

THE PROMISE OF WILDLAND FIRE MANAGEMENT:
CREATING ECONOMIC OPPORTUNITY
FOR AMERICAN INDIAN TRIBES

by

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ABSTRACT

Many rural, formerly resource-dependent communities seek sustainable forms of economic development that produce employment, attract economic activity, and revive community vitality through means other than commodity production of natural resources. Among such communities are American Indian tribes, many of which are rural and depend on their natural and cultural resources for their livelihood (inclusive of spiritual, cultural, and economic health). This study explores how a proactive, community-based approach to wildland fire management can provide tribes with opportunities to pursue economic and cultural development activities.

Findings suggest that opportunities exist for employment, small business development, and cultural enhancement projects through wildland fire management. Tribes face several obstacles to pursuing such opportunities including a lack of financial, political, and human capital. Building workforce capacity, forming strategic partnerships, educating tribal leadership, and exercising tribal sovereignty are key to creating economic opportunity through wildland fire management.

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CHAPTER ONE
DEFINING THE PROBLEM: TRIBES, NATURAL RESOURCE MANAGEMENT,
& ECONOMIC OPPORTUNITY

Many rural, formerly resource-dependent communities seek sustainable forms of economic development that produce employment, attract economic activity, and revive the vitality of communities that once prospered through intensive resource extraction. Among these communities are American Indian¹ tribes, many of which are rural² and dependent upon their natural and cultural resources for their livelihood (inclusive of spiritual, cultural, and economic health). Tribes seek viable forms of economic development that utilize existing resources and provide opportunities for economic diversification. Although some resource-rich tribes, such as the Menominee of Wisconsin and the Confederated Tribes of Warm Springs of Oregon, have been economically successful through sustainable natural resource development, others are still plagued by high unemployment and poverty.

¹ Although “Native American” and “American Indian” are often used interchangeably, I use the term “American Indian” or “Indian” when referring to the aboriginal inhabitants of North America (living in the United States).

² The U.S. Census 2000 defines “rural” by population density. Generally, areas can be considered “rural” if they have a population less than 2,500 and are located outside of an “Urban Area,” which exceeds 1,000 persons per square mile.

Creating sustainable forms of economic development for tribes in the realm of natural resource management is a complex task; however, the elements for success exist, and can be harnessed through a variety of means. These include an integrated approach to resource management, the assertion of tribal sovereignty³, and viable tribal governance institutions that are aligned with cultural traditions. Together, these elements form a foundation for successful economic development opportunities.

The purpose of this study is to explore how wildland fire-management⁴ activities can augment reservation economies and provide opportunities for both cultural and economic development. To provide a context for this study, I also explore how tribal authority over natural resources can provide opportunities for sustainable economic development through an assertion of sovereign rights and an integrated approach to resource management.

Exploring the role of fire management in the development of economic opportunity and tribal resource management is timely and warranted in light of recent changes in federal policy and funding allocations, the documented environmental effects of climatic change (increasing catastrophic wildfire risk), and the growing role

³ In essence, sovereign nations have the power to govern themselves. Tribal sovereignty is affirmed through the U.S. Constitution, hundreds of treaties and agreements, federal legislation, and case law. Ishiyama (2003) aptly describes sovereignty as a “product of the historical process” that is essential to tribal political survival.

⁴ This study focuses on “wildland fire management” as opposed to structural fire management (although they may overlap in some instances). I use the terms “wildland fire management” and “fire management” interchangeably.

of communities in public land management. Through proactive⁵ fire-management activities, tribes have the opportunity to restore ecosystem health, reintroduce traditional land-management practices to the landscape, utilize raw materials, and protect community resources both on and off the reservation.

The main objective of this study is to address the specific question: Can fire-management activities augment tribal economies, providing jobs and small business development opportunities while restoring the ecosystem and providing opportunities for cultural development? The secondary objectives of this study include exploring the role of sovereignty in natural resource management and identifying specific fire-management activities that may stimulate economic activity for tribes.

The primary assumptions on which this thesis is based include: (1) successful economic development may occur if the economic program pursued is aligned with cultural values and the institutional structures of the community affected (Duffy and Stubben 1998); (2) American Indians play (and have played) an integral role in shaping the natural environment and pursue natural resource management with a holistic approach that aims to utilize, preserve, and protect resources for the benefit of current and future generations (Krech 1999); and, (3) the application of traditional

⁵ A “proactive” approach to wildland fire management entails engaging in prevention and protection efforts that aim to reduce communities’ overall fire risk; enhance community awareness of wildfire; and incorporate local knowledge, needs, and wants into the fire-planning process. An aspect of such an approach may include creating economic opportunities for the community through prevention and protection efforts.

land-management practices such as the traditional use of fire may enhance ecological restoration and provide opportunities for cultural resource management and development (Kimmerer and Lake 2001).

In this chapter, I provide a context for the study through a discussion of the economic state of Indian reservations and an overview of conservation-based development and tribal sovereignty. I then discuss American Indian natural resource management to introduce the importance of incorporating tribal traditions and culture in pursuing natural resource management and sustainable economic development. Next, I present the study's purpose and objectives and discuss the potential economic opportunities through fire management. And, finally, I provide a brief description of my methodology and discuss the scope and delimitations of the study.

Background

This study is premised on the following points: many reservations are plagued by struggling economies, characterized by high unemployment and poverty rates; ecosystem management is aligned with cultural traditions, customs and practices of tribal communities, promoting the sustainable use of resources over the long term; conservation-based development provides viable economic and cultural development opportunities through the incorporation of local knowledge and needs in the planning process; proactive fire management is needed to restore ecosystem health and reduce communities' risk to wildfire; and finally, assertion of tribal sovereignty and control of natural resources is essential to successful economic development.

The Economic Condition of Indian Country⁶

Many tribes and other rural natural-resource dependent communities (in the Northwest, especially) have struggled to establish a solid economic foundation since the commercial fishing and timber industries virtually bottomed-out in the 1980s. These towns, communities, and tribes may be characterized by high unemployment and poverty rates, limited economic activity, and dwindling populations.

Many tribes suffer from lack of economic opportunity (Cornell 2001). The need to enhance economic development opportunities on Indian reservations is evident in recent statistics: as of 2000, the average unemployment rate of reservations is 13.5 percent—more than twice the national average. Likewise, 31.2 percent of reservation residents live in poverty and the national poverty rate of American Indians (on and off reservations) is 24.5 percent—more than double the national average (U.S. Commission on Civil Rights 2003, 104). According to the U.S. Census 2000, the poverty rates of federally recognized tribes in the Pacific Northwest (Idaho, Oregon, and Washington) range from zero to 55 percent, with the median poverty rate of 20.5 percent—almost double the national average. Although statistics do not always portray an accurate picture of the economic vitality of a community, they do provide significant insight into the local economy.

Many tribes have turned to the gaming industry as a viable form of economic development that provides employment for the tribal and non-tribal community and

⁶ I use the term “Indian Country” to describe Indian reservations in the lower-48 states as well as native communities in Alaska.

stimulates spin-off businesses. Although the gaming industry has revitalized some tribal economies and provided needed revenue to contribute to other sectors of the tribal economy, critics argue that a more sustainable form of economic development aligned with cultural traditions is needed (Clow and Sutton 2001). This study examines the possibilities for a more sustainable, balanced form of economic development through an integrated approach to resource development, specifically through fire management.

The Promise of Conservation-based Development

For many tribes, resource management is approached from a holistic point of view—a perspective that recognizes the interaction and interdependence of resources and aims to optimize use over the long-term, providing for current and future generations. There is significant evidence that tribes have practiced a form of ecosystem management for thousands of years, before they were displaced from their territories (Morishima 1997). This reinforces the idea of the “ecological Indian,” who balanced both the protection and use of natural resources (Anderson 1996).

Conservation-based development promotes a balanced, sustainable approach to economic and community development. This form of development incorporates qualitative considerations such as cultural and environmental values, local control of resources, and increased community capacity to ensure long-term viability (Kruger and Etchart 1994). Conservation-based development aligns well with Indian practices of natural resource management for the following reasons: (1) many tribes practice ecosystem management, stressing biodiversity and watershed needs and incorporating

cultural traditions and customs; and (2) many tribes practice resource management through a long-term lens, maximizing resources for current use, while preserving them for future generations.

Therefore, sustainable economic development opportunities that incorporate tribal values, traditions, customs, and practices may grow out of an integrated approach to natural resource management. Central to this strategy is a balanced approach to management that considers the economic, environmental, and social aspects of the community.

An Introduction to Tribal Sovereignty

A key element of economic success through tribal resource management is the assertion of tribal sovereignty. There are a number of success stories of tribes that have taken authority over natural resource management, providing both economic and cultural benefits to the community. Since the passage of the 1975 Indian Self-Determination Act and Education Assistance Act (ISDEA) (PL 93-638), a number of tribes have become more involved in natural resource planning and management.⁷ For

⁷ ISDEA consisted of two basic titles: Indian Self-Determination Act (I) and Indian Education Assistance Act (II). Title I, applicable in this case, provided subcontracting of federal services to tribal organizations, authorized discretionary grant and contract authority, provided for tribal government participation in the Intergovernmental Personnel Act, which allowed civil service employees to work for tribal organizations while retaining their benefits, and allowed the Secretary of the Interior, per his/her discretion, to waive federal contracting laws and regulations for tribal contracts. The passage of this Act encouraged tribes to work toward self-determination through asserting control over federal programs and services. This Act has been amended a number of times for technical and clarification purposes.

example, the number of tribes that have compacted⁸ forestry programs, partially or fully, to provide management services for their own forests nearly doubled from 1991 to 2001—from 64 to 121 (IFMAT 2001, 6). Tribes such as the Menominee of Wisconsin and the Yakama Indian Nation of Washington have implemented successful ecosystem management programs that incorporate sustainable practices and tribal traditions, while producing employment opportunities and generating substantial revenue through timber sales (Morishima 1997).

Although there are a number of tribes that have successfully exercised their sovereignty to gain control over their resources, many struggle for a variety of reasons including inadequate economic infrastructure or weak governance institutions. A number of scholars (Cornell and Kalt 1992; Duffy and Stubben 1998; Smith 1994) have proffered theories and recommended approaches to successful, sustainable economic development in Indian Country. While some scholars (Cornell 2001; Cornell and Kalt 1998, 1992) focus more on reliable, stable governance institutions, others (Smith 1994; Duffy and Stubben 1998; Trospen 1994) emphasize the maintenance of cultural identity and integrity as a key element.

Smith (1994) asserts that tribes must first take control of their resources (human, natural, capital, and cultural) and sustain a distinct cultural identity to ensure successful economic development. Also, Cornell and Kalt (1998) have found and recommend that in order to be economically successful, tribes must effectively assert

⁸ Compacting is a mechanism by which tribes can take over management of any or all federal programs and their associated budgets and exercise authority of the distribution of the budgets among compacted programs.

their sovereignty and create stable and legitimate governance institutions that are relevant to their culture. They also link reservation poverty to sovereignty: “it is increasingly evident that the best way to perpetuate reservation poverty is to undermine tribal sovereignty. The best way to overcome reservation poverty is to support tribal sovereignty” (Cornell and Kalt 1998, 29).

Therefore, to effectively address reservation poverty and increase economic development opportunities through natural resource management, tribes must first gain control of their resources to establish management strategies that are in synch with tribal culture, founded on stable governance institutions, and provide opportunities for both economic and cultural benefit.

Statement of the Problem

Conservation-based development is premised on a balanced, integrated approach to community and economic development that considers social, economic, cultural, and environmental aspects of a community. In order to be successful in this approach, the left hand must know what the right hand is doing; essentially, tribes must have full control of their resources to effectively engage in conservation-based development. Historian Rebekah Davis (1997) alludes to the importance of tribal authority over natural resource management to ensure acceptance, respect, and most importantly, success,

Conservation programs designed without regard for the beliefs or practices of the human population occupying the land are fruitless at best, and at worst, increase the level of mistrust and misunderstanding that has historically plagued Federal Government-American Indian relations (p. 51).

Cornell and Kalt (1998) further attest, “as long as the BIA or some other organization carries primary responsibility for economic conditions on Indian reservations, development decisions will reflect the goals of those organizations, not the goals of the Tribe” (p. 32). These scholars allude to the necessity of incorporating tribal culture, traditions, and objectives into any natural resource management strategy or economic development plan.

Tribes and Natural Resource Management

Over the last century, the federal government’s role in reservation resource management has evolved from a plenary authority over Indian affairs to a more removed proponent of self-determination as means to increase tribal authority and reduce government domination over programs and services.

Through the evolution of federal policy, tribes have lost millions of acres of traditional reservation land, complicating natural resource management due to checkerboard land ownership patterns and consequent disturbance of native ecology (as well as lack of authority over non-Indian land owners).⁹ Nonetheless, reservations across the United States have rich resources including timber (Quinalt, Menominee, White Mountain Apache), oil reserves (Osage, Blackfeet), grazing land (Blackfeet), and coal and uranium (Navajo) (Clow and Sutton 2001). Indian reservations contain approximately one-third of low-sulfur coal in the western United States, 20 percent of

⁹ Many tribes such as the Klamath in southern Oregon have also pursued consolidation and restitution of land holdings in recent years.

all known U.S. reserves of oil and natural gas, and over one-half of all uranium deposits (Wood 1994). These rich resources are and will continue to be an economic and cultural asset for tribes.

Many tribes have made progress toward self-determination and pursued resource management that has had significant economic benefit for the tribe and tribal members. For instance, the White Mountain Apache of east-central Arizona took control over hunting and fishing on the Fort Apache Reservation and established a trophy elk population and other wildlife opportunities on a sustainable basis, while generating significant revenue (Anderson 1996). Also, the Confederated Tribes of Warm Springs in central Oregon have pursued sustainable forest management and have capitalized on rich timber and water resources to enhance their financial assets and reinvest in the tribal economy (Hibbard and Lane 2004).

Although there are model examples of tribes that have become self-determining through effective management of their natural resources, there are also a number of examples that represent an exploitation of natural resources, counter to the notion of the “ecological Indian.” The environmental justice literature provides several examples of tribes that have allowed their resources (inadvertently at times) to be exploited by multi-national corporations (Fixico 1998; Ishiyama 2002), jeopardizing the condition and health of the land and its resources. Some tribes such as the Blackfeet and Mescalero Apache have independently pursued activities such as the development of oil and gas fields and a nuclear-waste facility that pose a threat to the environmental integrity of reservation resources (Clow and Sutton 2001).

In contrast, some tribes such as the Yakama Indian Nation, Menominee, and White Mountain Apache have successfully made progress toward self-determination through ecosystem-based approaches to natural resource management. These tribes have considered the balance of the ecosystem in the decision-making process, which has been beneficial from an economic and environmental perspective. However, many tribes, through a more conventional approach to natural resource management, have depleted rich resources for short-term profit (or allowed resources to be depleted), thereby threatening the environmental stability of the ecosystem for short-term economic gain. Such tribes may have pursued resource management programs that fail to incorporate tribal traditions or cultural values; or such tribes may struggle to exercise full authority over programs and services formerly under control of the Bureau of Indian Affairs (BIA), thus making an integrated approach to natural resource management difficult.

Many reservations are rich with resources that can be effectively utilized to provide economic opportunity for current generations, while preserving and protecting the resource for the future. With complete control over resources and an emphasis on an integrated, balanced approach to natural resource management, tribes may pursue a variety of sustainable economic development opportunities.

Purpose of Study

The purpose of this study is to explore how wildland fire-management activities can augment reservation economies and provide opportunities for both cultural and economic development. In a larger context, this study also explores how

tribal authority over natural resources can provide opportunities for sustainable economic development through an assertion of sovereign rights and an integrated approach to resource management.

As tribes continue to work toward self-governance and federal programs and policies continue to fund fire-management activities such as hazardous fuels reduction, biomass utilization, and stewardship contracting, tribes may be able to create additional economic development opportunities that will benefit tribal members while enhancing biodiversity, ecosystem health, and cultural traditions.

A spate of legislation was passed from 2000 to 2004 following the landmark 2000 fire season, during which 123,000 fires burned more than 8.4 million acres (USFS 2001, 4). This legislation, complemented by the trend of conservation-based development, has provided communities of all sizes, tribal and non-tribal, with increased access to federal funding to pursue community fire planning, hazardous fuels reduction, biomass utilization, and stewardship contracting. For many resource-dependent communities, this federal funding and the push to reduce hazardous fuels may provide needed opportunities for economic development. For tribes, in particular, this may provide additional funding and assistance to complement traditional land-management practices, while simultaneously providing increased opportunities for economic diversification through contracting and small business development.

Over the long term, fire management, as part of an integrated, balanced approach to resource management, may provide tertiary economic development

opportunities through the creation of a healthy ecosystem that attracts wildlife; produces non-timber forest products such as mushrooms, nuts, and grasses; and provides additional recreation opportunities for the tribal and non-tribal community. Furthermore, proactive fire management reduces communities' risk to wildfire, yielding economic benefit through the immediate utilization of raw materials and the protection of community resources over the long term.

Research Question

This study addresses the question: Can fire-management activities augment tribal economies, providing jobs and small business development opportunities while restoring the ecosystem and providing opportunities for cultural development? In examining the research question, the study also explores the role of sovereignty in natural resource management and identifies specific fire-management activities that may stimulate economic activity for tribes. More specifically, it examines how sovereignty plays a role in natural resource management and economic development; identifies a range of economic development opportunities in fire management; identifies obstacles tribes face in pursuing economic development through fire management; examines how tribal knowledge can be incorporated into fire management as means to provide opportunities for cultural development; and, identifies the limitations associated with economic development through fire management.

Methodology

The methodology of the study consists of: a secondary analysis of a Spring 2004 survey of natural resource managers of 31 federally recognized tribes in the Pacific Northwest (Oregon, Washington, and Idaho); and follow-up interviews with tribal representatives who indicated an interest in fire management as a tool for economic development.

The study builds from a wildfire protection and needs assessment of Pacific Northwest tribes conducted in Spring 2004 by Resource Innovations¹⁰, a non-profit organization affiliated with the University of Oregon. A portion of the 2004 survey specifically addressed economic development and contracting issues related to fire management as well as the traditional use of fire.

This study expands the scope of the 2004 survey to further explore tribal fire-management activities and to identify the obstacles and opportunities tribes face in pursuing economic development through fire management. The findings from this study are based on follow-up interviews with original participants in the 2004 survey. Interviewees included participants from tribes large and small (population and acreage) and east and west of the Cascade Mountains. Participants are all tribal members and involved in fire, forestry, and land-use management.

¹⁰ Resource Innovations, formerly the Program for Watershed and Community Health, is part of the Institute for a Sustainable Environment at the University of Oregon.

Importance of Study

Over the past 20 years, catastrophic fires (of 100,000 acres or more) have increased 13-fold (Morrison 2004). Due to the increase in wildfire risk and associated losses, fire management has come to the forefront in federal natural resource policy over the last ten years. Through shifts in federal policy and a proactive approach to fire management, tribal and non-tribal communities may capitalize on the opportunity to engage in community protection and prevention efforts that can provide both economic and cultural development opportunities.

This study is complex and involves the exploration of a number of issues such as the interrelationship of sovereignty, conservation-based development and economic development; the role and viability of fire-management activities to stimulate economic and cultural development opportunities; the needs and interest of tribes in economic development through fire management; and the opportunities and benefits of engaging in fire management as means to augment tribal economies.

A number of disparate elements have converged to heighten the importance and relevance of this study. This study draws from trends in tribal sovereignty, shifts in federal policy and natural resource management, and tribal economic needs and interests. It demonstrates the interconnected nature of these issues and contributes to the relative dearth of literature on this topic. The study presents several recommendations for scholars, practitioners, and policymakers to move forward to create economic opportunities for tribes in fire management and natural resource management in general.

Scope and Delimitations of Study

The research for this study occurred at two levels: a secondary analysis of a 2004 survey of wildfire protection and prevention needs of federally recognized tribes in the Pacific Northwest; and a series of follow-up interviews with original survey respondents. As discussed, the 2004 survey results used as a foundation for this research represent only 31 out of 42 federally recognized tribes in the Pacific Northwest, thereby limiting the sampling population for the follow-up interviews. The voluntary participation of tribal representatives in the follow-up interview process may also limit the scope of the study.

The relevance and applicability of this study for tribes seeking to create economic development opportunities through fire management may be limited based on reservation size, location, and natural resources. In terms of reservation size (in area), larger reservations may find this study more relevant due to sheer quantity of harvestable resources. Also, tribes located in more wildfire-prone country such as eastern Washington may have more of an interest in hazardous fuels reduction that poses an immediate threat to reservation resources. Furthermore, tribes that have significant timberlands or woodlands may find this study presents more viable economic development opportunities. Nevertheless, this study presents significant findings and recommendations that may provide insight to a variety of tribes (and other rural, resource-dependent communities) seeking to supplement local economies by engaging in fire-management activities.

Outline of Remainder of the Thesis

The remainder of this thesis consists of four chapters including: a review of related literature; methodology; findings; and summary, conclusions, and recommendations.

The literature review provides a brief organizational and historical background of the topic area of concern. The purpose of this chapter is to acquaint the reader with the existing literature, establish the need for future research or study, evaluate various theoretical positions, and create a theoretical framework that supports the purpose of this study. The third chapter reviews the methodology or procedures through which information was obtained, analyzed, and applied to the study. Methodological assumptions and limitations are also discussed. The study's findings are presented in Chapter Four, related to the topic areas covered in the interview process. A summary of economic opportunities and associated challenges is also provided at the close of Chapter Four.

The final chapter presents a brief summary of the study's findings. Conclusions are made based on the findings, and recommendations for moving forward to create economic opportunity through fire management are presented. The chapter closes with a final note that reiterates the salient points and conclusions of the study.

CHAPTER TWO

SETTING THE CONTEXT

The purpose of this chapter is to explore the existing literature in relevant topic areas, establish the need for future research, evaluate various theoretical positions, and create a theoretical framework that will support the purpose of this study. Exploring the opportunities for tribal economic development through fire management is a complex task requiring the distillation of salient elements from several lines of research. To provide an adequate background for the forthcoming analysis, I discuss scholarship in the fields of natural resource management, tribal sovereignty, economic development, and fire management.

Through this analysis, the interconnected nature of fire management, economic development, tribal sovereignty, and ecosystem management is evident; to explore one topic, requires a thorough discussion of all. The chapter begins with a discussion of the evolution of natural resource management and the emergence and principles of ecosystem management. Next, I explore American Indian natural resource management and the Indian worldview. Then, I address tribal sovereignty and its role in achieving tribal goals and objectives, especially focusing on economic development. I close with a more focused discussion of fire management. At this

point, I draw salient points from previous sections to illustrate that fire management may present viable economic development opportunities for tribes.

Evolution of Natural Resource Management

Over the last century, natural resource management evolved through a number of environmental movements. They have been characterized as preservation, conservation, environmental legislation, sustainability, and community-based management. Edward P. Weber (2000) breaks environmental history into four movements: preservation, conservation, contemporary, and grass-roots environmental management (GREM)¹¹. Although each of these movements has distinct characteristics, they also build off of one another and are contemporaneous, illustrating the evolutionary nature of natural resource management.

The purpose of this section is to briefly review the evolution of natural resource management theory, discuss the principles of the emerging paradigm of ecosystem management, and finally, to explore the role of expertise and knowledge in GREM.

Natural Resource Management over the Years

The preservation and conservation movements emerged at the turn of the 20th century during the Progressive Era. Preservation can be characterized by the belief

¹¹ GREM can be considered roughly synonymous with terms such as ecosystem management, integrated resource management, and integrated environmental management. GREM is also closely aligned with conservation-based development, promoting a balanced, sustainable approach to economic and community development and resource management.

that wilderness has the right to exist and that development is not always the first and best use of resources (Cortner and Moote 1999). John Muir, founder of the Sierra Club and an ardent proponent of preservation, believed nature was divine and sacred; that the nation's wildlands should be protected and preserved for human enjoyment and future generations (Cortner and Moote 1999). To this end, the government should be the "protector and defender" of these lands through the establishment and expansion of the nation's wilderness system (Weber 2000).

In contrast to the preservationists, the conservationists such as Gifford Pinchot and Teddy Roosevelt promoted a utilitarian philosophy that advocated nature as a commodity from which society should benefit (Weber 2000); nature is subservient to human needs and wants (Cortner and Moote 1999). Gifford Pinchot wrote, "the first great fact about conservation is that it stands for development . . . and the first duty of the human race on the material side is to control the use of the earth and all that herein is" (as cited in Cortner and Moote 1999, 14). The conservation movement can be characterized by a highly centralized, hierarchical approach that focuses on maximum sustained yield, the dominance of experts in the decision-making process, and the government as the most efficient manager of nature (Weber 2000).

In both the conservation and preservation movements, professionalism dominates the decision-making process and the public plays a passive role. Decisions are solely based on empirical measurements, reflecting ostensibly objective and professional values and definitions of the public interest (Cortner and Moote 1999).

The public, in this decision-making process, is rarely (if ever) consulted, based on the premise that the public is poorly informed and lacks necessary technical expertise and, therefore, is not capable of active participation.

The contemporary environmental movement that emerged in the late 1960s and early 1970s can be characterized by an “us versus them” philosophy, embodied by a rise of interest group environmentalism. Policy solutions focus on the degradation of natural resources, advocate for pollution control, and promote nature over humanity, i.e., nature trumps human interests, if nature is at all threatened (Weber 2000). Contemporary environmentalism approaches regulation from a command-and-control position that is premised on a top-down, hierarchical relationship between federal agencies and regulated industries and landscapes (Weber 2000). This hierarchical relationship, combined with the rise of interest groups, hinders effective dialogue between federal agencies and affected publics (Cortner and Moote 1999).

GREM represents a new ecological approach to the study and management of resources that emerged out of the late 1980s and early 1990s as a way out of the gridlock then dominating public lands management. The roots of GREM can be traced to the late 1980s, when the notions of sustainability, collaboration, and ecosystem science garnered more broad-based support. This marked a shift in the focus of resource management from output to resource condition. The foundation of this movement is based on three general themes: a concern for ecosystem health; a

preference for more place-based, decentralized, adaptive management; and new methods of integrating public participation into the decision-making process (Cornter and Moote 1999).

Although the GREM movement incorporates some elements of past environmental movements, the basic, underlying philosophy of this movement embodies a deviation from historical trends. Some of the basic principles of GREM include: decentralization, devolution of power to the local level, collaboration as a mode to solve complex problems, sustainability that balances ecology and economics, and voluntary citizen participation.

An essential element of GREM is its local, place-based focus. The “places” in which GREM is applied are often rural, resource-dependent communities. Decision-making authority is devolved to local, place-based alliances such as watershed groups made up of affected stakeholders and relevant state and federal agencies. The connection to place is important in that participants are engaged out of their attachment to “place”; they are willing to take part in the decision-making process because they have a stake in the community and want to work together to shape the decisions and policies affecting their community. Weber reinforces this idea with the term “self-governance”—GREM brings community members with a vested interest together to instigate change that conforms to their collective vision of their community (Weber 2000).

In contrast to the compartmentalized or categorical approach of past environmental movements, GREM embraces a holistic worldview that approaches

problems or issues from a number of standpoints and seeks balance between the needs of the community, environment, and economy. Central to this philosophy is the symbiotic relationship between humans and nature—one is essential to the survival of the other and they exist to benefit one another. This philosophy is in direct contrast to the “either or” philosophy of the conservation or contemporary environmental movements. In essence, GREM advocates the simultaneous maintenance of community development, ecological health, and economic stability for the benefit of future generations through adaptive management (Weber 2000). This philosophy is reflected through the case-by-case decision-making process, which attempts to “see the forest as well as the trees” (Weber 2000, 243). Each decision aims to ensure sustainability and ecological health over the long term.

A central feature of GREM is the collaboration of diverse stakeholders such as community members and state and federal agency representatives in the decision-making process. As the complexity of environmental issues has intensified over the last 20 years, collaboration has emerged as a viable alternative to traditional decision making. GREM has adopted collaboration as a central tenet to ensure issues are adequately addressed by a diversity of stakeholders that represent varied interests, organizations, expertise, and levels of authority (such as state and federal representatives). A critical component of this process is GREM’s motto of “them is us”; that is, animosity and judgment are put aside to work collaboratively toward a

common vision and solution. Also, this recognizes that the government is not the defender of ecosystem health; local communities must establish strong internal ties to ensure community goals are fulfilled (Weber 2000).

The Role of Local Knowledge

A key component of GREM is an integrated approach to solving specific problems in natural resource management. An integrated approach provides a comprehensive perspective of the problem, weighing several factors to better determine the extent and scope of an issue. In contrast to the conservation movement, which relies solely on “expert” knowledge that ostensibly incorporates the public interest through empirical measurements, GREM seeks “expertise” beyond bureaucratic or organizational interests. GREM aims to engage community assets such as technical experience and local knowledge to include a variety of community perspectives to enhance the efficacy of natural resource management (Weber 2000). Essentially, in this process, every participant is an “expert.”

GREM relies on “folk knowledge”—“the individual and collective expertise of those community members most familiar with a particular problem and ecosystem capacities”—to bring valuable, additional qualitative information into the decision-making process (Weber 2000, 252). Such knowledge sheds light on how natural resources should or should not be managed.

In some cases, input from native or aboriginal groups can be particularly insightful due to their long tenure and connection with the land. Traditional ecological knowledge (TEK) is a type of folk knowledge that is passed down from

generation to generation usually among aboriginal or tribal groups. Fikret Berkes (1999) defines TEK as

a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment (p. 8).

TEK, like GREM, is based on a holistic worldview that stresses the interrelated nature of community, environment, economy, and health.

The incorporation of TEK and other “folk knowledge” in the decision-making process of GREM enhances the legitimacy and efficacy of outcomes. This also provides the opportunity to include an array of community members such as aboriginal or tribal groups in the decision-making process. Often, the voices of these community members have been left out of the development of natural resource management strategies; this exclusion ignores a valuable source of information that can enrich natural resource management. Although obstacles such as a credibility or reliability gap may exist in the acceptance and application of such knowledge, GREM realizes the value of such expertise and integrates it into the decision-making process.

Therefore, natural resource management has evolved over the years to promote a devolved, place-based, community-driven approach to resource management. Central to this approach is the power of local knowledge; a sense of balance between economy, society, and ecology; and the sustainable use of resources over time. For tribes, many of which practice a form of ecosystem management, pursuing economic and community development based on the principles of GREM may be a logical extension of current activities.

American Indian Natural Resource Management

Reservations across the United States are rich in natural resources including timber (Quinalt, Menominee, White Mountain Apache), oil reserves (Osage, Blackfeet), grazing land (Blackfeet), and coal and uranium (Navajo) (Clow and Sutton 2001). Tribes have taken a number of approaches to the management of these resources ranging from complete authority over tribal lands and resources (exercising sovereign right) to federal (BIA) operation and oversight (utilizing the trust responsibility). Several proponents (Cornell and Kalt 1995, 1992; Deloria and Lytle 1984; Morishima 1997) of self-determination and self-governance advocate for tribal authority over natural resource programs to ensure that tribal management objectives and goals, which encompass a more holistic worldview, are realized and achieved.

In this section, I first explore the holistic worldview of American Indians and its relationship to the ecosystem management movement; then, I discuss the role of sovereignty in natural resource management; and finally I address the implications for the integration of traditional land-management techniques into broader land-management practices. I also discuss stewardship contracting and its potential as an avenue for the reintroduction of traditional land-management techniques to the landscape and for job development.

The American Indian Worldview

American Indians have often been referred to as the original stewards of the environment—caring, protecting, and managing agricultural and forestlands in a sustainable manner. Vine Deloria, Jr., Lakota author and lawyer, emphasizes the

sustainable, ecological, conservatory nature of the Indian: “The Indian lived with his land” (as cited in Krech 1999, 22). This statement implies the respect and sense of stewardship many Indians have for the land and its resources.

In living with the land, Indians shaped their environment to ensure cultural survival; they recognized their dependence on the land and its resources (Fixico 1998). Lewis (1995) describes Indians as students of their environment who developed a land ethic based on long-time experience and the recognition of the interrelationships between the inanimate and animate and the natural and supernatural inhabitants of the world. To this end, Indians practiced adaptive land management as environmental conditions changed over time. Lewis (1995) points out they did not leave the natural environment untouched—they shaped the environment and vice versa.

Warren (1996) also eschews the notion that Indians “lived in harmony with nature” or treaded lightly upon their environment. Rather, he emphasizes that natives profoundly shaped their environment to suit their needs. Warren (1996) expresses the utilitarian philosophy of Indians toward the land; he writes, “Indians often manipulated their local environments for specific purposes . . . the idea of ‘preserving’ land in some kind of wilderness state would have struck them as impractical and absurd” (p. 19). In short, though Indians revered the land and its resources, they regularly shaped their environments as part of the cultural adaptation process in which traditions persisted and evolved as necessary.

Gedicks (1993) discusses the “Natural Law” that guides the ethics and values of many indigenous groups, focusing on the Anishinabe (Chippewa) Nation. Natural Law is based on the tenets of reciprocity and cyclical thinking. It emphasizes the need to maintain a balance between humans and the ecosystem (Gedicks 1993). Kimmerer and Lake (2001) also emphasize the indigenous recognition of the reciprocal, equal relationships between human and nonhuman members of the ecological community—they are dependent upon one another. The ethic of reciprocal responsibility forms a basis for the manipulation of the environment by indigenous groups. For example, the application of fire to the environment is viewed as symbiotic—both the land and people benefit (Kimmerer and Lake 2001).

A central feature of the holistic worldview of many aboriginal groups is the notion of land and place. As Lewis (1995) emphasizes, land and place are key to the survival, identity, and beliefs of American Indians. In her discussion of Indian land and native sovereignty, Wood (1994) stresses the greatest threat facing native nations today is the deterioration of their land base. Although the land-grabbing days of the past are unlikely to reoccur, native land bases across the United States are threatened by rapid development, pollution, and loss of resources (Wood 1994). Wood (1994) describes a tribe’s land base as the “linchpin” to other attributes of sovereignty; she notes, “The tribal territory forms the geographical limits of the tribe’s jurisdictions, supports a residing population, is the basis of a tribal economy, and provides an irreplaceable forum for religious practices and cultural traditions often premised on the sacredness of the land” (p. 1474).

Therefore, land, and the condition thereof, plays a significant role in the native belief system and worldview. The native emphasis on interdependence, balance, reciprocity, adaptive management through knowledge and experience, and place dovetails with the principles of ecosystem management. This convergence of belief systems in natural resource management may provide future opportunities for the incorporation of traditional land-management techniques into the greater realm of natural resource management.

Traditional Ecological Knowledge

As discussed, ecosystem management calls for the incorporation of local or traditional knowledge in the decision-making process. The traditional ecological knowledge (TEK) of many aboriginal groups may be a valuable resource in the resolution of several resource management issues. Although ecosystem management is a rather recent focus of natural resource management policy, Morishima (1997) notes that tribes have practiced the ecosystem management principles of sustained yield, interrelationships, and balance for thousands of years. The incorporation of traditional knowledge into resource management or restoration plans may provide a significant foundation for local ecosystem processes and factors influencing biodiversity (Berkes 1999). The inclusion of traditional or local knowledge in resource management also provides the community with the opportunity to be involved in decision-making processes that affect current and future generations (Lake 2004).

A number of scholars (Kay 2002; Howitt 2001; Berkes 1999; Lake 2004) recognize that indigenous land-management practices contribute to overall ecological integrity and health through enhanced biodiversity and habitat and adaptive management. As Kay (2002) stresses, aboriginal land-management techniques can contribute to modern-management practices to help restore ecosystem processes and ecological integrity. Berkes (1999) also notes that despite the loss of authority over resources, the breakdown of land use and knowledge systems, and technological changes, many traditional and rural peoples still retain resource practices that are consistent with the protection of biodiversity.¹² Furthermore, Howitt (2001) emphasizes the benefit of applying aboriginal values and knowledge to the development of sustainable human systems in vulnerable ecological niches, which require a holistic rather than fragmented approach. Fixico (1998) writes, “Over the generations, these [tribal] values proved to be successful, and it is these traditional values that could offer a useful lesson as global natural resources are rapidly depleted by the progress of civilization” (p. 207).

Thus, the integration of traditional knowledge in the resource management decision-making process may have a number of positive effects including a more integrated approach to resource management (Morishima 1997), the opportunity for local ownership and involvement (Lake 2004; Kimmerer and Lake 2001), a greater

¹² Krech (1999) introduces an interesting concept of ‘cultural amnesia’. This occurs when people have been separated from cultural traditions and knowledge for a series of generations; their traditions, knowledge, and practices are forgotten.

balance of development and environment needs (Lewis 1995), and a broader knowledge foundation on which to base decisions (Lake 2004; Sallenave 1994).

Stewardship Contracting

There are a number of opportunities to incorporate traditional knowledge in natural resource management. One of the most promising is stewardship contracting. Stewardship contracting emerged in the 1980s as a viable land-management technique for a number of public agencies including the Forest Service and the Bureau of Land Management. In response to declining agency budgets, office downsizing, reduced personnel, and public demands for a broader utilization of federal forest and rangeland, federal agencies turned to land-stewardship contracting as means to maintain ecosystem health while providing additional employment and ownership opportunities for local, rural communities (Pinchot Institute). The Pinchot Institute defines stewardship contracting as

a set of natural resource management practices that seeks to promote a closer working relationship with local communities in a broad range of activities that improve land conditions, consistent with a community's ecological, social, and economic objectives.

Today, stewardship contracting can encompass several themes including: broad-based (community) collaboration; provisions for multi-year, multi-task, end-results oriented activities; a comprehensive approach to ecosystem management; improved administrative efficiency and cost to the agency; and creation of a new workforce focused on maintenance and restoration activities (Pinchot Institute).

Stewardship contracting can benefit the public in several ways. Local communities may become more involved in public land management and develop a sense of ownership in the process. Also, local involvement strengthens local economies through job diversification and opportunities for new and expanded markets (Pinchot Institute). Furthermore, applying local knowledge to the management of local lands may improve overall ecosystem health through the introduction of traditional land-management techniques (Ack et al., 2001). The inclusion of local or traditional knowledge also provides opportunities for cultural development for aboriginal groups. Stewardship contracting may provide these groups with the opportunity to practice and impart traditional techniques to interested parties to ensure the longevity of traditional practices.

Rural communities across the United States are becoming increasingly involved in stewardship contracting. Within the last five years, federal authorities have been established to encourage stewardship contracting through the Forest Service and the Bureau of Land Management. The FY 1999 Omnibus Appropriations Act authorized the Forest Service to implement up to 28 stewardship contracting pilot projects. The FY 2001 Appropriations Bill authorized an additional 28 Forest Service stewardship pilots. The 2003 Appropriations Act (P.L. 107-8) granted stewardship contracting authority to the Bureau of Land Management. The specific authorities emphasized include: exchange of goods for services, which allows the value of the product to be retained and reinvested on site; receipt retention, which ensures proceeds from the sale of commercial products are reinvested in the program; best-

value contracting, which emphasizes quality work, past performance, and wage requirements, and workmanship; designation by prescription, which promotes end-results contracting; and multi-year contracting, which fosters a stronger sense of stewardship through long-term contracts (Pinchot Institute).

The Maidu Stewardship Project (MSP) is an example of a stewardship contract awarded to a northern California tribal community that incorporates the use of traditional American Indian stewardship principles in national forestland management. The MSP was one of 28 pilot projects authorized by the FY 1999 Omnibus Appropriations Act. The MSP is based on three key elements: (1) culturally appropriate communication protocols; (2) demonstration of traditional ecological knowledge (TEK); and (3) community cultural revitalization (Cunningham and Bagby 2004). The primary goal of the group is to return the land to its pre-European state using Indian-management tools and to demonstrate how traditional land-management techniques can optimize forest health while providing local jobs (Little 2004).

The MSP illustrates a collaborative effort between the Forest Service and the Maidu tribal community that has continually evolved as two divergent worldviews have worked toward a common vision. Through this process, the two groups have had to become accustomed to one another's "language" and perceptions of time to develop collaborative protocols, a business plan, and monitoring and evaluation programs (Little 2000). To date, the MSP has produced a monitoring plan and methodology, analyzed approximately 1,300 acres (out of 2,100), and thinned 36

acres (out of 1,200) of the project area (USFS 2004). The Maidu have also secured a ten-year sole-source contract with the Forest Service to further implement traditional management techniques and rehabilitate the land. More importantly, as Lorena Gorbet, MSP contact, notes, the utilization of TEK has resulted in a “turn around of the land” (USFS 2004, 15). She continues, “instead of dying, the land is now responding and coming alive again with more and more plants . . . the animals are returning to this area and so are humans” (USFS 2004, 15).

The MSP provides an example of a successful tribal-federal agency partnership that applies traditional land-management techniques to the landscape while promoting both cultural and economic development. As the Forest Service and Bureau of Land Management continue to pursue stewardship contracting as a means to achieving land-management objectives, tribes may have increased opportunity to apply traditional knowledge to the landscape.

Tribal Sovereignty and Trust Responsibility

Tribes are sovereign nations in the United States—they have the power to govern themselves. Tribal sovereignty is affirmed through the U.S. Constitution, hundreds of treaties and agreements, federal legislation, and case law. In essence, the federal government has a fiduciary responsibility and financial obligation, through a number of agreements and treaties, to protect tribal sovereignty and to provide services and other protections to Tribes in exchange for relinquished lands. Ishiyama (2003) aptly describes sovereignty as a “product of the historical process” that is essential to tribal political survival.

The purpose of this section is to provide a brief background on tribal sovereignty, discuss the face of tribal sovereignty today, and establish a context for the future of tribal sovereignty and its implications for natural resource management and economic development. The history of tribal sovereignty and the U.S. trust responsibility is complex and a complete discussion of these issues is beyond the scope of this study. However, an understanding of the role of tribal sovereignty in achieving tribal goals and objectives is essential.

The Evolution of the Trust Responsibility

The exact nature of the federal trust responsibility has never been explicitly defined. However, drawing from European jurisprudence, it is generally understood as a long-term obligation that recognizes a responsibility to protect the rights and resources of indigenous peoples, who are unfamiliar with the laws and values of colonial powers, from exploitation (Morishima 1997). In the 1830s, a series of court cases established tribes as “domestic dependent nations” whose relationship with the federal government resembled that of a ward. In the late 1880s, the “Allotment Era” was ushered in as the United States attempted to “civilize” the Indians through disrupting the traditional systems of collective land tenure (Clow and Sutton 2001). The Dawes Allotment Act of 1887 divided tribal landholdings into separate parcels and granted them to individual tribal members (Wood 1994). Tribal land was also expropriated for non-Indian homesteading, corporate use, and national parks and forests (Duffy and Stubben 1998).

The Allotment Era ended with the passage of the Indian Reorganization Act (IRA) of 1934, which affirmed the right of American Indians to self-government. In addition to halting the practice of allotment, this legislation provided for the voluntary adoption of a tribal council governance structure, the establishment of a constitutional government, and the organization of tribes as business organizations to oversee Indian-owned resources (Willard 1994).

This step toward the reassertion of tribal sovereignty came to a temporary halt during the Termination Era (1945-1961), a time when policy reverted to the intent of the Allotment Era (Willard 2004). Put simply, termination policy aimed to integrate Indians into the rest of society through the dissolution of the reservation system. In 1953, Congress called for termination of Indian reservations; and between 1954 and 1963, 12 termination acts were passed (Anderson 1995). Through this process, legal jurisdiction, in most cases, was transferred to state and county governments and the buffer of federal and tribal laws came to an end (Willard 1994). The majority of reservation lands were later restored, but only after suffering immense losses of land and a decline in standard of living (Clow and Sutton 2001).¹³

Overall, until the 1970s, the federal government-Indian tribe relationship could be characterized as paternalistic—the federal government exercised broad authority to manage Indian tribal lands and resources in accordance with its own view of tribes' best interest (Morishima 1997). With rare exceptions, tribal values were

¹³ Several tribes such as the Klamath and the Confederated Tribes of the Coos, Lower Umpqua, and the Siuslaw continue to fight for tribal lands to be restored.

ignored or sacrificed in instances of conflict between the mission of the Department of the Interior (DOI) and its trustee obligation to Indians.

In the 1970s, a series of federal acts, notably the Indian Self-determination and Education Assistance Act (ISDEA)¹⁴, emphasized “self-sufficiency,” “self-determination,” or “self-governance” and set the parameters for the current legal status of tribes. The shift toward a federal “self-determination” policy gives tribes the opportunity to rebuild their governments and envision economic strategies that will work for their communities (Cornell and Kalt 1998). In the natural resource sector, it is stated policy of the federal government that “tribal governments have the responsibility to determine the extent and the methods of developing the tribe’s natural resources. The federal government’s responsibility should not be used to hinder tribes from taking advantage of economic development opportunities” (Cornell and Kalt 1992, 125). This shift in policy changes the role of the federal government from that of a “guardian” to a “mentor” (Cornell and Kalt 1992).

The Bureau of Indian Affairs (BIA) has the primary responsibility for carrying out the federal government’s trust responsibility to tribes. It is charged with “fulfilling” the trust relationship and working with tribal groups and governments to improve and protect their land and its natural resources, manage Indian trust accounts, fulfill treaties and the mandates of federal law, and help create educational opportunities and improve the quality of life (DOI 2003a). The BIA currently assists

¹⁴ See Chapter One, footnote 7 for a full description of ISDEA.

562 federally recognized Tribes, manages 56 million acres of Indian trust land and \$3.2 billion of financial trust assets, and provides education to 48,000 Indian students (DOI 2003a).

The efficacy of the trust responsibility has been critiqued from a number of standpoints (Deloria and Lytle 1984; Anderson 1994; Cornell and Kalt 1998; IFMAT-II 2001). The recent publication, “A Quiet Crisis: Federal Funding and Unmet Needs in Indian Country,” (U.S. Commission on Civil Rights 2003) emphasizes a burgeoning crisis in Indian Country caused by the federal government’s failure to honor financial commitments, pay attention to basic infrastructure needs in Indian Country, and promote self-determination.

Also, the Indian Forest Management Assessment Team (IFMAT) underscores the need for an independent assessment of the federal government’s effectiveness in fulfilling its trust obligation based on expressed tribal goals (IFMAT-II 2001). Although it acknowledges the vital force the BIA plays in the management of Indian forests, IFMAT points out that budget limitations, vague and shifting policies, and limited staff have hindered delivery and efficacy of needed services. IFMAT elaborates, “In some respects the BIA is less fit for this role than a decade ago, in that it has fewer technical specialists in fewer critical fields delivering technical support to Indian forests” (2001, 6).

Despite the documented shortcomings of the role of the BIA in aiding tribes’ progress toward self-determination and self-governance, statistics show tribes continue to work toward self-determination and governance. For instance, in terms of

tribal forestry programs the number of tribes that have compacted to provide management services for their own forests nearly doubled from 1991 to 2001—from 64 to 121 (IFMAT-II 2001, 6). Also, as of 2004, over 450 federally recognized tribes have self-determination contracts¹⁵ or self-governance compacts¹⁶ with the BIA and receive annually over \$650 million in funding to provide services to their members (DOI 2004).

Tribal Sovereignty and Natural Resource Management

A number of scholars (Clow and Sutton 2001; Allen 1989; Cornell and Kalt 1998; Deloria and Lytle 1984) emphasize the primacy of tribal land and resources as a means to effectively exercise sovereignty and achieve tribal goals and objectives. Although the era of self-determination has provided tribes with increased opportunity to exercise their sovereign right to administer programs and determine the structure, nature, and function of tribal government, many remain limited in their ability to carry out these functions for a number of reasons (Stull 1990).

A key step to attaining and sustaining tribal sovereignty is tribal control of tribal land and resources. As Wood (1994) emphasizes, control of tribal land is an essential attribute of exercising tribal sovereignty. Allen (1989) also asserts, “For all

¹⁵ Self-determination contracts are given to tribes that express a desire to take over a specific program, service, function, or activity that the BIA would otherwise provide.

¹⁶ Self-governance compacts implement the Tribal Self-Governance Act of 1994, so that tribes can efficiently plan, conduct, consolidate, and administer programs, services, functions, and activities for tribal citizens according to priorities established by their tribal governments, and as a consequence, can reprioritize funding and redesign programs.

of the federal government's rhetoric about Indian self-determination . . . tribes will not really attain this state until they control their own resources" (p. 892). Control over tribal land and resources ensures tribal objectives and goals are met through the implementation of tribally run programs. In her study of conservation and culture on the Navajo Reservation, Rebekah Davis (1997) finds that "conservation programs designed without regard for the beliefs and practices of the human population occupying the land are fruitless at best, and at worst, increase the level of mistrust and misunderstanding that has historically plagued Federal Government-American Indian relations" (p. 51).

Also, Cornell and Kalt (1998) emphasize that when other organizations such as the BIA have the primary responsibility for the condition of the economy or natural resources, the development decisions and programs inevitably reflect the goals of that organization, and not the tribe. The IFMAT (2001) builds from this theory and concludes that tribes with a greater degree of control of their resources have forests and forestry that align better with tribal goals and vision than those that have less autonomy. It specifically recommends: "Federal support for activities that enhance true tribal autonomy . . . should be maintained and intensified to strengthen institutions of self-governance" (IFMAT-II 2001, 87).

Since the 1970s, tribes have worked toward greater tribal autonomy through compacting and contracting services previously administered by federal agencies and through buying and demanding (through legal means) back thousands of acres of land lost during the Termination and Allotment Eras. A number of tribes such as the

Yakama Indian Nation and Confederated Tribes of the Colville Reservation have tribal government agencies dedicated to land restitution through outright purchase or legal means. Thus, tribes continue to exercise their sovereignty to resume authority over their ancestral lands and natural resources that have significant economic, cultural, and spiritual value.

As this abbreviated discussion of sovereignty implies, tribes have exercised their sovereign right to become “self-determined” and “self-sufficient” to varying degrees. This discussion stresses the primacy of tribal land and resources as a means to effectively exercise sovereignty and ultimately develop comprehensive natural resource and economic programs. It is essential that tribes continue to exercise their sovereign right to take back tribal land and resources as well as exercise their right over the use of those resources.

American Indian Economic Development

Tribes across the United States are faced with a number of obstacles in the realm of economic development including lack of human and financial capital and poor natural resources or lack of control over them. A number of scholars (Cornell and Kalt 1992; Duffy and Stubben 1998; Smith 1994) have proffered theories and recommended approaches to successful, sustainable economic development in Indian Country. Central to these theories is the importance of aligning of economic development with tribal values and traditions. Many scholars (Smith 1994; Cornell and Kalt 1992; Pickering and Mushiniski 2001; Cornell 2001) assert the primacy of Indian culture and values in approaches to economic development.

This section explores a number of issues related to American Indian economic development. To present a succinct vision of economic development in Indian Country today, I discuss the present economic status of tribes, obstacles to economic development, and American Indian economic development theory.

The Economic Condition of Indian Country

Poverty and unemployment have plagued reservations since their inception. Although some tribes such as the Mississippi Choctaw and the White Mountain Apache have developed successful economic development programs that offer substantial employment opportunities for tribal and non-tribal members, most still suffer from lack of economic opportunity (Cornell 2001).

Recent statistics illustrate the impoverished state of many reservations: as of 2000, the average unemployment rate of reservations is 13.5 percent—more than twice the national average. Likewise, 31.2 percent of reservation residents live in poverty and the national poverty rate of American Indians (on and off reservations) is 24.5 percent—more than double the national average (U.S. Commission on Civil Rights 2003, 104). Furthermore, according to the U.S. Census 2000, the reservation labor force rate, which provides a perspective on those who have ceased trying to find a job, is approximately 52 percent—12 percentage points less than the national average. Although statistics do not always portray an accurate picture of the economic vitality of a community, they do provide significant insight into the local economy and reinforce the fact that these communities are clear candidates for economic development.

Although federal efforts strive to improve the economic and social stability of tribes, a recent study by the U.S. Commission on Civil Rights (2003), finds the federal government has failed to adequately fund tribal-related programs. This failure has resulted in a backlog of unmet needs that are not satisfied by incremental increases in funding.

In the realm of economic development, the study highlights the Operation of Indian Programs (OIP), which is the highest funded program of the BIA. The OIP's largest program activity is Tribal Priority Allocations (TPA). TPA funding has decreased gradually over the years, causing an estimated \$2.8 billion shortfall of funding to tribes in 2000 (U.S. Commission on Civil Rights 2003, 25). Insufficient TPA funds have stifled opportunities for economic development on many reservations due to the reduction in program services such as benefits and insurance. The study emphasizes, "perhaps the greatest impediment to self-determination has been the decision by several tribes to refuse contracting activities because TPA funds simply are not sufficient to cover the cost of running programs" (U.S. Commission on Civil Rights 2003, 28). The fluctuation of funding for other programs, such as the Rural Community Advancement Program, administered by the U.S. Department of Agriculture (USDA), has also impeded economic development on reservations. As funding fluctuates, activities are suspended and goals are left unfulfilled. Many tribes are hesitant to start economic development projects or programs that depend on insecure or fluctuating funding.

In addition to fluctuating and insufficient federal funds, there are a number of other obstacles that impede successful tribal economic development. Tribes and individuals lack access to financial capital and human capital; reservations lack effective planning and strategic action; distance from markets puts tribes at a disadvantage; tribal cultures get in the way; the BIA is uninterested in reservation development; and intense competition from non-Indian communities precludes investors from locating on reservations (Cornell and Kalt 1992). Not all of these obstacles are relevant for all tribes in Indian Country. However, focusing on opportunities such as tribal artisanship, access to natural resources, and community connectedness may establish a more positive foundation for approaching economic development.

Cornell and Kalt (1992) also discuss the key elements of development—external opportunities, internal assets, and development strategy—which may limit or enhance tribes' abilities to accomplish development goals. External opportunities arise from the political, economic, and geographic setting in which tribes find themselves. Critical factors that may limit or enhance tribes' economic opportunity include political sovereignty, market opportunity, access to financial capital, and distance from markets. Internal assets are essentially an inventory of a tribe's characteristics and resources that are tribally controlled and can be utilized in the development process. Critical assets include natural resources, human capital, institutions of governance, and culture. And finally, development strategy simply refers to the approaches tribes take toward economic development including overall

economic system and choice of development activity. When approaching economic development in Indian Country, it is essential to consider these factors to balance tribal capacity and capability with market opportunity and development of appropriate scale and intensity.

Sovereignty, Institutions, and Culture in Tribal Economic Development

Several scholars have proffered theories and approaches to help solve the enigma of “successful” tribal economic development. “Successful” in this context means providing positive economic and well as social, cultural, and political impact. While some (Cornell 2001; Cornell and Kalt 1998, 1992) focus more on reliable, stable governance institutions, others (Smith 1994; Duffy and Stubben 1998; Trospen 1994) emphasize the maintenance of cultural identity and integrity as a key element. In sifting through various approaches, it is evident that several scholars’ viewpoints are interrelated—governance institutions are stable because they are rooted in the culture; and cultural identity is considered and heeded in decision-making processes that drive successful economic development approaches.

Over several years of study, Cornell and Kalt (1992, 1998) found that the effective de facto exercise of sovereignty and stable governance institutions are essential to successful economic development. They distinguish between the “jobs-and-income” approach taken by some tribes, and the “nation-building” approach to economic development taken by others (Cornell and Kalt 1998). The “jobs-and-income” approach is reactive by nature—emphasizing starting businesses immediately, focusing on short-term economic gains, and viewing development

through a narrow jobs-and-income lens. On the other hand, a “nation-building” approach is more proactive—emphasizing sustained community development over the long term, measuring success by the social, cultural, political, and economic impacts, and approaching development first through institutional development (Cornell and Kalt 1998).

Cornell and Kalt (1992, 1998) stress that the de facto exercise of sovereignty—the ability for tribes to have decision-making authority over tribal affairs and the use of tribal resources—is fundamental to pursuing economic development. They note, “As long as the BIA or some other outside organization carries primary responsibility for economic conditions on Indian reservations, development decisions will tend to reflect outsiders’ agendas” (Cornell and Kalt 1992, 13). Although tribal control over decisions does not necessarily guarantee economic success, it does establish a link between decision making and consequence that is central to incentive building and future progress.

Matthew Krepps’ (1992) study of over 70 tribes involved in “638 contracting”¹⁷ for forestry operations affirms Cornell and Kalt’s finding that tribal ownership and control of resources can ultimately lead to greater productivity. Krepps (1992) found that “all tribes, regardless of wealth or experience, enjoy a decided motivational advantage over BIA foresters who are paid flat salaries, regardless of

¹⁷ “638 contracting” refers to the contracting authority available to tribes through the 1975 Indian Self-Determination and Education Assistance Act (PL 638). PL 638 allows tribes to contract with the federal government to conduct a number of operations formerly conducted by federal agencies on their behalf.

how well they manage Indian forests” (pp. 199-200). Krepps’ research illustrates the link between accountability and productivity—the more control tribes have over their resources and the more responsibility they have over the use of those resources, the more productive and successful they will be. The desired level of accountability is difficult to obtain under the trusteeship of a federal agency (Anderson 1995).

Cornell and Kalt (1992) also emphasize that the sovereign status of tribes is a primary development resource and offers distinct legal and economic market opportunities including reduced tax and regulatory burdens that can be utilized for niche and specialty markets. For example, over 200 tribes have exercised their sovereign right and competitive advantage to pursue commercial ventures through the establishment of gaming institutions (Taylor and Kalt 2005). According to the 1988 Indian Gaming Regulatory Act, revenue from gaming institutions must be directed towards: funding tribal and government and operations; providing for the general welfare of citizens; promoting economic development; supporting charitable organizations; and funding operations for local, non-tribal government agencies (Taylor and Kalt 2005). Such ventures have had significant economic impact on tribal and non-tribal communities through job creation, stimulation of spin-off businesses, and additional investment opportunities in tribal and non-tribal businesses (Cornell and Kalt 1998).

Effectively exercising sovereignty relies upon stable and legitimate institutions of governance, both formal (constitutions, charters, laws) and informal (cultural norms). Cornell (2000) finds, “decision-making power that is not backed by

effective institutions of governance is unlikely to lead to sustained economic development” (p. 92). Effective institutions of governance reduce uncertainty and provide stability in everyday tribal activities; this creates an atmosphere that is attractive to potential investors and businesses (Cornell 2001; Cornell and Kalt 1995). Cornell (2001) suggests four elements of a stable institutional foundation: stability in the rules themselves; depoliticizing day-to-day business decisions; depoliticizing dispute resolution; and predictable and reliable bureaucratic structures and procedures. As tribes work toward self-determination, establishing a strong institutional foundation is crucial to solidifying local control, creating a safe and predictable environment for investment, and ultimately, instigating sustained economic development.

Several scholars (Cornell and Kalt 1992, 1998; Duffy and Stubben 1998; Troster 1995; Smith 1994) also stress the integration of culture and traditions in the economic development process. Cornell and Kalt (1992, 1998) find that a “cultural match” between formal institutions of governance and the culture of society is necessary to build public support for the policies and actions of the governing body, thereby creating a hospitable environment for economic development. They note,

Where cultural match is high, the institutions of governance tend to have a high degree of support in the community; they command allegiance and respect. Where cultural match is low, legitimacy is low, and governing institutions are more likely to be toothless, ignored, disrespected and/or turned into vehicles for personal enrichment (Cornell and Kalt 1998, 19).

For some tribes that adopted the typical government structure of the 1934 Indian Reorganization Act (IRA) (centralized, modest separation of powers, executive

oversight), the structure conflicted with their traditional forms of governance.

Anderson (1995) notes, “The main problem with the IRA approach was that it tried to use the same communal recipe for all tribes when it should have been clear that all Indian tribes are not one homogenous cultural unit” (p. 144). He continues, “It was because the IRA did not integrate a constitutional framework consistent with traditional ‘rules of the game’ for the various tribes that the IRA was a missed opportunity that led to another failed Indian policy” (p. 145).

Cornell and Kalt (1998) draw a connection between modern governance institutions, traditional governance structure, and economic viability. For example, the Sioux of the Pine Ridge Reservation traditionally had a decentralized governance structure, with a separation of powers, and an independent judicial system. When they adopted the typical (IRA) governance structure, it was wholly new and divergent from traditional practices. As Cornell and Kalt (1998) point out, Pine Ridge has struggled economically due, in part, to lack of legitimacy among its people and a subsequent unstable environment for investors. In contrast, the White Mountain Apache, traditionally had a more centralized governance structure with minimal separation of powers and executive oversight of business operations; a governance system that closely matched the adopted IRA governance structure. Cornell and Kalt (1998) attribute a large part of the economic success of the Apache to the closer match to tribal traditions.

Deloria and Lytle (1984) and Duffy and Stubben (1998) take the idea of a “cultural match” further in the actions of governing bodies. These scholars argue that

a critical factor to achieving economic stability in Indian Country is to develop economic development programs that are consistent with values and institutional structures with which the society is familiar. Deloria and Lytle (1984) emphasize developing economic programs that are “natural extensions” of what tribal members are already doing. For example, the Lummi Nation, which traditionally are a seafaring people, has successfully pursued economic development in aquaculture—an extension of traditional subsistence activities (Deloria and Lytle 1984).

In their study of tribal leaders nationwide, Duffy and Stubben (1998) find that a strong reservation economy relies on a strong tribal identity. They assert, “To be successful, then, economic development must place communal or tribal concerns above efficiency, routinization, secularity, differentiation, and, if need be, over profits” (Duffy and Stubben 1998, 71). The New York Oneida is an example of a tribe that pursued a more profitable form of economic development (gaming) despite community desires to pursue a more “traditional” economic venture (Johansen 2002). Although gaming has been a boon for the tribe, it has come at the expense of tribal interrelations. Tribal members have become polarized into “assimilationist” and “traditionalist” camps (Johansen 2002). Using Duffy and Stubben’s (1998) definition of “successful economic development,” the New York Oneida gaming venture is not “successful”—desires of the assimilationist camp for profit have overridden traditionalist concerns, leaving the community divided, thereby threatening tribal identity and solidarity.

In contrast to the New York Oneida economic development experience, Smith (1994) emphasizes that the intertwining of culture and economic development can help create a “community of opportunity” for all tribes (p. 178). Smith (1994) disputes the idea that traditional culture cannot be meshed with a successful economic development program. He asserts that some aspects of culture can be developed and improved when merged with a successful market economy (Smith 1994). He further emphasizes that a tribe can work toward self-determination and self-governance by pursuing economic development through evolving aspects of their culture. In essence, economic development plans that consider the impact on the structure of society will not only sustain tribal character and identity, they will also help the tribe work toward self-determination and the development of a successful market economy (Smith 1994).

Related to Smith’s assertion of intertwining culture and economic development, Ronald Trosper (1995, 1992) explores economic development policy based on “traditional” American Indian values. He summarizes the central components of the traditional Indian worldview as “community, connectedness, Seventh Generation, and humility” (Trosper 1995, 67).¹⁸ These values aim to align economic development with cultural traditions. Trosper points out four principles that influence the activities and methods of economic development pursued by tribes:

¹⁸ The characteristics of these components have been discussed in this literature review (see pp. 27-30). “Community” emphasizes respect and reciprocity; “connectedness” encompasses the respect for all beings; “Seventh Generation” promotes a long-term vision; and “humility” emphasizes respect and sustainability.

resource exploitation should be limited; consumption should have an upper bound; ecosystem health should be supported; and carrying capacities of systems should be heeded (Trosper 1995).

Some tribes such as the Menominee of Wisconsin have successfully pursued economic development aligned with cultural values. The Menominee have developed a successful sustainable-yield forestry management program that emphasizes biodiversity, ecosystem health, and sustainable harvesting methods (Trosper 1995; Yazzie-Durglo 1998). Marshall Pecore (1992) notes, “The Menominee people have balanced the concept of long-term, sustained-yield management with the shorter-term, diverse considerations of community stability and economic development” (p. 12).

Although tribes face a number of obstacles in pursuing economic development, the success of tribes such as the White Mountain Apache and the Menominee illustrates that tribes can work toward self-determination and maintain cultural integrity while pursuing economic development. As tribes move toward self-determination, they will have increasing opportunities to balance tribal values with development (Yazzie-Durglo 1998). Yazzie-Durglo (1998) aptly states, “Indeed . . . tribes have economic problems, but the short-term utilitarian perspectives compromises traditional land uses and culture” (p. 34).

The scholarship discussed emphasizes that a basic component of successful economic development is a reservation environment that is characterized by institutional stability, community support, governmental legitimacy, and a strong

tribal identity. This environment is created through the effective exercise of sovereignty to establish stable and predictable governance institutions and development plans that are aligned with the cultural standards and traditions of the tribe. As tribes grow increasingly accountable in the decision-making process through pursuing self-determination and self-governance, it is important to pursue economic development that is consistent with tribal culture and traditions. As Krepps' (1992) forestry study and the case of the Menominee of Wisconsin illustrate, development that is aligned with cultural values and traditions is not only more legitimate in the eyes of the people, it may also prove to be more productive and, therefore, successful.

Fire Management, Tribes, and Economic Opportunity

Aided by fuel-laden forests, sprawling interface communities, and gradual shifts in climate change, wildfires have increased in frequency and severity in the last two decades. The National Interagency Fire Center reports that catastrophic fires of 100,000 acres or more have increased 13-fold over the last 20 years, severely impacting communities on and off reservations. The federal government has responded to the increase in frequency of wildfire through legislation that illustrates the gradual shift in natural resource management from a reactive and prescriptive approach to a more proactive and holistic place-based approach that enhances ecosystem health and reduces communities' risk to wildfire.

Scholars, scientists, and, more recently to varying degrees, policymakers, have acknowledged the significant role of anthropogenic or traditional use of fire in the shaping of complex ecosystems rich with biodiversity. National forest policy now

calls for land managers to “recreate” this atmosphere of pre-settlement ecosystem health—an atmosphere that was regularly exposed to anthropogenic and non-anthropogenic fire (Kimmerer and Lake 2001). This shift in federal policy—from fire suppression to the recognition of the role of fire regimes in ecosystem health—may provide tribes with the opportunity to more readily apply traditional uses of fire to the landscape to restore ecosystem health. Propitious changes in federal policy such as the recognition of the importance of fire regimes and the emphasis of place-based approaches to wildfire protection and prevention, may provide tribes with needed economic development opportunities through fire-management activities hazardous fuels reduction and biomass utilization.

The purpose of this section is to draw the disparate pieces of this literature review together to explore the implications of the paradigm shift in fire management for enhancing economic development opportunities for tribes. An integral component of this discussion is the role of indigenous burning in land management and its potential role in modern-day land-management practices. The discussion aims to illustrate how shifts in federal policy and concomitant programs and authorities can help promote tribal economic development opportunities that are aligned with tribal traditions and values.

Fire as a Land-management Tool

Many scholars and scientists (Kimmerer and Lake 2001; Pyne 2004; Williams 2002; Kay 2002) have acknowledged the integral role anthropogenic fire has played in shaping complex ecosystems and enhancing biodiversity. As Kimmerer and Lake

(2001) point out, the loss of fire in the American landscape is directly linked to the history of federal Indian policy that removed tribes from native lands and, consequently, methods of indigenous land management from the landscape. Subsequently, a Euro-American perception of the inimical nature of fire prevailed and a century of “Smokey-the-Bear” fire suppression efforts ensued. Stephen Pyne (2004) further describes this limited perception of fire:

Our conception of fire is dangerously narrow. We think of it as a mechanical tool like an ax, when it more often resembles a domesticated species like a sheep dog or captured ecological process like a grizzly bear trained to dance. We think of it as natural, when it is humanity that . . . brought fire more completely within the circle of life and accounts for the real-world geography of burning on the planet (p. 876).

As federal policy advocates for a reintroduction of fire to the ecosystem to reduce wildfire risk and restore forest health, an understanding of indigenous burning in land management is essential (Kimmerer and Lake 2001; Williams 2002).

Fire was the most powerful tool for landscape manipulation used by North American tribes (Kimmerer and Lake 2001). Williams (2002) describes fire as the most powerful agent in the Indian “tool chest” that could minimally or drastically alter ecosystems to benefit tribal survival. Indigenous burning was frequent, deliberate, and varied in scale and outcome (Kimmerer and Lake 2001). Williams (2002) summarizes the documented purposes or reasons for Indian burning including: hunting (to drive, encircle, and/or attract game); crop management (to harvest, clear ground, and control); insect collection (to harvest); pest management (to reduce disease and invasive species); improving growth and yields (for grasses, berries, roots, crops, pasturage); fireproofing areas (to protect plants, settlements); and

warfare and signaling (for defensive and offensive measures); clearing areas for travel (improve trails, reduce brush); felling trees; and clearing riparian areas (to benefit beaver, moose, waterfowl, etc.) (p. 209-10).

Indigenous use of fire created a rich mosaic of vegetation types, differing in age and composition, which enhanced overall ecosystem health, productivity, and biodiversity. Kimmerer and Lake (2001) and Williams (2002) stress that knowledge of Indian use of fire may profoundly help meet contemporary land-management goals. Clinton B. Phillips (1983) suggests, “Knowing how the Indians used fire in the past might help managers achieve current fire management objectives for some wilderness areas” (p. 90). Pyne emphasizes the crucial role of Indian knowledge of burning:

To restore natural conditions without the Indian and the things they did, including burning, is to construct an artificial landscape that is historically and ecologically incomplete. The reason for reinstating fire is not to try and restore pre-Columbian vistas, but because we cannot sustain the landscape we value without it (as cited in Kimmerer and Lake 2001, 41).

Kay (2002) also stresses that if aboriginal land management is ignored and modern-day management practices remain unchanged, the biological diversity and ecological integrity of our ecosystems will continue to decline.

As advocated by a number of scholars and scientists, knowledge of the aboriginal use of fire in land management is essential to achieve modern-day management objectives. Kimmerer and Lake (2001) simply state that “indigenous practice and philosophy offer an alternative ‘natural’ fire regime, in which humans regain their role as ‘keepers of the fire’ and the symbiotic relationship between

humans, forest, and fire is reestablished for mutual benefit” (p. 40). Thus, traditional knowledge may play an indispensable role in restoring ecosystem health as federal policy objectives promote the reintroduction of fire to federal, state, tribal, and private forest and rangelands.

Federal Fire-management Policy

A spate of federal legislation was passed following the landmark 2000 fire season and the release of a 1999 United States General Accounting Office (GAO) report calling for a more cohesive strategy for wildfires. This legislation aims to protect communities from wildfire through proactive planning and restore healthy forests in fire-adapted ecosystems through fuel-reduction projects (Dombeck, Williams, and Wood 2004). Significant legislation includes the 2000 National Fire Plan (NFP), the 2002 Healthy Forests Initiative (HFI), the 2003 Healthy Forest Restoration Act (HFRA), and the 2004 Tribal Forest Protection Act (TFPA).

The 2000 National Fire Plan (NFP) and concomitant 2001 Ten-Year Comprehensive Strategy is a ten-billion-dollar, ten-year effort that focuses on the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on federal and adjacent state, tribal, and private forest and range lands across the United States (USFS 2001). The strategy emphasizes the needed shift from a reactive to a proactive, collaborative, community-based approach to reducing wildland fire that relies on local knowledge and develops objectives to manage long-term activities in communities and environments (USFS 2001). This shift in federal fire policy reflects the pendulum swing in natural resource management toward

GREM (Weber 2000), which emphasizes local knowledge, community interaction, collaboration, and a holistic, integrated approach to resource management.

The 2002 Healthy Forests Initiative (HFI) modified the NFP to expedite fuel-reduction projects by reducing constraints associated with environmental impact analysis, public involvement, and appeals and litigation associated with the National Environmental Policy Act (NEPA) (Dombeck, Williams, and Wood 2004). The 2003 Healthy Forest Restoration Act (HFRA) aims to restore forest health through the reduction of dense undergrowth that fuels catastrophic fires through activities such as thinning and prescribed burning.

The objectives of the HFI and HFRA are to improve the regulatory process to ensure more timely decisions, greater efficiency, and better results in the reduction of catastrophic fire fuels and the restoration of forest health (Kauffman 2004). HFRA also encourages utilization of small-diameter trees and other forest material through grants and local assistance to create market incentives for the removal of otherwise low-value forest material (PWCH 2005). As Kaufmann (2004) points out, this legislation is based on the assumptions that thinning and other forest-management activities can improve forest health, that small-diameter trees have economic value, and that regulatory processes need streamlining to increase the efficiency and effectiveness of forest restoration.

The 2004 Tribal Forest Protection Act (TFPA) (H.R. 3846) establishes a process for tribes to participate in contracting activities for fuels reduction and land restoration on federal lands adjacent to tribal lands. The TFPA allows the Forest

Service and the Bureau of Land Management to give preference to tribes that request to pursue contracting activities on federal lands that pose a fire risk to adjacent tribal lands due to disease, dense hazardous fuels, and other threats (U.S. Congress, House 2004, H3846). The TFPA provides tribes with the opportunity to protect their tribal lands from the catastrophic risk of wildfire and to engage in additional contracting and economic development activities.

The federal fire-related legislation passed in the last five years provides communities, counties, states, and tribes with the opportunity to take a proactive approach to wildfire protection and prevention. The pendulum in federal fire policy has swung from the suppressive, reactive, and prescriptive approach to emphasize a holistic, community-based approach that incorporates local knowledge and expertise in fire management. Federal policy also encourages the utilization of fire management to provide additional economic opportunities to local communities.

Economic Opportunity through Fire Management

Federal fire-management policy promotes a community-based approach to reducing communities' risk to wildfire through fuels management and restoring fire-adapted ecosystem through rehabilitation, restoration, and monitoring (USFS 2001). Central to these objectives is increasing local capacity to accomplish hazardous fuels reduction and rehabilitation work (USFS 2001). This emphasis on local capacity

building provides tribal and non-tribal communities with the unique opportunity for economic development through fire-management activities such as prescribed burning, thinning, and the utilization of woody biomass¹⁹.

Recent legislation has established authorities to fund research and development of biomass technologies. More specifically, under Title II of the 2003 Healthy Forests Restoration Act, three programs related to biomass were created to authorize research on overcoming barriers to the use of small-diameter biomass; to create economic opportunity through the sustainable use of the nation's forest resources; and to provide grants to persons who own or operate a facility that uses biomass as a raw material for specific processes and products (U.S Congress, House 2004).

Increased federal funding for fire management and biomass utilization, in particular, may provide tribal and non-tribal communities with needed economic opportunities. A 2003 Memorandum of Understanding (MOU) between the United States Departments of Agriculture, Energy, and the Interior sets out policy principles for woody biomass utilization. The MOU specifically aims to "support Indian Tribes, as appropriate, in the development and establishment of woody biomass utilization

¹⁹ A recent Memorandum of Understanding (MOU), "Woody Biomass Utilization for Restoration and Fuels Treatments on Forests, Woodlands, and Rangelands," between the United States Departments of Agriculture, Energy, and Interior defines "woody biomass" as the "trees and woody plants, including limbs, tops, needles, leaves, and other woody parts, grown in a forest, woodland, or rangeland environment that are the by-products of restoration and hazardous fuel reduction treatments." "Woody biomass utilization" can be defined as "the harvest, sale, offer, trade, and/or utilization of woody biomass to produce the full range of wood products including timber, engineered lumber, paper and pulp, furniture and value-added commodities, and bio-energy and/or bio-based products such as plastics, ethanol, and diesel." In this study, I use the terms "biomass" and "woody biomass" interchangeably.

within Tribal communities as a means of creating jobs, establishing infrastructure, and supporting new economic opportunities” (DOI 2003, 5). This policy principle complements the objectives of the 2004 Tribal Forest Protection Act in that contracting activities on federal lands may expand opportunities for biomass utilization.

Therefore, the primary fire-management activities that may provide economic opportunity for tribes are hazardous fuels reduction (prescribed burning and thinning) and biomass utilization. Also, a significant aspect of reducing wildfire risk and restoring forest and rangeland health is restoration and rehabilitation activities. These activities, in addition to hazardous fuels reduction, promote ecosystem health and provide several tertiary economic and cultural benefits.

Hazardous Fuels Reduction

As Williams (2002) points out, prescribed burning and thinning are important components of many restoration activities. Prescribed fire is often cited as a powerful tool available to forest managers seeking to restore ecosystem health, reduce fuel loads, stimulate seed production, reduce invasive underbrush, and increase forest resilience to fire (Williams 2002; Brown, Agee, and Franklin 2004). Mechanized and manual thinning may also improve ecosystem health by reducing fuel loads, giving trees “breathing space,” and removing diseased or insect-ridden material (Williams 2002).

Williams (2002) emphasizes that a gradual approach must be taken to reintroduce fire to forest and rangelands to avoid devastating losses. Although

prescribed fire may be the most cost-effective approach to reduce hazardous fuels (when utilization opportunities are limited), factors such as high-fuel loadings, air quality restrictions, inappropriate weather, and risk of escaped fire, may limit its application (USFS 2003). In such instances, mechanical treatments are an indispensable tool for land managers (USFS 2003). Nonetheless, Brown, Agee and Franklin (2004) stress that prescribed fire and thinning should be combined, when possible, to meet ecological objectives. As Kauffman (2004) points out, “the creation of form without function does not constitute ecological restoration” (p. 880). He continues, “No mechanical means of fuel reduction—grazing, timber harvest, thinning, or biomass utilization—can duplicate the unique ecological effects of wildland fire...” (p. 880). Therefore, prescribed fire is essential to replicate the effects of natural fire in the ecosystem; mechanical treatments alone are not effective in decreasing extreme fire behavior (Kauffman 2004).

Biomass Utilization

Although hazardous fuels reduction activities such as prescribed burning and thinning may be effective in reducing fuel loads, thereby reducing communities' risk to wildfire, these activities are often not cost effective (Brown, Agee, and Franklin 2004; Deeming 1990; Williams 2002; Deeming 1990). Deeming's (1990) study of the effects of prescribed fire on wildfire occurrence and severity finds, in few instances, “it is cost effective and operationally feasible to burn sufficient area often enough to affect wildfire losses” (p. 96). Nevertheless, woody biomass utilization is a method

promoted by federal policy (DOI 2003b) as well as scholars (Brown, Agee, and Franklin 2004) as a means to offset the cost of restoration strategies and provide additional job opportunities for local communities.

In the 15 western states, it is estimated that at least 28 million acres of forest could benefit from some form of mechanical treatment to reduce hazardous fuels loading (USFS 2003). Although some of these areas will be too expensive to treat to support fuel-reduction efforts, other areas may generate large volumes of biomass that may provide economic opportunities for local communities (USFS 2003). Biomass utilization refers to a host of uses for small-diameter wood and other forest material (e.g., limbs, saplings, tops) including roundwood-building materials, posts and poles, flooring, paneling, rustic furniture, chips, pulp, paper, and particle board (USFS 2003; DOI 2003).

Biomass may also be used as an alternative to non-renewable energy. Biomass can be converted to energy through several types of facilities (USFS 2003). However, as Sustainable Northwest (SNW 2004) points out, biomass energy facilities require a consistent and, in some cases, unsustainable, supply of biomass materials. Also, biomass generation facilities may not provide as many rural employment opportunities as compared to other forms of value-added processing (SNW 2004). Therefore, the siting and planning of such facilities must be coordinated with local forest restoration efforts to ensure viability and ability to meet a community's economic needs (SNW 2004).

The benefits of biomass utilization are numerous including reducing the cost and increasing the quality of hazardous fuel treatments; enhancing diverse ecosystems; increasing more fire-resilient landscapes; reducing communities' risk to wildfire; providing job opportunities in rural areas; decreasing air pollutants from wildfires and prescribed burns; and providing a renewable energy source (DOI 2003b; WSFPI 2005). However, some of the obstacles to pursuing successful biomass utilization operations include consistency of supply, transportation costs, access to capital, extraction methods, and market opportunity (ORDOE 2001; USFS 2003).

Non-timber Forest Products

An additional economic opportunity that stems from ecosystem restoration and enhancement activities such as prescribed burning and thinning is the non-timber forest product market. As prescribed burning and thinning improve ecosystem health and encourage biodiversity, non-timber forest products (NTFPs) such as herbs, berries, nuts, fungi, and lichens may thrive in the improved environment. Although NTFPs generate less income on a product-by-product basis than timber, these products provide an opportunity for economic diversification while trees are growing (Everett 2000). Over the last two decades, market demand for NTFPs has increased due to expansion of the floral, naturopathic, and health food industries (Mater 1997). Some products may include bough sales, moss, salal, beargrass, devil's club, oils and extracts, and echinacea (Mater 1997). Value-added products such as ointments, pills, tinctures and consumer-ready products may provide the highest returns for communities pursuing economic diversification (Everett 2000).

NTFPs are considered a “cottage industry,” where many of the businesses are home-based and require low-capital investment (Freed and Davis 1997). Many involved in harvesting NTFPs visit a number of sites (mostly on public lands) to gather the products. Therefore, it is unclear how much economic benefit stays in the communities where products are gathered (Everett 2000). Also, the threat of overharvesting and exploitation looms on public lands or what many harvesters consider “the commons” (Everett 2000; Freed and Davis 1997). However, on reservations, tribes may have more control over harvesting activities to provide a more consistent supply of NTFPs. Also, traditional knowledge of harvesting and restoration techniques, in most cases, minimizes the impact on the land and promotes overall ecosystem health (Richards 1997).

Although the NTFP market generally operates on a small scale, opportunities for larger commercial businesses exist as demand continues to rise in the floral, naturopathic, and health food markets. For tribes, native arts and crafts such as baskets woven from beargrass and willow may provide a special niche market. Also, NTFPs provide an avenue for the application of traditional knowledge to the landscape through harvesting and restoration techniques that can complement forest-management activities (Richards 1997). Furthermore, harvesting and processing of NTFPs provides opportunities for cultural development through the transmittal of traditional knowledge (Richards 1997; Martinez 1997).

Ecosystem Services

Hazardous fuels reduction and additional restoration activities play a key role in the maintenance and improvement of the ecosystem and its associated functions or services. Ecosystem services can generally be defined as the goods and services humans derive, directly or indirectly, from ecosystem functions (Costanza, et al. 1997). Such services can include: climate and water regulation, water supply, erosion and sedimentation retention, waste treatment, recreation, and cultural activities (Costanza, et al., 1997). Forest, woodlands, and rangelands provide several services to the human population including, but not limited to, food, timber, freshwater, carbon sequestration, medicines, recreation, fuelwood, and aesthetic and spiritual values (MEA 2005).

In recent years, the global push to reduce greenhouse gases (GHGs), particularly carbon dioxide, has emphasized the financial and environmental value of forests to offset carbon-dioxide emissions through carbon sequestration. The carbon-credit trading market facilitates the exchange of “credits” between those who sequester carbon and those companies and governments with high-carbon-dioxide-emission exposure. Since tree growth sequesters carbon, reforestation can generate carbon-sequestration credits (IFMAT-II 2001). Likewise, when trees are cut or burned in a wildfire, carbon dioxide is released. A less-developed aspect of the carbon-credit market deals with receiving emission-reduction credits by diverting

hazardous fuels from the forest (that would be lost to wildfire) and using the material to produce a clean biomass energy that produces less carbon-dioxide emissions than a wildfire event.

For tribes, there are several opportunities to increase carbon sequestration on tribal forestland, including: increasing productivity on existing forestland; increasing rotation ages; converting open land to forestland (afforestation); protecting sensitive areas; increasing the efficiency of wood use; increasing the use of biomass fuels; and avoiding the loss of forestland (IFMAT-II 2001). Pursuing carbon-sequestration projects on tribal land may be an attractive investment for carbon-credit purchasers because of the trust status of tribal land; purchasers can be assured that land ownership will not change over the long term—it will remain held in trust by the federal government (IFMAT-II 2001).

Carbon-sequestration projects not only protect forestland and its services, they can have tertiary effects from which a tribe can benefit economically and culturally. The restoration and preservation of forestland can provide recreational, educational, and cultural (e.g., gathering and harvesting culturally significant plants) opportunities for tribes and non-tribal community members. For example, in 2002, the Lummi Nation of northwestern Washington sold carbon credits to the Oregon-based non-profit organization, Climate Trust, to restore culturally significant forestland to old-growth forest. The credits purchased helped facilitate the acquisition of the property, which will serve as an educational laboratory for the Northwest Indian College (CL 2005), providing unique opportunities for cultural and educational development.

Although the carbon-credit market is still in its infancy, several tribes are interested in pursuing carbon-offset projects to protect and restore forestland, thereby protecting and enhancing ecosystem services. Over the years, as carbon-trading markets become more developed and the global need for GHG emission reduction increases, tribes may be well positioned to participate in a variety of carbon-offset projects.

Conclusion

Shifts in federal fire-management policy have mimicked the evolution of natural resource management—from a more prescriptive, short-term, utilitarian, top-down approach to a more holistic, place-based approach that aims to balance the economy with community and environmental needs and to include local knowledge and promote local ownership in the decision-making process. This shift has created new opportunities (e.g., stewardship contracting) for communities to incorporate local knowledge into land management as well as pursue economic development opportunities that, in the eyes of the community, “fit” with community needs. In resource-dependent communities such as timber towns in the Pacific Northwest, this emphasis on local control is a welcomed approach.

For tribes, this shift in federal policy, combined with the progress many tribes have made toward self-determination and self-governance, presents additional opportunities to apply traditional knowledge to the landscape through economic ventures that are “natural extensions” of work with which they are familiar (for some,

not all tribes). As Krepps' (1992) forestry study illustrates, productivity and profit is likely to increase as tribes gain greater control over their resources and decision making is linked with consequence.

Although fire-management activities may not be a "natural extension" of work for all tribes, it is applicable to many. There are a number of economic opportunities available to tribes through hazardous fuels reduction, biomass utilization, the non-timber forest product market, and other restoration activities. Applying traditional knowledge to the landscape through burning, harvesting, or other restoration activities, may not only restore forest and rangeland health and enhance ecosystem services, it may also reinvigorate tribal traditions and culture, while providing additional opportunities for economic development.

CHAPTER THREE

STUDY METHODOLOGY

Resource Innovations²⁰, a non-profit organization located within the Institute for a Sustainable Environment at the University of Oregon, conducted a needs assessment in spring 2004 that gauged the needs and concerns of tribes in the Pacific Northwest (Oregon, Idaho, and Washington) related to wildland and structural fire protection.²¹ A portion of the survey specifically addressed economic development and contracting issues related to fire management. The present study builds from that needs assessment to further explore the fire-management activities in which tribes are engaged and to identify the obstacles and opportunities tribes face in pursuing economic development through fire-management activities.

In this chapter, I first discuss the methodology used in the 2004 needs assessment to provide a background for the participant-selection process for this

²⁰ Formerly known as the Program for Watershed and Community Health (PWCH).

²¹ Thirty-one out of 42 federally recognized tribes in Idaho, Oregon, and Washington participated in this survey. Ninety-six percent of all participants expressed an interest in economic development and contracting opportunities in general. In terms of fire management, 12 tribes noted that biomass utilization from fuels-reduction projects may create additional economic development opportunities.

study. Next, I discuss the participant-selection and interview process as well as the guide used for the interview. And, finally, I address the strengths and weaknesses of the study approach.

2004 Wildfire Protection and Tribal Needs Assessment

The Wildfire Protection and Tribal Needs Assessment was conducted from February to June of 2004. Thirty-one out of 42 federally recognized tribes in the Pacific Northwest agreed to participate in the survey. Resource Innovations initiated the survey process by sending formal letters to Tribal Chairpersons that introduced the study and requested tribal participation.

Due to the varying governance structures of the participant tribes and differences in fire-related service delivery, the selection of individuals surveyed varied. Some tribal fire, forestry or natural resource departments are responsible for structural and/or wildland fire protection; in these instances, staff members from these departments were contacts for the survey. In other cases, tribes contract with public agencies or neighboring jurisdictions for fire protection; in these instances, planning, emergency management or natural resource staff were contacts for the survey.

Preferred contacts, who could best respond to the wide range of survey questions, were identified through a number sources including professional contacts of the researchers; partner agencies; and tribal officials, personnel lists, and general information offices. Planners, natural resource personnel, and Fire Management Officers were the most frequently interviewed professionals in the study. However, in some cases, an attorney, a housing director, and a variety of other personnel were

identified as the best respondents to participate in the survey. The distribution of survey participants by professional field can broadly be characterized as: General Administration (16 percent), Community Development (13 percent), Emergency Management (13 percent), Fire Management (15 percent), and Forestry/Natural Resources (43 percent).

A limitation of the data set is the number of tribes interviewed—only 31 of the 42 federally recognized tribes in the Pacific Northwest participated in the survey. Although the sample population was diverse in terms of location, land base, and population, not all tribes in wildfire-prone areas participated in the survey. Also, the professional position of the interviewee varied from tribe to tribe. It would have been more consistent to interview only Fire Management Officers or Natural Resource Directors; however, some tribes do not have such positions.

Participant Selection

The interview participants for the present study were selected from respondents who participated in the 2004 needs assessment and indicated that there were opportunities for economic development on the reservation through biomass utilization from fuels-reduction projects. Twelve out of the 31 tribes that participated in the original survey met these criteria. They are located both east and west of the Cascade Mountains in the Pacific Northwest; have land bases that range from approximately 4,000 acres to 1.3 million acres; and have reservation populations (tribal and non-tribal members) that range from approximately 200 to 32,000. The

professional field of interviewees varies, but can broadly be categorized as forestry and fire, land use, and natural resource management. All of the interviewees are tribal members.

The participants were first notified by electronic mail. The introductory letter stated the purpose of the project, the method of participant selection, and the necessary steps to participate in the study. Interested participants indicated their willingness to take part in the study by electronic mail, then received, in turn, the interview questions. After the participant reviewed the interview questions, an interview time was established via telephone. This process yielded seven interviews.

Interview Guide

The main objective of this study is to explore how (and if) fire-management activities can augment tribal economies, providing jobs and small business development opportunities while restoring the ecosystem and providing opportunities for cultural development. The secondary objectives of this study include exploring the role of sovereignty in natural resource management and identifying specific fire-management activities that may stimulate economic activity for tribes.

The interview guide aimed to gather specific information on fire-management activities and related employment opportunity; stewardship contracting opportunities; benefits, challenges, and constraints related to biomass utilization; traditional use of fire and associated cultural activities; and the viability of the non-timber forest product market. The following questions served as the interview guide:

- 1) What kind of fire-management activities is your tribe currently managing? Do these activities provide employment opportunities for tribal members? If so, how?
- 2) Are there opportunities for hazardous fuels projects/biomass utilization on neighboring federal lands? Are you utilizing stewardship contracting authorities or other means to take advantage of those contract opportunities?
- 3) What potential biomass projects does the tribe envision as feasible for economic development? Are there current plans for such projects?
- 4) Who is your anticipated market for the end product? Where is this market? Does the tribe currently have a marketing strategy?
- 5) What benefits and challenges does such an industry pose for the tribal economy?
- 6) What are some obstacles you anticipate encountering in pursuing biomass utilization projects?
- 7) What are some major constraints in utilizing biomass at this point in time? Regulations, funding, etc.?
- 8) Does your tribe use traditional fire-management techniques? Are there cultural activities such as gathering that are aided by using these techniques?
- 9) Do tribal members or tribal businesses engage in cultivating and harvesting non-timber forest products? To what extent has that activity resulted in economic benefit for the tribe?
- 10) Are there other economic development opportunities that have resulted in relationship to tribal fire-management activities?
- 11) Is there anything else you may like to share or comment on?

Interview Process

Seven interviews were conducted from February to March 2005. The interviews were semi-structured, using the above questions as a guide, and lasted from 25 minutes to over one hour. In some cases, all of the questions were asked,

while in others, the interview was more of a narrative. In the case of more narrative interviews, the desired questions were paraphrased and interjected at appropriate times. To ensure the accuracy of the information gathered, summary notes were taken and sent via electronic mail to the interviewee for review and correction as necessary.

Strengths and Weaknesses of Study Approach

The strengths and weaknesses of the study approach can be evaluated using three general categories: survey instrument, interview structure, and population sample. The “survey instrument” evaluates the format and content of the interview questions. The “interview structure” refers to the structure and methods used in the interview process. And the “population sample” refers to the targeted sample population that participated in the interview process.

The format of the survey instrument was open-ended, which allowed for in-depth discussion covering a broad range of issues. This format provided participants with the opportunity to go into as much or as little detail as desired throughout the interview. In most cases, the open-ended format provided rich, descriptive responses. However, a drawback of this approach was the tendency of discussion to digress and, at times, broach information tangential to the study. Also, the breadth of issues covered in the survey instrument required the interviewee to be knowledgeable of several issues. In some cases, participants were unaware of salient issues outside of their professional focus.

The interviews were semi-structured due to the open-ended nature of the survey instrument. The flexibility of this structure facilitated flowing, easy

conversation that often digressed to touch on important issues not explicitly addressed in the interview guide. Also, the lack of a time limit for the interview provided participants with the opportunity to discuss important issues for as long as desired. A weakness of the semi-structured format was the tendency of some participants to be terse in their responses. In these instances, a series of follow-up questions were required to fully explore an issue. On the other hand, some participants' responses resembled more of a narrative, making it difficult to interrupt the flow of discussion to address a specific question. In most cases, the skipped or missed questions were reworded to accommodate the discussion; in other cases, the questions were simply not asked.

The population sample used for this study was purposive; it was drawn from a previously surveyed group that indicated an interest in the area of study. For this reason, the interviews were successful in gathering the desired information. Also, the ease of the interview process was aided by previous contact with the interviewees; this familiarity contributed to a comfortable atmosphere in which several issues could be discussed. Furthermore, the varied demographics (population, land base, location) and professional experience of survey participants provided a range of perspectives on several issues, contributing to the depth of information gathered.

However, a weakness of the population sample was also its purposive nature. The interviewees were supportive and interested in the topic area, providing positive feedback that may not be representative of a larger sample. Also, the voluntary nature of the interview process may also result in a limited representation of perspectives.

And, finally, few participants were well versed in all of the topics covered in the survey instrument. The limited knowledge of some participants affected the amount and depth of information gathered for particular topic areas. Table 3-1 summarizes the strengths and weaknesses of the study approach based on the three categories discussed.

Table 3.1. Strengths and weaknesses of the study approach

	Strengths	Weaknesses
Survey Instrument	<ul style="list-style-type: none"> ◆ Open-ended questions allowed in-depth discussion ◆ Questions covered broad range of issues 	<ul style="list-style-type: none"> ◆ Open-ended format invited digression ◆ Questions covered range of issues, requiring knowledgeable participant
Interview Structure	<ul style="list-style-type: none"> ◆ Semi-structured format facilitated easy, flowing discussion ◆ No time-limit pressure; provided opportunity for in-depth discussion 	<ul style="list-style-type: none"> ◆ Responses to questions varied in detail; several follow-up questions were necessary in some cases to achieve desired detail ◆ Some interviews were less structured than others; some questions were not asked due to inappropriate timing
Population Sample	<ul style="list-style-type: none"> ◆ Purposive sample; speaking to tribes with identified interest ◆ Sample varied widely in population size, location, land base, experience ◆ Previous contact and familiarity with most participants helped ease of interview 	<ul style="list-style-type: none"> ◆ Purposive sample; speaking to tribes supportive of topic ◆ Participants varied in experience and knowledge of topic area ◆ Voluntary participation may yield limited perspectives

Based on information gathered using this methodology, my findings are presented in the following chapter.

CHAPTER FOUR

STUDY FINDINGS

The main objective of this study is to address the specific question: Can fire-management activities augment the tribal economy, providing jobs and small business development opportunities while restoring the ecosystem and providing opportunities for cultural development? The secondary objectives of this study include exploring the role of sovereignty in natural resource management and identifying specific fire-management activities that may stimulate economic activity for tribes.

To meet the study objectives, I interviewed several tribal representatives involved in fire- and forest-management activities. As discussed in the study methodology, the interview guide provided a framework from which to explore several topics including tribal fire-management activities and operations, stewardship contracting, the potential for biomass projects and related products and markets, the benefits and challenges of the biomass industry, the traditional use of fire, and the non-timber forest product industry.

The findings presented in this chapter are solely based on the information gathered through the interview process. As highlighted in the strengths and weaknesses discussion in the study methodology, the study's population sample was

purposive and not representative of all tribes in the Pacific Northwest. Individuals who participated in the study were supportive of and had an interest in economic development opportunities through fire management and related industries (e.g., biomass, non-timber forest products). This interest and support yielded in-depth, thorough interviews.

The findings are organized around the following topics: fire-management activities, stewardship contracting, current and potential biomass projects and markets, benefits and challenges of the biomass industry, the traditional use of fire, and the non-timber forest product industry. For each topic, I summarize the relevant interview questions and provide a summary of interview responses. The chapter closes with a brief summary of the study's findings. In the following sections, the term "tribes" will be used to refer to tribes that participated in the study. The term "biomass" refers to woody biomass except where noted.

Fire-management Activities

To capture the breadth of fire-management activities, tribal representatives were asked to describe the activities with which the tribe is involved and if (and how) such activities provide employment opportunities for tribal members. Overall, tribes are involved in various fire-management activities dealing with structural and wildland fire protection and prevention as well as restoration and rehabilitation. Specific activities include: hazardous fuels reduction projects for stand density and cultural enhancement (pre-commercial thinning and prescribed burning), structural and wildland fire crews, dispatch and training for tribal firefighter crews, Burned

Area Emergency Rehabilitation (BAER) projects, and various reforestation and restoration projects. These activities are generally operated by the tribe or the Bureau of Indian Affairs (BIA). In most cases, contract work is completed by federal and state agencies such as the Forest Service or privately owned businesses.

Fire-management activities provide employment opportunities for tribal members to varying degrees, depending on the tribal control of related programs and policies that may promote or constrain tribal employment. For example, one tribe has a Tribal Employment Rights Office (TERO) through which all contracts must be processed.²² Through this process, preference for jobs first goes to tribal contractors; if there are no tribal contractors, then the hired contractors must give preference to tribal members to complete contract work. In contrast, another tribe is constrained by language in its restoration agreement: the tribe must negotiate timber sales on the open market, through an open-bidding process. Therefore, the tribe cannot preference Indian contractors for timber sales—which limits tribal employment opportunities.

The most common constraints associated with fire-management activities mentioned by tribal representatives deal with seasonality of work, employee/contractor training, and lack of equipment and funding. “Seasonality of work” refers to the sporadic nature of hazardous fuels reduction projects and wildland

²² Although only one interviewee mentioned the existence of a TERO office, through my research, it is evident that most tribes have such an office. Three pieces of legislation allow for Indian-preference hiring on reservations: Title VII of the 1964 Civil Rights Act (Section 703), BIA 25 CFR 3271.44, and the 1977 Office of Federal Contract Compliance Program. These pieces of legislation provide for Indian preference in employment training, contracting, and subcontracting for Indians living on or near reservations.

firefighting opportunities. For many tribes, wildfire season provides tribal members with employment opportunities in camp crews that may work locally or be deployed nationally. Wildland firefighting is seasonal and, in most cases, does not provide year-round employment for tribal members. In contrast, structural firefighting may provide year-round employment, but few tribes have full-time structural fire departments. One tribe mentioned the possibility of utilizing fire crews as a labor pool for forest restoration work such as prescribed burning and thinning. Similarly, on some smaller reservations, it is difficult to offer steady work to tribal members because forest restoration and thinning projects are so sporadic—contractors are usually hired on a project-by-project basis to complete the work.

Other obstacles to tribal employment in fire management are employee/contractor training and lack of funding and equipment. One tribal representative mentioned there are employment opportunities for tribal members in firefighting, but noted the low retention rate of trainees,

Tribal members have a tendency to drop out [of fire training courses]. There are training opportunities for tribal members, but it is costly. Indians just aren't going—it's hard to say why . . . it's hard to keep kids in training. Some drop out or they can be a liability on the field.

Another tribal representative commented that several economic development opportunities exist in fire management, but funding, training, and equipment are needed to capitalize on opportunities. He commented, “I used to own two businesses, so I know there's opportunity out there. But, it's a matter of funding to develop the opportunities. It's not as simple as buying a chainsaw—you need staff, equipment, and training. Funding is such an issue.”

For many tribes, developing a workforce to conduct fire-management activities is advantageous because hiring contractors is simply expensive. One tribal representative expressed an interest in developing a tribal wildfire crew that can take over fire-suppression projects on fee lands that are currently contracted out to state and federal agencies. This step would cost the tribe less and provide tribal members with additional employment opportunities. Another tribal representative suggested that a contractor/employee training program for hazardous fuels reduction would provide opportunities for tribal employment, while, ultimately, reducing contracting costs. He noted,

It's worthwhile to train, because it's expensive to contract the work out. It'd be worthwhile to get tribal members involved . . . but there needs to be surety of supply and work to justify buying the equipment—it's expensive . . . It would be good to get an organized program in place first to get started.

Tribes are involved in various fire-management activities that provide a range of employment opportunities for tribal members, from contract work to firefighting. Tribal representatives mentioned several obstacles associated with fire-management activities including the need for employee/contractor training, the cost of equipment and training programs, and the sporadic nature of work. Nonetheless, several tribal representatives expressed the opportunity for employment for tribal members as firefighters, contractors, and contract labor. Indian-preference programs such as TERO can provide tribal contractors and laborers additional employment opportunities. Table 4.1 summarizes the economic opportunities and challenges through fire-management activities.

Table 4.1. Economic opportunities and challenges through fire management

Economic Opportunities	Challenges
<ul style="list-style-type: none"> ◆ Hazardous fuels reduction crews ◆ Structural and wildland fire crews ◆ Restoration/reforestation crews 	<ul style="list-style-type: none"> ◆ Seasonality of work ◆ Lack of Indian contractors ◆ Lack of equipment, funding, trained labor

Stewardship Contracting

To gain an understanding of the actual and potential utilization of stewardship contracting authorities by tribes on federal lands, tribal representatives were asked if opportunities exist for hazardous fuels reduction and biomass utilization projects on neighboring federal lands. Although none of the tribes currently utilize stewardship contracting authorities, all of the tribes expressed an interest in pursuing stewardship contracts in the future. One tribal representative expressed the significance of stewardship contracting,

Stewardship contracting is important because it forces agencies (the Bureau of Land Management (BLM) and the Forest Service (USFS)) into using a different management strategy—it makes them get their acts together, collaborate, and look long-term [using a] ten-year strategy.

Tribal representatives mentioned several constraints associated with stewardship contracting including location, tribal organization, and project feasibility.

Tribal businesses may vie for stewardship contracts on BLM and USFS lands; however, most tribes pursue contracts on ceded tribal lands of cultural significance to demonstrate traditional land management techniques to rehabilitate the land and/or to

protect cultural resources.²³ The Tribal Forest Protection Act (TFPA) provides tribes with the opportunity to pursue stewardship contracts on federal lands adjacent to trust lands.²⁴ Therefore, the location of the tribe limits the possibility of the tribes pursuing stewardship contracts on federal lands under the TFPA. Although two tribes interviewed do not border federal lands, tribal representatives expressed an interest in pursuing similar projects on federal lands in the general region (not bordering trust lands) or on state lands (that border trust lands).

To pursue stewardship contracts, tribes must have a for-profit business that can enter into a contract. Most tribes are non-profit organizations that have for-profit businesses such as an economic development corporation (e.g., Coquille Economic Development Corporation) or a forest-product business (e.g., Warm Springs Forest Products Industries). One tribal representative commented,

We're looking at stewardship contracting, but tribal government is a non-profit, so it can't bid on stewardship contracts. We need to have an independent tribal enterprise to go after the contracts. But, it'd be nice to see some of the tribal fire crews bid and get involved in those programs . . . We hope to see some contracting in the future; we may have to go through the forest products enterprise to administer. There's a possibility.

Another tribal representative expressed similar concern, interest, and optimism,

We have to create a forestry or restoration business to [utilize stewardship contracting authorities]. We would do it under the [Tribal] Economic Development Corporation if we did. This is something we will bring before the Tribal Council . . . Our lands are intermingled with BLM lands, so there is a lot of opportunity out there.

²³ Refer to the Maidu Stewardship Project, Chapter Two, pp..

²⁴ For a more detailed discussion on the Tribal Forest Protection Act, see Chapter Two, pp.

To pursue stewardship contracts, tribes must also be assured of the feasibility of the project to minimize project risk and cost. One tribal representative mentioned that there are opportunities for stewardship contracting for hazardous fuels projects, but the tribe must conduct a feasibility study to be sure the project will be worth the cost. Another tribal representative noted that stewardship contracts can be risky if things go badly. He commented, “The Forest Service won’t do a sole-source contract at cost, which means if things go badly, the burden is on us to pay—it’s just too risky.”

A tribal representative also noted that though there are opportunities for contracting, the initial capital investment for projects cannot be justified—especially if the projects yield less-than-expected returns.

Despite the constraints associated with stewardship contracting, tribes expressed interest and optimism for such projects to generate tribal revenue and employment while improving forest and rangeland health. To pursue tribal stewardship contracts, tribal representatives suggested working with existing tribal enterprises to bid on contracts, pooling resources with local tribes to generate a labor force, and diversifying tribal fire crew work to include stewardship projects. Table 4.2 shows a summary of the economic opportunities and challenges through stewardship contracting.

Table 4.2. Economic opportunities and challenges through stewardship contracting

Economic Opportunities	Challenges
<ul style="list-style-type: none"> ◆ Contracting on federal lands ◆ Contracting on state lands ◆ Partnerships/collaboration to pursue projects 	<ul style="list-style-type: none"> ◆ Lack of Indian contractors ◆ Project feasibility ◆ Tribal organization ◆ Tribal location ◆ Lack of funding

Potential Products, Projects and Markets for Biomass

To capture the range of potential biomass projects, tribal representatives were asked what biomass projects or products are feasible for economic development and what the anticipated markets are for such products. Tribal representatives shared several ways in which biomass is already used as well as potential projects for biomass. The anticipated markets for biomass products range from local to national distribution, depending on the product and the cost effectiveness of distribution.

Some tribes already utilize biomass from thinning projects for chipping that can be used for pulp or hog fuel²⁵. Only one tribe interviewed has a tribal-owned sawmill, which burns hog fuel to generate electricity to operate the facility. Other chips are sold to local mills, within a reasonable distance from the harvesting site, to minimize transportation costs. One tribe exports chips on a regional basis (to the Portland metropolitan area), and minimizes transportation costs by backhauling urban wood waste to use as hog fuel.

²⁵ “Hog fuel” is ground woody biomass, ranging in size from ½” to 6”, that is most often used to fuel high-pressure boilers for the wood and paper processing industries (to supply heat and electricity for the plant). Hog fuel may also be used as absorbent topsoil for erosion control.

Tribal representatives mentioned several potential biomass projects and products ranging from bagging topsoil to pursuing renewable energy. One tribe is looking into a portable mill that processes small-diameter wood on site for post-and-pole projects. Also, one tribal representative mentioned that bagging chips as compost for the local market could be profitable. On a larger scale, one tribe that already runs a small biomass plant (three megawatts) has plans to install a 15-megawatt plant in the future. Such a plant would cost close to \$26 million to build and would need 150,000 tons of dried material to run at capacity. The energy from the plant could be sold to a utility and distributed regionally or nationally. Other tribes are interested in more small-scale biomass power generation to power local facilities such as schools. Tribes with significant agricultural resources mentioned the potential for biodiesel and the utilization of wheat stubble for pressboard and related products.

In summary, tribes are currently engaged in the planning stages of pursuing more advanced utilization of biomass—beyond chips, pulp, and hog fuel. Tribes are interested in processing small-diameter wood for post-and-pole projects, generating power from small- and large-scale biomass plants, pursuing agricultural by-products such as biodiesel and additional value-added biomass products such as composting and topsoil. The market for these potential products ranges from local to national distribution.

Benefits and Challenges of the Biomass Industry

In a series of questions, tribal representatives were asked to identify the challenges, obstacles, constraints, and benefits of biomass utilization. Although tribal representatives shared several benefits of the biomass industry, representatives primarily focused on the challenges of the industry.

Possible benefits of the biomass industry included additional tribal employment and revenue, improved forest and rangeland health, reduction of smoke-management issues and wildfire risk, and opportunities for partnerships and collaboration. The biomass industry may stimulate the creation of tribal businesses involved in small-scale power generation or contracting for fuel-load reduction. One tribal representative noted that renewable energy from biomass produced 4.9 jobs for every megawatt generated. The stimulation of jobs and businesses also generates more money within the tribal economy.

Tribal representatives also emphasized that hazardous fuels reduction and the utilization of biomass can improve forest and rangeland health. One tribal representative mentioned that several non-native species need to be removed from the forests and rangeland to improve habitat and the overall ecosystem. The non-native material removed may be utilized for economic profit. Another tribal representative mentioned that removal of small-diameter wood and dead-and-downed material reduces fuel loads, and in turn, reduces wildfire risk. He also noted that smoke-management issues could be reduced or eliminated through the removal of biomass as opposed to the piling and burning of the material.

Pursuing biomass projects may also stimulate partnerships between tribes and local, state, and/or federal agencies. One tribe is involved in a collaboration of state agencies, local jurisdictions, and non-profit organizations to work on solving the “consistent supply” issue of biomass material. By pooling resources, this collaboration aims to address why timber sales are not being bid on, and how supply can be secured to make investment attractive. One tribal representative also suggested collaborating with Region Five (California) to exchange lessons learned and innovative techniques for improving efficiency of biomass projects. Another tribal representative suggested that coordinating commercial thinning efforts with adjacent private landowners would produce significant amounts of biomass material. The combination of efforts would reduce cost of transport, while meeting the common goals of fuels reduction.

Tribal representatives also noted several challenges to pursuing biomass projects including transportation costs, lack of capital, consistency of supply, limited capacity of use, lack of incentives, shifting federal policy, and a number of management issues. Several tribal representatives mentioned transportation costs or distance from markets as an obstacle to developing the biomass industry on the reservation. Simply put, small-diameter biomass material can only be hauled so far before it is no longer cost efficient. One tribal representative noted that to be economically viable, the material could be hauled only 50 to 70 miles from source to market. Another tribal representative mentioned that if some sort of credit or subsidy was available, they could deliver material to more distant locations.

In addition to transportation costs, tribes stressed the importance of adequate financing to pursue biomass projects. Many tribes are constrained by the initial capital investment required. One tribal representative described tribes as “resource rich, but cash poor,” making it difficult to secure investments and build equity to finance projects. Another tribal representative commented,

Some obstacles to biomass projects include transportation and market—like everyone else. We want to look into what is out there. The coast range definitely has the supply necessary to pursue projects—there is a lot of potential. The problem is the large capital investment that is needed . . . there is potential for small biomass electric facilities, but is that economically feasible? We are usually piling and burning [instead of pursuing other uses of biomass].

In pursuing renewable energy projects, one tribal representative stated, “We need help with donated equity and capital to bring the cost of projects down. We are going off the reservation to do this—This is all new to the Tribal Council.”

To receive funding or secure investments, tribal representatives emphasized that a consistent, reliable supply of biomass material is needed. One tribal representative noted that the sustainability of the resource is crucial, “Sustainability of supply is key. How long can we keep this going—for a lifetime? If we’re going to build [a biomass power generation facility], will it be worth the cost?”

One tribe is involved in a pilot study testing a new protocol, the Coordinated Resource Offering Protocol (CROP), that aims to coordinate the supply of biomass material coming out of state, federal, and tribal forests to provide a consistent, reliable source of material that can attract investment. The protocol guarantees a supply of material for ten years, which is essential to securing debt service to finance projects.

Also, one tribal representative emphasized that the limited capacity for the use of small-diameter material makes pursuing biomass projects daunting, “The idea of biomass utilization is terrific, but the capacity for use of biomass is so hard. “ Another tribal representative noted that the closure of several mills in the area over time has limited the infrastructure available for small-diameter processing. The location of the remaining mills that can process small-diameter material may be too far from the source to make the haul distance cost effective. He commented on the limited capacity of the tribal mill,

There’s some saw timber in fuels reduction timber—but not much. The rest of the material is real small. We don’t have the right machinery to process the small material. The smallest size we process is eight to 15 inches in diameter. It is hard to make the four-and-one-half- to seven-inch material worthwhile. There’s new technology out there, but it costs money—about four million dollars.

Tribal representatives also mentioned that the lack of incentives or subsidies and shifting federal or state policy pose obstacles for pursuing biomass projects. Several tribal representatives noted that if more incentives were available, pursuing biomass projects would be more attractive. One tribal representative commented that the concept of renewable energy is still relatively new and that state and federal agencies are trying to catch up to develop a renewable concept. Another tribal representative emphasized that to pursue biomass projects on federal lands, federal policy needs to be stable—not vague or shifting. Stable federal policy assures entrepreneurs, investors, and tribal leadership of the security of potential projects.

Tribal representatives shared several management-related issues that pose a challenge to the development of the biomass industry on the reservation. These

management-related issues can be broadly characterized as education of the powers-that-be²⁶, the past and present role of the BIA as trustee, and the constraints of out-of-date management plans and regulations.

Nearly all of the tribes interviewed cited the lack of education of the powers-that-be as an obstacle to the development of the biomass industry. Put simply, the decision-making bodies may not be aware of the economic or environmental benefits of the biomass industry. One tribal representative used the term “old-people mindset” to describe the narrow perspective with which several tribal members view timber value, “[I call it] “old-people mindset.” They’re looking too narrow—if it’s not 24 inches in diameter, there’s no benefit to be seen. They don’t realize that there’s a possibility for products from the smaller stuff.”

Another tribal representative emphasized the need to value the long-term benefits over short-term profits for pursuing biomass projects,

Educating people is key to convince them why these actions are needed. We need to communicate the idea that long-term gains may be better than short-term profits. We need to revive the forest; the lack of harvesting right now is not healthy. We need to convey the reason for spending money now to make it worthwhile in the future.

²⁶ The “powers-that-be” can be broadly defined as tribal leadership including Tribal Council members and department managers. Although most interviewees stressed the education of tribal leadership, some also emphasized the need for education of general community members, to garner support tribal projects and enhance awareness of the greater community.

One tribal representative stressed first and foremost the need to educate the powers-that-be about the opportunities of biomass and the benefits of fuels reduction, “This is all new to the Council. We need education first—what is fuels reduction and why is it important?—then move forward.” A few tribal representatives mentioned that site visits and conferences are helpful in educating the powers-that-be about the benefits of the biomass industry.

The past and present role of the BIA as trustee was mentioned as a challenge to pursuing biomass projects for some tribes. More specifically, one tribal representative noted that past BIA management of lands has hindered the tribe’s ability to pursue biomass projects, “We don’t have timber here anyway—the past BIA management was so bad, it’s really difficult at the moment. Maybe in 50 years, come back and ask—but now, we couldn’t get enough timber to support me.”

One tribal representative noted that the forestry and timber ranges are under BIA control, which makes pursuing biomass or thinning projects difficult. Another tribal representative commented that pursuing projects in coordination with the BIA takes a long time due to the limited forestry staff available to help with technical assistance needs—the tribe would rather move forward at a faster pace than wait for BIA approval. In contrast, one tribal representative mentioned that the tribe has good working relations with the BIA in addressing fire and forestry issues.

Another tribal representative discussed the growing trend of tribes compacting and contracting services from the BIA. He noted that many of these tribes under self-determination have strong thinking, determine their own destiny, and run their own

affairs. The lack of BIA involvement (with the exception of superintendent approval) gives tribes more freedom to streamline programs and accomplish projects on tribal terms.

A few tribal representatives also discussed the role of resource-management plans in pursuing biomass utilization projects. One tribal representative noted that the tribe did not have forest-management plan in place; the tribe has a harvest plan, but the plan is so outdated, the policies do not meet current needs of the tribe. She commented,

We have several internal constraints too [to utilizing biomass at this time]. We don't have a forest plan in place . . . We have a harvest plan in place, but it is not well thought out. It needs to be refined. Regulations have been put in place that were not well thought out; that is, regulations do not take into account how one regulation affects the other. . . [these regulations] were put in place before we were thinking about the big picture. There are opportunities to rethink that approach . . . to help the environment and the ecosystem.

Another tribal representative noted that the tribe's forest-management plan is so out of date, it does not promote best practices,

I am redoing the forest-management plan. The old one was so out of date and [just] not good practice. A lot of other tribes (Warm Springs, Grand Ronde) still operate from those old, out-of-date plans. In the meantime, there's pretty much a moratorium on forestry activity until the plan is done.

In contrast, one tribal representative commented that the fire and forestry programs operate using "pretty new" and up-to-date plans. Plans are required to be updated every ten years.

In sum, many tribes shared the benefits and challenges of biomass utilization and the development of a tribal biomass industry. Although tribal representatives

noted several benefits, many focused on the challenges, constraints, and obstacles of the industry. The benefits and challenges of pursuing biomass utilization projects are summarized in Table 4-3, below.

Table 4.3. The benefits and challenges of biomass utilization.

Benefits	Challenges
<ul style="list-style-type: none"> ◆ Additional tribal businesses, employment, and revenue ◆ Diversification of tribal economy ◆ Improved forest/rangeland health ◆ Reduction of smoke management issues ◆ Reduction of wildfire risk ◆ Opportunities for partnerships and collaboration 	<ul style="list-style-type: none"> ◆ Transportation costs/distance from markets ◆ Lack of capital/equity ◆ Continual supply ◆ Limited capacity of use ◆ Lack of incentives ◆ Stability of federal policy ◆ Management issues

Traditional Use of Fire

Tribal representatives were asked if fire was used as a land-management tool and if cultural activities were aided by the traditional use of fire. About half of tribal representatives indicated that the tribe actively applies fire to the landscape to aid cultural activities. Tribal representatives shared many reasons why fire is used as a land-management tool including: to stimulate plant production and rejuvenation (e.g., grasses, roots, hazel, bracken fern, cascara, huckleberries, and mushrooms); to eradicate noxious weeds and insect infestations; to improve soil health (e.g., burning cranberry bogs); and to reduce fuel loads to improve overall forest and rangeland health.

Two tribes are currently involved in projects applying the traditional use of fire to the land. One tribe is engaged in the restoration of a 500-acre meadow complex to promote traditional foods and grasses such as camas, bracken fern and witch hazel. The project is in its fourth year and funded by cultural grants from the BLM and the National Park Service. Tribal youth provide manual labor. The tribal representative explained,

To keep hazel at its most productive stage, it must be burned over. This practice has been long gone due to fire suppression. There is a lot of traditional knowledge originally. This site was specifically chosen to rehabilitate because of the meadow complex, plants, and potential for restoration.

Another tribe is working with a student on a beargrass regeneration project. He commented,

We have a unique vegetation type where beargrass and camas is growing where people (biologists, botanists) say it shouldn't be. We're looking at the regeneration of plants. The theory is that traditional use of fire helped foster growth. We plotted out areas, [then] de-vegetated some areas through mechanical means and other areas we burned.

Another tribal representative noted that the BIA has used prescribed burning to control or eradicate noxious weeds.

Although some tribes are currently engaged in prescribed burning for cultural purposes, others have plans for restoration projects. Two tribal representatives commented that the tribe would like to use fire to restore prairies on the reservation. One tribal representative noted, "Through oral and physical history, it is known that prairies (swampy, flat areas) were burned for hunting and gathering purposes. We're looking to do some restoration work on the prairies to rehabilitate the habitat."

Another tribal representative indicated that the tribe would like to restore one of the prairies on the reservation, but that rural residential development inhibits the possibility of a restoration project. Although the area needs to be treated, housing is spread throughout the forest and is simply in the way. One tribal representative also mentioned the possibility of restoring cranberry bogs through the use of fire; however, lack of funding and low priority impede project progress. She also noted, “Some of the cranberry areas are located on individual allotments, where allottees would need to become involved, or at the very least, provide power of attorney to allow forestry work in these areas” One tribe is also engaged in developing a wildfire education project that would document traditional burning practices. The education project would target youth as an audience and communicate the traditional uses of fire and the stories used to convey the power and origin of fire.

Although tribes do not currently apply fire to the landscape to the same extent as their ancestors, they are engaged (or have plans to be) in small- to medium-scale projects that aim to restore and rehabilitate the land. As noted by several tribal representatives, prescribed burning restores forest and rangeland health, which in turn, aids in cultivating culturally significant resources. Table 4.4 shows the economic opportunities and challenges associated with restoration project using traditional fire-management techniques.

Table 4.4. Economic opportunities and challenges through the traditional use of fire.

Economic Opportunities	Challenges
<ul style="list-style-type: none"> ◆ Land restoration ◆ Cultural development projects 	<ul style="list-style-type: none"> ◆ Lack of funding ◆ Low priority of projects ◆ Air quality regulations

Non-timber Forest Products

Tribal representatives were asked if tribal members harvested non-timber forest products and if such harvesting resulted in economic benefit for the tribe. Three tribes currently have non-timber forest product permit programs. These programs often allow tribal members to receive permits for free if the products gathered are for subsistence use; however, one program charges a nominal fee if tribal members want to resell the product (e.g., firewood). Tribal representatives mentioned that tribal and non-tribal community members collect the following non-timber forest products in tribal forests: cedar boughs and bolts (for shakes), bark, mushrooms, salal, firewood, Christmas trees, berries, moss, roots, and grasses.

Tribal representatives noted that most non-timber forest products are gathered for personal, cultural, or subsistence use only. However, tribal representatives mentioned that products such as salal, cedar boughs and bolts, mushrooms, and firewood are often sold for commercial purposes. One tribal represented noted,

Most harvesting is for personal use or benefit, but there is also commercial benefit. We issue permitting for tribal and non-tribal members to pick salal for use in floral arrangements. There are several distributors in the harbor here. On the reservation, there are some companies involved, but there are many individual harvesters.

He continued,

Cedar shakes are taken care of similar to a timber sale . . . depending on land ownership, there is a consortium of tribal businesses that get first bids on projects on tribal lands. On non-tribal allotments, the sale goes through the BIA. There's definitely good profit in the business.

Another tribal representative mentioned that tribal members produce value-added wildcrafting items for local sale on a seasonal basis.

Tribal representatives shared several challenges associated with the non-timber forest product industry. The most common challenges include administration and enforcement of permit programs and the commercialization of culturally significant resources. Although some tribes have a permit program for non-timber forest products, the administration of the program and the enforcement of program regulations is a challenge. One tribal representative noted,

We've got a lot of non-tribal members getting permits. There is a whole sector of the economy down here involved in this . . . The Empire site started [issuing permits to] tribal members, then opened it up to the public—it was a nightmare. People were taking ladders out to the forest, hurting the environment, and abusing the forest. The program is really hard to administer and control because of the dispersed activity . . . The whole process is a double-edge sword. Tribal members like it, but they still violate [the rules], maybe less so. The administration and enforcement is a nightmare. It's not making money for the tribe (it's for their personal use only)—it's a service to the public, but it's of more cost to [tribal resources].

Several tribal representatives mentioned that trespassing on tribal lands for harvesting of non-timber forest products is also an issue. One tribal representative noted that the checkerboard pattern of the reservation makes gathering hard to regulate. Another tribal representative commented that non-Indians often set up camp on tribal land to gather morels for personal use; the tribe has not addressed the regulation issue to date.

And, finally, one tribal representative stated that the tribe has been reluctant to go forward with business opportunities in the non-timber forest product industry because tribal members do not want to see the commercialization of things they've gathered—they would rather maintain harvesting non-timber forest products on an individual, independent basis.

Although not all tribes have a non-timber forest product permit program, all tribal representatives noted that tribal and non-tribal community members engage in harvesting non-timber forest products for personal, subsistence, or cultural use. Table 4.5 summarizes the economic opportunities and challenges for tribes through the non-timber forest product market.

Table 4.5. Economic opportunities and challenges through the non-timber forest product industry

Economic Opportunities	Challenges
♦ Personal business development	♦ Commercialization of resources
♦ Commercial business development	♦ Administration
	♦ Regulation

Conclusion

The study's findings indicate that there are several opportunities for fire-management activities to augment the tribal economy, providing jobs and small business development opportunities. Tribal representatives shared several ways in which tribal employment and revenue may be generated through engaging in fire-

management activities, stewardship contracting, and biomass utilization projects.

However, tribal representatives also highlighted several challenges, obstacles, and constraints that tribes face in pursuing these opportunities.

In the next chapter, I draw conclusions from the findings presented in this chapter and formulate policy recommendations that address the challenges associated with each topic area.

CHAPTER FIVE:
SO WHAT? DRAWING CONCLUSIONS & MOVING FORWARD

Like a number of formerly resource-dependent communities, Indian tribes seek sustainable forms of economic development that produce employment, attract economic activity, utilize existing resources, and provide opportunities for economic diversification. As findings from this study show, wildland fire management presents a range of economic and cultural development opportunities for tribes, many of which depend upon natural resources for their economic, cultural, and spiritual health.

Fire management may provide business development and employment opportunities for tribal members through wildland firefighting, hazardous fuels reduction, and restoration and rehabilitation activities. Also, wildland fire management may provide opportunities for cultural development through the restoration of the landscape using traditional land-management techniques such as prescribed fire. Over the long term, a proactive, integrated approach to fire management and, natural resource management as a whole, may provide tertiary economic development opportunities through the restoration of a healthy ecosystem

hat attracts wildlife; produces non-timber forest products such as mushrooms, nuts, and grasses; and provides additional recreation opportunities for tribes as well as non-tribal communities.

This study explores how fire management can augment tribal economies through the stimulation of small business development and employment opportunities in the realm of wildland firefighting, hazardous fuels reduction, and restoration and rehabilitation projects. It also examines the role of sovereignty in pursuing economic development through fire management and the opportunities for cultural development in fire management-related activities.

In this chapter, I present a summary of the study's findings, highlighting current and potential activities related to fire management that tribes are or could be engaged. I specifically highlight the opportunities for economic development expressed by tribal representatives (interviewed as part of the study) and the associated obstacles to pursuing such opportunities. I then draw conclusions from the study's findings and address the study's assumptions. Finally, I close the chapter with several recommendations based on the study's findings.

Summary of Findings

To adequately explore the breadth of economic and cultural development opportunities through wildland fire management, I asked tribal representatives questions covering a range of topics from stewardship contracting to the non-timber forest product industry. Tribal representatives shared activities in which their tribes

are currently engaged as well as activities or projects they are interested in pursuing. Tribal representatives also mentioned challenges or obstacles that tribes face in pursuing economic opportunities through fire management.

Current and Desired Activities

Tribes are currently involved in a number of fire-management activities including wildland firefighting, hazardous fuels reduction, prescribed burning, and biomass utilization. Tribal representatives expressed interest in expanding fire-management programs to develop year-round employment opportunities for wildland firefighting crews; to find additional, alternative uses for biomass (besides piling and burning slash piles); to apply traditional land-management techniques on and off tribal trust lands; and, to pursue stewardship contracting on state or federal lands. Table 5.1 summarizes the activities with which tribes are currently engaged and would like to pursue.

Table 5.1. Summary of current and desired activities of survey respondents

	Current Activities	Desired Activities
Fire Management	<ul style="list-style-type: none"> ◆ Structural and wildland firefighting crews ◆ Prescribed burning ◆ Pre-commercial thinning ◆ Hazardous fuels reduction ◆ Restoration/rehabilitation projects 	<ul style="list-style-type: none"> ◆ Tribal wildland and structural firefighting crews ◆ Biomass utilization
Stewardship Contracting	<ul style="list-style-type: none"> ◆ Exploring opportunities 	<ul style="list-style-type: none"> ◆ Contracting on federal lands ◆ Contracting on state lands ◆ Partnering to pool resources
Biomass Industry	<ul style="list-style-type: none"> ◆ Chipping ◆ Pulp ◆ Hog fuel ◆ Pile/burn slash piles 	<ul style="list-style-type: none"> ◆ Small- and large-scale biomass energy facilities ◆ Compost ◆ Small-diameter, value-added products (e.g., posts/poles) ◆ Biofuels
Traditional Use of Fire	<ul style="list-style-type: none"> ◆ Beargrass regeneration project ◆ Noxious weed removal ◆ Prescribed burns for cultural enhancement 	<ul style="list-style-type: none"> ◆ Cranberry bog restoration ◆ Prairie restoration
Non-timber Forest Product Industry	<ul style="list-style-type: none"> ◆ Permit programs for salal, cedar boughs and bolts, firewood, mushrooms, and Christmas trees ◆ Individual gathering and cultivation 	<ul style="list-style-type: none"> ◆ Maintain programs for individual/commercial purposes ◆ Address regulation of gathering

Economic Opportunities and Challenges

Tribal representatives shared a number of potential projects or activities that may provide economic development opportunities for tribal members. Tribes were particularly interested in pursuing stewardship contracts with federal or state agencies and finding alternative uses for biomass. Although there are several opportunities, tribal representatives mentioned a number of obstacles to pursuing such opportunities (see Table 5.2). Several representatives repeatedly stressed three challenges—lack of

education, funding, and human capital. Simply put, to make some of these opportunities come to fruition, the “powers-that-be,” or tribal leadership, must be educated about the potential of the projects to garner political support and take action; there must be adequate financing or funding sources to initiate, maintain, and sustain projects; and there must be a skilled and capable workforce to ensure the completion and success of the project.

Table 5.2. Summary of economic development opportunities and challenges related to fire management for survey respondents

	Economic Opportunities	Challenges
Fire Management	<ul style="list-style-type: none"> ◆ Hazardous fuels reduction crews ◆ Structural and wildland fire crews ◆ Restoration/reforestation crews 	<ul style="list-style-type: none"> ◆ Seasonality of work ◆ Lack of Indian contractors ◆ Lack of equipment, funding, trained labor
Stewardship Contracting	<ul style="list-style-type: none"> ◆ Contracting on federal lands ◆ Contracting on state lands ◆ Partnerships/collaboration to pursue projects 	<ul style="list-style-type: none"> ◆ Lack of Indian contractors ◆ Project feasibility ◆ Tribal organization ◆ Tribal location ◆ Lack of funding
Biomass Industry	<ul style="list-style-type: none"> ◆ Renewable energy ◆ Small-diameter wood products ◆ Compost/mulch/topsoil ◆ Agricultural by-products 	<ul style="list-style-type: none"> ◆ Transportation costs ◆ Lack of capital/equity ◆ Consistent supply ◆ Limited capacity of use ◆ Stability of federal policy ◆ Lack of incentives ◆ Management issues
Traditional Use of Fire	<ul style="list-style-type: none"> ◆ Land restoration ◆ Cultural development projects 	<ul style="list-style-type: none"> ◆ Lack of funding ◆ Low priority of projects ◆ Air quality regulations
Non-timber Forest Product Industry	<ul style="list-style-type: none"> ◆ Personal business development ◆ Commercial business development 	<ul style="list-style-type: none"> ◆ Commercialization of resources ◆ Administration ◆ Regulation

Conclusions: Bringing the Pieces Together

This study aims to answer the research question: Can fire-management activities augment tribal economies, providing jobs and small business development opportunities while restoring the ecosystem and providing opportunities for cultural development? Through reviewing the literature and conducting original research, I have found that (1) tribes are interested in expanding economic opportunities in the realm of fire management; (2) there are several opportunities for tribal business development and employment under the umbrella of fire management; and, (3) tribes are interested in using traditional land-management techniques for cultural development and enhancement projects. In this section, I first present a model for local economic development, based on information gleaned through interviews and the literature. I then discuss the opportunities for tribal economic development through fire management, based on tribal input and a review of the literature. Next, I highlight salient points from the study's findings and address how they are similar to or differ from the study's assumptions presented in Chapter One.

Creating an Economic Model

Several tribal representatives emphasized that to pursue economic development opportunities through fire management, tribes must overcome obstacles such as a lack of an educated decision-making body, financial resources, and/or an experienced labor force. At the most basic level, a community must have a solid economic foundation based on adequate natural, social, human, financial, physical,

and political capital to attract investment and sustain economic activity. In terms of fire management, these forms of capital may be manifested in a number of ways, including:

- ♦ A natural resource base that can produce a consistent supply of biomass or commercial lumber;
- ♦ A social network that facilitates partnerships and draws from strong cultural connections;
- ♦ A trained and capable workforce that can fight wildfire, operate heavy machinery, or take part in research and development activities;
- ♦ Adequate financial resources to initiate, maintain, and sustain economic activity;
- ♦ Infrastructure necessary to support basic operations such as access roads and lumber-processing facilities; and,
- ♦ The political leadership that can guide development and ensure institutional stability.

Forces that interact with the economic foundation of a community to influence economic growth and development include access to supply, access to markets, and market demand. “Access to supply” goes beyond raw materials to incorporate labor, capital, and infrastructure (inclusive of transportation and process facilities). As fire-management activities expand on reservations, tribes are likely to turn to off-reservation resources (labor, capital, infrastructure), once tribal resources are “tapped.” “Access to markets” refers to the available markets to which tribes can export outputs. Many reservations are located in isolated, rural locations that are far from viable markets, increasing transportation costs. Thus, partnerships and regional coordination are key to accessing and expanding the reservation market area. And,

“market demand” refers to the demand for the product or service the tribe is producing—without an identified market or expressed demand for a product, economic growth may stagnate or decline.

The interaction of the types of capital that form the foundation of a local economy and the exogenous factors that influence economic growth can potentially result in sustained economic growth and development. In the short term, indicators may include an increase in the number of jobs, per capita income, and businesses. Over the long term, such growth may result in the expansion and diversification of business activity and a heightened quality of life. Also, actively managing tribal resources to reduce fire risk and restore forest and rangeland health, may, over time, result in a healthier ecosystem that supports or attracts additional economic activity. Figure 5.1 provides a description of the types of capital that form the foundation of a local economy, as well as factors that influence economic growth and the potential outcomes of sustained economic growth and development.

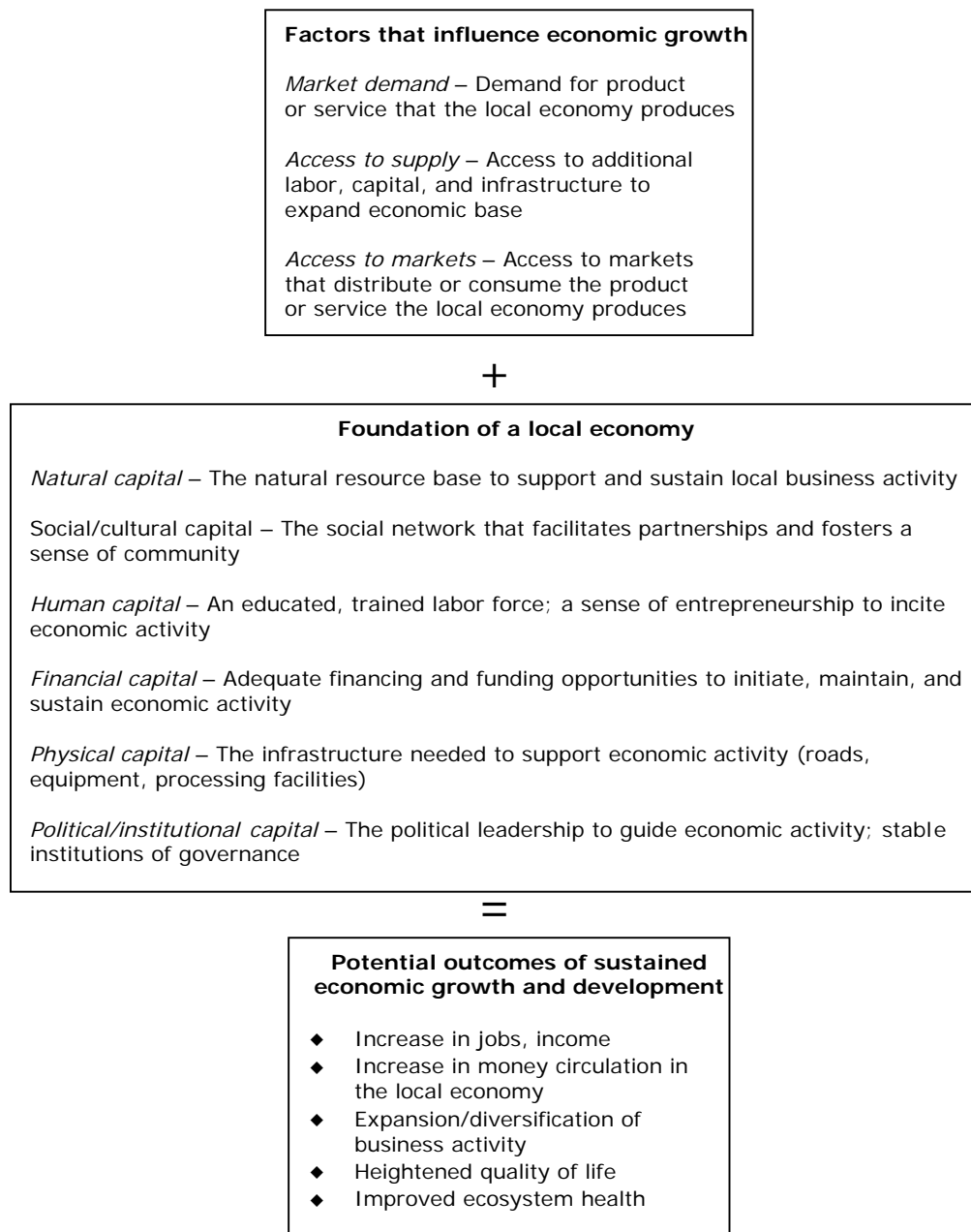


Figure 5.1. A concept model of local economic development. This model shows an “equation” of local economic development. Several forms of capital establish the foundation of a local economy. Exogenous factors such as market demand and access to markets and supply influence local economic activity, and if combined successfully, may initiate a cycle of sustained economic growth and development that may ultimately contribute to the diversification of the local economy, a heightened quality of life, and in terms of fire management, improved ecosystem health.

Potential for Economic Development through Fire Management

Tribal representatives shared several potential projects and activities that may provide small business development and employment opportunities for tribal members in fire management. Under the umbrella of fire management, tribes may pursue economic development in the general areas of wildland firefighting, hazardous fuels reduction, and restoration and rehabilitation activities. Each of these broad categories have subcategories such as biomass utilization and ecosystem services in which tribes may choose to focus small business development efforts. Figure 5.2 provides an overview of wildland fire management and the various areas in which tribal enterprises or Indian businesses may pursue contracting opportunities or other business ventures. Tribal representatives mentioned potential business opportunities in value-added uses for biomass such as compost and post-and-pole operations as well as dispatch and camp crews for wildland firefighting.

The economic development opportunities that exist under the aegis of fire management fall into two categories: wealth and jobs. “Wealth” refers to the expansion of local control over economic activity. On the reservation, this may entail the development and growth of tribal enterprises and local Indian-owned businesses. A key component of creating reservation “wealth” is the willingness of individuals to assume the risk in creating small businesses and pursuing contracting opportunities. “Jobs” refers to the employment opportunities that emerge from the growth and

expansion of businesses on the reservation. In the realm of fire management, such jobs may be labor-intensive ground crews, equipment operation, and management and supervisor positions.

Although the primary focus of this study is economic development opportunities through fire management, opportunities for cultural development activities were also explored. As Figure 5.2 shows, cultural development projects may be pursued through hazardous fuels reduction and restoration/rehabilitation activities. Such projects may utilize traditional land-management techniques to cultivate culturally significant plants for subsistence use, medicinal purposes, or craftmaking. Some tribes may choose to cultivate traditional plants for commercial purposes (such as grasses for basketweaving), while others may prefer to cultivate and harvest non-timber forest products for subsistence use only—preferring not to commercialize products of cultural significance.

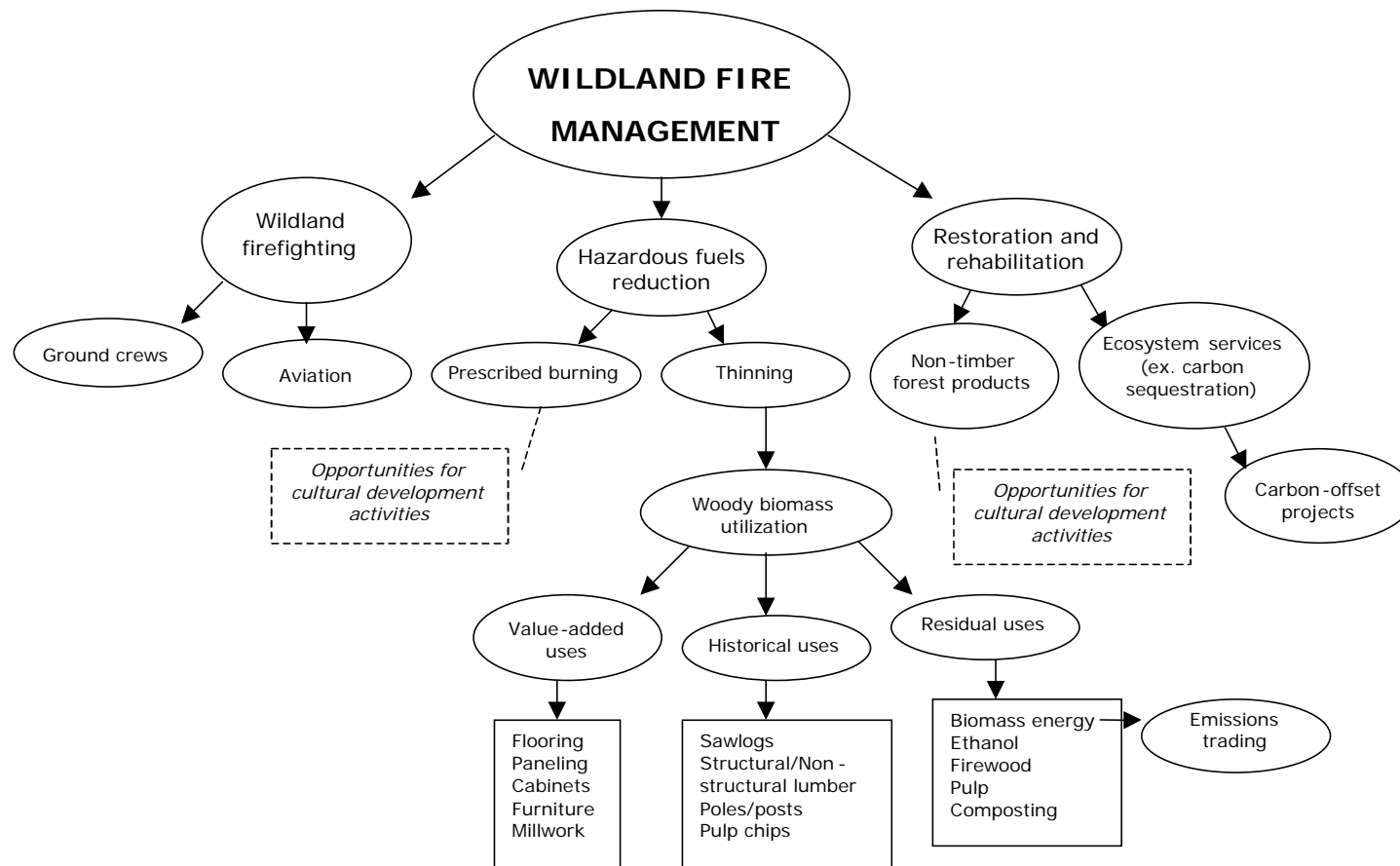


Figure 5.2. Opportunities for cultural and economic development through fire management. Wildland fire management presents tribes with several opportunities to pursue contracting and small business development. Wildland firefighting provides tribal members with labor-intensive work that is primarily seasonal; hazardous fuels-reduction projects provide opportunities for contracting and application of traditional land-management techniques; biomass utilization provides opportunities for the diversification of tribal industries and businesses; and restoration and rehabilitation activities contribute to the long-term health of forest and rangeland, which supplies market- (e.g., non-timber forest products) and non-market-value (e.g., clean water) goods that tribes may utilize and take economic advantage of over time. Note: woody biomass utilization categories adapted from Levan-Green and Livingston (2001).

Addressing the Study's Assumptions

In Chapter One, I set out three assumptions on which this study is based: 1) successful economic development may occur if the economic program pursued is aligned with cultural values and the institutional structures of the community affected (Duffy and Stubben 1998); (2) American Indians play (and have played) an integral role in shaping the natural environment and pursue natural resource management with a holistic approach that aims to utilize, preserve, and protect resources for the benefit of current and future generations (Krech 1999); and (3) the application of traditional land-management practices such as the traditional use of fire may enhance ecological restoration and provide opportunities for cultural resource management and development (Kimmerer and Lake 2001).

The study's findings did not explicitly address each assumption. In most cases, tribal representatives discussed issues that touched tangentially on the study's assumptions. For example, the study did not explicitly address the first assumption—the issue of economic development aligned with cultural values. However, the concept of pursuing economic development activities that adhere to tribal traditions and values is manifest in tribal authority over program operations and management. As one tribal representative emphasized, self-governed tribes generally have stronger thinking and are more focused on controlling their own affairs and determining their own destiny. Such control allows tribes to pursue more innovative projects that provide economic opportunity and fulfill cultural enhancement goals. One tribal representative shared an

example: the tribe thinned Douglas fir plantations to reduce hazardous fuels, provide economic benefit, and promote species diversity and growth of culturally significant plants.

The study's findings indicate that the second assumption—that American Indians pursue natural resource management from a holistic and long-term perspective—is not an appropriate assumption for all tribes. As illustrated by the previous example, some tribes pursue a more holistic approach to natural resource management, providing for economic and cultural development opportunities; however, several tribes are constrained by lack of an educated decision-making body and control of programs to apply such an approach to natural resource management.

While several tribal representatives stressed the importance of hazardous fuels reduction and restoration as integral components of a fire-management program, they noted that a major impediment to the initiation or maintenance of such projects is the lack of education of the “powers-that-be,” or the tribal leaders who have significant decision-making authority in tribal affairs. The lack of understanding of the cultural and economic benefits of biomass utilization and other restoration projects makes moving forward with such projects difficult, if not impossible. This lack of understanding may be attributed to what Krech (1999) terms “cultural amnesia”—the loss of traditional knowledge, or understanding of the practice, purpose, and benefits of traditional practices or techniques.

Another obstacle to pursuing a more holistic approach to resource management is the lack of control of tribal operations and programs. A few tribal representatives

noted that tribal resource management plans were outdated and based on management techniques that do not necessarily reflect modern tribal values. These management plans do not reflect changing practices in forest and natural resource management, such as harvesting small-diameter timber to promote forest health. One tribal representative specifically noted that BIA control of forest and timber ranges limits tribal ability to initiate more proactive management techniques.

Tribal representatives generally agreed with the study's third assumption—that traditional land-management practices can restore ecosystem health and provide opportunities for cultural development. Tribal representatives acknowledged the ecological benefits traditional land-management techniques may have for the landscape. Several tribes discussed current or potential projects that utilize prescribed fire to rehabilitate the land and cultivate culturally significant plants. A major obstacle for pursuing such projects is lack of funding. Some tribal representatives noted that their tribe would like to pursue such projects, but limited resources force many tribes to take a triage approach to projects—the most important projects are funded first.

Establishing a Foundation

The study's findings indicate that tribes are interested in pursuing economic development through fire management that will provide small business development opportunities while restoring ecosystem health and promoting cultural development activities. However, at the most basic level, tribes need to build human, financial, and political capital to pursue economic development opportunities through fire management.

In terms of human capital, tribes need an educated, skilled labor force to pursue contracting and other small business development opportunities. Also, tribes need adequate financing to pursue desired projects that have cultural and economic benefit. Indian businesses also need access to financial capital to initiate, maintain, and sustain business opportunities and support entrepreneurial enterprises. And, tribes need to have an educated decision-making body that is familiar with the ecological, economic, and cultural benefits of fire-management activities. Such educated leadership has considerable political sway and influence in the financial and institutional support of fire-management projects. Furthermore, tribes may exercise their sovereign right to ensure management compliance with tribal expectations and values through the compaction of existing management programs.

Recommendations

Depending on a tribe's location, assets, and economic development goals, the feasibility of and interest in pursuing economic opportunity through fire management may vary. However, this study highlights the challenges and opportunities that a variety of tribes face, providing insight into how tribes may benefit from taking a proactive approach to fire management that considers opportunities for economic and cultural development. The following recommendations build from the challenges and obstacles presented in this study.

The recommendations are categorized by the forms of capital—natural, social/cultural, human, financial, and political/institutional—on which each recommendation aims to build. Each set of recommendations is introduced by a

discussion of the type of “capital” and the purpose of the recommendations. I also present specific recommendations for biomass utilization to best address the extent of information gathered through the interview process. Following the recommendations, I suggest topics for further research and close the chapter with a final note that summarizes the salient points of this study.

Natural Capital

Natural capital refers broadly to the natural resource base of a community. Some tribes (especially in the Northwest) have abundant timber and water resources, while other tribes are rich in oil reserves or rangeland. Many of these resource-dependent communities have focused on commodity production of their natural resources as means to stimulate and maintain economic activity. However, in recent years, focus has shifted to find more sustainable forms of economic development through natural resource management.

Fire management presents tribes with economic and cultural development opportunities through the sustainable development of their natural capital. The following recommendations emphasize improving management programs, forming strategic partnerships, and pursuing research and development to help tribes enhance economic and cultural development opportunities through more sustainable natural resource management.

- ♦ Update and revise resource-management plans with best-management practices that promote sustainability and ecosystem management and improve the management of existing resources, while providing opportunities for economic and cultural development

- ♦ Consider adding value to timber resources through sustainable certification programs such as the Forest Stewardship Council Principles or Sustainable Forestry Initiative Standard
- ♦ Establish service-learning partnerships with research institutions to provide graduate-level assistance for the revision of resource-management plans
- ♦ Engage in research and development efforts to quantify the value of ecosystem services; use research to promote innovative economic development opportunities such as carbon sequestration
- ♦ Promote the use of traditional land-management techniques to restore ecosystem health within and beyond reservation boundaries

Social/Cultural Capital

Social/cultural capital encompasses the social and cultural cohesiveness or connectedness of a community. Communities rich in social capital may be characterized by a high level of interaction, networking, and mutual respect. Tribal communities may have high levels of social capital due to the strong cultural ties of the community. The presence of a common culture, traditions, and values provides a strong foundation for social and cultural growth.

Fire management presents tribes with several opportunities for cultural enhancement projects. The following recommendations focus on expanding opportunities for cultural development and utilizing social networks to facilitate business development.

- ♦ Develop an education program for tribal and non-tribal community members that focuses on the traditional use of fire; incorporate traditional stories and anecdotes of how fire has shaped the landscape; discuss how traditional use of fire can be used in modern-day land-management practices
- ♦ Involve tribal youth in cultural enhancement projects as means to provide labor-intensive work and the opportunity to share traditional ecological knowledge

- ♦ Increase awareness among agencies and non-Indians about the value of traditional land-management practices; consider utilizing stewardship contracting authorities to demonstrate traditional practices on public lands.
- ♦ Consider establishing a tribal enterprise that markets and sells cultural crafts (e.g., baskets, carvings) of local artisans; utilize tribal artisan network to market goods region- and nationwide.
- ♦ Utilize existing contractor knowledge and expertise in a contractor-mentor program, aimed at helping new contractors to “get to know the business”

Human Capital

Human capital refers to the level of expertise, work experience, and capacity of a workforce or labor pool. Building human capital requires an investment in education and training programs that bolster the workforce through the infusion of knowledge. Ideally, a community that is rich in human capital has a workforce that is educated at varying levels in several fields.

The purpose of the following recommendations is to enhance contractor training and small-business development and diversify the workload of existing labor pools.

- ♦ Provide ecosystem workforce training for tribal members as a means to develop a skilled labor force
- ♦ Provide access to affordable contractor training opportunities on/near the reservation; specifically, provide a workshop on contractor/manager training for fire management
- ♦ Provide information on micro-enterprise development, highlighting the basic steps required to establish a small business and possible funding sources that may target minority businesses
- ♦ Establish an Indian preference program to ensure certified Indian business priority for on- and near-reservation contracting opportunities

- ♦ Support the diversification of work for wildland firefighting crews to include off-season restoration and hazardous fuels reduction activities
- ♦ Encourage vocational education at the high-school level to expose tribal members to additional employment opportunities and prepare students for work in a trade
- ♦ Establish service-learning partnerships with local research institutions to promote the exchange of knowledge and to meet tribal technical assistance needs

Financial Capital

Tribes need financial capital to initiate, maintain, and sustain economic activity on the reservation. Several tribal representatives noted the financial obstacles their tribes face in pursuing fire management-related projects. In many instances, tribes must take a triage approach to projects—the most “important” are funded first. Often, projects such as those aimed at cultural enhancement are put on hold to pursue more “urgent” and potentially profitable projects.

The following recommendations are aimed at enhancing the financial capital of tribes through technical assistance and strategic partnerships.

- ♦ Develop a grant-writing assistance kit that describes the basic grant-writing process and provides information (e.g., contacts, deadlines, requirements) on grants that are specifically related to small-business development and fire management
- ♦ Consider pooling resources with local tribes to pursue fire-management projects or to hire needed staff (e.g., a grant writer)
- ♦ Pursue opportunities for pilot projects that test new technologies and processes in hazardous fuels reduction and biomass utilization
- ♦ Conduct feasibility studies for potential hazardous fuels reduction and biomass utilization projects to attract investment capital

- ♦ Continue to lobby for “green” incentives at the state and federal level as a means to reduce costs of pursuing hazardous fuels reduction and biomass utilization projects
- ♦ Utilize the comparative advantage of sovereignty (and the ability to offer reduced tax and regulatory burdens) to attract financial capital

Political/Institutional Capital

Political/institutional capital encompasses the political and regulatory arena of a community. Political capital refers to the political leadership charged with running and overseeing tribal affairs. Building political capital entails reaching out to other jurisdictions or organizations to collaborate or partner to address salient issues.

Institutional capital refers to the institutions of governance (e.g., laws, regulations) that guide tribal affairs. As Cornell and Kalt (1998, 1992) stress, stable institutions of governance are key to creating a safe, predictable environment that attracts investment and sustains economic activity. Tribal sovereignty is an integral component of stable institutions of governance.

For most, if not all tribes, the Tribal Council plays a key role in initiating and maintaining programs or enterprises of interest on the reservation. For this reason, it is imperative that tribal leaders are educated about proactive wildland fire management and the potential ecological, economical, and cultural benefits of such an approach. It is also important that tribal leaders utilize existing political networks to be aware of similar or complementary fire-management efforts that occur beyond reservation boundaries. Without the support of tribal leadership and concomitant financing, plans and ventures will most likely fail to come to fruition.

The following recommendations emphasize strengthening political leadership, exercising tribal sovereignty, and collaborating or partnering with organizations beyond reservation boundaries.

- ♦ Continue to support intertribal organizations that advocate for the protection of tribal sovereignty, lands, and resources
- ♦ Continue to support tribes working toward self-determination through the compaction of federal programs and services such as fire management and forestry
- ♦ Develop consultation protocols that local jurisdictions and state and federal agencies can refer to when pursuing collaborative partnerships with tribes
- ♦ Encourage cross-jurisdictional (tribal-non-tribal) collaboration to pool resources, maximize economic development opportunities, and build on collaborative strength in pursuing fire-management activities
- ♦ Develop an education program and resource guide for tribal leaders that addresses the overall benefits of proactive fire management and the opportunities, obstacles, and financing options for biomass utilization
- ♦ Establish inter- and intra-regional learning networks for tribal leaders that facilitate the discussion of obstacles, opportunities, and lessons learned in pursuing economic development through fire management
- ♦ Coordinate the efforts of existing working groups in the region that deal with fire management-related issues to maximize efforts and increase opportunities for collaboration

Biomass Utilization

Tribal representatives expressed an interest in the potential for biomass utilization to provide opportunities for economic development. For this reason, I developed several recommendations that focus solely on biomass utilization. The following recommendations aim to address obstacles such as inconsistent supply, high transportation costs, and lack of proper infrastructure and funding.

- ♦ Explore the Coordinated Resource Offering Protocol (CROP) on a regional basis as a method to levelize and guarantee the supply of small-diameter material over the long term
- ♦ Explore coordination of backhauling opportunities to minimize transportation costs of hauling low-value material long distances
- ♦ Provide increased funding for small- and large-scale small-diameter processing facilities
- ♦ Support efforts to develop federal and state “green credits” that reduce the transportation costs of hauling small-diameter material
- ♦ Support renewable energy initiatives to reduce the cost of biomass energy generation through state and federal incentives
- ♦ Explore the feasibility of biomass projects for tribes of varying sizes and capacities
- ♦ Partner with research institutions to take part in pilot studies that test the efficacy of alternative uses or processing methods of biomass
- ♦ Pursue stewardship contracting as a means to guarantee a supply of small-diameter material, while providing additional opportunities for economic and cultural development

Suggestions for Further Research

This study explores several aspects of fire management to identify opportunities and obstacles to pursuing economic and cultural development activities. The study's findings have shed light on the challenges and opportunities that a variety of tribes face in fire management. These findings provide insight into how tribes may benefit from taking a proactive approach to fire management. Although the study's findings answered several questions, they also spurred additional questions and areas of interest that should be explored through further research. Suggestions for further research include:

- ♦ *Explore the possibility of stewardship contracting on state lands.* Stewardship contracting is currently allowed on federal USFS and BLM lands—not state lands. However, tribes whose reservation boundaries border state lands (and not federal lands) are interested in pursuing similar stewardship contracts on state lands. In this case, it would be worthwhile to determine if state agencies would be amenable to such an agreement.
- ♦ *Evaluate the economic success of tribes that take a more integrated approach to natural resource management.* Although the study discussed integrated resource management in the review of the literature, this topic was not directly addressed in the interview process. In theory, an integrated approach to resource management requires that management efforts are coordinated to ensure optimal ecosystem health. Also, the coordination of management efforts may maximize economic development opportunities as resources are managed in a holistic and sustainable manner. It would be worthwhile to test this hypothesis in a case-study analysis of select tribes across the United States.
- ♦ *Evaluate the economic success of tribes that have compacted forestry and fire programs.* The study's findings tangentially touch on the role of sovereignty in pursuing natural resource management and economic development opportunities. It would be worthwhile to compare the economic success of tribes that have compacted forestry and fire programs to tribes whose forestry and fire programs are still under BIA supervision.

A Final Note

As tribes continue to pursue economic development strategies to rejuvenate struggling economies, wildland fire management should not be overlooked as an avenue to stimulate local growth and development. In recent years, federal fire policy has provided communities with increased funding and ownership in the decision-making process and emphasized a more balanced, integrated approach to fire management—one that balances ecological, economic, and societal needs over the long term.

For tribes, this translates to opportunities on and off the reservation to reduce communities' risk to wildfire and restore ecosystem health, while providing jobs for tribal members. Although tribes may have to overcome basic obstacles such as lack of human, political, and financial capital before pursuing such activities, findings from this study suggest that incorporating economic development into the fire-planning process simply makes sense.

Through wildland fire management, tribes can pursue a fire-management program that is aligned with tribal traditions and emphasizes cultural development; pursue economic development activities that may reconnect tribal members to the land and provide opportunities for job diversification and growth; protect significant cultural and economic resources that are vital to tribal economic, cultural, and spiritual life; and, apply traditional land-management techniques to the landscape, helping to restore ecosystem health for the benefit of current and future generations.

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