or other reasons, particularly in Gresham where vacant property and land newly brought into the UGB is located. The relationship among development, greenspaces and the environment is complex. For example, while greenspaces can benefit the environment by alleviating stormwater runoff and providing wildlife habitat, high density development can place pressure on greenspaces not currently managed as parks. At the same time, such development fosters alternative modes of transportation and alleviates sprawl, thereby improving environmental health. Indeed, these issues relate to planning for the urban growth boundary, which increases the pressure for high-density and in-fill development. Particular areas in Milwaukie and East Portland have larger lots, in part due to their relatively recent rural history and more suburban orientation, and some neighbors oppose the subdivision and development of these properties for a variety of reasons including concerns about livability and property values. One neighborhood activist with a large lot expressed a desire to maintain her yard, noting that it helps manage stormwater and is therefore good for watershed health. Others note the desire for greenspaces so that kids have a place to play.

Most environmental issues addressed by neighborhood associations deal with land use issues including development, as discussed above. In addition, some neighborhood

associations have undertaken restoration projects and street-tree plantings. Such work is commonly initiated by individual neighborhood activists with particular interests in the environment, and is often conducted in coordination with non-profit organizations such as Friends of Trees, SOLV (formerly known as Stop Oregon Litter and Vandalism, but now simply referred to as SOLV due to its diversified objectives and services), or the local watershed council. Such projects are also often initiated by interest-based non-profit groups and involve volunteers that live outside of the neighborhood or watershed. Informants from one jurisdiction noted that the majority of volunteers for local restoration projects come from outside the local community and many are involved with interest-based groups, while residents near restoration sites are frequently far less involved.

Another water-related activity for many neighborhoods in the City of Portland is the Downspout Disconnect program. Portland's Bureau of Environmental Services has encouraged residents to disconnect their downspouts to alleviate stress on the overburdened combined stormwater/sewer system. Interviews with neighborhood leaders suggest that this activity is largely undertaken because the BES pays the neighborhood association for each household that they help to disconnect their downspout. Thus, interest-based groups and governmental agencies both influence the activities undertaken by neighborhood associations.

Neighborhood associations in the City of Portland have been involved in the Healthy Portland Streams project primarily in two ways. First, some neighborhood leaders served on the Citizen Review Committee, and second, the City has attended NBA meetings by request. These public involvement processes are common for municipalities in the study area. In addition, all jurisdictions commonly mail informational materials and event announcements to the Chairs of neighborhood associations. It is at this higher administrative level that neighborhood associations are involved in policy issues at a broader geographical scale. In Gresham, a coalition of

neighborhood leaders exists that deals with policy issues. Similarly, Milwaukie neighborhoods appear to be a sort of training ground for resident activists. Initially, participants are concerned with issues relevant to their neighborhood, but as they become involved in NBA leadership roles they become more involved in city- or region-wide policy matters. To reiterate, whether or not a particular NBA is interested or involved in broader policy matters appears to be largely determined by the interest of the association leadership, and/or the degree to which a particular neighborhood is directly affected by policy.

Beyond informational meetings on the Healthy Portland Streams project, neighborhood associations in the Portland portion of the Johnson Creek watershed have not dealt much with this and associated policy issues. Of the fifteen relevant neighborhoods, only a few have discussed the HPS project and none took an official stance on the issue. One reason for this may be that neighborhood associations tend to avoid highly political issues that are contentious among neighbors. An alternative explanation is that neighborhood associations focus on issues of local interest or concern, particularly those that directly impact their community. Perhaps interest in water resource planning efforts is not great enough, or neighborhood activists do not see the potential effects that such programs have on them, whether they are significantly affected or not.

At the regional coalition office level in the City of Portland portion of the study area, little attention was placed on the Healthy Portland Streams proposal overall, due to the lack of interest among individual neighborhoods. The East Portland Neighborhood Office (EPNO) further east in the study area placed slightly more attention on HPS compared to Southeast Uplift (SEUL), which is closer to Portland's central business district. This may be due to affectedness, given that much of the SEUL region includes areas void of surface water. However, interviews suggest that organizational structure and the oppositional interest group United We Stand may also play a role. SEUL, like

most coalition offices, operates as a non-profit organization, whereas EPNO functions as a city agency. As such, SEUL seems further removed from the City and appears to establish its agenda based on the interests of personnel and neighborhood associations in their area. Moreover, SEUL's philosophical approach to community involvement is grassroots-oriented. Given the relatively top-down approach and perceived flaws in the public involvement efforts for Healthy Portland Streams, SEUL did not actively inform or involve neighborhoods in their region about the project. However, SEUL staff and the SEUL land use committee, which includes the Land Use Chairs of individual neighborhood associations, did meet with city officials to discuss the HPS project. By contrast, EPNO informed neighborhoods in east Portland about HPS through its newsletter, hosted a meeting where the City presented on the proposed policy, and sent a letter to the City regarding the proposal.

The East Portland Neighborhood Office Land Use Committee wrote a letter to the City of Portland about the Healthy Portland Streams project. The committee notes that the proposal includes requirements for property owners near streams, but does not restrict upland development to avoid adverse impacts to water resources. Further, two policies are strongly suggested: (1) development of land use codes that limit the amount of impervious surfaces, which has been requested by neighborhoods without results in the past; and, (2) adjustments to allowed densities in exchange for preserving tree canopy. In conclusion, the Land Use Committee emphasizes: "If the natural resources are everyone's concern, then we should all shoulder the burden." Indeed, upstream-downstream equity is a dominant theme in this letter, which again also relates to socioeconomics.

Informants reported that United We Stand, whose original leader and many members are from the wealthier southwest hills of Portland, targeted Lents to arouse concern and opposition in East Portland. Greater opposition to the Healthy Portland Streams initiative in East Portland might be expected given more dominant conservative

political views and lower socioeconomic conditions in this area, which are often associated with environmental values and views. At the same time, the higher socioeconomic status and urban orientation of the SEUL region, in addition to the environmental and watershed interests of at least some SEUL personnel, could be expected to result in greater expressions of support for resource protection. Based on interviews, this does not appear to be the case among neighborhood associations in the inner southeast (SEUL region), although this attitudinal pattern may exist among individual residents. Regardless, opposition, rather than support, appears to be a more important driver of interest and involvement in resource policy-making among neighborhood groups, in addition to such factors as organizational structure and the influence of interest-based groups. In relation to the former, one informant commented that it is simply human nature to become involved in an issue based of opposition rather than support.

The role of watershed councils in city and regional policy-making is, not surprisingly, different from that of neighborhood associations. As a place-based group with a larger geographical scope and more focused interests, one might expect greater involvement of watershed councils in water resource policy-making. Indeed, these groups are involved – to varying degrees – in local and regional watershed-related planning. For example, watershed councils throughout the Portland metropolitan region invite planners to present on projects at meetings, write letters to government officials and personnel that express watershed council views on policies, and testify at public hearings. In general, however, interviews suggest that the voluntary and grassroots-orientated missions of watershed councils may temper their support of top-down and regulatory measures aimed at water resource protection.

The JCWC mission statements is: “To *inspire* and *facilitate* community investment in the Johnson Creek Watershed for the protection and enhancement of its natural resources” (emphasis mine; JCWC 2004) . Thus, in relation to land use and water

resource planning, watershed councils tend to focus their support of policy measures on improving watershed health, in general, and/or undertaking particular actions based on scientific understanding that will result in improvements of watershed health. By contrast, environmental interest groups such as Audubon Society of Portland lobby for the strongest level of protection, including explicit support for regulations, and often oppose components of proposed policies because they are not protective enough.

Connections do exist between neighborhood associations and the watershed council in the Johnson Creek area. Some neighborhood association participants serve on the board of the Johnson Creek Watershed Council, while others are paying members or are otherwise involved in administrative tasks, restoration projects and/or other watershed-related activities. These collaborations are initiated from both sides. Some neighborhood associations have a contact person that stays abreast of watershed council activities. Recently, the JCWC has taken more initiative in reaching out to neighborhood associations in the watershed.

The activities of neighborhood associations and the watershed council in the Johnson Creek area are inherently different given unique objectives for each organization type and the different spatial scale at which they operate. While watershed councils cover a relatively large area and are more narrowly focused on water resources and watershed health, neighborhood associations are concerned with a wider range of issues over a small area. The activities of neighborhoods vary based on local land use and other conditions as well as the interests and initiative of individual neighbors. NBAs tend to focus on topics that affect livability such as transportation and traffic calming, crime and safety, and land use issues involving density and parks and greenspaces.

Environmental issues dealt with by neighborhoods include clean-up events, tree plantings, and downspout disconnection (in Portland), many of which are encouraged or facilitated by outside organizations including government bureaus and non-profit organizations. Neighborhoods tend to focus very little on region-wide policy matters,

unless an individual neighbor takes initiative or the neighborhood is directly affected. In contrast, the Johnson Creek and other watershed councils seem to be more involved with region-wide policies. However, both groups in the region tend to work toward consensus, and generally avoid matters that create conflict due to differing views among participants (especially for NBAs). For the watershed council, this appears to be related to the voluntary mission and grassroots orientation, in addition to goals aimed at including a diversity of stakeholders. At the neighborhood level, meetings and activities run more smoothly if controversial topics are avoided. This may, in part, be related to the characteristic of people who participate in neighborhood associations, as these people tend to be community-oriented and have other similarities. The next section further describes who is involved in neighborhood associations and the watershed council in the Johnson Creek area.

Participants in place-based groups

Many of the neighborhood association chairs who were interviewed commented that they got involved with their NBA by first attending a meeting because of a particular issue about which they were interested or concerned. Several became involved in leadership positions as a result of a general solicitation or direct request from people already actively involved with the neighborhood association. Some informants noted that when a good person comes along, the association encourages their involvement because skilled, committed people are hard to find. Several neighborhood chairpersons also commented on the difficulties of recruiting neighborhood leaders or getting people involved in general. While people will come out for a specific issue, many do not stay involved. Many leaders interviewed are longer-term residents who have been involved with their neighborhood for several years. A few stated that they would like to step down from their role as chair, and expressed concern that the neighborhood would dissolve if new leadership is not found.

Neighborhood chairs described a “core group” that is regularly involved in neighborhood association activities, which generally involves the board/staff members of the association and maybe a few additional neighbors. These core groups seem to range from five to fifteen people, and regular meetings are generally attended by approximately fifteen to thirty people. While some meetings are only attended by a few people, others can draw up to a hundred or more. Interviews suggest that most participants of neighborhood associations are homeowners, but some renters also participate. One informant suggested that older people participate in neighborhood association meetings and activities, while younger folks want to receive information but do not want to attend meetings. Another interviewee noted that many participants of the NBA are middle-aged adults with children, which explains interest in safety issues, school activities, and parks. Although many chairs note the diversity of participants in terms of sociodemographics, interests, views or personalities, neighborhood chairs and other regular participants generally seem to share a few things in common.

Several neighborhood chairs have professional backgrounds or other experience that aid their work with the neighborhood association such as facilitating meetings and involving people in activities. Informants described themselves and participants as active, community-oriented people. Personality traits of participants that were mentioned in interviews include perceived ability to affect change and tolerance for others’ views. With regard to the latter trait, many informants noted that when differing opinions exist, neighbors simply “agree to disagree.” Neighborhoods appear to operate on a majority-rules basis but as mentioned before, controversial and highly political matters are normally avoided. While one neighborhood activist stated, “I love politics,” in response to a question about how she got involved with her neighborhood association, another suggested, “I’ve always been a joiner.” Indeed, certain traits seem common among NBA participants, but different types of people are also involved. For example, one important distinction was noted by several informants.

Specifically, some participants are meeting-oriented, and others are activity-oriented. This observation was also made with respect to watershed council participants, and is linked to theories about how people perceive and interact with community regarding conservation issues (e.g., grassroots versus top-down management approaches) (Schwarz and Thompson 1990; Minter and Manning 2003).

People who participate in the Johnson Creek Watershed Council may do so by serving on the Board of Directors or one of three committees (Land Use Advocacy, Outreach, Restoration); attending general and other meetings; working on restoration projects or participating in other events; or, donating money or signing up to receive newsletters and other information. The Board is comprised of geographical (stream reach) representatives as well as jurisdiction- and interest-based representatives. To date, the watershed council has been more focused on Portland and urban portions of the watershed. This is partly due to the development of the council from the original Friends of Johnson Creek group that was Portland-based. City-initiated efforts, particularly those introduced by the Bureau of Environmental Services, also help explain the geographical focus on Portland. Greater connections between the watershed council and Gresham compared to Milwaukie may also exist, as is evident by Gresham's staff liaisons with the council. Less involvement and interest seems to exist among rural areas of the watershed, despite the fact that these residents often have closer connections to watershed resources. Considering the more conservative and "mind your own business" mentality of rural residents discussed previously, lower participation rates in these areas are not surprising. The urban/suburban location of meetings may also relate to lower participation in rural areas, in addition to recent bad experiences that some rural residents have had with government personnel regarding a recent Senate Bill dealing with water quality.

In both types of groups, the core membership is relatively small. Across neighborhoods, members appears to be diverse, yet NBA participants seem to be

similar within a single neighborhood. While one neighborhood association is dominated by elders, for example, another includes more middle-aged residents with kids. One informant noted, somewhat jokingly, that his/her NBA needs to diversify from its' lawyer-base. The watershed council, by contrast, is led by a core group of Board and Committee Members, the majority of whom seem committed to the goal of improving watershed health. Yet watershed activities range from meetings and event planning to work days and educational activities, and participants are involved to varying degrees and in a variety of ways. With over one thousand people on their mailing list, less engaged participants may very well differ from the core group. Regardless, interviews suggest that membership is a bit skewed toward (sub)urban rather than rural areas, as well as toward residents rather than businesses. Both organizations appear interested, however, in fostering involvement from a broader and more diverse range of people.

Conclusion

This chapter presented the dominant themes arising from preliminary interviews. Two main topics were addressed in semi-structured interviews. First, key informants were asked about residents' views towards local water resource issues in the study area. Informants suggest that residents' strongly support water resource protection in general, but opposition exists toward more concrete aspects of protection such as land use regulations. While some informants stress the importance of utilitarian factors such as affectedness in understanding attitudes, others emphasize the role of ideology and beliefs about nature, politics, and government. With regard to personal impacts, interviewees highlight the importance of multiple factors in determining impact including the proportion and location of the property affected by proposed policies (regulations) as well as current and planned land uses for a particular property. Other factors important in explaining attitudes are specific experiences with government and

the spatial and historical context of a particular area. Information about the nature and reasons for attitudes toward water resource protection address the first two questions posed for this research. These findings will be further referenced in the following chapter in relation to the research questions systematically investigated with the survey data.

Second, public involvement in water-related decision-making and land use planning were investigated, especially relating to place-based groups. Specifically, public participation processes for recent water resource policies in the region, the activities undertaken by neighborhood associations and the watershed council, and who participates (and how) in place-based groups were described. Informants highlight the influence of public involvement processes on attitudes about water resource protection, including how the public are involved in decision-making and the potential power of interest groups involved. While government entities in the study area seek the involvement of place-based groups, especially through passive means such as sending event announcements to neighborhood associations, place-based groups are involved to varying degrees in land use planning and water resource issues. Watershed councils appear to be involved but are sometimes cautious in taking positions on controversial, non-voluntary resource protection measures. Neighborhood group involvement appears to be influenced by the interests of leaders and participants in the NBA, external support and requests from outside entities, in addition to the degree to which neighborhoods are affected by particular policies or projects, which for water resource issues is linked to the amount of surface water within their boundaries. Similarly, individuals who participate in their neighborhood association are often drawn in by an issue that is particularly important to them and/or by requests from fellow neighbors, and in general participants tend to be "joiners." People actively involved in the watershed council, on the other hand, are often environmentalists with strong beliefs about resource protection. However, the various means by which participation may occur, and emphasis placed on voluntary protection efforts, offer

opportunities for people with diverse views to participate. These themes provide contextual information for understanding findings and their implications for water resources management and decision-making and related public involvement processes.

Overall, interviews provide a foundation for understanding responses to the mail questionnaire, which were analyzed to address the three research questions posed in this research:

- What is the nature and degree of support and opposition toward water resource protection?
- What factors explain attitudes (support/opposition) towards water resource protection?
- How do participants and non-participants differ in their attitudes about water resource protection?

The next chapter presents the findings from the analysis of the survey data by research question and, where relevant, refers to interview findings for further explanation and understanding. Themes arising from interviews will also be considered in the discussion of results arising from this research, which are presented in Chapter 6.

CHAPTER 5. FINDINGS FROM THE MAIL QUESTIONNAIRE

This chapter presents the results of the analysis of survey data for the three central questions posed in this research (Table 5-1). First, the degree and nature of support/opposition to water resource protection is summarized with descriptive statistics, ranking dependent variable questions items from most to least supported, and written comments from surveys. This section ends with a description of how the individual dependent variable items were combined to create various indices representing attitudes about different aspects of water resource protection. Second, factors that explain water-related attitudes are presented with the results of bivariate correlations and multiple regression analyses, following summary statistics for the explanatory variables in these analyses. Third, attitudinal differences among participants and non-participants of place-based and other groups will be presented, along with qualitative findings related to water-related attitudes and civic involvement. Qualitative descriptions of written comments on surveys, which were made by over half of respondents, are highlighted throughout the quantitative findings to further shed light on residents' attitudes towards water resource protection. Where relevant, references to preliminary interviews are made to help understand survey findings.

Table 5-1. Overview of the Analytical Methods and Variables Analyzed for the Three Primary Research Questions

Research Questions	Methods of Analysis	Variables Analyzed: Attitudinal Aspects & Explanatory Factors
<p>1. What is the nature of attitudes towards water resources protection, & to what degree do residents support/oppose particular efforts?</p>	<p><i>Descriptive statistics & ranking of individual attitudinal question items</i></p> <p><i>Qualitative review of interview notes & written survey comments</i></p> <p><i>Factor & reliability analyses of individual items for creation of 5 attitudinal indices: general values, government, regulations, economic, overall (4 above)</i></p>	<p><i>Attitudinal aspects measured:</i></p> <p><u>General</u> importance of water resource protection</p> <p><u>Values</u> (importance/not): Drinking water quality; clean streams, lakes, wetlands; flood management; fish & wildlife habitat; public use & enjoyment.</p> <p><u>Groups</u> (support/opposition): Government: local; regional (Metro); state; federal; & non-profit organizations; businesses.</p> <p><u>Policy options</u> (support/opposition): Financial incentives, education & outreach, restoration purchasing land (from voluntary landowners), regulations →</p> <p><u>Regulations</u> (support/opposition): In general; - Different land use types: residential; commercial; industrial; agricultural; parks & open spaces; - Types of restrictions: how development is designed; removal of trees; new construction; types of plants.</p> <p><u>Economic</u> (support/opposition): - Expressed willing to pay personally; - Various funding mechanism: taxes on polluting products; fines from land use violations; property & income taxes; water/sewer bill charges; fees on new development; voter-approved bonds.</p>
<p>2. What are the most important explanatory factors for residents' attitudes about water resource protection?</p>	<p><i>Bivariate correlation coefficients (Pearson's rho)</i></p> <p><i>Multiple linear regression: full & condensed models</i></p> <p><i>Qualitative review of interview notes & written survey comments</i></p>	<p><i>Attitudinal variables</i> for water resource protection (5 indices): General importance; government, regulations, economic, & overall attitudes (previous 4 combined)</p> <p><i>Explanatory variables:</i> Knowledge*; distance to stream; water on/bordering property; use/visitation of water; civic involvement*; environmental beliefs*; political beliefs*; perceived condition of water resources; perceived desirability of living near water*; place attachment*; gender; age; income; education; political orientation (liberal/conservative); number of (grand)children; years residence in Portland/Oregon; jurisdiction - urban/rural.</p> <p>* Indicates variable has more than one measure.</p>
<p>3. How do attitudes differ between participants & non-participants of place-based organizations?</p>	<p><i>T-tests & ANOVAs, with Tukey's post-hoc comparison test</i></p> <p><i>Back-up: Mann-Whitney U & Kruskal-Wallis non-parametric tests</i></p>	<p><i>Attitudinal variables</i> for water resource protection (5 indices): General importance; government, regulations, economic, & overall attitudes (previous 4 combined)</p> <p><i>Sociodemographic variables:</i> Gender; age; income; education; political orientation (liberal/conservative); number of children/grandchildren; years residence in Portland/Oregon).</p> <p><i>Grouping variables:</i> Participants vs. non-participants of watershed council, neighborhood associations, & both place-based groups.</p>

The first section below describes the nature of attitudes about water resource protection and the degree of support and opposition to various aspects of resource protection efforts. These attitudinal dimensions comprise the dependent variable in this research. In order to address the first research question, summary statistics are presented for individual question items representing different attitudinal dimensions of water resource protection, along with qualitative descriptions of written comments on surveys. The rankings of individual question items are also presented in order to understand which efforts are most supported and opposed by residents in the study area. The generation of five dependent variable indices by combining individual question items was achieved through reliability and factor analyses. The development of the dependent variables indices is then described prior to the analyses for the remaining research questions. The five aspects of attitudes about water resource protection captured by the indices are: *general* importance of water resource values, support/opposition to *government, regulations,* and *economic* measures, and an *overall* attitudinal measure that incorporates these four unique dimensions.

Research Question 1: Nature of Attitudes about Water Resource Protection

This section addresses the first research question, *What is the nature of attitudes toward water resource protection, and to what degree do residents support/oppose various water resources protection efforts?* Overall, the survey findings indicate substantial support for water resource protection measures among residents in Johnson Creek area of metropolitan Portland, Oregon, though significant opposition exists for some resource protection efforts. The high degree of support expressed by survey respondents is consistent with other surveys and is otherwise not surprising. Emphasis is placed here on evaluating descriptive statistics in terms of the degree of support and opposition (e.g., mean response, percent support/oppose) toward water resource protection efforts, and the nature of attitudes is assessed by ranking particular aspects

of protection efforts from most-to-least supported. The different aspects of water resource protection (Table 5-2) evaluated in this research are:

- *General importance* of water resource protection;
- Importance of particular *values* associated with protecting water resources;
- Support/opposition toward different *groups* including various levels of government;
- Support/opposition toward *policy options*, with particular attention to regulations applied to different types of land (e.g., residential, industrial) and specific types of restrictions (e.g., on tree removal, how development is designed); and,
- Support/opposition of *economic means* of protecting water resources in terms of expressed willingness to pay personally for water resource protection and support/opposition toward specific funding mechanisms.

The color coding in Table 5-2 indicates the individual question items that were combined to create four unique attitudinal dimensions, which will be described in-depth in the following section: generally expressed importance of water resource protection and related values (blue) as well as support/opposition to government (orange), regulations (gray), and economic measures (green). Note that the response scales for the economic attitudinal items were different than that for the other attitudinal question items, which were measured on a six-point Likert scale. Economic support/opposition was measured on three and four-point scales, which will be detailed below. *In the analysis and presentation to follow, all question items were oriented such that one equals the greatest support for water resource protection and higher numbers represent increasing opposition.* All attitudinal questions were asked in relation to “protecting the condition of water resources such streams, rivers, lakes and wetlands in the greater Portland metropolitan area.”

**Table 5-2. The Dependent Variable Question Items:
Aspects of Attitudes About Water Resource Protection**

General importance of water resource protection
Values (importance):
Drinking water quality
Clean streams, lakes, wetlands
Fish and wildlife habitat
Flood management
Public use and enjoyment
Different groups (support/opposition):
Local government (city, county)
Regional government (Metro)
State government
Federal government
Non-profit organizations
Businesses
Policy options (support/opposition):
Financial incentives
Outreach/education
Purchasing land (from voluntary landowners)
Regulations*
Restoration
Regulations (support/opposition):
Regulations, in general (repeated, from above) *
Land use: residential
Land use: commercial
Land use: industrial
Land use: agricultural
Land use: public parks and open space
Type of regulation: restricting new construction near water
Type of regulation: restricting how new development is designed (to minimize impacts)
Type of regulation: restricting removal of trees near water
Type of regulation: restricting types of plants near water
Economic/financial items (support/opposition):
Expressed willing to pay personally (yes, probably, probably not, no)
Funding mechanism: fines from land use violations
Funding mechanism: taxes on polluting products
Funding mechanism: property taxes
Funding mechanism: income taxes
Funding mechanism: water/sewer bills
Funding mechanism: fees on new development
Funding mechanism: voter-approved bonds

The most general measures of water-related attitudes included two questions; one that asked respondents to rate the importance of protecting water resources in the greater Portland metropolitan area in general, and the second asked them to rate the importance of specific values (or reasons) associated with protecting water resources (Table 5-3). The vast majority of respondents assigned importance to water resource protection generally and for each value, ranging from eighty-five to ninety-nine percent support. Consistent with other findings, generally expressed importance and water quality, both for drinking purposes and clean waterways, rank highest in terms of support. Biocentric values (in-situ water quality and habitat protection) were more supported than anthropocentric values (flood management and public use/enjoyment), with fewer and greater than ten percent of respondents opposing these values, respectively.

Table 5-3. Importance of Water Resource Protection In General and With Regard to Water Resource Values (Ranked from most important to least important)

General Importance Question Items	Mean	Standard Deviation	Percent Important (1-3 on scale)	Percent No Opinion	Percent Don't Know	N
Drinking water quality	1.221	0.696	98.5%	0.5%	0.1%	807
General importance	1.468	0.796	97.4%	0.2%	0.4%	771
Clean streams, lakes, wetlands	1.613	0.882	97.5%	0.2%	0.1%	807
Fish and wildlife habitat	1.833	1.085	92.7%	0.1%	0.2%	807
Flood management	2.210	1.201	87.2%	0.6%	1.2%	794
Public use and enjoyment	2.391	1.190	84.7%	0.5%	0.4%	804

Note: Scale for these question items is 1 = very important, 6 = not important.

With regard to various groups that undertake water resource protection efforts, local and state government are most preferred, followed by non-profit organizations and the regional government (Metro) (Table 5-4). Efforts by the federal government are opposed by thirty percent of respondents, and for-profit businesses are most opposed, with forty-five percent opposition. Written comments on the survey add to the

interpretation of these results. Many respondents attribute water resource problems (or target solutions) to industry or other businesses, and suggest that “the polluter” – often seen as businesses – should pay. This opposition may be due to distrust or other negative views about businesses undertaking water resource protection efforts, as several respondents wrote comments suggesting that business cannot be trusted to do the right thing on their own given profit motives or self interests. A few example comments follow:

“[Government] doesn't do enough to stop polluting of waterways everywhere. I think government is paid off by businesses. There is no accountability in government” (#108).

“... I also believe that individuals are almost powerless against businesses and the U.S. market driven economy...I think business have too much influence & dominate gov't decisions” (#177).

“I support the government effort, but their lack of progress & slow reaction to problems is very disturbing. They seldom prosecute industrial polluters that have ruined major waterways. I wouldn't even consider eating any fish caught in a river or lake in the metro area. The local government seems to cover up corporate polluters and continue to give extensions to fixing their violations. Are there kickbacks? and under the table dealings? It seems so. The taxpayers are always asked to pick up and pay when corporations don't or won't” (#940).

Table 5-4. Support/Opposition Towards Water Resource Protection Efforts of Different Entities (Ranked from most to least supported)

Group	Mean	Standard Deviation	Percent Support (1-3 on scale)	Percent No Opinion	Percent Don't Know	N
Local government	2.218	1.305	84.6%	3.1%	5.3%	729
State government	2.289	1.238	84.7%	2.9%	6.0%	726
Non-profit organizations	2.407	1.474	78.9%	5.0%	6.4%	703
Regional government	2.540	1.559	77.2%	2.8%	5.4%	728
Federal government	2.713	1.491	70.5%	3.2%	5.8%	722
Businesses	3.264	1.734	55.1%	5.1%	8.3%	675

Note: Scale for these question items is 1 = strongly support, 6 = strongly oppose.

Not all comments about business were negative. Some people noted that they support any and all efforts to protect water resources, while others emphasized the need for cooperation and partnerships across entities including business and government. A few stated that government ought to be run more like business, suggesting that government is inefficient. As seen in the above comments, many respondents made linkages between business and government. Over half of respondents with written comments explicitly addressed government efforts, which was prompted by the open ended question at the end of the questionnaire. In some written comments, respondents expressed preferences for other entities such as non-profit organizations and community-based groups, which will be discussed further below.

In general, written comments suggest that research participants responded to the survey question regarding entities involved with water resource protection in different ways. Several respondents noted that they are unfamiliar with the activities of (some) groups listed, and either responded generally or not at all. This likely explains the relatively high level of “don’t know” and “no opinion” responses to these question items. However, some survey participants made reference to specific efforts or experiences with a particular group (or groups). Preliminary interviews suggest that views about government are often linked to general beliefs such as distrust in government and/or specific projects or experiences with government agencies or personnel. Indeed, this pattern is seen in written comments on surveys, with various levels of specificity for both positive and negative comments about entities, especially government agencies. Several quotes follow that help illustrate varying levels of specificity in both positive and negative comments about government efforts to protect water resources.

“Too many agencies – they don't cooperate with each other & use rules selectively as they see fit. Too many little kingdoms” (#844).

“City has been, and currently is, and probably will be in the future, run by idiots” (#1375).

“I believe this [water resource protection] is an area that government should have very little control. Education and informational guidelines would be welcomed from the government but not the lock down controls now present with the current land use planning laws. Work more through community associations for education, area cleanups, etc.” (#705).

“The necessity is obvious to protect water resources. I do not agree with duplicate governments (Metro) or duplicate programs...” (#391).

“...City of Portland stole property from a family on Foster Rd. & turned it into a special water collection area. It turned out to be a big mess. They planted native plants and the area is an eyesore” (#3114).

“I oppose government in charge of water, because they will not react when you need them. Three years ago the property owner by me circled his wet land & drained it on my property. I called the county & they told me it was up to the State. I called the State in Salem many times & received no help – not even a come see” (*sic*) (#885).

“I have lived on Johnson Crk. for 32 yr....Improvements made to my riparian area property by my family for last 15 years has had amazingly positive results for wildlife here. Metro's rules and information was a great help” (*sic*) (#2306).

“Generally support, because without government leadership & assistance, protection would be very limited & scattered & inefficient; but enforcement must be fair, equitable & reasonable & compensated for when unreasonable or excessive” (#2144).

“I support the governments efforts because it is imperative that we take care of our planet and its natural resources” (#2447).

Most of the positive comments supportive of government were general statements. For example, several respondents suggested that if government does not protect water resources no-one will, while others commented that government is the obvious entity to oversee, coordinate or lead efforts to protect resources. Some people commended government efforts, especially at the local level, such as the City of Portland's efforts to clean up the Willamette River and Metro's helpful information for riparian

restoration efforts. While Metro was praised by a few participants for region-wide planning, greenspaces acquisition and other programs, about one-fifth of respondents express opposition to Metro in the closed-ended survey question. In general, some comments illustrate preferences for particular levels of government over others.

“Generally, I think the local government(s) have a better understanding of the needs of our area than government from Wash DC. Keep it local!” (#612).

“These regulations are best left to the counties which have historically regulated building, development, and water resources. County government best represents the interest of local citizens in these matters. Metro regional government is elected by, and serves the interests of urban elites and amounts to only a mechanism whereby the Portland urban political activists can usurp local control on a regional basis” (#2353).

“Metro+ government has bigger picture on resource issues than individuals & business. Watershed policy is inherently regional & needs regional solutions” (*sic*) (#2465).

About one-fifth of respondents who commented specifically about government had explicitly negative remarks, as can be seen from the comments included above. Negative comments about government were both general and specific in nature. General negative comments included statements about government inefficiency, bureaucracy, or incompetence, to name a few dominant themes. Many comments lacked details to explain these viewpoints, and yet some comments illustrate the link between negative general views of government and specific opinions of government projects. For example, several respondents emphasized the government’s incompetence in regard to the failure of a new computer system adopted a few years ago to bill residents for water and sewer charges. The mishap cost the City a lot of money and resulted in billing residents incorrectly. Respondents also commented about recent increases and relatively high water/sewer bills. Other specific projects that were mentioned include the combined sewer overflow project on the Willamette River and land use policies such as Healthy Portland Stream and Metro’s Fish and

Wildlife Habitat Protection Program. Comments about these programs were both positive and negative; while some residents commended these programs, others criticized them. Even residents who support cleaning up the Willamette River criticize the government for allowing sewage to run into the river. Interestingly, several respondents commented about the city allowing sewage to run off into the Willamette, yet very few made the link to individual residents of the region (e.g., in terms of whose sewage is running into the river and who should pay for the clean-up). Another project commented on by several respondents is the plan considered by the City of Portland to cover the reservoirs on Mt. Tabor, a publicly-owned park in southeast Portland that is north of the Johnson Creek watershed. Local opposition to the project was high, and some respondents appear angry at the City of Portland for this proposal (which was not yet abandoned at the time of the survey mailings), despite the fact that many of them overwhelmingly support water resource protection efforts otherwise.

Regarding policy options, education and outreach and restoration rank as the most preferred policy options for protecting water resources (Table 5-5). While less than ten percent of respondents oppose education and restoration efforts, eighteen percent oppose (voluntary) land acquisition. Regulations and financial incentives rank last among the five general policy options, with twenty percent of respondents opposed to these approaches. Almost seven percent of respondents responded “don’t know” to financial incentives, which may suggest that some respondents did not understand this question item, or perhaps more information is needed to respond.

Table 5-5. Support/Opposition toward Policy Options for Water Resource Protection (Ranked from most to least supported)

Policy Options	Mean	Standard Deviation	Percent Support (1-3 on scale)	Percent No Opinion	Percent Don't Know	N
Outreach/education	1.758	1.010	94.0%	1.8%	1.1%	756
Restoration	1.867	1.099	92.2%	1.7%	1.8%	758
Purchasing land	2.276	1.340	82.2%	2.6%	3.4%	732
Regulations	2.422	1.480	79.4%	2.1%	2.3%	746
Financial incentive	2.530	1.447	79.5%	3.3%	6.7%	689

Note: Scale for these question items is 1 = strongly support, 6 = strongly oppose.

Expressions of support for regulations in general were expected to be greater than more specific expressions of support for regulations, since evidence suggests widespread support for general expressions about environmental protection. However, greater support was expressed by respondents for regulations applied to specific land uses (i.e., industrial) as well as for particular types of restrictions (e.g., on how new development is designed) compared to the general attitudinal expression about regulations. It appears that many residents may become more comfortable with regulations as they understand the specifics of their application. In addition, this result indicates varying levels of support and opposition to different types of regulatory programs. Written comments on surveys indicate that some people are uncomfortable expressing support or opposition to general statements, recognizing that their opinions are often conditional on the details of water resource protection efforts. For example, one resident supports all types of regulations in terms of the closed-ended survey questions, with the exception of regulations on residential land, which s/he strongly opposes. Written comments help explain her/his viewpoint on regulations:

“I strongly oppose the Healthy Streams idea. I purchased my home with a large yard for the specific purpose of growing my own garden to can food. The overlay proposed will create areas of homes that can't be sold because a person can't have a garden. I feel long-term that the overlay will create a no mans land & that is the goal - to drive us out of our properties” (*sic*) (#2171).

Interestingly, this respondent mildly supports restrictions on the types of vegetation that can be planted near water ways, which indeed is a regulation that could affect gardeners. A similar example is a respondent who mildly supports regulations on how land is used/developed in general, and strongly supports the four specific types of restrictions included on the survey; however, this respondent strongly opposes government regulations on all types of property regardless of land use. No written comments were made to shed light on his/her views about regulations. Comments from other respondents emphasize that support/opposition is conditional, or is otherwise not fully captured by survey questions. For example, one respondent noted, "I support some level of protection regulations and permit review as long as it can be done in a timely fashion and with common sense..." (#383). Another wrote, "I prefer to think of regulations as design guidance - not restrictions, and I think it is important to promote development in conjunction with water resources, not treatment, not 'total separation'... Talking about protection as 'restrictions' only reinforces the negative stereotype" (#2438). Survey responses to closed-ended questions and written comments highlight the complexity of attitudes about regulations, including mixed support and opposition by individual residents. Yet substantial support for specific regulations aimed at protecting water resources was expressed overall.

Support ranged from a low of eighty percent for regulations in general to a high of ninety-five percent for regulations on industrial lands (Table 5-6). With regard to land use, regulations on industrial and commercial lands were most supported, followed by regulations on parks, agricultural, and residential land. Regulations on residential land uses were most opposed, with thirteen percent expressing some level of opposition. Given that the population studied consists of residents of the region, this finding may indicate the pursuit of self-interests in environmental attitudes. Additional explanations exist, however, and are supported by written comments. First, greater support for regulations on industrial and commercial land may be associated with perceptions regarding the impact of these land uses on water resources relative to others. This

perspective is seen in comments such as, "...Big businesses are the main polluters of water" (#1177). Second, this finding may relate to perceptions about the fairness of regulating these versus residential areas. That is, residents may support regulations on residential property only if industrial and commercial land uses are equally regulated or otherwise held responsible for water resource protection. Issues of equity and fairness were highlighted by informants in preliminary interviews and in the letter written by the Neighborhood Association Land Use Chairs in East Portland. Below are a few comments that highlight views about the unequal treatment of residential versus industrial or commercial land.

"The City of Portland has some 'stupid' policies re: development of land on one's private property. We have watched new business be built across from our property over the years, causing our neighborhood to flood since the buildings were built. The City of Portland allowed the business to be built, but still restrict the homeowners on developing their land. This is very unfair and it seems as the city does not care about the wetlands that surround our property. After all what is in the runoff from these businesses? Why has flooding never been an issue on our property until these new buildings were built? Standards should be kept across the board, not to those who can afford to 'buy the city out'..." (#1156).

"The questionnaire focuses on the private home and land owner but not on industrial use of land. It doesn't focus on large developers, who have been allowed to destroy natural habitat. It's contradictory, to tell property owner, that they can only plant native plants on their property when a major industrial owner has been established on the watershed." (#2080).

"...I send a tidy sum of money to local water bureau. I think I probably pay more than my share as compared to industrial customers. All that said, I wholly endorse most efforts to clean up the local waterways." (#3120).

Table 5-6. Support/Opposition toward Regulations on Specific Land Uses for Water Resource Protection (Ranked from most to least supported)

Regulations on Specific Land Uses	Mean	Standard Deviation	Percent Support (1-3 on scale)	Percent No Opinion	Percent Don't Know	N
Industrial	1.639	1.043	94.5%	2.0%	2.2%	748
Commercial	1.812	1.074	93.2%	2.2%	1.5%	750
Public parks/open spaces	1.838	1.109	92.5%	2.1%	1.6%	751
Agricultural	1.929	1.211	90.5%	2.1%	2.2%	749
Residential	2.198	1.362	86.6%	2.1%	1.1%	752

Note: Scale for these question items is 1 = strongly support, 6 = strongly oppose.

Relating to equity, property rights issues were highlighted in some written comments. While a couple of people noted the challenges posed by property rights advocates in protecting resources, most comments about property rights emphasized the need to protect private property rights while pursuing water resource protection efforts, or the need for government compensation when property values are diminished due to land use laws. Most of these comments were made as general, normative beliefs rather than in specific regard to personal situations. A few comments were made in regard to programs such as Healthy Portland Streams or Metro's Fish and Wildlife Habitat program. The quote below highlights an individual's situation and illustrates how property rights can be viewed as an issue of equity:

“The Healthy Streams Program takes away the rights of the property owners devaluing their property - I have a concern for nature but it should be cost shared by all, not just those who bought property many years ago. Hence why people vote for Measure 7 - etc.” (#1058).

In terms of specific types of regulations, residents are most supportive of restrictions on how development is designed (e.g., to minimize impacts) and the removal of trees near waterways, which are supported by approximately ninety percent of respondents (Table 5-7). Slightly more opposition is expressed for restrictions on the types of plants allowed near water resources, in addition to prohibiting new

construction near water. To reiterate, each of these specific types of regulations were opposed less than the more general measure of support/opposition to regulations. This suggests that people may be more accepting of particular types of regulations over others, and that residents may be more supportive of regulations once they understand the specifics of their application. An example provided by one interview informant suggested that informing residents at a public meeting about the details of a proposed water resource program that included restrictions eased fears and concerns (which were originally provoked by literature distributed by opponents).

Table 5-7. Support/Opposition toward Specific Types of Regulations for Water Resource Protection (Ranked from most to least supported)

Specific Type of Regulation	Mean	Standard Deviation	Percent Support (1-3 on scale)	Percent No Opinion	Percent Don't Know	N
How new development is designed	1.73	1.12	92.3%	1.8%	1.2%	764
Removal of trees near water	1.84	1.32	88.4%	1.5%	1.0%	767
Types of plants allowed near water	2.02	1.36	86.5%	2.1%	3.4%	740
New construction near water	2.06	1.38	85.5%	2.1%	1.8%	754

Note: Scale for these question items is 1 = strongly support, 6 = strongly oppose.

Economic support was measured in terms of expressed willingness to pay personally for efforts aimed at water resource protection in the greater Portland area. It is important to stress that this question did not employ contingent valuation or similar methods used to estimate willingness to pay, as such methods were beyond the scope of this research. Rather, participants responded on a four-point scale on which one equaled no, four equaled yes, and probably not and probably options were offered in-between. The average response to this question was 2.86, with a standard deviation of 0.96. Response rates were twelve percent for “no,” nineteen percent for “probably not,” forty-one percent for “probably” and twenty-nine percent for “yes.” In addition, ten percent responded “don’t know.” Several participants wrote comments next to this question, many of which indicated that they already pay for these efforts, for example,

through sewer bills, taxes, etc. This question did not differentiate between contributing financially at current versus higher levels, although the question regarding funding mechanisms did make this distinction (Table 5-8). Several participants commented specifically about the large increase in sewer bills over the last few years, which may explain the relatively high opposition to increased charges on water/sewer bills to fund water resource protection efforts. Others expressed anti-tax sentiments with comments such as “Oregon is tax hell” (#1539), and “The gov. has money. Tired of increasing property taxes, water & sewer costs” (#1526).

Table 5-8. Support/Opposition toward Funding Mechanisms for Water Resource Protection (Ranked from most to least supported)

Funding Mechanisms	Percent Support Higher Levels	Percent Support Current Levels	Percent Don't Support, Oppose	Percent Don't Know	Percent No Opinion	N
Fines from land use violations	71.2%	23.6%	5.2%	2.2%	2.0%	751
Taxes on polluting products	67.8%	22.8%	9.5%	3.8%	1.8%	738
Fees on new development	51.7%	34.3%	14.1%	5.1%	2.6%	718
Voter-approved bond	23.7%	47.3%	29.0%	8.2%	4.4%	676
Water/sewer bills	10.9%	58.3%	30.7%	3.3%	2.7%	722
Property taxes	7.1%	43.9%	49.0%	2.3%	1.7%	732
Income taxes	7.1%	40.2%	52.7%	2.1%	2.5%	729

Note: Respondents checked a box for each response category: support higher levels, support current levels, and don't support/oppose.

Interesting and expected patterns can be seen in the degree of support and opposition to various funding mechanisms potentially used to protect water resources (Table 5-8). The funding mechanisms receiving the greatest support involve those that require the parties responsible for pollution or degradation of resources to pay, with the vast majority of respondents expressing support for current or higher levels of funding through fines on land use violations, taxes on polluting products, and fees on new development. Moderate opposition to voter-approved bond measures and charges on water/sewer bills was expressed, with approximately one-third of respondents opposed to these funding methods. However, while only eleven percent expressed support for

higher levels of funding through water/sewer bills, twenty-four percent support higher levels of funding through voter-approved bond measures. Several respondents (eight percent) checked “don’t know” with regard to bond measures, suggesting that people may not understand this mechanism or additional details may be necessary for residents to express a viewpoint. As noted above, written comments suggest that substantial increases in water/sewer bills, which are related to the City of Portland’s efforts to resolve combined sewer overflow problems in recent years, help explain opposition to increased charges on water/sewer bills. Yet almost sixty percent of respondents support current levels of water/sewer bills, compared to under fifty percent for bond measures. Lastly, the survey findings highlight anti-tax sentiment in the region, as approximately half of residents oppose the use of property and income taxes for resource protection and fewer than ten percent support higher taxes. It seems worthy to note that the three funding mechanisms to which residents are most opposed are those that most widely and directly affect residents, which indicates that self-interests may also be at play here.

In summary, the nature of attitudes and degree of support/opposition toward water resource protection overall is understood by ranking the individual question items representing different aspects of protection efforts and associated attitudinal dimensions (Table 5-9). Residents are most supportive of water resource protection (less than ten percent opposition or expressed non-importance) in terms of generally expressed importance and the importance of water quality and biocentric values such as habitat protection, education and restoration as policy options, specific regulations including those on business land uses (e.g., industry) and restrictions on *how* new development is designed, as well as funding mechanisms that ‘make the polluter pay.’ Moderate support (between eleven and eighteen percent opposition or expressed non-importance) exists for protection efforts aimed at anthropocentric resource values, regulations on residential land, specific types of land use restrictions, land acquisition, and local and state government efforts. Opposition is greatest (at least twenty percent

opposition) towards regulations and financial incentives as general policy options, efforts of non-profit organizations and the regional (Metro) and federal government, and several economic measures. Moreover, roughly half of residents oppose efforts of for-profit businesses and income and property taxes as funding mechanisms. The following section describes the combination of individual question items into attitudinal indices that capture different aspects of water resource protection efforts, which will be the dependent variables used in subsequent analyses.

**Table 5-9. Summary Findings for Research Question 1:
Ranking of All Attitudinal Aspects of Water Resource Protection**

Individual Questions about Attitudes toward Resource Protection (ranked from most to least supported)	Negative Attitudinal Expression	Percent Negative Attitudes	Valid N
General value: drinking water quality	Not important	1.5%	807
General value: clean streams, lakes, wetlands	Not important	2.5%	807
General importance	Not important	2.6%	771
Funding mechanism: fines from land use violations	Oppose	5.2%	751
Regulations on land use: industrial	Oppose	5.5%	748
Policy options: outreach/education	Oppose	6.0%	756
Regulations on land use: commercial	Oppose	6.8%	750
General value: fish and wildlife habitat	Not important	7.3%	807
Regulations on land use: public parks & open space	Oppose	7.5%	751
Regulations on how new development is designed	Oppose	7.7%	764
Policy options: restoration	Oppose	7.8%	758
Regulations on land use: agricultural	Oppose	9.5%	749
Funding mechanism: taxes on polluting products	Oppose	9.5%	738
Regulations on removal of trees	Oppose	11.6%	767
General value: flood management	Not important	12.8%	794
Regulations on land use: residential	Oppose	13.4%	752
Regulations on types of plants allowed	Oppose	13.5%	740
Funding mechanism: fees on new development	Oppose	14.1%	718
Regulations on new construction near water	Oppose	14.5%	754
Government: state	Oppose	15.3%	726
General value: public use and enjoyment	Not important	15.3%	804
Government: local	Oppose	15.4%	729
Policy options: purchasing land	Oppose	17.8%	732
Policy options: financial incentive	Oppose	20.5%	689
Policy options: regulations (general)	Oppose	20.6%	746
Non-government: non-profit organizations	Oppose	21.1%	703
Government: regional (Metro)	Oppose	22.8%	728
Funding mechanism: voter-approved bond	Oppose	29.0%	676
Government: federal	Oppose	29.5%	722
Expressed willingness to pay personally	Oppose	30.6%	709
Funding mechanism: water/sewer bills	Oppose	30.7%	722
Non-government: businesses	Oppose	44.9%	675
Funding mechanism: property taxes	Oppose	49.0%	732
Funding mechanism: income taxes	Oppose	52.7%	729

Note: Individuals' responses to similarly colored items were averaged to create indices for four unique attitudinal dimensions: general values (blue); government (orange); regulations (gray); and economic (green). These four indices were then combined for an index of overall attitudes.

The Dependent Variables: Index Construction and Data Considerations

The dependent variables of interest in this research - attitudes towards the protection of water resources - were measured based on responses to the above-described individual question items. For the statistical analyses that follow, individuals' responses to these questions were combined into four dependent variable indices that capture unique attitudinal dimensions, and these four indices were combined into overall attitudinal measure, as described below. The five dependent variable indices incorporated into the analyses that follow are:

- (1) Importance assigned to *general values* associated with water resource protection (blue-shaded items in above tables);
- (2) Support/opposition toward *government* efforts (orange-shaded items);
- (3) Support/opposition toward *regulations* (gray-shaded items);
- (4) *Economic* support/opposition (green-shaded items); and,
- (5) *Overall* attitudes toward water resource protection (i.e., combination of four unique measures above).

This section describes the creation of the dependent variable indices, which was based on reliability and factor analyses. Data considerations relevant for the statistical analyses conducted for this research are also addressed below.

The development of indices from survey data in social science research is common, as indices based on several individual question items are more reliable than the individual responses (Carmines and Zeller 1979; Spector 1992). Reliability analysis is a critical part of index construction and involves determining the degree to which individual items are measuring a single, intended concept (Carmines and Zeller 1979). The most common statistical measure of reliability is Cronbach's alpha, which is a test of internal consistency for individuals' responses to multiple questions that depends on the average inter-item correlations and the number of items in a test. The possible range for Cronbach's alpha is zero to one, and the suggested cut-off point for

reliability is a Cronbach's alpha of 0.70 or higher, though some suggest that an alpha of 0.50 or higher can be used in early stages of research (Nunnally 1967; Albrecht et al. 1992). Reliability analysis was conducted for individual question items in the five pre-conceived indices – again, general importance, support/opposition for regulations, government and economic measures, and overall attitudes about water resource protection. Alpha was greater than the 0.70 criterion for all attitudinal dimensions (Table 5-10).

Table 5-10: Results of Reliability Analyses for Dependent Variable Indices

Dependent Variable Index	# of Items	Items Mean	N	Cronbach's Alpha	Scale
General importance/values	6	1.77	746	0.778	1 = very important, 6 = not
Regulation	10	1.92	673	0.920	1 = support, 6 = oppose
Government	4	2.44	705	0.873	1 = support, 6 = oppose
Economic	8	1.93	507	0.823	1 support, 3/4 = oppose
Overall measure (four above indices)	4	8.17	720	0.764	See above
Note: Criteria for Cronbach's alpha is 0.70 or higher.					

In addition to reliability analysis, factor analysis was employed to further assess the efficacy of the dependent variable indices in terms of identifying a single factor among the dependent variables overall and for each index. This approach is recommended by Carmines and Zeller (1979), who lay out the following criteria for scale construction used in this study: all items in an index load substantially (i.e., loading greater than 0.35) on a primary factor, or component, that has an eigenvalue greater than one and accounts for more than forty percent of the variance, with subsequent components accounting for sequentially less but about the same variance in the data. For the analysis described below, principal components extraction and varimax rotation were employed. Factor analyses were conducted with no rotation and with oblique rotation

(i.e., Direct Oblim) to examine the consistency of results. Similar findings were obtained across rotation methods, so these results are not presented here.

Factor analysis was conducted on all the attitudinal questions items. The results suggest a primary component with an eigenvalue of 13.54 that accounts for forty percent of the variance in the items. All but one item – drinking water quality – loaded substantially on the primary factor. Drinking water quality had a low loading of 0.199, while the loadings for other items ranged from 0.353 to 0.788. This finding indicates that attitudes about protecting drinking water quality are related to human welfare or other factors more than to the primary factor studied here (that is, attitudes about the protection of water resources such as streams, rivers, lakes and wetlands). The subsequent components in the non-rotated matrix had low loadings, but pointed to commonalities in the data such as similar, substantial loadings for the economic items. The rotated matrix produced clearer results, with high loadings on different components for the regulation, government, and general importance/values items.

For the factor analysis of all dependent variable items, the economic variables were split between components such that the expressed willingness to pay, income and property taxes, water/sewer bill charges and bond measure items loaded high on one component and fines on development, taxes on polluting products, and fees on new development loaded high on another component. This finding further underscores differential responses to these two groups of items. In general, the factor analysis of all the attitudinal items supported the development of the indices conceptualized and constructed for this research. Rather than combining thirty-three individual items that have substantial loadings in the factor analysis into an overall measure of support/opposition for water resource protection, the four independent indices were combined in the overall index. This alternative gives equal weight to the four measures included in the overall index, which was justified through the factor analyses described below.

The factor analysis for each of the five indices resulted in all items loading substantially on a primary factor with an eigenvalue greater than one and at least forty percent of the variance accounted for by that component. Items in two of the attitudinal indices – regulations and economic – possessed a second component with an eigenvalue greater than one; however, the variance explained by the second component was relatively low (thirteen and fifteen percent, respectively) and the loadings were somewhat weak (i.e., less than 0.438 for regulations and 0.594 for economic items). The rotated component matrix for the regulation items highlighted distinctions between regulations applied to land uses versus specific types of regulations. The rotated component matrix for the economic measures highlighted the differences between funding mechanisms that employ the “make the polluter pay” principle (e.g., taxes on polluting produces, fines on land use violations, and fees on new development) versus other mechanisms for which greater opposition exists, especially property and income taxes. This finding for the economic measure was similar to that described for the factor analysis of all attitudinal question items together.

Factor analysis is often used to create scales for further statistical analyses (Kim and Mueller 1978). As suggested by Kim and Mueller, factor analysis was used in the development of dependent variable indices for this research both to assure that individual items in each index loaded significantly on that factor and to assess the relative magnitude of loadings. All items loaded significantly on the primary component and had relatively similar loadings, as discussed above and presented in the table below (Table 5-11). Differences between the lowest and highest loading values for each index ranged from a low of 0.061 for the government items to a high of 0.299 for the general items. Among the general values, drinking water quality loaded significantly on the primary component, but had the lowest loading at 0.549. Because of the low and insubstantial loadings for drinking water quality in the factor analyses of the general values and all attitudinal items, drinking water quality was omitted from the general index of support for water resource protection. The range of

loadings is still greatest for the general measure, even with the drinking water quality item omitted, though to a lesser extent (the difference between the lowest and highest loadings changed from 0.299 to 0.214). Overall, the loadings for all indices are similar, which justifies the development of indices without weights for the individual items (Kim and Mueller 1978).

Table 5-11. Results of Factor Analyses for Five Dependent Variable Indices

Dependent Variable Index	# of Items	Eigenvalues, Percent Variance Accounted for by Primary Component	Range for Factor Loadings (Minimum - Maximum)
General importance/values [minus drinking water quality]	5	2.76, 55.11%	0.634 - 0.848
Regulations	10	5.93, 59.31%	0.720 - 0.817
Government	4	2.94, 73.38%	0.832 - 0.893
Economic	8	3.65, 45.60%	0.574 - 0.722
Overall (composite of four indices above)	4	2.49, 62.31%	0.742 - 0.871

Simple index construction without weights is justified not only because of similar loadings, but also because loading values are sensitive to omitted factors and sampling error (Kim and Mueller 1978; Amer 2004). The indices developed for the four unique dependent variables are simply the mean response of individuals to the items that comprise a particular index. The average was used partly due to missing values that complicate an additive measure. Many missing values in returned surveys were “don’t know” or “no opinion” responses. Incomplete questions appear mostly due to respondents missing entire pages of the survey, likely due to turning two pages at a time. The only survey questions that appear to be intentionally skipped were personal questions (i.e., sociodemographics), where some respondents commented that these questions are private or irrelevant to the topic. Regardless, missing values were addressed in the creation of dependent variable indices by using the mean response to

items included in the four unique measures. The overall index, however, is additive to give equal weight to the four attitudinal components (general, government, regulations, economic), since the number of items in each index and response scales vary. As a result, respondents who do not have a mean response for *all* four indices comprising the overall measure were assigned a missing value for the overall index and are excluded from the analyses of this particular dependent variable.

The summary statistics presented in this section illustrate the high portions of the sample that exhibit support for water resource protection. This finding is expected given widespread expression of environmental values among the general public, as discussed in the literature review. However, consideration must be given to the impact of the positively skewed data on the results of statistical tests that assume a normal distribution around the mean, specifically t-tests and analyses of variance (ANOVA). The dependent variable indices were log transformed (using the natural log) to improve the normality of the dependent variable indices. Multiple transformations were compared including the commonly used inverse and square root transformations as well other log transformations (Osborne 2002; Amer 2004). The natural log was employed since it resulted in the most normal distribution of data. A constant of one was added to the natural log transformed data for the four component indices to remove zeros from the data and maintain a base of one, as suggested by Osbourne (2002). The constant was not added to the overall measure, as the original values started at four and did not require the constant to achieve a base of one. The transformation of the data improved normality significantly, though some skewedness in the dependent variables still exists.

Non-parametric tests do not assume a normal distribution and, thus, offer an alternative to parametric tests that operate under the assumption of normality. However, results from non-parametric tests are less powerful in detecting real differences compared to parametric tests and, therefore, are not as conclusive (Amer

2004). To assure that erroneous conclusions are not drawn from the data, all statistical tests for comparing means were conducted in two ways; parametric tests were ran on the log transformed indices, and non-parametric tests were ran on the non-transformed indices. The results presented in this chapter are those from the parametric tests. Results of non-parametric tests are only referred to when they differ from parametric test results. When statistical tests indicated that the assumption of equal variances was not met for t-tests and ANOVAs, the more robust statistics and their associated p-values are presented. For the bivariate correlations presented below, the raw (non-transformed) dependent variable indices were used since normality is not an assumption of this statistic, however the natural log transformed dependent variables were used in the multiple regression analyses because comparisons with models that included the raw indices proved that the transformed dependent variables better met assumptions of normality. As a result, caution must be used in interpreting the non-standardized regression coefficients. Statistical findings presented in this dissertation are based on the commonly employed 0.05 significance level unless otherwise noted.

Research Question 2: Factors that Explain Attitudes about Water Resources

To determine *which factors best explain attitudes about water resource protection*, the second question in this research, bivariate correlations and multiple regression analyses were conducted with the five dependent variable indices representing attitudes about different aspects of water resource protection: general importance, support/opposition toward government, regulations, and economic measures, and overall attitudes. Several independent variables were hypothesized to influence water-related attitudes including environmental and political beliefs, knowledge, sociodemographics, place attachment, civic involvement, and perceptions about water resources (Table 5-12). Several variables were comprised of multiple survey items. Analyses were conducted on the multi-item independent variables to aid the

construction of reliable indices, as was done for the dependent variables. This section first describes the independent variables assessed in this study. Next, the findings of bivariate and multiple regression analyses are presented to shed light on the relative importance of factors that explain attitudes about water resource protection.

Table 5-12. Explanatory Variables and Hypothesized Relationship with Attitudes about Water Resource Protection

Variable	Hypothesized Relationship
Knowledge*	More knowledge = more support
Distance to stream	Farther distance = more support/opposition
Water on/bordering property	On = more support/opposition
Use/visitation of water	Greater use = more support
Civic involvement*	More involvement = more support
Environmental beliefs*	Greener ideologies = more support
Political beliefs*	More liberal = more support
Perceived condition of water resources	Perceived bad = more support
Perceived desirability of living near water*	Perceived desirability = more support
Place attachment*	Greater attachment = more support
Gender	Females = more support
Age	Younger age = more support
Income	Higher income = more support
Education	More education = more support
Political orientation (liberal/conservative)	More liberal = more support
Number of children/grandchildren	More children = more support
Year residence in Portland/Oregon	Longer residences = more support
Jurisdiction - urban/rural	Urban residence = more support
Note: Variables with an asterisk include several individual items that comprise that measure.	

Description of independent variables

Descriptive statistics are presented here for the explanatory variables, along with information on the construction of indices for some variables. The asterisks next to variables in the above table identify those with multiple items on which reliability

analysis was conducted for the construction of indices, which include environmental and political belief statements, place attachment, perceived effects of living near water, and civic involvement. Some variables in the above table were measured in more than one way, such as knowledge and proximity to water resources and location within a resource area or regulatory zone. Sociodemographic variables, which were discussed in the previous chapter with respect to the representativeness of the sample, are also presented briefly in Table 5-13. These include gender, age, income, education, political orientation (i.e., liberal/conservative), number of (grand)children, and years residence in the greater Portland area and in Oregon. The correlation between attitudes toward water resources and variables measured as ordinal and continuous variables will be discussed in the next section, which presents bivariate correlation coefficients. For binomial variables, t-tests were conducted to assess differences in attitudes about water resource protection. With regard to sociodemographics, women are significantly more supportive than men on the general, regulations, and overall measures.

Table 5-13. Summary Statistics for Sociodemographic Variables

Sociodemographic Variables	Mean	Standard Deviation	N	Scale
Gender	50.3% female, 49.7% male		793	Categorical: female, male
Education	2.51	0.94	797	Ordinal: 1 = high school or less, 2 = trade school/some college, 3 = bachelors, 4 = post-bachelors
Income	4.78	1.66	739	Ordinal: 1 = <\$15,000...4 = \$35-49,999, 5=\$50-74,999...7 = >\$100,000
Political orientation	3.89	1.63	727	Ordinal: 1 = liberal, 4 = moderate, 7 = conservative
Age	53.65	14.34	779	Continuous: age (in years)
Number of children / grandchildren	2.01 / 2.06	1.63 / 3.41	760 / 645	Continuous: number of (grand)children
Length of residences in Portland area / Oregon	33.5 / 38.1	19.60 / 20.02	772 / 745	Continuous: years of residence

Knowledge was evaluated in three ways. First, self-reported knowledge was measured on a six-point scale, where one equaled knowledgeable and six equaled not knowledgeable. The mean response to this question is 3.48. While approximately half of respondents are on either side of the scale, small percentages report substantial knowledge or no knowledge at all. Second, knowledge was measured in terms of responses to the question, “do you live in a watershed?” Yes responses were coded as correct, while no and don’t know responses were coded as incorrect. Again, approximately half of the sample responded correctly. T-tests were employed to test for differences in water resource attitudes between respondents who are and are not knowledgeable about water resource issues in terms of both self-reported knowledge and the watershed question. While differences exist (at the 0.05 level) between people who know they live in a watershed and those who do not, with the knowledgeable group being more supportive of water resource protection on all but the general measure of attitudes, the only difference between respondents who report being knowledgeable versus not knowledgeable is in economic support for water resource protection (at 0.01 level), with those who report being knowledgeable expressing slightly greater support for financial means of water resource protection.

Thirdly, knowledge was measured in terms of reported awareness of five water resource policies or programs relevant for the Portland metropolitan area. In descending order from most to least known, water-related policies have been “heard of” by the following percentages of respondents: Metro’s Fish and Wildlife Habitat Protection Program (seventy percent), Healthy Portland Streams (fifty-two percent), River Renaissance Program (thirty-two percent), the Title 3 program (twenty-four percent), and Oregon Goal 5 (eleven percent). A couple of points are important here. First, the policies rank in approximate order of their currency in planning and implementation, which likely affects respondents familiarity with them. Metro’s Fish and Wildlife Program is currently underway, and property notices for public hearings about the program were mailed between the first and second survey mailing. Although

Metro's program is the regional Goal 5 program for the Portland metropolitan area, planning for local Goal 5 programs in the region was completed several years ago. Another potentially relevant factor in the low ranking of "Goal 5" and Title 3" is their planning jargon titles. The number of policies that respondents reported awareness of were summed to create an index of knowledge relating to water resource policies.

Two additional explanatory factors are frequency of use or visitation of water resources and perceived condition of water resources in the Portland metropolitan area. Frequency of use was measured by a four-point scale bound by never at one end and regularly at the other. Over eighty percent of respondents indicate that they sometimes or regularly use or visit water resources for recreational purposes, and only three percent report never visiting water resources. Regarding the condition of water resources, approximately forty percent of respondents report that the condition is good to very good, with thirty percent responding barely good (i.e., just over the half-way point on the scale) and only two percent reporting very good. At the other extreme, only eight percent report that the condition of water resources is very bad. A map of perceived condition of water resources seems to show a clustering of people who think the condition of water resources is bad to very bad in the downstream and Portland area of the watershed (Figure 5-1). ANOVA results suggest that differences in perceptions about the condition of water resources exist among the jurisdictional groupings (e.g., urban, suburban, rural) at the 0.05 level. Tukey's multiple comparison tests indicate that urban residents' perceptions about the condition of water resources are more negative than those of suburban residents.

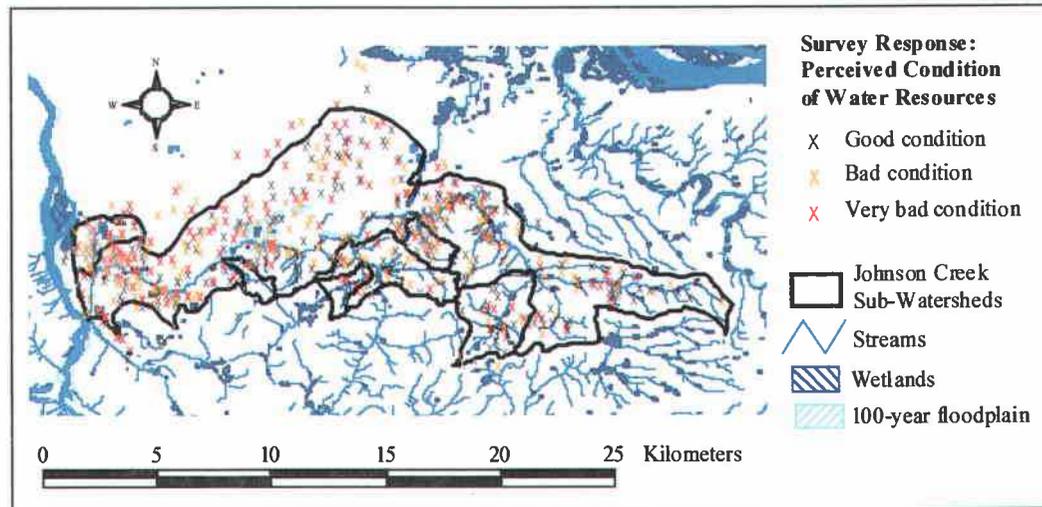


Figure 5-1. Spatial Distribution of Residents' Perceptions of the Condition of Water Resources

Four question items addressed the perceived positive/negative effects of living near water concerning property values, scenic views, access to outdoor activities and flooding (Table 5-14). The factor most positively associated with living near water is scenic views (or aesthetic values), followed by effects on property values and access to outdoor activities, which have similar means. As expected, the mean for effects due to flooding was on the negative side of the response scale. Cronbach's alpha for all four items is only 0.413. However, when the flooding item is omitted, Cronbach's alpha increases to 0.647. In addition, factor analysis of these four items results in two components with eigenvalues greater than one, the first of which accounts for forty-five percent of the variance and the second, twenty-six percent. The first component constitutes the perceived positive impacts often associated with living near water, with substantial and similar factor loadings of 0.685 for property values, 0.807 for access to outdoor activities, and 0.817 for scenic views. The flooding item was the only substantial item for the second component with a loading of 0.989. As a result, the former three items that load onto the first component were averaged into a single index of the perceived desirability of living near water.

Table 5-14. Summary Statistics for Perceived Effects of Living Near Water

Perceived Effects of Living Near Water	Mean	Standard Deviation	N
Due to scenic views	1.59	0.81	765
Due to impacts on property values	1.99	1.04	713
Due to access to outdoor activities	1.99	0.94	741
Due to flooding problems	4.69	1.38	744
Note: Scale is 1 = positive, 6 = negative. Cronbach's alpha is 0.647 for first three items, which were averaged into an index of perceived desirability of living near water.			

Several statements with which respondents indicated agreement or disagreement were included in the survey to assess respondents' environmental and political beliefs (Table 5-15). The first five statements in the table comprise the environmental belief measures, and the last five statements capture political beliefs. Four of the five environmental belief items are from the New Environmental Paradigm (NEP) scale, and the fifth statement relates to protection of nature and wildlife in cities. These five items have a Cronbach's alpha of 0.711, which indicates reliability of the environmental belief scale. Thus, an index was created that is the average response to these items, with the scales oriented such that one represents stronger environmental beliefs. The sixth statement in the middle of Table 5-15 relates to livability, and is not included in the environmental belief index.

Table 5-15. Summary Statistics for Agree-Disagree Statements Capturing Environmental and Political Beliefs

Belief Statement	Mean	Standard Deviation	Percent Agree	Percent No Opinion	Percent Don't Know	N
Humans have an ethical obligation to protect plant/animal species (NEP).	1.72	1.00	95.0%	0.6%	0.2%	793
Efforts should be made to protect nature/wildlife in cities.	1.84	1.10	92.5%	0.4%	0.1%	796
The earth is like a spaceship with limited room and resources (NEP).	1.95	1.29	88.9%	2.1%	1.1%	769
Plants and animals exist primarily to be used by humans (NEP).	4.74	1.45	20.1%	1.3%	0.7%	778
Technology will find a way to solve shortages of natural resources (NEP).	4.35	1.38	28.9%	2.2%	4.5%	744
Parks and greenspaces are necessary to keep urban areas livable.	1.62	0.94	96.5%	0.5%	0.5%	791
Individuals have power to influence governmental decisions.	2.73	1.55	73.6%	0.6%	0.4%	793
Government is needed to keep order in society.	2.37	1.29	82.7%	1.5%	0.4%	780
The government cannot be trusted.	3.38	1.48	52.5%	2.6%	1.5%	762
The government should not interfere with the free market economy.	3.80	1.54	42.7%	3.7%	5.3%	716
Private property owners should be able to do whatever they want on their land.	4.06	1.58	38.9%	1.1%	0.4%	786
Note: Scale is 1 = strong agreement, 6 = strong disagreement. Cronbach's alpha is 0.711 for the first five statements, which were averaged for an index of environmental beliefs.						

The individual belief statements relating to politics (bottom five statements in Table 5-15) are unique, and therefore were not combined into a single scale. The first political statement assesses whether or not individuals feel they have the power to influence government. The remaining statements tap into beliefs that relate to the role of government in society, generally, and to (dis)trust of government and private property rights, specifically. The majority of respondents agree that individuals can influence government and that government is necessary for societal order, yet respondents are split in terms of (dis)trust of government. Meanwhile, less than half of respondents

agree that the government should not interfere with the free market and that property owners should be able to do whatever they want on their land.

Two sets of information were collected relating to civic involvement. First, attendance of public events and meetings was measured with a four-point frequency scale ranging from never to regularly (Table 5-16). The most attended events are community festivals or similar events, followed by neighborhood association meetings, outdoor or environment projects, and public hearings, opens houses or meetings. Attendance of watershed council meetings is lowest, with seventy-two percent responding that they never attend these events. Cronbach's alpha for these items is 0.736, hence the average response to these items serves as a measure of participation in community events.

Table 5-16. Summary Statistics for Attendance of Public Meetings and Community Events

Type of Event	Mean	Standard Deviation	Percent Never	N
Community festivals or similar events	2.60	0.85	13.5%	784
Neighborhood association meetings	2.00	1.08	44.2%	783
Planting or other outdoor/env'tal project	1.92	0.94	42.3%	784
Public hearings, open houses, etc.	1.91	0.96	45.5%	782
Local watershed council meetings	1.42	0.75	71.6%	776

Note: Scale is 1 = never, 2 = rarely, 3 = sometimes, 4 = regularly. Cronbach's alpha = 0.736.

Second, various types of involvement in several organizations were measured (Table 5-17). Respondents are most involved in religious and spiritual organization, followed by professional organizations, environmental organizations and neighborhood associations. The organizations with which people are least involved are the watershed council and property rights groups. For this survey question, respondents simply checked their type(s) of involvement – specifically, donation of money, participation in activities, serving on the board/staff, or no involvement at all – for eight different

organizations. Reliability analysis was conducted on the sum of the different types of involvement checked for each organization, with a resulting Cronbach's alpha of 0.636. An index of involvement in different types of organizations was constructed by averaging the number of different types of participation checked across all organizations.

Table 5-17. Summary Statistics for Involvement in Different Organizations

Type of Organization	Percent Not Involved	Percent Donate Money	Percent Participate in Activities	Percent Serve on Board/Staff	N
Religious/spiritual groups	54.7%	32.1%	36.3%	7.5%	764
Professional organization(s)	60.9%	17.2%	28.8%	8.1%	763
Environmental organization(s)	63.3%	27.4%	16.1%	2.1%	769
Neighborhood association	65.4%	8.4%	25.4%	13.5%	761
Political organization(s)	70.0%	22.8%	14.1%	2.1%	767
Human rights organization(s)	75.9%	19.7%	8.0%	0.9%	765
Watershed council	84.9%	4.7%	12.0%	1.8%	766
Property rights group(s)	90.3%	2.4%	7.4%	0.5%	755
Note: Number of involvement types were summed for each respondent, and the resulting Cronbach's alpha is 0.636.					

Significantly more people are involved with neighborhood associations compared to the watershed council. While one-third of respondents are somehow involved with a neighborhood association, only fifteen percent are involved with a watershed council (Table 5-18). Excluding those respondents who are involved with both their neighborhood association and watershed council, five percent of respondents are involved with the watershed council only. Meanwhile, one-quarter of respondents report at least some involvement with just their neighborhood association. The nature of participation in these and other organizations will be discussed further in subsequent sections of this dissertation.

Table 5-18. Respondents' Involvement in Place-Based Groups

Involvement in Place-Based Groups	Number (%) of Respondents	Number (%) of People Involved in Both NBA & WSC
Involved in neighborhood association (NBA) only	188 (25%)	263 (35%)
Involved in watershed council (WSC) only	41 (5%)	116 (15%)
Involved in both NBA and WSC	75 (10%)	--
Not involved in either NBAs or WSC	457 (60%)	--
Total	761 (100%)	--

Place attachment at various geographical scales was assessed by asking respondents how connected or attached they feel to the neighborhood they live in, the greater Portland metropolitan area, the Pacific Northwest, and the western United States (Table 5-19). Respondents exhibited the strongest attachment to the Pacific Northwest, and the least attachment to the Portland metropolitan area. Cronbach's alpha for these four items is 0.642, just under the 0.70 criteria. This is not surprising since it is quite possible that a person may be attached to a geographical area at one scale but not another. Factor analysis of the four variables resulted in an eigenvalue of 1.98, with fifty percent of the variance accounted for by the primary component. Factor loadings were similar and ranged from 0.642 for the neighborhood level to 0.809 for the Pacific Northwest. As a result, a place attachment index was created that is the average response to all four items.

Table 5-19. Summary Statistics for Place Attachment

Place Attachment Question Items	Mean	Standard Deviation	N
Pacific Northwest	1.76	1.03	774
Western US	2.16	1.24	763
Neighborhood	2.20	1.27	774
Portland metro area	2.85	1.47	764
Note: Scale is 1 = very attached, 6 = not attached. Cronbach's alpha is 0.642.			

Jurisdiction was coded after respondents were mapped in ArcView GIS. Forty-five percent of respondents live in the City of Portland, thirty-two percent live in the suburbs of Milwaukie or Gresham, and twenty-three percent live in unincorporated areas of Multnomah or Clackamas Counties (Figure 5-2). In order to create a binomial variable for urban/rural residence, analysis of variance (ANOVA) was first conducted to identify significant differences between respondents living in different jurisdictions on the five attitudinal dimensions of water resource protection. Differences exist among the jurisdictions for the overall, government and regulations measures (at the 0.01 significance level). Specifically, Tukey's post-hoc multiple comparison tests indicate that residents of unincorporated Multnomah County express significantly less support for water resource protection on these measures compared to those in the cities of Portland and Milwaukie. Residents of Clackamas County are also significantly less supportive of regulations than Portland residents. No differences exist between paired (sub)urban jurisdictions. The only difference in attitudes between residents in the two unincorporated areas is that people in Multnomah County exhibit less support for government than those in Clackamas County. As a result, residents from Portland, Milwaukie, and Gresham were combined into an urban category, while the those in unincorporated areas were combined into a rural category. T-tests comparing attitudinal means between urban and rural residents indicate differences on the overall ($p = 0.002$), government ($p = 0.004$), and regulations ($p = 0.000$) dimensions, with urban residents expressing greater support for water resource protection.

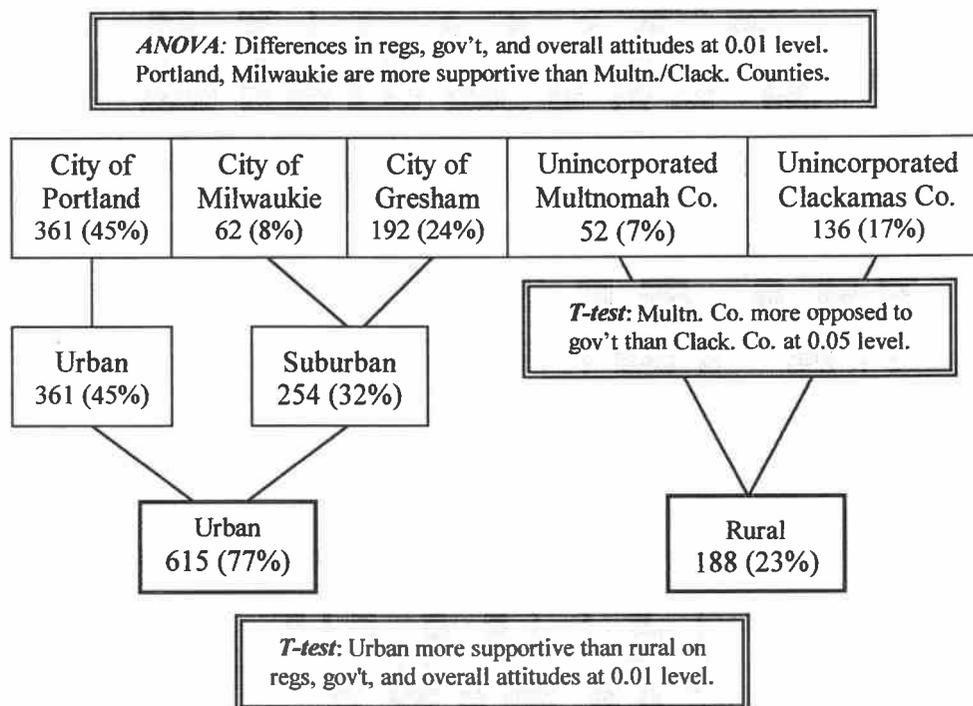


Figure 5-2. Percent of Sample by Jurisdictional Groupings and Statistically Significant Differences in Water Resource Attitudes

Distance from water resources was measured and evaluated in several different ways. The distance between each respondent and the nearest stream was calculated in ArcGIS. Distance was evaluated at the continuous level of measurement (in feet) as well as in theoretically developed ordinal categories. Specifically, fifty and 200 feet distances are relevant due to current and proposed regulatory zones that incorporate these buffer widths. The quarter and half mile distances are also significant in terms of travel and recreation behavior, since these are commonly considered walkable distances and are associated with park visitation and recreation behavior (Wojtanik 2003). Since only twenty-two respondents are within fifty feet of a stream (Table 5-20), these respondents were combined with those in the 200 feet category. Differences in attitudes toward water resource protection among residents in the four distance categories were analyzed with ANOVA. The only significant result at the 0.05 level was for the regulations measure, which had an F value of 2.67 and p of 0.047. Tukey's

multiple comparisons test suggests that residents within 201 feet to a quarter mile of a stream exhibit significantly less support for regulations than those within a quarter to a half mile.

Table 5-20. Frequencies for Categories of Distance from Nearest Stream

Categories for Distance to Nearest Stream	Number of Respondents	Valid Percent
Within 200 feet	159	19.8%
201 feet – 1/4 mile**	336	41.8%
1/4 mile – 1/2 mile*	156	19.4%
Beyond 1/2 mile	152	18.9%
Note on statistical findings: * <i>T-tests</i> : The quarter-mile cut-off is the only distance for which attitudes (about regulations) differ between residents within and beyond. ** <i>ANOVA</i> : Residents within 201 ft.-1/4 mile are less supportive of regulations than those within 1/4-1/2 mile.		

Another analysis was conducted for respondents within and beyond set distances, using the categories above as cut-off points. T-tests were employed to identify differences in attitudes about water resource protection between people who live within or beyond these distances. These analyses identified only one distance category for the regulations index as statistically significant, with a p-value of 0.036. Specifically, people within one-quarter mile (mean response is 2.013) exhibit less support for regulations than people beyond one-quarter mile (mean is 1.879).

In addition to physical distance calculated using GIS, a survey question asked respondents how close they live to water resources, with four response categories including do not live close, live somewhat close, live very close and there is water on or bordering my property (referred to as water on/off below). Approximately one-quarter of respondents report that there is water on or bordering their property and that they live very close to water, while over one-third say they live somewhat close to water and about fifteen percent report that they do not live close to water. ANOVA

was conducted to test for differences in attitudes about water resource protection among these groups. Results indicate differences in attitudes about regulations as well as the economic and overall attitudinal measures (Table 5-21). While the F-value for the overall measure is significant at the 0.05 level, multiple comparison tests reveal differences only at the 0.10 significance level. Attitudinal differences for regulations and economic measure are stronger, with significant post-hoc comparison p-values of less than 0.01. Overall, results indicate that people who live very close to water exhibit significantly greater support than both those who do not live close to water and those with water on/bordering their property, which may indicate a non-linear relationship between proximity and attitudes about resource protection. The differences are most consistent between people who live very close and those who do not live close, since people with water on/bordering their property are only different in their attitudes about regulations and people who live somewhat close are only different in terms of economic support. As a result of these findings, the water on/off will be used in the multiple regression analysis, along with distance to the nearest stream (in feet), which will be mathematically transformed to investigate non-linear relationships between distance and attitudes. T-tests on the attitudinal measures for residents with and without water on/bordering their property reveal that the latter group is significantly more opposed to government efforts ($p = 0.014$) and regulations ($p = 0.016$) aimed at resource protection, but no differences exist for the other attitudinal dimensions.