

THE ROLE OF SOCIO-ECONOMIC INDICATORS IN WATERSHED
MANAGEMENT

by

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In Oregon, watershed councils are a prime example of community-based natural resource management. Since the early 1990's the state has promoted local place-based ecosystem management for the restoration of fish habitat, water quality, and the protection of water resources. In this new paradigm, watershed management in Oregon incorporates ecosystem and adaptive management, a concept that involves acting, monitoring, and evaluating current and past programs. Since their early beginnings, watershed councils have recognized the integrated nature of the socio-economic and biophysical environment. However, the management practices of watershed councils in Oregon have focused on the bio-physical environment and bio-physical monitoring and evaluation. Socio-economic

indicators may provide information that will allow watershed councils to plan for watershed management in a more holistic framework for strategic decision-making and collaborative management through an integration of the socio-economic and bio-physical elements of the watershed.

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DEDICATION

I dedicate this thesis to my dog Luciernega for her numerous hours of sitting by my side and providing moral support for the completion of this research.

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CHAPTER I

PROBLEM STATEMENT

Introduction

In the early 1990's, the concept of community based natural resource management (CBNRM) emerged as a new paradigm in natural resource management. CBNRM in general, is a local community-based management process associated with ecosystem management, the principles of sustainability, adaptive management, and collaborative management.

Although there are benefits to CBNRM, there are also theoretical and practical challenges to address. In Oregon, watershed councils are a prime example of CBNRM and have become the dominant paradigm in watershed management. There are approximately 90 watershed councils in the state (OWEB, 2007) all of which are managed by a "council" of community members that represent diverse stakeholder interests in the watershed.

Since their inception, watershed councils have used adaptive management and ecosystem management practices to improve the health of watersheds and restore fish habitat (Moseley 1999). Adaptive management "focuses on learning and adapting, through partnerships of managers, scientists, and other stakeholders who learn together

how to create and maintain sustainable ecosystems” (US Department of the Interior 2007).

As has been the case for most CBNRM groups, monitoring and evaluation have been difficult activities for watershed councils. In particular, a major challenge has been the incorporation of socio-economic monitoring and evaluation. Many watershed councils use adaptive management and “know” the importance of socio-economic factors in the watershed. However, successful attempts to measure and monitor these have been limited.

The amount of local data and reports generated by the federal, state, and regional governments and non-profit organizations has grown in recent years, and the emphasis on measuring the outputs and outcomes has increased. Even with new information there are a number of challenges in deciding which information to use, how to use it, and how to integrate the information into the watershed council management process.

This thesis will examine the potential of one type of measure, socio-economic indicators, to enhance the socio-economic goals, objectives, and monitoring in four watershed councils. I will explore the benefits as well as the issues of integrating socio-economic indicators and their development.

Background

Community-based natural resource management has its modern roots in the United States beginning in the 1980’s and early 1990’s and is most commonly associated with forest management, and water resource management. CBNRM uses the principles of ecosystem management, a holistic practice of supporting and facilitating the natural

environmental processes in the forest, lakes, rivers, and streams (Donoghue & Sturtevant, 2007). While the federal government promotes and supports ecosystem management through laws like the Endangered Species Act, the implementation of ecosystem management often happens at the community level, through community-based organizations.

Watershed management organizations (a generic term for organizations such as Oregon's watershed councils) have grown rapidly in the United States since the mid-1990's (Clark, Burkhardt and King, 2005). On a national level, federal forest policy plays a role in watershed management and habitat restoration, but the EPA and federal water quality regulations and policies are more closely associated with the impetus to community-based watershed management organizations (Clark, Burkhardt and King, 2005).

The departure of watershed management and water quality from a top-down prescriptive approach by the EPA to a decentralized local watershed approach began largely as a result of criticism of the EPA's "regulatory inflexibility, one-size fits all policy prescriptions, and excessive transaction costs,...and the command-control approach behind the 1972 Clean Water Act, questions have arisen regarding [the EPA's] efficiency and effectiveness" (Clark, Burkhardt and King, 2005).

CBNRM and ecosystem management are also supported by state level policy through agreements like the Enlibra doctrine which was signed in 1998 by the Western Governor's Association to promote ecosystem management in forests (Malone 2000). Oregon was a signatory and has been active in creating policies, legislation, and

programs consistent with the Enlibra Doctrine and in support of ecosystem management (Malone 2000). The Oregon Plan for Salmon and Watersheds, legislation, and funding have supported the development of watershed councils to manage riparian/watershed ecosystems on a local level (Malone 2000).

According to the State of Oregon watershed councils are defined as “locally organized, voluntary, non-regulatory groups established to improve the condition of watersheds in their local area... Watershed councils are required to represent the interests in the basin and be balanced in their makeup” (OWEB 2007). Watershed Councils are also charged with looking “across jurisdictional boundaries and across agency mandates to look at the watershed more holistically” (OWEB 2007). Because of their legislatively recognized status as locally-based organizations watershed councils in Oregon are worthy of study to better understand how CBNRM functions, what the challenges are, and how it can be improved in the future.

Statement of Problem Situation

There has been a growing emphasis on monitoring within community based organizations as a way of gauging sustainability of the community. Over the last fifteen years, community based organizations -- from economic development, to housing authorities, to environmental groups -- are moving in the direction of sustainability. In the state of Oregon, watershed councils manage the restoration of watersheds and salmon habitat in order to improve the sustainability of Oregon communities.

The Oregon Watershed Enhancement Board (OWEB) is a statewide agency whose main mission is:

“To help create and maintain healthy watersheds and natural habitats that support thriving communities and strong economies” (Oregon Watershed Enhancement Board, 2001).

Additionally, “the Board fosters the collaboration of citizens, agencies, and local interests. OWEB’s programs support Oregon’s efforts to restore salmon runs, improve water quality, and strengthen ecosystems that are critical to healthy watersheds and sustainable communities” (Oregon Watershed Enhancement Board, 2001).

OWEB and Oregon watershed councils have focused on developing environmental monitoring systems to use adaptive management for watershed restoration. However, since the foundation of the Governor’s Watershed Enhancement Board (GWEB), the state government has recognized the importance of the socio-economic environment in the watershed.

“A comprehensive watershed management program was initiated in Oregon in 1993 to address the complex natural resource issues facing Oregon. This strategy entails a long-term commitment by local, state and federal land managers, private landowners, and private citizens to address watershed protection, enhancement, and restoration in an effort to restore watershed health throughout Oregon. The formation of cooperative partnerships to seek common solutions to protect and restore the health of Oregon's ecosystems, support sustainable resource use, and enhance local economies is essential.

The most effective means to mobilize, educate, and involve local citizens in this effort is through the creation and support of watershed councils.

In 1993, the Oregon Legislature created the Watershed Health Program as part of a natural resources strategy based on recognition of the critical importance of watersheds to Oregon's livability and economic health” (Governor's Watershed Enhancement Board 1997). The integrated nature of watershed health and the socio-economic environment were reiterated in March 2004.

Despite express socio-economic goals and values, incorporating socio-economic monitoring and evaluation into watershed management has been a challenge. In part, it has been a challenge for Oregon’s watershed councils to integrate socio-economic monitoring and evaluation with ecosystem management. One approach to advance thinking about sustainability and create a more holistic system of adaptive management would be to develop socio-economic metrics to complement the bio-physical metrics that watershed councils already use.

There are various metrics that constitute monitoring. These include indicators, output measures, outcome measures, and performance measures. Each of these metrics has a specific function:

- Indicators provide a baseline of information about general health and are often external data from a government or non-profit organization (Phillips 2005, Hart 1999, Redefining Progress 1997).
- Output measures assess the direct products or services that come from an organization’s activity, it is usually data collected by the organization about the number of products or services rendered (Bellamy, Walker, et al. 2001).
- Outcome measures look at the impacts of the organization’s activities on the community (Spar and Dail 2002, Webler, Tuler and Kruger 2001).

- Performance measures reflect the overall efficiency and effectiveness of the organization (Environmental Protection Agency 2009).

The incorporation of socio-economic indicators into a monitoring system that looks at a holistic management of the watershed has been a difficult task, in part because indicators themselves have many issues (McCool and Stankey 2004).

Socio-economic indicators have a long history in the United States. The US Census, first taken in 1791, is considered one of the most important sources of information on the social aspects of American growth and development (Innes 1990). According to Innes, the “idea that a society should produce a quantitative picture of itself” began in the 1920’s (Innes 1990). Over the years social indicators have arisen in bursts of popularity and then been abandoned, mainly because of the technical difficulties involved. In the early 1990’s the Sustainability Indicators movement started as an offshoot of the social indicators movement. With the adoption of Agenda 21 at the United Nation’s Earth Summit in 1992, and ‘Local Agenda 21’ sustainability indicators have grown into their own movement (Guy and Kibert 1998).

Sustainability indicators are intended to be a more comprehensive and integrated approach to quantifying the relationships between the environment, economy, and society (Guy and Kibert 1998). Since 1992, communities all over the world have been looking at how to develop socio-economic and environmental indicators to measure sustainability at the local level. Indicators developed at the local level are being seen as keys to improving sustainability (R. Gahin 2001). However, developing and incorporating socio-economic indicators at the local level has proved very challenging. This study builds on

the existing research and literature on the development and incorporation of socio-economic indicators at the local level, within CBNRM, and in watershed management.

Purpose of Study

This research is part of a larger on-going project to develop a process and identify a framework for socio-economic measures, to create a more sustainable framework for the adaptive ecosystem management of watersheds. The overall “purpose of the larger project is to demonstrate the feasibility of measuring the local economic and social outcomes of the restoration, education, and other activities of watershed stewardship organizations, using Oregon’s watershed councils as a case in point” (Hibbard and Sweitzer 2007).

There are a variety of socio-economic metrics that watershed councils can use, including outcome measures, performance measures, and community indicators. This particular study focuses on the latter. It aims to develop a process for identifying, selecting, and incorporating socio-economic indicators into watershed management, as part of a holistic framework.

Questions to Be Answered

This study examines the following question:

“What role can socio-economic indicators play in watershed management?”

To answer this question I asked:

- How are watershed councils currently using socio-economic indicators?
- What are the different ways in which watershed councils can use socio-economic indicators?

- What are the main challenges to developing and incorporating socio-economic indicators in watershed management?
- What process can watershed councils follow to develop meaningful socio-economic indicators?

Methodology

This study was conducted through organizational action research with four watershed councils in Oregon: Coos Watershed Association, Partnership for the Umpqua Rivers, Grande Ronde Model Watershed, and the Walla Walla Watershed. I worked with the four watershed council executive directors and the Network of Oregon Watershed Councils' Director to explore the current and potential uses of socio-economic indicators and the methods for developing and incorporating them into watershed management.

Importance of Study

Oregon watershed councils are a prime example of a CBNRM organization because the organizational structure is a community-based collaborative decision making group, and the predominant form of management is ecosystem management. While there are watershed councils all over the United States that could benefit from a process and framework to develop and use socio-economic indicators, this research is important in establishing a theoretical and practical model that can improve the understanding and use of socio-economic information and data as it is relevant to Oregon watershed councils and CBNRM.

Watershed Councils have a unique status in Oregon. While they are not necessarily funded directly by the state, and their structure and management often resembles a non-profit organization, they are governmentally recognized and their

authority and jurisdiction is established in Oregon Revised Statute 541.350. The state also has a grant program specific to watershed councils, for environmental restoration projects. While the main focus of watershed councils is environmental in nature, the socio-economic elements are deeply embedded and integrated in the health of a watershed. To effectively conduct ecosystem management, watershed councils must consider all elements of the ecosystem, including the human community. Without this information, watershed councils are not fully considering all the factors that affect watershed health and restoration.

Limitations

The four watershed councils studied for this project were not randomly chosen and are not representative of all councils. The purpose of this research is to generalize to theory and build on existing knowledge of how organizations can use indicators as management tools. It is also important to recognize that because CBNRM is local in nature, the local culture and socio-economic climate may greatly impact the potential for the processes and models developed and explored through this research to apply to other communities.

Remainder of Paper

Chapter II of this paper discusses the major relevant literature associated with the current issues, challenges, and successes of community-based natural resource management, watershed management and socio-economic indicators. Chapter III describes the methods used to collect the data. Chapter IV discusses the findings from this research and presents the models and processes developed. Chapter V presents the

conclusions from this research and the recommendations for watershed councils and future research.

CHAPTER II

LITERATURE REVIEW

Introduction

This study draws on two lines of research. One is studies of CBNRM. The other is the challenges of developing socio-economic measures. With regard to CBNRM, I first look at the emergence of this approach to natural resource management, then at the specific experience of Oregon's watershed councils. Turning to socio-economic measures, I begin with a discussion of the definitions and uses of socio-economic measures, with an emphasis on indicators. I then describe the ways of thinking about socio-economic indicators – social indicators, community indicators, and sustainability indicators, giving special attention to the criteria of “good” indicators. In the final section I review the ways indicators have been used in CBNRM.

Community-based Natural Resource Management and its Challenges

Community-based Natural Resource Management (CBNRM) is loosely defined as “local, place-based projects, programs, and policies that have the goals of advancing healthy environments and human communities” (Lurie & Hibbard 2006). The collaborative community approach has become the dominant paradigm in natural resource management in the US and in many areas of the world (Margerum 2004, Lane

2005, Fraser, et al. 2006). While this review will use the term Community-based natural Resource Management (CBNRM), other names include Integrated Resource Management (Bellamy, McDonald, Syme, Butterworth, & McDonald 1999), Community-based Environmental Planning (Lane and McDonald 2005), collaborative stewardship, grass-roots ecosystem management, and civic environmentalism (Lurie & Hibbard 2006). Recent research has focused on understanding the challenges and best practices for improving the effectiveness of CBNRM (Fraser, Dougill, Mabee, Reed, & McAlpine 2006, Bellamy, McDonald, Syme, Butterworth, & McDonald 1999, Conley & Moote 2003, Lane 2005).

CBNRM is an evolving and developing paradigm. Some of the key challenges identified by researchers include: the concept of community as a homogenous social unit, social inequality at the local level, organizational and technical capacity of community groups, the scale of management, and “parochialism” (Lane and McDonald 2005).

The major critics often cite the lack of a clear concept of community and the vision of the community as a homogenous place-based unit as major impediments to CBNRM (Agrawal 1999, Lane 2005). In particular, Lane and McDonald note that the romanticization of the idea of “community” is a major threat to success in CBNRM. While this may be a challenge it is important for CBNRM groups to look at the concept of community not as a homogenous unit, but rather as a multi-dimensional unit that will embrace rather than avoid differences (Lane and McDonald 2005). Lane and McDonald note that it is important to consider “a new concept of community to be inclusive of

dynamism, multiplicity and aspatiality.” And that “it should be recognized that conflict and conflict resolution must be an accessory to” CBNRM (Lane and McDonald 2005).

Social inequality is another major concern in CBNRM. While the idea that traditional local and indigenous knowledge are important components for CBNRM they are not guaranteed by transferring decision-making to the local level. If this issue is not addressed it can lead to the empowerment of some groups through financial and political resources while marginalizing others. Many of the issues that result from inequality are similar to the issues associated with the issues of equity in participatory government and the inability of certain groups to have a voice resulting in inequitable decision-making (Lane and McDonald 2005).

Another issue that has arisen in CBNRM is the lack of resources, capacity and ability at the community level to make technical decisions and manage resources. Local and indigenous knowledge are crucial for local resource management (Lane and McDonald 2005). Yet, many communities lack the financial and human resources to effectively manage ecosystems. Additionally, communities may not have the skills or ability to work as a collaborative social group to manage resources (Lane and McDonald 2005).

While the “top-down” versus “bottom-up” distinction has been made regarding CBNRM, extensive research into CBNRM organizations (including watershed councils) show that decisions made at an exclusively micro/local level has posed many issues for the larger ecosystem (Lane and McDonald 2005, Margerum 2004). While operating at the larger scale poses a challenge for local community groups it is a necessary component

for success at both the micro and macro level (Lane and McDonald 2005). Furthermore, there is concern that local implementation and state policies are not in-line with specific federal policies and may result in a weaker implementation of ecosystem management (Malone 2000).

Oregon Watershed Councils

Oregon watershed councils are a prime example of CBNRM practices and principles. Their challenges and issues are similar to those of other CBNRM groups around the world. To understand these challenges I will first review the history of Oregon watershed councils, and then review the literature concerning the challenges.

Oregon state support for community-based watershed conservation dates back to the Governors' Watershed Enhancement Board (GWEB) which was created in 1987. GWEB mainly funded citizen efforts to educate the public about salmon and trout. In 1991, the Pacific Rivers Council, an environmental organization introduced a bill to the legislature for the development of watershed councils after a group of scientists persuaded them that rivers should be managed as ecosystems and not as they were being managed under the wild and scenic river Legislation. In 1993, the Oregon State Legislature authorized House Bill 2215, creating the Oregon Watershed Health Program that appropriated \$10 million for pilot projects in the south coast/Rogue and the Grande Ronde. In 1995, the Watershed Health Program and the Governor's Watershed Enhancement Board (GWEB) were combined by House Bill 3441 (Moseley December, 1999).

In 1998 a citizen initiative was passed to fund watershed restoration through State Lottery dollars and in 1999 the Oregon Watershed Enhancement Board (OWEB) was established to provide grant funding and technical assistance to watershed councils (Lurie & Hibbard 2006). Oregon has approximately 90 watershed councils with varying sizes, structures, and capacities. Research into the structure and operations has shown that these organizations have had many successes. However, there are still a number of challenges that face watershed councils (Clark, Burkhardt and King, 2005, Lurie and Hibbard 2006, Margerum 2004).

All watershed councils in Oregon are local/community-based organizations. They share similar goals and missions that generally include habitat and stream (environmental) restoration, collaboration, outreach, and education. Statewide initiatives for salmon habitat restoration and sustainable watersheds, as well as state and federal water quality initiatives provide context and direction at administrative levels for local councils (Clark, Burkhardt and King 2005, Lurie and Hibbard 2006, OWEB, Oregon Watershed Enhancement Board Sustainability Plan 2004). Additionally OWEB has a statewide mission and set of goals that drive the grant program (Oregon Watershed Enhancement Board 2001).

Watershed Councils have been very successful in “improving terrestrial and aquatic habitats on private and public land,” creating parks, trails, and public art, improving water quality and efficiency, building trust between stakeholders, and developing the sense of community in the watershed (Lurie & Hibbard 2006). However, according to Lurie and Hibbard (2006), some have faced challenges that have included:

- Financial – watershed councils have largely been dependent on grants from OWEB, foundations, donors, and other agencies. A local match is required for some state funds which is especially difficult in rural Oregon where there are limited financial resources available and an extensive number of distressed communities. In the past, this has also caused issues for councils as an organization because staff size and technical capacity are limited. Additionally, the minimal staff that is in place has had to spend a significant amount of time “chasing” funding as opposed to designing and managing projects and advancing the successes (Clark et. al 2005, Lurie and Hibbard 2006, Margerum 2004).
- Resource – Watershed Councils in Oregon have varying levels of capacity. In many cases rural watershed councils have been volunteer-run due to a lack of human resources (funding-based) and have had limited technical resources for complex decision making and program management (Lurie & Hibbard 2006).
- Institutional - Oregon Watershed Councils have had institutional issues with legitimacy and networking. While they have had many successes they are fairly new organizations and still in the process of establishing their local authority within their communities. Also, networking with other agencies and organizations is a complex and difficult process that has caused many difficulties for watershed councils that have a lack of resources and technical support (Lurie & Hibbard 2006).

The challenges that have faced Oregon watershed councils are not insurmountable, and it is possible that incorporating socio-economic indicators into the framework of watershed management may help councils to better understand and address some of their challenges.

Socio-Economic and Sustainability Indicators

Community-based decision making has traditionally been characterized by some as a process that uses little or no technical information, with decisions made based on local politics and traditions (Lane and McDonald 2005). Though monitoring is a fundamental element of adaptive management and environmental indicators are a component of that system (Moseley and Wilson 2002, Clark 2002), the use of socio-economic indicators or monitoring has been minimal.

A significant quantity of research has explored the potential benefits of using indicators. McCool and Stankey (2004) summarize that indicators can “help depict existing conditions of systems,” “facilitate evaluating the performance of various management actions,” and “alert users to impending changes in social, cultural, economic, and environmental systems.” Other researchers claim that indicators create “empowerment” among community members through participatory development processes (Gahin, Veleva & Hart 2003, Fraser et al. 2006). Additionally, indicators can be used as educational or communicative tools to build community awareness (Beratan, et al. 2004, Rydin, Holman & Wolff 2003). Indicators can also provide a common framework to describe a system on a larger level and compare with other systems as well as assisting to provide a holistic approach to ecosystems (Montreal Process Working Group 2007).

According to Hart (1999), “an indicator is something that points to an issue or condition. Its purpose is to show you how well a system is working. If there is a problem, an indicator can help you determine what direction to take to address the issue.” A socio-economic indicator is an indicator that measures the economic status of a community, be it a small town, large city, country or continent (Phillips 2005). An indicator is also described as “a quantitative or qualitative variable which can be measured or described and which, when observed periodically, demonstrates trends” (Montral Process Working Group 2005). For purposes of this research, I use this definition of an indicator: Data that describe the current socio economic conditions or climate of a community.

While some researchers consider all components of a monitoring and evaluation system to be indicators (Bowen and Riley 2003), I distinguish indicators from program evaluation measures based on the definition of program evaluation developed by Jennifer Bellamy which clearly distinguishes program evaluation from indicators by defining program evaluation as “the systematic collection of information about the activities, characteristics, and outcomes of programs for use by specific people to reduce uncertainties, improve effectiveness, and make decision with regard to what those programs are affecting” (Bellamy, McDonald, et al. 1999). Where indicators describe the existing condition or trend in a system, program measures are much more specific to the activities of an organization. While “there are no universally accepted models for evaluation” (Bellamy, Walker, et al. 2001), there are three general categories that are commonly found in this framework: output measures, outcome measures, and performance measures. An *output measure* is defined as the tangible results of a project, program, or activity (Bellamy, et. al. 2001). An *outcome measure* measures changes in the conditions that result from the outputs of an organization (Webler, Tuler and Kruger 2001, Spar and Dail 2002). A *performance measure* measures an organization’s efficiency or effectiveness in achieving established goals and objectives (EPA). In this context, monitoring for adaptive management involves the integration of indicators with program evaluation (Bellamy, Walker, et al. 2001, Clark 2002).

Indicators are an integral part of a monitoring system for adaptive management (Clark 2002). According to Clark, “monitoring refers to information collected on a repeat cycle or with a set frequency and against a specific objective, providing a

capability to identify local or temporal trends.” He continues to say that there is a need for baseline data that may be costly and difficult to collect. For this reason, “indicators are variables chosen to represent the state and operation of the system that is being monitored and managed...they provide cost-effective information that is easy to collect and communicate” (Clark 2002).

“Sustainability indicators integrate environmental, social, and economic factors such that the complex cause-and-effect relationships between these multiple factors can be more readily investigated” (Guy and Kibert 1998). This can be in the form of either an indicator that has multiple significance, such as a healthy fish population signifies good environmental health and (theoretically speaking) a healthy economic situation for fishermen, or it can be a group of indicators that measure the triple bottom line (Hart 1999). In watershed management, indicators are largely environmental in nature and present the opportunity for socio-economic indicators to complete the holistic framework.

History of Socio-Economic and Sustainability Indicators

As previously noted in Chapter I, sustainability indicators are an outgrowth of the most recent social indicators movement. This movement began in the 1960's and was prompted by NASA, with the publication of “Social Indicators” in 1966 (Phillips 2005). While enthusiasm in the United States has waned and waxed since then, European interest in the subject grew and the international community continued working with the concept even after the US had abandoned the concept in the 1980s (Phillips 2005). In the past, state, federal, and international agencies and institutions were driving the development and use of indicators. However, in the 1990s, socio-economic indicators

have focused on the community level and have now become known as “community indicators” (Phillips 2005).

Sustainability indicators are distinguished from social indicators or community indicators by the goal of the indicator. The goal of sustainability indicators is to not only to measure the social and economic aspects of the community, but rather to show the balance between environment, economics, and society (Guy and Kibert 1998). Socio-economic indicators are part of sustainability indicators, as they are incorporated with environmental indicators. In theory, sustainability indicators are not intended to just articulate the status of the triple bottom line, but rather, to capture their linkages and connections (Bowen and Riley 2003).

The validity of using indicators is still up for debate within the literature. Frameworks and criteria have been developed by numerous governments, agencies, and organizations, but there are many conflicting perspectives about what an indicator should do. According to Bowen and Riley, “OECD has argued that a successful indicator should reduce the number of measures which normally would be required for an exact presentation of a situation and simplify the process of communication to managers, stakeholders, and communities” (Bowen and Riley 2003). One definition of indicators states that they are “bits of information that highlight what is happening in the large system. They are small windows that provide a glimpse of the ‘big picture.’ (AtKisson, 1995)” (Guy and Kibert 1998). This concept of indicators is criticized by researchers who recognize that indicators are used to “reduce complex, poorly understood systems to a limited number of variables...” and consider this a weakness in the use and purpose of

indicators (McCool and Stankey 2004). Depending on whether the organization/government is collecting indicators for monitoring purposes or for policy making, this criticism may or may not be valid. In the case of watershed management, where there is a complex framework of indicators, monitoring, and collaborative decision making, it is probably less of an issue.

Socio-Economic and Sustainability Indicator Criteria

While there are varying opinions on both what constitutes an indicator and how it can or should be used, research that delineates criteria for indicator development includes several consistent themes regarding process and content.

Most research suggests that the development of indicators, if they are to have value, should be done on as local a level as possible with public participation and the integration of key stakeholders (McCool and Stankey 2004, Fraser, et al. 2006, Rydin, Holman and Wolff 2003). While there is some debate as to the level of technicality in which indicators should be created, research suggests that indicators should be transparent and embedded in the local culture and knowledge (Fraser, et al. 2006).

McCool and Stankey (2004) are critical of this concept, and express a number of concerns over a process that is embedded in socio-political structures. Mainly, “methods that rely more on selecting indicators that represent what some people feel are socially problematic issues than on portraying and understanding the system to be sustained” (McCool and Stankey 2004). McCool and Stankey also note that selection criteria are political in nature and that it is equally embedded in the goals and values of the

community (McCool and Stankey 2004). While this is an issue for criteria, they recognize that indicators fall in a delicate balance of simplifying complex systems without trivializing situations or creating misleading information (McCool and Stankey 2004). Inherent in this process, is what McCool and Stankey label as the “normative” and the “scientific” value of these indicators. While there are some researchers that look at indicators as a science, the normative value is equally important to take into account in the development process (McCool and Stankey 2004).

On the other hand, a number of researchers and practitioners express the importance of basic indicator criteria and suggest general guidelines. The following criteria are the most common to be suggested by researchers and practitioners:

- Scientific validity – the indicator should use reliable and accurate data (Phillips 2005, Guy and Kibert 1998, Redefining Progress 1997).
- Relevant – indicators should be relevant to the policies, goals, or objectives of the organization/community (Phillips 2005, Guy and Kibert 1998, Redefining Progress 1997)
- Understandable and clear – indicators should be accessible to the public and in that sense they should also be meaningful and clear to members of the community (Phillips 2005, Guy and Kibert 1998, Redefining Progress 1997)

Hart (1999) states that regardless of characteristics, effective indicators are relevant, easy to understand, reliable, and timely, meaning that they “give information while there is still time to act.”

While these three criteria are consistent throughout research, there are a number of other criteria that are relevant to indicators but depend on the use of the indicator. For example, indicators that are meant to empower and engage the community should be

attractive to the media (Phillips 2005, Guy and Kibert 1998, Redefining Progress 1997). Additionally, indicators that are meant to measure the effects of policy changes should be “responsive,” meaning that changes relevant to the policy will be represented by the indicator (Phillips 2005, Guy and Kibert 1998, Redefining Progress 1997). Recent research also considers that indicators should be compatible with and complimentary to traditional and local knowledge (Fraser, et al. 2006).

Regardless, the development process is regarded as highly significant to the use and value of the indicators (Rydin, Holman and Wolff 2003, Fraser, et al. 2006, Gahin, Veleva and Hart 2003). Yet, the questions still remains, “who should indicators be valuable to?” and “how should they be valuable?” To these questions, there is no right answer, and it will vary within different communities. Within the context of CBNRM, sustainability and socio-economic indicators may serve an important role, but there are still a number of challenges and issues that must be considered before the determination is made.

Indicators, Sustainability, and CBNRM

A major impetus for the incorporation of indicators and evaluation in CBNRM comes from funders government program requirements (Conley and Moote 2003). In other cases "collaborative groups themselves are initiating monitoring and self-evaluation processes, often as part of a participatory approach to adaptive management" (Conley and Moote 2003). Additionally, the size and breadth of the interests, regulations, and politics that come into the process through stakeholders, has created a need for neutral information. Not all stakeholders have “equal power.” By integrating indicators and

evaluation into the process stakeholders have a “truthful” basis of information from which to make decisions and balance the interests of different groups and empower the community (Fraser, et al. 2006).

Instead of the top-down approach of collecting data, information, and public input then making a generic prescriptive decision, research suggests that information and data should be collected and used at the local level in combination with cultural knowledge and understanding of community organizations to make decisions (Fraser, et al. 2006, Beratan, et al. 2004).

More and more community organizations are seeing the value of integrating information into the planning and programming processes for organizations. This is also happening to a certain extent in government programs. Federal programs including the US Forest Service, National Marine Fisheries Services, etc. are using monitoring and evaluation programs to look at the overall effectiveness of the organization (Donoghue and Sturtevant 2007, Sepez 2006).

While current research focuses on the challenge of developing and using indicators in a collaborative context, there is always one major issue with using “data” for decision making. Clifford Cobb and Craig Rixford express the conundrum that drives continual research in socio-economic and sustainability indicators:

“The truth we are told, is the first casualty of war. It does not survive political conflict very well either. The misuse of statistical evidence by all sides has been the mainstay of politics ever since the census of 1840. Descriptive statistics are the mainstay

of politics because they are more malleable and evocative. But when a diagnostic model of causality fits the ideology of one side or another in political debate, it is an even more powerful tool” (Phillips 2005).

This statement not only shows the general historical challenges, but also the current challenges of indicators for CBNRM. While, the concept of using data and information to make decisions has merit, as does the idea of “grounding” the collaborative process, this potential pitfall is important to consider. It is a reminder that information is not necessarily fact, and that statistical data, indicators, and other “scientific knowledge” cannot be taken as supreme over the traditional or cultural knowledge (McCool and Stankey 2004).

Another major issue that has plagued socio-economic indicators throughout their history in the United States, is the expectations placed on measurements. Indicators by nature are “descriptive” and not “predictive variables.” According to Cobb and Rixford, this is a weakness that has caused indicators to “die” in the past. They suggest that indicators need to “transcend the descriptive approach to social phenomena” and be used as “diagnostic” tools (Phillips 2005).

Looking specifically at CBNRM, there have been two major challenges for the incorporation of indicators. The first is data collection. Not only is it time and resource intensive, it also takes specific technical skills to interpret and analyze the data collected (McLain, et al. 2008). In many cases, the data desired is not available and the data that is available is not useful to local CBNRM (Conley and Moote 2003). Additionally, if the indicators and evaluation are conducted at the local level under local standards it may not

be compatible with other data to aggregate at regional, state, and national levels. However, research also shows that indicators and evaluation should complement traditional knowledge (Lane and McDonald 2005).

Additionally, “environmental policy and management is too often driven by simple and incomplete sets of indicators” (Fraser, et al. 2006). In the past, community-based decision making is largely driven by the culture of the organizations, local politics, and what they “know” about the situation, but data has not played a significant role (Lane and McDonald 2005).

Socio-economic indicators have enormous potential in the advancement and improvement of sustainable watershed management, but there are a number of ambiguities, challenges, and issues with the concept. This project contributes to the existing research by attempting to address some of these issues and explore the potential role of indicators in watershed management.

My research builds off the research described above and looks at socio-economic indicators in a holistic framework for socio-economic monitoring in watershed planning and management.

CHAPTER III

METHODOLOGY

Background and Overview

Prof. Michael Hibbard of the University of Oregon's Institute for Policy Research and Innovation (IPRI) is conducting an ongoing project with Oregon watershed councils to develop socio-economic metrics. The purpose of the project is to "demonstrate the feasibility of measuring the local economic and social outcomes of the restoration, education, and other activities of watershed stewardship organizations..." (Hibbard and Sweitzer June, 2007). Among other activities, the IPRI held a series of socio-economic indicator workshops with six watershed councils from around the state, to brainstorm potential socio-economic indicators that would benefit watershed councils. While there were variations in the indicators identified, the workshops found common themes across the participating watershed councils. In addition, the coordinators of the participating watershed council coordinators showed significant interest in the "basic economic development issues" in the watershed."

The project resulted in the identification of socio-economic and civic engagement indicators by the six watershed councils. However, it was concluded that additional research was necessary "1) to assess whether the suggested indicators fit the goals that

have been developed, and 2) if so, are the indicators useful to the watershed councils in their planning and management activities...” (Hibbard and Sweitzer June, 2007)

My research is a follow-up to that earlier work, exploring the current and potential roles of socio-economic indicators in watershed management. I engaged in initial qualitative action research with four high capacity Oregon watershed councils. I then followed up with a more in depth case study with the Coos Watershed Association.

“The process [of action research] is as much an act of scientific research as an act of engagement with people experiencing the problem...It involves theorizing, experimenting, and implementing, being extremely rigorous with some steps, and very flexible with others...the social scientist is ‘engaged’ within an organization or group undergoing change” (Cunningham 1993).

Between June 2008 and February 2009, I conducted four individual interviews, one group interview, and analyzed the current planning documents associated with the four councils. These steps were not linear. As more documents became available and as I received new information from both the interviews and the expert panel discussion, it was necessary to re-analyze documents and refine the steps and criteria for the indicator development process.

As is typical with action research, the participants informed the process and the direction of the project (Cunningham 1993). The purpose of this research was to come up with socio-economic indicators and a process for developing them that would be useful for watershed councils and CBNRM organizations. To substantiate my initial findings from the preliminary research I conducted case study research with the Coos

Watershed Association. In this chapter I will detail the steps taken in this study and explain my methodology.

Selection of Watershed Councils

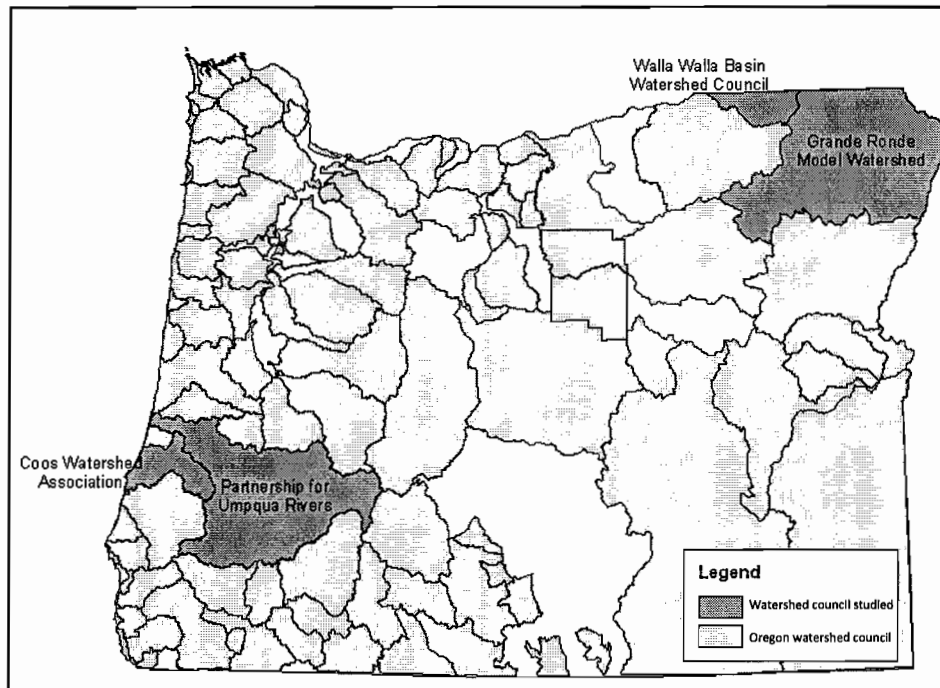
Oregon watershed councils are complex organizations, and in order to work on an indepth level, it was necessary to focus on a small number of councils that had already participated in the workshop held by the IPRI.

Additionally, it was necessary to work with organizations that would have the organizational capacity and interest to engage in this project. Six watershed councils participated in the IPRI's Socio-Economic Indicator Workshop. I chose to work with four of those councils based on capacity, interest and availability. These were:

- Coos Watershed Association, Coos Bay, Oregon
- Grande Ronde Model Watershed, La Grande, Oregon
- Partnership for the Umpqua Rivers, Roseburg, Oregon
- Walla Walla Basin Watershed, Milton-Freewater, Oregon

The map below shows the locations of these watersheds within the state of Oregon:

Figure 3.1: Map of Watershed Councils Studied



Source: Oregon Geospatial Information Office, 2009

All of these are high capacity “older” watershed councils managed by executive directors that have been coordinating the councils and their activities for at least 10 years. Additionally, all of these watershed councils are in rural areas, with at least one small/medium city in the watershed.

After the preliminary steps of this research, Coos Watershed Association was self selected as a case study for a more detailed and technical study of how indicators can be incorporated into watershed management. Case study research has a long history. Though it is more closely associated with anthropological or ethnographic, or historical studies, case study research has been used in policy research to examine the effects of policies and programs. Case study research “permits the grounding of observations and

concepts about social action and structures in a natural setting...” and “provides information from a number of sources and over a period of time, thus permitting a more holistic study of complex social networks...” (Feagin, Orum and Sjoberg 1991) This additional step provided the opportunity to test the results of the exploratory research.

Documents Analysis

The documents analysis phase was a significant portion of my research. I reviewed a number of documents in order to understand the history of the existing research project and the context of watershed councils in Oregon. According to Michael Quinn Patton (1990):

“One particularly rich source of information about many programs is program records and documents... all programs leave a trail of paper that the evaluator can follow and use to increase the knowledge and understanding about the program.”

I began this research by reviewing the report “Evaluating Environmental, Social, and Economic Impacts of Watershed Enhancement Activities.” In particular I reviewed and analyzed the results of the “Watershed Council Community Indicator Workshop” based on the literature review of indicator criteria. In the workshop, the watershed councils were asked to identify indicators that were: relevant, easy to understand, reliable, based on accessible data, outcome oriented, and asset oriented. In my literature review and initial research on criteria for indicators, I modified the criteria for indicators and used the following to analyze the indicators selected during the workshop:

- Understandable and clear- What level of complexity is useful to the watershed council?
- Relevance - How are these socio-economic indicators relevant to the work of the watershed council
- Time/cost effective - Will it be time and resource efficient to gather this information in relation to its value to the council?
- Leading - will they show a trend that can have significance in program design?
- Holistic - Does this indicator relate to the others in an integrated manner? With the other indicators do they tell a story?
- Classification - Is this an indicator or a different kind of metric?

Beyond this, it was necessary to evaluate the indicators based on questions that would not only evaluate if they were good indicators, but also on their usefulness. These evaluative questions included:

- How can this information be interpreted?
- How can this knowledge affect future planning, programming, and management?
- Where will the data be obtained?

I analyzed the IPRI workshop indicators for each of the watershed councils based on the above criteria and evaluative questions, then classified the indicators into three categories:

- Effectual indicators – Indicators that meet all the above criteria and have the capacity to be powerful and meaningful for the planning, programming, or activities of the watershed council.
- Potentially effectual indicators – Indicators that may have value to the planning, programming, or activities of the watershed council, but need to be modified because they do not fit one or more of the basic criteria identified above.

- Ineffectual indicators - Indicators that do not provide information relevant to watershed councils, or does not fit the basic criteria identified above.

Interviews

The one-on-one interviews took place in a series of site visits in which Professor Hibbard and I visited the four watersheds and met with the watershed council executive directors. In these open-ended interviews, I presented the indicators selected in the workshop as it had been filtered through the criteria in the document analysis phase of the project.

In these meetings, the general topics covered were:

- Introductions
- Updates on current situations
- Re-engagement and confirmation of participation in the indicator development project
- Current uses of indicators
- How the indicators identified through the workshop fit the needs of the organization and relate to the socio-economic goals defined in their plans and documents

Table 3.1: Schedule of Interviews with Watershed Council Executive Directors

Interviewee / Organization	Date	Location
Jeff Oveson, Grande Ronde Model Watershed	August 18, 2008	La Grande, Oregon
Brian Wolocott, Walla Walla Basin Watershed Council	August 19, 2008	Milton-Freewater, Oregon
Jon Souder, Coos Watershed Association	October 3, 2008,	Coos Bay, Oregon
Bob Kinyon, Partnership for the Umpqua Rivers	October 3, 2008	Roseburg, Oregon

These open-ended interviews were conducted as “problem-solving interviews” (Cunningham 1993), in which the researcher and the participant have a mutual interest in not only discovering information, but working towards solutions from the problem presented (Cunningham 1993). In this case, the interviews focused on indicators, their current uses, the value of the identified indicators, and the potential ways for integrating them. The interviews differed from the standard problem-solving interview format in that these were exploratory interviews and not intended to develop a final resolution.

Documents Analysis (Phase 2)

Through the interview process I came across new documents from the watershed councils and new information regarding the indicators I had previously evaluated. I first reviewed the plans and documents from the councils to assess their socio-economic goals, values, objectives, and related programs. Below is a list of the documents reviewed in this analysis:

- Coos Watershed Association website
- Coos Watershed Association, Strategic Framework 2005-2015

- Coos Watershed Association (Coos WA): Model Watershed Program Proposal to the Bonneville Environmental Foundation
- Grande Ronde Model Watershed Website
- Grande Ronde Subbasin Plan, 2004
- Grande Ronde Subbasin Plan Supplement, 2005
- Partnership for the Umpqua Rivers Website
- Partnership for the Umpqua Rivers Strategic Plan 2008-2011
- Partnership for the Umpqua Rivers 2008 Annual Report.
- Walla Walla Basin Strategic Action Plan. Strategic Plan, 2003
- Walla Walla Basin Watershed Council website

Next, I re-evaluated the socio-economic indicators and metrics from the IPRI workshop and those identified in the above documents based on the criteria from initial analysis. During this phase I distinguished the metrics as either indicators, performance measures, output measures, or outcome measures. In order to do this, I used the following working definitions based on the literature review and initial research:

- Indicator - Data that describe the current socio economic conditions or climate of a community ((Phillips 2005, Hart 1999, Redefining Progress 1997)
- Output Measure - The tangible results of a project, program, or activity (Bellamy, et. al. 2001)
- Outcome Measure - A measure of changes in the socio-economic conditions that result from the outputs of an organization (Webler and Tuler 2001, Spar and Dail 2002)
- Performance Measure - A measure of an organization's efficiency or effectiveness in achieving established goals and objectives (EPA, 2009)

Expert Panel Discussion

The next step in the process involved a panel discussion with the expert panelists. This method was chosen because group discussions are useful for understanding multiple perspectives on a specific topic (Patton 1990). The reasoning behind this method, was to allow the different perspectives of each executive director to influence one another and build a creative synergy that would result in a deeper understanding of how socio-economic indicators are currently used, can be used, and how they can be developed.

The participants were watershed council executive directors Jon Souder from Coos Watershed Association (Coos WA), Jeff Oveson from the Grande Ronde Model Watershed (GRMW), Bob Kinyon from Partnership for the Umpqua Rivers (PUR), and Brian Wolocott from the Walla Walla Basin Watershed Council (Walla Walla), John Moriarty, the executive director of the Network of Oregon Watershed Councils, and Professor Hibbard. On November 19, 2008 the project participants discussed the current uses of socio-economic indicators, monitoring, and evaluation. There was no formal agenda because it was important to allow the participants to develop the conversation naturally. There was a flexible agenda that included the following topics:

- How socio-economic metrics are currently used
- How socio-economic metrics can be used
- Challenges of incorporating socio-economic indicators
- How the IPRI team can assist the councils in the process of developing and integrating socio-economic indicators.

Tool Box Development

As a result of the expert panel discussion, I then selected the effectual indicators from each of the participating councils and developed a toolbox of effectual indicators from the evaluation of indicators identified by watershed councils in the workshop. Additionally, I included indicators that I modified from potentially effectual indicators identified by watershed councils. At this point, I also developed a preferred process for identifying and selecting socio-economic indicators, based on the steps taken in this project.

Coos Watershed Association Case Study

The initial phase of this research provided a theoretical basis for understanding the existing and potential role of socio-economic indicators in watershed management, but it was clear that in order to substantiate the initial findings, it was necessary to follow up with a more in depth case study. Coos Watershed Association was self-selected as the subject of the case study research. This was appropriate because organizational buy-in is essential for developing and using effective indicators and the executive director showed a strong interest in actually developing socio-economic indicators for the Coos Watershed. In this phase I conducted three additional phases of research:

- 1) I created a matrix with the goals, objectives, and values with the indicators identified by Coos WA and the toolbox indicators. I then organized the socio-economic indicators and the other metrics into two categories based on the goals; community and economy. This was used to identify the links between monitoring of socio-economic impacts of the watershed with potential indicators.

- 2) I then gathered the data for the effectual indicators selected by Coos WA and the toolbox indicators for Coos WA.
- 3) On April 21, 2009 I met with Coos WA Executive Director Jon Souder to review the results of the matrix and the selected indicators. During this visit I interviewed Jon Souder and asked the following questions:
 - How do the indicators meet the information “needs” of the organization?
 - How might this data/information impact the planning, strategy or management of watershed resources?
 - How will Coos WA incorporate this information?
 - Does this data provide a more holistic perspective of the watershed?
 - Is there additional information that will/could be useful or meaningful for Coos WA?
 - What are concerns about the use of these indicators or indicators in general?
 - Is it likely that these indicators “will change anything?”

Based on the results of the interview with Dr. Souder, I then conducted additional research on the indicators selected and made some additional modifications to the indicators adding indicators to fill any gaps. On April 28, 2009, I reviewed the changes made to the Coos WA indicators with Dr. Souder and confirmed the findings and results from the case study portion of this research. Over a period of two weeks I worked with Dr. Souder as well as technical experts from various state agencies to further refine the indicators identified by Coos WA, and in the following chapter I will present the results from this research.

CHAPTER IV

FINDINGS

Introduction

This chapter begins with a brief description for each of the watershed councils used in this research. I will then discuss how watershed councils currently use socio-economic metrics with a specific emphasis on indicators, and how they fit or could fit within the current framework of watershed management. I will then summarize the findings of this research as it relates to my research questions in the first chapter.

Watershed Council Profiles

Coos Watershed Association

Coos Watershed Association (Coos WA) manages the Coos River Watershed which flows from the coast range to the Pacific Ocean through Coos Bay. Geopolitically, the watershed consists of part of Coos County, including the most heavily populated areas of Coos Bay and North Bend. Coos Bay is one of the largest natural ports between San Francisco and Seattle. Coos County has a natural resource based economy, that depends on timber, fisheries, and agriculture, but shipping and trade also contribute significantly (OECD 2008).

Coos WA was formed in 1993 and has an Executive Council that “includes representatives of local ranching and agriculture, small woodlot owners, industrial timber operators, commercial fisheries and aquaculture, environmental groups, tribal land managers, and local, state, and federal land managers” (Coos Watershed Association 2009). The Coos WA organizational mission is “to provide a framework to coordinate and implement proven management practices, and test promising new management practices, designed to promote environmental integrity and economic stability for communities of the Coos watershed.” (Coos Watershed Association 2009)

Grande Ronde Model Watershed

Grande Ronde Model Watershed (GRMW) manages the watershed of the Grande Ronde River which is a tributary of the Columbia River. Located in the upper northeast corner of the state, the watershed includes Wallowa and Union Counties, both of which have natural resource economies based mainly on timber and agriculture. The area is extremely rural with just over 32,000 residents between the two counties (OECD 2008).

GRMW was founded in 1992 following its designation as a model watershed by the Northwest Power Planning Council. “A board of directors composed of local representatives and agency personnel involved with the multiple uses of natural resources within the basin, was formed to coordinate policy for the development, implementation, monitoring, and maintenance” of the watershed (Grande Ronde Model Watershed 2009). The GRMW mission 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” (Grande Ronde Model Watershed 2009).

Partnership for the Umpqua Rivers

Partnership for the Umpqua Rivers (PUR) manages the Umpqua River watershed. The watershed boundaries follow very closely the Douglas county boundaries. Historically, Douglas County has had a natural resource based economy, mainly associated with timber, mining and agricultural production. It is located in southwest Oregon, and has a population of over 100,000 residents. The county includes area from the Cascade Mountains to the Pacific Ocean (OECD 2008).

PUR was incorporated in May of 2000. The council is made up of representatives of “various local interest groups” (Partnership for the Umpqua Rivers 2007-2008). “Through collaboration with diverse participants, the partnership for the Umpqua Rivers maintains and improves water quality and fish populations from source to sea in the streams of Umpqua...educate people about the value of healthy stream...work with willing landowners to improve stream conditions... monitor health of the streams and their fish populations. Through these actions the Partnership contributes to the ecological and economic well-being of the basin” (PUR 2008).

Walla Walla Basin Watershed Council

The Walla Walla Basin is split in half by the Oregon/Washington state line. There are two watershed councils, one for each state, that manage a section of the watershed. The Walla Walla Basin Watershed Council is located in the upper northeast corner of Umatilla County. Milton-Freewater is the only significant population center in this part of Umatilla County, which is largely rural. The Walla Walla Basin is dependent on agriculture production.

The Walla Walla Basin Watershed Council in Oregon was formed in 1994. It is governed by 13 directors with the mission 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” (Walla Walla Basin Watershed Council 2009).

Socio-Economic Indicators

All four watershed councils identified socio-economic metrics in their plans and in the May 2007 workshops. Among these metrics the councils identified socio-economic *indicators*. Using the definition developed from the literature review I identified the indicators from the metrics identified by the watershed councils. Then based on the criteria stated in Chapter III, I classified each of the councils’ indicators as:

- Effectual indicators, meaning that they are useful, accessible, understandable, and could be useful to the council.
- Potentially effectual indicators, meaning that the theory and concept behind the indicator selected was good, but that it needs to be modified in order to provide useful substantive information
- Ineffectual indicators - meaning that the indicator selected will not be useful in helping the council to measure what they have selected.

All four of the watershed councils studied have at least one valid planning document. In reviewing these documents, I found that there were explicit goals, values, and objectives related to the socio-economic health of the watersheds. I first identify these goals for each watershed and then evaluate the indicators based on these goals as well as the effectualness of the indicator.

Coos Watershed Association

In 2004, Coos WA contracted with Shorebank Enterprises to write a strategic plan for the council. In the executive summary, the purpose of the strategic planning process is identified as “to develop a new business framework that would act as a strategic foundation that will serve the organization for the next ten years” (Shorebank Enterprises 2004). Within the document Coos WA is very clear about the connections between the environmental and socio-economic health of the watershed in their expression of shared values:

“WHEREAS we believe it is possible to achieve both environmental integrity and economic stability within the Coos Watershed; and

WHEREAS we believe that the natural products and processes of the watershed are indicators of the watershed health, and are important to the economy and vitality of the community; and

WHEREAS we recognize that our actions can affect the stability of the watershed and related economy; and...

WHEREAS we believe the coordination of our individual efforts can achieve a synergistic, beneficial effect on the watershed;

THEREFORE we will support environmental integrity and economic stability within the Coos Watershed by increasing community capacity to develop, test, promote, and implement management practices in the interests of watershed health...” (Shorebank Enterprises 2004)

It is important to note the length of this statement. It is not just a token mention of the socio-economics of the watershed; it is a clear and official recognition of the

integration of the biophysical and socio-economic health. Based on these shared values, it seems clear that the Coos WA has a strong interest in the socio-economic health of the watershed and that the stated values are in line with the statewide sustainability goals. Additionally, this document refers several times to the goal of increasing the market-based approach and to increasing diversified funding opportunities for Coos WA. These two elements are significant for the integration of socio-economic indicators because they show the organizational value to collecting information on the socio-economic health of the watershed.

Additionally, I found this document to provide a clear reference to the importance of “monitoring, data collection, and analysis” (Shorebank Enterprises 2004).

Specifically, the program area of “Information” states:

“Information: Monitoring and information collection and analysis provide the framework to maximize impact of our effects. Activities include:

Environmental Monitoring

Species Monitoring

Assessment and Analysis” (Shorebank Enterprises 2004)

Socio-economic monitoring is not stated as part of this, but because of the goals and objectives there is an opportunity to integrate these activities into the plan.

Additionally, a recent proposal (November, 2007) to the Bonneville Environmental Foundation to get additional funding for Coos WA resulted in the identification of socio-economic metrics in relation to the stated socio-economic goal and objectives which include:

“The Goal of the social-economic program is to engage the local community to restore the Coos watershed... (1) garner landowner and project partner interest in restoration; (2) increase public awareness about issues related to watershed condition, processes, and health; (3) provide watershed stewardship tools and training; and (4) support sustainable natural resource based economies.”

In this proposal, Coos WA identified socio-economic metrics:

- At least one publication annually
- Number of individuals attending association meetings and other council educational activities
- Number of presentations given by association staff, volunteers
- Number of households receiving information
- Number of monitoring contracts
- Percentage of surveyed watershed residents and other stakeholders who express an understanding of watershed issues
- Number of hours of residents devoted to participation in projects
- Amount of funding for research and development
- Increased tenure of staff
- Establish deputy director position
- Median meeting attendance for executive council members
- Median staff tenure

These metrics show that the council has a genuine interest in measuring the socio-economic impacts and effects and that there is an additional opportunity to include socio-economic indicators.

In the May, 2007 workshop, Coos WA further identified indicators for the management of the Coos Watershed. They are as follows:

- Percent of surveyed watershed residents and other stakeholders who express an understanding of watershed issues
- Number of monitoring contracts
- Number of people involved in Coos WA who are also involved in other civic organizations
- Number of watershed cooperative projects with NPOs
- Number of joint projects resulting from Coos WA outreach
- Average Coos WA Pay and benefits as a percentage of the Coos County Average
- Sites available for development in the watershed

Based on this project's definitions I found that the metrics selected were not all indicators. The following table shows the classification of the metrics based on the project definitions identified in the literature review and Chapter III:

Table 4.1: Classification of Coos WA socio-economic metrics

Socio-Economic Metric Identified	Type of metric
Number of people involved in coos WA who are also involved in other civic orgs	Indicator
Number of watershed cooperative projects with NPOs	Outcome measure
Number of joint projects resulting from Coos WA outreach	Outcome measure
Number of land owners participating in programs	Performance measure

Table 4.1 (continued)

Socio-Economic Metric Identified	Type of metric
Average Coos WA pay and benefits as a The percentage of the Coos County average	Indicator
Sites available for development in the watershed	Indicator
The percentage of surveyed watershed residents and other stakeholders who express an understanding of watershed issues	Outcome Measure
at least one publication annually	Output Measure
number of presentations given by association staff, volunteers	Output Measure
Number of individuals attending association meetings and other council educational activities	Performance measure
Number of households receiving information	Performance measure
Number of hours of residents devoted to participation in projects	Performance measure
Number of monitoring contracts	Output measure
amount of funding for research and development	Performance measure
establish deputy director position	Objective
increased tenure of staff	Performance measure
median meeting attendance for executive council members	Performance measure
median staff tenure	Performance measure

Additionally, I found that the indicators identified were potentially effectual, or ineffectual as shown below in Table 4.2.

Table 4.2: Effectualness of socio-economic indicators selected by Coos WA

Indicator Selected	Effectualness of Indicator	Reasoning for Category Assignment
Average Coos WA pay and benefits as a percentage of the Coos County average	Potentially Effectual	In order to get the average pay for just the watershed, the council would have to conduct an income survey which is extremely time intensive. Additionally, there are tools available that can provide similar information with significantly less of a time investment.
Sites available for development in the watershed	Ineffectual	In order to get this information, the council would have to research it by going through planning and zoning maps. It would be intensive and time consuming. This is also highly subjective information and may or may not provide clear understanding of an issue.

Grande Ronde Model Watershed

There are several planning documents available on the GRMW website. The most recent “Action Plan” was written in 1994. Since then, a Sub-basin plan for GRMW was authored by the Grande Ronde Model Watershed Foundation for the Northwest Power and Conservation Council. Prepared in 2004, the management plan was updated in 2005. The sub-basin plan takes socio-economic factors into account, but does not use indicators.

“The estimated 2002 subbasin population was: Union County - 24,484 and Wallowa County - 7,025 The subbasin is sparsely populated with 12 persons per square mile in Union County and 2.3 persons per square mile in Wallowa County (Wallowa County statistics include the Imnaha Subbasin).

“Agriculture, including crop production, livestock and forestry play a significant land use role in the subbasin. Major crops in Union County include wheat, hay and forage, grass and legume seeds, peppermint, potatoes and

specialty crops such as canola. Wheat, hay and forage are the primary crops in Wallowa County. Livestock production accounts for nearly 40 percent of the gross farm income....

“The subbasin’s economy has become more diversified in recent years but is still heavily dependent either directly or indirectly on agriculture and timber resources. Table 2 displays employment data for 2000....

These natural resource based activities have the potential to be directly affected by watershed protection and restoration, or regulatory activities. Additionally, most economic sectors would be indirectly affected by negative impacts to the natural resource based sector.

Natural resource based activities directly account for about 10 percent of the jobs in the Grande Ronde Subbasin. Agriculture’s contribution to the local economy is likely a larger segment of the total picture when indirect effects are taken into account. Gross farm sales for 2003 were \$42,116,000 for Union County and \$33,999,000 for Wallowa County. Median household income for 2000 was \$33,738 in Union County and \$32,129 in Wallowa County. Unemployment rates for northeast Oregon often exceed the state average. For 2001 unemployment was 10.8 percent in Wallowa County and 5.8 percent in Union County” (Nowak 2004).

This is all important socio-economic information that can be useful for the watershed council, but none of these are actually indicators because they are current statistics. None of these show trends or changes in the watershed or comparisons with

state, regional, or national figures. While interesting, these are not leading indicators that can help the council understand how things are changing in a scientific or conclusive manner.

Based on the review and public comment associated with the original Subbasin Plan, several issues were identified with the adoptability of the plan. For this reason, GRMW engaged in a supplemental planning process (Watershed Professionals Network, LLC 2005). Through this process GRMW identified much more specific strategies to address the objectives and goals of the watershed council. The majority of the plan focuses heavily on biological and stream restoration priorities. It does include the following strategic priorities to address watershed restoration that address the socio-economic factors/impacts associated with restoration:

- “Explore feasibility of water storage facilities (above or below ground) to enhance late season stream flow.
- Reduce irrigation withdrawals through an integrated program of irrigation efficiency improvements, diversion point consolidations, water right leasing and water right purchase, where applicable with willing landowners.
- Promote education and technical training in the efficient use of irrigation water.
- Facilitate research and development of less water-intensive agricultural crops.
- Reduce water withdrawals through measurement to valid water rights quantities
- Encourage landowner participation in riparian management incentive programs, e.g. CREP, WRP, EQIP.
- Promote/implement minimum tillage practices.
- Promote/implement development of grazing plans to improve upland vegetative condition.
- Create/construct wetlands and filter strips for livestock feedlots and irrigation return flows” (Watershed Professionals Network, LLC 2005).

Based on this information, it is clear that the council recognizes the integrated nature of agriculture and watershed restoration, and attempts to make the connection in the planning documents.

As a participant in the May, 2007 workshops, GRMW also identified socio-economic indicators. The following were selected by the council:

- Livestock and timber harvest
- Unemployment rate
- Tourism: motel occupancy rate, deer elk tags issued
- Median family income
- Percent of GRMW board positions filled
- Percent of GRMW board attendance in various designated seats
- Number of completed outreach events
- Participants in outreach events

Through the evaluation process I found that the metrics identified by GRMW fit into the following categories in the table below.

Table 4.3: Types of Socio-Economic Metrics Identified by GRMW

Socio-Economic Metric Identified	Type
Livestock sales and timber harvest	indicator
Unemployment rate	indicator
Tourism: motel occupancy rate, deer elk tags issued	indicator
Median family income	indicator
The percentage GRMW board positions filled	performance
The percentage GRMW board attendance in various designated seats	performance
The number of completed outreach events	output
Participants in outreach events	output

In looking specifically at the socio-economic indicators above, I found that there were effectual and potentially effectual indicators, as shown in the table below.

Table 4.4: Effectualness of Socio-Economic Indicators Identified by GRMW

Socio-Economic Indicator	Effectualness	Reasoning/Analysis
Livestock and timber harvest industry data	Effectual	This information strongly impacts the natural resource economy. There is ample data available online to show trends and changes over time. Limited time is required to collect this information
Unemployment Rate (county level)	Effectual	This is good economic information. It is easily accessible and presents information that may be useful in strategic planning.
Median Family Income (county level)	Effectual	The median income is useful and accessible information that can help councils better understand the economic health of the region in which their watershed exists.
Tourism: motel occupancy rate, deer & elk tags issued	Potentially Effectual	The idea behind this is good, but the exact information identified is difficult to compile. However, the Oregon Tourism Commission contracts out a tourism impacts analysis each year. This information is online and would be useful as an indicator.

Partnership for the Umpqua Rivers

The PUR Strategic Plan is a key document for the organization. The description of the planning process, states that, “Changes and uncertainty in the funding environment, combined with a desire to select projects more strategically, have prompted

PUR to undertake a thorough strategic planning process” (Newberry Watershed Consulting 2007).

According to the plan, “PUR maintains a comprehensive monitoring program, focused on three areas: water quality, fish habitat/population, and project specific effectiveness” (Newberry Watershed Consulting 2007). The stated values of the organization include: “It is possible to achieve both environmental integrity and economic stability within the Umpqua Basin Watershed and Douglas county...Natural Products and processes of the watershed are indicators of watershed health and are important to the economy and vitality of the communities...Land management and other human activities have a legitimate place in the watershed...” Of the nine stated values/Principles, seven relate to the integration of the socio-economic and bio-physical health of the watershed. The other two values relate to property and landowner rights. This presents an opportunity for the integration of socio-economic indicators and monitoring within the existing structure of the organization.

According to the strategic plan, PUR selects projects through the Technical Advisory Committee (TAC). The TAC “is a group consisting primarily of natural resource professionals, who review and evaluate project proposals submitted to PUR...” (Newberry Watershed Consulting 2007) The TAC uses a matrix based on the 2007 basin action plan. This is based on environmental information, and there is a potential to incorporate socio-economic data (Partnership for the Umpqua Rivers 2008).

Goal-wise, PUR takes an integrated approach to looking at the bio-physical and socio-economic aspects of the watershed. They participated in the May 2007 workshops, and identified the following metrics:

- The number of family wage jobs
- Tourism as a % of the local economy
- Council grant support as a percentage of the PUR budget
- Percent of the PUR budget from non-governmental sources
- Number of community partnerships with PUR

From the evaluation, I found that the metrics selected were not all indicators. The following Table 4.5 shows the classification of the metrics based on the project definitions:

Table 4.5: Types of Socio-Economic Metrics Identified by PUR

Socio-Economic Metric Identified	Type
The percentage of funds coming from single source	Performance Measure
The number of annual publications	Output Measure
The number of riparian plantings	Output Measure
Family wage jobs	Indicator
Tourism as a percentage of local economy	Indicator
Council support grant as a percentage of PUR budget	Performance Measure
The percentage of PUR budget from non -governmental sources	Performance Measure
The number of community partnerships with PUR	Performance Measure

Additionally, the evaluation showed that the indicators were either potentially effectual or ineffectual as shown in the Table 4.6 below.

Table 4.6: Effectualness of Socio-Economic Indicators Identified by PUR

Socio-Economic Indicator	Effectualness	Reasoning/Analysis
Potentially effectual	Tourism as a percentage of the local economy	The assumption behind this is that tourism is better for the environment than other industries. This could be valuable quantitative information, but it may be difficult to use as an indicator in order to draw inferences about watershed health and restoration in relation to tourism
Ineffectual	Family wage jobs	The thought behind this is good, but the information is difficult to collect. First, because it is necessary to determine what is a “family wage job,” and second because there are a number of subjective elements that go into defining family wage. It is very difficult to define these.

Walla Walla Basin Watershed Council (Walla Walla)

In 2003, Walla Walla adopted a new strategic plan. The Walla Walla plan is distinct from other plans because it gives a very thorough description of the varied interests and controversies within the watershed, making it distinct from other council plans. According to the plan, “The basin has been utilized intensively for agriculture, range, and timber for over 160 years, and many senior water rights still in use date back to the 1860’s.” There are several places in the strategic plan that directly reference how agricultural and water rights impact the current watershed and relate to the future restoration issues.

The Walla Walla Basin plan much more specifically addresses the agricultural needs as they relate to watershed restoration. For example, “Agriculture remains the dominant economic force in the valley, which produces world-class wheat, apples,

asparagus, onions, cherries, wine grapes, hay, and alfalfa seed. Improvement in water delivery and on-farm efficiency have assisted the Walla Walla Irrigation District and Hudson Bay Improvement Company to bypass 25 cfs of water through the summer in 2002, while continuing to serve patrons...” (Walla Walla Basin Watershed Council 2003)

The plan notes that this was the result of a civil penalty agreement based on the endangered species act. Speculating that the recognition of controversy in the plan is the result of a higher level of contention over water resources, there is a very strong opportunity to incorporate socio-economic indicators into the decision-making process for the council.

The Walla Walla Plan also differs in purpose from the Coos WA and PUR plans. “The purpose of a subbasin plan is to document subbasin conditions and evaluate indicators that drive the implementation of NWPCC programs at the subbasin level” (Walla Walla Basin Watershed Council 2003). From this statement it is clear that the NWPCC is the driver for the plan creation, as was the case with GRMW, but comes in a very different form. This is in part due to the fact that the plan for GRMW was contracted to be written by outside organizations, whereas this plan was authored “in-house” and takes into account the tensions and realities behind the clashes of the socio-economic and bio-physical factors of watershed health.

The mission and goals of the Walla Walla Basin are also very distinct. Two of the identified goals and related objectives are as follows:

“Problem Solving – to identify potential and existing problems and solutions in the watershed based on the best available scientific information.

- 1) Assessment of conditions
 - 2) Find agreeable solutions to issues pertaining to both the council and relevant outside organizations.
 - 3) Find outside assistance for those actions beyond landowner or local scope.”
- “Monitoring; to promote ongoing monitoring of watershed health
- 1) Baseline: record baseline conditions
 - 2) Assessment: To collect data for a specific analysis of processes currently underway
 - 3) Efficiency: collect and analyze data for overall basin improvements, and specific project effectiveness” (Walla Walla Basin Watershed Council 2003).

The Walla Walla Strategic Plan is set up in a way that is very conducive to the inclusion of socio-economic indicators and monitoring to gauge watershed health. They also participated in the May 2007 workshops and developed the following indicators:

- Number of local contractors employed on watershed restoration
- Amount of water available
- Number of new businesses in the community
- Number of in-migrant home owners
- Land value differential based on water rights
- Number of farms with salmon safe certification

After analyzing these metrics I found they were mostly, but not all indicators, as is shown in Table 4.7 below.

Table 4.7: Types of Socio-Economic Metrics Identified by Walla Walla

Socio-Economic Metric Identified	Type
The number of local contractors employed on watershed restoration	output
Amount of water available	indicator
The number of new businesses in the community	indicator
The number of in-migrant home owners	indicator
land value differential based on water rights	indicator
The number of farms with salmon safe certification	indicator

From the evaluation of the indicators identified by Walla Walla, I found the indicators were mostly not effectual. Table 4.8 shows the results from the analysis of the effectualness of the socio-economic indicators identified as indicators above.

Table 4.8: Effectualness of Socio-Economic Indicators Identified by Walla Walla

Indicator	Effectualness	Reasoning/Analysis
Number of new businesses in the community	Ineffectual	This information is not compiled by any other organization in a way that is conclusive. If the watershed council wanted to know, they would have to do extensive research and even still might not be able to know the real number. Another issue is the measure of success for new businesses. This is not a good indicator of economic health
Number of in-migrant home owners	Ineffectual	The executive director explained to us that new in-migrant home owners were detrimental to the environment. This is a value judgment and in my research I found literature to the contrary (Jones, Fly, et.al 2003).

Table 4.8 (continued)

Indicator	Effectualness	Reasoning/Analysis
Number of farms with Salmon Safe Certification	Ineffectual	After talking with the director of Salmon Safe he recommended against the use of Salmon Safe as an indicator, based on the fact that not all farms that are salmon safe are certified Salmon Safe. He thought it would be “short sighted.”
Land Value differential based on water rights	Ineffectual	This information is not readily available and would take considerable research to find. The use of this data is unclear.
Amount of water available	Ineffectual	This is an interesting indicator, but it is largely unclear. It would require extensive research to find the “water available” and track it over time. Also, it is difficult to interpret this data, and know exactly what “water available” entitles.

Summary of Initial Findings from the Exploratory Research

Currently most watershed councils in Oregon are not using socio-economic indicators. Most data collection regarding socio-economics is used for grant writing. I found that the watershed council executive directors were open to the idea of indicators and the possibility of using them, but were not sure how to use them and integrate them with the existing structure or the watershed council. This was particularly salient in the review of the “indicators” the council executive directors developed in the workshops, most of which were not indicators. It was also clear and apparent in the interviews, in which it was necessary to clarify the difference between an indicator and evaluation measures.

Uses of Socio-Economic Indicators in Watershed Management

Watershed council executive directors have an interest in the socio-economic health of the watershed, and in general, favor projects that have socio-economic benefits over purely environmental restoration projects. In discussing indicators, the executive directors expressed a greater interest in output and outcome measures than socio-economic indicators. Through the interviews and expert panel discussion, it became clear that the watershed councils see the need for and have engaged in some socio-economic monitoring, but it has been limited. The executive directors provided some examples of either programs or elements that have been monitored but without a strategic framework. For example, one council, one year, measured the dollars spent in the local community versus outside the community. Another council measured volunteer participation in projects. Coos WA has measured outcomes from the Coffee Klatches and expenditures of watershed council dollars in the local community versus outside. PUR has socio-economic goals and measures diversification of funding sources, and several councils have looked at volunteer participation as an outcome measure.

One executive director summed things up by stating they do “mostly biophysical monitoring, but with some socio-economic inferences, but we are not trying to get ahead of ourselves in measuring socio-economic impacts.” Another stated, “We have more aggressive younger people in the council... I don't know that if we had metrics that it would change much... We have a good organization and we get good feedback.” There seemed to be a split in the level of interest in indicators. It was not geographically based, nor did it have to do with the age, size, or capacity of the council, but rather based on the director and their professional views on the value of planning.

The executive directors saw useful metrics as those that would show impacts or outcomes of their work. However outcomes are difficult for watershed councils, because there are so many actors in the watershed it is next to impossible to attribute changes in the socio-economics of the watershed to their work (Hibbard and Sweitzer, 2007). From this research I found that socio-economic indicators cannot fill this role either, but they can help councils to provide a deeper significance to their outputs and after digging deeper, that there are ways in which indicators can be useful. These include:

- Strategic decision making – In order to create strategic and sustainable plans, watershed councils need a common understanding of the existing socio-economic conditions of the watershed. Even though watershed councils focus on bio-physical watershed health, all of the councils have some form of stated socio-economic goals, values, or objectives based on the understanding that the socio-economic health is integrated with the bio-physical. This is documented in their plans, but there is little inclusion of consistent socio-economic information in the strategic decision making process.
- Collaborative tool – In a collaborative group there may be many perspectives about existing conditions. All four watershed councils have diverse members that make decisions. The use of indicators can help normalize the various perspectives of group members to create a factual basis for decision making. Table 4.9 shows the type of membership in each of the four council case studies.
- Telling the story - Watershed councils need to tell their story; whether it is to the legislature or some other agency that provides funding for councils, it is necessary to provide holistic information on the status of the watershed. This can also help councils broaden the scope of their funders by allowing them to make a socio-economic case for restoration projects to organizations that provide funding for community development as opposed to funders of environmental restoration.

Table 4.9: The interests represented on the watershed council by membership

Coos WA	GRMW	PUR	Walla Walla
<ul style="list-style-type: none"> • Industrial Timber • Small Woodlands • Agriculture and Ranching • County and Local Govt. • State Land Mgmt. • Federal Land Mgmt. • Waterfront Industries • Fisheries & Aquiculture • Tribes • Public-at-Large 	<ul style="list-style-type: none"> • Local & County Government • Environmental/ Conservation • Stock Growers • Tribes • Public Interest • Soil & Water Cons. Dist. • Economic Development • Private landowners • Fish and Wildlife • Forestry • University 	<ul style="list-style-type: none"> • County Government • Agriculture and Livestock • Timber, aggregate, construction, and mining • Fishing, recreation, conservation • City Govt., special districts, & public utilities • Tribes • General Public 	<ul style="list-style-type: none"> • Tribes • Wildlife • Member at Large • Range • Recreation • Dry land Agriculture • Upriver Agriculture • Irrigated Agriculture • Industry • Fisheries • Ecology • City Government • Economic Development

Developing Socio-Economic Indicators for Watershed Councils

The process for developing indicators should be tailored to fit the size and nature of the organization. Based on the best practices documentation and handbooks on indicator development, if socio-economic indicators are going to be useful, they should be developed as part of the existing planning process for the watershed. If there is no planning process, they should be developed before programming and projects are planned. All of our case study watershed councils had very different information needs. Some generic indicators can provide the context, but depending on the region and the type of information available in the region, each council will have different needs. Even the councils in close geographic proximity had significantly different information needs,

for example, GRMW and Walla Walla are geographically touching, but the indicators developed were very different. Walla Walla's indicators focused on the areas of contention in the watershed, whereas GRMW focused on the economic health of the watershed in general.

Despite these differences in data needs, there are some similarities in the way the executive directors felt about indicators. They are not interested in long lists of indicators that present complex information to be deciphered. They have time and resource constraints, and do not want to waste resources on planning when there is restoration work to be done. The watershed council executive directors suggested that a "Tool Box" of indicators and metrics would be useful for them to use as a starting place for developing socio-economic indicators. Based on the effectual and potentially effectual indicators identified by the councils, I put together a toolbox of indicators as seen below in Table 4.10.

The Challenges of Developing and Incorporating Socio-Economic Indicators

Despite their value, there are a number of challenges associated with the process of developing and using indicators for watershed councils, these include:

- Lack of time and resources within the organization to collect, coordinate, and manage data – the executive directors were all very skeptical of a new activity that was not funded. The executive directors made it clear that they were largely bound by the constraints of their funders, whether it is OWEB, Bonneville Power Administration, or the Ford Family Foundation.
- There is confusion between the idea of an indicator that measures the socio-economic health of the watershed, and monitoring and evaluation metrics that measures the outputs/outcomes of the watershed councils' activities.

Table 4.10: Toolbox of Indicators

Indicators	What can be learned from the indicator?	Significance to the Watershed Council	Source
Job earnings in income brackets in the watershed vs. region	What percentage of people are in certain income brackets? Which brackets are growing and which are shrinking?	Changes in the economy may affect the funding available for watershed councils. Additionally, changes in the economy of the watershed may impact the relationship of the council with land owners, and land owners interest in watershed restoration projects.	Census Bureau, OnTheMap tool
Total farm gate sales for agricultural production in the county including small wood lots.	What is the economic status of the agricultural economy? What crops are more significant than others? How is it changing?	The way in which crop production changes will potentially impact the watershed if certain crops either use more or less water, or more or less pesticide than other crops. This could be useful information for planning programs that target certain types of farming.	OSU Agricultural Extension Service
Change in local unemployment rate as compared to the region, state, and/or United States	What percentage of the population is unemployed? How stable is the job market?	This information could be used to strategically plan restoration projects that make use of funding geared toward job training and development.	Oregon Labor Market Information System (OED)
Change in tourism employment and dollars generated	How significant is tourism in the counties in which watershed councils are operating? How much do tourism dollars contribute to the economy and the job market	In several of the watersheds studied, the executive directors and councils felt this was important to quantify because of the impacts tourism has on local economies. It may be useful for councils to know what changes are occurring in the counties in order to make a case for restoration based on its relationship to tourism.	Oregon Travel Impacts Report, Dean Runyan Associates contracted by Oregon Tourism Commission

- The executive directors wanted to know what the result of incorporating indicators would be, before they commit to using them, but it is difficult to pinpoint a direct and tangible result.

- There is a difference between the information that watershed councils feel would be useful, and the information that is accessible to watershed councils. For example, in the interview with Brian Wolocott, he expressed an interest in several kinds of data. Unfortunately none of these were readily available pieces of information, and would require original research on the part of the watershed council to collect, which is not possible with the time and resource constraints of the organization.
- Watershed councils are concerned about “getting distracted from their main purpose of environmental restoration.” First and foremost, councils focus on the restoration of stream and river habitat. In several of their plans they recognize the significance of socio-economics in the watershed health, but if the bottom line is restoration of habitat and improving the bio-physical conditions, the executive directors do not want to get bogged down in something that is seemingly “off track.”

Despite these challenges, indicators can still provide an important layer of information in the planning and programming of watershed activities. Because the indicators in the tool box are relatively easy to access, it is possible that they may have a high value in comparison to the cost of gathering the data. To a large extent, the feasibility of incorporating indicators depends largely on the interest of the executive director or other driving members of the organization. In order to substantiate these findings, I continued my research in a case study with Coos Watershed Association.

Coos Watershed Association Case Study Findings

The second phase of my research confirmed many of the initial findings and provided a technical understanding of the benefits and challenges of indicators. I found that socio-economic indicators can be valuable to the Coos Watershed Association; the following section details the results and findings from this phase of research.

Matrix and Meeting Findings

The evaluation of the indicators in relation to the institutional goals and missions revealed gaps in the comprehensive monitoring strategy. After separating out the indicators and the metrics, then categorizing them by community, economy, and organizational indicators, outputs, and outcomes, I found the council did not have any community related indicators nor any organizational indicators:

Table 4.11: Relationship of socio-economic goals and objectives to selected the socio-economic indicators identified by Coos WA

	Community	Economy	Organizational
Related Goals and Objectives	Engage local community, garner landowner and project partner interest in restoration, increase public awareness of issues	Economic stability, sustainable natural resource based economies	Increase organizational capacity, diversify funding, increase tenure of staff, establish deputy director position
Indicators	None	<ul style="list-style-type: none"> • Coos County average pay • Sites available for development in the watershed • Job earnings in income brackets in the watershed vs. region • Number of sustainable industry jobs (natural resource management, etc.) • Total farm gate sales for agricultural production in the county including small wood lots. 	Not applicable

Table 4.11 (Continued)

	Community	Economy	Performance
Indicators continued		<ul style="list-style-type: none"> • • Change in local unemployment rate as compared to the region, state, and/or United States • Change in tourism employment and dollars generated 	
Output Measures	<ul style="list-style-type: none"> • number of presentations given by association staff, volunteers • at least one publication annually • The number of joint projects resulting from Coos WA outreach • The number of watershed cooperative projects with NPOs • The number of coffee klatches held and the number of participants 	<ul style="list-style-type: none"> • The number of monitoring contracts 	<ul style="list-style-type: none"> • amount of funding for research and development • median meeting attendance for executive council members
Outcome Measures	<ul style="list-style-type: none"> • percentage of surveyed watershed residents and other stakeholders who express an understanding of watershed issues 	<ul style="list-style-type: none"> • Coos WA pay and benefits as a percentage of Coos County average pay 	<ul style="list-style-type: none"> • median staff tenure

I collected the data (where available) for the indicators above and shared the information with Dr. John Souder, in an action interview to determine which indicators were useful and what needed to be added. I found that:

- Socio-economic indicators may be valuable for Coos WA, as they can provide important strategic information for planning and programming.
- Socio-economic indicators can provide an important layer of information for Coos WA when they report to funders or in seeking potential funding.
- Socio-economic indicators can assist the decision making process by “ground-truthing” individual assertions based on interests by providing a factual context for decision making that is in the best interest of the watershed.

Coos WA Effectual Socio-Economic Indicators

By reviewing the socio-economic indicators and the above matrix with the executive director, I found that indicators are useful for Coos WA, but that it was necessary to fine tune the indicators to be effectual. I worked with Dr. Souder to develop effectual indicators for Coos WA. In this process I explored a wide range of indicators, but based on the importance of having a select few that are comprehensive and relate to the goals and mission of the organization as well as to each other, I found the following indicators to be effectual for Coos WA:

Job Earnings in Income Brackets in the Watershed vs. Region

Source: US Census Bureau LED OnTheMap

Website: <http://lehdmap3.did.census.gov/themap3/>

Description: The Census LED OnTheMap tool is an interactive economic data tool that can be accessed by anyone with a computer and internet access. The system provides statistically imputed data on an area that can be selected based on a defined political boundary or a user defined region using a freehand tool, as demonstrated in Figure 4.1. The system generates an economic report for the selected area which includes job

earnings. The job earnings are categorized by under \$1,200 per month, \$1,201-\$3,400 per month, and over \$3,400 per month. It is possible to use the freehand tool, select the watershed, and then determine the percentage of jobs that falls into these three categories for the time period between 2002 and 2006. LEDS is constantly updating and improving. It is currently in its third version, but the fourth will be coming out at the end of 2009 and will contain data through 2008. A sample of the map and data are found in Table 4.12 and Figure 4.1 below.

Data Evaluation: OnTheMap has limited value. While it generates reports for a specific region, the data is statistically imputed, which means that the accuracy of the data is more questionable than other data sources like the Bureau of Economic Analysis (BEA).

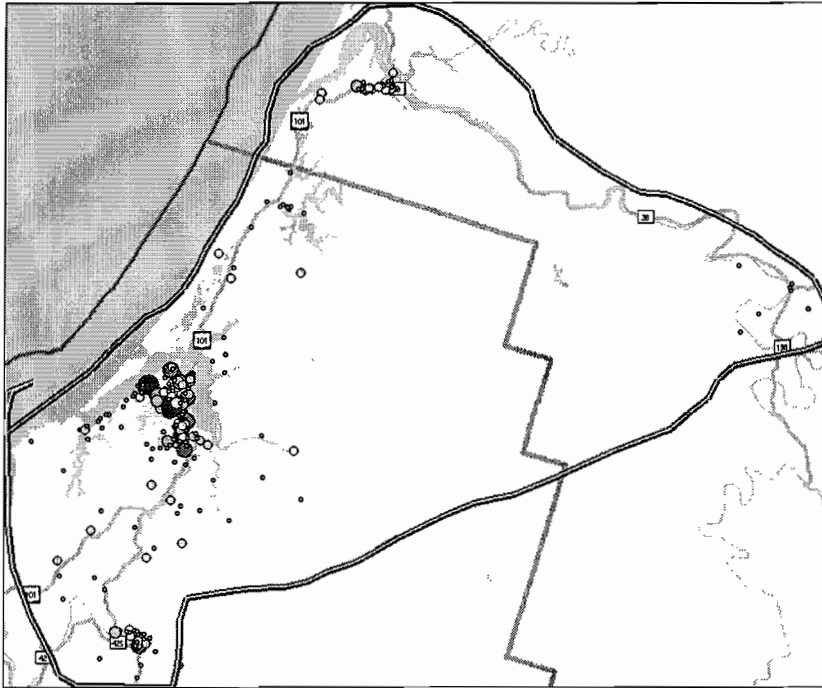
However, if the information is used to show a trend it is accurate enough to be valuable for Coos WA, and it can provide a level of geographic specificity that the BEA does not provide.

Table 4.12: LEDS OnTheMap Data for the Coos Watershed “Economic Impact Area”

Monthly Earnings Paid	2002	2003	2004	2005	2006
\$1,200 per month or less	38.8%	38.3%	35.7%	33.6%	32.4%
\$1,201 to \$3,400 per month	43.2%	42.8%	44.0%	45.2%	44.1%
More than \$3,400 per month	18.1%	18.9%	20.2%	21.2%	23.4%

Source: US Census Bureau, LED Origin-Destination Database
(2nd Quarter 2002, 2003, 2004, 2005, and 2006)

Figure 4.1: Freehand Selection of the Coos Watershed “Economic Impact Area”



Source: LEDES OnTheMap

Role in Watershed Management: This information can help Coos WA better understand what percent of the population has low versus high monthly job earnings, and the changes in those percentages over time. This is useful for the council to understand how they can shape their fundraising activities and may provide context for the watershed council when they report the kinds of jobs they support and the salaries for those jobs.

Change in School District Average Daily Membership in Relation to the Changes in the Under 18 Population of Coos County

Source: Oregon Department of Education State School Fund and Portland State

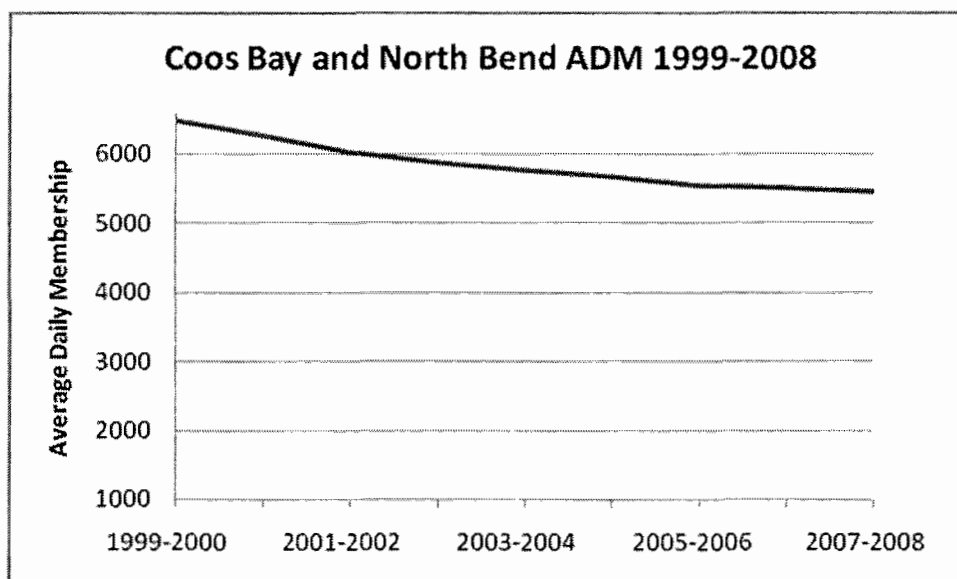
University (PSU) Population Research Center

Website: <http://www.ode.state.or.us/search/results/?id=341>, <http://www.pdx.edu/prc/>

Description: Average Daily Membership is the average number of students who attend the school on a daily basis within a district. In Figure 4.2, the ADM is for the Coos Bay and North Bend school districts. In Figure 4.3, the population data from PSU shows the changes in population by age group between 2000 and 2008, which provides important context for understanding if the change in ADM is based on a population trend or another factor.

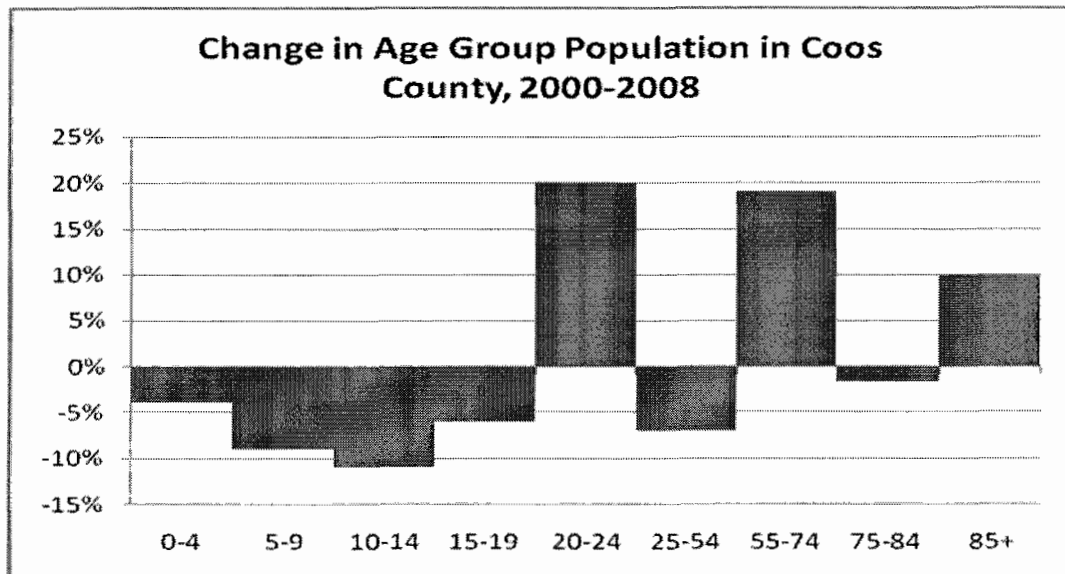
Data Evaluation: School attendance is collected locally at each school and agglomerated at the district and state level. This is an accurate data set and can be collected for both Coos County, and only districts in the watershed. The Portland State Population Research Center collects yearly demographic information for each county in Oregon. This data set shows accurate population trends for counties in Oregon. It requires some data management and in-spreadsheet calculations to develop into an indicator.

Figure 4.2: Graph of the Coos Watershed school district Average Daily Membership 1999-2000 through 2008-2009 school years



Source: Oregon Department of Education

Figure 4.3: Graph of the change in Age Group Population in Coos County between 2000 and 2008



Source: Portland State University Population Research Center

Role in Watershed Management: can use this as an indicator of the health of the community. Schools are an important community organization, and the Average Daily Membership (ADM) numbers can give the watershed council an understanding of the changes taking place in these institutions. Coos WA has several community outreach programs and information about how the status of the community of the watershed may be helpful in deciding how to target future programs.

Student Enrollment Comparison

Source: State of Oregon Department of Education

Website: <http://www.ode.state.or.us/sfda/reports/r0062Select.asp>

Description: School Enrollment Comparison data is based on the number of students enrolled in schools by year, as seen in Table 4.14 below.

Table 4.13: Changes in School Enrollment in Coos Watershed 1997-2008

School Category	1997	2008	Change	% Change
Elementary Schools	3368	2015	-1353	-40%
Middle Schools	1009	985	-24	-2%
High Schools	2717	1969	-748	-28%
Other	13	939	926	7123%

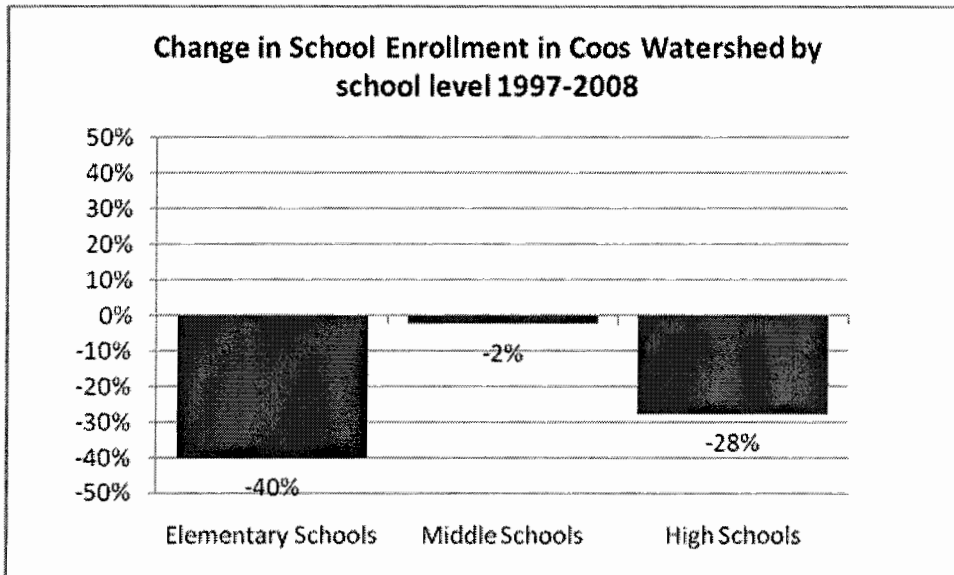
Source: Oregon State Department of Education

Data Evaluation: This data set is valuable, as it is collected annually by the state and can be extracted from an online database accessible to the public. This data set is more time intensive than the ADM numbers because it requires data management and formulas.

The report generated by the website is case sensitive and reports by name, meaning that if the school was written in all caps in 1997 and standard capitalization in 2008, it will generate two separate records for the same school. The end user must manage the data, group the data by school level, and create formulas for percentage change.

Role in Watershed Management: This data, as seen for Coos WA below in Figure 4.4, can help watershed councils in strategically planning educational programs. If there is a trend in school enrollment that shows an increase or decrease within a certain school level it can help the council decide where to focus their programs.

Figure 4.4: Changes in School Enrollment in Coos Watershed 1997-2008



Source: Oregon State Department of Education

Overall Population Trend

Source: United States Bureau of Economic Analysis (BEA)

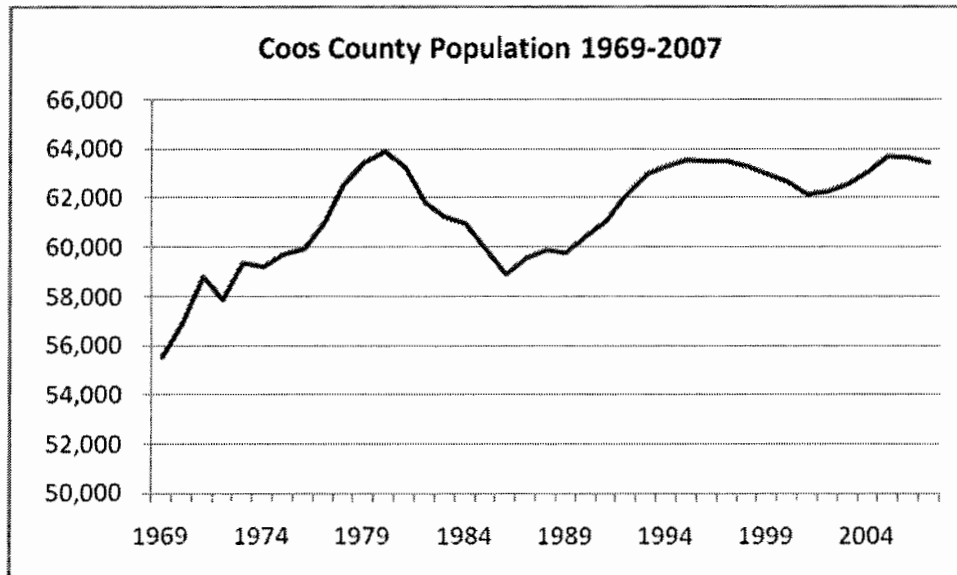
Website: <http://www.bea.gov/regional/reis/default.cfm?selTable=CA1-3§ion=2>

Description: BEA provides population estimates at the county level from 1969 through (at present) 2007, and is updated regularly. BEA data relies on more sources and therefore takes more time to process. It is more accurate, but less current. For example, PSU has population estimates for 2008 available online and OLMIS has First Quarter 2009 estimate on employment available online, but BEA is only current through 2007.

Data Evaluation: The data are easy to access, and it is very simple to generate a reliable table which is graphed in Figure 4.5 below.

Role in Watershed Management: This is not a very significant stand-alone indicator. However, it provides important context for the changes in school enrollment, ADM, and age group changes.

Figure 4.5: Total Population Change in Coos County 1969-2007



Source: US Bureau of Economic Analysis

Total Farm Gate Sales for Agricultural Production in the County Including Small Wood Lots and Commodity Comparisons

Source: Oregon State University, Agricultural Information Network

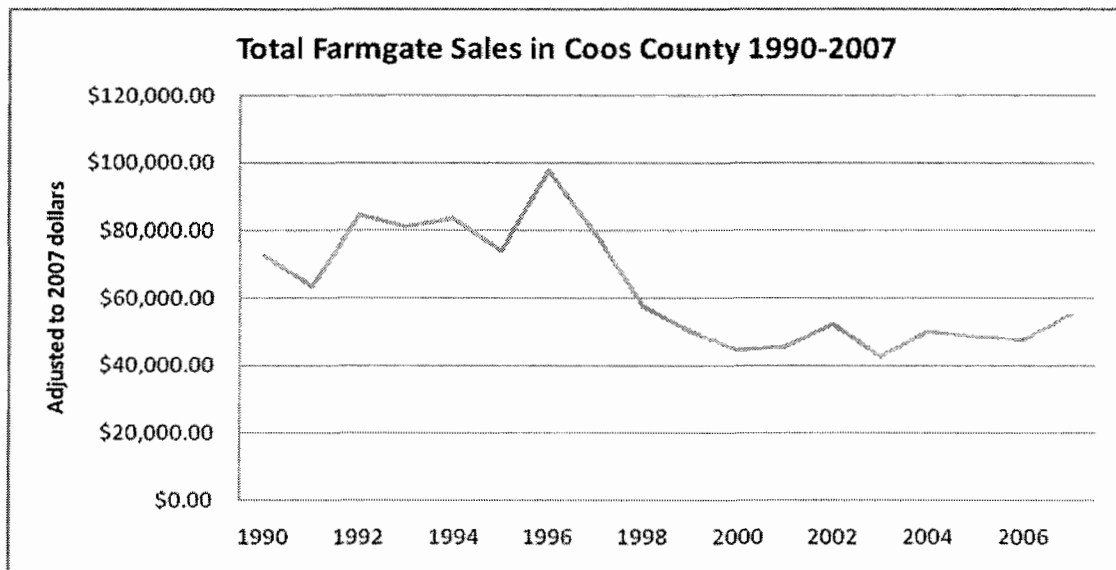
Website: <http://oain.oregonstate.edu/SignIn.asp>

Description: This data is collected and agglomerated by the Oregon State University Agricultural Extension Service, Oregon Agricultural Information Network. "OAIN county estimates were collected and updated by one OSU employee who traveled across the state, county-by-county, to consult with OSU faculty in county and regional offices. This was a hand-calculation process each year that added to the county and statewide

database maintained for agricultural commodities which were commercially produced in Oregon” (Burt 2007). Figures 4.6 and 4.7 show this information for Coos County.

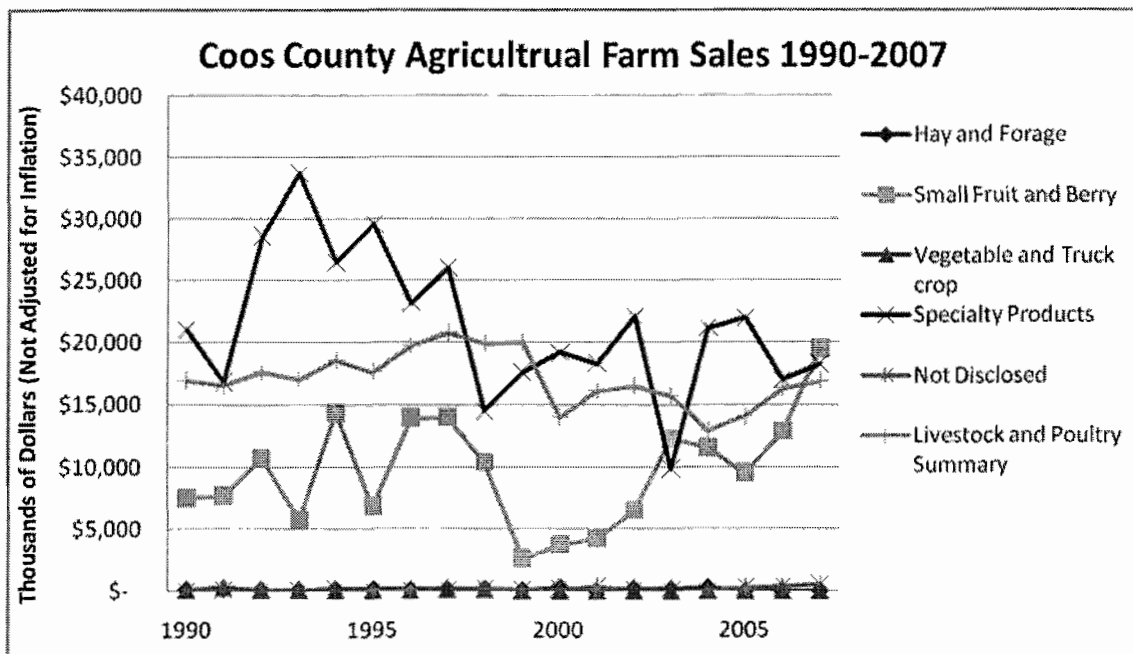
Data Evaluation: The data is not adjusted for inflation, but if the council wants to understand the importance of agriculture in the county and how that has changed over time, it is important to adjust for inflation. This can be done with little technical skill by using the Consumer Price Index Calculator supplied by Oregon Employment Department, <http://www.qualityinfo.org/olmisj/DoQuery?itemid=00000027>, though it does require more time.

Figure 4.6: Graph of the Changes in Total Farm Gate Sales in Coos County from 1990-2007



Source: Oregon Agricultural Information Network

Figure 4.7: Graph of the Commodity Comparisons of Farm Gate Sales in Coos County from 1990-2007



Source: Oregon Agricultural Information Network

Role in Watershed Management: can use this data to inform the process of deciding which land owners to target. If certain commodities are losing value, they may be good landowners to approach for conservation easements and restoration. Additionally, this provides a baseline of information about the economic health of the agricultural industry in Coos County that can be used to provide context and frame requests to funders.

Change in Local Unemployment Rate as Compared to Oregon and United States

Source: Oregon Employment Department, Oregon Labor Market Information System

Website: <http://www.qualityinfo.org/olmisj/OlmisZine>

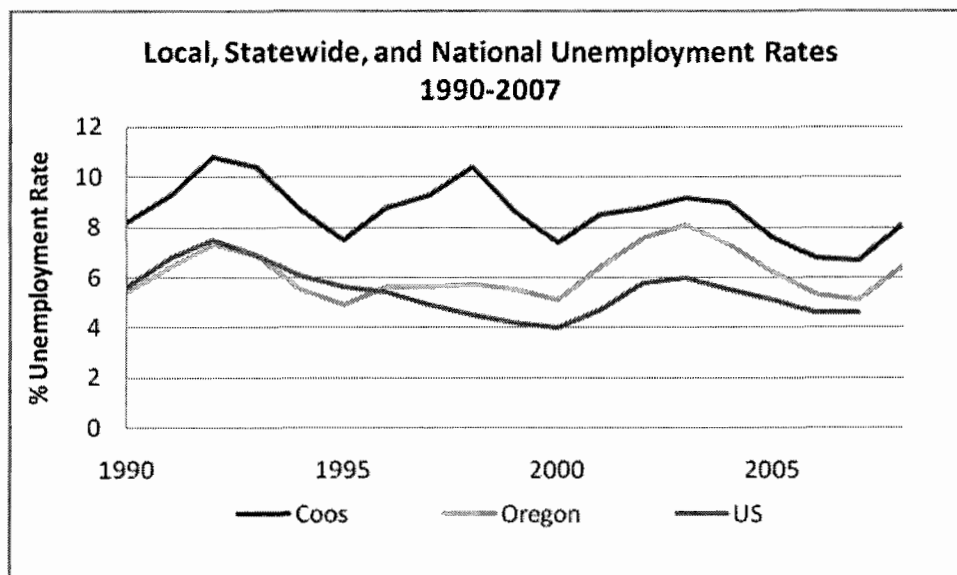
Description: The unemployment rate is a standard calculation available on a monthly, quarterly, or yearly basis from the Oregon Employment Department. It shows the

percent of the population that is currently unemployed and is a statistical calculation based on the estimated population, monthly current employment statistics, and state unemployment insurance systems.

Evaluation: This is a reliable and standard metric used to monitor economic health. It is easily accessible and readily available.

Role in Watershed Management: The unemployment rate is a useful metric for monitoring the economic health of the county, but by looking at it in relation to the state and the country as a whole, it provides context that shows how the county compares to the state and nation. This information is shown in below in Figure 4.8.

Figure 4.8: A Comparison of Coos County, Oregon, and US Unemployment Rates from 1990-2007



Source: Oregon Employment Department

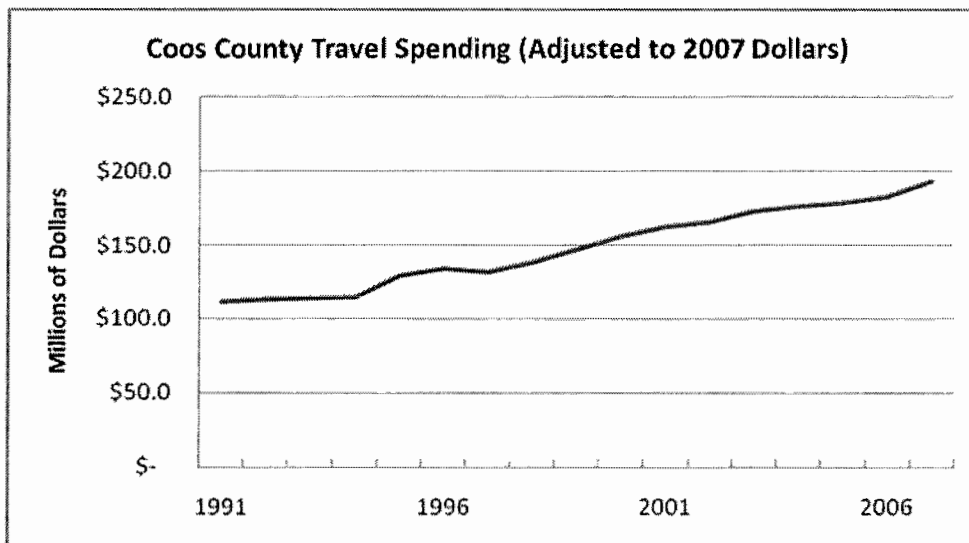
Change in Tourism Employment and Dollars Generated

Source: Dean Runyan & Associates (Oregon Tourism Commission)

Website: <http://www.deanrunyan.com/impactsOR.html>

Description: The Oregon Tourism Commission has contracted with Dean Runyan and Associates to generate reports on the travel impacts of tourism in Oregon. County level data ranging from 1991 through 2007 are easily accessible on-line. Reports include the total dollars in travel spending by county in each year, as seen in Figure 4.9 and the employment directly related to travel spending, as seen in Figure 4.10 below.

Figure 4.9: Changes in Travel Spending in Coos County, 1991-2007

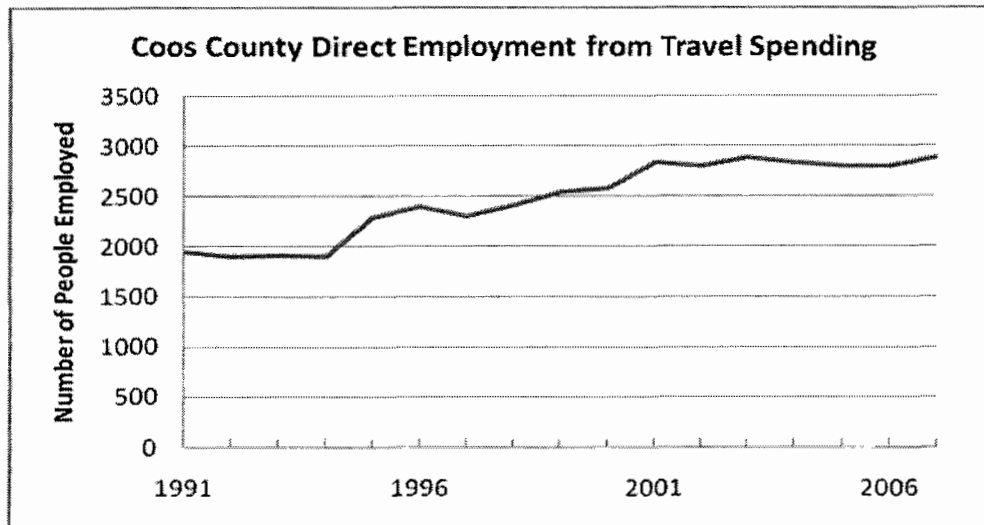


Source: Dean Runyan and Associates

Data Evaluation: The data set is reliable, but more accurate when adjusted for inflation. This is not done in the report, and it will be necessary for each council to do that after transferring the data from the digital document to a spread sheet using the same method recommended for farm gate sales.

Role in Watershed Management: Tourism is an important part of the economy for watersheds, especially sport fishing. This indicator provides useful information because it helps the council understand how tourism is changing as a local industry. It can provide

Figure 4.10: Changes in Employment Directly Related to Travel Spending



Source: Dean Runyan and Associates

a factual and tangible reason why riparian restoration and preservation is an economically important activity because it preserves assets that have both an environmental and economic benefit.

Proprietorship Total Employment in Coos County 1969-2007

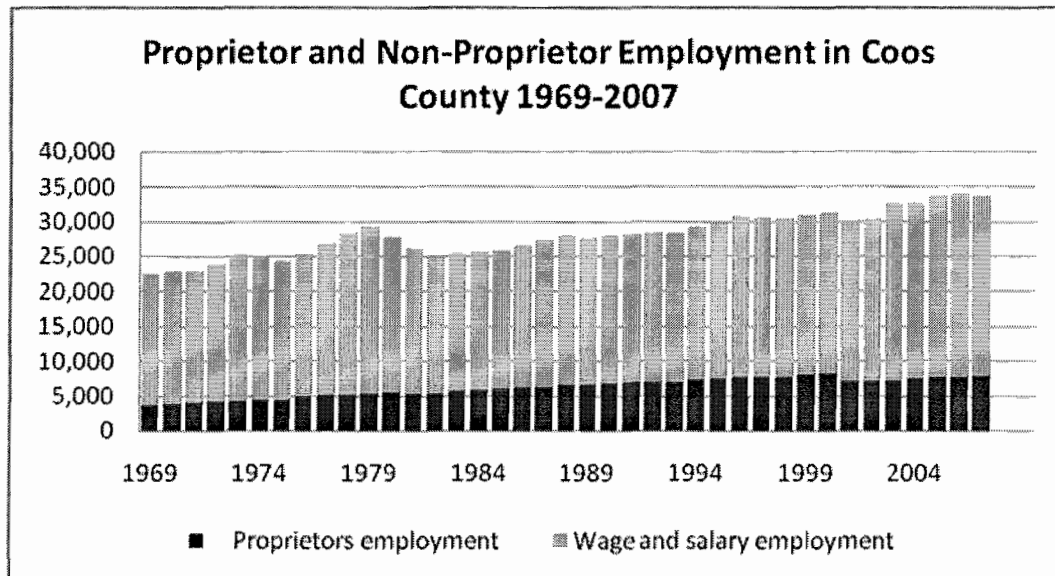
Source: Bureau of Economic Analysis

Website: <http://www.bea.gov/regional/reis/default.cfm?selTable=CA30>

Description: This information is compiled by the Bureau of Economic from a variety of federal sources, including the Internal Revenue Service. The information is available in a user-generated report from the Regional Economic Information System. It can be downloaded directly into a spread sheet for graphing and interpretation.

Evaluation: This is a reliable data set that can be easily accessed and incorporated into the watershed's socio-economic indicators. The data for Coos County is shown below in Figure 4.11.

Figure 4.11: Proprietor and Non-Proprietor Employment in Coos County, 1969-2007



Source: Bureau of Economic Analysis

Role in Watershed Management: Coos WA works primarily with sole proprietors and self-employed contractors. By tracking the economic changes of proprietorships, the watershed council can get a more complete understanding of the changes in the type of employment that is more directly related to the work of the council than it does by using the employment information from OLMIS, which only counts the employees of businesses that purchase unemployment insurance.

Coos County Per Capita Personal Income, 1969-2007

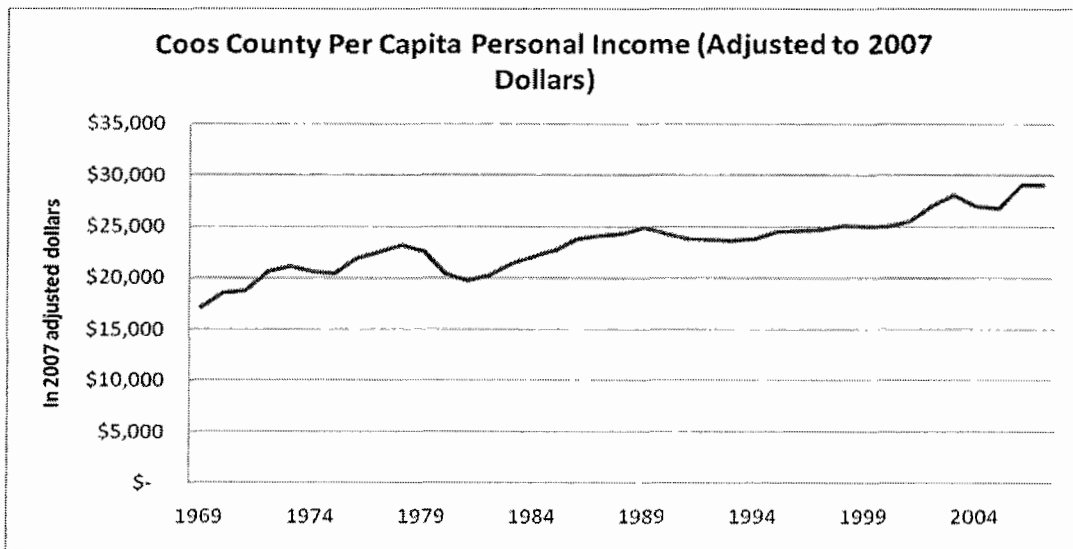
Source: Bureau of Economic Analysis

Website: <http://www.bea.gov/regional/reis/default.cfm?selTable=CA30>

Description: This information is compiled by the Bureau of Economic from a variety of federal sources, including the Internal Revenue Service. The information is available in a

user-generated report from the Regional Economic Information System. It can be downloaded directly into a spread sheet for graphing and interpretation. However, income should be adjusted for inflation using the method referred to in farm gate sales. Evaluation: This is a reliable data set that can be easily accessed and incorporated into the watershed's socio-economic indicators. The Per Capita Income for coos County is seen below in Figure 4.12.

Figure 4.12: Inflation Adjusted Per Capita Income in Coos County 1969-2007



Source: Bureau of Economic Analysis

Oregon Watershed Enhancement Board, Funding Granted to Watershed Councils per Biennium by Percent and Total Dollars

Source: OWEB, Fiscal Manager

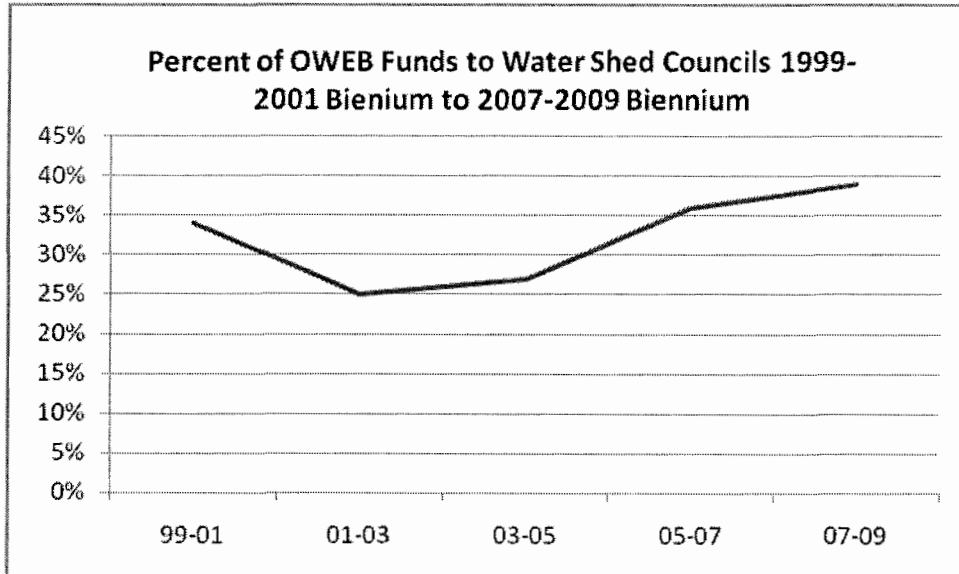
Description: This data set is compiled upon request from the fiscal records of the Oregon Watershed Enhancement Board. It shows total funding from OWEB awarded to

watershed councils, as seen in Figure 4.13, and the percentage of OWEB dollars that go directly to watershed councils, as seen in figure 4.14.

Evaluation: This data is reliable, and should be easily accessible for watershed councils.

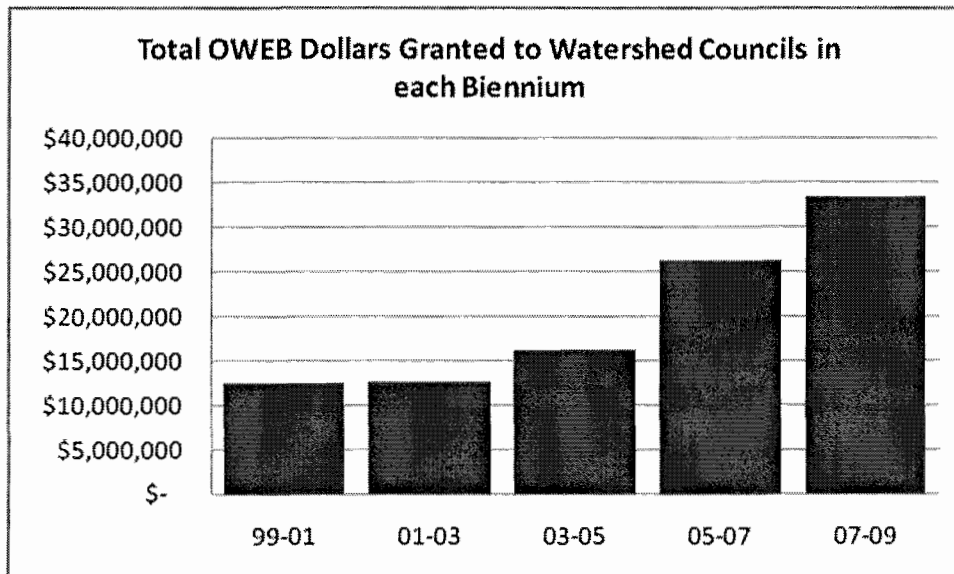
Role in Watershed Management: This information is intended to be used as a performance indicator. Coos WA has goals to diversify and increase funding. By tracking the OWEB dollars awarded to watershed councils and the percentage of dollars available from the state, Coos WA has a basis for understanding the changes in what they receive from OWEB. Also, this gives valuable information on the general trend of total dollars allotted for watershed councils.

Figure 4.13: Percent of OWEB funds that go directly to watershed councils from the 1999-2001 Biennium to the 2007-2009 Biennium



Source: OWEB

Figure 4.14: Total OWEB Dollars that go directly to watershed councils from the 1999-2000 Biennium to the 2007-2009 Biennium



Source: OWEB

The Socio-Economic Health of Coos Watershed

The above socio-economic indicators for Coos Watershed suggest that there are a lot of changes taking place in both the community and the economy. There are some potentially concerning trends, such as the decrease in school enrollment and the decrease in the population of school age children, and a high and climbing unemployment rate. However, the overall rise in per capita personal income and the significant increase in tourism dollars and tourism employment may indicate positive trends.

The LEDS data shown in Table 4.12 shows a slight trend down in the percentage of jobs earning less than \$1,200 per month and an upward trend in the percentage of jobs paying more than \$3,400 per month, while the mid-range (\$1,201- \$3,400) stays relatively the same. This could suggest that there are a growing number of higher paying

jobs in the area, and less low wage jobs. This is further supported by the per capita personal income indicator which shows a steady increase over the last 30 years, even after being adjusted for inflation. This may suggest that current jobs have higher earnings than historic jobs, or that the current residents in the county have a larger source of income which is higher than in the past. It may also be a combination of the two, as seen by the increase in job earnings indicator. This could be interpreted to show a long term improvement in the economic situation of Coos County.

Average Daily Membership (ADM) in schools is steadily dropping in the Coos Watershed school districts at a rate of -2% each year. As seen in Figure 4.4, elementary school and high school enrollment have dropped significantly in the North Bend and Coos Bay Districts. Schools are a major community institution. If the schools in the Coos Watershed are dropping in enrollment and losing funds, this may suggest a weakening trend in the community. This signifies that the council may need to think about adapting their school outreach programs to cater to what will likely be schools with fewer teachers.

The overall population trend shows growth in the population of Coos County, as seen in Figure 4.5. However, there was a period of heavy growth from 1969 to 1980 at which point the population had a sharp decline between 1980 and 1986. The population began to grow again in 1986, and since then has had a steadier growth rate, with the exception of a small dip from 1999-2001. This provides interesting background information for other indicators, and shows that growth and development is not a major concern for the watershed, as is the case with watersheds near growing and urbanizing

areas. Overall the population and school enrollment data suggest a decrease in the population of school age children. This may suggest that the community in Coos County and Coos Watershed is shifting from working families to a community of older retirees.

The economic indicators for Coos WA suggest that the economic situation in Coos County may not be as strong as it was in the past. Overall, Coos County has a higher unemployment rate than both the US and Oregon. With the exception of a spike in the late nineties, the Coos County trend in unemployment generally follows the state trend, and in recent years, the national trend. This may suggest that Coos County has a more depressed economy than the state and nation, but that it is currently following the same economic trends. This may suggest that monitoring the state and national economic forecasts may be useful for the county as they are considering their planning and programming, and thinking about the economic health of the watershed. Unfortunately, recent trends in unemployment have increased significantly, which may not bode well for Coos County. This may suggest a very significant rise in the unemployment rate in Coos County and Coos Watershed indicating an economic recession. This provides a barrier to Coos WA fundraising programs, and may suggest that the community is in need of more economic development opportunities. This may also provide an opportunity for Coos WA to jumpstart restoration projects with federal stimulus funding or other economic development funds.

Coos WA works mainly with small proprietors. According to the BEA data, proprietorships are small portion of total employment in Coos County, but there is an overall growth trend in proprietor that may show that proprietor employment is more

stable than total employment in Coos County. This may be a positive indicator for Coos WA because their work mainly supports employment for small proprietors.

Another positive trend in Coos County is tourism which has steadily grown from \$111 million dollars in 1991 (adjusted to 2007 dollars) to almost \$193 million in 2007. This may be considered a significant economic contribution and could be useful in making the case for watershed protection and riparian restoration to an economic development group. The growth in both tourism related employment and tourism dollars suggest that it may be a more important industry in the future, and that protecting the natural assets of the county are important for maintaining this industry. This may be considered a positive trend for both the economy of Coos County and for the watershed because tourism is considered to be more environmentally friendly than natural resource extraction industries.

In looking at the agricultural industry in Coos County, the data suggests an overall decline in farm gate sales which may indicate that commodities are not as profitable as they once were. However, there is a shift in the economic importance of small fruits and berries and specialty products and an overall shift in the commodities market. This may indicate future opportunities, but the overall decline in farm gate sales and commodities suggests a shift from this industry.

Additionally, if the total dollars of farm gate sales are compared to tourism dollars, we see an interesting trend. Between 1990 and 2007 farm gate sales peak at just under \$100 million, whereas the tourism dollars in 1991 were at \$111 million and in 2007 were nearly \$200 million. This is particularly interesting because it not only shows the

growth trend of the tourism industry and the decline in farm gate sales, but further suggests that there is an economic shift from an industry that may be considered more intensive on the land to an industry that supports restoration and preservation of natural resources.

Additionally, there is an overall growth trend in dollars awarded to watershed councils from OWEB. There was a drop in the percent of dollars in the 2001-2003 biennium, but the total dollars remained the same, and there after increased. This implies that more funding from OWEB should be available. The increase in OWEB funding and the growing importance of tourism in the county may suggest that there is an even stronger opportunity for the watershed council to make the case for watershed restoration as an economic development opportunity, in part because it is growing, but also, funds are available to support projects, which can be matched from other sources, possibly some that support green jobs or sustainable economic development.

These indicators provide a fact-based window into the socio-economic conditions of the watershed and Coos County from which the watershed council can “ground-truth” their local knowledge and make decisions about programs and activities. These indicators suggest some concerning trends in the county that show an “aging population,” but they also show some opportunities for the watershed council, in the growth of tourism, an industry that is considered to be more supportive of restoration and preservation than natural resource extraction industries. While the data suggests some challenges for the future of Coos Watershed, it also suggests some opportunities.

Summary of Findings

Socio-economic indicators may provide important insight into the socio-economic conditions of watersheds. From this research I found that watershed councils have an interest in the socio-economic health of the watershed, and in general, favor projects that have socio-economic benefits over purely environmental restoration projects. Socio-economic indicators can be useful in strategic decision making, collaboration, and by telling the socio-economic story of the watershed.

I found that watershed councils have an interest in using socio-economic indicators, but that there are many challenges to selecting and incorporating the right information that will be of value to the council. There is a vast amount of socio-economic data accessible to the public via the internet. Depending on the agency or organization providing the data, the information may be available at a county level, state level, or national level. I found few sources that provided valuable and reliable information on a smaller scale.

Through this research, I found that a “tool box” of socio-economic indicators is useful as a starting point for councils to begin developing socio-economic indicators specific to the needs of their watershed. By comparing, reviewing, and analyzing these in the context of Coos Watershed Association, I found that several data sets may potentially be useful to watershed councils including:

- Job earnings by income brackets in the watershed
- The change in average daily membership or the student enrollment comparison in relation to the change in population of school age children
- Overall population trend

- Unemployment rates in the county as compared to the state and national levels
- Total farm gate sales for agricultural production
- Changes in tourism dollars and tourism related employment in the county
- Changes in total farm gate sales in the county
- Proprietorship and total employment in the county
- Per capita personal income in the county
- Overall trends in available OWEB dollars and the percentage of dollars that go directly to the funding of watershed councils

Through this process I found that the socio-economic indicators may provide important information about the socio-economic health of watersheds, and that they may be useful in planning, programming, and improving the sustainability of the watershed.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Summary

Oregon watershed councils are a prime example of the emerging paradigm of CBNRM. With the emergence of the sustainability movement in the 1990's there has been a trend to better understand how we can incorporate environmental, economic, and community development for a sustainable future. Sustainability indicators were thought to be a way of quantifying or qualifying the decisions made by both governmental and non-governmental bodies to become more sustainable, and as a means of measuring "where we are at" as holistic communities and societies. Researchers, social scientists, and practitioners are still grappling with how to adequately integrate indicators and how to use them. The conclusions and recommendations of this research include a way for thinking about indicators in a holistic framework as well as identifying how indicators can be used by practitioners.

The Role of Socio-Economic Indicators

Conclusion

Socio-economic indicators can help fill an important role in connecting the socio-economic goals with the watershed council programs that have socio-economic outputs

and objectives. The watershed executive directors have a “local knowledge” of the socio-economic benefits of watershed restoration. By having indicators and metrics, they can qualify the relationship between the bio-physical and the socio-economic environment. In this framework, socio-economic indicators add a very important level of information that can create new opportunities for council members. It is nearly impossible to link changes in the socio-economic environment directly to the watershed council activities, but the watershed council can use socio-economic indicators to provide context and describe the environment in which they are working. The value of this information depends entirely on the direction of the watershed council and the way in which the data is used, but has the potential to be of great value.

Recommendation

Watershed councils should review some of the indicators in the Toolbox developed through this project and consider incorporating them into their strategic planning and collaborative decision making processes.

Indicator Development Process

Conclusion

The process of measuring and monitoring socio-economics is more of an art than a science. Even though indicators should be objective, statistical, or scientifically based, there is an inherent subjectivity to measuring socio-economics. This comes in the interpretation phase, and no matter what data or information source a watershed council

uses, there will be interpretation at some level. This does not diminish the value, but it does present a challenge for using indicators to the benefit of the organization.

Watershed councils are unique organizations. Their authority is recognized and mandated by the government, but their operation is very similar to a non-profit group. Most watershed councils are “action” oriented groups with a mission, goals, and program that in general supports the healthy and sustainable management of watersheds. Because of the complex nature of resource management, sustainability, and collaborative management, the concept of socio-economic indicators and their role in the organization is not a simple question. The practical value or utility of an indicator is going to be very different for each watershed council depending on their size, resource base, location, and history.

Recommendation

Depending on the organization, the exact process of indicator identification and development should fit the decision-making needs of those who will actually use the indicators. Below are the steps I recommend for developing socio-economic indicators:

1. With respect to the mission, goals, and objectives of the organization, use a brainstorming process and or a list of existing indicators to decide what information would be useful for understanding socio-economics and sustainability of the watershed.
2. Determine what organizational resources (time, funds, staff) are available to gather information, create reports, and manage indicators and evaluation.

3. Determine the criteria that would be useful for selecting indicators. There are a number of existing criteria available, but the council should adapt the criteria to fit the organizational needs.
4. Return to the list of brainstormed indicators and determine which should be eliminated or added based on the findings of the previous steps.
5. Through this process it may become clear that what have been selected as indicators are actually evaluation measures. If the information is useful and meaningful to the council they should still consider incorporating it, but as an evaluation measure and not an indicator.

A Holistic Framework for Socio-Economic Indicators

Conclusion

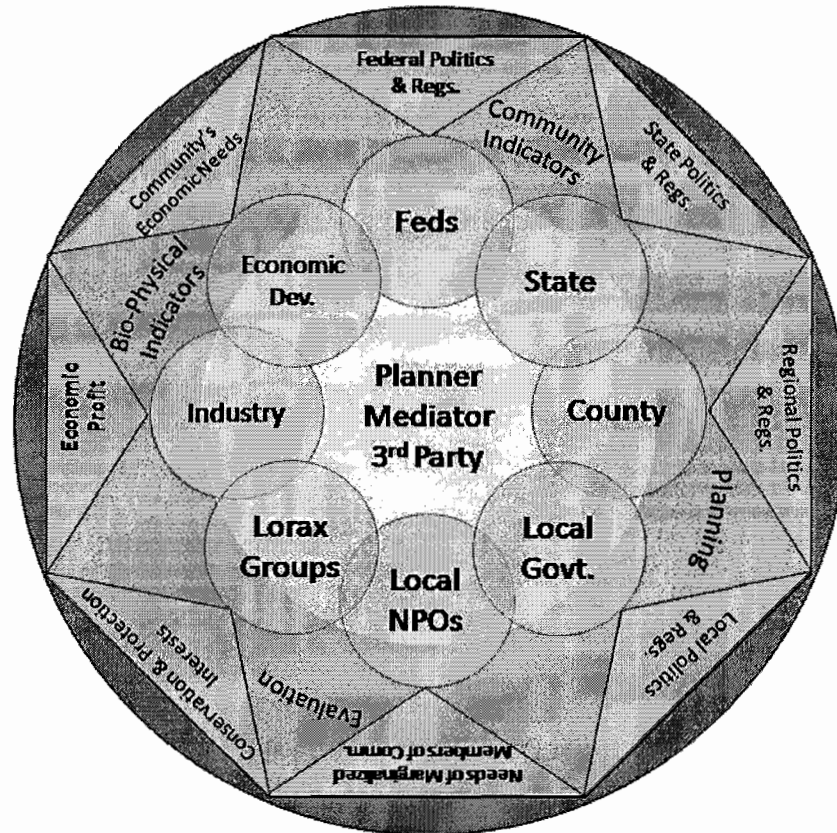
There are a number of potential ways that socio-economic indicators can be used by watershed councils. However, they are not stand alone tools. They should be incorporated into the management of the watershed in a holistic manner.

Recommendation

Socio-economic indicators are a piece of a puzzle, not the answer. In order to put indicators in perspective, it was necessary to create a model or framework that shows how indicators fit within the complexity of watershed management and CBNRM in general. This preliminary “working model” was designed based on the literature review and findings from research on CBNRM. It takes the form of a mandala.

Figure 5.1: The Mandala of Community Decision Making

The Mandala of Community Decision Making



Mandala is “from the classical Indian language of Sanskrit. Loosely translated to mean "circle," a mandala is far more than a simple shape. It represents wholeness, and can be seen as a model for the organizational structure of life itself... that reminds us of our relation to the infinite, the world that extends both beyond and within our bodies and minds” (Cunningham 2002).

The mandala is an ideal model for CBNRM because it encompasses the multidimensional complexity of successful community-based decision making. It recognizes the relationship of local decision making to the external environment and

recognizes the “concept of ecologically sustainable development” which “endorses the notion of the interrelatedness of environmental, economic, social, and political aspects of resource use” (Bellamy, McDonald, Syme, Butterworth, & McDonald, 1999). Many of the key elements for success in CBNRM are represented in the definition of a mandala including holistic, integrated, equitable, relational, and collaborative. Because the mandala is not just one circle but a complex pattern made of different layers that come together, the mandala captures the essence of CBNRM and presents a model that captures the complexity of community-collaborative decision making. Additionally, there is no single way to draw a mandala, it can be tailored to the individual community in order to describe the process and model for decision making.

Each layer in the mandala represents a key element to successful community-based decision making as described in the existing literature on the topic. It is important to note that the layers of the mandala should not be considered above or below one another; they are nested and interconnected (Fraser, et al. 2006). The relationships between the layers are most significant and it is necessary to recognize them in order to use this model successfully.

A mandala should not be used only as a theoretical tool. It can be used to help executive directors or other council members to recognize imbalances in their organization or identify areas that need to be strengthened. It is also intended to serve as a tool that can help generate an understanding of the complexities in watershed management. Indicators have been used in the past to trivialize complex situations, but if we are to move forward and think about sustainability in a holistic and realistic manner

we must embrace the complexity of resource management at all levels while still using planning, evaluation, and measurements.

Watershed councils should consider socio-economic information in planning for sustainability within the watershed. This may be in the form of indicators, evaluation measures, or simple reports from the census or Oregon Employment Department. One of the dangers of collaboration is the lack of technical decision making. Socio-economic indicators should not be regarded as the soul basis for decision making, but when they are combined with environmental indicators and local “expert” knowledge of the council members these tools can be very helpful in providing the groundwork for good decision making.

The current literature advocates looking at collaborative management of natural resources in a holistic manner. Yet, this is a theoretical concept that has not translated into the practice easily, in part because it shifts from the idea of finding the shortest path to embracing complexity. The Mandala of Community Decision Making is a new model and there is a need for continued research that will explore not only indicators, but the holistic framework of watershed councils and how indicators fit into that framework.

Alternatives to Indicators

Conclusion

Socio-economic indicators can be extremely useful for organizations, but in many cases the challenges prohibit their development and use. This does not diminish the

value of information that gives the council a better understanding of its conditions.

Indicators are a good option, but they are not the only option.

Recommendation

In the event that a council is too small or lacks the resources or skills to assemble indicators, a number of government agencies and non-profits collect and compile free reports for local areas. Through this research, I found the following reports that are available on the internet and free to the public:

- Headwaters Economics (<http://www.headwaterseconomics.org/index.php>) has created socio-economic profiles for all counties in the Pacific Northwest. These are very comprehensive documents that give extensive detailed information and trends that compare with national averages. The reports are on average about 40 pages and contain a lot of data, some that may or may not be useful to the watershed council. A weakness is that these reports are only on the county level which may or may not reflect the existing conditions within watersheds that do not conform to political boundaries.
- Oregon Labor Market Information System (<http://www.qualityinfo.org>) provides an extensive amount of county and statewide information for Oregon. In some cases, there is so much information that it is difficult to find county specific reports. When they are found, OLMIS provides one-page county data sheets that give trend data on employment, unemployment, wages, and industries. This may be useful for watershed councils to use as a quick reference in lieu of creating indicators. This source has the most recently updated economic information and easily accessible timelines.
- American Community Survey Report, <http://factfinder.census.gov/>: The American Community Survey (ACS) is an annual census bureau survey conducted for each county and Metropolitan Statistical Area. While this data is by far the most comprehensive in measuring social data as well as economic data. It does not supply trends, only data from the most recent surveys (which began after the 2000 census) data is compatible with decennial Census data which can be used to create a timeline.
- Census Bureau LED OntheMap, <http://lehdmap3.did.census.gov/themap3/>: The number one benefit to using OntheMap is the ability to profile a specific area. It is possible to conglomerate this data on larger levels but would involve generating additional reports (which is fairly simple). This data can be generated to fit the

size and shape of any watershed regardless of political boundaries, but there are questions about the accuracy of the data. Current research and a new version of OntheMap will determine if the data is useful at the watershed scale.

- Additionally, OntheMap only gives an economic/employment profile. It does not contain social information.
- Oregon State University Extension Service, Oregon Agriculture Information Network, <http://oregonstate.edu/oain/database/SelCountyCharts.asp>: This system has statewide and countywide reports. It shows the total yearly farm gate sales from the different crops and agricultural production in the county and state. This report may be useful to help the watershed council in strategic decision making and planning.
- US Bureau of Economic Analysis, Regional Economic Profile, <http://www.bea.gov/regional/reis/default.cfm?selTable=CA30>: The BEA provides a large amount of information on their website that is accessible at the county level. The data are not as current as the OLMIS site because the data is more in-depth (for example, 2007 data recently became available in mid-2009), but this data goes back much further than OLMIS with categories dating back to 1969. The Regional Economic Profile is a short report that can be generated and provides basic time series data at the county level. This includes: wage, population, per capita income, proprietor data, etc. There is a trade off with BEA data in that you get a longer time frame, but the data is less current.
- Oregon Economic and Community Development Department, Regional Analysis, <http://www.oregon4biz.com/data.htm> : These reports were generated “ad-hoc” in 2008, but there is the possibility that OECD will continue to update and produce them. Like most reports, they may not provide enough information on their own, but when combined with other reports, they may provide useful information.

Recommendations for Watershed Councils

While watershed councils do impact the socio-economic environment indirectly, and it is an important aspect of a sustainable watershed, it is also important to note, that certain aspects of sustainability may not be measurable by socio-economic indicators. I recommend that councils look at qualitative ways of capturing information about the sustainability of the watershed that cannot be captured statistically or through data sets.

Additionally, I recommend that either OWEB or the Network for Oregon Watershed Councils convene a meeting or discussion to determine recommended statewide definition for socio-economic indicators for watershed councils. This would provide for a framework in which all councils in Oregon could develop and use socio-economic indicators and minimize the confusion between indicators and other monitoring and evaluation metrics.

Additionally, I recommend that councils that have the capacity and size to have a strategic plan use socio-economic indicators to inform the planning process. Socio-economic indicators can be helpful in watershed councils by establishing a common set of “facts” or information that council members can agree upon and use to make decisions that look at sustainability in a holistic manner.

Recommendations for Further Research

There is still a great need for qualitative action research in the development of socio-economic indicators for watershed councils. This project piloted a study with four councils and one in depth case study. It would be useful to continue the study on a larger scale and conduct a time series experiment in which watershed councils not only developed indicators, but integrated them into the management of their organizations and use them as collaborative decision making tools. It would also be valuable to survey watershed council coordinators to find out how effectual the socio-economic indicators identified in this project might be in their planning, programming, and project activities.

It would also be valuable to study the LED OntheMap System to determine if the data available on a watershed level is useful and accurate enough for decision making. This system is fairly new and has the potential to provide very useful socio-economic data, but it may not be the right scale for smaller watersheds.

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