

WATERSHED RESTORATION IN WESTERN OREGON: LANDOWNERS,
WATERSHED GROUPS, AND COMMUNITY DYNAMICS

by

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Stacy R. Rosenberg for the degree of Doctor of Philosophy
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Title: WATERSHED RESTORATION IN WESTERN OREGON: LANDOWNERS,
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The State of Oregon promoted the development of voluntary, locally organized watershed groups in the early to mid-1990s to provide local leadership in dealing with decreasing native salmon populations and other watershed health issues. Despite a dramatic increase in the number of watershed initiatives over the past 15 years, there is still uncertainty about how these initiatives influence private land management practices. The goal of this research was to better understand the critical factors that affect a landowner's decision to adopt watershed restoration practices and explore the role that watershed groups play in the decision-making process. A written questionnaire was mailed to 900 riparian landowners in five watersheds in Western Oregon (52% response rate; $n = 446$), and 80 face-to-face interviews were conducted with landowners that had varying amounts of familiarity with watershed groups.

Research findings revealed that personal land ethics, economic circumstances, and community discourse about watershed restoration are significant elements in a

landowner's decision-making process. A landowner's moral responsibility to be a good land steward and concern for future generations were key factors for a substantial number of respondents. Friends, family, and neighbors were found to be the most trusted source of information for landowners when they made land and water management decisions. Survey responses highlight that landowner perspectives on land management, trusted sources of information, and preferred outreach methods vary by socio-economic, cultural, and land use characteristics. Interviews revealed that landowners have favorable views of watershed group activities and support the development of a 'sense of community' among watershed residents.

Watershed groups were found to play a strong role in promoting riparian restoration activities on private lands. The voluntary and non-regulatory nature of watershed groups limited the development of contentious relations and encouraged open communication among divergent stakeholders interested in watershed management. This has resulted in landowner willingness to conduct restoration projects on their property. These findings also highlight the importance of understanding landowner preferences and motivations in order to design outreach strategies. Watershed groups should consider using a streamlined assessment of target audience characteristics when they develop outreach programs to reach nonparticipating landowners. This dissertation includes my co-authored work with Dr. Richard D. Margerum (Chapter III).

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CHAPTER I

INTRODUCTION

“Government alone cannot conserve and restore salmon across the landscape. The Plan [Oregon Plan for Salmon and Watersheds] recognizes that actions to conserve and restore salmon must be worked out by communities and landowners, with local knowledge of problems and ownership in solutions. ... People must understand the needs of salmon in order to make informed decisions about how to make changes to their way of life that will accommodate the needs of the fish” (State of Oregon, CSRI Executive Summary 1997, p. 1).

Native salmon populations have decreased dramatically in the Pacific Northwest. Over the past century, Pacific salmon have vanished from 40% of their former breeding ranges and the remaining stocks are seriously diminished (National Research Council 1996). The Oregon Plan for Salmon and Watersheds is a unique approach to salmon restoration that promotes the formation of voluntary, locally organized watershed groups to evaluate watershed conditions and identify opportunities for protection and restoration. The Plan and its precursors acknowledged that private landowners play a critical role in watershed restoration efforts. The State of Oregon strongly supports watershed groups and has provided substantial financial support for watershed activities throughout Oregon.¹

Collaborative watershed management initiatives have dramatically increased over the past 15 years. The State of Oregon's collaborative approach to salmon restoration is just one example of the numerous watershed management programs in existence. The Natural Resources Law Center has estimated that there are more than 400 watershed

initiatives in the Western U.S. (Kenney et al. 2000). This increase in the formation of watershed groups can be traced to a change from an adversarial, top-down approach to public participation in natural resource management to a more collaborative, grassroots approach (Griffin 1999). Despite the proliferation of these initiatives, there is little research on how these efforts affect land management decisions on private lands. This dissertation examines the significant factors that influence a landowner's decision to adopt watershed restoration practices and explores the role that watershed groups play in the decision-making process. It also includes a discussion of how local, state, national, and global socio-political and economic processes affect landowner decisions.

Why Study Watersheds?

As far back as the 1870s, there was support for using watersheds as the basic unit of resource management. In a 1878 report to Congress, John Wesley Powell recommended that Western States be organized by drainage basins rather than straight-line political boundaries (Fife 1997). Watershed management provides for the integration of natural, social, and economic elements within a geographic area (National Research Council 1999). It is the appropriate scale of analysis for this study because of the unique features of the Oregon Plan for Salmon and Watersheds and the advantages of managing natural resources at the watershed-level. Watershed management links uplands and downstream

areas, integrates various human activities that impact water resources, and reduces the possibility of solving a resource problem in one portion of the watershed that results in a negative impact to another portion (National Research Council 1999).

The Oregon Plan for Salmon and Watersheds

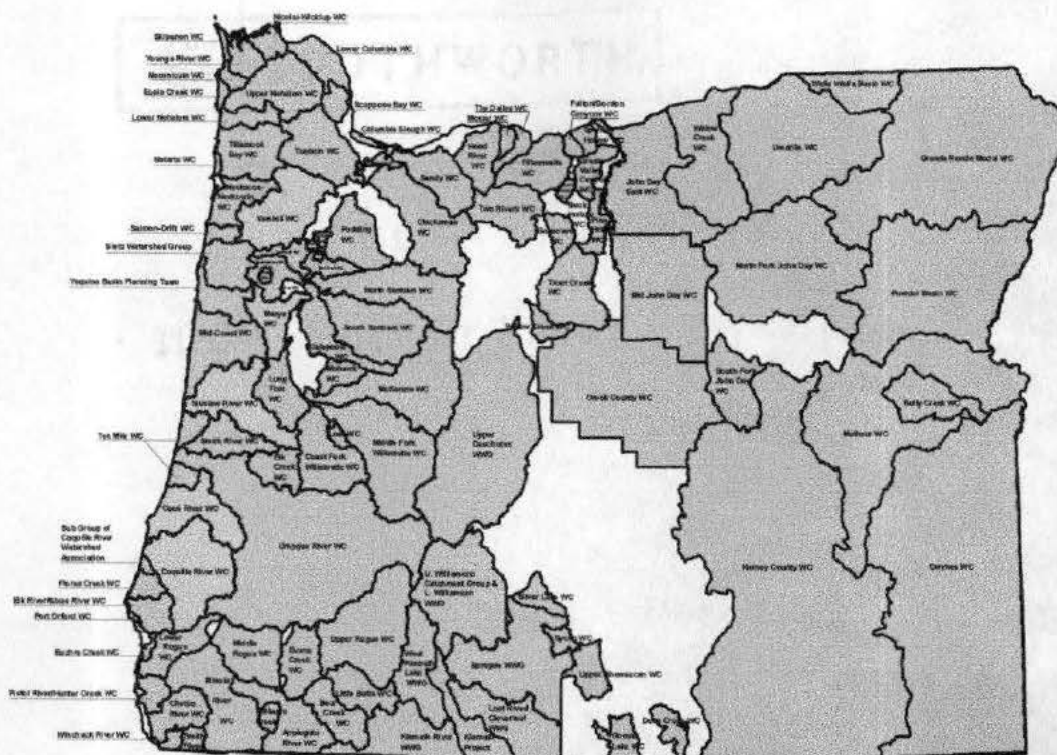
The Oregon Plan for Salmon and Watersheds is the culmination of previous state efforts. In 1987, the Governor's Watershed Enhancement Board was established to provide technical assistance and administer a grant program to improve watershed conditions and promote public awareness of watershed enhancement benefits. Oregon's Watershed Health Program began in 1993 as an effort to promote watershed protection, enhancement, and restoration activities. The effort involved local, state, and federal land managers, private landowners, and citizens. It focused on the formation of cooperative partnerships to restore natural ecosystems, support sustainable resource use, and enhance local economies. The creation and support of watershed councils or groups was an essential element in this program (State of Oregon, CSRI 1997). In 1995, the Coastal Salmon Restoration Initiative (CSRI) was developed in an effort to preclude the listing of coho salmon under the Federal Endangered Species Act (ESA). Watershed groups were the focal point of state decision-making and local involvement in habitat protection and restoration. The CSRI was later expanded to include steelhead trout and all at-risk wild salmonids within the State of Oregon and evolved into the Oregon Plan for Salmon and Watersheds. Due to legal actions, the National Marine Fisheries Service reconsidered its

original decision not to list coho salmon under the Federal Endangered Species Act and listed this species in early October of 1998. Regardless of this action and subsequent fish listings, Oregon continued to implement the Oregon Plan and its strong emphasis on the creation and support of watershed groups.

Watershed Groups in Oregon and Existing Research

There are over 90 watershed groups in Oregon (see Figure 1), and their approaches and stages of development vary. Many watershed groups are just beginning to become known within their community, while others have been implementing restoration projects for over ten years. Several analyses have been conducted on watershed groups in Oregon with the longest history, such as the Applegate, McKenzie, and Grande Ronde Watersheds (Duncan 1998; National Research Council 1999; Yaffee et al. 1996). Other research has focused on land use activities within specific watersheds, institutional analyses of groups, and other watershed management attributes (Habron 1999; Moseley 1999; Rickenback 1999; Wright 2000). In addition, a multi-state study of the Pacific Northwest and Northern California evaluated ecological effectiveness and organizational processes (Huntington and Sommarstrom 2000). However, none of these studies have analyzed landowner behavior in relation to watershed group activities.

Figure 1: Watershed Councils in Oregon



Map courtesy Oregon Watershed Enhancement Board

Private Lands Conservation

Many endangered species occur on private lands and this is an important reason to better understand what motivates private landowners to undertake conservation activities on their property. Knight (1999, p. 223) describes how “nearly half of all species threatened with extinction occur on private lands, and nearly all threatened species have at least part of their distribution on private lands.” Concern over the loss of biodiversity occurs even before species become endangered. Noss and Cooperrider (1994, p. 63) describe that “species extinction is only the last and most obvious stage of biotic

impoverishment. Of greater long-term concern is the degradation of ecosystems and landscapes.” Restoring watershed health will require action by both public and private land managers. However, relatively little is known about how to encourage private lands conservation. According to Bean and Wilcove (1997, p. 1) “Conserving rare species on privately-owned land is the most challenging and politically volatile aspect of the U.S. Endangered Species Act. It may also be the most important task facing conservationists.”

The ever increasing number of endangered and threatened species demonstrates that innovative solutions are needed to improve watershed health. The State of Oregon’s collaborative approach to salmon restoration is an example of such an effort. Watershed groups provide a local forum for diverse stakeholders to discuss watershed health issues and implement restoration projects on public and private lands.

Research Questions

The main focus of this dissertation is to better understand the multiple factors that influence private non-industrial landowners to conduct watershed restoration practices on their property. Specifically, this study concentrates on riparian landowners (i.e. landowners who live adjacent to or near a stream) that own agricultural, small woodland, and rural residential property. It also concentrates on how landowners perceive watershed group activities and whether this influences their decision to adopt or not adopt restoration practices. The other three research questions are supplemental to the main question but highlight related points of interest. They concentrate on community

discourse, watershed group interactions with the community, and socio-political processes that affect landowner decisions about watershed group activities and restoration practices. Analysis of these questions will provide insights into the reasons landowners choose to adopt restoration practices within a broad socio-political context.

Main Question

- What are the key motivating factors that influence private non-industrial landowners to adopt watershed restoration practices on their property? What role do watershed groups play in a landowner's decision-making process?

Supplemental Questions

- How do social networks, community ties, and personal relationships affect landowner decisions?
- How does a watershed group's creation of a 'sense of community' influence landowner perspectives?
- Do landowners believe that their local watershed group represents all of the stakeholders involved in watershed restoration? How does this affect their perception of group activities?

Relevant Literature

This dissertation synthesizes several different bodies of literature. Each one provides valuable contributions to this study and there is some overlap between them. The primary fields of research include the following: 1) collaborative natural resource management, with a special emphasis on watershed initiatives, 2) the adoption of soil and water conservation measures, 3) community-based natural resource management, and 4) political ecology. The dissertation integrates the theoretical foundations and practical lessons from these distinct bodies of literature. Chapter III, and IV provide a more in-depth analysis of relevant literature, and only a brief synopsis is provided below.

Collaborative Natural Resource Management

The watershed initiative movement in the Western U.S. is just one example of the dramatic increase in collaborative natural resource management since the 1990s. Watershed groups and other community forums engage voluntary participants with diverse viewpoints in ongoing conversations about social, economic, and environmental issues of a specific place, such as a watershed (McKinney 2001). Current research has highlighted hundreds of success stories (Wondolleck and Yaffee 2000). Local collaborative groups have the ability to manage resources beyond political borders and encompass ecological boundaries.

Despite the many proponents of collaborative natural resource management, there are skeptics who question the underlying tenets of this movement and fear that these

efforts will undermine the achievements that national environmental organizations have gained over the past few decades (Coggins 2001; McCloskey 1996). Some critics also argue that less powerful stakeholders may be pressured or coerced to compromise, and that this approach could lead to increasing the concentration of power in already powerful interests (Kenney 2000). This dissertation uses research from both proponents and critics of collaborative natural resource management and provides new knowledge about how private landowners are affected by collaborative watershed initiatives.

Adoption of Soil and Water Conservation Measures

There is an extensive body of research on farmer and non-industrial private forest owner participation in conservation programs and adoption of conservation practices (Camboni and Napier 1994; Baughman 1996). Research has found that the adoption of a 'new' management practice is influenced by a variety of psychological, socio-cultural, structural, and economic constraints (Hooper 1995). The adoption-diffusion model developed by Rogers (1983) is often cited in the literature, and it can be distinguished from other research through its depiction of how innovations are adopted over time. There have been 3,890 publications on this topic, and the model includes a list of innovation characteristics that promote adoption and an analysis of communication processes and segments of the population that adopt innovations over time (Rogers 1995). However, these studies often include specific, expert-driven programs and traditional agricultural and non-industrial forest landowners. Collaborative natural

resource management initiatives are different in character than these traditional programs and it is likely that motivational factors that influence landowners to adopt watershed restoration practices will be distinct from other types of programs.

Community-Based Natural Resource Management

Community-based natural resource management (CBNRM) concentrates on the idea that local people have a greater stake and are more efficient in sustainably managing natural resources than state or corporate entities (Brosius et al. 1998). Social justice and project planning strategies at the community level are important focal issues. The concept of 'community' and the creation of a 'sense of community' are investigated in this dissertation research. Agrawal and Gibson (2001, p. 1) describe communities as "... complex entities containing individuals differentiated by status, political and economic power, religion and social prestige, and intentions." Although the CBNRM literature has a strong focus on Third World case studies, there are relevant themes for First World situations as well. Watershed residents are a heterogeneous group of individuals that have distinct interests and goals. Landowners can be influenced by diverse social networks within a community and the multiple discourses surrounding watershed groups and restoration practices.

Political Ecology

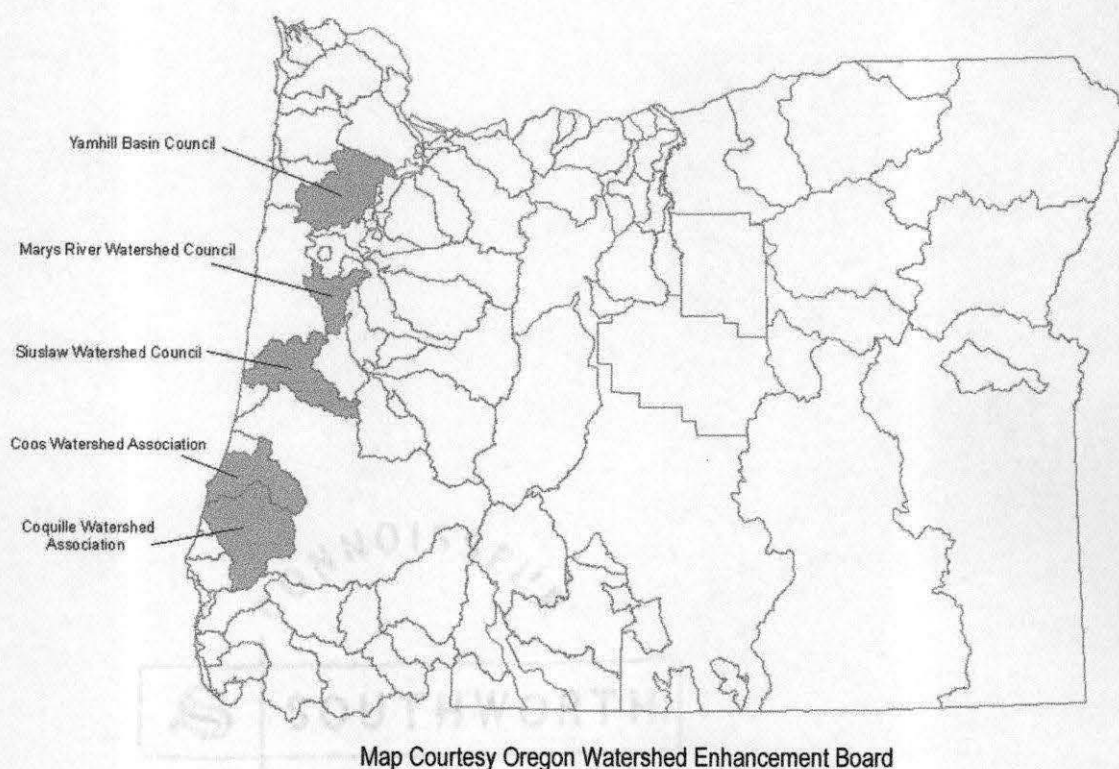
Political ecology is a diverse field that has been defined in many ways. Robbins (2004, p.12) synthesizes earlier works and describes political ecology as “empirical, research-based explorations to explain linkages in the condition and change of social/environmental systems, with explicit considerations of relations of power.” Power relations between watershed groups and other community organizations and among diverse social networks are likely to influence landowner perspectives on watershed group activities and restoration practices. Neumann (2005, p. 9) describes how “human transformation of natural ecosystems cannot be understood without consideration of the political and economic structures and institutions within which the transformations are embedded.” Thus, it is important to consider how social, political, and economic processes at local, state, national, and global scales influence landowner decisions about watershed restoration.

Research Methods

This study was conducted in collaboration with five watershed groups in Western Oregon: Coos Watershed Association, Coquille Watershed Association, Siuslaw Watershed Council, Yamhill Basin Council, and Marys River Watershed Council (see Figure 2). The State of Oregon’s innovative approach to watershed management was a critical focus of this research and consequently it was necessary to limit the selection of watershed groups to those within its boundaries. These five groups were selected based

on a set of specific criteria and as a result of discussions with Oregon Watershed Enhancement Board (OWEB) staff, researchers, and others knowledgeable about watershed groups (see Appendix A for further details).

Figure 2: Selected Watershed Groups



Agricultural, small woodland, and rural residential landowners who owned riparian land were the focus of this research. Nine-hundred landowners received written questionnaires specific to their watershed (180 per watershed).² This mail-out survey gathered data on landowner views and participation with local organizations, perceptions of watershed group outreach activities, watershed management practices, and the factors

that motivated private landowners to adopt watershed restoration practices. The written questionnaire was developed in accordance with a modified version of Dillman's (2000) Tailored Design Method. In addition, eighty semi-structured, face-to-face interviews were conducted with landowners with varying amounts of familiarity with watershed groups and who had conducted or not conducted watershed restoration practices. A snowball sample³ was utilized in the interview process. Key informants and previously interviewed landowners provided the names for potential interviewees. The interviews focused on gathering information about why landowners adopted restoration activities, why they chose not to conduct restoration projects, views on local community groups, personal land ethics, and interpretations of survey questions. Appendix A provides additional information on the survey and interviews.

Overview of Dissertation

This dissertation is organized in a journal style format. Chapter II, III and IV will each be submitted for publication in a peer-reviewed journal. Chapter V provides a summary of all the conclusions from each chapter. Appendix A describes the research methods, and Appendix B includes a copy of the survey and additional statistical data.

Chapter II presents an overview of the history of the Oregon Plan for Salmon and Watersheds and discusses the heterogeneity of watershed groups within the State of Oregon. It provides a synopsis of state actions leading up to the implementation of the

Oregon Plan and describes some of its accomplishments. The chapter also includes a typology and discussion of watershed group attributes and highlights some of the distinguishing features of these groups.

Chapter III provides a general summary of the major findings from the written questionnaires and includes interview data that further explain landowner viewpoints. It highlights landowner motivations for conducting land and water management practices, trusted sources of information, preferred outreach methods, and barriers to implementing restoration practices. The role that watershed groups play in influencing watershed restoration efforts is also discussed. This chapter is co-authored with Dr. Richard D. Margerum.

Chapter IV explores the multiple factors that influence a landowner's decision to adopt watershed restoration practices. It provides a simple model to acknowledge the different elements in a landowner's decision-making process and emphasizes the important role that community discourse plays in this process. Local, state, national, and global processes that influence landowner decisions are also included in this chapter. A substantial portion of this chapter relies on data from the interviews and focuses on landowner responses to watershed groups' creation of a 'sense of community' among watershed residents.

Chapter V discusses the major research findings and limitations of this study, and summarizes the conclusions from each chapter. It also describes future areas of research. Appendix A provides a more detailed overview of research methods and Appendix B includes the survey instrument and statistical analyses not included in Chapter III.

Notes

¹ The Oregon Watershed Enhancement Board provided \$31.1 million dollars for watershed related activities that was then matched by \$74.6 million (i.e. federal and private monies) in the 2001-03 Biennium (OWEB 2003).

² Five surveys were developed. Each one included the local watershed group name and three of the five had a modified version of outreach activities to represent ongoing efforts.

³ Snowball sampling is a type of nonprobability sampling that utilizes previously identified group members to provide the names of other group members (Henry 1990).

CHAPTER II

OREGON'S APPROACH TO WATERSHED MANAGEMENT: THE OREGON PLAN FOR SALMON AND WATERSHEDS AND THE DIVERSITY OF WATERSHED GROUPS

Chapter Overview

This chapter provides a brief overview of the history of the Oregon Plan for Salmon and Watersheds and discusses the heterogeneity of watershed groups within the State of Oregon. The Oregon Plan for Salmon and Watersheds is the culmination of earlier efforts by the State of Oregon to preclude the listing of coastal coho salmon. The Plan was developed to promote a voluntary approach to salmon recovery within existing regulatory frameworks, and is seen as a model for species recovery efforts. Despite the eventual listing of coastal coho salmon due to legal actions, the State of Oregon continued to strongly support this effort and has provided extensive financial resources for watershed restoration projects. Implementation of the Plan involved an unprecedented level of teamwork between state natural resource agencies, and cooperation between the State of Oregon and federal agencies. Voluntary watershed groups are considered the 'backbone' of the Plan and they each have their own unique structure, goals, and program priorities. This chapter includes a typology and discussion of group attributes that highlights some of the distinguishing features of these groups.

Introduction

Collaborative watershed initiatives are rapidly increasing in the U.S. These initiatives have altered the institutional landscape for natural resource management in the Western U.S. and they receive extensive political and financial support (Kenney et al. 2000). The Oregon Plan for Salmon and Watersheds (Oregon Plan) and its emphasis on voluntary watershed groups is one example of this approach. The Oregon Plan is a unique approach to salmon recovery. The State of Oregon began laying down the foundation for the main elements of the Oregon Plan long before the National Marine Fisheries Service (NMFS), now known as NOAA Fisheries, formally proposed listing coho salmon along the coast of Oregon under the Federal Endangered Species Act (ESA). A pivotal year for salmon-related activities was 1993 when the Watershed Health Program was established, and the next five years included a flurry of activities at the local, state, and national level. The 'backbone' of this plan was the development of voluntary watershed groups that conduct watershed assessments, identify and implement restoration projects, and carry out education and information programs. These voluntary groups relied on collaborative processes to engage diverse stakeholders at the local level. This chapter describes the history of the Oregon Plan, and includes a typology and discussion of the heterogeneity of watershed groups within the State of Oregon.

A Brief History of the Oregon Plan for Salmon and Watersheds

The Oregon Plan for Salmon and Watersheds is the culmination of many years of previous activities. The history of natural resource conflicts in the Pacific Northwest has had a profound effect on the State of Oregon's approach to salmon restoration. The following is a brief overview of the major events leading up to the Oregon Plan (see Table 1), but it only describes information taken from publicly available documents. Governor Kitzhaber and his staff played an important role in this process and it is likely that there is more to this story than is readily available from these documents.¹

Table 1: History of the Oregon Plan

1987 Governor's Watershed Enhancement Board (GWEB) created
1993 Watershed Health Program began
1993 Environmental groups petition National Marine Fisheries Service (NMFS) to list coho salmon under Federal Endangered Species Act (ESA)
1993 Oregon State Senate Bill 1010 passes the State Legislature
1995 State of Oregon begins development of Coastal Salmon Restoration Initiative (CSRI)
1995 NMFS proposes to list coho under ESA
1997 NMFS and State of Oregon sign Memorandum of Understanding
1997 State Legislature supports CSRI, changes name to Oregon Plan for Salmon and Watersheds
1998 Steelhead Supplement released
1998 NMFS lists Oregon coastal coho due to court decision
1999 Governor's Executive Order broadens scope of Oregon Plan for Salmon and Watersheds

In the 1987 Oregon State Legislative session the Legislative Joint Committee on Water Policy convened a group of stakeholders, including interest groups and state and federal agency officials, to discuss ongoing water management issues (GWEB 1997). The result was Senate Bill 23 and the creation of the Governor's Watershed Enhancement Board (GWEB). The Board provided financial and technical assistance for riparian

restoration and other water-related projects, with a special emphasis on encouraging local partnerships. Funding for GWEB increased substantially over its first ten years of existence (GWEB 1997).

The 1993 Watershed Health Program grew out of several earlier efforts that focused on watershed management issues. Predecessors included the following: 1) the Salmon and Trout Enhancement Program directed by the Oregon Department of Fish and Wildlife, 2) a pilot restoration project in the John Day Basin funded by the Legislative Emergency Board in 1990, 3) Senate Bill 5576 which continued funding for the John Day project and a similar project in the Grande Ronde Basin, 4) the Strategic Water Management Group (SWMG) 1992 recommendations, and 5) the Governor's Coastal Salmonid Restoration Initiative conference in 1992 (State of Oregon, WHP 1995).

Although all of these efforts led up to the development of the Watershed Health Program, the SWMG recommendations and 1992 conference played prominent roles in its development. The 1993 Legislature appropriated \$10 million dollars for the program and \$6.5 million was assigned to the Grande Ronde and South Coast/Rogue Basins.² "The cornerstone of the program was the creation of local watershed councils to work in partnership with local, tribal, state, and federal agencies to help solve watershed problems in their own backyards" (State of Oregon, WHP 1995, p. 1). During this same year, House Bill 2215 promoted the development of voluntary local watershed councils with the aim to improve water quality, fish habitat, and watershed health, while Senate Bill 81 provided funding and state direction for the program. Watershed councils were designed to represent diverse community interests and members were appointed by local

government, such as county commissioners. Councils were to assess watershed conditions, identify opportunities for restoration, and conduct education activities.

In the 1980s and 1990s, controversy over the Northern Spotted Owl polarized communities throughout the Pacific Northwest.³ Leaders of Oregon state government knew that the potential existed for similar responses to listing salmon populations under the Federal Endangered Species Act (ESA) and wanted to maintain state control over salmon recovery. Senate Bill 81, passed in 1993, includes the following statement about state policy: “to protect and restore the natural functions of Oregon’s watersheds to the point that salmonid fish species that depend on the watersheds will avoid listing under the provisions of the Endangered Species Act and to promote and enhance sustainable, harvestable salmonid fish populations for the environmental, economic, and social benefit of all Oregonians” (State of Oregon, WHP 1995, p. 9). The provision to avoid listing under the ESA is not mere coincidence. In 1993 several environmental organizations petitioned the National Marine Fisheries Service (NMFS) to list coho salmon under the ESA.

During this same year (1993), the State Legislature passed Senate Bill 1010 which provided for the development of regional agricultural water quality management plans for watersheds listed on the Federal Clean Water Act 303(d) list for poor water quality. It specifically targets agricultural lands and the Oregon Department of Agriculture has enforcement authority. The development of these plans was partially due to federal and state water pollution control directives (Arha et al. 2003), but was also seen as a method for agricultural interests to do their fair share for improving water quality.⁴ Local

advisory committees create plans for each area and develop recommendations to meet local conditions. Local soil and water conservation districts (SWCDs) are the local management agencies for these plans and they provide technical assistance to landowners on how to comply with plan specifications.

In 1995 NMFS proposed to list coho salmon under the ESA. The Coastal Salmon Restoration Initiative (CSRI) was developed the same year specifically to preclude the listing of salmon in the State of Oregon. After the Northern Spotted Owl controversy, Governor Kitzhaber directed the development of a state plan to promote salmon recovery that would allow the State of Oregon to retain control over recovery efforts. He took a personal interest in this issue and attended bi-weekly meetings with state natural resource agency directors during the development of the CSRI (Arha et al. 2003). Voluntary watershed groups were the 'backbone' of this plan. The CSRI defined a watershed group as "a locally organized, voluntary, non-regulatory group established to assess the condition of their watershed and build a work plan to implement enhancement and protection activities within their watershed" (State of Oregon, CSRI 1997). Each watershed was to include stakeholders unique to the watershed and the formation of the group was to be approved by a local government entity, such as a county commission.

In 1997 NMFS signed a Memorandum of Understanding with the State of Oregon and approved the CSRI in lieu of listing coastal coho salmon in Oregon (Arha et al 2003). The State Legislature supported the draft CSRI and passed Senate Bill 924. As a result of this legislation, the plan name was changed to the Oregon Plan for Salmon and Watersheds, the Joint Legislative Committee on Salmon and Stream Enhancement was

created, and the Healthy Streams Partnership was formed. The Partnership is a 21-member group of diverse stakeholders from across the State that gathers information and develops recommendations to improve water quality and watershed health. Senate Bill 924 also resulted in the formation of the Independent Multidisciplinary Science Team that advises the State of Oregon on scientific issues concerning the Oregon Plan. The Legislature appropriated \$15 million dollars (House Bill 5042) to implement the Oregon Plan in the 1997 - 1999 biennium (Arha et al. 2003). All of these efforts demonstrated the State of Oregon's strong support for the Oregon Plan.

During the following year, new activities would influence the Oregon Plan. In 1998, the Steelhead Supplement was released, Oregon voters approved Ballot Measure 66, and NMFS listed Oregon coastal coho salmon. The Steelhead Supplement was an addendum to the Oregon Plan that expanded state efforts to confront decreasing steelhead populations. Measure 66 provides that $\frac{1}{2}$ of 15% (or 7.5%) of net state lottery proceeds are spent on salmon recovery and watershed health projects over a 15-year period. The measure expires in 2014 when it has to be re-approved by Oregon voters. Although NMFS had agreed not to list Oregon coastal coho, a federal district court order required NMFS to reconsider its original decision and the federal agency listed it in 1998. A lawsuit by a coalition of environmental groups and commercial fishermen associations claimed that the Oregon Plan did not provide enough protection for coho salmon because it relied on future voluntary practices and the court agreed and required NMFS to review its decision not to list the species under the ESA (Earthjustice 1998). Although coastal coho was officially listed under the ESA, the State of Oregon, and in particular Governor

Kitzhaber, decided to go through with the implementation of the Oregon Plan. The huge momentum for the Plan had been driven by efforts to avoid listing, but the decision was made to continue with implementation of this far-reaching approach to salmon recovery. Governor Kitzhaber argued that the listing of salmonid populations under the ESA did not provide an incentive for landowners to assist in species recovery, whereas the Oregon Plan would provide positive incentives for landowners to participate in recovery efforts (State of Oregon, Office of the Governor 2000). It would have also been difficult to step away from the extensive work and progress made during the development of the Oregon Plan.

In 1999, Governor Kitzhaber issued Executive Order EO 99-01 and reaffirmed the State of Oregon's commitment to the Oregon Plan and expanded its scope to include at-risk fish populations throughout Oregon. The Oregon Plan has four main elements: 1) agency actions, 2) voluntary restoration action, 3) monitoring, and 4) science oversight. The mission of the Oregon Plan for Salmon and Watersheds is "to restore the watersheds of Oregon and to recover the fish and wildlife populations of those watersheds to productive and sustainable levels in a manner that provides substantial environmental, cultural, and economic benefits" (OWEB 2005). The overarching goal of the Oregon Plan is to promote fish recovery efforts and improve watershed health across the State. In 1999, House Bill 3224 renamed GWEB to OWEB (i.e. from Governor's to Oregon) to further demonstrate the expanded scope of the Oregon Plan. OWEB

promotes the implementation of the Oregon Plan by administering a grant program and providing support to local watershed groups and SWCDs, overseeing monitoring efforts, and compiling reports on the progress of the Plan.

Several other legislative actions have occurred since 1999, but most clarify specific Oregon Plan operations and provide further support for OWEB programs. Numerous restoration projects, such as streambank plantings and fencing, culvert replacements, and other in-stream fish habitat improvements, have been implemented within Oregon as a result of the Oregon Plan. Financial support for the Oregon Plan has been extensive. According to OWEB's 2003-2005 Biennial Report, over \$300 million dollars is reported to have been spent on voluntary restoration projects between 1995 and 2003.⁵ Federal and state monies provide the majority of this funding. In the 2003-2005 biennium, OWEB received \$55.6 million dollars with 55% coming from the Federal Pacific Coastal Salmon Recovery Fund, 43% from Measure 66 funds, and very small amounts from the U.S. Fish and Wildlife Service and State of Oregon salmon license plates (OWEB 2005). This funding supports education and outreach programs, on-the-ground restoration projects, and operational expenses for watershed groups. During the grant cycle between July 2003 and September 2004, 63% of OWEB grants were awarded to restoration projects and 14% to group support (OWEB 2005). This abundance of financial support has promoted voluntary restoration projects throughout Oregon, but grant requests continue to outpace grant availability and OWEB has developed specific criteria for distributing grant funds.

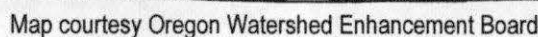
Despite these accomplishments, OWEB recognizes problems that continue to hinder Oregon Plan implementation. These include: 1) permits needed for restoration projects can be complicated and require too much time to complete, 2) not enough technical assistance is available to landowners, and 3) incentives for landowners to conduct restoration are not adequate (OWEB 2005, p. 36). These challenges do not have easy solutions, but watershed groups, SWCDs, and state and federal agencies strive to improve some of these situations.

What is amazing about the history of the Oregon Plan is that despite the listing of coho and other salmonid populations under the ESA, the State of Oregon continued to promote the voluntary approach to salmon restoration. Governor Kitzhaber and his staff continued to provide support to local watershed councils, integrate state natural resource agency efforts, and promote federal-state cooperative activities to direct salmon recovery efforts. Governor Kitzhaber and his staff demanded an unprecedented amount of cooperation among different state agencies by requiring bi-weekly meetings and ensuring that each agency fulfilled its responsibilities. This unique and innovative approach to species recovery is one of a kind and is seen as a model for other states and governments. The reliance on voluntary restoration efforts is the key to the Oregon Plan, and as Governor Kitzhaber said in a speech in 2000, "the Oregon Plan was designed to involve, empower and incent private landowners to make voluntary commitments to watershed restoration and habitat restoration" (State of Oregon, Office of the Governor 2000). Private landowners are conducting watershed restoration activities on their property and

it may take years, decades, or even longer to determine the effectiveness of these restoration practices. Still, the approach demonstrates that landowners are willing to undertake activities to promote salmon recovery.

The Heterogeneity of Watershed Groups

Oregon's watershed groups include diverse stakeholders and operate within the specific needs of each particular watershed. There are more than 90 watershed groups in Oregon (see Figure 1). Watershed groups implement the goals of the Oregon Plan for Salmon and Watersheds by conducting watershed assessments, education and outreach programs, water quality monitoring, and restoration projects. Although each group is unique in its list of stakeholders, goals, priorities, and geographic setting, there are also similarities between groups. Following is a discussion of some of the individual features of watershed groups, often referred to as councils. It is meant to draw attention to the heterogeneity of these groups and their activities, and is not an exhaustive list of every characteristic.



Watershed groups were formed for a variety of reasons and have developed mission statements highlighting their goals. A few examples are included to demonstrate the similarities and differences between groups. For example, a group in Northeastern Oregon states that: “the mission of the Walla Walla Basin Watershed Council is to protect the resources of the Walla Walla Watershed, deal with issues in advance of resource degradation, and enhance the overall health of the watershed, while also protecting, as far as possible, the welfare, customs, and cultures of all citizens residing in the basin” (WWBWC). A similar but slightly different type of mission was developed by the Coquille Watershed Association in Southwestern Oregon: “to provide an organized

framework to coordinate the assessment of the watershed's conditions; implement and monitor proven management practices that are designed to support environmental integrity and economic stability for the communities of the Coquille Watershed and adjacent areas" (CWA). Meanwhile, the mission of the Tualatin River Watershed Council in the Portland Metro area is "to foster better stewardship and understanding of the Tualatin River watershed resources; address natural resource issues; and ensure sustainable watershed health, functions, and uses" (TRWC). Another Portland group, the Johnson Creek Watershed Council (JCWC), stated their mission as "to inspire and facilitate community investment in the Johnson Creek Watershed for the protection and enhancement of its natural resources" (JCWC).

These four mission statements are similar in their goals of protecting watershed health but vary in the language used to describe this. They also differ in some of the specific goals mentioned, such as protecting the culture of local residents or implementing "proven management strategies." The two urban groups are vague in their statements and the JCWC does not mention human uses in particular, but includes 'community investment,' a phrase that can be interpreted in many different ways. This comparison illustrates the unique qualities of each statement and is not intended to be a critique. The goals of each watershed group also vary, and watershed conditions are a significant component of these distinctions. Some watersheds have threatened fish populations listed under the ESA while others have water quantity issues. These conditions influence the stated goals of watershed groups. After reviewing numerous watershed group materials, some common themes emerge. The three major goals of

groups that can occur together or separately include: 1) the assessment and improvement of water quality, 2) improvement of fish passage and habitat, specifically for threatened fish populations, and 3) dealing with water quantity issues. Some groups include all three in their goals while others mention just two of them. The improvement of water quality and watershed health is the common thread throughout these groups. Water quantity issues are more likely to be mentioned in Eastern Oregon where there is limited rainfall and overappropriated streams, although there may be exceptions to this.

A typology was developed to highlight some of the significant distinctions among watershed groups (see Table 2). It is not intended to evaluate effectiveness of any particular category or type and is only a tool for trying to understand the heterogeneity of these efforts and the range of factors that led to this situation. The development of diverse groups that reflect locally significant social, economic, and physical conditions is a key component of the Oregon Plan for Salmon and Watersheds and illustrates how local communities can determine the most appropriate methods for implementing the goals and priorities of a state-wide initiative. This typology may also benefit other states and collaborative initiatives that strive to develop similar programs and want to understand the advantages of allowing local flexibility in the implementation of state-wide policies.

Watershed groups have differences in their organizational design and membership criteria, relationship with local SWCDs, size and governance, staff and funding resources, and geographic setting. These distinctions are primarily due to the goals of the original participants involved in the development of each group, local influences, and OWEB priorities. All groups include a diverse set of stakeholders and a majority of

groups use consensus as a decision-making process. Information for the following section was obtained from watershed group documents and websites and personal interviews.⁶

Table 2: Typology of Watershed Groups

<u>Components</u>	
1 –	Organizational Design and Membership Criteria
2 –	Relationship with SWCD
3 –	Watershed Size and Governance
4 –	Staff and Funding Resources
5 –	Geographic Area
<u>Categories</u>	
1.a	Participant driven group and open membership
1.b	Stakeholder driven group and limited participation from the general public
2.a	Co-located or under jurisdiction of SWCD
2.b	Independent of SWCD
3.a	Umbrella organization
3.b	Medium to large size watershed and self-governing
3.c	Small size or under the coordination of an umbrella group
4.a	Large staff size and budget
4.b	Medium to small staff size and budget
5.a	Western Oregon
5.b	Eastern Oregon
5.c	Portland Metro area

Organizational Design and Membership Criteria

Watershed groups differ in their organizational design and level of involvement from the general public. Some watershed groups have an organizational design that gives partner organizations the ability to select group representatives and the general public is

allowed only a few slots on the group's decision-making body while other groups have a participant driven process where voting membership is open to anyone interested in group activities.

1.a Participant driven group and open membership: The Long Tom Watershed Council (LTWC) exemplifies a participant driven watershed group. It began with a meeting of a small group of residents in 1996 and the LTWC charter was developed in 1998 (LTWC). The LTWC has an open membership and "... is fully inclusive and open to anyone who lives, works, or plays in, derives benefit from, or is affected by the watershed and its resources" (LTWC). Membership is gained by putting your name on the LTWC sign-in sheet at a monthly meeting and this allows interested participants to vote, utilizing a consensus format, on LTWC decisions. The LTWC includes diverse stakeholders on their 12-member steering committee but these members volunteer to participate and are affirmed by the entire LTWC (LTWC). This open membership format is in sharp contrast to the McKenzie Watershed Council's approach to group composition and structure.

1.b Stakeholder driven group and limited participation from the general public: The McKenzie Watershed Council (MWC) provides only limited participation from the general public. The Lane County Commissioners and Eugene Water and Electric Board Commissioners played key roles in designing the composition and structure for the MWC in 1993 due to concerns about fish conservation, recreational development, relicensing of hydroelectric facilities, and water quality (LCOG 1995). The MWC has 22 partner representatives who are selected by their partner organization to be

conduits for information between the organization and the MWC (MWC). Voting is only allowed by partners, and the general public does not have an avenue for active participation in MWC decision-making other than the two at-large community resident positions and a ten minute public comment period during meetings. Sixty-eight percent of the McKenzie River watershed is managed by federal land management agencies, and the MWC has received substantial funding through Congressional appropriations and other federal agency grants (LCOG 1995; NRLC 1996). The composition and structure of the MWC is a result of these specific circumstances. In particular, the original organizers of this effort and the significant role played by federal agencies are likely to have influenced the development of this type of organizational design.

Relationship with SWCD

Watershed groups interact with a variety of local community groups and governmental entities. The special relationship that some watershed groups have with their local soil and water conservation district (SWCD) is unique because a number of groups across the state are co-located with their local SWCD and often work under their administrative framework. This is in sharp contrast to watershed groups that are completely independent of SWCD administrative functions. These groups work cooperatively with their local SWCD, and often include a SWCD representative on their

steering committee or executive board, but they maintain their independence from SWCD operations. A brief review of watershed groups found that both relationships were common throughout the state.

SWCDs have a long history in the U.S. In 1935 the Soil Conservation Service was created to deal with soil erosion problems caused by the Dust Bowl. By 1937 states were asked to pass legislation promoting local SWCDs and the State of Oregon passed this legislation in 1939. Oregon has 45 SWCDs that are municipal corporations and subdivisions of state government (Marion SWCD). A board of directors is elected through general elections and some districts have been able to obtain a local tax base from voter approval (West Multnomah SWCD). SWCDs provide technical assistance to landowners and contribute to the implementation of the Oregon Plan for Salmon and Watersheds and local agricultural water quality management area plans (i.e. Senate Bill 1010 plans). SWCDs have a variety of relationships with watershed groups.

2.a Co-located or under jurisdiction of SWCD: The Yamhill Basin Council (YBC) was created in 1995 due to initial efforts by Yamhill and Polk Counties and the Yamhill SWCD (Kenney et al. 2000). For almost ten years the YBC was co-located with the Yamhill SWCD (they recently had to move out due to space limitations) and these groups often partnered on workshops and other events. According to interviews among landowners within the Yamhill Basin, the YBC has a diverse membership but is strongly associated with the SWCD. Interviews also revealed that landowners were often unable to distinguish the YBC from the SWCD although no one mentioned a negative connotation from this relationship. Landowners were supportive of both organizations

and their activities and several had worked with the SWCD before participating with the YBC. However, due to the YBC's recent move it may be possible for the YBC to gain a broader base of participants including those that may be more open to working with the YBC because it is no longer co-located with a governmental organization.

2.b Independent of SWCD: The Marys River Watershed Council (MRWC) was formed in 1997, and according to interviews with landowners within the watershed, early participants specifically chose to be independent of their local SWCD because they did not want to be associated with a government agency. Interviews revealed that participants felt that the SWCD had a close working relationship with large agricultural landowners, but the MRWC wanted to reach a much broader audience. A Memorandum of Understanding exists between the MRWC and the Benton SWCD, and a SWCD representative is on the steering committee. Since its inception the MRWC primarily focused on the watershed assessment, education and outreach activities, facilitating technical assistance, and conducting monitoring projects and other research studies while the SWCD implemented on-the-ground projects. Landowners mentioned that this delineation of activities is changing due to OWEB's increased prioritization that watershed groups conduct on-the-ground projects. Interviews also revealed that the SWCD felt it was in direct competition with the MRWC for restoration project grants. This competitive feeling by the SWCD is likely to increase as the MRWC implements more on-the-ground projects.

Watershed Size and Governance

Watershed groups can vary from under a hundred square miles to over 7,000 square miles. It is not surprising that this diversity influences watershed group structure. There are watershed groups that are umbrella organizations for a number of smaller groups, completely self-governing groups, and small or sub-watershed groups that are under the coordination of a larger group. The consolidation of staff and funding resources for umbrella organizations can be beneficial for smaller watershed groups that otherwise would not be able to hire watershed group staff. Funding agencies, such as OWEB, can also be assured that administrative costs are minimized through consolidation.

3.a Umbrella organization: The South Coast Watershed Council (SCWC) is an umbrella group for the Floras Creek, Elk/Sixes River, Port Orford, Euchre Creek, Hunter Creek/Pistol River, Chetco River, and Winchuck River watersheds. The smaller watersheds that comprise the SCWC are all located in Curry County. The SCWC provides an organizational framework for these watershed groups which vary in their organization and meeting frequency (South Coast). Several of these groups only meet periodically and the coordination provided by the SCWC is likely to be helpful in managing ongoing projects. The SCWC is co-located with the Curry SWCD and coordinates the production of the *Curry Currents*, a quarterly newsletter that provides county-wide information on watershed restoration activities (South Coast). Without this umbrella organization it would be difficult for these small watersheds to manage the administrative, staff, and budgetary requirements for restoration projects. It must also be

easier for the Curry SWCD and other local organizations and officials to work on a regular basis with an umbrella organization rather than numerous small part-time groups.

3.b Medium to large size watershed and self-governing: A large percentage of the watershed groups in Oregon are self-governing and are not an umbrella organization or under the coordination of this type of group. Self-governing groups still coordinate activities with other agencies and organizations but they have developed their own organizational structure. The Walla Walla Basin Watershed Council (WWBWC) was formed in 1994 and the watershed includes 1,758 square miles. One-third of the basin is located in Oregon and the remainder is in Washington. The WWBWC focuses on issues in the Oregon portion of the basin but also works in partnership with Washington entities (WWBWC). It conducts monitoring and research studies, education and outreach efforts, and restoration projects. A 13-member board of directors governs the group and the WWBWC's collaborative approach has been described as the "Walla Walla Way" (WWBWC). The WWBWC has its own staff and office and exemplifies a self-governing watershed group.

3.c Small size or under the coordination of an umbrella group: The Ecola Creek Watershed Council (ECWC) was established in 1997 and the watershed is approximately 22 square miles (Parker and ECWC 2001). It joined with three other watershed groups to form the North Coast Watershed Association in 2001. The Association is a 501(c)(3) non-profit tax-exempt group that serves as an umbrella organization. It has an executive director that coordinates activities for all four groups. The ECWC meets monthly and recent projects include a culvert replacement and a large woody debris stream

enhancement project (Parker and ECWC 2001). The ECWC maintains its identity within the North Coast Watershed Association by holding monthly meetings and having its own steering committee. However, administrative and staffing costs are reduced through the use of one council coordinator for the four small watersheds that participate in the Association.

Staff and Funding Resources

The size of a watershed group's staff plays an important role in the types of activities that a group can undertake. A part-time coordinator that completely relies on volunteers for project assistance is quite different than a full time staff of eight. Staff size is partially due to watershed size and conditions, OWEB priorities, grant success, and watershed group goals.

4.a Large staff size and budget: The Coquille Watershed Association (CWA) is one of the earliest watershed groups established in Oregon and the watershed includes 1,059 square miles. It was formed in 1994 and received substantial funding due to its significance for coastal coho salmon habitat. The executive council includes 27 members from a diversity of interest groups and CWA has a membership of 250 people⁷. The CWA reports that it has an annual budget of \$1 million dollars and has worked with 210 private landowners to implement the following accomplishments as of February 2002: 1) over 130 miles of fencing and riparian plantings, 2) 23 culverts replaced to improve fish passage, and 3) 180 in-stream structures (CWA). The CWA has eight staff members that

include a watershed group coordinator, two restoration specialists, project manager, grant administrator, office manager, inmate crew leader, and monitoring coordinator. The ability to maintain such a large staff is a result of successful grant funding and this is likely to be at least partially influenced by the importance of the watershed for coho salmon recovery.

4.b Medium to small staff size and budget: The Crooked River Watershed Council (CRWC) was established in 1997 and the 13-member board represents the diverse stakeholders in the watershed. Although the watershed includes 4,500 square miles, it only has one full-time coordinator and a half-time hydrologist. Between 1997 and 2000, the annual budget for the CRWC ranged from \$35,000 - \$150,000 (Kenney et al. 2000). The CRWC conducts restoration projects, education and outreach programs, and research studies. In comparison to the Coquille Watershed Association, the CRWC covers a wider geographic area, but is a much smaller organization with fewer financial resources. Other groups have even smaller financial and staff resources. The Coast Fork Willamette Watershed Council is currently looking for a part-time watershed coordinator to work approximately 50 hours a month (Coast Fork). A watershed coordinator who works this limited number of hours will only be able to accomplish a fraction of the activities that a full-time coordinator with four staff members can implement.

Geographic Area

The geographic location of a watershed is an important component of watershed group attributes. Each watershed includes unique topography and land uses and there is great diversity between different parts of Oregon. Social, economic, political, and cultural dimensions vary by geographic area as well. For example, timber production is an important land use in the western forested portions of the state, grass seed agriculture provides vital revenues in the Willamette Valley, and ranching plays a significant role in the culture and economic welfare of residents in Eastern Oregon. For this discussion, Western Oregon, Eastern Oregon, and the Portland Metro area have been delineated but there are also local distinctions. The goals and mission of each watershed are dependent on the participants involved and reflect their ideas, values, and concerns.

5.a Western Oregon: The Coos Watershed Association formed in 1994. The watershed is 586 square miles and includes the largest estuary within Oregon.⁸ Approximately 30% of the watershed contains urban and agriculture lands, 50% industrial forest, and close to 20% state, county or federally owned forest lands. The purpose and mission is to “provide a framework to coordinate and implement proven management practices, and test promising new management practices, designed to support environmental integrity and economic stability for communities for the Coos Watershed” (Coos Watershed Association). The Association includes a board of directors that has 20 members that meet at 7:00 am in the morning on a monthly basis.⁹ At its inception the Association had a strong emphasis on working with landowners in the

upper reaches of the watershed, primarily industrial forest landowners and the Elliot State Forest. This approach allowed restoration activities to occur within an entire subwatershed because they could work with four or five landowners and accomplish goals more easily due to the small number of landowners. Recently, the Association has been working with landowners throughout the watershed to conduct a broad array of restoration practices.

5.b Eastern Oregon: The Grande Ronde Model Watershed Program (GRMWP) was established in 1992. The watershed includes approximately 4,884 square miles in Oregon and 54% of it is managed by federal land management agencies while 46% is privately owned (OWEB 2005). Sixty-two percent of the area is forest, 25% shrub/grasslands, and 11% agriculture. The mission of the GRMWP “is to develop and oversee the implementation, maintenance, and monitoring of coordinated resource management that will enhance the natural resources of the Grande Ronde River Basin” (GRMWP). The 15-member board of directors is appointed by the Union County Commission and the Wallowa County Court. The Grande Ronde is unique in its designation as a Model Watershed and it has distinctive socio-political and geographic attributes. The extensive participation of the Umatilla and Nez Perce Tribes, the presence of several threatened fish populations, and the water development projects within the Columbia Basin distinguish it from other groups in Oregon.

5.c Portland Metro area: The Tryon Creek Watershed Council (TCWC) was established in 1994. The watershed is approximately 6.6 square miles and is an urban area that is dealing with ongoing development pressures (PSU). Most of the area is

wooded residential property but it does include Tryon Creek State Park (1 square mile). The TCWC is "a citizen-based organization dedicated to protecting the health of Tryon Creek and its watershed" (Tryon Friends). TCWC representatives include ten citizens and seven agency stakeholders. The TCWC conducts watershed monitoring, education and outreach activities, and restoration projects. One of the challenges the group faces is dealing with multiple city agencies and other Portland area organizations. The urban character of this watershed distinguishes it from rural watersheds. Some watersheds include both rural and urban areas while others predominantly fall into only one category. Physiographic, socio-economic, political, and cultural differences between geographic areas in Oregon are likely to have played a role in the heterogeneity of watershed groups. However, the goals of the original participants and organizations have probably had the greatest effect on group composition and structure.

Conclusion

Governor Kitzhaber and his staff took unprecedented steps to promote the Oregon Plan for Salmon and Watersheds and through numerous meetings with state natural resource agency staff, federal representatives, and other participants developed and implemented a far-reaching effort to recover threatened fish populations and improve water quality conditions. The enthusiasm and high level of commitment towards the Oregon Plan demonstrates that state government can make a significant contribution in the recovery of federally listed species under the ESA. The Oregon Plan promotes state

agency actions, monitoring, and science oversight but primarily emphasizes voluntary restoration activities. OWEB provides financial and technical support for watershed groups and has developed strategic priorities for awarding limited grant funds.

Watershed groups each have their own approach to watershed management within their boundaries and face increasing challenges.

Watershed groups are heterogeneous and reflect the interests and circumstances of local participants and organizations. The typology provides a framework for understanding some of the important characteristics of watershed groups. It was not meant as a comprehensive list of every attribute but is an attempt to highlight some of the similarities and differences among these groups. The organizational design and membership criteria, relationship with SWCD, watershed size and governance, staff and funding resources, and geographic area all contribute to watershed group composition and structure and influence group activities. All watershed groups strive to improve watershed health and conduct a variety of education and restoration activities. The focus of each group depends on the individuals involved and watershed conditions. Each group includes a diverse array of participants who are willing to attend monthly meetings and other events to improve watershed conditions. Many of these participants have spent two to ten years involved with their local group. This level of commitment is admirable, especially for residents who volunteer their time and energy, and these individuals would not continue to undertake these activities unless they felt a sense of accomplishment from these efforts.

Watershed groups were intended to be diverse entities that would reflect the social, economic, and physical conditions of local watersheds. The Oregon State Legislature and those involved in the development of the Oregon Plan for Salmon and Watersheds recognized that local communities are heterogeneous and that a structured, one-size-fits all prototype watershed group would not be the best approach. The goal was to allow local communities the opportunity to design their own watershed group, within the guidelines provided by state statutes and policies, and this would enable local citizens and organizations the ability to incorporate local circumstances and watershed conditions into watershed management activities. The second half of this chapter illustrated that watershed groups have developed distinctive approaches to improve watershed health and local citizens have designed programs to meet local conditions.

The geographic diversity within Oregon is significant but highlights circumstances that exist elsewhere. Physiographic, socio-economic, political, and cultural differences influence land management decisions. A rancher in Eastern Oregon is likely to have a different perspective on what a watershed group should do than an urban resident in the Portland Metro area. The same can be said for a landowner in Central Michigan and a landowner in Southwestern Michigan. Locally distinctive conditions are common and state-wide or federal initiatives do not always allow for local flexibility in program implementation. The growth in collaborative initiatives demonstrates that there is an increased interest in trying to allow local communities the opportunity to be involved in natural resource management policies and programs. This chapter demonstrates that the Oregon Plan for Salmon and Watersheds provided the flexibility to incorporate local

conditions into the implementation of a state-wide initiative. By better understanding why diverse groups have emerged from the Oregon Plan, other states and organizations can determine what type of framework and policies they think would be transferable to their own natural resource management initiatives.

This chapter is a stepping stone for the remainder of the dissertation. Private landowners in different geographic areas deal with distinctive local conditions that influence watershed group structure and composition. The unique features of these groups affect the level of trust that landowners have for their local group. For example, if a landowner has a long positive history of working with their local SWCD and the watershed group is co-located with the SWCD this is likely to influence whether a landowner is eager to work with the watershed group. The participation of local community leaders, such as the president of a local ranching organization or county commissioner, can also affect landowner perspectives of watershed groups. This in turn can shape a landowner's decision to implement watershed restoration practices.

The next chapter highlights the reasons why landowners adopt watershed restoration practices and explores the role that watershed groups play in this process. It also discusses the diversity of landowner perspectives and motivations regarding land management practices and why it is important for watershed groups to promote a variety of education and outreach activities to reach distinct audiences within their watershed.

Notes

¹ Jay Nicholas and Governor Kitzhaber are reported to have played significant roles in the development of the Oregon Plan. Governor Kitzhaber attended biweekly meetings with state agency directors, held many meetings with federal officials, and continued to support the Oregon Plan even after coho salmon was listed under the Federal Endangered Species Act. This relentless promotion of the Oregon Plan led to the substantial financial and public support for the Plan.

² GWEB was provided with an additional \$500,000 for statewide projects (State of Oregon, WHP, 1995).

³ The Northern Spotted Owl controversy polarized relations between environmental advocates and logging interests. Lawsuits, public events, and other activities highlighted the halting of timber sales on federal lands. The Northwest Forest Plan was developed to deal with this issue.

⁴ The State of Oregon's Forest Practices Act includes stream buffer regulations for private timber lands but similar regulations for private agricultural lands do not exist.

⁵ Although the majority of funding comes from federal and state monies, a portion of funding comes from private and other sources.

⁶ Interviews were part of a research project focusing on landowner motivations (see methods section of Chapters III and IV).

⁷ There is a \$10 fee to become a member of the Coquille Watershed Association.

⁸ This excludes the Columbia River.

⁹ Almost all other groups have public forums in the evening.



CHAPTER III

LANDOWNER MOTIVATIONS FOR WATERSHED
RESTORATION: LESSONS FROM FIVE
WATERSHED GROUPS

Chapter Overview

Collaborative watershed management initiatives have increased tremendously over the past 15 years. However, there is still uncertainty about how these initiatives influence private land management practices. This chapter examines landowner motivations and preferences and the role that watershed groups play in influencing watershed restoration efforts. The research focused on five watersheds in Western Oregon. Surveys were sent to 900 private landowners (52% response rate; $n = 446$) and 80 personal interviews were conducted. The research revealed that landowners are strongly motivated by their concern for future generations, and they are influenced by a range of sources, with interpersonal influence being one of the most important. Newsletters were the preferred outreach method, and finances, time, and unfamiliarity were the most significant barriers to the adoption of conservation practices. Socio-economic variables were also found to affect landowner preferences. These findings highlight the need for watershed groups and other community-based, collaborative initiatives to implement a diversity of outreach activities and develop networks of influence through group members to reach nonparticipating landowners.

Introduction

In the area of watershed management, community-based watershed groups have assumed a critical role in addressing watershed health (U.S. EPA 1994; Kenney et al. 2000). The strength of these groups is their ability to bring together a broad and diverse set of participants who share information, agree on common goals, and develop a strategy for change (Gray 1989; Innes and Booher 1999; Margerum 1999; Wondolleck and Yaffee 2000). Their localness and community base are seen as assets in building consensus and expanding participation, but there is growing concern about their effectiveness in achieving results "on the ground." Too often, efforts to achieve collaboration engage only a limited number of social groups and individuals, failing to reach a broader range of people within socially diverse communities. This broader circle of potential participants is critical because it includes riparian landowners whose land management practices affect watershed conditions. Although a number of riparian landowners are likely to participate in watershed initiatives, nonparticipating riparian landowners can still have a strong effect on watershed health. The extent to which a watershed group is able to encourage the adoption of restoration practices among a diverse array of landowners is an important intermediate measure of their effectiveness. In order to encourage adoption, watershed groups need to understand the factors that motivate landowners to change their land management practices.

The primary goals of this study were to understand landowner motivations for implementing watershed restoration practices, determine the barriers to implementing

these practices, and explore the role that watershed groups played in these processes. This chapter describes the context for watershed management in Oregon, relevant literature, research methods, study results, and discussion and conclusion.

The Context for Watershed Management in Oregon

Watershed groups play a vital role in addressing some of the most difficult environmental management issues in Oregon, including endangered species, water quality, and water quantity (State of Oregon 1998; Oregon Watershed Enhancement Board 2001). The State of Oregon promoted the development of watershed groups in the early to mid-1990s to provide local leadership in dealing with watershed health issues, particularly the dramatic decrease in native salmon populations. The Oregon Plan for Salmon and Watersheds promotes the formation of voluntary, locally organized watershed groups to evaluate watershed conditions and identify opportunities for protection and restoration. Watershed groups conduct education and outreach programs, and provide technical assistance and funding for restoration projects, such as streambank fencing and plantings, culvert replacement to improve fish passage, and in-stream alterations to improve fish habitat. There are over 90 watershed groups in Oregon (see Figure 1), and their approaches and stages of development vary. Many watershed groups are just beginning to become known within their community, while others have been implementing restoration projects for over ten years. One of the challenges found by many groups is how to encourage conservation on private lands.

technical assistance approach to soil conservation was implemented under the premise that once landowners understood the benefits of soil conservation they would voluntarily undertake these practices (Camboni and Napier 1994). However, some landowners continue to refrain from adopting soil and water conservation practices. In order to better understand this situation, researchers have worked diligently to understand landowner motivations for adopting or not adopting land management practices. There is an extensive body of research on farmer participation in conservation programs and adoption of conservation practices (see for example: Napier et al. 1984; Napier et al. 1988). Hooper's (1995a) review of the literature found that the adoption of a 'new' management practice is influenced by a variety of psychological, socio-cultural, structural, and economic constraints. A comprehensive review of the literature by Camboni and Napier (1994) provided 22 generalizations, including: (1) economic viability and subsidies are important factors in the adoption process, (2) relevance of conservation technologies to farm operations is significant, and (3) most personal characteristics of landowners are not good predictors of adoption behavior.

The adoption literature often includes research on specific, expert-driven programs and traditional agricultural landowners. There is also a substantial amount of research on nonindustrial private forest (NIPF) owners that similarly focuses on participation in a particular program or evaluates NIPF owner motivations (Jones and Harmon 1996; Graesser and Force 1996; Bliss and Martin 1990; Erickson et al. 2002; Dutcher et al. 2004). While these approaches have had some success in delineating factors that motivate landowners to participate in particular programs, watershed groups and similar

community-based, collaborative initiatives tend to appeal to different types of landowners and use a range of approaches to leverage changes in behavior (Campbell 1994; Hooper 1995a; Hooper 1995b).

The adoption-diffusion model developed by Rogers (1983) has been frequently cited in the literature and many studies have used this model to describe the adoption of specific techniques or programs over time. The adoption of soil and watershed conservation measures literature often overlaps with adoption-diffusion studies, but there are differences in regard to whether the diffusion process is included in research projects. Rogers (1995) identified 3,890 publications on this topic, and his model includes the following: 1) communication processes used during different stages of diffusion (e.g. mass media as an effective means to inform potential adopters, interpersonal communication for persuasion), 2) characteristics of the innovation that promote adoption (e.g. relative advantage, compatibility, observability), and 3) segments of the population that adopt innovations over time (e.g. change agents, early adopters, late adopters). The model is often used to assess the characteristics of landowners who have adopted innovative practices over a period of time and determine the reasons for nonadoption. For example, the vast literature on the attributes of 'early adopters' primarily finds that this social group has an advanced education level, a higher social status (which can include income and/or occupational prestige), and owns larger units (Rogers 1995). This research provides valuable insight into some of the factors that influence adoption of

innovative practices, focusing in particular on landowner perceptions of the innovation, social-psychological characteristics of the landowner, and the adoption of a specific practice.

Environmental and social psychology have also investigated environmental behaviors and many studies have investigated how attitudinal factors relate to behavior. The theory of planned behavior (Ajzen 1985) has recently been used to explain proenvironmental behavior and the adoption of conservation practices (Harland et al. 1999; Lynne et al. 1995; Beedell and Rehman 2000; Corbett 2002). This theory is used to predict future behavior and relies on an individual's attitude toward an act, subjective (social) norms, and perceived behavioral control. The likelihood of an individual conducting a specific behavior depends on their attitude about the behavior, their perception of social norms about the behavior, and whether they perceive they have the ability to conduct the behavior. Corbett's (2002) predictive model using the theory of planned behavior found that a likely participant in a government-sponsored riparian program is motivated by financial considerations, has recently received information on riparian areas, and thinks that their land management practices can affect environmental quality.

The adoption of soil and water conservation measures and adoption-diffusion literature, and the theory of planned behavior each have valuable insights into landowner behavior but they do not fully describe landowner motivations for implementing conservation practices. Government-sponsored and expert-driven programs that focus on the adoption of a specific conservation program by a particular type of landowner (e.g.

farmer or small woodlands owner) are considerably different in character than watershed group education and outreach efforts that are designed to reach a broad base of watershed residents with diverse land use practices. In addition, despite all of the research on trying to understand landowner motivations there is still limited knowledge of what motivates a landowner to implement watershed restoration activities. Thus, one of the goals of this study is to provide new insights into the motivations and barriers to adopting watershed restoration practices.

Research Methods

This study was conducted in collaboration with five watershed groups in Western Oregon: Coos Watershed Association, Coquille Watershed Association, Siuslaw Watershed Council, Yamhill Basin Council, and Marys River Watershed Council (see Figure 1). Based on discussions with researchers, state agency staff, and others knowledgeable about watershed groups, these five groups were selected because: 1) they have a significant amount of private land, 2) they have a similar cross-section of private land uses, 3) they are in two ecoregions, which each have similar climate, geology, and vegetation, 4) they have used a range of educational and outreach programs, and 5) the groups are in a mature stage of development.

A mail-out survey and face-to-face interviews were conducted with private landowners in the five watersheds. The written questionnaire was developed and mailed-out to 900 landowners using a modified version of Dillman's (2000) Tailored Design

Method. Half of the 900 landowners were randomly selected from county property records (i.e. county records list) and the other half were selected from watershed group mailing lists (i.e. watershed group list). Only riparian landowners (i.e. landowners whose property is adjacent to or next to a stream) were selected from county property records, and the majority of landowners selected from the watershed group lists owned riparian property. Information from watershed groups, federal agencies, and county property records were utilized to obtain an equitable selection of small woodland, agricultural, and rural residential landowners from each watershed. The county records list was obtained by segregating agricultural, small woodland, and rural residential property within each watershed and then randomly selecting 30 landowners from each group. Only landowners who lived on their property were selected because it was important to investigate landowner management practices and views of community groups. The watershed group list was developed by overlapping watershed group mailing lists with county property records to select riparian landowners, although a small number of non-riparian landowners may have been included when ownership data were inconclusive. One hundred eighty questionnaires were mailed out to landowners in each watershed (i.e. 90 from each list). The mailings occurred between August and November 2003 and included a prenotification letter, original mailing, reminder postcard, and second mailing to nonrespondents.

The written questionnaire gathered data on landowner views and participation with local organizations, watershed management activities, and the factors that motivated private landowners to adopt watershed restoration practices. It also focused on

landowner perceptions of watershed group outreach activities. The survey included closed-ended questions on land management practices, local organizations, socio-economic, cultural, and institutional characteristics and a few open-ended questions on personal perspectives on these components.

Eighty semi-structured, face-to-face interviews were undertaken between October and December 2003. Interviews were conducted with watershed group members, landowners not involved in watershed group activities, landowners who had implemented watershed restoration practices, and landowners who had not conducted restoration activities. A snowball sample¹ was utilized in the interview process. Key informants and previously interviewed landowners provided the names for potential interviewees. Landowners were then selected from this group of names depending on which of the above categories they fit into. The interviews focused on gathering information about why landowners adopted restoration activities, why they chose not to conduct restoration projects, views on local community groups, personal land ethics, and interpretations of survey questions.

Study Results

The overall survey response rate was 52% ($n = 446$).² The response rate per watershed ranged from 46-58%. Responses were well distributed between landowners originally taken from the watershed group list (48%) and those from the county records list (52%). However, only 23% of respondents self-identified themselves as watershed

group members. Primary land use types were equitably divided between agricultural, small woodlands, and rural residential landowners.³ Although respondents do not resemble the average resident (see Table 1) they do reflect many of the attributes of rural residents who own agricultural land, non-industrial forestlands, and rural residential property. Typically, these residents are older and have lived within their communities for a long time. For a complete overview of statistical results, see Appendix B.

Table 1: Respondent Characteristics

Years lived in community (mean)	30
Acreage owned (median)	29
Age (mean)	59
Gender:	
Male	66%
Female	34%
Percent of income from land:	
0%	50%
1 - 25%	36%
26 - 100%	14%
Highest level of education	
High school or less	21%
Some college	31%
College degree	48%
Employment status	
Employed	54%
Retired	36%
Other	10%
Income Level	
\$0 - 40,000	42%
\$40,000 - 70,000	30%
Over \$70,000	28%

Landowner Motivations for Land Management Decisions

In the survey, landowners were asked to select the most important factor that influenced their land management decisions. Landowners report that they are motivated by the need to maintain and improve their property for future generations (see Figure 2). Forty-six percent of survey respondents selected this as their most important factor, but the interviews revealed that the idea of future generations is a complex issue involving a combination of factors. Some landowners interpreted it as way to maintain the economic viability of their property, while others view 'future generations' as a balance between their personal land ethic and their future goals for the property. If they expected their children to continue farming they also included this factor in their decision-making process. All of these circumstances were taken into consideration when they made a decision about their property.

A landowner's personal land ethic also was reported to have influenced land and water management decisions. Close to two-thirds of the landowners interviewed expressed that they had a moral obligation to be a good steward of the land or "give something back to nature." The sentiment that fish restoration is "the right thing to do" was mentioned by the majority of landowners who had conducted watershed restoration practices. Approximately one-fourth of the landowners who had conducted restoration projects reported that they implemented these projects to both help fish and maintain bank stability. For these landowners, protecting land productivity by limiting bank erosion and loss of productive land (i.e. land for grazing, crops, etc.) went hand-in-hand

with improving fish habitat. Overall, landowners were concerned about the long-term use of their land and how their families and/or their property would be affected by a newly adopted land management practice.

Figure 2: Motivation for Land Management Decisions (n=380)

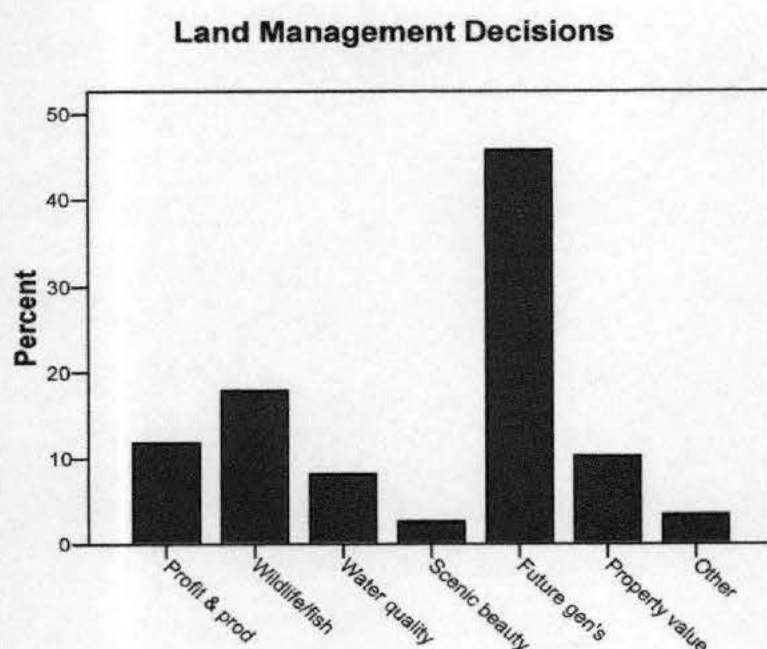


Table 2: Summary of Chi-Square Test for Motivations for Land Management Decisions

Factors and Covariates	X²	(d.f.)	p (2-tailed)
Land use type (agricultural, small woodland, & rural residential)	31.8	8	.000***
Education	9.3	12	.674
Income	13.0	12	.372
List type (watershed group list vs. county list)	9.7	4	.045*
Percent of income from land	57.3	8	.000***
Employment	3.7	4	.454

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Chi-square tests were conducted to understand how socioeconomic factors influenced landowner motivations for land management decisions. The dependent variable representing the most important factor in making land management decisions was cross-tabulated with the six independent variables shown in Table 2. Three factors, land use type, list type (originally selected from county property records or watershed group mailing list), and percentage of income derived from land, did influence motivation, but other factors did not have a significant association with motivation. Rural residential landowners identified improving wildlife and fish habitat as a motivating factor more often than expected as compared to agricultural and small woodland owners. Landowners originally taken from watershed group mailing lists (i.e. watershed group list) and residents who do not receive income from their land also emphasized wildlife and fish habitat more than expected. Small woodland and agricultural landowners, residents who derive 26-100% of their income from their property, and those on the county records list (i.e. originally obtained through a random selection of county property records) identified increasing profit more often than expected.⁴

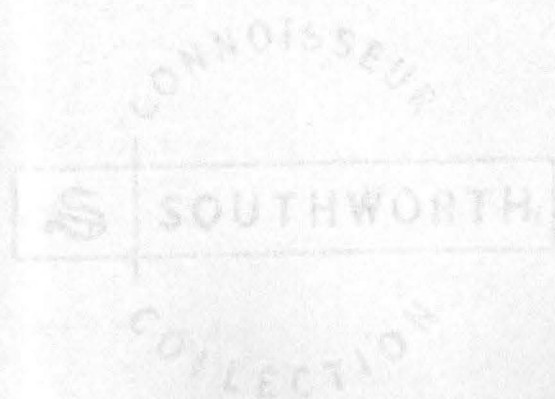


Table 3: Multinomial Logistic Regression - Motivations for Land Management Decisions*(Reference Group - Maintaining/Improving Land for Future Generations)*

	<u>Prod./Profit</u>	<u>Fish/Wildlife</u>	<u>Water Quality</u>	<u>Prop. Value</u>
Intercept	0.061***	1.131	0.287*	0.131***
College degree or above	1.373	0.805	1.234	2.312(a)
Total income > \$40,000	2.191(a)	0.632	0.758	0.751
County records list	2.518*	0.515*	0.501	1.904
Income from land >25%	5.119***	0.137**	0.161(a)	0.504
Age: > 58 years old	0.616	0.725	1.133	0.755

(n = 341)

[Exp(B) – odds ratio results]

*p ≤ .05, **p ≤ .01, ***p ≤ .001, (a) p < .10

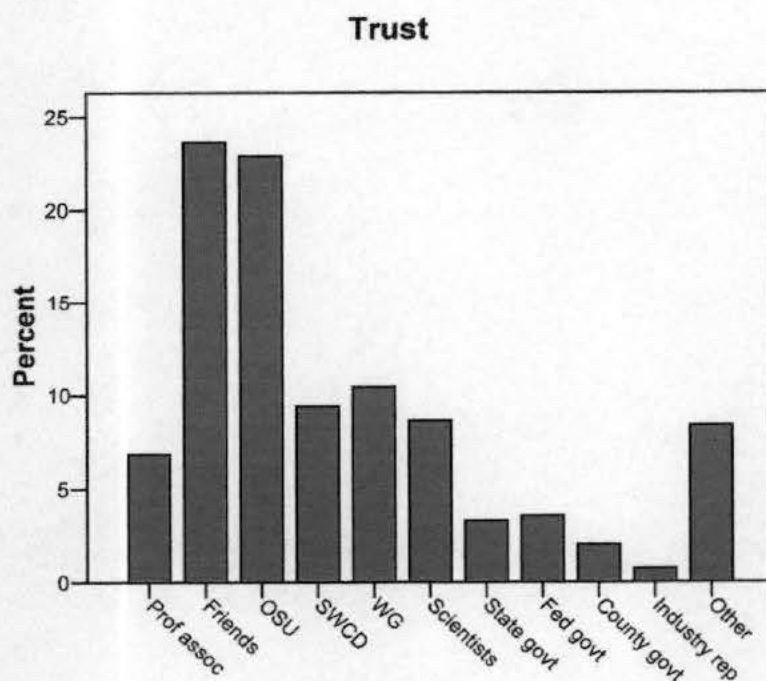
A multinomial logistic regression was conducted to better understand the relationship between landowner characteristics (independent variables) and motivations for land management decisions (dependent variable) using the Statistical package for the Social Sciences (SPSS) program.⁵ Five independent variables were simultaneously input into the multinomial logistic regression model and maintaining and improving the land for future generations was the reference category for the dependent variable (see Appendix B for further details). Regression results, Exp(B),⁶ illustrate the odds of selecting one of the four categories (i.e. productivity/profit, fish/wildlife, water quality, or property value) rather than maintaining/improving the land for future generations (see Table 3). Landowners who receive more than 25% of their income from their property have more than 5 times the odds of choosing productivity and profit rather than maintaining or improving the land for future generations. Also, landowners in this category are less likely to choose improving wildlife and/or fish habitat or water quality than future generations. A landowner on the county records list, rather than the

watershed group mailing list, has 2.5 times the odds of choosing productivity and profit rather than future generations and is less likely to choose improving wildlife and/or fish habitat than future generations.

Trusted Sources of Information

In the survey, landowners were asked to select their most trusted source of information when they made land and water management decisions. Survey findings highlight the significance of friends, family, and neighbors and Oregon State University (OSU) Extension Service as trusted sources of information (see Figure 3). The high ranking of friends, family, and neighbors demonstrates the important role that interpersonal communications play in the dissemination of information. OSU Extension Service is the second highest trusted source of information and seventy-nine percent⁷ of survey respondents were familiar with OSU Extension Service. In both the survey and interviews, respondents cited familiarity with their education programs (e.g. 4H, Master Gardener programs), their trust of them as a source of information, and their longevity.



Figure 3: Trust for Information (n=393)**Table 4: Summary of Chi-Square Test for Trusted Sources of Information**

Factors and Covariates	X ²	(d.f.)	p (2-tailed)
Land use type	51.7	12	.000***
Education	44.1	18	.001***
Income	33.0	18	.017*
List type	32.4	6	.000***
Percent of income from land	27.0	12	.008**
Employment	13.4	6	.038*

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Chi-square tests revealed that all six independent variables (i.e. land use type, education, income, list type, percent of income from land, and employment) were found to affect who landowners trust for information (dependent variable) when they make land and water management decisions (see Table 4). Rural residential landowners were more

likely than expected to rate government agencies and watershed groups as their most trusted source of information, while agricultural landowners were more likely to select OSU Extension Service as their most trusted source.⁸ Small woodland owners and landowners with a higher percentage of income from their land selected professional associations more than expected. Respondents with lower formal education levels and those from the county records list were more likely to select friends, family, and neighbors as their most trusted source of information. University scientists were selected more often than expected by respondents in the highest education brackets and those that are employed,⁹ while watershed groups were selected more often than expected by respondents from the watershed group mailing list.

Table 5: Multinomial Logistic Regression - Trusted Sources of Information
(Reference Group – Friends, Family, and Neighbors)

	<u>Pro.Assoc.</u>	<u>Govt.</u>	<u>OSU Ext.</u>	<u>SWCD</u>	<u>Wat.Group</u>	<u>Univ. Sci.</u>
Intercept	0.114***	0.119***	1.014	0.593	1.041	0.263*
College degree or above	2.712(a)	3.819**	2.216*	1.639	1.733	8.713***
Total income > \$40,000	1.094	1.721	1.333	1.300	0.683	1.165
County records list	0.715	1.921	0.481*	0.210***	0.149***	0.418(a)
Income from land >25%	1.650	0.705	0.673	0.261(a)	0.335(a)	0.304
Age: > 58 years old	2.831*	0.607	1.016	1.935	1.533	0.470

[Exp(B) – odds ratio results]

*p ≤ .05, **p ≤ .01, ***p ≤ .001, (a) p < .10

A multinomial logistic regression was conducted in SPSS to understand the relationship between landowner characteristics and who landowners trust for information when making land and water management decisions (see Table 5). Five independent variables were simultaneously input into the multinomial logistic regression model and

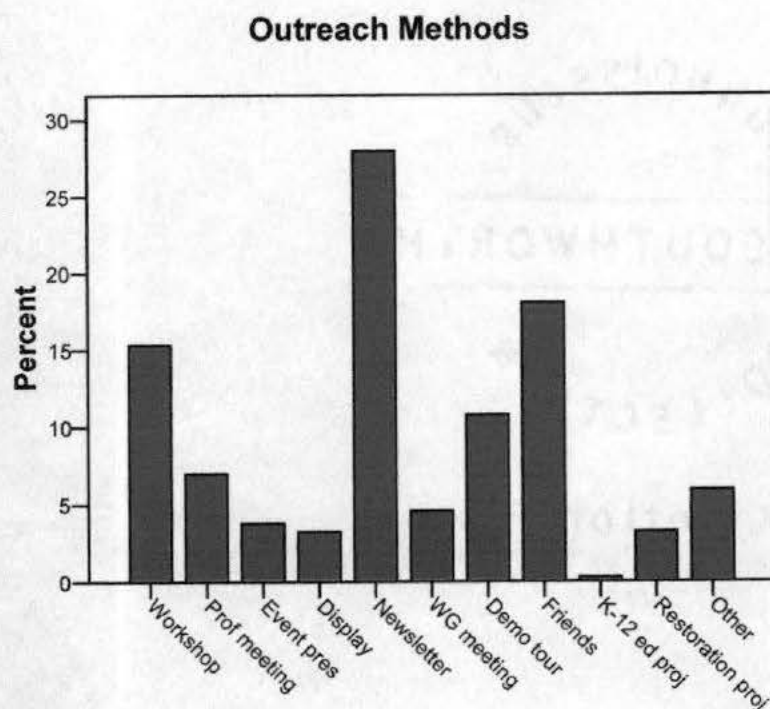
friends, family, and neighbors were selected as the reference category for the dependent variable. Regression results, $\text{Exp}(B)$, illustrate the odds of selecting one of the six categories (i.e. professional association, government agency, OSU Extension Service, SWCD, watershed group, or university scientists) rather than friends, family, and neighbors. One of the prominent findings is that having a college degree increases the odds by a factor of 8.713 of a landowner selecting university scientists as their most trusted source of information in comparison to choosing friends, family, and neighbors.¹⁰ Additional sources of information were also found to be statistically significant for landowners with a college degree. This suggests that education level influences the type of information sources trusted by landowners. An additional finding is that landowners from the county records list, rather than the watershed group mailing list, are less likely to trust OSU Extension Service, their local Soil and Water Conservation District (SWCD), and their local watershed group than friends, family, and neighbors. Both education level (i.e. having a college degree) and being on the county records list significantly affects the odds of choosing trusted sources of information.

Preferred Outreach Method

Survey respondents were asked to select the most helpful outreach method in getting information to them about land management practices. Newsletters were found to be the most preferred outreach method (see Figure 4). Interviewed landowners mentioned that they preferred newsletters because they are a quick and noninvasive

method of getting information. They could read the newsletter at a convenient time and it provided general information. It is not surprising to find that friends, family and neighbors are also an important communication network for disseminating information because they are a highly trusted source of information. Interviewees also discussed their views on other outreach methods, and stated that they liked workshops because they provide valuable technical information on land management practices, and demonstration tours allowed them a visual encounter with a restoration project.

The interviews revealed that technical staff plays a key role in promoting watershed restoration efforts. Landowners spoke very highly of the technical staff they worked with and stated that if the staff member was professional, came on time, and understood their land management needs (e.g. importance of maintaining the productivity of their property for grazing), they developed a favorable relationship with them and the watershed group. Positive interaction with group water quality and fish survey staff also led some landowners to work with watershed groups on restoration projects.

Figure 4: Preferred Method of Outreach (n=372)**Table 6: Summary of Chi-Square Test for Preferred Method of Outreach**

Factors and Covariates	X ²	(d.f.)	p (2-tailed)
Education	54.2	24	.000***
List type	29.8	8	.000***
Employment	8.7	8	.368

* p ≤ .05, **p ≤ .01, ***p ≤ .001

[Other factors could not be included due to small cell size]

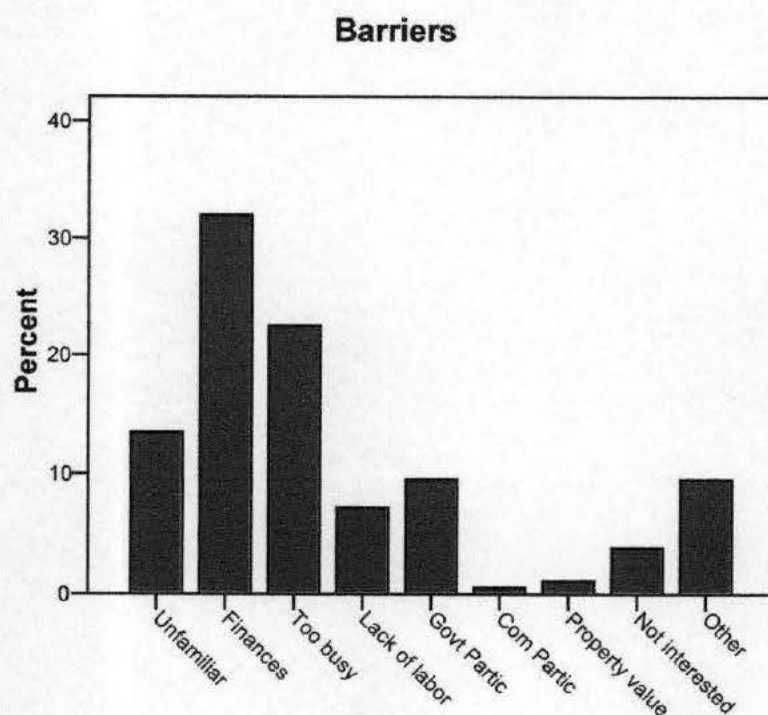
Different types of landowners prefer distinct types of outreach methods. A comparison of means test for land use types reveals that agricultural landowners prefer workshops more than any other type of outreach, while small woodland owners prefer demonstration tours, and rural residential landowners prefer newsletters.¹¹ Chi-square

tests found that landowner preferences for outreach methods are also influenced by formal education level and list type (see Table 6).¹² Chi-square tests for land use type, income, and percent of income from land could not be utilized because they did not meet standard statistical requirements (see Appendix B for further details). Respondents with advanced degrees (i.e. Masters, Ph.D. or professional degree) and those from the watershed group list were less likely to select friends, family, and neighbors as their preferred outreach method, while those in lower formal education brackets and from the county records list were more likely than expected to select this method. Workshops were chosen more than expected by respondents from the watershed group list and less than expected by those from the county records list. Additional statistical analyses could not be conducted due to the large number of categories and small response size.

Barriers to Changing Land Management Practices

Finances, time, unfamiliarity, and participation in a government program¹³ were the most significant barriers to undertaking watershed restoration and other land and water management practices (see Figure 5). Financial constraints, being too busy, and unfamiliarity with restoration practices may work together to prevent some landowners from learning more about watershed restoration. Interviews revealed similar findings. Additional analyses on this question were not conducted due to small response size (see Appendix B for further details).

Figure 5: Barriers to Changing Land Management Practices (n=178)*



* Note: only includes respondents that did not undertake restoration or other land management efforts.

Discussion and Conclusion

These findings highlight the diversity of landowner views and the important role that watershed groups play in promoting watershed restoration efforts. Landowner perspectives on land management, trusted sources of information, and preferred outreach methods vary by socio-economic, cultural, and land use characteristics. Differences were found between landowners on a watershed group list and a county records list, among agricultural, small woodland, and rural residential landowners, between those that receive

a substantial portion of their income from their property and those that do not, and according to their level of formal education. Landowners are a heterogeneous group of individuals and developing education and outreach strategies to reach these different segments of the population is a challenge for watershed groups or other community-based, collaborative initiatives.

A landowner's personal land ethic, economic circumstances, and land management goals for the future all play a role in whether a landowner adopts a watershed restoration practice. Survey respondents and interviewees emphasized the importance of improving the land for future generations, while recognizing that fish restoration and long-term land productivity can work hand-in-hand. Landowners conduct restoration because it is "the right thing to do," and they spoke about their strong connection to the land (e.g. "if you take care of the land, it will take care of you"). Other research has demonstrated similar results in which riparian landowners supported the statement that it is a landowner's moral responsibility to protect resources for future generations (Corbett 2002). In addition, it has been found that protecting the land for future generations and having a strong attachment to the land were essential in a landowner's intention to be a good land steward and these intrinsic motivations influenced farmers to adopt conservation practices (Ryan et al. 2003). Other research has also suggested that appeals to personal obligation could encourage environmentally conscious behavior (Harland et al. 1999). A study utilizing the theory of planned behavior found that an important predictor in explaining the variance in participation in a riparian conservation program is whether a landowner believes that their land management practices can affect environmental quality

(Corbett 2002). Consequently, landowners who recognize that they can make a difference and improve watershed health may be more likely to participate in restoration projects.

This research revealed that friends, family, and neighbors form an important communication network within a community. Friends, family, and neighbors were the most trusted source of information and a highly preferred outreach method. Interpersonal channels of communication have been found to persuade an individual to adopt an innovation and it is thought to be particularly important during the persuasion stage of the diffusion of innovation decision process (Rogers 1995). Friends, family, and neighbor-to-neighbor interactions are vital communication networks that can promote watershed restoration activities. The challenge for watershed groups is to become known to many different social networks within the watershed.

Although OSU Extension Service was the second most trusted source of information for this research, another study of watershed residents in Oregon found that OSU Extension Service had the highest trust rating among 18 information sources, including specific government agencies and other entities (Wright 2000). Landowner familiarity with this organization was very high, perhaps due to the popularity of 4H and Master Gardener education programs within the State of Oregon. By understanding who landowners trust for information, watershed groups can co-sponsor education and outreach activities with these organizations to encourage a positive reception of watershed group programs.

Outreach techniques and strategies are an important mechanism for watershed groups to promote their activities, but each outreach method has its own set of advantages and disadvantages. Other research has shown that two-way communication techniques (e.g. public meetings) were considered to be a more effective outreach method than one-way communication methods (e.g. newsletters), but staff time and other circumstances frequently required the use of one-way communications (Duram & Brown 1999). However, as this research and other studies have shown newsletters can be an effective and useful information dissemination method (Nelson 1986; Riley et al. 1991). Newsletters can reach a wide audience, but they do not provide in-depth information about specific restoration practices. Workshops can provide practical information about particular restoration practices, but only a small number of landowners attend. One-on-one outreach appears to have a significant influence on landowner decision-making, but it takes time to build trust and is staff-intensive for watershed groups. Innovative projects, such as a free tree giveaway program or subwatershed neighbor-to-neighbor outreach project, can be effective at increasing landowner familiarity with watershed groups and may lead to the implementation of watershed restoration projects, but it is important for groups to evaluate their target audiences to understand the best fitting strategies. Furthermore, watershed groups may need to develop an outreach plan or business model that aligns a strategy with the resources and capacity of the group.

This research revealed that socio-economic and land use characteristics influence landowner preferences and land management goals. Significant differences were found between landowners originally obtained through watershed group mailing lists (i.e.

watershed group list) and those randomly selected from county property records (i.e. county records list). Landowners from the county records list placed higher emphasis on increasing profit and productivity, were more likely to select friends, family, and neighbors as their most trusted source of information, and preferred newsletters and friends, family, and neighbors as their outreach method. Notable differences were also found between agricultural, small woodlands, and rural residential landowners. Agricultural landowners trusted OSU Extension Service and preferred workshops, while small woodland owners trusted friends, family, and neighbors and professional associations and favored demonstration tours. Rural residential landowners trusted OSU Extension Service, preferred newsletters, and selected improving fish and wildlife habitat as a close second to future generations in rating their motivations for conducting land management activities. Landowners who receive over 25% of their income from their property placed a higher emphasis on productivity and profit than those who receive less income from their land, and it is reasonable to expect that a landowner dependent on property income includes this in their land management decisions. Formal education level was also found to affect landowner preferences and this was particularly apparent by the finding that landowners with higher levels of education had a higher rating of trust for university scientists than their counterparts. Another study of watershed residents in Oregon also found that university scientists received higher ratings of trust by respondents with higher levels of education (Wright and Shindler 2001).

Financial constraints, lack of time, unfamiliarity, and participation in a government program were found to be significant barriers to the adoption of restoration and other land

management practices, but these results are not unknown to watershed groups and validate long-held assumptions. Cost-share programs, efficient time-saving project management, and diverse outreach strategies may help mitigate some of these barriers. Landowners who are not willing to work with government agencies may decide to work with non-regulatory watershed groups, although some of the financing for restoration projects is from government sources.

Watershed groups play a strong role in promoting riparian restoration activities. The survey found that 10% of respondents trusted their local watershed group more than any other information source, and it is the third most trusted source of information. Watershed groups educate residents about watershed health issues and provide technical and financial assistance to landowners wanting to conduct watershed restoration activities. Technical staff promotes watershed group efforts through their professionalism and understanding of landowner priorities. Group education and outreach strategies, such as newsletters, workshops, demonstration tours, and special festivals and events, have influenced landowners to conduct streambank fencing and planting projects and other restoration activities.

By better understanding the distinctions among landowner preferences, watershed groups can target specific audiences within their watersheds. The use of a streamlined assessment of target audience characteristics could be one component in an outreach strategy developed to reach a particular segment of the community. Groups can conduct a brief survey or a small number of interviews that identify trusted sources of information and other important characteristics of their intended audience. Watershed groups can

also design and implement a broad base of outreach strategies that can reach diverse audiences, including landowners not currently on group mailing lists. A study of Oregon coastal residents found that 63% agree with the need to protect salmon and that there is support for a voluntary approach to salmon restoration (Smith et al. 1997). The challenge for watershed groups is to develop the most effective and appropriate strategies to promote watershed restoration given their limited financial and staff resources. Although this chapter has focused on watershed groups, understanding the range of information sources, motivating factors, and other influences on behavior are important for a variety of community-based, collaborative initiatives.

Table 7: Lessons for Watershed Groups

- Conservation adoption is often a response to a sense of moral responsibility to be a good land steward (e.g. "its the right thing to do")
- Friends, family and neighbors are important communication networks
- Diverse types of landowners tend to rely on different sources of information
- Education level affects who people trust for information
- Personalized outreach efforts have the strongest influence on landowners
- Newsletters are the preferred method of outreach
- Watershed groups appear to reach landowners with different types of land uses
- The professionalism and flexibility of watershed group staff are essential for effective working relationships with landowners
- Survey methods: costly approach to assess watershed resident concerns and preferences, but helpful in obtaining a broad cross-section and large number of respondents
- Interviews: time consuming approach to gather information from a small number of landowners, but provide important insights into the complexity of landowner decision-making

This chapter is co-authored with Dr. Richard D. Margerum. I conducted background research, developed written questionnaires, conducted interviews, and

analyzed data results for this project. Dr. Margerum provided advice and guidance throughout this process and contributed a few paragraphs discussing relevant literature, editing, and other advisory assistance. I conducted all the statistical analyses in SPSS and final analysis. Funding support for this project was provided by the Community-Based Collaboratives Research Consortium.

The next chapter provides further details about the landowner interviews and discusses the socio-political and economic processes that influence landowner motivations to adopt restoration practices. It also describes how landowners perceive their local watershed group's creation of a 'sense of community.'

Notes

¹ Snowball sampling is a type of nonprobability sampling that utilizes previously identified group members to provide the names of other group members (Henry 1990).

² This excludes 37 undeliverable mailings.

³ Raw responses include the following: agriculture = 199 responses, small woodlands = 162 responses, and rural residential = 201 responses. Some landowners mentioned more than 1 type of land use so it was necessary to exclude multiple responses from statistical analyses. Consequently, land use types used in data tables only include single responses to the question of primary land use.

⁴ For complete results, see Appendix B.

⁵ A multinomial logistic regression model was used because the dependent variable was a categorical variable.

⁶ Exp(B) or exponentiated Beta is the estimated odds ratio. A number greater than 1 is a positive relationship (more likely to occur) while less than 1 is a negative relationship (less likely to occur).

⁷ Seventy-nine percent of respondents affirmed their familiarity with OSU Extension, however 92% of respondents who answered this question were familiar with them (14% missing value for this question).

⁸ Agricultural landowners ranked OSU Extension Service and friends, family, neighbors as their most trusted source of information, while small woodland owners chose friends, family neighbors and professional associations, and rural residential owners selected OSU Extension, watershed groups, and then friends, family, and neighbors.

⁹ This variable distinguished between respondents that were employed and those that were retired.

¹⁰ This is not surprising. Landowners with college degrees are more familiar with university scientists and academic journals.

¹¹ A comparison of means test was conducted for each land use type and outreach method. The highest means for each land use type include the following: agricultural landowners mean rating for workshops was 2.27, small woodland owners rated demonstration tours at 2.35, and rural residential landowners rated newsletters at 2.26 (3=very helpful, 2=somewhat helpful, and 1=not helpful).

¹² Chi-square tests for land use type, income, and percent of income from land could not be utilized because they did not meet standard statistical requirements (i.e. there were too many cells with an expected count less than five).

¹³ Participation in a government program could include a state program (e.g. Oregon Department of Fish and Wildlife streambank fencing program) or a federal agency program (e.g. Natural Resources Conservation Service conservation program).



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CHAPTER IV

PRIVATE LANDOWNER PERSPECTIVES FROM WESTERN OREGON: LAND STEWARDSHIP, COMMUNITY, AND WATERSHED GROUPS

Chapter Overview

Private landowners play a pivotal role in watershed restoration efforts. This chapter explores how community discourse surrounding watershed restoration and other factors influence a landowner's decision to conduct watershed restoration practices. A written questionnaire was mailed to 900 riparian landowners in five watersheds in Western Oregon (52% response rate; $n = 446$), and 80 face-to-face interviews were conducted with landowners with varying amounts of familiarity with watershed groups. Research findings revealed that personal land ethics, economic circumstances, and community discourse about watershed restoration are significant elements in a landowner's decision-making process. A landowner's moral responsibility to be a good land steward and concern for future generations were key factors for a substantial number of respondents. Potential economic impacts of adopting a restoration practice involve not only the farm or small woodland operations, but state, national, and global policies and pricing structures. Community discourse surrounding a local watershed group includes communications among diverse social networks, and socio-political and organizational responses to watershed group efforts. These findings highlight the importance of

recognizing the multiple factors that influence land management decisions on private lands and the effects of local, state, national, and global processes on these decisions.

Introduction

Native salmon populations have decreased dramatically in the Pacific Northwest. Over the past century, Pacific salmon have vanished from 40% of their former breeding ranges and the remaining stocks are seriously diminished (National Research Council 1996). In the early to mid-1990s the State of Oregon supported the development of voluntary, locally organized watershed groups to encourage watershed protection and restoration efforts. Watershed groups evaluate watershed conditions and identify opportunities for protection and restoration. These groups include diverse stakeholders who represent local residents, industry, government agencies, and environmental groups. The goal of this research is to better understand the critical factors that affect a landowner's decision to adopt a watershed restoration practice and explore the role that watershed groups play in the decision-making process.

Landowner motivations for implementing conservation practices are complex and diverse. Existing research has shown that multiple factors influence the implementation of soil and water conservation measures (Camboni and Napier 1994), but despite over 50 years of research, understanding of these factors remains weak (Nowak and Korsching 1998). Some of these factors are situated at the farm or small woodlands level but are influenced by state and national policies and global economic processes. As Jarosz and

Qazi (2000, p. 9) state, “global does not exist externally to the local, but the global is realized locally through social structures and agency as it unfolds within and is shaped by particular landscapes.” National and international policies, such as food tariffs and subsidies or environmental regulations, can directly affect landowner decisions through a variety of socio-economic and political processes. Although this research project primarily focuses on landowner perspectives and community-level dynamics, there is a limited discussion of state, national, and global policies and the linkages between these different scales.

This chapter will provide a brief overview of relevant literature, research methods and results, elements in a landowner’s decision-making process, personal land ethics, and economic considerations. It also provides a detailed analysis of community discourse surrounding watershed restoration, interactions among community groups, and group representation.

Literature Overview

This chapter synthesizes material from several different bodies of literature with primary emphasis on collaborative natural resource management, community-based natural resource management (CBNRM), and political ecology. A distinction is made between collaborative natural resource management, which primarily highlights case

studies and analyses within the U.S., and CBNRM, which predominantly focuses on Third World countries. All three fields of research overlap with each other but make distinct contributions to the study of human-environmental relations.

Collaborative approaches to natural resource management have increased dramatically in the U.S. over the past decade. Collaborative natural resource management efforts, sometimes referred to as collaborative conservation or community-based collaboratives, have been defined by Conley and Moote (2002, p. 372) as "multiparty natural resource management projects, programs, or decision-making processes using a participatory approach." This body of literature contains a rich assortment of case studies, lessons for success, and critiques (Wondolleck and Yaffee 2000; Smith and Gilden 2002; Leach and Pelkey 2001; Kenney 2000; Singleton 2002; Coggins 2001; McCloskey 1996). The number of watershed initiatives in the Western U.S. has grown substantially since 1995 and includes widespread political and financial support (Kenney et al. 2000). This increase in the formation of watershed groups can be traced to a change from an adversarial, top-down approach to public participation in natural resource management to a more collaborative, grassroots approach (Griffin 1999). This new model of resource management focuses on collaboration, open participation, and consensus to advocate sustainable resource use.

CBNRM can be defined in different ways, but relies on the idea that local people have a greater stake and are more efficient in sustainably managing natural resources than state or corporate entities (Brosius et al. 1998). Issues of social justice are paramount within this body of literature and the focus has largely been on Third World countries and

development project planning and management. An emphasis on community and conservation pervades this body of research and the concept of 'community' has recently been analyzed in depth (Li 1996; Agrawal and Gibson 1999; Leach et al. 1999; Agrawal and Gibson 2001). Communities are described by Agrawal and Gibson (2001, p. 1) as "... complex entities containing individuals differentiated by status, political and economic power, religion and social prestige, and intentions." The concept of 'community' as a heterogeneous group of individuals with different interests and goals is critical to this research project. Diverse social networks within a community can have varying attitudes toward watershed group efforts, and rural landowners are influenced by community discourse on watershed restoration practices.

Political ecology is a growing field that has made important contributions to the study of human-environmental relations. After reviewing numerous definitions of political ecology, Robbins (2004, p. 12) synthesized this material into the following definition: "empirical, research-based explorations to explain linkages in the condition and change of social/environmental systems, with explicit considerations of relations of power." The emphasis on power relations is important to this study because watershed groups are situated within a local arena of pre-existing community groups and social networks with varying amounts of power, and this strongly influences community discourse and landowner opinions. Most of the studies on political ecology occur in the Third World, with only a limited number of studies in the First World. However, there is an emergent body of literature on First World political ecology (Willems-Braun 1997; Hansis 1998; Smethurst 1999; Wilson 1999; Nesbitt and Weiner 2001; Sheridan 2001;

McCarthy 2002; Walker 2003). Although Third World studies emphasize the local scale, McCarthy (2002) notes that First World studies in the U.S. tend to highlight the federal arena, and he mentions the need for exploring local, regional, national, and international scales and their interrelationships, while acknowledging the significance of the local political arena for research studies in the U.S. as well. Walker (2003) has recently argued for a regional approach that links local and global analyses and focuses on research at the meso-scale.

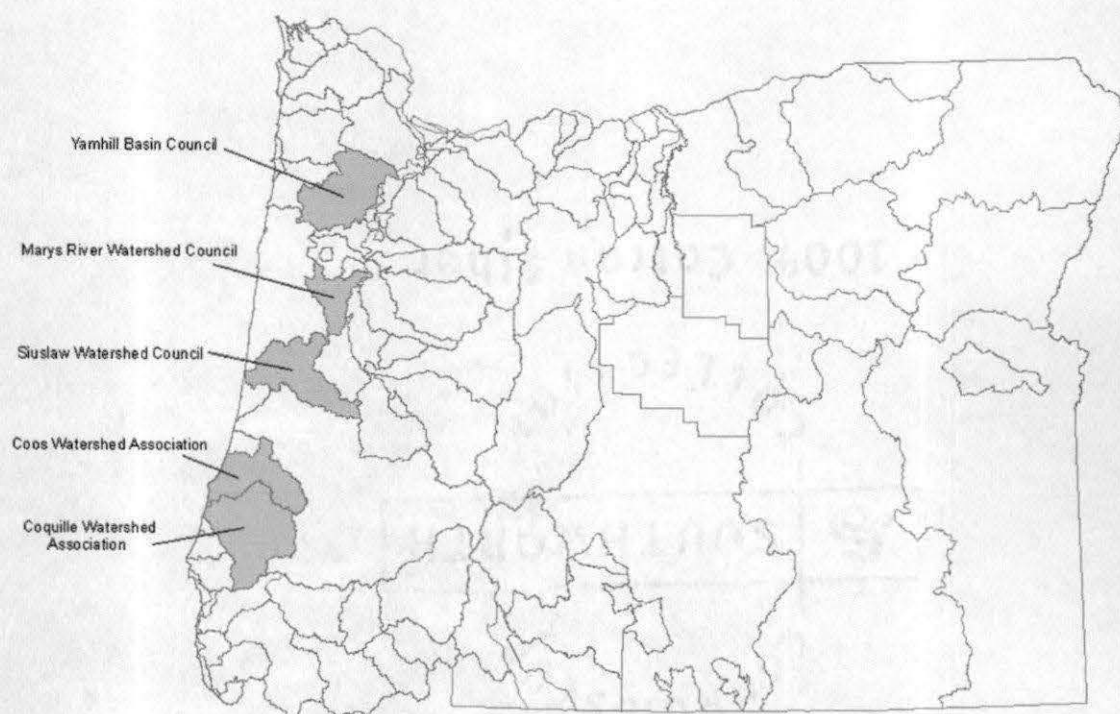
Research Methods

This study was conducted in collaboration with five watershed groups in Western Oregon: Coos Watershed Association, Coquille Watershed Association, Marys River Watershed Council, Siuslaw Watershed Council, and Yamhill Basin Council (see Figure 1). These groups were selected according to watershed characteristics, such as significant private land acreage and diverse land use types, as well as group attributes.¹ Each group has a unique approach, style of operating, emphasis, outreach strategy, and different relationships with other conservation organizations.

A mail-out survey and face-to-face interviews were conducted with private landowners in the five watersheds. The written questionnaire was developed according to a modified version of Dillman's (2000) Tailored Design Method and was mailed-out between August and November 2003. Nine hundred landowners were randomly selected from county property records and watershed group mailing lists. Half of the landowners

selected were taken from each list. Only riparian landowners (i.e. landowners whose property is adjacent to or next to a stream) were selected from county property records, and the majority of landowners selected from the watershed group lists owned riparian property.

Figure 1: Selected Watershed Groups



Map Courtesy Oregon Watershed Enhancement Board

Eighty semi-structured, face-to-face interviews were conducted with watershed group members and landowners not involved in watershed group activities between October and December 2003. A snowball sample² was used in the interview process.

Key informants and interviewed landowners provided the names for additional potential interviewees. Landowners were selected from this list of names in order to gain a balanced distribution of landowners who were familiar and unfamiliar with their local watershed group. Interviews were also conducted with watershed group coordinators, and the author attended watershed meetings and other events during this research.

Results

The overall survey response rate was 52% ($n = 446$).³ Responses were well distributed between landowners originally taken from a watershed group list (48%) and those from county property records (52%). However, only 23% of respondents self-identified as watershed group members. Primary land use types of the landowners were roughly equally divided between agricultural, small woodlands, and rural residential land.⁴

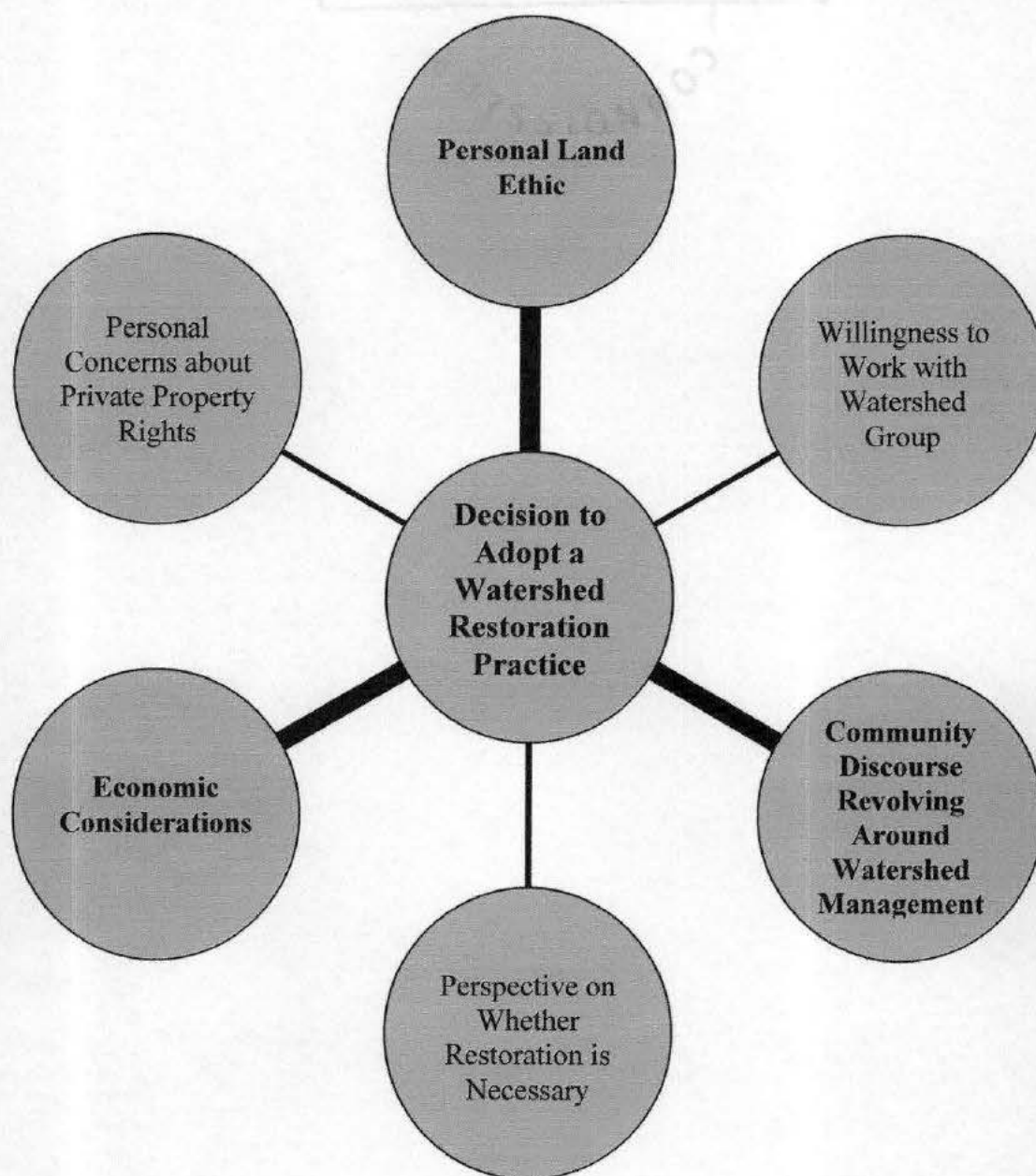
Interviews were conducted with landowners with the following characteristics: 1) landowners who had conducted watershed restoration projects, 2) landowners who had not implemented restoration projects, 3) landowners who were familiar with their local watershed group, 4) landowners who were not familiar with their local watershed group, and 5) watershed group board members (i.e. executive or steering committee members). Although the goal of this study was to interview generally equal numbers in each category, it was difficult to find landowners who were not familiar with their local watershed group. Interviews revealed that landowners who were thought to be unfamiliar

with their local watershed group were indeed knowledgeable about it. As a result, a smaller percentage of interviews were conducted with landowners who were unfamiliar with watershed groups.

Elements in a Landowner's Decision-Making Process

Numerous factors influence private landowners' decisions to adopt a new land management practice. Interviews revealed that a landowner's personal land ethic, economic situation, and response to community discourse revolving around watershed restoration are the primary elements in their decision-making process. Landowner views on private property rights, their willingness to work with a watershed group, and their perspective on whether restoration is necessary on their property play a part in this process as well (see Figure 2). Each element affects a landowner's decision to adopt or not adopt watershed restoration practices and there is overlap between some of the factors.

Figure 2: Model of Elements in a Landowner's Decision-Making Process



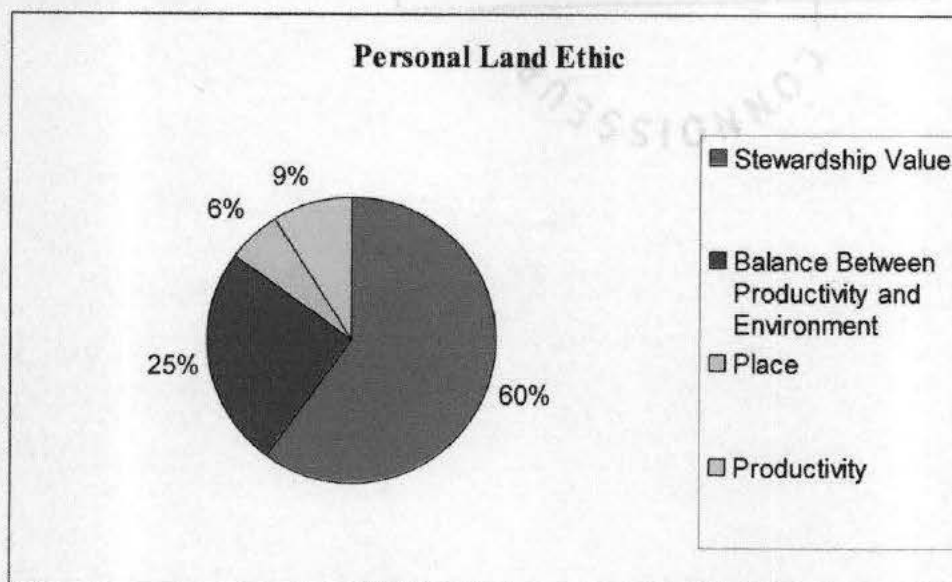
Personal Land Ethic

Results from the mail-out questionnaire found that respondents selected 'maintaining and improving the land for future generations' as their most important land and water management goal (for further discussion see Rosenberg and Margerum, unpublished manuscript). During the interviews, landowners were asked about their personal land ethic and 60% of the respondents described a moral obligation to be a good steward of the land (see Table 1 and Figure 3).⁵ In addition, ninety-percent of landowners who had conducted restoration activities mentioned this as a critical factor why they implemented these activities. Other research has also found that landowners want to be good land stewards (Corbett 2002; Rickenbach and Reed 2002; Ryan et al. 2003; Dutcher et al. 2004).

Table 1 - Personal Land Ethic⁶

Moral obligation to be a good steward of the land (60%)	"it is my personal responsibility to give back to nature" "you take care of the land and it will take care of you" "if you own land you owe a little something back" "try to be a good steward of the land" "stewardship means passing along as good or better condition"
Importance of 'place' (6%)	"place – its your home, where you grew up – your roots" "my family has been here for 100 years, I don't want to leave"
Balance between productivity and environmental considerations (25%)	"balance between economics, aesthetics, wildlife and water quality" "try to find a balance between 'use' – farm use, pasture, animals and 'preserve' land"
Improve productivity (9%)	"trying to make it [the land] as useful as I can"

Figure 3: Personal Land Ethic Categories



Although 'being a good steward' was often expressed by interviewees there was little interpretation of what this meant. One-eighth of the interviewees specifically mentioned Leopold's (1949) land ethic and how it incorporates respect and admiration for the land, plants, and animals, but the remainder did not elaborate on their views. According to Worrell and Appleby (2000) the concept of stewardship is currently being used more frequently in natural resource management and their definition follows: "stewardship is the responsible use (including conservation) of natural resources in a way that takes full and balanced account of the interests of society, future generations, and other species ..." (p 263). This definition may take into account a broader spectrum of concerns than what some landowners envisioned when they used the term 'stewardship' but the importance of future generations is substantiated by the survey and interview

results. One-fourth of the interviewees mentioned the need to balance a utilitarian 'use' of the land and environmental considerations, while a smaller percentage mentioned the importance of 'place, or improving land productivity by itself.

Private Property Concerns

Even though landowners highlighted the importance of their land ethic when they made land and water management decisions, they also expressed concerns about private property rights. In particular, agricultural and small woodland owners often discussed their frustration with "too many government controls, too many regulations." Another quote often heard during the interviews was "landowners don't like to be told what to do." These concerns about protecting private property rights are similar to other research findings (Rickenbach and Reed 2002) and can affect whether a landowner decides to work cooperatively with a watershed group. However, over 80% of the landowners who implemented watershed restoration projects also discussed their private property concerns, but they did not feel that a fence or culvert paid with watershed group, state, or federal monies was a threat to their property rights.

One-quarter of the responses to the open-ended question at the end of the mail-out survey also described concerns about private property rights or criticisms of government regulations, but these concerns did not strongly influence their response to a question about motivations for land management decisions (see Table 2). Survey respondents were asked to select the most important factor when they made land and water

management decisions and Table 2 compares the overall survey response rate to the response rate for landowners that had specifically described their concerns about private property rights or criticized government regulations or policies. Although there are slight differences between several of the variables, the response rate for selecting the maintenance/ improvement of property for future generations was very similar. Once again, this demonstrates that landowners can express strong concerns about private property rights or the overabundance of government regulations but still prioritize maintaining and improving the land for future generations.

Table 2: Motivation for Land Management Decisions - Comparison Between Survey Respondents Concerned About Private Property Rights and Overall Study Response Rate

Motivation	Private Property/Govt. Concerns (N=41)	Overall Survey Response (N = 380)
increase productivity and profit	19.5%	11.8%
improve wildlife/fish habitat	9.8%	17.9%
improve water quality	7.3%	8.2%
improve scenic beauty	0%	2.6%
maintain/improve land for future generations	43.9%	45.8%
improve property value	7.3%	10.3%
other	12.2%	3.4%

For a minority of interviewees (i.e. approximately three percent) the fear of government repercussions from having a technical expert on their land was so strong that they never let anyone on their property. These landowners were afraid of regulatory

actions from the Federal Endangered Species Act and the Clean Water Act. One landowner mentioned that "people are not allowed on my property – no one tells me what to do" and "if you take federal government money it allows a third party to gain a vested interest in your land." These landowners were not interested in working with watershed groups or any other organization but were still concerned with maintaining good management practices. A few interviewees mentioned that they went to land management workshops sponsored by groups, such as the Oregon State University (OSU) Extension Service or the Soil and Water Conservation District (SWCD), but never let anyone on their property. They believed that it was important to be up-to-date on land management practices, but they implemented these practices on their own.

Despite the voluntary, non-regulatory nature of watershed groups, much of the money for watershed restoration projects comes from the Oregon Watershed Enhancement Board (OWEB) or the Natural Resources Conservation Service (NRCS). These monies require contracts and management guidelines. For example, the distance a fence can be placed by a stream accompanies state and federal monies. However, private, non-profit funds do not usually have these limitations but are far less available to watershed groups. Contractual agreements are even an issue for some board members who mentioned their eagerness to complete their contractual agreements so that 'outsiders' would not be coming on their land. Board members were not concerned with regulatory issues but just liked keeping their management activities to themselves. Watershed groups work with willing landowners and concern over private property issues, including contractual agreements and mandated project criteria, can influence

landowner participation. Community discourse about watershed groups is a critical element for some landowners because if they receive misinformation about potential threats to their private property rights this could deter them from working with these groups. For example, one interviewee was starting to communicate with his local watershed group about potential watershed restoration projects when his daughter claims to have read a newspaper article about private property rights being affected by a land management program. She then influenced her father not to participate with the local watershed group. It turned out that the article had nothing to do with the watershed group, but this misinformation kept the interviewee from conducting a restoration project.

Willingness To Work With Watershed Group

A landowner's willingness to work with their local watershed group depends on a number of factors. Trust, respect, and familiarity with group efforts can influence participation. Friends, family, and neighbors were found to be the most trusted source of information when landowners make land and water management decisions (Rosenberg and Margerum), and this can directly affect a landowner's willingness to participate in group programs. If friends, family, or neighbors boasted about their restoration project or if a landowner visibly saw the beneficial outcomes of a neighbor's project, this could motivate a landowner to conduct a similar project on their property. Interviewees who had worked with their local watershed group also revealed that their initial contact with group staff was favorable and this motivated them to learn more about

watershed group efforts. The collaborative characteristics of groups were important to approximately one-third of the landowners who had conducted restoration practices, but the remaining two-thirds were not familiar with group processes or stakeholder participation. Some board members and active participants had conducted restoration projects on their own land while others had not. Those that had not undertaken a project stated that there were others in greater need, they did not want to modify their personal goals in order to obtain funding, or they were still thinking about conducting a project. This illustrates that there are different levels of participation within groups (e.g. board member or active participant in meetings or events vs. willingness to implement a restoration project). A few interviewees mentioned that they do not work with any group because they had the knowledge and expertise to manage their land without input from outside sources and they liked to do things their own way. Community discourse and private property concerns can overlap with a landowner's willingness to work with a watershed group, but the interviews suggested that this classified as a category of its own.

Economic Considerations

A landowner's economic situation is an important element in the decision-making process of whether to implement watershed restoration activities. One review of the extensive soil and water conservation literature found that economic incentives were a significant factor in the adoption of these practices (Camboni and Napier 1994). During the interviews over 90% of agricultural and small woodland owners mentioned the

importance of determining how the adoption of a new land management practice would affect their current level of productivity and profit. Survey results also found that landowners who receive over 25% of their income from their property placed a higher value on productivity and profit than their counterparts (for further discussion see Rosenberg and Margerum). If a landowner is dependent on income from their property and they are barely breaking even it may be unlikely that they will implement a watershed restoration practice. Although conservation easements provide financial benefits, interviewees mentioned that participation in these programs can cause friction between neighbors and other community members (e.g. some landowners do not believe that land should be taken out of production). On the other hand, cost-share programs were well received by many of the interviewees

It is also important to recognize that a landowner's economic circumstances are affected by local, state, federal, and global processes. The level of federal subsidies for their operation, and local, regional, and global markets (for trees, cows, sheep, and agricultural products) also influence landowner decisions about management practices. As one of the survey respondents stated, "...They [farmers] are paying 2003 prices for feed and supplies. They [farmers] are paid at 1970 prices for our product." It is not surprising that global food markets can influence landowner profit margins and land management activities. International trade agreements, such as NAFTA, also affect pricing structures and if the costs of raising cattle exceed market prices over an extended period of time, a landowner may decide to change management regimes. Many interviewees within two watersheds in this study described how the loss of local dairies

was the direct result of government regulations aimed at dairies in the Midwestern U.S., and the widespread economic demise of this industry affected the everyday lives of residents within these communities. Not only were the immediate families put out of work but it changed local businesses dependent on dairy operations and community social structure. Rural residential landowners may also be affected by global processes when their economic situation changes, whether related to stock market slumps or employment layoffs, and this could potentially influence their land management decisions. Economic considerations play an important role in a landowner's decision-making process, but it is one of many factors.

Perspective on Whether Restoration is Necessary

Riparian landowners will not be willing to adopt watershed restoration activities unless they recognize that their property is in need of restoration. Previous experience with riparian conditions may predispose a landowner to continue past activities because it was what their parents and grandparents had done. For example, landowners may maintain cleared riparian areas because they have always been in that condition and/or they like the neat and tidy appearance (Dutcher et al. 2004). During the interviews, several landowners mentioned that they had planted trees along their stream for several decades and they felt that their riparian areas were in good condition. Since this study did not conduct a stream site analysis, there is no way to know if landowner opinions would be shared by technical experts. In order to assess riparian conditions a landowner

must either be knowledgeable about this topic or be familiar with the availability of technical experts to assist them. Once landowners are aware that watershed restoration practices could benefit their property they could then make a decision about adopting such practices.

Community Discourse Revolving Around Watershed Restoration

Community discourse is influenced by a multitude of factors and is not just about communication. Local community institutions and politics, state policies, federal agency mandates and funding mechanisms, and global economic processes influence community discourse about watershed restoration and consequently affect landowner decisions about restoration practices. Of special interest to this research project is whether watershed groups are creating a sense of community among watershed residents and how participants and non-participants view groups and their ability to create a community within existing socio-political institutions. The following topics are discussed in more detail: 1) community, 2) images of community (Li 1996), 3) interaction between community groups, 4) group representation and equality of benefits, and 5) containment (Few 2001).

Community

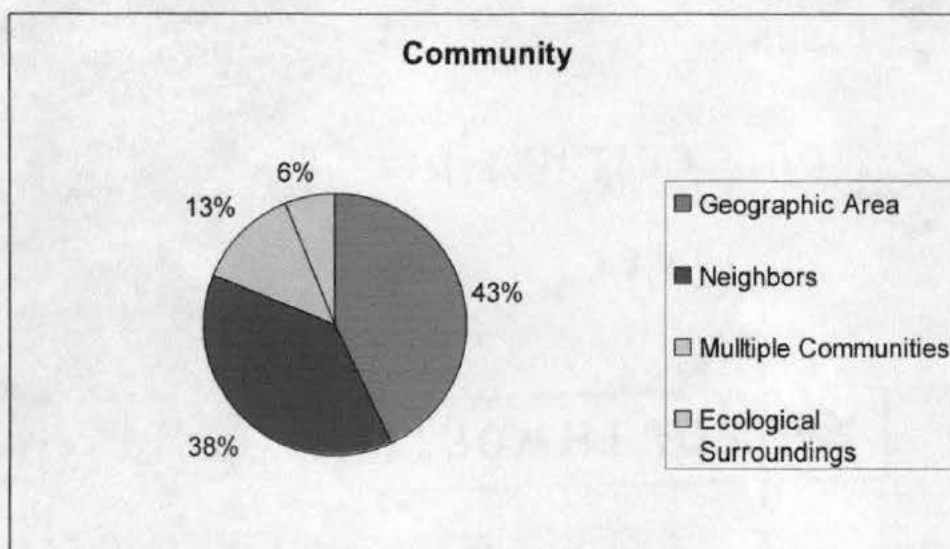
This chapter does not focus on the meaning of community, but does examine how watershed residents interpreted the term 'community' and watershed group creation of a 'sense of community' among participants. 'Community' can be defined in many different ways and for many distinct purposes. The traditional definition of community refers to "a social network of interacting individuals, usually concentrated into a defined territory" (Johnston et al., p. 80). However, other definitions are more useful in relation to collaborative natural resource management. Duane (1997, p. 772) distinguishes between three types of communities: "1) communities of *place*, which are tied to a physical space through geography; 2) communities of *identity*, which are tied to each other through social characteristics but may transcend place; and 3) communities of *interest*, which may have commonalities in how they relate to a particular ecosystem or resource as beneficiaries of that place or contributors to its condition." He acknowledges that they can overlap and/or conflict with each other and that it is necessary to reconcile communities of interest with communities of place. Citizens build community through their interest in common concerns, and people gain a sense of belonging from the different communities that they are affiliated with (Cortner and Moote 1999; Putnam 2000). Communities of place have been the focus of many collaborative efforts because the common inhabitation of a specific place is the motivation for people to work together to find solutions to local resource-based problems (Kemmis 1990).

The community-based, collaborative nature of watershed groups provides an opportunity for landowners to build community through group meetings, workshops, and restoration activities. In other words, landowners are building social capital. Putnam (1993, p. 167) describes social capital as the “features of social organization, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated activities.” Watershed groups are a forum for community members to build trust and reciprocity and this can lead to the implementation of restoration projects.

Before exploring whether watershed groups were creating a ‘sense of community’ it was important to ask interviewees about their interpretation of what ‘community’ meant and whether they felt a ‘sense of community’ among other residents in their watershed. Landowners described a variety of meanings for ‘community’ but they centered on four general themes: geographic area, neighbors, common interests, and ecological surroundings (see Table 3 and Figure 4).⁷ Approximately 43% of the responses focused on geographic terms, 38% on neighbor relations, and 13% on multiple communities and communities of common interest. A description of their local ecological surroundings was only mentioned by a fraction of interviewees. When landowners were asked whether they felt a ‘sense of community’ among other residents in their watershed, 86% responded that they felt a sense of community in their immediate local area. These responses included “if you are in trouble someone will help you” or other notions of neighbors helping each other. The geographic notion of a watershed was only known to landowners who were active participants in their local watershed group.

Table 3 – Interpretations of ‘Community’ - General Themes

Geographic Area (43%)	“place where you live” “the area and people that live within a certain vicinity that you live and work with every day”
Neighbors (38%)	“your neighbors” “neighbors helping neighbors” “a group of people who help each other out when the barn burns”
Common interests – multiple communities (13%)	“people that have common interests” “various kinds of community – groups of communities, farmer community and town community, community of like thinkers”
Ecological surroundings (6%)	“whole ecological community of animals – how everything fits together, including organisms”

Figure 4 – Interview Responses to ‘Community’

Watershed groups include a diverse set of stakeholders who have different values and land management goals. However, board members and other group participants focus on their common interest of improving watershed conditions. This common interest brings them together and groups in this study have implemented numerous

watershed education and restoration projects. This research project investigated whether groups were creating a 'sense of community' among participants and how both participants and non-participants viewed the construction of this 'sense of community.' The interviews revealed that only a little over half of the interviewees knew enough about their local watershed group to answer this question and that 90% of responses affirmed that groups were creating a community. Many believed that this community was comprised only of board members and other active participants but that over time a larger group of residents would become part of this community. The 10% who disagreed with this thought that the watershed group was supposed to solely focus on fish restoration and education activities. No one had negative views of the idea that a 'new community' was forming or felt it was inappropriate for the group to promote this activity. Several board members mentioned that they had extended their sphere of friends through their participation in group activities and they now interacted with landowners they would not normally socialize with. Others commented that they did not socialize outside of group functions but they did have a better understanding of different perspectives on land and water management issues.

Interviewees who were familiar with their local watershed group were also asked whether they thought that the group's creation of a sense of community was intentional or merely a by-product of group activities. Close to half of them answered this question, and nearly 50% thought that it was an intentional goal of the group. One-quarter of those that responded felt that it was a by-product of other group activities and one-quarter thought that it was both an intentional goal and a by-product. Four of the five watershed

group coordinators agreed that creating a community of residents interested in promoting watershed health was an intentional goal of the group. None of the interviewees mentioned a negative viewpoint about this creation of a new community centered around watershed restoration.

Images of Community

Communities should not be viewed as being homogeneous, and different segments of the population can have divergent views on what 'community' means. The idea that communities are harmonious entities that are composed of a homogeneous social structure has been disputed (Li 1996; Agrawal and Gibson 1999; Agrawal and Gibson 2001). Disparate groups within communities have different views about natural resource management. These groups have distinctive roles in the local political arena and have varying amounts of power in the discourse and management of natural resources. The five watershed groups in this study include community members that represent timber interests, environmental organizations, fishing groups, government agencies, landowners, and others. These stakeholders come from different backgrounds, have different values, and belong to different subgroups within the local area. Power relations within these watershed groups has the potential to influence how landowners perceive group efforts, and it can affect landowner participation in restoration projects.

Applying theoretical concepts developed for Third World contexts can be a challenging pursuit but can offer valuable contributions to First World situations.

Li (1996) describes how different representations of community in Central Sulawesi, Indonesia affect property relations and can be strategically used by outside groups, government officials, or international NGOs to promote their resource management agendas. The idea of constructed 'images of community' that can be deliberately invoked to pursue resource management goals is a useful approach to exploring watershed group interactions with community members and state agencies. Participants and non-participants are likely to be influenced not only by official group activities, such as education and outreach programs, but by how informal and formal local leaders respond to watershed group activities. Many landowners who participated in the survey and interviews have lived in their community for a long time and were very familiar with different social networks and local politics. Li (1996, p. 510) states that "the partial overlapping of local history, landscape, kinship and biography provide a richness of shared and separate experiences which can be invoked by individuals to achieve specific outcomes..." This research found that watershed group members have created a new community within existing socio-political structures and have the ability to appeal to shared experiences with watershed residents. For example, nominating a well respected landowner to a group leadership position can send a quiet message to community residents that the goals of watershed groups are valuable and this can ultimately influence participation. Community leaders who support group activities can have limited or widespread effects on community dynamics.

Watershed groups were developed to promote watershed health and include diverse stakeholders within each watershed. Despite the heterogeneity of stakeholders and

subgroups within local communities, there is little controversy about group formation, representation, or activities. Both participants and non-participants spoke favorably about group activities. This is probably due to the voluntary, non-regulatory nature of these groups. Different subgroups within each community have divergent views of resource management but this does not appear to affect perceptions of group activities. For example, some landowners want to protect their land in perpetuity and put it into a land trust while other community members want to keep all currently productive land (i.e. agricultural land or small woodlands) in production. Even though there is disagreement on how resources should be managed within the watershed, these different perspectives do not inhibit watershed group activities or community discourse about watershed restoration. Community members with both types of views participate in group efforts. It also appears that participants and non-participants do not have strongly different images of community.

State policies have had a direct influence on watershed group priorities and actions. The State of Oregon encouraged watershed groups to provide local leadership in watershed restoration and over the years guidelines and policies have been instituted to govern group formation and activities. Although local governments (e.g. county commissions) have had approval of group formation, state policies dictate funding priorities. The goals of the OWEB Board and the State Legislature directly shape the types of projects implemented at the local level, and can include different goals than what groups first envisioned. At least one group in this study has had to change their focus in

order to continue receiving OWEB funding and this could potentially influence how community residents perceive this group and its constructed image of community in the future.

Interactions Between Different Community Groups

Watershed groups have altered community dynamics within watershed boundaries. SWCDs have been strongly affected by the emergence of watershed groups and there are varying types of relationships between these two groups. Two of the five watersheds in this study have strong relationships with SWCDs and use this pre-existing organization as their financial administrator. In these cases there is little discord between these two groups and consequently limited fractionalization within the watershed. On the other hand, the three other groups have different relationships with their local SWCDs. Interviewees mentioned that there are competing interests between these groups over funding and participation. This influences community discourse because landowners then have to occasionally choose which group they support. Competition over funding can cause friction and affects how different segments of the population interact with each other. Some interviewees revealed that they supported both groups but noted that they had stronger ties or more in common with one group. Other landowners mentioned that they were closely aligned with one group but had no connection to the other. Additional community interactions exist, but the SWCD relationship is the most pertinent to this discussion.

Group Representation and Equality of Benefits

Watershed group representation is important to community discourse and landowner perception of watershed restoration practices because if landowners believe that these groups adequately represent community stakeholders and there is equal access to restoration funding this can favorably influence their decision to become involved with this group. Research has found that groups with large numbers of stakeholder types report greater planning and restoration accomplishments than groups with fewer stakeholders (Koontz and Johnson 2004). Watershed group steering committees and executive boards usually include from 15 to 25 different stakeholders. Board members are elected or appointed to represent a particular stakeholder group and are supposed to be a liaison with this group. Although each watershed group includes different stakeholders, state policies and local county commissioners were directly involved in the designation of stakeholder representatives.

Landowners who were familiar with their local watershed group were asked whether they felt that their group included all the stakeholders in their watershed. Over 95% of the interviewees responded that they believed that group representation was adequate but there were one or two missing stakeholders. Four of the five watershed groups had difficulty in maintaining a representative from large-scale traditional agriculture. At the beginning stages of group development there were an adequate number of traditional agriculture representatives but over the years it was challenging to keep this position on the board filled. Small-scale agriculture representative slots on the

board were easier to fill and there was usually a SWCD representative as well. During the interviews with traditional large-scale farmers this subject was discussed, and farmers mentioned that they had nothing against the watershed group but they were busy and didn't have anything to gain by participating in the group (i.e. they had no direct incentive for participation). The limited amount of participation by large-scale agriculture is an issue for watershed groups in the Willamette Valley because agriculture is an important stakeholder. However, this stakeholder group did not respond negatively toward the watershed group and a few comments were quite complimentary about their activities. Concerns have been raised about the adequacy of stakeholder representation and the role of rural elites in community-based initiatives (McCarthy 2003), but this does not seem to be an issue for landowners who were interviewed. A few landowners admitted that watershed board members were a self-selected group of individuals but no one mentioned that this was problematic. Nevertheless, individual board members have varying amounts of respect and power among other community residents and this can affect how other landowners perceive watershed group efforts.

Even though watershed groups usually use a consensus decision-making model and include a diverse set of stakeholders, power relations among board members are not equal. During the interviews participants were asked about how the board operated and several landowners mentioned that private landowner opinions were not respected in the same way as agency personnel. Landowners felt that their personal experience and hands-on knowledge of land management practices were dismissed by "book-trained biologists." This situation was mentioned in three of the five watersheds. This

perspective was only mentioned by a handful of interviewees so it is difficult to determine how widespread this concern extended, and other board members denied the existence of this situation. Since agency staff and timber representatives get paid for attending group meetings and events there is also a distinction between them and landowners who participate without pay. These differences were only mentioned by a few interviewees but it is likely to be strongly felt by those willing to give up their time to participate in the group.

Watershed group participants and non-participants were asked if they believed that the development of a sense of community by the group benefited everyone equally or if some individuals benefited more than others. The majority of responses described how landowners who participate benefit more than those that do not participate. The widespread belief that participants benefit more than non-participants was an expected outcome because they were knowledgeable about group activities and restoration opportunities. Again, the lack of negative responses to this situation highlights the acceptance of this situation from both participants and non-participants. Many interviewees stated that there was equal access to group activities and programs and that everyone, including fish, benefited indirectly from group projects.

Containment

Watershed groups play a key role in the dissemination of information and implementation of watershed restoration practices. Few's (2001) description of

containment and counter-containment processes of public involvement planning efforts is relevant to this discussion because watershed groups are the primary agents for promoting restoration practices. Although Few's research refers to a formal planning program implemented by planning agencies and watershed groups are voluntary, non-regulatory organizations, there are similarities in some of the underlying power relations among community members and adaptive socio-political processes that occur.

Containment refers to the following: "avoidance of conflict; exclusion of dissent; and control over both knowledge and procedure" (Few 2001, p. 116). These activities can be implemented by planning organizations to strategically push through resource management plans without genuine public involvement in the planning process. Even though watershed groups use a consensus decision-making model that promotes open discussion of resource issues, some scholars have stated their concern over the potential use of coercive tactics by powerful stakeholders in collaborative initiatives (Coggins 2001; Kenney 2000; McCloskey 1996).

Containment action #1: avoidance of conflict. In three of the five watershed groups board members mentioned that controversial issues were avoided to promote group cohesion and discourage potentially fractious deliberations. The "low hanging fruit" argument has also been used by critics of collaboration to refer to situations where groups successfully resolve easy problems and avoid those with difficult or contentious solutions (Kenney 2000). Although interviewees stated that controversial topics were avoided this approach did not entirely limit the discussion of contentious issues during general watershed group meetings. In addition, no organized community opposition or

counter-containment actions to obstruct watershed group activities ever formed. The voluntary nature of these groups probably hinders any such actions because landowners know that all restoration activities are completely voluntary and most interviewees were supportive of group efforts. Consequently, some watershed groups do intentionally avoid controversial topics during board meetings in order to gain wide support for improving watershed health, but appear open to listening to potentially controversial issues raised by watershed residents.

Containment action #2: exclusion of dissent. Board members mentioned that dissenting opinions about watershed group activities were discussed during board meetings, but this did not always stop group plans or projects. Dissent was not excluded from watershed group meetings but a few board members mentioned that on occasion a board member chose not to vote because they disagreed with the issue at hand. In these instances the board member discussed reservations about the project or issue and then abstained from voting because they did not want to be the lone dissenter. In at least one of the watershed groups a single board member repeatedly dissented from the rest of the group and eventually the group designed a maneuvering strategy to go forward with projects without bringing issues to a board vote. Still, in many instances dissenting opinions were welcome and watershed group members respected these differing opinions and worked towards a compromise or did not go through with a specific project. Interviews revealed that opposing viewpoints from non-board members attending watershed group meetings have been discussed, however, time constraints can limit opportunities for dissent (i.e. the agenda for group meetings is tightly controlled). As

previously mentioned, there are landowners who may disagree with specific watershed restoration practices, but less than five percent are not supportive of watershed group activities in general. Even landowners who have limited knowledge of group activities or who believe that current environmental regulations are sufficient to protect fish populations and water quality supported the goals of these groups. In general, dissent is not excluded but watershed groups or individual board members have developed mechanisms to disempower dissenting opinions.

Containment action #3: control over knowledge and procedure. Watershed groups do play a role in controlling knowledge and procedures about watershed restoration but there are differing opinions among board members about the appropriateness of certain restoration techniques and there are several state and federal agencies who also implement restoration practices (e.g. Oregon Department of Fish and Wildlife, NRCS, U.S. Fish and Wildlife Service). Information about watershed restoration activities is also readily available from the OSU Extension Service, a highly trusted source of information for landowners (Rosenberg and Margerum; Wright and Shindler 2001) and from academic and industry publications. Consequently, landowners have open access to a multitude of informational materials, but many do not have the time or inclination to investigate these sources. Watershed groups are often considered to be a reliable source of technical expertise in the area of watershed restoration and landowners interested in conducting restoration often contact them for assistance in restoration activities. However, watershed groups tend to rely heavily on agency staff expertise and academic research rather than industry findings or landowner experience.

A few board members mentioned that when they disagreed with agency staff about the use of specific land management techniques in certain landscapes they felt that their practical knowledge was dismissed by other board members who relied on the “book-trained” agency biologist.

Watershed groups do plan outreach and education activities and conduct monthly meetings, but they are one of several organizations that promote educational activities focused on watershed restoration. The OSU Extension Service and local SWCDs also conduct workshops and other events to promote restoration efforts. From the limited number of interviews, it did not appear that watershed groups controlled knowledge or procedures, but they did conduct educational activities to promote their goal of improving watershed health. Funding sources also played a role in these processes because groups rely heavily on government grants. Consequently, state and federal agencies can strategically determine what types of projects are to be funded and this controls the kinds of projects implemented by watershed groups. A few groups have received small amounts of non-governmental funding but these amounts are minor in comparison to agency funding. Still, there is little controversy about the importance of implementing watershed restoration practices and limited disagreement about what types of restoration practices should occur. The interviews did not reveal that watershed groups strategically manipulated or limited the circulation of information about watershed restoration and staff provided both the advantages and limitations of restoration practices. There was

also no evidence that groups tried to control potentially troublesome opposition within the community. Watershed groups appeared to actively support open discussions about watershed restoration.

Overall, interviews revealed that Few's (2001) discussion about containment actions applied within a very limited context and did not represent watershed group planning efforts in general. Few's case study focused on the relationship between agency planners and community stakeholders and involved regulatory actions. The voluntary and non-regulatory attributes of watershed groups probably accounts for the disparity between these planning efforts. Watershed groups adhere to the consensus decision-making process on most occasions and try to foster open communications with watershed residents about watershed health. Although it does appear that some groups attempt to avoid controversy and limit the effects of dissenting opinions on occasion in order to broaden support for their goals, they do not try to neutralize opposition or forcibly control the circulation of information. Improving watershed health is not contentious for many watershed residents and consequently watershed groups that strive to promote it do not need to control the planning process to meet their goals.

Conclusion

Landowners include a multitude of factors when they make land and water management decisions. Land stewardship values, private property concerns, economic considerations, and community discourse about watershed restoration influence

landowner perceptions and willingness to implement watershed restoration practices.

These components interact within evolving local, state, national, and global political arenas that can promote or deter restoration activities. Data from interviews and mail-out questionnaires revealed that landowners felt a moral obligation to be good land stewards and manage their property for future generations. At the same time, many landowners discussed their concerns over government regulations and the need to protect their private property rights. Economic circumstances were particularly important for agricultural and small woodland owners, and landowners were receptive toward cost-share projects.

Community discourse revolving around watershed restoration includes local, state, and national policies that influence landowner perceptions of watershed groups' creation of a 'sense of community' among watershed residents. Interviews revealed that watershed residents have favorable views of group activities, and do not have discord with stakeholder representation, planning strategies, or their constructed 'image of community.' In general, the voluntary and non-regulatory nature of watershed groups has eliminated or severely limited the development of contentious resource conflicts that has occurred in other locations. There is no doubt that this was the intention when the State of Oregon promoted this collaborative approach to improve watershed health. Still, watershed groups have affected socio-political and economic relationships within watersheds and this can influence the dissemination of information and support for these groups. Putnam (2000) has reported on the decline of civic engagement in the U.S. and

explains how single purpose organizations are supplanting multi-purpose organizations.

Watershed groups are a good example of this newly emergent form of civic engagement, and exemplify how diverse stakeholders can pursue common interests.

Notes

¹ Criteria included the following: 1) they have a significant amount of private land, 2) they have a similar cross-section of private land uses, 3) they are in two ecoregions, which each have similar climate, geology, and vegetation, 4) they have used a range of educational and outreach programs, and 5) the groups are in a mature stage of development.

² Snowball sampling is a type of nonprobability sampling that utilizes previously identified group members to provide the names of other group members (Henry 1990).

³ This excludes 37 undeliverable mailings.

⁴ Agriculture = 199 responses, small woodlands = 162 responses, and rural residential = 201 responses. Some landowners mentioned more than 1 type of land use.

⁵ These categories were developed after reviewing the interview data. Each interview was then analyzed to determine which response category was best suited for the landowner's remarks. Although some landowners mentioned more than one category, the primary focus of their remarks was interpreted by the author.

⁶ This table was compiled by categorizing interview responses. These four topics appeared to be the most common and then a systematic review was undertaken to place responses into the different categories.

⁷ See Note 6.

CHAPTER V

CONCLUSION

“There is an almost mythic connection with Salmon among the people who live in the Pacific Northwest. It is a powerful connection that cannot be overestimated – the power of history, the power of identity, the power of the past’s promise to the future” (Governor Kitzhaber 2000 speech).

Governor Kitzhaber and his staff designed the Oregon Plan for Salmon and Watersheds, and its precursors, with the intention of promoting salmon restoration and avoiding a major resource conflict. Watershed groups provide a local forum for watershed residents, government officials, industry representatives, environmental advocates and others interested in watershed health to discuss and implement watershed restoration activities with limited rancor. The voluntary and non-regulatory nature of watershed groups has limited the development of contentious relations among divergent stakeholders interested in watershed management. This is in sharp contrast to the polarization of communities that occurred during the Northern Spotted Owl controversy.

Collaborative natural resource management is widely supported by government agencies, local communities, and citizens. The tremendous growth in collaborative watershed initiatives demonstrates that this approach to resource management has something to offer that previous forms of management lacked. The Oregon Plan for Salmon and Watersheds provides a flexible, collaborative framework that allows local citizens the opportunity to assimilate local conditions into the implementation of a state-wide initiative. The inclusion of genuine public involvement is considered an asset of

this approach. Voluntary watershed groups have conducted numerous watershed restoration and education programs and they receive support from a diverse set of stakeholders within community settings. This is not to say that there are not problems with the voluntary approach to the implementation of conservation measures or that there is enough funding to satisfy everyone. Voluntary restoration, even with the existence of federal and state laws, does not guarantee that the most suitable restoration project site is available for restoration. Watershed groups have financial constraints and OWEB receives far more grant applications than it can support. There is also concern about what will happen when Measure 66 runs out and needs to be re-approved by Oregon voters in 2014.

This dissertation examined the key factors that motivate private landowners to adopt watershed restoration practices and explored the role that watershed groups play in the decision-making process. Personal land ethics, economic circumstances, and community discourse about watershed restoration were each found to be significant factors in this process and there is no hierarchy between them. Many landowners strive to be good land stewards and feel a moral responsibility to take care of their property. They also feel a strong need to maintain and improve their land for future generations. Despite these beliefs, many landowners are also concerned about private property rights and government regulations. However, the greatest barriers to implementing watershed restoration practices are financial constraints, lack of time, and unfamiliarity with these types of programs. Landowners are generally supportive of watershed groups' creation of a 'sense of community' among watershed residents and believe that community

stakeholders are adequately represented in group efforts. Although watershed groups have attempted to avoid discussing controversial topics and limited the effect of dissenting opinions on occasion, they have maintained an open dialogue with watershed residents and they do appear to listen to opposing viewpoints.

These findings highlight the importance of understanding landowner preferences and motivations and acknowledging the heterogeneity of landowners and watershed groups. Agricultural, small woodland, and rural residential landowners trust different sources of information when they make land and water management decisions and they prefer distinct types of outreach methods. Landowners who rely on their property for financial income place a higher value on productivity and profit than landowners who solely rely on outside income. These differences illustrate why watershed groups should consider the use of a streamlined assessment of target audience characteristics when they are developing outreach strategies. Groups can conduct a brief survey or small set of interviews that identify the important characteristics of their intended audience. Landowners in different watersheds have distinct perspectives and it would be valuable for watershed groups to know who the trusted sources of information are for each subgroup of the population and other site-specific qualities. Watershed groups can also implement a broad base of education and outreach programs that can reach diverse audiences, including residents not currently on watershed group mailing lists. It is also important to recognize that watershed groups co-exist with other community groups and

are affected by a variety of socio-political and economic processes unique to each watershed, which can ultimately influence the dissemination of information and support for these groups.

Landowners trust friends, family, and neighbors more than any other source of information when they make land and water management decisions, and it is imperative that groups understand the implications of this interpersonal communication network. Watershed residents who have conducted restoration practices on their property are one of the best outreach tools available to watershed groups. If technical staff demonstrate that they are willing to work with landowner goals, this can lead to restoration projects that landowners support. This support for watershed group efforts is then disseminated to other landowners throughout the watershed. In general, watershed groups promote the implementation of watershed restoration activities due to the following reasons:

1) ability to work alongside landowners to design projects, 2) availability of financial resources, 3) technical expertise, 4) nongovernmental status, and 5) multiple forms of outreach programs.

The Oregon Plan for Salmon and Watersheds is a unique approach to watershed management. Although this research has touched upon a variety of important issues about watershed group diversity, landowner motivations and perspectives, and community dynamics it is not possible to delineate the most critical reasons for the outcomes of the Oregon Plan. However, there are several factors that appear to be vital components. The voluntary nature of watershed groups is likely to be a significant element of this process. Private landowners do not want to be told what to do and in

certain situations they can be responsive to non-regulatory approaches to land management. Landowners have been willing to implement voluntary watershed restoration practices throughout Oregon. The historical timing of the Oregon Plan probably played a strong role in the design and community support for this approach to improve watershed conditions as well. The Northern Spotted Owl controversy had recently occurred when the National Marine Fisheries Service (NMFS) proposed listing coho salmon under the Federal Endangered Species Act (ESA). The State of Oregon's efforts to take the lead in coho salmon recovery and allow local residents the opportunity to assist in recovery activities without federally imposed regulations was probably welcome news to some landowners. The Coastal Salmon Restoration Initiative (CSRI) required that different stakeholders work together to promote fish recovery in order for the CSRI to be approved by NMFS in lieu of federally listing coho salmon under the ESA. This situation created an impetus for diverse stakeholders to work through their differences and find common ground.

The symbolic mythology associated with salmon is likely to be a very important component in the public support gained for the Oregon Plan. If the focus of this effort was on another species, such as a little known mollusk, it is doubtful that the Oregon Plan would have received the same amount of support from the Oregon State Legislature and the general public. Citizens in the Pacific Northwest have a special relationship with salmon, as articulated by Governor Kitzhaber at the beginning of this chapter, and this can be a motivational factor for landowners to assist in recovery efforts. The substantial financial support for watershed restoration activities is also a unique feature of the Plan.

Over \$300 million dollars has been spent on watershed restoration activities and this has resulted in numerous education and outreach programs and on-the-ground restoration projects. Without this extensive amount of financial support it is unlikely that so many projects could have been implemented. All of these elements integrate with each other to explain the Oregon experience.

How These Findings Can Be Used in Other Contexts

The Oregon Plan for Salmon and Watersheds is a model for other collaborative efforts. Despite the extensive support and unique nature of this initiative, there are lessons from this research that can be applied to other watershed programs and other collaborative initiatives. By providing local communities the opportunity to design and implement their own strategies for improving watershed health, within state guidelines and existing laws and regulations, diverse watershed groups have emerged that reflect local conditions. Other initiatives can review the Oregon approach and determine if providing local flexibility in the implementation of regional, state or federal programs could be beneficial to their situation as well.

This research found a number of interesting findings in regard to education and outreach programs. Groups or agencies should be aware of the diversity of landowner perspectives on information sources and individual preferences for a variety of education and outreach methods. The use of a streamlined assessment of a target audience would be useful in a variety of settings. Individuals trust distinctive sources of information,

respond to public relation messages in different ways, and prefer a variety of outreach methods. A brief survey or small number of interviews could provide valuable data for a group designing an outreach strategy to reach an intended population. Data from this type of assessment could save financial and staff resources and result in better outcomes. Another important finding in this research is that the perceived neutrality of an information source can be influential in how citizens respond to education and outreach programs. In this research OSU Extension Service was a highly trusted source of information and it was perceived as a neutral source of information. Trusted sources of information will vary by geographic area and individual characteristics of target audiences but the perception that a source is neutral and not furthering any particular agenda is an important consideration. The intrusiveness of education and outreach programs is also relevant to this discussion because landowners in this study preferred to receive newsletters due to their non-intrusive nature. The level of intrusiveness of an education and outreach campaign should be considered when designing an outreach strategy. One of the significant findings from this research is that there is not one type of education and outreach method that will reach diverse audiences. The use of a variety of education and outreach activities will have the greatest chance to reach a broad audience.

Limitations to Research Findings

It is important to acknowledge the limitations of this research. The interviews used a snowball sampling technique that may not have produced a representative sample of all

landowner perspectives. During the interview process, key informants and previously interviewed landowners provided the names of potential interviewees. Landowners were selected from this list of names in order to gain a balanced distribution of landowner perspectives. Although interviews were conducted with landowners with varying levels of familiarity with watershed groups, it is possible that there are other landowner viewpoints not included in this study. It is also possible that the sample included an overabundance of landowner views from enthusiastic supporters of watershed groups and underrepresented other viewpoints. Consequently, landowner information in Chapter IV and interview data in Chapter III may not be representative of all landowners. However, both of these chapters describe common viewpoints of the 80 landowners interviewed.

Another issue that arises when dealing with interview and survey data is that there is always the possibility that interviewees are answering questions in a way that they think the researcher wants to hear. Although landowners appeared to be forthcoming with their ideas and viewpoints, it is possible that landowners emphasized the more positive aspects of watershed group activities and restricted their less than positive perspectives. It is also important to recognize that the sample may not have been representative in the first place and this could have further skewed data results. Social science research can not determine with complete certainty that respondents are being honest and truthful. Due to the controversy over the Northern Spotted Owl, it is possible that landowners wanted to provide a 'rosy' picture of watershed group activities because they like the idea of voluntary restoration efforts and wanted others to believe that they are doing their part in the recovery of salmonid populations. However, there was overlap

between the surveys and interviews and the similarities in findings help support interview data on certain topics. For example, survey data showed that landowners selected maintaining/improving the land for future generations as the most important factor when they made land and water management decisions and this coincides with interview data that revealed the significance of a landowner's moral responsibility to be a good land steward. Still, the future generations category was interpreted in different ways and it may be the item that sounded the most reasonable, regardless of a landowner's true priorities. To some landowners the idea of maintaining or improving the land for future generations may embody multiple factors, including the maintenance of productivity and profit. These issues should be considered when reviewing study results.

Interview and survey data include landowner perspectives on a variety of issues, but what landowners believe and how they manage their property may be different. This research did not assess riparian conditions and therefore there was no evaluation of the congruency of what landowners said during the interviews and how they actually managed their property. It is possible that landowners believe they are good land stewards but they actually conduct activities that harm watershed health. This may be particularly true in cases where landowners don't believe that restoration or modification of historical practices is necessary. For example, some landowners may not believe that cows have a negative effect on stream health and they continue to allow their cows to stay in the creek all summer long, yet they continue to believe that they are good land stewards.

An important caveat to this research is that some of the findings are specific to watershed restoration practices. For many landowners who conducted restoration, they did not have to choose between profit and productivity and improving watershed conditions. For example, bank stability projects provide benefits to water quality and fish habitat and help maintain land productivity by limiting erosion and the loss of farming or grazing acreage. The availability of cost-share programs enables landowners to receive at least 75% of the costs associated with restoration projects and the remaining 25% is usually achieved through in-kind donations, often filled through equipment or landowner time commitments. Still, some landowners conduct restoration practices without utilizing cost-share programs or may undertake restoration practices that may limit their profit margin. Nevertheless, landowners in this study are not likely to have had to choose between economic viability and their personal land ethic. Other types of land management practices may involve more direct competition between these two important elements, and this should be taken into consideration when reviewing this research.

This dissertation discussed three key components in a landowner's decision-making process in regard to adopting watershed restoration practices. A landowner's personal land ethic, economic circumstances, and community dynamics were found to be significant elements that influenced landowner decisions, but this study did not determine a hierarchy for these three components. Each component plays a vital role, however it was not possible to prioritize them.

Integrating Different Fields of Research

This dissertation synthesized research from several different bodies of literature and contributed to these distinct fields. Literature from collaborative natural resource management, adoption of soil and water conservation measures, community-based natural resource management (CBNRM), and political ecology provided valuable insights into this research topic and through the integration of theoretical and practical elements of each field, we now have a better understanding about landowner motivations for adopting restoration practices and the strong role that watershed groups play in this process.

This research has contributed to the collaborative natural resource management literature by providing valuable data on how collaborative efforts influence on-the-ground land management activities. Watershed groups encourage the adoption of watershed restoration activities on private lands and they operate within a broad, socio-political and economic arena beyond the group itself. The existence and influence of socio-political and economic processes is not often discussed in the literature. The inclusion of state, national, and global processes and their interrelationships with landowners and local community dynamics would also be beneficial to this body of literature. This study included all of these elements and found that they had a substantial benefit to the analysis of this topic.

The potential existence of unequal power relations among collaborative group members and its effect on decision outcomes is often described by the critics of this

approach to resource management and in the CBNRM and political ecology literature, but is not widely discussed in case studies in the U.S. Power relations among group members have the potential to influence a group's decision-making process. If a more powerful stakeholder promotes a particular viewpoint and others follow their lead, this can affect the types of activities implemented. This research did not focus specifically on power relations within watershed groups, but did find that a handful of landowners on steering committees or executive boards did feel as though their opinions were not respected in the same manner as others on the board. In addition, this research found that a few board members clarified their disagreement with other stakeholders but chose to refrain from the consensus voting process because they did not want to hold up decisions. The occasional use of this mechanism is important to discussions involving the use and misuse of the consensus decision-making model and may be an indication that power relations among board members are influential in determining group priorities and projects.

The adoption of soil and water conservation measures literature does not usually entail collaborative initiatives. The addition of collaborative processes and landowner perspectives on these processes can benefit research outcomes, and should be included as one of a variety of causal factors in determining landowner participation in conservation programs. This dissertation highlights the importance of a landowner's personal land ethic to their land management decision-making process and the future inclusion of this component in the adoption literature would be valuable. This body of literature describes economic and socio-psychological factors important to adoption but should place a

greater emphasis on a landowner's stewardship values. A few studies have started to incorporate this factor but much more remains to be done. A more inclusive approach might provide better predictive capabilities as well.

The CBNRM literature provides numerous examples of the benefits and criticisms of community conservation efforts in the Third World and this information is rarely used in First World contexts. Analysis of the diverse and constructed 'images of community' and its implications for natural resource management in the U.S. is a worthwhile venture. Although this research did not find significant differences between participants and nonparticipants, other case studies may provide other results. The political ecology literature offered valuable insights into how social, political, and economic processes at different scales (i.e. interactions among local, regional, state, national, and global) influence landowner decisions, but critique of destructive resource management practices is often the primary focus of case studies. The use of this approach to study ongoing restoration efforts and the processes that effectively promote these actions would also be beneficial.

Future Research

Comparisons between watershed groups in Oregon and other collaborative forums would be an important next step in this research arena. Through the analysis of different formal and informal institutional arrangements, government policies and regulations, and community efforts it may be possible to delineate the specific components within the

Oregon approach that have resulted in the implementation of numerous restoration projects. This research project only highlighted a few of the significant factors that motivate landowners to conduct conservation practices on private lands. The existing literature is limited in explaining the full range of motivational factors that influence landowner decisions and how they interact with each other. Additional research on this topic is sorely needed and should include an interdisciplinary approach.

Further research on the link between interpersonal communication networks and private land management decisions is also necessary. The importance of the friends, family, and neighbors' network for promoting land management activities is not well understood. Future studies on social networks and how they influence on-the-ground land management decisions could remedy this situation. Research on the effectiveness of a broad range of education and outreach methods is also needed. By investigating landowner reactions to a variety of outreach methods, it may be possible to have a greater understanding of how these activities, or other factors within these social interactions, persuade landowners to adopt restoration practices. There is also a scarce amount of research on how collaborative initiatives affect on-the-ground private land management decisions. Research in this area is currently being undertaken but additional studies could be useful. In particular, it would be valuable to survey landowner perspectives on the health of their riparian areas, appraise their familiarity and interaction with watershed initiatives, and do site-specific assessments of riparian areas. This would provide an interesting analysis of whether landowner views and actual practices are congruent.

A review of the historical processes and the social, economic, and political dimensions that influence restoration practices would also be of great interest. An analysis of the underlying reasons for restoration and the constraints to these actions could include an assessment of power relations at the local, state, and federal level. This type of analysis could benefit policymakers who strive to increase restoration activities.

APPENDIX A

RESEARCH METHODS

This study was conducted in collaboration with five watershed groups in Western Oregon: Coos Watershed Association, Coquille Watershed Association, Siuslaw Watershed Council, Yamhill Basin Council, and Marys River Watershed Council. The State of Oregon's innovative approach to watershed management was a critical focus of this research and consequently it was necessary to limit the selection of watershed groups to those within its boundaries. Western Oregon was selected because many watershed groups in this part of Oregon developed in response to the early focus on coastal coho salmon and have been in existence for a long time.

These particular five groups were selected based on a set of specific criteria and as a result of discussions with Oregon Watershed Enhancement Board (OWEB) staff, researchers, and others knowledgeable about watershed groups. First, it was essential that each watershed had a large quantity of non-industrial private land. The exclusion of watersheds with a high percentage of federal land was due to the stronger role that federal land managers play in these watersheds and the distinct nature of watershed group makeup. Industrial landowners were not included in this study because they have a different set of priorities than other types of landowners. Second, each watershed needed to have a range of land ownership and land use patterns so that there would be enough agricultural, small woodland, and rural landowners for adequate representation in

statistical analyses. Third, it was important to include two different ecoregions so that the findings would not be unique to one type of ecoregion, but still have areas with similar climate, geology, and vegetation. Fourth, watershed groups with different types of relationships with Soil and Water Conservation Districts (SWCDs) was desired because there was uncertainty about how landowners perceived groups with close working relationships with SWCDs (e.g. groups who have SWCD as financial administrator) and those with more independent forms of relationships. And fifth, it was essential to include watershed groups that used a variety of education and outreach programs in order to evaluate how landowners perceived a wide range of programs. It was anticipated that these selection criteria would improve the reliability of study findings.

Survey techniques were utilized to assess private landowner perceptions, motivations, and land use practices within the selected watersheds. The written questionnaire was developed in accordance with a modified version of Dillman's (2000) Tailored Design Method. A pre-test was administered to evaluate the reliability of data gathered from the questionnaire. Results from the pre-test did not identify questionnaire weaknesses and the questionnaire was later sent out in its original form. Nine-hundred questionnaires were mailed out to randomly selected landowners from county records data and landowners on watershed group mailing lists (180 per watershed).¹ Half of the landowners selected were taken from each list and cross-checked to ensure that overlap did not occur. When overlap did occur, another selection was made. After contacting watershed group staff and agricultural and small woodland organizations, acreage minimum standards were employed to ensure that the relevant land use activities could be

undertaken and that the size was large enough to conduct restoration practices.

Agricultural landowners were included in the study if they owned ≥ 20 acres, small woodland owners were required to have ≥ 10 acres, and rural residential landowners needed to have ≥ 2 acres.

Landowners selected from county records data were chosen through the use of two different methods. For three of the watersheds (i.e. Siuslaw Watershed Council, Marys River Watershed Council, and Yamhill Basin Council), landowners were selected from county property records with the assistance of county planning and GIS specialists who provided a list of riparian landowners (i.e. landowners whose property is adjacent to or next to a stream) within each watershed. This list included zoning data that was used to separate landowners into agricultural, small woodland, and rural residential landowners. The county records list was obtained by segregating agricultural, small woodland, and rural residential property within each watershed and then randomly selecting 30 landowners from each group in Excel. Only landowners who lived on their property were selected because it was important to obtain landowner perceptions of community group activities and this required full-time residence. The watershed group list was developed by overlapping watershed group mailing lists with county property records to select riparian landowners, although a small number of non-riparian landowners may have been included when ownership data was inconclusive. One hundred eighty questionnaires were mailed out to landowners in each watershed (i.e. 90 from each list).

The mailings for these three watersheds occurred between August and September 2003 and included a prenotification letter, original mailing, reminder postcard, and second mailing to nonrespondents.

The second method of obtaining landowner property information was necessary because Coos County did not have GIS data available in 2003 (the Coos and Coquille watersheds are located in Coos County). Therefore, federal data on land use types was compiled from various sources and integrated with stream data for each watershed. Randomized points were then derived by using an ArcView GIS random selection process (i.e. random program default). Three-hundred random points were distributed on a map for each watershed that included 100 points for each land use type. By using state maps and county property data, landowners were selected one at a time if they met the previously mentioned criteria (i.e. lived on property, minimum acreage, etc.). Questionnaires were mailed out between October and November 2003 using the previously described methodology.

Eighty semi-structured, face-to-face interviews were undertaken between October and December 2003 (15-18 per watershed). Interviews were conducted with watershed group members, landowners not involved in watershed group activities, landowners who had implemented watershed restoration practices, and landowners who had not conducted restoration activities. A snowball sample² was utilized in the interview process. Key informants and previously interviewed landowners provided the names for potential interviewees. Landowners were then selected from this group of names depending on which of the above categories they fit into. The interviews focused on gathering

information about why landowners adopted restoration activities, why they chose not to conduct restoration projects, views on local community groups, personal land ethics, and interpretations of survey questions.

* 100% Cotton Fiber *

COLLECTION

SOUTH WORTH

Notes

¹ One watershed group did not have a watershed group list so all of the questionnaires were sent to randomly selected landowners.

² Snowball sampling is a type of nonprobability sampling that utilizes previously identified group members to provide the names of other group members (Henry 1990).

APPENDIX B

STATISTICAL ANALYSES

This appendix includes a copy of the survey instrument and a more detailed review of the statistical elements of the dissertation. In particular, it provides background data and an expanded description of the statistical methods used in Chapter III. The appendix begins with an overview of the survey response rate, includes a copy of the survey instrument, describes the main variables used in the statistical analyses, and provides the background data used in the tables and figures used in Chapter III.

Development of the Survey Instrument

The survey instrument was developed in the spring and summer of 2003. Watershed group staff provided valuable input into the development of the survey. Each watershed had its own survey instrument, but there were only minor differences between them. The name of each watershed group was included in the five distinct surveys and one to two outreach methods specific to each group were included in a follow-up question in the survey (see Section B7 in the survey). The survey that follows was used in the Coos Watershed and it has been resized to fit required page dimensions for the dissertation. All survey questions are included despite the minor format modifications.

Community Outreach Survey

INSTRUCTIONS

- **LANDOWNERS WHO OWN MULTIPLE PROPERTIES:** When you fill out this survey, please think about your rural property that is next to a stream or river.
- **IF YOU DO NOT OWN ANY PROPERTY:** Please skip the land management questions and fill out the remainder of the questionnaire – the community outreach components are very important.
- **REMINDER:** All questionnaires are anonymous



SECTION A

TO BEGIN, PLEASE ANSWER A FEW QUESTIONS ABOUT WHERE YOU GET INFORMATION ABOUT LAND MANAGEMENT PRACTICES FOR YOUR PROPERTY

1. How much do you trust each of the following as sources of information when you make land and water management decisions?

	<u>A lot</u>	<u>Some</u>	<u>A little</u>	<u>Not at all</u>	<u>Don't know</u>
a. Professional associations (e.g. small woodlands assoc.)	☐	☐	☐	☐	☐
b. Friends/family/neighbors	☐	☐	☐	☐	☐
c. OSU Extension Service	☐	☐	☐	☐	☐
d. Soil and Water Conservation District (SWCD)	☐	☐	☐	☐	☐
e. Coos Watershed Association	☐	☐	☐	☐	☐
f. University scientists or scientific journals	☐	☐	☐	☐	☐
g. State government agency (e.g. ODFW, ODOT, ODA)	☐	☐	☐	☐	☐
h. Federal government agency (e.g. USFS, BLM, NRCS)	☐	☐	☐	☐	☐
i. County government	☐	☐	☐	☐	☐
j. Industry representatives	☐	☐	☐	☐	☐
k. Other _____ (please specify)	☐	☐	☐	☐	☐

2. Which one of the above sources do you trust the most? _____ (choose one from a-k)

3. How helpful are these outreach methods in getting information to you?

	<u>Very helpful</u>	<u>Somewhat helpful</u>	<u>Not helpful</u>	<u>Don't know</u>
a. Workshop	☐	☐	☐	☐
b. Presentation at a professional group meeting	☐	☐	☐	☐
c. Presentation at a community festival or event	☐	☐	☐	☐
d. Display at a local fair/festival	☐	☐	☐	☐
e. Newsletter	☐	☐	☐	☐
f. Watershed association meeting	☐	☐	☐	☐
g. Demonstration tour	☐	☐	☐	☐
h. Friends/family/neighbors	☐	☐	☐	☐
i. K-12 education project	☐	☐	☐	☐
j. Community restoration project	☐	☐	☐	☐
k. Other _____ (please specify)	☐	☐	☐	☐

4. Which one outreach method is the most helpful? _____ (choose one from a-k)

5. When you make land management decisions, how would you rate the importance of the following?

	<u>Very important</u>	<u>Somewhat important</u>	<u>Not important</u>	<u>Don't know</u>
a. practice will increase profit and productivity	☐	☐	☐	☐
b. practice will improve wildlife and/or fish habitat	☐	☐	☐	☐
c. practice will improve water quality	☐	☐	☐	☐
d. practice will improve scenic beauty	☐	☐	☐	☐
e. practice will maintain/improve property for future generations	☐	☐	☐	☐
f. practice will improve property value	☐	☐	☐	☐
g. other _____ (please specify)	☐	☐	☐	☐

6. Which one of the above items is the most important to you? _____ (choose one from a-g)

SECTION B

NEXT, PLEASE ANSWER A FEW QUESTIONS ABOUT
COMMUNITY ORGANIZATIONS

1. Do you volunteer for any of the following types of organizations?

a. K-12 education-related group (e.g. PTA)	☐ Yes	☐ No
b. Community service group (e.g. Rotary, Kiwanis, Lion's)	☐ Yes	☐ No
c. Religious group (e.g. church group)	☐ Yes	☐ No
d. Veteran's group	☐ Yes	☐ No
e. Environmental group	☐ Yes	☐ No
f. Other _____ (please specify)	☐ Yes	☐ No

2. Do you participate in any professional organizations related to land management?

a. Forestry association	☐ Yes	☐ No
b. Ranching association	☐ Yes	☐ No
c. Agricultural association	☐ Yes	☐ No
d. Other _____ (please specify)	☐ Yes	☐ No

3. Have you received technical or financial assistance from any of the following groups?

	<u>Technical Assistance</u>		<u>Financial Assistance</u>	
a. Soil and Water Conservation District	☐ Yes	☐ No	☐ Yes	☐ No
b. OSU Extension Service	☐ Yes	☐ No	☐ Yes	☐ No
c. Coos Watershed Association	☐ Yes	☐ No	☐ Yes	☐ No
d. State agency (e.g. ODFW, ODA)	☐ Yes	☐ No	☐ Yes	☐ No
e. Federal agency (e.g. NRCS, USFWS)	☐ Yes	☐ No	☐ Yes	☐ No
f. Other _____ (please specify)	☐ Yes	☐ No	☐ Yes	☐ No

4. Please answer the following questions about the organizations listed below.

	Soil & Water Conservation District (SWCD)	OSU Extension Service	Coos Watershed Association
a. Are you familiar with the following organizations? (If you are unfamiliar with all three organizations, please go to SECTION C)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
b. Have you used information produced by any of the following organizations?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
c. Have you participated in any programs/activities associated with the following organizations?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
d. Have you worked with one of the following on a land management project on your property?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

5. If there is one organization (of the three listed above) that you work with more than the others please explain why? _____

6. What are your first thoughts about the following organizations?

a. Soil and Water Conservation District (SWCD): _____

b. OSU Extension Service: _____

c. Coos Watershed Association: _____

If you are familiar with the Coos Watershed Association, please answer the following questions. If not please go to Section C.

7. How useful have you found the following types of watershed association outreach activities?

<u>Outreach Activity</u>	<u>Very useful</u>	<u>Somewhat useful</u>	<u>Not very useful</u>	<u>Don't know</u>
a. workshops	☐	☐	☐	☐
b. association meetings	☐	☐	☐	☐
c. demonstration tours	☐	☐	☐	☐
d. restoration projects	☐	☐	☐	☐
e. displays at fairs	☐	☐	☐	☐
f. presentations to groups	☐	☐	☐	☐
g. K-12 education projects	☐	☐	☐	☐
h. one-on-one-outreach	☐	☐	☐	☐
i. newsletters	☐	☐	☐	☐
j. stream clean-ups	☐	☐	☐	☐

8. Are you a member of the Coos Watershed Association? ☐ Yes ☐ No

SECTION C

PLEASE ANSWER THESE QUESTIONS ABOUT LAND MANAGEMENT PRACTICES ON YOUR RURAL PROPERTY

1. What is the primary use of your land? (Please check the description that best fits your operations.)

- ☐ Agriculture → type of agriculture: ☐ crops ☐ grazing ☐ dairy ☐ vineyard ☐ other
- ☐ Small woodlands
- ☐ Rural residential
- ☐ Other _____ (please specify)

2. Please answer the following questions about land and water management practices on your property. (Check ☒ all that apply)

Practice/Activity	I have done this in the past	I am practicing this now	I intend to practice this in the future	I don't intend to practice this	I am not familiar with this practice
a. Best Management Practices (BMPs)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
b. Road work or culvert replacement to improve fish habitat/water quality	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
c. Streambank plantings or fencing	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
d. In-stream alterations to improve fish habitat	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
e. Water quality monitoring	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
f. Active land management activities (e.g. erosion control, weed control)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐
g. Other activities to improve watershed health (describe activity below)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐	☐

If you have ever adopted any of the above practices, please answer the following question - if not, please go to Question #5.

3. How important were the following factors when you adopted these practices?

	<u>Very important</u>	<u>Somewhat important</u>	<u>Not important</u>	<u>Don't know</u>
a. to improve fish and/or wildlife habitat	☐	☐	☐	☐
b. to improve water quality	☐	☐	☐	☐
c. to improve scenic beauty	☐	☐	☐	☐
d. to maintain/improve property for future generations	☐	☐	☐	☐
e. to increase productivity and profit	☐	☐	☐	☐
f. to improve property value	☐	☐	☐	☐
g. to comply with regulations	☐	☐	☐	☐
h. other reason _____ (please specify)	☐	☐	☐	☐

4. Of the above items, which one is the most important reason why you adopted these practices?

_____ (choose one from a-h)

5. If you have not adopted any of the above practices, which of the following barriers have you encountered?

a. don't know enough about these practices	☐ Yes	☐ No
b. financial constraints	☐ Yes	☐ No
c. too busy/lack of time	☐ Yes	☐ No
d. lack of labor to implement practices	☐ Yes	☐ No
e. practices require participation in a government program	☐ Yes	☐ No
f. practices require participation with a local community group	☐ Yes	☐ No
g. concerns about the effects on property value	☐ Yes	☐ No
h. not interested in implementing these types of activities	☐ Yes	☐ No
i. other _____ (please specify)	☐ Yes	☐ No

6. Of the above items, which one is the most important reason that prevents you from adopting these practices?

_____ (choose one from a-i)

SECTION D

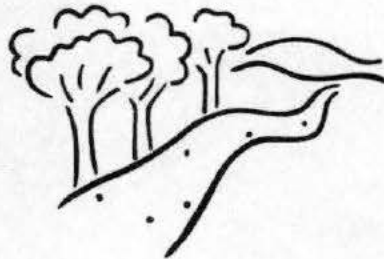
TO CONCLUDE, PLEASE ANSWER THE FOLLOWING QUESTIONS ABOUT YOU AND YOUR PROPERTY. **PLEASE REMEMBER THAT ALL ANSWERS ARE ANONYMOUS.**

- How many years have you lived in Oregon altogether? _____ years
- How many years have you lived in this community? _____ years
- Is the address on this mailing your main residence? ☐ Yes ☐ No
- How many years have you lived on this property? _____ years

5. Are you the owner of this property? ☐ Yes ☐ No
6. How many acres do you own? _____ acres
7. Is a stream or river next to or on your property (e.g. small stream, river, etc.)? ☐ Yes ☐ No
8. What percent of your income is from land management activities (e.g. crops, forestry, grazing)?
- 0% _____ 1-25% _____ 26-50% _____ 51-75% _____ 76-100% _____
9. What is your sex? ☐ Male ☐ Female
10. What is your age? _____ years old
11. What is the highest degree or level of school you have completed?
- ☐ Less than high school
 - ☐ High school graduate or equivalent
 - ☐ Some college
 - ☐ Associate degree
 - ☐ Bachelor's degree
 - ☐ Master's degree (e.g., MA, MS) or professional degree (e.g. MD, DDS, DVM, LLB, JD)
 - ☐ Doctorate degree
12. Which category best describes your current situation?
- ☐ Employed
 - ☐ Retired
 - ☐ Looking for work/unemployed
 - ☐ Keeping house
 - ☐ Student
 - ☐ Disabled/unable to work
 - ☐ Volunteer work only
 - ☐ Other _____
13. Do any children under the age of 18 currently live with you? ☐ Yes ☐ No
14. What is your total annual household income, from all sources, before taxes?
- ☐ Less than \$15,000
 - ☐ \$15,000-\$25,000
 - ☐ \$25,000-\$40,000
 - ☐ \$40,000-\$70,000
 - ☐ \$70,000-\$100,000
 - ☐ Over \$100,000

15. Is there anything else that you would like to tell us that is not included in this survey?

**THANK YOU FOR TAKING THE TIME
TO ANSWER THIS SURVEY!!**



Response Rate

As previously described in Appendix A, 900 questionnaires were mailed out between August and October 2003. However, 37 surveys were returned with the following information:

28 landowners moved from property
4 landowners were deceased
1 landowner was too ill to respond
4 landowners did not meet land/stream requirements
37 surveys excluded from response rate calculations

These 37 surveys were then subtracted from the original 900 surveys for calculating the survey response rate.

$$900 \text{ surveys} - 37 = 863$$

The survey response rate was then calculated: 446 returned surveys out of 863 = 52% response rate

The Variables

After reviewing relevant literature and information obtained from the personal interviews, the following six variables were selected for statistical analyses. Several of the variables have been modified to provide enough cases in each category

(i.e. categories have been aggregated). Therefore, variables that had six or seven response categories have been condensed into four categories. The frequency distributions are provided for each variable.

Land Use Type

Landowners were asked to select the primary use of their land in survey question C1. One of the goals of the study was to investigate if there were differences between agriculture, small woodlot, and rural residential landowner preferences and motivations. Unfortunately, many landowners selected more than one type of primary land use for their property. In order to differentiate between the three land use types it was necessary to eliminate responses that included more than one type of land use. Consequently, only 273 responses are included in this variable (see below).

Land Use Type	Frequency	Percent	Valid Percent	Cumulative Percent
agriculture	91	20.4	33.3	33.3
small woodlot	57	12.8	20.9	54.2
rural residential	125	28.0	45.8	100.0
Total	273	61.2	100.0	
Missing from System	173	38.8		
Total # of surveys	446	100.0		

Education Level

Although the survey allowed respondents to select one of seven categories for the highest degree or level of school completed (question D11), the education variable was compressed into four categories for statistical analyses (see below).

Education Level	Frequency	Percent	Valid Percent	Cumulative Percent
high school or less	90	20.2	20.9	20.9
some college	132	29.6	30.6	51.5
bachelor's degree	109	24.4	25.3	76.8
advanced degree	100	22.4	23.2	100.0
Total	431	96.6	100.0	
Missing from System	15	3.4		
Total # of surveys	446	100.0		

Income Level

Survey respondents were asked to select their total annual household income, from all sources, before taxes in question D14. Although there were six response categories, they have been reduced into four categories for statistical analyses (see below).

Income Level	Frequency	Percent	Valid Percent	Cumulative Percent
\$0-25K	61	13.7	15.5	15.5
\$25-40K	104	23.3	26.5	42.0
\$40-70K	119	26.7	30.3	72.3
\$70K+	109	24.4	27.7	100.0
Total	393	88.1	100.0	
Missing from System	53	11.9		
Total # of surveys	446	100.0		

List Type

As explained in Appendix A, survey respondents were selected from watershed group mailing lists and county property records. Three of the returned surveys had crossed out reference numbers so it was not possible to determine if they had originally been obtained from a watershed group list or randomly selected from county property records. These three surveys were excluded from this variable (see below).

List Type	Frequency	Percent	Valid Percent	Cumulative Percent
watershed group mailing list	211	47.3	47.6	47.6
county records list	232	52.0	52.4	100.0
Total	443	99.3	100.0	
Missing from System	3	.7		
Total # of surveys	446	100.0		

Percent of Income from Land

Survey respondents were asked to select what percent of their income was from land management activities (question D8): 0%, 1-25%, 26-50%, 51-75%, or 76-100%. Responses were condensed into three categories for statistical analyses (see below).

Percent of Income from Land	Frequency	Percent	Valid Percent	Cumulative Percent
0%	210	47.1	49.6	49.6
1-25%	155	34.8	36.6	86.3
26-100%	58	13.0	13.7	100.0
Total	423	94.8	100.0	
Missing from System	23	5.2		
Total # of surveys	446	100.0		

Employment

Survey respondents were asked to select among eight categories that best described their current situation. The majority of respondents selected employed or retired (see below). The remaining categories were dropped due to their small size.

Employment	Frequency	Percent	Valid Percent	Cumulative Percent
employed	235	52.7	60.1	60.1
retired	156	35.0	39.9	100.0
Total	391	87.7	100.0	
Missing from System	55	12.3		
Total # of surveys	446	100.0		

Landowner Motivations for Land Management Decisions

In the survey, landowners were asked to select one factor that was most important to them when they made land management decisions. Below is the frequency distribution that was used to generate Chapter III's Figure 2: Motivation for Land Management Decisions.

Motivation	Frequency	Percent	Valid Percent	Cumulative Percent
improve profit/productivity	45	10.1	11.8	11.8
improve wildlife/fish habitat	68	15.2	17.9	29.7
improve water quality	31	7.0	8.2	37.9
improve scenic beauty	10	2.2	2.6	40.5
maintain/improve for future gen's	174	39.0	45.8	86.3
improve property value	39	8.7	10.3	96.6
other	13	2.9	3.4	100.0
Total	380	85.2	100.0	
Missing from System	66	14.8		
Total # of surveys	446	100.0		

For Chapter III's Table 2 it was necessary to drop scenic beauty and the 'other' category in order to meet sampling distribution rules on chi-square tests. "As a working rule, n is adequately large when all of the expected frequencies F , are 2 or more and at least 50 percent of them are 5 or more" (Neter et al. 2000, p. 11). Here are the tables for each of the items in Table 2: Summary of Chi-Square Test for Motivations for Land Management Decisions.

Motivation and Land Use Type (N = 225)

Crosstabulation

Motivation	Land Use Type			Total
	agriculture	small woodlot	rural residential	
increase profit & productivity	19.7%	22.6%	5.9%	14.2%
improve wildlife/fish habitat	8.5%	9.4%	29.7%	18.2%
improve water quality	5.6%	5.7%	13.9%	9.3%
improve for fut gen's	52.1%	56.6%	37.6%	46.7%
improve property value	14.1%	5.7%	12.9%	11.6%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.799 ^a	8	.000
Likelihood Ratio	33.241	8	.000
Linear-by-Linear Association	.229	1	.632
N of Valid Cases	225		

a. 1 cells (6.7%) have expected count less than 5. The minimum expected count is 4.95.

Motivation and Education Level (N = 350)

Crosstabulation

Motivation	Education				Total
	high school or less	some college	bachelor's degree	advanced degree	
increase profit & productivity	9.1%	14.9%	15.8%	9.1%	12.6%
improve wildlife/fish habitat	18.2%	21.8%	18.9%	18.2%	19.4%
improve water quality	7.6%	6.9%	5.3%	13.6%	8.3%
improve prop for fut gen's	54.5%	48.5%	47.4%	46.6%	48.9%
improve property value	10.6%	7.9%	12.6%	12.5%	10.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.334 ^a	12	.674
Likelihood Ratio	9.120	12	.693
Linear-by-Linear Association	.022	1	.881
N of Valid Cases	350		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.47.

Motivation and Income Level (N = 325)

Crosstabulation

Motivation	Income Level				Total
	\$0-25K	\$25-40K	\$40-70K	\$70K+	
increase profit & productivity	10.9%	6.1%	13.6%	17.0%	12.3%
improve wildlife/fish habitat	21.7%	26.8%	19.4%	16.0%	20.6%
improve water quality	15.2%	6.1%	9.7%	6.4%	8.6%
improve property for future gen's	43.5%	50.0%	49.5%	46.8%	48.0%
improve property value	8.7%	11.0%	7.8%	13.8%	10.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.957 ^a	12	.372
Likelihood Ratio	12.986	12	.370
Linear-by-Linear Association	.002	1	.964
N of Valid Cases	325		

a. 2 cells (10.0%) have expected count less than 5. The minimum expected count is 3.96.

Motivation and List Type (N = 354)

Crosstabulation

Motivation	List Type		Total
	watershed group mailing list	county records list	
increase profit & productivity	10.1%	15.4%	12.7%
improve wildlife/fish habitat	23.5%	14.9%	19.2%
improve water quality	10.6%	6.9%	8.8%
improve prop for future gen's	48.0%	49.1%	48.6%
improve property value	7.8%	13.7%	10.7%
Total	100.0%	100.0%	100.0%

- watershed group mailing list = originally drawn from watershed group mailing list
- county records list = randomly selected from county property records

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	9.733 ^a	4	.045
Likelihood Ratio	9.824	4	.043
Linear-by-Linear Association	.657	1	.418
N of Valid Cases	354		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.32.

Motivation and Percent of Income from Land (N = 348)

Crosstabulation

Motivation	Percent of Income from Land			Total
	0%	1-25%	26-100%	
increase profit & productivity	2.9%	18.2%	30.4%	12.4%
improve wildlife/fish habitat	30.6%	10.6%	4.3%	19.5%
improve water quality	11.2%	7.6%	2.2%	8.6%
improve prop for future gen's	43.5%	51.5%	58.7%	48.6%
improve property value	11.8%	12.1%	4.3%	10.9%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	57.308 ^a	8	.000
Likelihood Ratio	62.141	8	.000
Linear-by-Linear Association	1.297	1	.255
N of Valid Cases	348		

a. 1 cells (6.7%) have expected count less than 5. The minimum expected count is 3.97.

Motivation and Employment Status (N = 314)

Crosstabulation

Motivation	Employment Status		Total
	employed	retired	
increase profit & productivity	13.9%	11.7%	13.1%
improve wildlife/fish habitat	18.6%	17.5%	18.2%
improve water quality	6.7%	11.7%	8.6%
improve prop for future gen's	48.5%	50.8%	49.4%
improve property value	12.4%	8.3%	10.8%
Total	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	3.661 ^a	4	.454
Likelihood Ratio	3.640	4	.457
Linear-by-Linear Association	.000	1	.992
N of Valid Cases	314		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 10.32.

Multinomial Logistic Regression

A multinomial logistic regression was conducted to look at the relative importance of each independent variable in explaining the dependent variable. Regression models can examine the association between a dependent variable and an independent variable while controlling for other variables. A multinomial logistic regression model was used because the dependent variable is categorical and there is no order to the categories. "The multinomial logistic regression, in effect, simultaneously estimates a set of binary logistic regression models" (Hoffman 2004, p. 85). The Statistical Package for the Social Sciences (SPSS) program was used to determine the odds ratios or $\text{Exp}(B)$. Exponentiated Beta or $\text{Exp}(B)$ is the estimated odds ratio. The estimated odds ratio was selected as the regression outcome rather than predictive probabilities because this research project was exploratory and was not interested in predicting outcomes.

Five independent variables were simultaneously input into the multinomial logistic regression model. The land use type variable had to be excluded from the multinomial regression model because the total number of cases in the variable was too low for the regression model (i.e. low number of cases in each category) and employment was not

included because it did not appear to have a great deal of statistical significance in the chi-square tests. After reviewing the chi-square tests, the four remaining variables, education, income, list type, and percent of income from land, were thought to be important variables for the regression model. Age was added to the multinomial logistic regression model because of the potential it had for interesting findings. Age did not appear to be significant in any of the initial statistical tests, but due to the mixed findings on the importance of age in the adoption literature it was included in the regression model. Each of the five variables was modified so that there were only two categories (0 and 1), with the most statistically significant variable category being singled out and the rest lumped together. This was necessary because of the small sample size and the goals of the regression analysis. For the dependent variable, maintaining and improving the land for future generations was selected as the reference category because it had the highest ranking and was thought to provide the most interesting findings. Here is the entire multinomial logistic regression model for Chapter III's Table 3: Multinomial Logistic Regression – Motivations for Land Management Decisions.

Case Processing Summary

Landowner Motivations	N	Marginal Percentage
increase productivity and profit	38	12.1%
Improve fish/wildlife habitat	65	20.7%
improve water quality	28	8.9%
improve property value	32	10.2%
maintain/improve land for future generations	151	48.1%
Valid	314	100.0%
Missing	132	
Total	446	
Subpopulation	30(a)	

a The dependent variable has only one value observed in 5 (16.7%) subpopulations.

Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	281.506			
Final	224.072	57.434	20	.000

Pseudo R-Square

Cox and Snell	.167
Nagelkerke	.178
McFadden	.066

(The Pseudo R-Square table provides information about the proportion of variation explained by the multinomial regression model.)

Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	271.107	47.035	4	.000
College Degree or Above	229.563	5.490	4	.241
Total Income >\$40,000	231.158	7.086	4	.131
County Records List	241.194	17.122	4	.002
Percent of Income from Land >\$25%	258.102	34.030	4	.000
Age: >58 years old	226.847	2.774	4	.596

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Parameter Estimates

Landowner Motivations ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
increase productivity and profit	Intercept	-2.799	.585	22.910	1	.000			
	CollegeDegreeorAbove	.317	.412	.593	1	.441	1.373	.613	3.075
	Income	.784	.449	3.057	1	.080	2.191	.909	5.276
	CountyRecordsList	.924	.424	4.736	1	.030	2.518	1.096	5.787
	PercentofIncomefrom Land	1.633	.468	12.169	1	.000	5.119	2.045	12.813
	Age	-.485	.400	1.473	1	.225	.616	.281	1.347
improve fish/wildlife habitat	Intercept	.123	.369	.110	1	.740			
	CollegeDegreeorAbove	-.217	.329	.435	1	.510	.805	.422	1.534
	Income	-.458	.323	2.020	1	.155	.632	.336	1.190
	CountyRecordsList	-.663	.327	4.120	1	.042	.515	.272	.977
	PercentofIncomefrom Land	-1.985	.766	6.707	1	.010	.137	.031	.617
	Age	-.321	.315	1.042	1	.307	.725	.391	1.344
improve water quality	Intercept	-1.249	.528	5.589	1	.018			
	CollegeDegreeorAbove	.210	.457	.211	1	.646	1.234	.503	3.023
	Income	-.277	.443	.391	1	.532	.758	.318	1.807
	CountyRecordsList	-.691	.454	2.317	1	.128	.501	.206	1.220
	PercentofIncomefrom Land	-1.824	1.057	2.979	1	.084	.161	.020	1.280
	Age	.125	.426	.086	1	.769	1.133	.492	2.609
improve property value	Intercept	-2.033	.548	13.742	1	.000			
	CollegeDegreeorAbove	.838	.445	3.542	1	.060	2.312	.966	5.533
	Income	-.287	.424	.457	1	.499	.751	.327	1.724
	CountyRecordsList	.644	.427	2.269	1	.132	1.904	.824	4.401
	PercentofIncomefrom Land	-.665	.789	.754	1	.385	.504	.107	2.366
	Age	-.281	.407	.475	1	.491	.755	.340	1.678

a. The reference category is: maintain/improve land for future generations.

Variables: College Degree or Above
Total Income >\$40,000
County Records List
Percent of income from land >25%
Age: >58 years old

In order to interpret these findings it is important to remember that $\text{Exp}(B)$ compares the odds of selecting one category from another. For example, landowners that receive more than 25% of their income from their property have more than 5 times the odds of choosing productivity and profit rather than maintaining or improving the land for future generations, controlling for other variables in the model. A number greater than 1 is a positive relationship (more likely to occur) while less than 1 is a negative relationship (less likely to occur).

Trusted Sources of Information

In the survey, landowners were asked to select their most trusted source of information when they made land and water management decisions. Below is the frequency distribution that was used to generate Chapter III's Figure 3: Trust for Information.

Sources of Information	Frequency	Percent	Valid Percent	Cumulative Percent
professional association	27	6.1	6.9	6.9
friends/family/neighbors	93	20.9	23.7	30.5
OSU Extension Service	90	20.2	22.9	53.4
SWCD	37	8.3	9.4	62.8
watershed group	41	9.2	10.4	73.3
university scientists	34	7.6	8.7	81.9
state government agency	13	2.9	3.3	85.2
federal govt. agency	14	3.1	3.6	88.8
county government	8	1.8	2.0	90.8
industry representatives	3	.7	.8	91.6
other	33	7.4	8.4	100.0
Total	393	88.1	100.0	
Missing from System	53	11.9		
Total	446	100.0		

- SWCD = Soil and Water Conservation District

In order to meet sampling distribution rules for chi-square tests as previously described, it was necessary to combine the state government agency, federal government agency, and county government into one variable. The resulting government agency variable is the culmination of this action. It was also necessary to eliminate the industry representative and 'other' categories due to their small size. Here are the individual tables for each of the items in Chapter III's Table 4: Summary of Chi-Square Test for Trusted Sources of Information.

Trusted Sources of Information and Land Use Type (N = 228)

Crosstabulation

Sources of Information	Land Use Type			Total
	agriculture	small woodlot	rural residential	
professional associations	2.6%	25.5%	1.9%	7.0%
friends/family/neighbors	29.9%	29.8%	17.3%	24.1%
OSU Extension Service	33.8%	14.9%	25.0%	25.9%
SWCD	13.0%	8.5%	9.6%	10.5%
watershed group	5.2%	10.6%	18.3%	12.3%
university scientists	10.4%	4.3%	11.5%	9.6%
government agency	5.2%	6.4%	16.3%	10.5%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.736 ^a	12	.000
Likelihood Ratio	45.914	12	.000
Linear-by-Linear Association	11.349	1	.001
N of Valid Cases	228		

a. 4 cells (19.0%) have expected count less than 5. The minimum expected count is 3.30.

Trusted Sources of Information and Education Level (N = 347)

Crosstabulation

Sources of Information	Education Level				Total
	high school or less	some college	bachelor's degree	advanced degree	
professional associations	9.7%	3.7%	11.2%	6.4%	7.5%
friends/family/neighbors	37.5%	36.1%	16.9%	11.5%	25.9%
OSU Extension Service	20.8%	25.9%	24.7%	29.5%	25.4%
SWCD	8.3%	11.1%	12.4%	9.0%	10.4%
watershed group	8.3%	13.0%	12.4%	11.5%	11.5%
university scientists	1.4%	5.6%	13.5%	17.9%	9.5%
government agency	13.9%	4.6%	9.0%	14.1%	9.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	44.065 ^a	18	.001
Likelihood Ratio	47.668	18	.000
Linear-by-Linear Association	12.812	1	.000
N of Valid Cases	347		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.39.

Trusted Sources of Information and Income Level (N = 318)

Crosstabulation

Sources of Information	Income Level				Total
	\$0-25K	\$25-40K	\$40-70K	\$70K+	
professional associations	4.3%	9.6%	5.0%	10.3%	7.5%
friends/family/neighbors	34.0%	27.7%	23.8%	23.0%	26.1%
OSU Extension Service	27.7%	19.3%	26.7%	27.6%	25.2%
SWCD	10.6%	10.8%	13.9%	6.9%	10.7%
watershed group	23.4%	10.8%	11.9%	4.6%	11.3%
university scientists		12.0%	11.9%	11.5%	10.1%
government agency		9.6%	6.9%	16.1%	9.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	33.020 ^a	18	.017
Likelihood Ratio	40.959	18	.002
Linear-by-Linear Association	2.475	1	.116
N of Valid Cases	318		

a. 3 cells (10.7%) have expected count less than 5. The minimum expected count is 3.55.

Trusted Sources of Information and List Type (N = 355)

Crosstabulation

Sources of Information	List Type		Total
	watershed group mailing list	county records list	
professional associations	7.6%	7.7%	7.6%
friends/family/neighbors	18.0%	33.9%	26.2%
OSU Extension Service	26.7%	23.5%	25.1%
SWCD	14.5%	6.6%	10.4%
watershed group	16.9%	6.6%	11.5%
university scientists	11.6%	7.7%	9.6%
government agency	4.7%	14.2%	9.6%
Total	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.366 ^a	6	.000
Likelihood Ratio	33.362	6	.000
Linear-by-Linear Association	.935	1	.334
N of Valid Cases	355		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 13.08.

Trusted Sources of Information and Percent of Income from Land (N = 343)

Crosstabulation

Sources of Information	Percent of Income from Land			Total
	0%	1-25%	26-100%	
professional associations	2.5%	10.6%	16.0%	7.6%
friends/family/neighbors	23.0%	24.2%	32.0%	24.8%
OSU Extension Service	26.1%	24.2%	28.0%	25.7%
SWCD	8.1%	15.2%	6.0%	10.5%
watershed group	16.1%	8.3%	8.0%	12.0%
university scientists	12.4%	8.3%	4.0%	9.6%
government agency	11.8%	9.1%	6.0%	9.9%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.969 ^a	12	.008
Likelihood Ratio	27.944	12	.006
Linear-by-Linear Association	14.175	1	.000
N of Valid Cases	343		

a. 3 cells (14.3%) have expected count less than 5. The minimum expected count is 3.79.

Trusted Sources of Information and Employment Status (N = 312)

Crosstabulation

Sources of Information	Employment Status		Total
	employed	retired	
professional associations	6.2%	11.8%	8.3%
friends/family/neighbors	23.8%	27.7%	25.3%
OSU Extension Service	28.0%	21.8%	25.6%
SWCD	7.8%	14.3%	10.3%
watershed group	10.4%	10.9%	10.6%
university scientists	13.0%	4.2%	9.6%
government agency	10.9%	9.2%	10.3%
Total	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.362 ^a	6	.038
Likelihood Ratio	13.948	6	.030
Linear-by-Linear Association	3.622	1	.057
N of Valid Cases	312		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.92.

Multinomial Logistic Regression

A multinomial logistic regression was conducted for trusted sources of information (see earlier discussion under Landowner Motivations Multinomial Logistic Regression section). The five independent variables used for the landowner motivations regression model were also used for the trusted sources of information regression model. Friends, family, and neighbors was selected as the reference category for the dependent variable because it was the highest ranking variable and the most intriguing. Here is the entire multinomial logistic regression model.

Case Processing Summary

Trusted Sources of Information	N	Marginal Percentage
professional association	23	7.4%
government agency	29	9.4%
OSU Extension Service	78	25.2%
SWCD	34	11.0%
watershed group	36	11.7%
university scientists	31	10.0%
friends/family/neighbors	78	25.2%
Valid	309	100.0%
Missing	137	
Total	446	
Subpopulation	30(a)	

a. The dependent variable has only one value observed in 2 (6.7%) subpopulations.

Model Fitting Information

Model	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	432.181			
Final	340.691	91.491	30	.000

Pseudo R-Square

Cox and Snell	.256
Nagelkerke	.263
McFadden	.081

(The Pseudo R-Square table provides information about the proportion of variation explained by the multinomial regression model.)

Likelihood Ratio Tests

Effect	Model Fitting Criteria	Likelihood Ratio Tests		
	-2 Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	371.693	31.002	6	.000
College Degree or Above	363.158	22.468	6	.001
Total Income >\$40,000	344.607	3.917	6	.688
County Records List	374.418	33.728	6	.000
Percent of Income from Land >25%	351.000	10.310	6	.112
Age: >58 years old	355.433	14.742	6	.022

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Parameter Estimates

Trusted Sources of Information ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
professional association	Intercept	-2.170	.670	10.493	1	.001			
	CollegeDegreeorAbove	.998	.537	3.455	1	.063	2.712	.947	7.765
	Income	.090	.510	.031	1	.880	1.094	.403	2.973
	CountyRecordsList	-.336	.531	.400	1	.527	.715	.252	2.025
	PercentofIncomefrom Land	.501	.584	.736	1	.391	1.650	.526	5.180
	Age	1.041	.520	3.999	1	.046	2.831	1.021	7.848
government agency	Intercept	-2.126	.646	10.840	1	.001			
	CollegeDegreeorAbove	1.340	.487	7.560	1	.006	3.819	1.469	9.926
	Income	.543	.499	1.185	1	.276	1.721	.848	4.573
	CountyRecordsList	.653	.530	1.515	1	.218	1.921	.679	5.431
	PercentofIncomefrom Land	-.350	.707	.245	1	.621	.705	.176	2.818
	Age	-.499	.481	1.076	1	.300	.607	.237	1.558
OSU Extension Service	Intercept	.014	.405	.001	1	.972			
	CollegeDegreeorAbove	.796	.364	4.786	1	.029	2.216	1.066	4.519
	Income	.288	.346	.690	1	.406	1.333	.677	2.627
	CountyRecordsList	-.732	.356	4.229	1	.040	.481	.240	.966
	PercentofIncomefrom Land	-.396	.455	.759	1	.384	.673	.276	1.640
	Age	.016	.340	.002	1	.963	1.016	.522	1.977
SWCD	Intercept	-.522	.507	1.060	1	.303			
	CollegeDegreeorAbove	.494	.462	1.144	1	.285	1.639	.663	4.053
	Income	.262	.447	.343	1	.558	1.300	.541	3.124
	CountyRecordsList	-1.560	.467	11.158	1	.001	.210	.084	.525
	PercentofIncomefrom Land	-1.343	.703	3.650	1	.056	.261	.066	1.035
	Age	.660	.441	2.243	1	.134	1.935	.816	4.589
watershed group	Intercept	.040	.473	.007	1	.933			
	CollegeDegreeorAbove	.550	.459	1.436	1	.231	1.733	.705	4.259
	Income	-.381	.438	.758	1	.384	.683	.290	1.611
	CountyRecordsList	-1.904	.483	15.526	1	.000	.149	.058	.384
	PercentofIncomefrom Land	-1.093	.638	2.931	1	.087	.335	.096	1.171
	Age	.427	.433	.972	1	.324	1.533	.656	3.585
university scientists	Intercept	-1.337	.607	4.842	1	.028			
	CollegeDegreeorAbove	2.165	.547	15.686	1	.000	8.713	2.985	25.435
	Income	.153	.485	.099	1	.753	1.165	.450	3.015
	CountyRecordsList	-.873	.461	3.292	1	.070	.418	.163	1.073
	PercentofIncomefrom Land	-1.192	.830	2.063	1	.151	.304	.060	1.544
	Age	-.754	.499	2.282	1	.131	.470	.177	1.252

a. The reference category is: friends/family/neighbors.

Preferred Outreach Method

In the survey, landowners were asked to select the most helpful outreach method in getting information to them. Due to small cell size of several of these categories, it was not possible to include all of the categories in the chi-square tests (i.e. cell size was too small to meet standard statistical rules). Below is the frequency distribution that was used to generate Chapter III's Figure 4: Preferred Method of Outreach.

Outreach Methods	Frequency	Percent	Valid Percent	Cumulative Percent
workshop	57	12.8	15.3	15.3
presentation at group meeting	26	5.8	7.0	22.3
presentation at community event	14	3.1	3.8	26.1
display at local festival	12	2.7	3.2	29.3
newsletter	104	23.3	28.0	57.3
watershed group meeting	17	3.8	4.6	61.8
demonstration tour	40	9.0	10.8	72.6
friends/family/neighbors	67	15.0	18.0	90.6
K-12 education project	1	.2	.3	90.9
community restoration project	12	2.7	3.2	94.1
other	22	4.9	5.9	100.0
Total	372	83.4	100.0	
Missing from System	74	16.6		
Total # of surveys	446	100.0		

In order to conduct chi-square tests at all it was necessary to eliminate the K-12 category due to small response size, and the 'other' category was left out because it did not provide useful information. Here are the individual tables for each of the items in Chapter III's Table 5: Summary of Chi-Square Test for Preferred Method of Outreach.

Preferred Outreach Method and Education Level (N = 343)

Crosstabulation

Outreach Method	Education Level				Total
	high school or less	some college	bachelor's degree	advanced degree	
workshop	1.5%	14.6%	22.2%	23.8%	16.3%
pres. at group meeting	1.5%	4.9%	12.2%	10.7%	7.6%
pres. at community event	9.1%		6.7%	2.4%	4.1%
display at local festival	6.1%	2.9%	1.1%	4.8%	3.5%
newsletter	34.8%	30.1%	24.4%	31.0%	29.7%
watershed group meeting	3.0%	7.8%	2.2%	4.8%	4.7%
demonstration tour	10.6%	11.7%	10.0%	13.1%	11.4%
friends/family/neighbors	30.3%	24.3%	17.8%	6.0%	19.2%
restoration project	3.0%	3.9%	3.3%	3.6%	3.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.233 ^a	24	.000
Likelihood Ratio	66.252	24	.000
Linear-by-Linear Association	21.800	1	.000
N of Valid Cases	343		

a. 16 cells (44.4%) have expected count less than 5. The minimum expected count is 2.31.

Preferred Outreach Method and List Type (N = 348)

Crosstabulation

Outreach Method	List Type		Total
	watershed group mailing list	county records list	
workshop	21.1%	11.3%	16.4%
pres. at group meeting	7.2%	7.1%	7.2%
pres. at community event	4.4%	3.6%	4.0%
display at local festival	2.2%	4.8%	3.4%
newsletter	28.3%	31.5%	29.9%
watershed group meeting	6.7%	3.0%	4.9%
demonstration tour	15.6%	7.1%	11.5%
friends/family/neighbors	10.6%	28.6%	19.3%
restoration project	3.9%	3.0%	3.4%
Total	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.820 ^a	8	.000
Likelihood Ratio	30.631	8	.000
Linear-by-Linear Association	6.505	1	.011
N of Valid Cases	348		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.79.

*Preferred Outreach Method and Employment Status (N = 312)***Crosstabulation**

Outreach Method	Employment Status		Total
	employed	retired	
workshop	16.8%	15.5%	16.3%
pres. at group meeting	8.7%	6.9%	8.0%
pres. at community event	4.1%	4.3%	4.2%
display at local festival	4.1%	2.6%	3.5%
newsletter	28.1%	30.2%	28.8%
watershed group meeting	6.1%	1.7%	4.5%
demonstration tour	11.7%	11.2%	11.5%
friends/family/neighbors	16.3%	25.9%	19.9%
restoration project	4.1%	1.7%	3.2%
Total	100%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.706 ^a	8	.368
Likelihood Ratio	9.245	8	.322
Linear-by-Linear Association	.737	1	.391
N of Valid Cases	312		

a. 3 cells (16.7%) have expected count less than 5. The minimum expected count is 3.72.

The following tables illustrate why land use type, income, and percent of income from land could not be included in Chapter III's Table 5.

Preferred Outreach Method and Land Use Type (N = 226) – Not Used in Analysis

Crosstabulation

Outreach Method	Land Use Type			Total
	agriculture	small woodlot	rural residential	
workshop	19.2%	19.1%	16.8%	18.1%
pres. at group meeting	7.7%	14.9%	4.0%	7.5%
pres. at community event	2.6%	2.1%	6.9%	4.4%
display at local festival	2.6%		5.0%	3.1%
newsletter	25.6%	36.2%	34.7%	31.9%
watershed group meeting	7.7%	2.1%	4.0%	4.9%
demonstration tour	14.1%	12.8%	3.0%	8.8%
friends/family/neighbors	19.2%	10.6%	18.8%	17.3%
restoration project	1.3%	2.1%	6.9%	4.0%
Total	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.910 ^a	16	.042
Likelihood Ratio	29.175	16	.023
Linear-by-Linear Association	.042	1	.838
N of Valid Cases	226		

a. 14 cells (51.9%) have expected count less than 5. The minimum expected count is 1.46.

Crosstabulation

Outreach Method		Land Use Type			Total
		agriculture	small woodlot	rural residential	
workshop	Count	15	9	17	41
	Expected Count	14.2	8.5	18.3	41.0
pres. at group meeting	Count	6	7	4	17
	Expected Count	5.9	3.5	7.6	17.0
pres. at community event	Count	2	1	7	10
	Expected Count	3.5	2.1	4.5	10.0
display at local festival	Count	2	0	5	7
	Expected Count	2.4	1.5	3.1	7.0
newsletter	Count	20	17	35	72
	Expected Count	24.8	15.0	32.2	72.0
watershed group meeting	Count	6	1	4	11
	Expected Count	3.8	2.3	4.9	11.0
demonstration tour	Count	11	6	3	20
	Expected Count	6.9	4.2	8.9	20.0
friends/family/neighbors	Count	15	5	19	39
	Expected Count	13.5	8.1	17.4	39.0
restoration project	Count	1	1	7	9
	Expected Count	3.1	1.9	4.0	9.0
Total	Count	78	47	101	226
	Expected Count	78.0	47.0	101.0	226.0

This table could not be used because over 50% of the cells have an expected count less than five and there are two cells with expected frequencies less than two.

Preferred Outreach Method and Income Level (N = 320) – Not Used in Analysis

Crosstabulation

Outreach Method	Income Level				Total
	\$0-25K	\$25-40K	\$40-70K	\$70K+	
workshop	6.4%	17.1%	20.6%	18.0%	16.9%
pres. at group meeting	8.5%	1.2%	4.9%	15.7%	7.5%
pres. at community event	6.4%	2.4%	2.9%	4.5%	3.8%
display at local festival		4.9%	3.9%	3.4%	3.4%
newsletter	31.9%	30.5%	30.4%	27.0%	29.7%
watershed group meeting	4.3%	1.2%	6.9%	4.5%	4.4%
demonstration tour	4.3%	15.9%	13.7%	9.0%	11.6%
friends/family/neighbors	34.0%	24.4%	11.8%	14.6%	19.1%
restoration project	4.3%	2.4%	4.9%	3.4%	3.8%
Total	100%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.415 ^a	24	.019
Likelihood Ratio	43.843	24	.008
Linear-by-Linear Association	9.012	1	.003
N of Valid Cases	320		

a. 17 cells (47.2%) have expected count less than 5. The minimum expected count is 1.62.

Crosstabulation

Outreach Method		Income Level				Total
		\$0-25K	\$25-40K	\$40-70K	\$70K+	
workshop	Count	3	14	21	16	54
	Expected Count	7.9	13.8	17.2	15.0	54.0
pres. at group meeting	Count	4	1	5	14	24
	Expected Count	3.5	6.1	7.7	6.7	24.0
pres. at community event	Count	3	2	3	4	12
	Expected Count	1.8	3.1	3.8	3.3	12.0
display at local festival	Count	0	4	4	3	11
	Expected Count	1.6	2.8	3.5	3.1	11.0
newsletter	Count	15	25	31	24	95
	Expected Count	14.0	24.3	30.3	26.4	95.0
watershed group meeting	Count	2	1	7	4	14
	Expected Count	2.1	3.6	4.5	3.9	14.0
demonstration tour	Count	2	13	14	8	37
	Expected Count	5.4	9.5	11.8	10.3	37.0
friends/family/neighbors	Count	16	20	12	13	61
	Expected Count	9.0	15.6	19.4	17.0	61.0
restoration project	Count	2	2	5	3	12
	Expected Count	1.8	3.1	3.8	3.3	12.0
Total	Count	47	82	102	89	320
	Expected Count	47.0	82.0	102.0	89.0	320.0

This table could not be used because three cells have expected frequencies less than two.

*Preferred Outreach Method and Percent of Income from Land (N = 341) –
Not Used in Analysis*

Crosstabulation

Outreach Method	Percent of Income from Land			Total
	0%	1-25%	26-100%	
workshop	16.9%	16.3%	15.4%	16.4%
pres. at group meeting	4.2%	10.6%	9.6%	7.3%
pres. at community event	7.2%	.8%	1.9%	4.1%
display at local festival	5.4%	2.4%		3.5%
newsletter	30.7%	33.3%	19.2%	29.9%
watershed group meeting	4.8%	4.9%	3.8%	4.7%
demonstration tour	4.8%	12.2%	30.8%	11.4%
friends/family/neighbors	20.5%	17.9%	17.3%	19.1%
restoration project	5.4%	1.6%	1.9%	3.5%
Total	100%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.813 ^a	16	.000
Likelihood Ratio	45.411	16	.000
Linear-by-Linear Association	.330	1	.565
N of Valid Cases	341		

a. 7 cells (25.9%) have expected count less than 5. The minimum expected count is 1.83.

Crosstabulation

Outreach Method		Percent of Income from Land			Total
		0%	1-25%	26-100%	
workshop	Count	28	20	8	56
	Expected Count	27.3	20.2	8.5	56.0
pres. at group meeting	Count	7	13	5	25
	Expected Count	12.2	9.0	3.8	25.0
pres. at community event	Count	12	1	1	14
	Expected Count	6.8	5.0	2.1	14.0
display at local festival	Count	9	3	0	12
	Expected Count	5.8	4.3	1.8	12.0
newsletter	Count	51	41	10	102
	Expected Count	49.7	36.8	15.6	102.0
watershed group meeting	Count	8	6	2	16
	Expected Count	7.8	5.8	2.4	16.0
demonstration tour	Count	8	15	16	39
	Expected Count	19.0	14.1	5.9	39.0
friends/family/neighbors	Count	34	22	9	65
	Expected Count	31.6	23.4	9.9	65.0
restoration project	Count	9	2	1	12
	Expected Count	5.8	4.3	1.8	12.0
Total	Count	166	123	52	341
	Expected Count	166.0	123.0	52.0	341.0

This table could not be used because two cells have expected frequencies less than two.

Barriers to Changing Land Management Practices

In the survey, landowners who had not implemented restoration practices, water quality monitoring, best management practices, or active land management activities were asked to select the most important reason that prevented them from adopting these practices. Due to the small response size ($n = 178$), chi-square tests could not be conducted on this question. Here is the frequency distribution used to generate Chapter III's Figure 5: Barriers to Changing Land Management Practices.

Barriers	Frequency	Percent	Valid Percent	Cumulative Percent
don't know enough	24	5.4	13.5	13.5
financial constraints	57	12.8	32.0	45.5
too busy/lack of time	40	9.0	22.5	68.0
lack of labor	13	2.9	7.3	75.3
require partic. in govt. program	17	3.8	9.6	84.8
require partic. with local group	1	.2	.6	85.4
concerns about property value	2	.4	1.1	86.5
not interested	7	1.6	3.9	90.4
other	17	3.8	9.6	100.0
Total	178	39.9	100.0	
Missing from System	268	60.1		
Total # of surveys	446	100.0		

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