

THE IMPORTANCE OF PLACE-BASED FISHERIES TO THE KARUK TRIBE OF
CALIFORNIA: A SOCIOECONOMIC STUDY

By

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ABSTRACT

THE IMPORTANCE OF PLACE-BASED FISHERIES TO THE KARUK TRIBE OF CALIFORNIA: A SOCIOECONOMIC STUDY

Amy M. Stercho

The Karuk Tribe of California, with an ancestral home on the Klamath and Salmon Rivers, was once one of the wealthiest tribes in California. Access to abundant salmon and Pacific lamprey fisheries allowed the Karuk to develop a highly specialized subsistence economy dependent on complex systems of ecosystem management that provided for the health of the people, the forest, and the fisheries. In the mid-1800s, with the discovery of gold in northern California, the Karuk way of life was forever disrupted. Subsequent mining, logging, up-river irrigation, and the damming of the Klamath River have led to the decline of the fisheries that was both a way of life and religion for the Karuk. The Karuk Tribe, though the second largest in California, has no reservation and limited rights to fish, hunt, and manage natural resources on their ancestral territory. The Tribe has systematically been denied access to subsistence and cultural resources by federal and state governments. This study uses data from archival records, in-depth interviews, and the 2005 Karuk Health and Fish Consumption Survey to describe the economic and social impacts to the Karuk Tribe of California from the loss of healthy fisheries and denied access to subsistence and cultural resources.

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INTRODUCTION

In the summer of 2004, I was hired by the Karuk Tribe of California to document the social and economic impacts of the loss of healthy Klamath River fisheries to the Tribe, focusing primarily on impacts associated with the Klamath Hydroelectric Project. However, as I interviewed Karuk Tribal members, it became apparent that the PacifiCorp dams only partially contributed to Tribal members' inability to harvest adequate amounts of fish. The dams have negatively impacted the health of the Klamath River and consequently the health of Klamath fish populations but, equally as important, the governments of the United States and the State of California have systematically denied the Tribe access to natural resources that are important for both subsistence and cultural purposes, not limited to Klamath River fish. Therefore, the socioeconomic impacts of both the physical loss of Klamath River fisheries as well as denied access to traditional ecosystem management practices that include the right to manage and harvest natural resources for subsistence and cultural purposes should be considered.

The leases on the PacifiCorp dams will expire in 2006 and the relicensing process is in motion. As part of this process, it is necessary to consider the effects of the dams on all basin communities and yet, there are large gaps regarding the socioeconomic impacts of federal and state management decisions on Klamath Basin Tribes (Pierce, 2004). What social and economic costs have Tribal members incurred due to the decline of Klamath River fisheries? Has the decline of healthy fisheries resulted in the loss of employment opportunities for Klamath Basin Tribes? What is the monetary cost for Tribal members to replace Klamath River fish in their diet? In part, this report attempts to document the

socioeconomic impacts to the Karuk Tribe of California caused by the loss of healthy salmon, steelhead, and eel fisheries on the Klamath and Salmon Rivers.

Ecological, social, and economic consequences, and the linkages among the three, must be considered in all policy and management decisions (Barbier et al., 1994; Costanza & Folke, 1997). Although sufficient knowledge rarely exists to fully understand the impacts of these decisions, the attempt to quantify social and biophysical consequences is valuable (Daily et al., 2000). The Meyer-Zangri Associates Inc. Report (1982) addressing the historic and economic value of Trust Species to the tribes in Washington, Oregon, and Idaho suggests that the consideration of dam impacts must include potential project effects on (1) salmon, salmon fishing, and other Treaty fisheries, (2) game and game hunting, (3) plants used for food and medicines, (4) accustomed places for fishing, hunting, or gathering, and (5) overall assets and well-being of the referent tribes. This report will follow their analysis but will be heavily weighted toward impacts on fisheries, though an attempt will also be made to acknowledge how management decisions and regulations have negatively influenced other upslope Tribal Trust species of concern including large and small mammals, game birds, mushrooms, and plants gathered for subsistence or cultural purposes.

The first two chapters will introduce broader concepts covered later in the text. Chapter One defines relevant terms and lays the theoretical foundation for subsequent chapters. Chapter Two offers background information on the Klamath River Basin, including ecosystem services provided by the river and the communities these services support.

Chapters Three through Five provide an overview of events, regulations, laws, and actions leading to the decline of fisheries and the changes in subsistence opportunities for Karuk people, as the Karuk Tribe recognizes that there is not one agency or event that is solely accountable for problems the Tribe is facing (Ron Reed, personal communication, 2005). Chapter Three outlines a brief history of the Karuk Tribe from their pre-contact methods of ecosystem management through initial contact and the transition from a subsistence to a market economy. Chapter Four reviews the federal government's actions that resulted in the loss of the Karuk's land, language, fishing and hunting rights, and cultural practice, while Chapter Five documents the Karuk Tribe's continued reliance on subsistence foods and the poor state of the Klamath River fisheries.

Chapters Six and Seven provide statistical data on the social and economic well-being of the Karuk Tribe. Chapter Six presents an economic analysis of the impacts of lost access to subsistence foods, including costs associated with replacing fresh-caught, wild salmon in the diet and costs related to the loss of the right to gather subsistence foods on the ancestral territory. Chapter Seven offers a statistical review of the social well-being of the Tribe including data on unemployment, poverty, health, and emigration away from the ancestral territory.

Chapter Eight weighs the success of hydroelectricity and agriculture in the upper Klamath Basin against the economic benefits of a restored ecosystem. Chapter Nine returns specifically to the relicensing of the dams on the Klamath River and management decisions that are harming the populations of salmon, steelhead, and Pacific lamprey upon which the Karuk Tribe depends.

The future of the Karuk people as a Tribe is dependent on a healthy ecosystem. Management of riverine and upslope resources is fundamental to the culture, religion, and way of life of Tribal members. Historically, the Karuk Tribe relied on a subsistence economy, gathering all they needed for survival from the land around them. Forced assimilation into Euro-American society contributed to the Tribe's incorporation in a modern market economy. However, the remoteness of the ancestral territory demanded that their participation in the market economy include continued reliance on natural resources. Therefore, the declining health of Klamath River fisheries has had significant impacts on the economic and social well-being of the Tribe. Any management decisions that will affect the Klamath River or the natural resources of the Karuk ancestral territory must take into account the needs of the Karuk Tribe as an ecosystem dependent community.

While this report will critically analyze past and present management decisions, and will give recommendations for the future, it will not give detailed analysis on religious or physical health issues. Reports on these issues can be obtained from the Karuk Tribe of California.

NOTES ON TERMINOLOGY USED:

American Indian; Indian:

These terms will be used interchangeably. The term “American Indian” is used in literature and Federal law. The Karuk Tribe of California uses the term “Indian”.

Eel:

Eel is the term used by Karuk for Pacific lamprey (*Lampetra tridentata*) and Klamath River lamprey (*L. similis*).

Karuk ancestral territory; Karuk ancestral homelands; Karuk homelands:

These three terms will be used interchangeably to refer to the area of land inhabited by the American Indian families whose descendants have formed the Karuk Tribe of California. Approximate boundaries for the ancestral territory extend north along the Klamath River to just below Seiad Valley and south along the Klamath River to seven miles below Orleans, with a western boundary near the headwaters of Clear Creek, and an eastern boundary 15 miles up the Salmon River. These terms are inclusive of all lands managed by the Tribe for subsistence, lifestyle, and cultural purposes.

The Karuk Tribe of California; the Karuk community:

Prior to the organization of the Karuk Tribe of California in 1985, the Tribe consisted of several districts. This was more in accordance with the traditional way decisions were made by Karuk ancestors who lived in several communities based on family bonds and geographic location along the Klamath and Salmon Rivers. As management decisions affect all communities equally, and as the Tribe has now unified under one Tribal council, for the purposes of this paper, I will be discussing the Karuk community as a uniform whole.

Pre-contact:

This term refers to the time period before settlement of the Karuk homelands by Euro-Americans in the 1850s.

Traditional:

Of, relating to, or in accordance with “the passing down of elements of a culture from generation to generation” (The American Heritage Dictionary, 1992, p. 1897).

CHAPTER ONE THEORETICAL OVERVIEW AND DEFINITION OF TERMS

Overview

Community well-being is dependent on economic and environmental health. Decisions regarding the allocation of natural resources must take into account any impacts to the economic and social health of local communities. Natural resources are of a limited supply, and when multiple communities are dependent on the same natural resource, competing values come into play. To make fully informed decisions on natural resource allocation, it is essential to recognize the needs and values of each individual community.

Community, Economy, and Value

A community can be defined as a social unit or group of households that are located in close geographic proximity and have the sense of sharing a common place (Berry, 1987; Etzioni, 2001), while working together to meet everyday human needs of its members (Esbjornson et al., 1996). Communities are often united by a common characteristic, such as equity of economic resource distribution, ethnicity, religion or language (Agrawal & Gibson, 1999; Simmons et al., 2004).

Economics, as defined by Hackett (2001), is “the study of how scarce resources are allocated among competing uses” (p. 5). Economic systems develop from social organization (Polanyi, 1944) but as Berry (1987) notes, "economy is not merely a

function of community; the community and the economy are virtually the same thing,” thus strong local economies and strong local communities are dependent upon one another (p. 189). Features of a strong community include networks of trust, coordination, and accountability (Putnam, 2002).

The market is the basis of the United States’ economic system; a market is a place where people come together to buy or sell goods (Polanyi, 1944). As noted by Polanyi (1944), market economies are directed only by market prices. The drive of the market economy is capital in the form of money (Kovel, 2002). Capital is “considered to be a stock of materials or information that exists at a point in time” (Costanza et al., 1997). A capitalist market system is

. . . a socioeconomic system in which scarce resources (and the goods and services into which they are transformed) are allocated by way of a complete set of decentralized markets... the term decentralized means that system wide resource allocation occurs as a consequence of many individual market transactions, each of which is guided by self-interest... Under capitalism, individuals rather than governments or collectives also own the other factors of production, land, and capital.

(Hackett, 2001, p. 39)

Capital may exist as natural capital, manufactured capital, human capital (Costanza et al., 1997), or social capital (Putnam, 1995). For communities and economies to function properly, natural, human, and social capitals must remain balanced. Natural capital is supplied by the natural world in forms such as mineral deposits, trees, water, and ecological systems (Costanza, 2001). Human capital is comprised of physical labor and cognitive ability (Costanza, 2001). Social capital refers to trusts, networks, coordination, accountability, and social norms that enable human interactions and

cooperation (Berkes & Folke, 1994; Krishna, 2000; Costanza, 2001; Putnam, 2002; Simmons, et al.; 2004).

Values play a significant role when making decisions regarding natural resource allocations (Costanza et al., 1997). Values can be perceived as the “relative weights we give to the various aspects of the individual and social decision problem, and the weights that we give are reflections of the goals and worldviews of the community, society, and culture of which individuals are a part” (Costanza & Folke, 1997). There are multiple classes of values.

Resources can have values in exchange, like the market price or exchange value assigned to them, or values in use, such as a resource’s importance to people for their survival or subsistence (Meyer-Zangri Associates, Inc., 1982; Hackett, 2001). Resources such as air or water traditionally have a high value in use but a very low value in exchange (Meyer-Zangri Associates, Inc., 1982; Hackett, 2001).

Additionally, resources can have direct use or indirect use values. For example, if a resource provides food or shelter for humans, it has a direct use. However, a resource that is not directly consumed or utilized by humans but plays a vital role in the maintenance of ecosystem functions, such as a bee pollinating the flower of a fruit tree, has an indirect use value (Goulder & Kennedy, 1997).

There are also consumptive values: a hunter values waterfowl as a source of food; and non-consumptive values: a birdwatcher values waterfowl because he or she receives pleasure merely from observing the animals (Goulder & Kennedy, 1997).

Nonconsumptive values include non-use values in which there is no “actual direct or indirect physical involvement with the natural things in question” (Goulder & Kennedy, 1997, p. 25). Non-use values include bequest values, which derive from a person's knowledge that a resource will be available for future generations; existence values, which acknowledge the pleasure one gets from knowing that a place or resource simply exists, even though they themselves do not utilize it (such as the value people place on the Amazon even though they will never personally travel to see it) and option values, the value people give to a resource they do not currently utilize, yet know is there for future use (Postel & Carpenter, 1997).

The concept of ecosystem services has been developed to describe the benefits humans derive from natural resources. Ecosystems are comprised of and defined by the network of organisms living in a biotic community, their abiotic environment, and their biological and physical interactions (Stilling, 1996; Daily, 1997; Ricklefs, 1997). Ecosystem services are goods and services provided by this network that directly or indirectly benefit and in part sustain human life (Daily, 1997; Costanza et al., 1997). For example, bees provide an indirect ecosystem service for humans when they pollinate fruit-producing trees.

The Interface of Community, Economy, and the Environment

To fully comprehend how communities, economies, and environments interact in the modern-day United States, it is necessary to understand that our government is built upon a foundation of early theorists whose writings still affect modern policy decisions.

John Locke (1632-1704) reasoned that nature was to be subdued. Locke's definition of property rights is testimony to this end.

God and his reason commanded him to subdue the earth, i.e. improve it for the benefit of life, and therein lay out something upon it that was his own, his labour. He that, in obedience to this command of God, that subdued, tilled, and sowed any part of it, thereby annexed to it something that was his *property*, which another had no title to, nor could without injury take from him... As much as any one can make use of to any advantage of life before it spoils, so much he may by his labour fix a property in: beyond this, is more than his share and belongs to others.

(Locke, 1988, p. 290)

Locke's property rights theories influenced the writers of the United States Constitution, thus establishing a *modus operandi* for the settlement of the United States and the acquisition of land from Native American communities (Ball & Dagger, 1998).

Jeremy Bentham (1748-1832) introduced the utilitarian philosophy, proposing that something has "utility" if it helps a person get what he or she wants or if it brings pleasure to him or her (Ball & Dagger, 1998). Utilitarian principles assert that people act of their own self-interest and the role of the government is to settle disputes that occur when one person's or group of people's self-interests interfere with the interests of others (Ball & Dagger, 1998). In contrast, John Stuart Mill argued that decisions should be made based upon a principle of "the greatest good for the greatest number" (Sandel, 1996).

These principles are the basis upon which many of the natural resource management decisions have been made in the United States over the last two hundred years. They can be interpreted as such: Natural resources are to be exploited for the

human good because if they are not utilized, they are wasted. Self-interest will dictate personal resource use while the government is responsible for solving conflicts between different resource users. Ultimately, decisions regarding allocation should benefit the largest number of people.

Values of Natural Resources

The capitalist market system emphasizes value in exchange over value in use, which can contribute to the degradation of healthy ecosystems (Kovel, 2002). Natural capital is “essential to human welfare” (Costanza, et al., 1997, p. 254), yet it has been argued that it is impossible or inappropriate to try to place values on ecosystem services (Costanza, et al., 1997). Goulder and Kennedy (1997) assert that great disparity exists between actual and perceived values of ecosystem services in part because utilitarian principles avow that resources only have value to the extent to which they benefit humans. Marketable uses for resources are, by definition, easier to assess than non-use values; thus, it is often the case when management decisions are made that the natural state of the environment loses out (Goulder & Kennedy, 1997).

In 1998, President Clinton’s President’s Committee of Advisors on Science and Technology noted that:

. . . the composition and scale of economic activities in the United States are changing the chemistry of the nation’s land, water, and atmosphere so dramatically that some of these changes are adversely affecting its natural capital, and thus, the ecosystem services required to support its population.

(quoted in Dasgupta et al., 2000, p. 339)

Daly (1992) states that when managing the natural resources necessary to both economic systems and life-support systems it is imperative that distribution of both marketable and non-marketable resources be done efficiently and fairly, with regard to current and future generations of humans as well as other species (see also Costanza & Folke, 1997; Mooney & Ehrlich, 1997; Costanza, 2001). The tendency to base allocation decisions on utility and self-interest is working against goals of ecological sustainability and social fairness (Bishop, 1993; Costanza, 2001).

Environmental Justice

Environmental justice recognizes that environmental harms and hazards are distributed unequally between communities, with those of lower socioeconomic status bearing the brunt of the environmental burden (Schlosberg, 2003; Holifield, 2001). The U.S. Environmental Protection Agency (2003) defines environmental justice as:

The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

President Clinton, in his 1994 Executive Order 12898, required all federal agencies to include environmental justice as one of their missions by identifying and addressing “disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States.” The National Environmental Policy Act (NEPA) of

1969, designed to ensure that decisions regarding natural resource allocation and management have minimal impact on ecosystem and human health, requires analysis of effects of management decisions on local communities and instructs that the understanding of these effects be included in the decision-making process (Bartlett, 2001; Pinney, 2004). Under NEPA, any federal organization taking an action that will significantly impact the human environment is required to write an environmental impact statement (EIS) (Bartlett, 2001). The EIS must take into consideration “aesthetic, historic, cultural, economic, social, or health” effects of agency decisions (Pinney, 2004, p. 295).

Subsistence Economies

Environmental Justice is a relatively new concept and little research has been conducted as to the effects of environmental problems on economically poor communities, in part because high poverty is linked with a weak political voice and little economic clout (Bawa & Gadgil, 1997; Dasgupta et al., 2000). Of particular concern are peoples who rely on the natural resources of their local environment to fulfill daily needs (Bawa & Gadgil, 1997). The term “subsistence” refers to people utilizing local resources to produce products that are not placed on the market but are used to meet their nutritional and cultural needs. There are strong community, familial, and cultural ties associated with traditional dependence on subsistence gathering by aboriginal peoples (The Government of Japan, 1994). The United States government recognizes

subsistence-fishing rights for some federally recognized tribal communities but, aside from Alaskan Tribes, there is a dearth of information on how such rights are managed.

Functioning ecosystems are the base for subsistence economies (Bawa & Gadgil, 1997). People who rely on their local ecosystems for subsistence needs often have little in the way of financial capital and even less political sway. As recognized by Bawa and Gadgil (1997), ecosystem-dependent people often lose control over their local natural resources, thus losing the ability to manage these resources sustainably. The ensuing loss of diversity often disallows the communities to continue full-subsistence lifestyles, advancing a cycle of poverty.

Valuing Ecosystem Services

The strong relationship between environmental health, economic health, and equity issues has been widely documented, most markedly by the United Nation's Environmental Programme (UNEP) (Cleaver & Schreiber, 1994; Watson et al., 1998; Dasgupta et al., 2000). The heterogeneous distribution of environmental problems in different socioeconomic groups (Dasgupta et al., 2000) makes decisions about natural resource allocation all the more difficult.

Conservation of biodiversity has become both a social and a political issue in part because natural resources are often economic commodities (Myer, 1998). The vital services supplied by properly managed ecosystems provide marketable and subsistence goods, life support processes, and recreation (Daily et al., 2000). Thus it can be important to identify ecosystem services provided by local environments and determine

their worth (Goulder & Kennedy, 1997). Relative to other forms of capital, the world's stock of natural capital is "poorly understood, scarcely monitored," often treated as "free" and inexhaustible, and thus in many circumstances, undergoing "rapid degradation and depletion" (Daily et al., 2000, p. 395).

As social and cultural values are nearly impossible to convert to market values and the monetary values of ecosystem services are equally hard to determine, it is habitually the case that allocation decisions favor the production of marketable products; for example, trees will be harvested for timber rather than left in forests for carbon sequestration or spiritual significance (Goulder & Kennedy, 1997; Gatto & De Leo, 2000; Costanza et al., 2001). However, Polanyi (1944) wrote, "The economic function is but one of many vital functions of land. It invests man's life with stability; it is the site of his habitation; it is a condition of his physical safety; it is the landscape and the seasons" (p. 178). There is a growing consensus that it is vital to try to ascertain economic costs and benefits associated with changes made to the earth's stock of natural capital (Costanza et al., 2001). Further, valuation of ecosystem services must be considered in all decisions regarding allocation of natural capital (Pimentel et al., 1997; Gatto & De Leo, 2000; Costanza et al., 2001). Costanza et al. (1997) conclude that if nature's services could be adequately measured and weighed, policy decisions would better emulate the true value of ecosystems (Gatto & De Leo, 2000).

The Values of Water

Life on this planet could not exist without water (Postel & Carpenter, 1997). A mere 2.5 percent of earth's water is fresh enough to meet human needs and of this only 0.77 percent is circulating through the hydrological cycle, the rest locked away in glaciers or ice caps (Shiklomanov, 1993; Postel & Carpenter, 1997). Postel and Carpenter (1997) separate the services of fresh water into three categories: (1) Direct use of the water supply, such as home needs (including drinking, cooking, and washing), manufacturing and industrial purposes, and irrigation, (2) supply of goods other than water or indirect uses including food supplies such as seafood, fish, and waterfowl, and (3) non-extractive or in-stream benefits such as recreation, transportation, habitat, pollution dilution, hydropower generation, enhanced property values, and other non-use values (p. 196).

Of the innumerable ecosystem services provided by fresh water, many are public goods free for all to use, making it almost impossible to capture the resource's true value (Postel & Carpenter, 1997). Among those researchers who have tried, Chichilnisky and Heal (1998) weighed the costs of restoring the natural purification and filtration services provided by New York's Catskill watershed against building a water-purification plant for the same services. The cost of restoring the Catskill's ecosystem was \$1.3 billion as opposed to \$8 billion to build the plant plus \$300 million a year to run it (Chichilnisky & Heal, 1998). The huge cost of a technological replacement for the ecosystem services provided by the watershed reveals only a portion of the value of the watershed itself as benefits outside those of water-purification were not taken into account.

In addition to ecosystem services, recreational uses of fresh water systems provide key economic opportunities to rural and Native American communities throughout the West (Colby, 1989; Postel & Carpenter, 1997). In one study, local stores along a twenty-mile stretch of the Wisconsin River boasted \$800,000 in one summer's sales to boaters (Colby, 1989; Postel & Carpenter, 1997). In 1991, the United States saw direct economic benefits of freshwater fishing exceed \$16 billion with total economic benefits of around \$46 billion (U.S. Department of the Interior, Fish and Wildlife Service, 1991; Postel & Carpenter, 1997). In the same year, waterfowl hunting in the United States saw direct expenditures from hunters of \$670 million (U.S. Department of the Interior, Fish and Wildlife Service, 1991; Postel & Carpenter, 1997).

The economic and environmental impacts of the loss of healthy freshwater ecosystems are also being studied. The diversion of two-thirds of the water from the Aral Sea caused the loss of 20 of 24 native fish species, the complete demise of the commercial fishing industry on the sea (annual catches had averaged about 40,000 tons and supported 60,000 jobs), an 85 percent loss of wetlands, and a decrease in nesting bird diversity on one river inlet alone from 173 to 38 species (Glazovskiy, 1991; Micklin, 1992; Postel & Carpenter, 1997).

Degradation of ecosystems can decrease their resilience, their ability to recover from disruption, and leave them in such a state that recovery is costly or impossible (Dasgupta et al., 2000). Water is a resource that has no substitute, yet the increase in human population and water consumption has increased the demand for water three-fold in the last sixty years (Shiklomanov, 1993; Postel & Carpenter, 1997). Accessing and

utilizing water for projects such as irrigation or urban consumption requires large-scale engineering of dams, levees, and dikes which disrupt ecosystem functions; the consequences of such projects are just now beginning to be realized (Postel & Carpenter, 1997).

Agricultural runoff, unsustainable timber harvest, and other human activities are adding chemicals, such as fertilizers and pesticides, and increased loads of sediment to the water supply, negatively affecting water quality (Postel & Carpenter, 1997). Habitat destruction is contributing to the consideration of 364 species or subspecies of fish in North America being listed as threatened, endangered or of special concern (Postel & Carpenter, 1997). Currently, the United States Department of Fish and Wildlife lists 114 fish species in this country as threatened or endangered (U.S. Department of the Interior, Fish and Wildlife Service, 2005a). Allen and Flecker (1993) reported that some 20 percent of fish and amphibians, 36 percent of crayfish, and 55 percent of Unionid mussels in the United States, Canada, and Mexico are either at risk or extinct. The National Research Council (1992) reported that the United States has lost 30 percent of its pre-settlement wetlands (approximately 117 million acres) in the past two centuries; excluding Alaska, this percentage rises to 50 percent loss of the wetlands in the United States. The same report concluded that, "Eighty-five percent of the country's inland water surface is artificially controlled" (National Research Council, 1992; Postel & Carpenter, 1997, p. 209). Farming activities are the primary source for non-point pollution of about 2.6 million acres of imperiled lakes in the United States (National Research Council, 1992; Postel & Carpenter, 1997). The destruction of aquatic

ecosystems will have far-reaching consequences including the disruption of ecosystem services vital to the existence of human life.

Subsistence Fishing

Throughout the globe, freshwater fish have been providing riverine communities with a reliable and irreplaceable source of nutritious, high-protein food at no market cost (Coates, 2005). North America's west coast, from central California to Alaska, was at one time home to over 100,000 tribal communities that relied on annual runs of salmon to provide sustenance, spiritual meaning, and a basis for subsistence economies (Meyer-Zangri Associates, Inc., 1982; Alkire, 1993). These groups lived in relative balance with their resources (First Nations Panel on Fisheries, 2004).

Many tribal communities whose cultures evolved with Pacific salmon persist today with a continued reliance on fish for food and cultural and economic well-being (Alkire, 1993). King (2004) notes that the river provides the foundation for these tribes' ceremonies, gatherings, rituals, languages, and food sources. Riverine resources provide both the cultural and socioeconomic framework for these communities and the very existence of the tribes is dependent upon salmon (King, 2004). Pacific salmon are anadromous fish, born and reared in the river then migrating to the ocean for several years to feed before returning to their home rivers to spawn and die, and are thus subject to changes in both ocean and riverine conditions (U.S. Department of the Interior, Fish and Wildlife Service, 2005b). Climate change, agricultural run-off, pollution, water diversion, sedimentation and other changes in water quality have had significant impacts

on the population size and geographic distributions of salmonid species (Pacific Fisheries Management Council, 2005). The loss of many salmon populations, as well as decreases in run size, has negatively impacted tribal communities economically and spiritually (Alkire, 1993).

In Canada, policy has dictated that First Nations have the right to fish for “food, social and ceremonial purposes and treaty obligation over commercial and recreational fisheries” (First Nations Panel on Fisheries, 2004, p. 15). However, because of commercial and recreational fishing sectors’ political sway, these rights are seldom realized and tribal communities are no longer able to remain self-sufficient (First Nations Panel of Fisheries, 2004).

The rights of tribes to cultural, spiritual, and subsistence resources have been recognized in the United States in the way of “trust responsibilities” (Meyer Resources, Inc., 1999). Tribal trust resources are plants, animals, lands and other resources that can sustain a tribe’s way of life and are to be protected for the tribes by the United States government (Meyer Resources, Inc., 1999). A 1974 court decision in Washington entitled tribes in northwestern Washington to 50 percent of the harvestable fish running through their territorial homelands; the decision, upheld in 1979 by the U.S. Supreme Court, has set the precedent for fisheries allocation throughout the West (United States of America, 1974; First Nations Panel on Fisheries, 2004). In 1993, the Secretary of Interior ordered a directive stating that “the heads of bureaus and offices are responsible for being aware of their plans, projects, programs or activities on Indian trust resources” and that any “anticipated effects [be] explicitly addressed in the planning, decision and

operational documents” (Meyer Resources, Inc., 1999, p. 3). A 1994 Presidential directive iterated the above guidelines for all executive departments and agencies (Meyer Resources, Inc., 1999).

Concluding Thoughts

Historically in the United States, the allocation and management of natural resources were based primarily on utilitarian objectives. Often these directives were both shortsighted and detrimental to ecosystems and ecosystem-dependent communities. Ecological research in the past hundred years has transformed our knowledge of ecosystems and human dependence on healthy environments. It is the responsibility of current government agencies, policy makers, and land managers to consider the short- and long-term effects of all natural resource policies and management decisions on ecosystem services, health, and human well-being. The allocation and management of natural resources in the Klamath River Basin has had specific and deleterious effects on the health of Tribal communities of North America and specifically the Karuk Tribe of California, as will be detailed in the following chapters.

CHAPTER TWO THE KLAMATH RIVER BASIN

The Environment

The Klamath River Basin encompasses 15,600 square miles (Spain, 1998), 2000 river miles, and ten million acres (Ritter, 2004). It is a large and diverse watershed with headwaters near Crater Lake, Oregon and mouth located between Arcata and Crescent City on the northern California coast. The Klamath and its tributaries flow through ten counties. Land ownership in the basin is 38 percent private ownership, 61 percent public ownership, and 1 percent tribal ownership (Ritter, 2004). The upper Klamath Basin (north of the California-Oregon border) was historically an expanse of 350,000 acres of wetlands in the midst of high-elevation desert (Boyles et al., 2002). The mid-Klamath Basin (south of the California-Oregon border to the confluence of the Klamath with its major tributary, the Trinity River) drains rugged mountains, the highest summiting at over 9,000 feet, through steep, narrow gorges. The lower Klamath Basin (from the confluence with the Trinity River to the mouth of the Klamath) becomes less rugged as the river enters coastal mountain ranges and flows its remaining miles to the ocean.

The Klamath Basin sustains the largest population of wintering bald eagles in the continental United States and gives refuge to over 80 percent of waterfowl migrating on the Pacific Flyway, the major north-south bird migration route in the western United States (U.S. Department of the Interior, Fish and Wildlife Service, 1997). In the 1960s, between six and seven million waterfowl visited the Klamath Basin; the number has

decreased to about one million today (U.S. Department of the Interior, Fish and Wildlife Service, 1997). Environmental degradation that contributes to smaller bird populations in the upper basin also impacts virtually all the Klamath River's aquatic species.

The Klamath watershed was once the third largest producer of Pacific salmon with sockeye, pink, chum, coho, and chinook salmon all spawning in its waters (Spain, 1998). The populations of sockeye (*Oncorhynchus nerka*), pink (*Oncorhynchus gorbuscha*), and chum (*Oncorhynchus keta*) salmon have become extinct in the basin (Salmon Nation, 2005). Coho (*Oncorhynchus kisutch*), now considered threatened under the Endangered Species Act, and spring and fall chinook (*Oncorhynchus tshawytscha*), also considered threatened, still return to the Klamath to spawn, though in drastically reduced numbers (U.S. Department of the Interior, Fish and Wildlife Service, 2005b). The annual population of fall chinook returning to the Klamath River between 1915 and 1928 averaged 400,000, 1972 saw 148,000 returning fall chinook, and the annual average run size between 1978 and 1995 was 58,820 fish (Fedor, 2005). Fedor (2005) also observed that the run of spring chinook in the Klamath, once the most dominant fish run in the river, became almost obsolete after the 1980s with only small, remnant populations, totaling between 150 and 1500 fish, returning to the Salmon River, a tributary of the Klamath River. In 2005, only 75 spring chinook returned to the Salmon River to spawn (Salmon River Restoration Council, 2005). Additional significant species in the Klamath River Basin include steelhead (*Oncorhynchus mykiss*), which have decreased in abundance by approximately 90 percent and are considered threatened, and green sturgeon (*Acipenser medirostris*) and Pacific lamprey (*Lampetra tridentata*), both of

which have been considered for endangered species listing (Williams, 2003; U.S. Department of the Interior, Fish and Wildlife Service, 2005b).

Water Usage

Ecosystem services provided by the Klamath River include direct uses such as recreation, fishing, swimming, and boating (Douglas & Johnson, 2002), and the support of lifestyles of Tribal members, farmers, and other ecosystem-dependent communities (Niemi et al., 2001). Farm and ranch direct uses include irrigation and pollution and agricultural waste absorption (Niemi et al., 2001). Additional municipal and industrial uses include the use of water by households and firms for consumption and pollution absorption (Niemi et al., 2001). Indirect services from the river include benefits to local economies from tourism and other recreation-related expenditures (Postel & Carpenter, 1997; Niemi et al., 2001) and services to “firms and households that realize benefits or costs indirectly from the allocation of water” (Niemi et al., 2001, p.7). The Klamath River also provides non-consumptive existence and bequest values as well as intrinsic values of species and habitats (Niemi et al., 2001).

The Bureau of Reclamation’s (BOR) Klamath Project has become one of the major users of water in the Klamath Basin, having converted approximately 240,000 acres of land in south-central Oregon and northern California to cropland and pasture (U.S. Department of the Interior, Bureau of Reclamation, 2004), with 80 percent of the upper basin’s original marshlands and shallow lakes having been drained (Niemi et al., 2001). The Klamath River and Upper Klamath Lake are among the main sources of irrigation

water for the Klamath Project (U.S. Department of the Interior, Bureau of Reclamation, 2004). The Project, which was authorized May 15, 1905, currently provides irrigation water for approximately 200,000 acres of agricultural lands a year (U.S. Department of the Interior, Bureau of Reclamation, 2000). Over the summer months, the Bureau of Reclamation diverts more than one-half of the flow of the upper parts of the Klamath River for irrigation needs of the Klamath Project (Spain, 2005). The hydrology of the upper basin has been transformed by “seven dams, 185 miles of transmission canals, 516 miles of lateral ditch, and 45 pumping plants” (Blake et al., 2000; Niemi et al., 2001, p. 14).

The People

Since time immemorial, ecosystem services provided by the Klamath watershed have supported American Indian communities and economies. Currently, Klamath River water also supports the economies of farmers and ranchers, commercial fishers, recreation-centered business, and the hydroelectric industry.

The Klamath River is home to numerous American Indian communities, including the Klamath Tribes in the upper basin, the Shasta and Karuk Tribes in the mid-Klamath Basin, the Hoopa Valley Tribe, along the Trinity River, and the Yurok Tribe, in the lower Klamath Basin (King, 2004). These Tribes were well established in the Klamath Basin before settlement of the area by Euro-Americans. For these tribes, fish is a staple food, a core element of religious beliefs (Meyer-Zangri Associates, 1982), and the basis for

subsistence economies (Niemi et al., 2001). King, in his (2004) report, *First Salmon*, established the cultural importance of the Klamath River to the Tribes.

Clearly the Klamath Riverscape is associated with significant patterns of events in the traditional histories of the Yurok, Karuk, Hupa, Shasta, and Klamath tribes. These tribes to lesser or greater degrees (mostly greater) depended and continue to depend on the river and its resources, especially salmon, steelhead, and other fish, for their existence. Their cultural lives were and are substantially built around the river and its fish, plants, wildlife and water.

(King, 2004, p. 9)

Federally protected Tribal Trust species for the tribes in the Klamath/Trinity Region include the following fish for subsistence and ceremonial purposes: fall chinook salmon, spring chinook salmon, summer steelhead, fall steelhead, winter steelhead, coho salmon, Pacific lamprey, sturgeon, and eulachon (Trinity Restoration Program, 2003). Tribal Trust plant species include: willow shoots, cottonwood, wild grape, bulrush, hazel sticks, tules, spearmint, and blackberries (Trinity Restoration Program, 2003). Wildlife species include bear, for subsistence purposes and bald eagle, blue heron, mallards, fox, otter, and fisher for ceremonial purposes, as well as deer and elk for both subsistence and ceremonial purposes (Trinity Restoration Program, 2003; Marlon Sherman, personal communication, 2004).

Commercial fishers also rely on the Klamath River for their livelihoods. The Klamath River fisheries presently support 3,090 fishery-related jobs, which represents about half the jobs the Klamath River previously supported (Spain, 1998). Spain (1998) reports that due to habitat loss and declining productivity of wild salmon, 3,780 fishery-related jobs have been lost. Paula Yoon, M.A., Consultant for Fisheries Focus and

Director of the Redwood Regional Watershed Center in Bayside, CA commented on the decline of the commercial fishing industry on the northern California Coast (personal communication, 2005):

. . . just as traditional Tribal ways of life based on salmon that reflects human, spiritual and economic health have diminished, likewise the commercial salmon way of life is being lost. It is a way of life that embraces a strong connection with ocean elements and a bonding with families and socioeconomic factors that can support a sustainable fishery when properly managed. When the native salmon's reproductive habitat and genetic capability unravels, the entire culture of salmon people unravels.

Farming families utilize Klamath River water in the northern reaches of the basin. Klamath, Modoc, and Siskiyou Counties, all of which include portions of the upper Klamath Basin, are home to 1,744 farms or ranches, 80 percent of which utilize irrigation waters (Niemi et al., 2001). The main crops produced are alfalfa, small grains, potatoes, onions, sugar beets and other miscellaneous crops (U.S. Department of the Interior, Bureau of Reclamation, 2000). Farming and ranching families are dependent upon the water of the Klamath River for more than economic purposes. They value the water as it allows them to continue their lifestyle of growing food and working the land and they wish to pass along the values of their heritage to their children (Niemi et al., 2001).

Agriculture in the basin is supported in part by diversions and hydropower generated from hydroelectric dams on the Klamath River. Hydropower facilities on the Klamath River are owned and/or operated by PacifiCorp, a company that, according to the homepage of their website, "works to meet growing energy demand while protecting and enhancing the environment" (PacifiCorp, 2005a). In 1997 PacifiCorp became a

subsidiary of Scottish Power (PacifiCorp, 2005a). MidAmerican Energy Holdings Company acquired the company in 2005 (Pacific Power, 2005). PacifiCorp maintains the 151 megawatt Klamath River Hydroelectric Project (FERC No. 2082) which consists of seven dams that produce hydroelectric power: Westside, Eastside, JC Boyle, Copco Numbers 1 and 2, Fall Creek, and Iron Gate (PacifiCorp, 2005b). PacifiCorp indicates that “All of [their company’s] projects use water from Upper Klamath Lake or from the mainstem Klamath River to generate electricity – except one plant that is located on Fall Creek, a tributary to the Klamath River” (PacifiCorp, 2005b). The Link River Dam is owned by the Department of the Interior’s Bureau of Reclamation but is operated by PacifiCorp (PacifiCorp, 2005b). All of the project’s dams were built between 1908 and 1962, with Iron Gate being the last developed (PacifiCorp, 2005b).

Income drawn in by recreational activities supports many communities along the Klamath River. Such activities include hunting, fishing, sightseeing, canoeing, whitewater rafting, (Niemi et al., 2001; Douglas & Johnson, 2002), wildlife viewing, and kayaking. These activities sustain numerous businesses that provide equipment rental and guiding services for fishing and boating. These activities also support numerous campgrounds, lodges, restaurants, stores and other local businesses that benefit from the tourism trade (Reis, 2005).

The next five chapters of this report will focus primarily on the effects of federal and state management decisions on the Karuk Tribe of California. Chapters Eight and Nine will return to other Klamath River water users and take a further look at the agricultural, commercial fishing, recreational, and hydroelectric economies discussed above.

CHAPTER THREE THE KARUK TRIBE OF CALIFORNIA ECONOMIC AND SOCIAL DEPENDENCE ON THE LOCAL ENVIRONMENT

Historical Overview

Before gold was discovered at Sutter's Mill in 1848 and became the basis of the Californian economy, American Indian cultures of northwest California had thriving subsistence economies that depended on the abundance of salmon in annual migrations in the Klamath River (McEvoy, 1986). To the Karuk Tribe, the Klamath River is the true origin of their world (Salter, 2003). Yurok peoples inhabit the lands from the mouth of the Klamath River to its confluence with the Trinity River and the Hoopa Valley Tribe inhabits the region surrounding the Trinity River. Karuk homelands stretched 60 miles along the Klamath River from just south of where Orleans is today, to north of Happy Camp and into Siead Valley, and extended eastward along the Salmon River for several miles from its confluence with the Klamath (Bell, 1991). For the Tribes living on the rivers, salmon fisheries were "not much less necessary to the existence of the Indians than the air they breathed" (Pierce, 2001, p. 7-2).

Value of the Fishery

Historically, the Klamath River Basin was the third largest producer of salmon on the west coast of the United States, following the Columbia and California's Central

Valley fisheries (Spain, 1998).¹ The salmon abundance in the Klamath system sustained relatively dense populations of native peoples with a dependable and predictable source of food (Salter, 2003). This natural resource allowed the tribes of the lower Klamath River freedom to focus on other aspects of daily life, and the Karuk became one of the wealthiest Tribes in the region, if not in the country (Sherman, personal communication, 2004). Nevertheless, the Karuk practiced forms of birth control and lived below their environment's carrying capacity, reaching a fairly stable equilibrium population (McEvoy, 1986; Swezey & Heizer, 1993).

The abundance of local anadromous fisheries allowed the Karuk and their close neighbors, the Yurok and Hupa, to develop highly specialized subsistence economies (Swezey & Heizer, 1993). Salter (2003) stated that “the natural richness of [the Karuk’s] environment found expression in a wealth of ceremony, regalia, and material goods without equal in California” (p. 9). Wealth was considered a symbol of prestige (Tripp, 1986), and affluence was measured by ownership of money, treasures, woodpecker scalps, obsidian blades, and fishing spots (Bell, 1991). However, Powers (1975) proclaimed that the Karuk were “generous to the last crumb” (p. 5). Before the fall harvest, a prayer was made on behalf of all people of the world, “that everywhere there be money, fish and berries and food, and no sickness” (McEvoy, 1986, p. 36). After the first salmon of the season was caught, the fish was thanked for its providence: “Rich people and poor people will be happy. And you will bring it about that on land there will be everything growing that there is to eat” (McEvoy, 1986, p. 36).

¹ See Appendix A for estimates of historic salmon runs.

The Karuk used money and developed systems for compensating and paying fees and fines for events such as marriage, injuries and deaths to persons, and trespasses committed against others (McEvoy, 1986). Dentalium shells were a form of currency shared throughout the region, and many goods had fixed prices between the Karuk, Yurok, and Hoopa Valley Tribes (McEvoy, 1986; Bell, 1991).

There were well-established trade routes throughout the entire region. The Karuk traded mostly among themselves and with their closest neighboring tribes, including the Yurok, Shasta, and Konomihu Tribes (McEvoy, 1986; Bell, 1991). The Karuk sometimes traveled to the coast to gather and trade for mussels, clams, and salt water crabs; surf fish were consumed by the wealthy, and the seaweed found at the coast was used as a source of salt common to all households (Bell, 1991). The elements of the subsistence economy were considered more important than trade, with local economies being “products of local resources” (McEvoy, 1986, p. 26).

Reproduction was considered counterproductive to the accumulation of wealth (Salter, 2003). One early informant was quoted as saying: “Good people didn’t have many children. Some people never married, so they had lots of acorns. Lizzie’s mother told her it was a good thing not to marry, because then you can think about money, how to get things” (Salter, 2003, p. 12). Karuk, when speaking English, used the term “good people” to refer to the wealthy, and they were given the highest respect and prestige (Salter, 2003). Margolin (1981) describes the Karuk heroine as “calculating, firmly insistent that her rights be respected, quick to take advantage of a situation and always attentive to wealth and material possession” (p. 31). Bride price was emphasized and

honor and economics were considered important in marriage (Margolin, 1981). Men of wealth gained esteem not just through material possessions, but also by exercising leadership, assuming responsibility in the community and maintaining personal integrity (Bell, 1991).

Although great emphasis was placed on wealth, and the economic system of the Karuk was highly specialized, money was seldom used to purchase food (Salter, 2003). Nor was food an item of wealth (McEvoy, 1986).

Sustainable Management of a Common-Pool Resource

Today's fisheries are managed as "common property" resources. However, within a competitive economy, there is no market mechanism in place to limit harvest and conserve fish stocks (McEvoy, 1986). The tribes of the lower Klamath Basin balanced the supply of fish within the economy through a complex system of human population control, family ownership of fishing sites, law and ceremony (McEvoy, 1986; Bell, 1991; Salter, 2003). David Arwood (personal interview, 2005), a member of the Karuk Tribe, explains:

People used to have status. It's like in society. You have different classes, and that was predicated a lot on what kind of a fishing right you had down there. Long ago, any old person couldn't go down there to fish any old time they wanted in any old hole, which is pretty much going on today, but you had fishing rights [to a certain hole] that was handed down from your family from one person to the next... and every third day, you had to lay off, because you've got to give some back.

The best fishing sites on the river were privately owned and governed by complex rules (Pierce, 2001). These rights were enforced by laws, passed down through inheritance, bought, or given as gifts or payments (McEvoy, 1986; Salter, 2003). No new sites could be established below already existing ones (Bell, 1991), and women could own fishing rights, but fishing was strictly an activity of the men (Bell 2001; Salter, 2003). Some sites had shared ownership with individuals rotating fishing days according to their “proportionate shares of ownership” (Bell, 1991, p. 86) and individuals could sell shares of their ownership rights (Salter, 2003). Ownership had a different historical meaning to the Tribe as compared with how the term is understood today. Ownership was not of the land itself, but instead, ownership referred to the right to fish (Salter, 2003). McEvoy (1986) describes the Tribe’s concept of private ownership as more closely allied to the modern concept of “trusteeship” (p. 30).

It is also important to note that the Tribal members without fishing rights were not left hungry. Owners of individual fishing sites could give away surplus fish or allow others to fish their site (Salter, 2003). There were also common access pools shared by people who had no fishing rights; each family was given a spot and a day to fish (Bell, 1991). Additionally, each year a fishing weir was constructed at one of six sites along the river (Salter, 2003). Mass fishing at the weir could provide a winter’s supply of salmon to many families in just a few days (Bell, 1991; Salter, 2003).

Strict laws and ceremony regulated the harvest of salmon runs. Swezey and Heizer (1993) have called anadromous fisheries “perhaps the most intensely managed and ecologically manipulated food resource” which “required intelligent and competent

organization and control of fishing practices to ensure efficient harvest” (p. 327). Numerous legal, ceremonial, and ritual controls existed over fishing (McEvoy, 1986; Salter, 2003). For example, the right to hold the Deerskin and Jump Dances were privately owned, and this ownership could only be passed down through inheritance (Kroeber & Gifford, 1949). The content and sequence of the First Salmon Ceremony were also private property, the procedures being known only to the formulists, those who performed the ceremony (Swezey & Heizer, 1993). Powers (1975) described that the purpose of the First Salmon Ceremony was to ensure a plentiful catch of salmon for the year, and no one could consume fish before or for ten days after the formulist caught and consumed the first salmon. These ceremonies were part of a holistic form of ecosystem management practiced by the Tribe for centuries. Not only did regulation of harvest guarantee that tribes upriver of the Karuk would have fish for subsistence but it also ensured that enough fish would spawn to maintain a viable population for the future.

Open communication between the tribes on the Lower and Mid-Klamath River also helped to ensure a healthy fishery (Salter, 2003). The Shasta Tribe, an upriver neighbor of the Karuk, would not catch salmon until the completion of the Karuk Deerskin Dance (Swezey & Heizer, 1993). The Kepel weir, constructed annually by the Yurok Tribe, was taken down after ten days to avoid conflict with upriver tribes. Additionally, the trap on the weir was opened at the end of each fishing day to allow salmon to run upriver (Swezey & Heizer, 1993). In order to insure that sufficient fish made it upstream to supply those people with food, and also to provide for adequate

spawning for future migrations, only an appropriate number of fish were caught (Margolin, 1993).

McEvoy (1986) notes that the “Indian communities eventually learned to balance their harvest of fish with their environment’s capacity to yield them” (p. 21). There was never greed as long as fish were plentiful (Bell, 1991). These ritualized systems between and within the tribes were an annual reaffirmation of cultural and ecological interdependence (McEvoy, 1986).

The California Gold Rush

The discovery of gold in northern California drastically altered life on the Klamath. In 1850, 300 miners laid claims to land along the Klamath and Salmon Rivers, causing many Karuk to flee for the mountains when they were forced out of their villages. Removal of Indians from their land was supported by government law and carried out by both miners and the state militia (Johnston-Dodds, 2002). The United States government’s 1850 Act for the Government and Protection of Indians promoted the removal of countless Indian communities from their homelands between the years 1850 and 1865 (Johnston-Dodds, 2002). In California, the governors, with authority from California’s constitution and the state’s militia laws, ordered sheriffs across the state to conduct expeditions against Indians (Johnston-Dodds, 2002). Expeditions were little less than government-sanctioned genocide that resulted in incalculable murders and the complete annihilation of entire tribes. Between 1851 and 1859 alone, the California legislature reimbursed local militias approximately \$1.3 million for carrying out such

expeditions (Johnston-Dodds, 2002). Of militias operating near Karuk homelands, Trinity, Klamath, and Clear Lake areas received \$34,320 and the Siskiyou Volunteer Rangers received nearly \$15,000 for action against local tribes (Johnston-Dodds, 2002).

In the second half of the 19th century in northern California, as across the United States, tribal communities were victims of massacres and murders sanctioned by the federal and state governments. Indians had no rights. They were not allowed to testify in court, they were removed from their land and forbidden to practice their cultures, families were separated, and individuals of all ages were forced into boarding schools or indentured apprenticeships (Johnston-Dodds, 2002). Communities that had existed on the landscape for millennia were erased or marginalized in mere decades. The Karuk Tribe was not immune to the genocide that took place.²

By 1851, half of the Tribe had perished due to disease, contaminated water, loss of their salmon-based food source, and violence against the tribes (Bell, 1991). The Hoopa Valley Reservation was established downriver in 1864 for all tribes of the lower and mid-Klamath Basin, but many of the Karuk chose not to relocate (Brann, 2003). After the supply of placer gold was depleted, and due to the remoteness of the region and the absence of arable land, most miners and settlers abandoned the area, and by 1870 surviving Karuk had returned to their fragmented homelands (McEvoy, 1986; Bell, 1991).

The gold rush and the far-reaching changes that it brought to northern California have proven catastrophic for the Karuk Tribe that depends so fundamentally on salmon

² See Chapter Four for further information on Karuk's loss of land, fishing, and hunting rights, forced assimilation and criminality of their culture.

from the river. Up-slope activities, over-fishing, agriculture, and the seven dams on the mainstem Klamath River have led to changes in water quantity, quality, temperature and flow and loss of spawning habitat, severely limiting salmon production (Salmon River Restoration Council, 2005). In the 1970s “the Federal government forcibly denied Karuk people the right to continue their traditional fishing practices” (Norgaard, 2004, p. 15). Currently the Karuk Tribe’s only fishing rights are at Ishi Pishi Falls where the use of traditional dip-nets is allowed (Salter, 2003).³

The following statement by Ron Reed (personal interview, 2005), a cultural biologist and member of the Karuk Tribe, communicates how the loss of fishing rights and the decline of healthy fish populations on the Klamath River have affected the Karuk people:

As far as how many fish [we used to catch in a day], I don’t know. It depended on the fisherman. Probably at least 100 fish on each side of Ishi Pishi Falls. More than the whole tribe got this year [2004]... It’s kind of like when you go down to the Falls, and even if the fish aren’t running, you’re obligated to keep fishing for the ceremonies, for the people, for your family. Then sometimes, you’re not even able to do that, like this year. This year, we found ourselves cutting fish in half, and it’s kind of like a first, I was feeling embarrassed. I was embarrassed about it and said, ‘Mom, I have a problem. I don’t know what to do with these fish, because I don’t feel like giving one to this person, [and not one to] this person. There’s only one fish down there. Mom, I had to cut one in half today because I couldn’t differentiate who needed the most. I couldn’t do that, so I cut it in half.’ She says, ‘Well, Ron, that’s the most respected thing when you get a half-cut salmon. That means that there’s not very much available. The fact that you got a half says a lot.’

³ See the section on Denied Fishing Rights in Chapter Four for more information.

The Effects of the Market Transition

With the settlement of the Karuk homelands by Euro-Americans, a capitalist market economy replaced the local subsistence economy as the dominant economic system. For several reasons, including geographic isolation, limited employment opportunities, and the revolutionary nature of the market transition, the transition from subsistence to market economy was incomplete and an economy based around subsistence continues to be important to Karuk living on the ancestral territory. There is continued reliance on local plant and animal species to provide a nutritious and free source of food. When fish are abundant, traditional fisheries provide food for all tribal members, as fishermen are required to distribute their catch to elders and anyone else who is in need of fish. Traditional and recreational fisheries also present economically valuable opportunities for trade and employment. Though a subsistence economy still exists in part, the transition to a market economy caused both economic and social hardships that will be addressed in the remainder of this chapter.

Acorns used to be more plentiful than now. The foresters took over and managed the forests. What did they manage the forests for? Marketable timber. They didn't manage the forests for the forest. They managed the forest for something that was economic. It was driven by money. Economically driven. That's what most things are driven by.

David Arwood, Karuk Tribe, personal interview, 2005

Ecosystem dependent people rely on natural resources of local ecosystems to fulfill the majority of their needs, thus the bases of their economies are the local subsistence materials that sustain their livelihoods (Bawa & Gadgill, 1997). Research by Salvatore (2001) suggests that transitions from subsistence to market economies are often

considered revolutionary. Market transitions are considered revolutionary when a culture's "beliefs, behaviors, emotions, and interpersonal relations" are altered (Salvatore, 2001, p. 2). Individuals living through revolutionary market transitions are aware of an epoch change in the structure of their society (Salvatore, 2001).

The transition to a self-regulating market institutionally separates society into economic and political spheres (Polyani, 1944). The capitalist market, a self-regulating market, is very different from the holistic subsistence market system with which the Karuk culture evolved. As Polyani (1944) asserts, to "separate labor from other activities of life and to subject [traditional tribal lifestyles] to the laws of the market was to annihilate all organic forms of existence and to replace them by a different type of organization, an atomistic and individualist one" (p. 163). In market transitions, traditional institutions, and social and cultural systems can be disrupted if not destroyed completely (Polyani, 1944). The dislocation or replacement of social structure and culture of tribal societies with the market system can elicit negative reactions and moral dilemmas for those experiencing the change (Salvatore, 2001).

Though the Karuk Tribe, pre-contact, had a monetary system, their subsistence economy dominated all aspects of life. Labor provided food, shelter, and items for trade. For instance, fishermen would trade excess fish for acorns or venison from people who lived upslope. However, in the capitalist market system, labor had to be exchanged for money that then had to be exchanged for other goods and services.

The Karuk Tribe had no choice but to assimilate into the dominant market system as they were cut off from the fundamental necessities of their subsistence economy. They had very limited ability to harvest food; thus they were forced to buy or trade for food at the local store. As Indian people were not allowed into the local store, they would have to sit outside and ask a white person or a person of both white and Indian lineage to enter the store and buy their food for them. Often, Tribal members had no money and were forced to barter or trade religious regalia or other cultural possessions for food. The storeowner would then sell these items to collectors traveling through the area (Hillman, personal communication, 2005).

The economy in the area did not stabilize after the initial disruption of the market transition. Geographic isolation inhibited healthy economic growth. It was not until the 1950s that the first paved highway made its way into the Karuk ancestral territory. According to Sachs et al. (2004), where there is little access to global trade there is slower market growth.

Ecosystem dependent communities, when forced off their lands by colonial forces, often have no choice but to take unskilled or semiskilled jobs extracting the natural resources upon which their subsistence economies once depended (Peluso, 1992; Bawa & Gadgil, 1997). This was the case for the Karuk. The timber industry was one of the first major industries to enter the ancestral territory after the gold-mining industry. Harold Tripp (2005) recalled, “When I was a kid, here too, the forest was different. I lived here, grew up here in the old growth forest. Seen the first loggin’ company come into this country.” The seasonality and cyclic boom-and-bust character of the timber

industry forces timber workers to find other jobs or collect unemployment for parts of the year (Niemi et al., 2001). Niemi et al., (2001) assert that these patterns discourage workers from finding jobs in other industries and “cause economic and social problems for families and communities” (pp. 71-72). Timber related economic problems were aggravated in the 1980s with the closure of mills throughout the region. With these closures came population loss, unemployment, and poverty (Wilson-Wright, 2003).

The fishing industry has been important in the Karuk ancestral territory, and throughout the entire Klamath River Basin. There is documentation concerning the decline of the commercial fishing industry but less attention has been given to the decline in the recreational fishing industry, the loss of which was of greater consequence to the Karuk.⁴ Felice Pace, Director, Yurok Social Services, stated (personal communication, 2005):

Numerous scientific studies and reports, including the Forest Service's Northwest Forest Plan, document the fact that logging and road building on public and private lands in the post World War II era in the Klamath River Basin has had a profoundly negative impact on salmon and steelhead stocks and fisheries. Basically, from the 1950s through the 1980s public policies facilitated a transfer of wealth from those who depend for their livelihood on fisheries - including tribal, sport and commercial fishers - to those who depend for their livelihoods on logging and related activities. This constitutes an environmental and social injustice that has not been adequately acknowledged and for which there has been inadequate compensation. Underfunded and inadequate restoration activities have not been effective in bringing back the salmon and steelhead. Looked at comprehensively, fisheries restoration in the Klamath River Basin has amounted to little more than inadequate mitigation for the damage which continues to be caused by the legacy of logging and logging roads.

⁴ Chapter Six of this report addresses the decline of the recreational fishing industry and supporting businesses.

The cumulative effects of decades of environmental degradation continue to impact the health and well-being of the Karuk Tribe. The Karuk depend on the natural capital of their ancestral territory to fill social, cultural, and nutritional needs as well as economic ones. The following chapter will explore governmental policies and actions that have decreased the Tribe's social capital.

CHAPTER FOUR COMPOUNDING EFFECTS LEADING TO LOSS OF SOCIAL CAPITAL

The following is a summary of the California Indian experience from the perspective of the San Francisco Bay Area Indian Community as described in their 1995 Strategic Plan (pg.4-5):

Before the Europeans came, the First Generation of our ancestors lived peaceably on the lands that bordered the San Francisco Bay. The Second Generation was exposed to English, Spanish and Russian seafarers, missionaries and conquerors. They were decimated during the American settlement of the west. The Third Generation was herded on to reservations and struggled to retain knowledge of the ancient sacred traditions. The Fourth Generation turned to alcohol to deaden the pain caused by the destruction of their culture and many migrated to urban areas as part of the federal relocation program. The Fifth Generation rediscovered the Red Road and became the bridge between the old ways and Western culture. The Sixth Generation adjusted to urban life and developed a comprehensive network (of) community-based organizations and human services. The world now belongs to our children, the Seventh Generation, a new generation that is revitalizing American Indian culture, spreading the message that we need to heal ourselves and help each other.

(Yeo, et al., 1999, pp. 15-16)

Social Capital and the Strength of the Community

The historic wealth of the Karuk Tribe was made possible by the abundance of natural resources on the ancestral territory, yet it was a system of strong social ties and cooperation among individuals and family groups that allowed the Tribe to sustainably utilize these natural resources for millennia. For the Karuk, all people are destined to take on certain responsibilities in the social organization of the Tribe. As Harold Tripp (2005) recalls, “I would hear grandma talkin’ about how certain people from certain...

villages, they had roles to play in life. Some people were born fisherman. Some people were born hunters. Some people gatherers.” Families who lived upslope would trade mushrooms or acorns for fish from families who lived on the river. Cooperation between families allowed the community as a whole to flourish and survive. Social capital is the term used to describe trust, networks, coordination, accountability, and social norms (Putnam, 2002). The Karuk Tribe became wealthy because they were able to build up and maintain both social and natural capital.

Since 1850 the governments of the United States and State of California have upset both the social and natural order on the ancestral territory. The United States Government forcibly removed the Karuk from their homeland and designated it National Forest Land. National policy forced the Karuk to assimilate into white culture by sending generations of Indian children to boarding schools where they were not allowed to speak their language or practice their culture. The government has denied the Tribe their rights to fish and hunt on their ancestral homelands and has criminalized the Karuk culture. For the Karuk, the health of their community cannot be disconnected from the health of their environment. In order to address the current social health of the Tribe, one must consider how the events of the past 150 years have shaped the lives of modern Karuk.

Michaelidou et al. (2002) identify some of the factors that should be considered when assessing community well-being:

- 1) Qualitative as well as quantitative changes must be recognized as affecting community and cultural sustainability.
- 2) The retention of cultural values contributes to both physiological and psychological well-being.

- 3) Individuals must have the freedom to participate in decision-making that affects the community.
- 4) Economic well-being is vital.
- 5) Individuals must “feel peaceful, safe, and secure within their communities.”
- 6) “Rights to land may often help increase people’s sense of security and enhance community and cultural viability” (p. 608).

When assessing the socioeconomic health of the Karuk Tribe, it is important to consider these objectives. For the Karuk Tribe, natural and social capitals are intertwined, embedded in a deep sense of place, not merely to a geographic location, but to the holistic ecosystem encompassing the community and their interactions with the land. This chapter will explore how the United States Government’s actions have been detrimental to the social health of the Karuk Tribe with consideration of the above factors listed by Michealidou et al. (2002).

A Brief History of Policies of the United States Government Related to American Indians

It is impossible to fully comprehend the current needs of the Karuk peoples without understanding the American Indian policies of United States Government over the past 150 years. Many individuals interviewed for this report were among those sent to boarding schools and many had grandparents who were alive during the turn of the 20th century. The full weight of the Federal Government’s Indian policies are still being felt today as the Karuk peoples struggle to regain what has been lost and to recover from harms done to their families and themselves.

Indian policies were in place long before 1848 when California was acquired from Mexico at the end of the Mexican-American War (Napier-Tibere, 2005). As early as 1831, the United States Supreme Court ruled that Indian Nations were “domestic dependent nations” (Napier-Tibere, 2005). In 1879, the government turned an army barracks in Carlisle, Pennsylvania into the first non-reservation boarding school for the forced assimilation of American Indian children into the white world (The Brown Quarterly, 2001). The federal government passed the Dawes Act in 1887 forcing individual ownership of tribal land (Napier-Tibere, 2005). This Act gave any person who could prove that they were “of one-half or more degree Indian blood” United States citizenship and a parcel of land; the government then sold or converted to National Park or National Forest Land any remaining reservation land not parceled out (Keohane, 2005). The Dawes Act was abolished in 1934, but by this time total American Indians land holdings throughout the United States had shrunk from 140 million acres pre-Dawes Act, to 50 million acres (Napier-Tibere, 2005). In the first two decades of the 20th century the federal government banned traditional and spiritual practices and Indian boarding schools proliferated (Napier-Tibere, 2005). In 1924, the federal government gave all American Indians United States citizenship and provided them with “the basic necessities of life, job training, protection, and some lands held in trust” (Johnson, 1997). However, in 1954 the federal government “terminated” 100 tribes and eliminated the above services, forcing more American Indians onto welfare and increasing the cycle of poverty (Johnson, 1997).

Research conducted by Goldberg-Ambrose and Champagne (2005) found that California Indians, as compared to other Indians nationwide, have suffered from a lack of government spending. The authors note that the United States government spent much less per-capita on California Indians than on other Indians nationally. Between 1990 and 1994 California Indians were funded at rates of one-third to one-half of all other tribes (Goldberg-Ambrose & Champagne, 2005). Also among the findings of Goldberg-Ambrose and Champagne (2005):

- Funding from the Indian Health Service for California Indians [was] about 30 to 40 percent less than the national average.... from 1988 through 1995.
- Housing and Urban Development Indian Housing programs also show a systematic under-funding over the last decade.
- Less than 1 percent of all current federal general assistance funds is going to support California Indians, who comprise approximately 12 percent of all Indians nationwide.
- The dearth of federal funding for these and other programs in California has diminished the social and economic welfare of California Indians relative to Indians elsewhere in the country.

Denied Access to Land and Cultural Sites

As you know, most of our land is now managed by the Forest Service. There were only about 20 allotments given to Karuks during the late 1800's early 1900's. All the land the tribe owns now was either bought for low-income housing or donated. We have put most of it in trust, which gives it reservation type status. We signed a treaty in 1851, but it was never ratified by congress, so we never got a reservation.

Scott Quinn, Karuk Tribe, Land Manager, personal interview, 2005

I can't get through to my medicine grounds, my gathering places, because there are 'No Trespassing' signs there.

Charlie Thom (testimony from Karuk Department of Natural Resources, 1999)

People have to be empowered to once again use family gathering areas because with the loss of that ability comes breakdown of families and villages... There has been a breakdown due to the government's prohibitions. The government moves in and says, 'Now we prohibit this. Now we're going to manage your resources for the good of the Nation, for your good too.' That's the spiritual connection that makes life itself possible that is being lost.

Leaf Hillman, Karuk Tribe, Vice Chair (testimony from Karuk Department of Natural Resources, 1999)

Bell (1991) defines the boundaries of Karuk ancestral lands as extending north along the Klamath River to just below Seiad Valley, extending south along the Klamath River to seven miles below Orleans, with a western boundary near the headwaters of Clear Creek and an eastern boundary fifteen miles up the main stem of the Salmon River. In all, the Karuk ancestral homeland encompassed over one million acres in northern California (Hillman & Salter, 1997). There were three main village clusters located at favorable locations along the river (Salter, 2003). Altogether, 119 villages dotted an 80-mile stretch of the Klamath and Salmon Rivers, with 80 percent to 90 percent of the population living in the three main village clusters (Crowell, 1998).

The discovery of gold in northern California in the mid-1800s disrupted the Karuk way of life forever (Salter, 2003). In 1852, miners burned down many Karuk villages and forced the people to leave their ancestral homes, and for approximately the next fifteen years, mining dominated the landscape. However, when the more accessible placer gold was removed, miners began to leave the area and the surviving members of the Karuk Tribe re-inhabited their lands (Salter, 2003). By the late 1860s, approximately 90 Karuk villages existed in this area (Bell, 1991).

Between 1851 and 1852, government agents negotiated eighteen land treaties with California Tribes, including the Karuk, that would have set aside 7.5 million acres of reservation land (Johnston-Dodds, 2002; Quinn, personal communication, 2005). In 1852, the California Assembly and Senate “voted to submit [to the United States Congress] resolutions opposing the ratification of the treaties” due to pressure from white settlers worried that gold might be found on the deeded lands (Johnson, 1997; Johnston-Dodds, 2002). Consequently, the United States Senate never ratified these treaties (Johnson, 1997) and the federal government never created a reservation for the Karuk (Crowell, 1998). However, the United States Government established a trust responsibility over the Tribe and assumed responsibility for the protection of the people and the land (Johnson, 1997).

In 1905, the federal government designated the majority of the Karuk ancestral territory as National Forest land (Happy Camp Chamber of Commerce, 2005). Members of the Tribe continued to live on Indian allotments, remnants of village sites, and parcels of private property along the Klamath and Salmon Rivers. However, in the 1950s, the “Termination Era” in the United States began, and the government initiated efforts to break up the remaining clusters of Karuk peoples in this area (Crowell, 1998). Because the Karuk had only an ancestral claim to the land they occupied, but no recognized legal ownership, the federal government relocated many Tribe members to the Hoopa reservation down-river or to Yreka and the Quartz Valley Reservation up-river. Some individuals were given small parcels of land, but these were often sold or claimed by the government with very little or no monetary compensation (Crowell, 1998). Karuk tribal

members share accounts of deeds to land that were rescinded by the federal government when men were away fighting for the U.S. during the World Wars. As sanctioned by federal mining laws, properties along waterways that are designated mining claims were and continue to be taken away from Karuk who are not actively mining as their sole source of income. Additionally, many Karuk were forced to relinquish their land to the State of California for the development of Highway 96.

The Karuk people overall have suffered an incredibly significant loss of land, as shown by the fact that the Karuk tribal government retains management of less than one percent of their historical territory. Currently, much of the Karuk ancestral land is designated as National Forest and managed by the United States Forest Service (Crowell, 1998). There also exist small parcels of land owned by the Karuk Tribe as well as some land held in trust for the Tribe by the United States Bureau of Indian Affairs. Because the Karuk are not federally recognized as having land rights to their ancestral territory, the Tribe has minimal fishing rights along the Klamath River.

Table 1 Land holding of Karuk Tribe of California, past and present (information provided by Scott Quinn, Land Manager, Karuk Tribe of California)

Property	Number of Properties	Size
Karuk Ancestral Territory	Not Applicable	1,051,016 acres
Current land held in fee by Karuk Tribe	35 properties	140 acres
Current land held in trust by the USA for Karuk Tribe	27 properties	601 acres
Total of current lands managed by Karuk Tribe	62 properties	741 acres

The paving of State Highway 96 through the ancestral territory significantly affected the land holdings of many Karuk Tribal members. Highway 96 begins in Willow Creek, CA and follows the Trinity River to its junction with the Klamath River near Weitchpec, CA. From here the highway enters the Karuk territory, running northeast along the banks of the Klamath. The river and the road bisect the entirety of the ancestral territory.

In 1934, the section of State Highway 96 between Klamath and Weitchpec was designated as part of the state highway system and in 1941, when a need for better roads to access mineral and timber resources in the rugged mountains of Northern California was recognized, plans for the improvement of State Highway 96 above Weitchpec were signed (California Highways, 2005). Until State Highway 96 was completed in the early 1970s, there were only small, dirt roads running in and out of the Karuk ancestral lands. When State Highway 96 was paved, the Karuk people lost much of the land that remained in their ownership, as the majority of village and spiritual sites, as well as Indian allotments, were located along the river and in the path of the road. In the early 1970s, the California Department of Transportation completed a section of Highway 96 which penetrated the east side of Katamin, the cultural center of the Karuk world (Karuk Tribe of California, 2000). Ron Reed and Marge Houston (2005) describe the means by which this happened and effects that the loss of land has had on the Tribe:

After the '55 flood, they took the land out of trust status and put it into fee-patent status so that they could push the right of way. They basically didn't give the Indians around here a choice of taking... It's basically, 'You take the money or we're taking it [the land] from you.' So all the land got put into fee-patent status and subsequently a lot of the land was sold. A lot of the land was lost to taxes.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

Highway 96 changed this entire territory... There's not the homesteads here anymore there used to be. There's not the natives that live here on this river that used to be. There were so many places along the River now that I can just, between here and Happy Camp, can tell you where there were homes where people lived that I'm not even sure the property exists anymore. The Highway. Yeah, the Highway wiped out a lot of property. Including ours.

Marge Houston, Karuk Tribe, personal interview, 2005

Understanding the property structure of the ancestral territory illuminates one of the reasons that the Tribal members are presumably leaving their homelands. There is sparse property available to acquire. Further, we can assume that because the bulk of land adjacent to the private property is National Forest land, very few employment opportunities exist for Tribal members who wish to stay close to their cultural center.

That's one of the problems is there's not very much property on the river that was not taken by the government and made into the Six Rivers and Klamath National Forests. Out of our original 1.051 million acres of our Aboriginal Territory, only about 2% of that is private land, and the tribe only owns 3% of that. This leaves the Tribe with 750 acres to work with. A lot of the old village sites are all Forest Service land now. And those are the places where a lot of people want to move back to... but there's no property to buy... And [as for properties that do come up for sale] a lot of retirees from down south, and people from out of the area, have bought those up. Now the value of the properties has gone up to unreachable levels for most people. Even if there was property to buy, there are no jobs. Around here there's the Tribe, the Forest Service and Caltrans, that's it.

Scott Quinn, Karuk Tribe, Land Manager, personal interview, 2005

Preventing the Karuk from Managing the Land
for Cultural and Subsistence Purposes

Information for this section was gathered through interviews with Karuk Tribal members. Information offered but not cited was held in general consensus by almost all of the interviewees with whom I met and the same information was also found in transcriptions of interviews conducted by other researchers. However, thoughts and feelings expressed in this section do not necessarily represent the feelings of all Karuk Tribal members.

The Great Creator's wish was for Karuk people to manage this land, keep it where it would cover traditional subsistence needs. Two hundred years ago this land provided for our people. This slacked off because we were interrupted by another culture.

Norman Goodwin (testimony from Karuk Department of Natural Resources, 1999).

But for some reason [the United States Government] don't feel that they have that trust obligation [to the Karuk Tribe]... I know what the reason is, it's because we don't have a big reservation and... they don't think that they have to deal with us like they do with other tribes at the levels that they do.

Harold Tripp, Karuk Tribe, Cultural Resource Specialist, personal interview, 2005

With the majority of Karuk ancestral lands designated as National Forest, the Tribe has been denied access to lands and cultural areas once managed for subsistence foods and cultural materials (Norgaard, 2004; Jackson, 2005). The United States Forest Service now oversees the management of these lands. Until recently, the local Forest Service managed mainly for Douglas Fir, a tree species valuable for timber but not important for Karuk subsistence and cultural needs. The Forest Service cut down or poisoned tan oaks

and other native plants previously managed by the Tribe and then replanted the areas where they grew with Douglas fir.

The Karuk peoples have struggled with the United States Forest Service over the implementation of traditional land management practices, such as the use of fire.

William Tripp (2005) explains, “They just don’t let us manage for things that we need to use. Eighty percent of our cultural-use plants are fire dependent species and they need low intensity fire and... nobody sees the spiritual connection to these resources and the human influence on the quality of those resources as part of an actual natural process.”

Often it takes years to build relationships with Forest Service employees and coordinate co-management plans. However, because of the high rate with which Forest Service employees rotate in and out of local Forest Service offices, relationships once established are often lost and co-management plans are rarely implemented. Again, William Tripp (personal interview, 2005): “We’re being able to start doing more of that stuff and then we get a new ranger or a new supervisor and we have to start all over again and it’s kind of a frustrating process, because every time you think that you’re about to do something good, something happens and we can’t do it anymore.”

Ron Reed, Cultural Biologist for the Karuk Tribe, (personal interview, 2005) described the emotional effects of the loss of traditional management practices and the constant struggle to regain rights and access to land that was managed by his people for over 10,000 years:

When you’re not able to go upslope and go manage, you’re not able to go up and reap the harvest of that management and when you’re not able to go produce for your children and give things for each other for the well-being of life, then all of a

sudden, that puts you in this little down feeling. You're down casting yourself. I think that's where a lot of the people in Karuk Tribe are because of our inability to get to these resources that have been given to us by the creator. We understand very much that we're a proud people. We're here for a reason, but a lot of us struggle with modern society, trying to figure out how do we integrate into modern society? How do I get my word out there? How do I get my passion out there to be able to change management decisions?

Boarding Schools

[They] didn't have a choice. You had to be white. They couldn't live in this world, couldn't choose their boarding schools, couldn't talk their language, couldn't have their hair long. So most of those people became white, and they lost a lot of what they were taught when they were young... They were brainwashing them people to the extent it was beyond... How they survived, I don't know, because if I grew up [speaking] Karuk, and they tried to change me into the other way, I would be dead. I wouldn't do it. I would not go that way. So the strength that those people had... A lot of people think they were weak because they did that, but the strength that they had to do that, I can't even find anything to compare it to. I admire every one of them. I especially admire my mother, because she came back. She went full circle. I think it was just as hard for her to turn back to the native way as it was for her to be white, to become white.

David Arwood, Karuk Tribe, personal interview, 2005

The year 1879 marked the beginning of the boarding school era as the first off-reservation boarding school for American Indian children was opened under the command of Captain Richard Henry Pratt and with the funding and support of the United States government (The Brown Quarterly, 2001). Pratt, previously a cavalry officer who had led troops of African Americans in battle against American Indians in the western United States, believed in assimilation of American Indians into the white culture through total immersion, a philosophy that would come to permeate boarding schools across the

country (The Brown Quarterly, 2001). Government regulations mandated compulsory education for all American Indian children and although law specified that children could not be removed from reservations without the full consent of their parents, in fact American Indians were not considered citizens and parents could not protest their children's removal (V. Johnson, 1997; The Brown Quarterly, 2001; Napier-Tibere, 2005). Parents were often beaten or threatened, their children taken by force to boarding schools located great distances from their homelands, and communication between family members was prohibited except on holidays (V. Johnson, 1997; The Brown Quarterly, 2001; Napier-Tibere, 2005). Some parents willingly sent their children to boarding schools, seeing an opportunity for their children to obtain a higher quality of life than was found on the reservations and allowing for opportunities of success in a newly unfolding world (The Brown Quarterly, 2001). For orphaned children, there was no choice but to attend boarding schools (The Brown Quarterly, 2001).

When children arrived at boarding schools, school officials cut their hair, burned their clothes and gave the children school uniforms and English names, as their native languages were forbidden (The Brown Quarterly, 2001; Napier-Tibere, 2005). Many schools enforced strict discipline and harsh punishments and regularly beat children for using their home language (V. Johnson, 1997; The Brown Quarterly, 2001). In 1928, the Meriam Report found that boarding schools throughout the United States had "meager food budgets, overcrowded facilities, inadequate health care, and overwork of children" (The Brown Quarterly, 2001). The children were fed government commodities of white flour, white rice, beans, and bacon, foods that not only were very different from their

traditional diets but were also low in nutrition; thus, disease was common in the boarding schools and tuberculosis was almost an epidemic (Keller, 2002).

In 1921 the United States Government decided that, “children could attend local schools if an Indian facility could not be found within a three mile distance from their homes” (The Brown Quarterly, 2001) and in 1934, with the passage of the Indian Reorganization Act, parents were given the right to decide whether their children went to boarding schools (Napier-Tibere, 2005). Though enrollment in boarding schools dropped, many children were still sent away and most of those who returned home faced new challenges. The boarding schools taught trades, such as farming, to boys, and domestic services to girls, and upon return to their homes many found that they no longer fit into their culture (Napier-Tibere, 2005). Though some found friendship and community within the boarding schools, many left the schools with a feeling of loss and displacement (The Brown Quarterly, 2001).

The emotional costs of boarding schools affected not only those who attended the them, but also their friends and families. The 1970’s saw a generation of children raised by parents who had attended boarding schools. Many of the children were not taught the traditional ways or language and felt betrayed by their parents (Napier-Tibere, 2005). Bill Wright, a Colusa County Wintu man and sweat lodge doctor was raised at the Stewart Institute in Nevada, where he received no affection and no support (quoted in Ross, 2000):

So growing up then, you can't show affection. When you get older, you go and get married, have kids, you know, and it's like the boarding school is still there. You want things done now. Anybody that's been to boarding schools and they're in their 50s to 60s, now the way there were treated, they will treat their kids like that, because it is that we want things done – no talking back – that's boarding school... The parent doesn't stop to think about what he's doing to his kid. He's taking his boarding school attitude out on him. He wants it done the way he was taught.

As a result of boarding schools much knowledge of Karuk ceremony, culture, language, and traditional life was lost. Carrie Davis (personal interview, 2005), a Karuk Tribal member, spoke to the effects of the boarding schools on her family and friends:

One thing I do know that changed with a lot of the salmon too was all of the kids got shipped off the river to the boarding schools. My father took initiative and he learned the fishing part of his culture. His best friend didn't really catch the fishing part as much as he knows language and a lot of the ceremonial stuff. My dad never danced in a ceremony. Four years ago was the first time he'd ever danced, because he was beat for even trying to be Indian.

There were two generations of Karuk children sent away to boarding schools, and during this time much knowledge of traditional management practices was lost. Children were raised on diets that did not include traditional foods. Individuals were punished for "being Indian." People were separated from their culture and they lost touch with what it meant to be Karuk. The emotional and mental distress caused by boarding schools cannot be quantified, but one can speculate that both high rates of alcoholism and decreased physical health resulted.

Loss of Language

Language can be considered the most important system that human societies have for communicating meaning (Berger & Luckmann, 1967). Languages develop through face-to-face interactions and are a key catalyst for the accumulation and transmission between generations of a social stock of knowledge (Berger & Luckmann, 1967). The Karuk language was almost completely lost due to boarding schools and other efforts on the part of the United States government to remove Karuk peoples from their homelands. Harold Tripp (personal interview, 2005) discusses his personal experiences:

Everybody was supposed to be in reservations or moving onto a reservation. My grandma said that they took her down to Hoopa and put her in like a prison. There were bars on the windows and everything. They made her learn English. And that's the reason that I didn't get to learn our language. You know. I learnt some few words but she did all she could to keep me from learnin' the language. But still she taught me in English how we're supposed to be as Indians, about all the traditional laws of life and stuff. But she robbed me of the language which a lot of times I wish I would have learned...

Susan Gehr is Language Program Director for the Karuk Tribe. Because Tribal members recognize the importance of language, attempts are being made to document and restore the Karuk language before it is entirely lost. She and other members of the Tribe have been building a digital dictionary of the Karuk language. When asked how many Karuk people can speak the language, she answered that there are about eight people who learned Karuk as their first language or in the home at the same time they learned English. There are about 30 to 50 Karuk people who are learning Karuk as a second language mainly through community classes, self-study or through a one-on-one master-apprentice arrangement. Thus, a mere one to two percent of tribal members can

speak the Karuk language. The Tribe has been teaching Karuk in the local public schools since 1972. Gehr (personal interview, 2005) spoke eloquently of the importance of the Karuk language to the people:

I think definitely that our language is an important part of the culture. It is one thing that identifies us as who we are. Naming, having names for things, is really important. I mean it's one of the things that establishes our sovereignty or the fact that we were here, have been here. We have names for things in Karuk. And we have names for things that are from this place. And we don't have many... names for creatures that aren't from around here, like buffalos and elephants, and... penguins and things like that. But we have bunches of names for coyotes and wolves and bears and all the things that are from around here. Birds and things... Some of our people look at our language as sort of a luxury... but one of the things that establishes our identity as Karuk people is our language. And our stories. And the fact that we didn't always just speak English. We have a unique language and a unique grammar and a unique vocabulary to describe exactly perfectly all the things that are here. And that establishes your tribal sovereignty and your tribal identity. And if that goes away your identity goes away. Sure, maybe your body's still alive but... the rest of you isn't. You are half dead.

There are currently about 6,300 entries in the digital dictionary. Gehr spoke of the importance of naming significant objects in the local environment. A limited search of the dictionary identified words related to diet and fishing. There are 106 words related to food or traditional diet. There are 18 words for fishing and 10 words related to eel. There are 56 words related to salmon. Language is proof of existence. The sheer number of words related to salmon in the Karuk language is proof of the significance of salmon to the Tribe.

Denied Fishing Rights

[Ishi Pishi Falls is] the only place we can fish all up and down the river. Every family used to have their own little place to dip and the game wardens took all them out way back in 1927 I think. So we only got the falls up there to get our fish... salmon. And long time ago, they didn't go by numbers, you take all you want. I seen them myself when I was about eight years old. We went over there to get fish and there was a big sack of it. One guy came with his horse and he loaded down the horse and went home. And you could get it every day, long as you could handle it.

Violet Super (testimony from Karuk Department of Natural Resources, 1999)

[Historically] the Indian people didn't just dip at the falls. That's all we are allowed to do nowadays. They don't really allow us. They just don't look at us. They don't come searching us out.

David Arwood, Karuk Tribe, personal interview, 2005

Due to the lack of federal recognition of land rights, the Karuk Tribe retains only limited legal access to fisheries (Norgaard, 2004). In the late 1980s, the Karuk Tribe petitioned the United States government to recognize their fishing rights on the Klamath River but they were denied (Karuk Tribe of California, 2000). In a court decision in 1985, the State of California designated limited fishing rights to the Karuk Tribe only at Ishi Pishi Falls where they are allowed to use traditional dip-nets (Bell, 1991). Thus, there is a conflict between state and federal policy regarding the Tribe's fishing rights. The state has allowed the Tribe limited fishing rights, yet the Tribe has no federally recognized fishing rights.

As the Yurok and Hoopa Valley Tribes were granted reservations by the United States government, finalized judicially in the Jessie Short Litigation (1973) and

legislatively by the Hoopa-Yurok Settlement Act of 1988, they have more complete, although still inadequate fishing rights guaranteed them by the Boldt Decision (United States of America, 1974; Pierce, 2001). One-half of the annual harvest of the Klamath anadromous fishery is allowed for tribal use, and the other half for non-tribal uses (Karuk Tribe of California, 2000; Pierce, 2001). The tribal share is allocated 80 percent to Yurok and 20 percent to Hoopa, and the non-tribal half is 71 percent ocean commercial, 14 percent ocean recreational, and 15 percent river recreational (Pierce, 2001).

Any attempt to communicate the cultural, ceremonial, and subsistence meanings of the fisheries to the Karuk Tribe would be inadequate. The Karuk Tribe (2000) avers, “Subsistence and Ceremonial fishing are the primary reason the Karuk people have survived as a people with an intact culture” (p. 1). Though Congress never ratified the 1851 Treaty, signed by the Karuk Tribe on November 4, 1851, the Tribe never ceded their aboriginal hunting and fishing rights nor were they abrogated by Congress; thus these rights, as incident of Indian title, remain in effect (Karuk Tribe of California, 2000). The Karuk Tribe is attempting to have their right to a share of the 50 percent allocation for Tribal fisheries recognized (Karuk Tribe of California, 2000). The Tribe also stresses the need for the protection of all Tribal Trust species from impacts generated outside of tribal lands (Karuk Tribe of California, 2000).

If traditional fisheries had been protected, tribal members would have been able to gather fish for subsistence with almost no capital opportunity cost (Meyer-Zangri Associates, Inc., 1982). Because of the decline in fisheries, the Karuk Tribe is forced to

purchase more foods from sources outside their homelands. The form of capital needed for such purposes is United States dollars. However:

Dollars have no intrinsic value, and are simply a facilitator (or medium) for exchange of real goods, services and resources. Thus, dollars can be useful, but if a socio-political entity cannot secure control over basic real resources... such dollars will likely be used for consumption, not investment – and the society will evolve, over time, to reestablish a condition of poverty.⁵

(Meyer-Zangri Associates, Inc., 1982, pp. 39-40)

As both the United States government and the State of California have denied the Karuk full fishing rights, the Tribe has suffered both economic and social consequences.⁶ The Karuk have lost a food source that must now be replaced with store-bought foods that are often expensive and less healthy than wild salmon. Tribal members have lost a stock of natural capital that could be sold or traded for other foods or goods. Fishing sites are gathering spots for families and communities where bonds are reinforced and knowledge is shared between generations. Social capital is weakened when cultural activities based around the fisheries cannot take place.

Prior to 1985, when California granted the Karuk fishing rights at Ishi Pishi Falls, people were arrested for fishing on the river. Interviewees spoke of continuous harassment for even being found on the river. One man spoke of having his cooler searched during an evening picnic by the river. Another man spoke of growing up fishing with his older relatives only at night. He thought this was tradition, not realizing that if they were caught fishing they would be fined, arrested, or even jailed. Fishing

⁵ Authors refer the reader to R. Prebisch: Change and Development – Latin America’s Great Task. Report to the Inter-American Development Bank, New York, 1971.

⁶ Chapter Six explores economic consequences in more detail.

rights at Ishi Pishi Falls permit the Tribe one small refuge where they can continue their traditional harvesting practices, but these rights are not adequate. Ishi Pishi Falls are steep and allow only enough room for one or two men to stand and fish. Fishing at the Falls can be dangerous and only limited salmon can be harvested. Thus, Karuk must go without salmon, or men must risk arrest to fish at other places on the river.

It is the Karuk belief that salmon return to the river for the people to eat. Not catching and consuming salmon is disrespectful to the fish and if the salmon are not respected, they will not return the next year. Consumption of fish is not merely a right for the Karuk Tribe; it is a force of life. Salmon are religion, culture, and the path to the future. The gathering and distribution of salmon reinforce social bonds in the community. Salmon consumption nourishes the body while salmon gathering nourishes the spirit and the mind. By not fully recognizing the Karuk's right to gather fish, the governments of the United States and the State of California are denying the Karuk the right to practice their religion, to live their culture, to build their community, and to ensure that future generations will understand what it means to be Karuk.

Ishi Pishi Falls is sacred. That's where you fish for ceremonies. That's where you fish for subsistence. That's where you fish for our people. It's not only just a fishery. It's a social area. So people come from all over the place still today. They go to Ishi Pishi Falls, to mingle, to get their fish, to share their wisdom, their knowledge about when they were kids. It was very quiet down there this year, and it was very sad. Less than a hundred fish at Ishi Pishi Falls illustrates the health of the river at this point in time. It means a lot to the Karuk people. It means so much that we fish out of one fishery and we try to reach everybody and we know we can't. We're reaching less and less people every year. Some years we had good years, some years we've got bad years, but on the average, we're declining.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

Criminality of the Culture

We'd have to kind of sneak around. We'd go sneak around to catch a fish; we'd have to go sneak around to kill a deer... can't shoot a gun, y'know. They'd throw us in jail and a few other boys in jail. Because I recommend, as a Medicine Person, go get a deer. So these young boys that were sent out got picked up for taking deer out of season. Yet it was supposed to be for this planet, and plants and trees and wildlife, people. They don't understand, it's ignorance for them. Yet it worked for us. It worked for the Indian people for thousands and thousands of years. It worked for us, but they still won't listen to us. We had clean forests, everything abundant. Everybody was happy. It could be the same way again.

Charlie Thom (testimony from Karuk Department of Natural Resources, 1999)

The Karuk religion and culture are dominated by the local landscape and, in the past, the successful long-term management of local resources provided both food and livelihood for the people. Recent research in the fields of political and social sciences have focused on the impacts of the dislocation of local communities when their land is taken from them by colonial powers or for the purpose of establishing parks or other protected lands. This research is relevant to the status of the Karuk people.

The combination of growing human population sizes and decreasing stocks of the world's natural resources has accentuated the global trend of resource capture by "individuals or groups with social power to capture, transform and use natural resources from a much wider catchment area" (Guha & Martinez-Alier, 1997, p. 12). Often small, local communities are displaced without compensation for lands that have been home to their ancestors for countless generations and the people are either driven into more urban areas to find work and new homes or they set up new homes on the fringes of the now public land (Guha & Martinez-Alier, 1997). The local communities are often those

whose “secure livelihood depend[ed], not... on the availability of permanent paid employment in the industrial service, or state sectors, but rather on the sustained availability of local land, water, and forests,” (Lohman, 1995, p. 123). Human rights issues arise (Guha & Martinez-Alier, 1997) as the science and bureaucracy of new land managers conflict with the subsistence needs of the local communities (Lohman, 1995). Subsistence materials, once free to local people, are regulated and harvest limited, thus local people must depend on monetary resources, at least in part, to fulfill their needs. Employment opportunities in the now public land are usually seasonal positions for unskilled or semiskilled laborers (Peluso, 1992). Land degradation and poverty of the local community escalate (Peluso, 1992). Subsistence activities, which frequently conflict with new land management regulations, are considered illegal, and those who managed the land for generations are seen as criminals (Peluso, 1992).

Such has been the case with the Karuk Tribe of California. As documented in this chapter, the United States Government claimed 99 percent of Karuk homelands and converted it into National Forest Land. Traditional land management practices, the religion and culture of the Karuk, were either prohibited or severely regulated. As evidence from both the 2005 Karuk Health and Fish Consumption Survey⁷ and interviews show, the United States Forest Service and California Fish and Game regulations have negatively impacted Karuk culture and livelihoods.

I remember the game warden caught me one time. And he said, ‘What are you doing here behind this fence?’ And I said, ‘I was going over here to look for fish.’ Cause I didn’t have a spear. And he says, ‘Well, you know there’s a fence

⁷ See Appendix B for survey methods.

there that you can't go across there because it's private property.' And I told him, 'Well, you see there's a gate there that we can go through and so we can get going through there.' So he says, 'Well, you know these people.' I said, 'Yeah, I do.' So he couldn't do nothing to me. I always remember that. But after that, things happened like that, they discourage you from fishing anymore.

Robert Grant, Council Member at Large, personal interview, 2005

Survey Results:

Many Karuk living on the ancestral territory report that Forest Service employees or game wardens have questioned or harassed them while they were gathering cultural resources (Table 2, 2005 Karuk Health and Fish Consumption Survey). Respondents to the 2005 Health and Fish Consumption Survey wrote of being questioned, searched, fined, jailed, and treated as if they were stealing resources. One survey respondent stated that he no longer gathers cultural resources because, "They don't recognize our rights and I don't want to spend my life in jail." Another respondent iterated, "Everything [is] against the law." Others spoke of being questioned while gathering cultural-use plants or rocks from the river.

Table 2 Percentage of respondents whose households had been harassed while gathering for cultural or subsistence purposes

Activity	Percent whose household had been hassled
Gathering mushrooms	22.2
Fishing	33.3
Hunting	26.7
Eeling	10
Other	13.3
Gathering firewood	42.2
Gathering basketry materials	12

Additionally, 44.4 percent of individuals completing the survey stated that members of their household have been questioned or harassed by game wardens while gathering food or other cultural resources; 35.6 percent of individuals stated that mushroom gathering, fishing, hunting, and eeling had decreased in their household due to regulations or negative encounters with game wardens; and 20.5 percent of individuals who answered this series of questions stated that gathering of firewood, basketry materials, and other cultural resources had decreased in their household due to regulations or negative encounters with United States Forest Service employees (2005 Karuk Health and Fish Consumption Survey).

Harold Tripp (personal interview, 2005) expresses the feelings of stress associated with trying to live a traditional lifestyle when laws outside of the local community's control forbid it:

You could catch like two-hundred if you fished all day at it hard. Nobody ever did. You usually didn't need that many fish. Because even then, that was in the late fifties... people had already kinda' started bein' afraid of the law because we didn't have a right accordin' to the law to be down there. The cops would come down there and throw people in jail. People were gettin' kind of scared to even do that. So it's driftin' away from catchin' all the salmon...

I remember my grandfather, we lived over here on the Salmon River, and you'd go almost all winter without seein' a car and when he'd hear a car and he'd get all scared and like we always had deer meat or somethin' like that and that's the first thing he'd [say], "It's the game warden. It's the game warden." And he'd start hidin' everything and yeah... I thought it was crazy. Way out here in the mountains like that. A little-bitty thin... one-lane road in all directions and every time he heard a car, man, he thought it was a cop. So that was terrible, havin' to live like that, you know. Especially when that was the food you was supposed to be eatin'. Like a doctor, he told my grandmother one time, to eat deer meat.

The Need for Co-management

Due to the isolation and high rate of poverty on the Karuk lands, there has been continued reliance on subsistence foods. “Traditional foods are higher in protein, iron, zinc, omega-3 fatty acids, and other minerals and lower in saturated fats and sugar” (Norgaard, 2004, p. 1). With strict regulations of the gathering of food on National Forest Lands and high fees for licenses, Tribal members are often forced to decide between feeding their families traditional, wholesome foods or complying with regulations. Many who cannot pay the fees for fishing and hunting licenses or who do not wish to be harassed, arrested, or fined for partaking in these activities must forgo participation in their culture. Those who do not adhere to regulations live in fear of being caught. The Tribe does not advocate for the lifting of these regulations on National Forest Lands altogether. However, the cultural and subsistence utilization of the local natural resources by the Karuk Tribe must be recognized and appreciated by current managers. Co-management and cooperation between the United States Forest Service, California Fish and Game, and the Karuk Tribe can lead to successful and sustainable management of the lands and waters of the Karuk ancestral homelands while providing for the subsistence and cultural needs of the Karuk people.

Concluding Thoughts

Returning to the list of provisions for healthy communities found in the beginning section of this chapter, we can see that the Karuk Tribe is being denied its basic necessities. Michealidou et al., (2002) suggest healthy communities are ones that retain cultural values, that feel they are free to participate in decision-making, have a healthy economy, and feel safe, peaceful, and secure. Michealidou et al., (2002) further suggest that security and cultural and community viability are increased with the right to land, and that if any of these needs are not met, individuals' psychological and physiological well-being and the viability of the community as a whole are negatively influenced. For the Karuk, there has been a loss of culture, tradition, and language due to the actions and policies of the governments of the United States and the State of California. Individuals are not able to participate in local decision-making and there is a feeling of disempowerment. Poverty prevails. Individuals do not feel secure in their homelands. There is limited employment opportunity and rights to land have been denied. The combination of the loss of land and cultural sites, the lasting impacts of boarding schools, and the criminalization of the Karuk culture have severely impaired the social and economic health of the community.

It's basically been made illegal to live traditionally anymore. And without a place to live and a way to survive people aren't going to come back.

William Tripp, Karuk Tribe, Air Quality Coordinator, personal interview, 2005

CHAPTER FIVE CONTINUED RELIANCE ON A HEALTHY RIVERINE SYSTEM

Continued Reliance on Salmon Fisheries and Other Subsistence Foods

Though the Karuk Tribe has been systematically denied full access to their traditional subsistence foods and though the health and abundance of species gathered for subsistence purposes have declined dramatically since 1851, there is still continued reliance on traditional subsistence foods. This report is not only an account of the loss of past generations; present generations of Karuk continue to suffer great losses. Though fish populations are in decline, evidence from interviews and the 2005 Karuk Health and Fish Consumption Survey show that salmon, steelhead, and Pacific lamprey were significant food sources for members of the Karuk Tribe until recent decades. (Survey questionnaires used the term “eels” to refer to Pacific lamprey.) In the following statements, Karuk Tribal members speak to the importance of wild stocks of Klamath River fish to the Karuk diet.

[My father] worked [during the summer] and had good money, but during the winter, we didn't have a lot. We used freezers. We'd live on the salmon. Everyday we would have some kind of food cooked with the salmon. It was salmon patties, fried salmon, baked salmon, salmon cooked on the stick. It was either that or it was deer meat. So it was whatever was in the freezer that's what we got to eat. I noticed, as I got older, it was less and less. It's really hard now for me... I remember being so tired of salmon patties. Now I just wish I had some. We ate it so often. My kids don't even know what it is.

Carrie Davis, Karuk Tribe, personal interview, 2005

It is six species of salmon,... at one time, and... our steelhead and then our lampreys, our eels, our green sturgeon, our white sturgeon, the candle fish – all of these things. It is our supermarket. You guys noticed when you drove in here you didn't see no Safeways. So our ability to live here in permanent habitation in our homeland for thousands of years was dependent on these resources. They provided it for us year-round. The river provided it for us year-round.

Leaf Hillman in his statement to the Federal Energy Regulatory Commission during the Karuk Government to Government Meeting, 2005

Contemporary Karuk peoples depend on a variety of fish species obtained from the Klamath River system (Figure 1) as was often expressed in interviews and further supported by survey data. Fifty-nine percent of individuals surveyed reported that someone in their household gathered steelhead for food, while 50 percent of individuals responded that fall chinook was gathered for food in their household. Eel was also gathered by a considerable percent of respondents, with 40 percent of individuals reporting that someone in their household actively attempted to harvest eel.

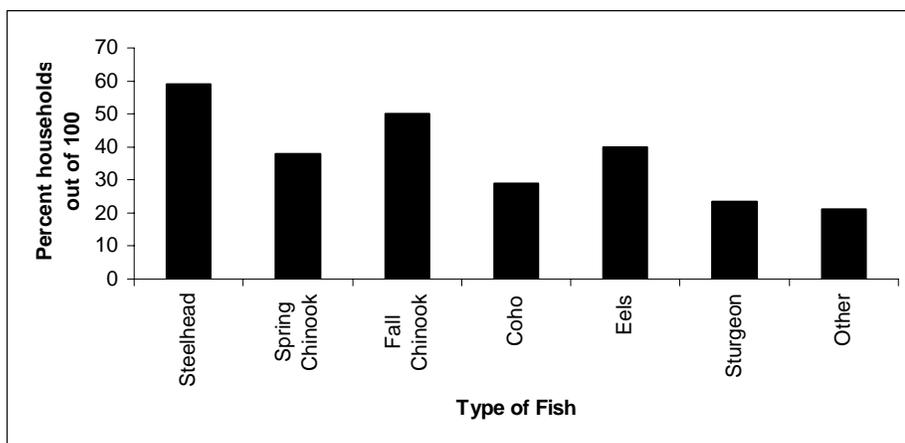


Figure 1 Percent of households that currently gather fish for food

Many interviewees attested to growing up with refrigerators and freezers packed with fresh and frozen salmon, while cupboard shelves were stocked with canned salmon harvested from the river that year. Eel and steelhead are essential to the Karuk diet during seasons when the salmon are not running. As many Karuk are only seasonally employed and a large majority of the population live below poverty level, having readily available stocks of wild fish is crucial to the health and well-being of families. Ron Reed testified to the abundance of salmon in his childhood diet:

Growing up, I just remember, some of my earliest ages, remember seeing fish at the bottom of the refrigerator. I remember eating fish all the time to where we were sick of it. Kind of like all the time, all the time, all the time. And we lived in a project up at Happy Camp, the Ghetto, it was called. We didn't have a smoke house or anything like that. So we weren't really privileged to have a whole lot of smoked fish. We ate a lot of fried fish, baked fish, fried fish mainly. My mother, being a single parent, most of time, was often working 2 and 3 jobs. So we fended for ourselves a lot. But I remember having a lot of fish around. Ceremonies had a lot of fish and things like that.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

Though the majority of interviewees and survey respondents stated that fish is an important food source, not all tribal members are able to harvest these traditional resources. When respondents were asked to quantify how much fish was gathered in their household in the 2004 – 2005 fishing season, 77 percent of survey respondents reported that no eel was gathered, 73 percent no spring chinook, 65 percent no fall chinook, and 67 percent no steelhead. When asked why fish are not harvested, people most often responded that there are no longer enough fish in the river to catch (Figure 2).

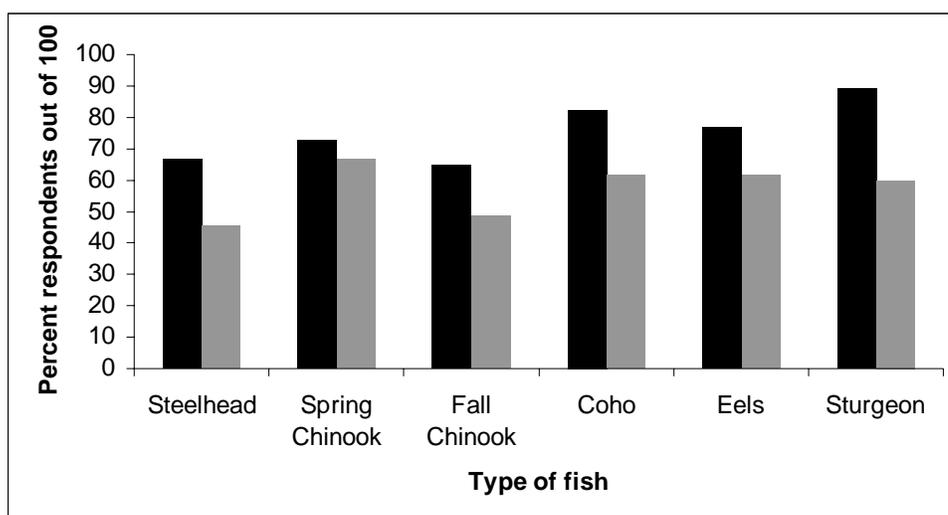


Figure 2 Percent of individuals who were not able to gather fish in the 2004 - 2005 fishing season (dark bars) and those who believe that there are no longer enough fish to gather (light bars)

The continued reliance on riverine species for food is evidenced by survey results. The above data illustrates that although fish are still actively harvested by Karuk, very few fish were gathered in the the 2004 – 2005 fishing season. What is perhaps more compelling, is the fact that 85 to 90 percent of survey respondents indicated that they were unable to fulfill their needs for fish due to regulations or insufficient numbers of fish in the river (Figure 3).

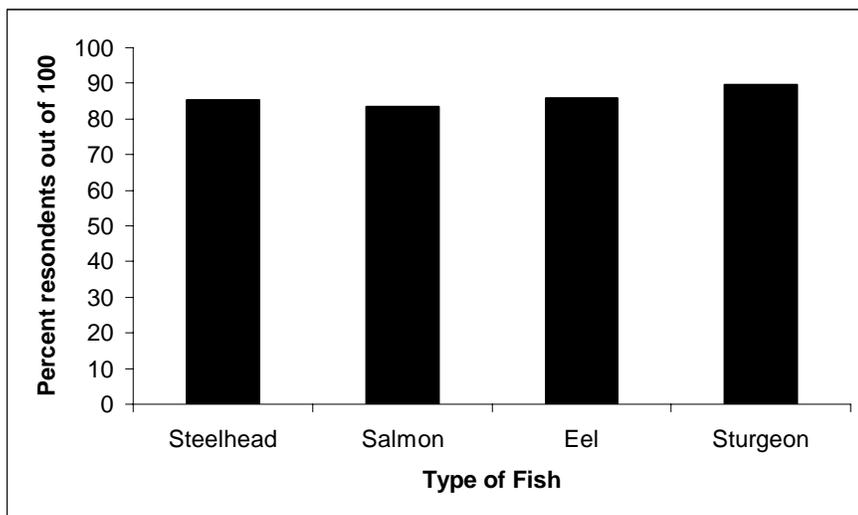


Figure 3 Percent of respondents who are unable to fulfill their needs for fish

When asked to explain why needs for fish were not met, 61 percent of respondents said that they were not able to fulfill their needs because there are *too few fish in the river*. Thirty-three percent of respondents noted that their needs are not met because the *fish are unhealthy* and 33 percent noted that their needs were not met because *regulations did not allow for adequate harvest*. (Respondents were allowed to mark more than one reason that their needs were not met.)

In the 2005 Karuk Health and Fish Consumption Survey, we also asked individuals about family gathering of fish. Forty percent of respondents said that there were fish that *their family had gathered in the past that they currently do not harvest*. In reply to a question asking respondents to identify when harvesting stopped in their families, the trend noted a general decline in the fisheries starting in the 1960s and 1970s with a sharp

cessation in the 1990s for most species.⁸ Little evidence exists documenting the Karuk's use of each fish run. In fact, there is a general paucity of information regarding historic fish populations on the Klamath River. However, survey data reveals that fish were still a significant food source for the Karuk up until the 1960s (Figure 4). When asked in which decade respondents' families had stopped gathering fish or when that fish species became an insignificant food source, between 75 and 90 percent of individuals indicated decades from the 1960s to the present. This timeline illuminates a clear link between the decline of Klamath River fish species and the PacifiCorp dams, most notably, the Iron Gate Dam which was completed in 1964.

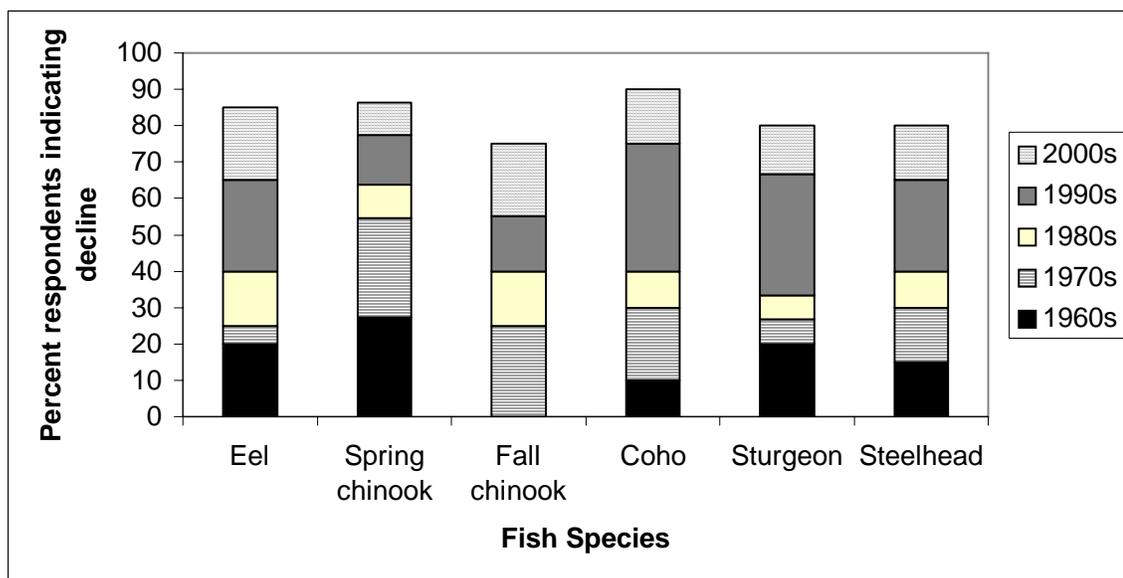


Figure 4 Survey respondents indication of what decade fish species were no longer gathered by their families or became an insignificant food source.

⁸ Response alternatives included both “before 1950s” and “1950s”

The 2005 Karuk Health and Fish Consumption Survey documented in detail the decrease of salmon in the diet by asking Karuk to record the amount of salmon they consumed as teenagers and the amount of salmon they consumed in the 2004 –2005 fishing season (Figure 5 and Figure 6).

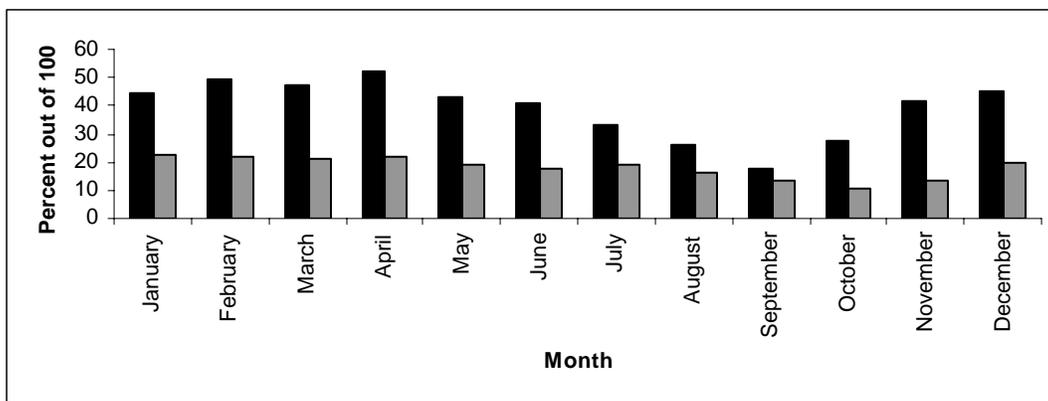


Figure 5 Salmon consumption by month, percent respondents who ate no salmon during a given month in the 2004 – 2005 fishing season (dark bars) and as teens (light bars)

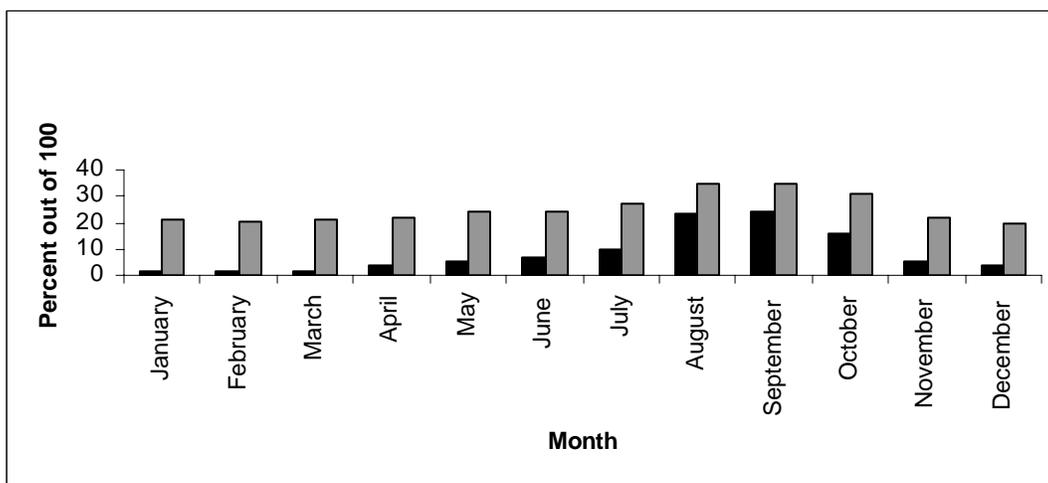


Figure 6 Salmon consumption by month, percent respondents who ate salmon once a week or more during a given month in the 2004 - 2005 fishing season (dark bars) and as teens (light bars)

Looking specifically at the months April through October when salmon was historically the most important fish in the diet, the time when adult spring and fall chinook return to the river, we can see a drastic reduction in the consumption of salmon over the lives of survey respondents.⁹ In the months April through June, between 18 and 22 percent of respondents ate no salmon as teenagers whereas currently between 40 and 53 percent of respondents ate no salmon in those same months during the 2004 –2005 season. Additionally, in April through June, as teenagers 22 to 24 percent of respondents ate salmon more than once a week where only 3 to 7 percent ate the same amount in the 2004 – 2005 fishing season. During the months of July through October 11 to 19 percent of respondents ate no salmon in those months as teenagers but 18 to 33 percent ate no salmon in those months in the 2004 – 2005 fishing season. Twenty-seven to 34 percent of respondents ate salmon once a day or more as teenagers during July through October with only 10 to 24 percent eating salmon as often in the 2004 – 2005 fishing season. Notably, just one person reported eating salmon once a day or more in the 2004 – 2005 fishing season and this occurred only in October. However, at least two people reported eating salmon once a day or more in each month in their teenage years. When asked why consumption had decreased, 58 percent of respondents stated that they *eat less salmon now* than as a teenager because *there are less salmon* in the river. The following testimonies from Karuk tribal members attest to abundance of salmon in the diet in past decades and the scarcity of salmon now.

⁹ Survey respondents' ages were evenly distributed between 1920 and 1987. Please see Appendix B.

We had salmon every meal. Got tired of salmon. But we didn't have freezers so we had to salt salmon down. Big crocks of it. And we always ate salt-fish. Every meal. Salt-fish and boiled potatoes. Just meal after meal. I remember one of my uncles in the family, you know that one day a month when we got to eat steak or chicken or somethin'. He wouldn't eat it; he would the salmon. He'd reach over there and grab fish and leave the steak layin' there. I was thinkin' man, you crazy. But yeah. We even made, she even made a fish chowder. Smell the house up for days but it was good. Yeah, that's all we ate was fish. Fish, fish, fish. And if we didn't have salmon we'd eat steelhead. I had an uncle that fished all the time. He'd catch like ten a day. And he'd give 'em away. He always caught more than we could ever eat. There was a couple people down there in Orleans that he kept supplied with fish. But there was a lot of them [fish].

Harold Tripp, Karuk Tribe, Cultural Resource Specialist, personal interview, 2005

There's a time away I spent away from the fishery and I guess on my own because of my own situation. And now come back to the fishery and I eat salmon a lot more in my diet but, more importantly, I make sure that other people around me that are elders eat, get a lot more in their diet. Oftentimes, you struggle with it, because you know you're giving away everything. Then when you don't have anything for your own children, there's an issue there. It goes against traditional well-being. Back in the day, they used to take care of your family, make sure your family had sufficient supplies while you're doing everything else, but obviously, nowadays, we can't do that, because I don't think I can catch enough fish down there.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

Eels are the most recent species to have been identified as in decline within the Klamath River Basin and by the 1990s there was widespread concern for their conservation (Center for Biological Diversity, 2005). The reduction of eel numbers in the Klamath River can be attributed to various events including habitat alteration and destruction, blocked access to habitat due to dams, dredging, decreased river flows, and chemical pollution (Center for Biological Diversity, 2005). Pacific lamprey is one of four lamprey species in the Western United States that have been considered for listing

under the Endangered Species Act (Center for Biological Diversity, 2005). William

Tripp and David Arwood give testimony:

They're [eel] disappearin'. I don't know why, per se. I know that every study that's ever been done on the Lamprey before we started doin' one was on how to kill 'em. Because of dams. They interfere with the turbines. And so, I don't know. I know that just since I was a kid, you know, we used to go down and catch as many as we wanted. And now you spend all season just to get enough for a barbeque for one night. And, it's pretty bad. They are a pretty important food source for in the spring.

William Tripp, Karuk Tribe, Air Quality Coordinator, personal interview, 2005

When I was little, you could go up and down... anywhere you go near the river at a certain time of the year and you could smell the eels because they really stink. Now you can't find a place where you smell them anymore. When I was little, they would run a jet boat up the river. You would be standing over by the shore, and you could see all these little eels get washed up. Jet boats would be up all day now and you can't see any eels getting washed up. The eels are almost gone.

David Arwood, Karuk Tribe, personal interview, 2005

Eel have been and continue to be a staple food for the Karuk. Eel were traditionally harvested in March through June and they provided a vital source of nutrition after gathering of steelhead ended and before the run of spring chinook began in the Klamath River (Frank Lake, personal communication, 2005). Survey results showed that 79 percent of respondents had gathered *no eel for food in 2004*. Eighty-six percent of respondents stated that, given regulations and population numbers, *they are not able to gather enough eel to fulfill their needs*. Sixty-two percent of respondents indicated that eel gathering had stopped in their family or was no longer a significant food source because there were *no longer enough eel in the rivers to catch*.

Carrie Davis explains:

I know that, to this day, my husband, my brothers, my dad, my uncles, they all take off to go get eels. They all get everything down there. They get frustrated because they can't get them anymore. They go and they try for them and they're not getting them.

Carrie Davis, Karuk Tribe, personal interview, 2005

The 2005 Karuk Health and Fish Consumption Survey investigated the continued reliance on fish and also documented the trend in overall dependence on subsistence foods. Two questions were asked regarding the number of meals eaten per month that contained subsistence foods, one question asked for current consumption rates and one asked for consumption rates from the respondents' teenage years. Survey results show that consumption of subsistence foods has decreased within the lifetime of respondents (Figure 7). Most survey respondents ate, as teenagers, meals containing subsistence foods one or two times a week or on a daily basis. Compared to past decades very few respondents currently eat subsistence foods on a daily basis, and the amount of individuals who never eat meals with subsistence foods has risen from 6.8 percent as teenagers to almost 22 percent currently.

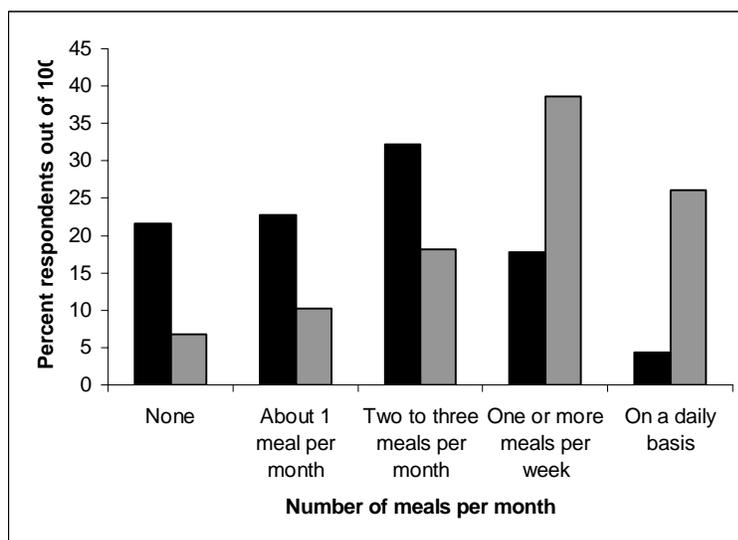


Figure 7 Number of meals consumed containing subsistence foods, currently (dark bars) and as teenagers (light bars)

Seventy-seven percent of respondents reported eating meals that contain subsistence foods two or three times per month or less currently as compared to 35.2 percent of respondents who ate that amount as teenagers. Twenty-three percent of respondents reported eating meals that contain subsistence foods one or more times per week or daily currently as compared to 64.7 percent of respondents who ate that amount as teenagers.

Subsistence foods that are important to the Karuk diet include acorns (*Lythocarpus spp.* and *Quercus spp.*), huckleberries (*Vaccinium spp.*), wild mushrooms, Indian rhubarb (*Darmera peltata*), watercress (*Nasturtium officinale*), wild turnips, mussels (*Anodonta oregonensis*, *Gonide angulata*, *Margarititera falcate*), crayfish, and deer (*Odocoileus*

hemionus) (Norgaard, 2004).¹⁰ Norgaard (2004) noted that Karuk have limited or denied access to all of these resources. Gathering has been interrupted due to several factors including: the mismanagement of forest and aquatic ecosystems by federal and state agencies leading to the deteriorating health and availability of subsistence resources; denial of aboriginal hunting and fishing rights in combination with expensive license fees; inadequate gathering limits; exorbitant fines for hunting and fishing offenses; and continuing questioning and harassment by game wardens and U.S. Forest Service employees when gathering is attempted.

In the absence of subsistence foods, Karuk must substitute store-bought foods into their diet; these foods are usually less healthful and of course require dollars as a medium of exchange. Gathering subsistence food provides Karuk with opportunities to exercise their bodies while exploring their connection to their homelands, culture, and religion. Additionally, gathering of subsistence foods is empowering in that it allows for self-reliance which is even more crucial in a community where over 80 percent of families live in poverty and are economically challenged to provide healthy foods for their families. The Karuk's connection to and dependence on upslope resources must be recognized and managed for by federal and state agencies.

Klamath River fisheries are the cornerstone of Karuk life on the river, yet 85 to 90 percent of the population living on the ancestral territory are unable to fulfill their needs for fish. The Karuk rely on the fisheries for their spiritual, social, physical, and economic well-being. Consuming salmon is a way of reaffirming the connections to one's

¹⁰ See Norgaard (2004) Table 1 for a complete list of denied subsistence resources.

ancestors. What is more, when Karuk contribute to the gathering or preparing of fish, they reinforce the bonds of family and community. Additionally, salmon provide a nutritious source of food, low in saturated fat but high in omega-3 fatty acids, protein, and minerals such as iron and zinc (Norgaard, 2004).

Management decisions made by the United States government and the State of California and the continued presence of the PacifiCorp dams have caused the decline of salmon in the Klamath River. The Karuk are being denied access to riverine resources that are essential to their well-being and it would be irresponsible for any agency to make management decisions without considering the impacts to the Tribe. The following section gives a synopsis of how past management decisions have affected the health of the Klamath River fisheries.

Health of the Klamath River Salmon

The health of ecosystems and of ecosystem-dependent communities can be severely and negatively affected by the policies and actions of external forces, including those of national governments (Michaelidou et al., 2002). Ecosystem health should be considered holistically and, therefore, management decisions must consider the impacts of human activities on all species including those that are not visible to our constructed markets and economies (Westra et al., 2000). Species diversity is important to ecosystem-dependent communities (Michaelidou et al., 2002). The health of the environment is directly connected to the socioeconomic status of the human communities living within that ecosystem (Crabtree & Bayfield, 1998). Within these ecosystems there

are indicator species that are indicative of the health of the ecosystem and keystone species essential for both consumptive and non-consumptive utilization (Michaelidou et al., 2002). An understanding of the health of these species often reveals the health of the communities dependent upon them.

This section will explore the direct relationship between the health of the Karuk Tribe of California, and the health of the watershed ecosystems of the Klamath and Salmon Rivers, focusing specifically on salmonids as indicator species.

The Ecosystem and the People

The American landscape is often perceived as pristine, untouched by the hands of humans, when in fact the overwhelming majority of regions have undergone eons of land management by indigenous cultures (Hull & Robertson, 2000). Such has been the case throughout the Klamath River Basin in Northern California. The banks of the Klamath River and its tributaries were once dotted with villages of various tribes, each of whom practiced comprehensive land management techniques and relied on the offerings of the land for their survival.

The Klamath and Salmon Rivers are the ancestral home to the Karuk Tribe of California (Salter, 2003). Over time, the Tribe developed complex systems of ecosystem management that provided for the health of the people, the forest, and the fisheries. The Karuk way of life was deeply rooted in the land, and the Klamath and Salmon watersheds shaped both religion and lifestyle of the Karuk peoples (Connors, 2000). The introduction of white settlement to the Klamath River Basin halted many indigenous land

management practices and altered the health of the ecosystems upon which their subsistence depended.

“Water sources--such as groundwater, lakes, marshes, and rivers--are essential for all life and play a critical role in maintaining natural ecosystems and ecological integrity” (Michaelidou et al., 2002, p. 604). The health of a river is indicative of the health of the entire watershed (Westra et al., 2000). Within ecosystems, there are certain species whose presence, population density, dispersion, and reproductive success can be used as an index to measure the health of the ecosystem as a whole. These important species are called indicator species (Landres et al., 1998). In this regard, the profiles of salmonid species in the Pacific Northwest suggest that salmon can be considered indicator species for the rivers and ecosystems in which they exist. Salmonids can also be considered keystone species in their environment. Hunt (2004) listed 137 species that receive nutrients either directly or indirectly from salmon. Ewing (1999) stated simply that “salmon are a keystone species for Northwest ecosystems” upon which entire food chains are based (p. 7).

Indicators are useful for monitoring the pressures that people place on their environment and the changes in that environment that these interactions cause (Crabtree & Bayfield, 1998). By investigating the life histories and limiting factors of salmonid species in the Klamath Basin, we can begin to assess whether or not the ecosystem, as a whole, is healthy.

Before settlement in the Klamath Basin by non-indigenous people, there were eight anadromous runs of fish on which the Karuk Tribe depended: Pacific lamprey;

steelhead; and six salmon species that include the spring-run chinook, the fall-run chinook, the coho, the pink, the chum, and the sockeye (Salter, 2003). The pink, chum, and sockeye are now extinct in the Klamath Basin; the coho is considered under endangered species protection; the spring-run chinook is so scarce that it is rarely harvested; and the fall-run chinook has experienced a dramatic decline in population (Salter, 2003)¹¹. It should be noted that current federal regulations list the spring- and fall-run chinook as the same species. However, there is agreement among many of the Tribes, non-governmental organizations, and scientists within and outside the basin, that spring and fall-run chinook should be managed as separate species.

The following testimony was given by Nat Pennington, Fisheries Program Coordinator for the Salmon River Restoration Council, at the Karuk Government to Government Meeting with the Federal Energy Regulatory Commission in Orleans, California in 2005. I include it in its entirety as it highlights the critical need to manage the Klamath River for spring chinook.

Another thing about this Salmon River which I'd like to bring to light is that it hosts one of the last remnant wild populations of spring chinook in the Klamath Basin, which, as you may know, was once the predominant run. And I'd like to talk a little bit more about the spring chinook. Basically, they are fish that need – they need cold water. They usually exist in the higher portions of watersheds like the Klamath, for instance, the upper basin above Iron Gate Dam was where many of those fish would have returned to spawn. And this year in the Salmon River we had 446 returning spring chinook. And so, if you imagine that it's largest remnant population of what once was the predominant run in the Klamath Basin, upwards of millions of fish and this recent year we had 446. So that's what we have left of the third largest salmon run on the West Coast, basically – 446 salmon, and on the best year we have 1200. So really this species is on the brink of being extinct forever. Iron Gate hatchery mitigates for – supposedly mitigates

¹¹ See Appendix C for life histories and stressors of chinook and coho salmonids.

for habitat loss above the dams. And I have a major concern that Iron Gate was unsuccessful at mitigating for the loss of spring chinook salmon, which are very important to the Karuk people and to our economy here locally. Spring chinook are much healthier fish for people to eat than the fall chinook salmon because they come with the fat stores in their body to stay through the summer and spawn in the fall...

A Closer Look at the Klamath River Ecosystem

In order to fully understand the factors affecting the health of the Klamath and Salmon Rivers, it is first necessary to define the ecosystem services that the rivers provide. The following lists, obtained from the North Coast Regional Water Quality Control Board website (2005), show the current uses of water from the Klamath and Salmon River watersheds.

The Klamath River water body beneficial direct uses include: agricultural supply, aquaculture, commercial and sport fishing, industrial service supply, municipal and domestic supply, hydropower generation, industrial process supply, water contact recreation, and non-contact water recreation. Indirect uses of Klamath River water include: cold freshwater habitat, freshwater replenishment, ground water recharge, migration of aquatic organisms, existence of rare, threatened, and endangered species, spawning habitat, reproduction and/or early development habitat, warm freshwater habitat, and wildlife habitat. The website does not list cultural and subsistence purposes.

The North Coast Regional Water Quality Control Board (2005) lists the following “potential” uses for the Salmon River water body, noting that these services are not currently being utilized. Direct uses include: agricultural supply (potential), aquaculture (potential), commercial and sport fishing, industrial service supply (potential), industrial

process supply (potential), water contact recreation, and non-contact water recreation.

Indirect uses for the Salmon River include: cold freshwater habitat, freshwater replenishment, migration of aquatic organisms, spawning, reproduction, and/or early development habitat, and wildlife habitat. The website does not list cultural and subsistence purposes.

Most direct uses of the Klamath and Salmon Rivers have an impact on water quality. The following section documents some of these impacts and addresses how they affect the health of riverine species. Ed Sanderson, Karuk Tribal member, described changes that he has seen in the river over his lifetime and speculates as to their cause:

We used to be able to walk across Camp Creek on the salmon's backs and not get your feet wet. Lucky to see a salmon in Camp Creek anymore. It's those dams up there. They dam it up. There's two dams up there, Copco and the new one, Iron Gate. They'll let a lot of water down sometimes, then other times that river is so low. Then there's pollution...

(Karuk Department of Natural Resources, 1999)

The Karuk Tribe of California has a sophisticated and successful Department of Natural Resources (DNR) that conducts ongoing research in areas such as water and air quality control, watershed restoration, fisheries, and cultural resources management. The mission of the Karuk DNR is "to protect, promote, and preserve the cultural/natural resources and ecological processes upon which the Karuk People depends. [The] Natural Resources staff works in conjunction with agency personnel to ensure that the integrity of natural ecosystem processes and traditional values are incorporated into current and future management strategies within our area of influence" (Karuk Tribe of California, Department of Natural Resources, 2005). The Karuk Tribe has Memorandum of

Understandings (MOUs) in both the Klamath and Six Rivers National Forests based on existing Government-to-Government relationships with the U.S. Forest Service. The goal of these MOUs is to “jointly identify, plan and accomplish mutually beneficial projects and activities that provide for watershed restoration, job opportunities, and community economic development” (Karuk Tribe of California, Department of Natural Resources, 2005). The Tribe also has cooperative agreements with the U.S. Geological Survey and the U.S. Fish and Wildlife Service to monitor and assess water quality conditions in both the mainstem Klamath and its tributaries. Additionally, the Tribe has federally appointed representative seats on the Klamath River Basin Fisheries Task Force, the Klamath Restoration Task Force Technical Work Group, the Trinity River Basin Fish and Wildlife Task Force, and the Klamath River Basin Inter-Tribal Fish and Water Commission (Hillman, 2000).

In April of 2001, The Karuk Tribe of California completed a comprehensive study of the stressors on their ancestral territory, mainly focusing on the Klamath River system. These included non-point pollution, nutrient loading, turbidity and suspended solids, flow, water quality standards, contaminants, and gold mining and are summarized below (Johnson & Geiselman, 2001).¹²

Total Maximum Daily Loads (TMDLs) for the Klamath River

In 1991, the North Coast Regional Water Quality Control Board set standards for dissolved oxygen in the mid-Klamath region at a minimum of 7.0 mg/l and a maximum of 10.0 mg/l, noting that during spawning and egg incubation, the minimum level of

¹² All information is from Johnson and Geiselman unless otherwise noted.

dissolved oxygen should not be lower than 9.0 mg/l. Water pH in the mid-Klamath should not be lower than 7.0 and not higher than 8.5. On the Salmon River, dissolved oxygen levels should remain between 9.0 mg/l and 10.0 mg/l, and the pH should not exceed 8.5 or be below 7.0. According to studies conducted by the Karuk Tribe's Department of Natural Resources, pH levels in the main stem Klamath River are "elevated above acceptable ranges as a result of diel fluctuations of nutrient-rich river water." The same study notes that "organic enrichment results in oxygen sags causing dissolved oxygen levels to dip below those necessary to support salmonids and physiological stress or mortality occurs, especially during early life stages" (Johnson & Geiselman, p. 29, 2001).

Average temperatures on the Klamath River were gathered from the United States Fish and Wildlife Service (U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, 2005). The average temperature for water in the Klamath River at Seiad, the northernmost water quality monitoring station in the Karuk ancestral territory, was calculated for August 2002 to be 22.4 degrees Celsius. At the station in Orleans, which is below the confluence with the Salmon River, the average temperature for the same month was 22.9 degrees Celsius, and on the Salmon River, it was 21.8 degrees Celsius. These values are all well above the preferred temperatures for chinook and coho upstream migration. Fall-run chinook prefer temperatures between 10.4 and 19.4 degrees Celsius, and coho prefer 11.8 to 14.6 degrees Celsius but tolerate temperatures from 7.2 to 15.6 degrees Celsius. Lethal temperatures for coho are ones above 25.8 degrees Celsius (Laufle et al., 1986).

Non-Point Pollution

Non-point pollution in the streams and rivers occurs from various sources one of which is acid mine drainage from abandoned mines. Indian Creek, one of the major tributaries to the Klamath River within the ancestral territory, contains 0.027 mg/l arsenic, 101 mg/l iron, 0.15 mg/l nickel, and 0.91 mg/l zinc, originating from the abandoned Grey Eagle Mine. The stream has a pH of 2.8, which is approximately 10,000 times too acidic for salmon. The Grey Eagle Mine is a Super Fund restoration site. Heavy metals from mine runoff are known to be toxic to spring and fall chinook (Allen & Hassler, 1986).

Additional non-point pollution comes from the administration of herbicides on clear-cuts, roadsides, and forest vegetation although there is limited spraying of herbicides in the Salmon River Basin. Non-point pollution is also associated with damming and dam releases, abandoned mills, storage tanks, septic systems, and nutrient loading. Agriculture in the upper basin is a source of non-point pollution in the Klamath Basin as run-off from fields releases sediments, manure, and farm chemicals to the river (Niemi et al., 2001). Niemi et al., (2001) note that further restricting non-point pollution in the upper basin could lead to a decrease in demand for irrigation water.

Nutrient Loading

People in the area of the ancestral territory rarely swim in the Klamath but choose to recreate on its tributaries, such as the Salmon River, due to the presence of algal mats and aquatic vegetation in the main stem Klamath. Populations of benthic macroinvertebrates on the Klamath River are shown to be at similar levels to other rivers

that are moderate to high in algae production. Nitrogen and phosphorus released from logging, herbicide spraying, wastewater discharges, and agricultural run-off increase algal blooms, algal mats, and noxious aquatic plants while decreasing the levels of dissolved oxygen in the river. Low levels of dissolved oxygen inhibit proper development and behavior of salmon and increase susceptibility to disease, predation, and toxic contaminants (Orsi, 1967; Davis, 1975). High pH is also associated with excess nutrients.

High levels of nutrients in Klamath River water make it unsuitable for salmon production and unhealthy for human consumption and bathing (King, 2004). It is worth noting that water quality improves as the Klamath River flows through the Karuk ancestral territory. Dissolved oxygen increases as nitrates and phosphorus become diluted from the clearer waters running in from local tributaries.

Turbidity and Suspended Solids

The steep slopes and unstable upland soils of this area have frequently led to natural disturbances on the Karuk ancestral territory. However, landslides have increased as a result of new road construction as have the negative effects of these slides such as blocked streams, destruction of riparian vegetation, and loss of rearing habitat, cover, and spawning grounds for salmonids. Further, the resulting siltation from landslides does not allow for adequate amounts of dissolved oxygen.

Grazing and agriculture have been identified as major contributors leading to increases in turbidity and suspended solids in rivers (Bash et al., 2001). Niemi et al, (2001) found that increased sediment load was associated with run-off from agriculture in

the upper Klamath Basin. Increased turbidity and unsuitable levels of total suspended solids have been shown to have negative physiological and behavioral effects on coho while also reducing the suitability of coho habitat (Bash et al., 2001).

Flow

Iron Gate Dam, which regulates the flow of water out of the upper Klamath Basin, operates on a standard minimum flow regime that does not consider the flow needs of aquatic resources. Currently, water flow out of Iron Gate Dam is mitigated for controlled release or water at 900,000 acres/feet per year in order to meet the needs of endangered suckers and coho listed under the Endangered Species Act (Niemi et al., 2001). However, release timings and amounts do not account for the needs of all life stages of Klamath River fish (King, 2004). Further, Karuk have testified that dam releases do not incorporate periodic flushings of high water necessary to clear the riverbed of pollutants and sediment build-up (King, 2004). Low flows out of Iron Gate Dam increase water temperature at times when low temperatures are critical to the physiological and behavioral health of salmonids. Overall, unnatural flow regimes contribute to poor water quality.

Water Quality Standards

Of the water quality standards set by Oregon's Department of Environmental Quality, the Klamath River above the California-Oregon border does not meet minimum standards for toxins, chlorophyll, pH, or temperature. Armour (1991) indicated that temperature is most likely the critical factor affecting fish health and survival. Dissolved oxygen levels in the upper Klamath are too low, and there are high concentrations of non-

ionized ammonia present in the water. Non-ionized ammonia has been implicated in fish kills.

Other Contaminants

Other contaminants listed in the report come from agricultural chemical facilities, fertilizer applications, irrigation practices, pesticide applications, landfills, septic tanks, waste piles, waste tanks, material stockpiles, current mining, and mine drainage. Pesticides have been shown to affect the physiological health and behavior of coho salmon while also making the fish more susceptible to predation, disrupting food supply, and altering rearing and spawning habitat (Ewing, 1999).

Present Gold Mining

I think that the Forest Service and the Tribe should have access to getting their fair share out of what they are taking out of the river or the forest. Because they belong to us also and when you see all of these gold miners on the river, and all they leave is piles of dirt, how do we know they are not disturbing the fish eggs now at the mouth of the streams? We had a lot of fish before we had gold miners on the river.

Vera Arwood (Karuk Tribe of California, Department of Natural Resources, 1999)

Suction dredgers are a comparatively recent stressor to the Klamath and Salmon River aquatic ecosystems. Despite concern that the dredges are doing damage to critical spawning and rearing habitat for many species, including salmonids, their popularity is continuing to grow (Izakson, 2004). As discussed in a recent *Los Angeles Times* article (Izakson, 2004), suction dredges are capable of reaching fairly large and often remote stretches of river where powerful suction hoses are capable of excavating holes eight feet wide by five feet deep as they remove gravel and sediment from river bottoms and

deposit them into a sluice box where the gold is settled out. The United States Forest Service declared the Salmon River off-limits to suction dredges until an environmental review is completed, as the dredges might trap young fish or harm spawning habitats. However, dredging still takes place on the north and south forks of the Salmon River (Izakson, 2004).

Suction dredging, which occurs between June and September before the October and November spawning, disrupts the substrate upon which salmonids build their redds.¹³ The decreased redd quality can cause salmon to deposit eggs on the finer gravel that overlays unstable tailings, and eggs can be swept away in a strong current, adding to increased salmon mortality (Harvey & Lisle, 1999).

Ecosystem Health

The health of an ecosystem is determined by the complex interdependence of many factors including vigor, resilience, and organization (the interdependence of species and nutrient cycling). Rapport and Whitford (1999) propose that a healthy ecosystem is one free of ecosystem distress that also retains the capacity both to resist and to rebound from disturbance. Ecologically healthy places can be exploited while remaining stable and productive, with no loss of soils and no widespread effects (Westra et al., 2000). They are resilient and have the ability to re-organize and self-correct after disturbances (Hull & Robertson, 2000). Ecosystems that evolve with natural disturbances, such as flooding or fire, are adapted to recover from even the most severe of these natural events

¹³ Salmon use their tails to move gravel and stones on the riverbed to form protective areas in which to deposit their eggs.

(Rapport & Whitford, 1999). Vigor, a vital component of ecosystem health, is the sum of all trophic exchanges, characterized by the richness of individual transfers, the evenness of these transfers, and the opportunities for these transfers to take place (Westra et al., 2000).

Using the above guidelines to determine the current health of the environmental systems in the Karuk ancestral territory, it appears that the ecosystem is in poor condition. The impacts from human activity above the northeastern boundary of the territory appear to be negatively affecting the health of the system. However, the Salmon River appears to be less impacted than the mid-Klamath River, although it is showing very elevated temperatures. Lack of healthy ecosystem functions in the Klamath River is an important limiting factor in salmonid production on the Salmon River.

The lasting effects of the 1964 flood are an example of how the Klamath River has lost its resilience (Fedor, 2005). Healthy ecosystems can recover from natural disturbances, such as floods (Rapport & Whitford, 1999). However, the fine sediment deposited on the river bottom has not been flushed out due to severely altered flows from dams and reduced water in the river. The vigor of this system can also be questioned when salmon is considered both an indicator and a keystone species. With population dwindling in the Salmon River, the year 2005 saw the lowest numbers of spring-run chinook ever with 97 returning spawners (Salmon River Restoration Council, 2005). It is obvious, from these low population numbers that opportunities for transfers of energy from salmon to other species in the ecosystem have dropped significantly. Aquatic resources of the Karuk Tribe's ancestral territory are in distress.

Cultural Keystone Species

A cultural keystone species is one that plays a fundamental role in the diet, materials, medicine, language, ceremonies, and narratives of native peoples (Garibaldi & Turner, 2004). Salmon can be considered such a species to the Karuk Tribe. During an interview, Karuk religious and spiritual leader Leaf Hillman (December 2004) told the Creation Story of the Karuk Peoples. It is appropriate that this story be passed on in summary as an attempt to explain how the salmon are at the heart of the Karuk culture.

All of the world around the Karuk is descended from the spirits that inhabited the land before the people. It was decided at a point long ago, that these spirits would transform to take the shape of the land that we know today. They became the rocks, trees, bears, grass, salmon, and people. People were given the responsibility to respect and care for the land and all of its inhabitants. Salmon were given the responsibility to feed the people. If the people did not eat the salmon, they were doing them a great harm, and the salmon would not return. Every year at the World Renewal Ceremonies, one priest is chosen to purify himself for ten days so that he can converse with the spirit people. The members of the Tribe then speak to the spirit people through him, reconfirming their relationship to everything that is around them.

It is hard for people outside the culture to truly understand the connection between the salmon, the people, and the culture, but without one, the others cannot exist. Ron Reed (personal interview, 2005), Cultural Biologist for the Karuk Tribe, spoke of this connection during an interview:

I think that back in the 1900s, when the spring run was effectively cut off from the upper basin,... [because of] the 6 dams on the Klamath River main stem, owned by Scottish Power... began a dramatic decline in traditional values within the Karuk tribe. All of a sudden now 70 miles of river with over a hundred village sites [and] 8 runs of salmon that used to run through the system... Each village site associated with the fishery, each fishery having a handful of fishermen. Now today, we're fishing down the Ishi Pishi Falls, one fishery, with

over 3,000 tribal members. It's pretty hard not to point the fingers at certain events, but... the final straw in that camel's back was Iron Gate Dam. The last remaining habitat 8 miles below Copco to Iron Gate was gone, and all the cold streams and all the spawning habitat. That small reach is gone now. That's the run [spring-run chinook] that I used to, as a child, harvest that run before Labor Day. Now we don't even start fishing until after Labor Day. Well, we fish but we don't catch until after Labor Day. So those dams have tremendous impact on the spring salmon... We're the only federally recognized tribe below Iron Gate Dam that does not actively fish for the spring salmon. That's a travesty to the people.

Salmon are a species central to the foundation of the Karuk culture, religion, and livelihood. This fact cannot be overemphasized. It is unknown how the Karuk Tribe would survive without wild stocks of salmon in the Klamath River. Ceremonies would be lost, as would the core of the Karuk tradition, culture, and community. Klamath River salmon populations cannot be replaced in the life of Karuk people.

The poor health of the Klamath River ecosystem is contributing to the decline of the salmon populations on which the Karuk depend. Management decisions and the continued presence of the PacifiCorp dams are harming the Karuk. Changes must be made to benefit the health of the salmon and the people who depend on their sustained existence in the Klamath River.

Concluding Thoughts

The fact that the Karuk Tribe of California successfully managed the Klamath and Salmon River ecosystems for millennia cannot be ignored. Nor can the fact that the replacement and disruption of their traditional management practices with those of the United States Forest Service and the Bureau of Reclamation, along with other national

and state agencies, has severely stressed and negatively altered the health of these systems in potentially irreversible ways. The mismanagement and deterioration of ecosystem health has negatively affected the cultural, spiritual, and physical well-being of the Karuk peoples.

Data gathered from the 2005 Karuk Health and Fish Consumption Survey has proven that members of the Karuk Tribe living on the ancestral territory still rely on subsistence foods, including Klamath River salmon, steelhead, and eel. However, the significance of these food sources in the diet has been declining since the 1960s. It is imperative to understand that denied access is the reason subsistence resources do not currently contribute significantly to the Karuk diet. Though tribal members actively attempt to harvest subsistence resources they are not able to because of regulations or unhealthy resource populations. Between 83 and 90 percent of survey respondents indicated that their needs for fish are not met. Despite the fact that resources are in decline, approximately 78 percent of respondents still consume subsistence foods regularly. For these reasons, it is critical that the Karuk Tribe be involved in all management decisions that affect their resource base and every one of these decisions must reflect the needs of their community.

CHAPTER SIX ECONOMIC ANALYSIS OF THE CURRENT SITUATION WITHIN THE KARUK TRIBE OF CALIFORNIA

The following chapter evaluates the economic costs of the decline in natural resources valuable to the Karuk Tribe for subsistence, cultural, and ceremonial purposes. The beginning of this chapter will attempt to place value estimates on the ecosystem services of the Klamath River. This is done by looking first at the amount people would be willing to pay to protect salmon and then by examining the trade or sale value of the Karuk's traditional salmon fishery. The second half of the chapter considers the cost for Karuk to replace wild-caught Klamath River salmon in their diet with store-bought salmon and gathering fees Tribal members must pay to live a subsistence lifestyle.¹⁴ No attempt has been made to put a price on lost social capital. However, Chapter Seven will discuss social and quality of life issues facing the Karuk Tribe.

The Meaning of "Value"

Agricultural and commercial fishing industries in the Klamath Basin profit from the sale of goods whose production is dependent on the Klamath River's ecosystem services. Thus, in some instances, they have been able to place a monetary value on the provided services. These figures are often calculated from the market value of goods or wages earned or lost. The Klamath River is sacred to the Karuk and most members of the Tribe reject the idea of trying to assign a monetary figure to its value. However, as

¹⁴ See Chapter Seven for a discussion of the decline of fishery-dependent employment opportunities on the Karuk ancestral territory.

conflicts regarding the use of Klamath River water continue, it is useful to explore economic benefits the Karuk Tribe receives from the river while understanding that these figures are meaningless to the Tribe.

To the Karuk, value is a comprehensive term that describes thankfulness, respect, and understanding. In a recent interview, Marge Houston (personal interview, 2005), a member of the Karuk Tribe, discussed how she was raised to value her natural surroundings:

Well, you always have to give thanks for what you take from Mother Earth. Always. Whether it's a medicine root or a basket root. It doesn't matter. Whichever one you get done you give thanks for the bounty, whichever it may be, whether it be a púfich [black tail deer] or a bundle of fern. It doesn't matter. You take from the earth. You respect it by saying thank you.

Salmon and other subsistence foods have numerous and varied values to the Karuk Tribe. Many of these values, such as the intrinsic values of the species, the bequest value to future generations, and cultural and ceremonial values, cannot be assigned monetary figures (Meyer-Zangri Associates, Inc., 1982). Accordingly, this chapter will only assign use values to the Karuk's sources of natural capital.

To assign monetary value to subsistence resources of the Karuk Tribe is to apply "radically different social and economic structures" to those "who do not share [the same] lifestyle and cultural values" (Bawa & Gadgil, 1997, p. 297) and in essence "to constrain Indian nutritional, social, cultural and spiritual values... by a private market

straight-jacket that is not [the Tribe's] choosing" (Meyer-Zangri Associates, Inc., 1982, p. 703). Any attempts to place economic values on natural resources in this chapter will be inadequate and values will be extremely moderate estimates of the true values to the Karuk Tribe.

We really don't believe in sellin' fish. We always used to trade fish for other things that we needed. And the same goes with deer meat or any resource out there. And you know... the amount of spawning habitat [lost] above the dams, automatically there is going to be that much of a reduction in the return populations. So that has a drastic effect on our ability to... if you want to view subsistence as an economy, then it's a huge effect. We're losing months out of the year when we could be eatin' fish or even trading fish with other families that have ... some huckleberries.

William Tripp, Karuk Tribe, Air Quality Coordinator, personal interview, 2005

Willingness-to-Pay

For the purpose of this report "willingness-to-pay" can be defined as the maximum amount of money an individual, or household, is willing to pay for a service (adapted from Hackett, 2001). A report by ECONorthwest (1999) found that residents of the Pacific Northwest (PNW) "are willing to pay \$30 to \$97 per household, per year to protect salmon. Applied over the 3.4 million households in the PNW, these figures indicate a total intrinsic value of preventing salmon extinctions of \$102-330 million per year" (p. 12).

The Cost of Replacing Wild-Caught With Store Bought Salmon

I've heard so many times at different meetings I've been in, well, can't you just go buy your fish? Can't we figure something out? Can't the federal government give you fish and things like that. And the answer is absolutely not. The nutrient value is only one very small piece of the traditional aspect of the Karuk people. It's about the energy you expend going and getting these fish. A lot of these fisheries are associated with ceremonies. It's our inherent right. It's our obligation to get fish – to fish for our ceremonies.

Ron Reed (testimony from Karuk Government to Government Meeting with the Federal Energy Regulatory Commission, 2005)

Norgaard (2004) found that denied access to traditional food sources, including wild salmon, are related to illnesses including diabetes, obesity, heart disease, hypertension, kidney troubles and strokes. As the Tribe is not able to fulfill their needs for subsistence foods from their natural environment, they must purchase food at the store. Jackson (2005) found that, “The average cost for a two-person family to eat healthy foods, based on the prices of foods available at the local grocery store in Orleans, is ~ \$ 150/week or 55% of the income for the week” (p. 10). For some Karuk, such exorbitant costs are prohibitive.

The Karuk Tribe's enrollment now exceeds 3,000 individuals; yet, in 2004, a mere 100 fish were harvested at Ishi Pishi Falls (Pennington, 2004). It would cost one Tribal member \$4,400 a year to continue to eat a traditional diet of salmon if salmon was purchased at the store.¹⁵ This is 33 percent of the median income for Karuk households. A two-person household, with median Tribal income of \$13,530, would spend 65 percent of their annual income on salmon. The overall cost to the Karuk Tribe for each of its

¹⁵ See Appendix D for complete calculations of replacement cost.

members to eat a traditional diet of fish would exceed \$13 million dollars annually.¹⁶

These expenditures would be needed in order to replace a food source that was virtually free when the Klamath River ecosystem was healthy.

These figures do not adequately represent the full cost of salmon purchases, as salmon is not available at local grocery stores. The 2005 Karuk Health and Fish Consumption Survey found that 55.6 percent of respondents shopped at local grocery stores and thus were not able to purchase wild-caught fresh salmon. The nearest store that sells wild-caught fresh salmon is in Arcata, CA, 86 miles from Somes Bar, CA (the cultural center of the ancestral territory). Minimum round-trip travel costs for an individual living on the ancestral territory to buy wild-caught fresh salmon would be \$70.00. Additionally, 44.4 percent of Tribal members living on the Karuk ancestral territory had to travel over 31 miles to the grocery store and of these 31.3 percent traveled over 80 miles to buy their groceries. Travel costs associated with food shopping trips were calculated using the United States General Services Administration (2005) mileage reimbursement value of 40.5 cents/mile (Table 3). Round-trip travel costs for the 31.3 percent of respondents who travel over 80 miles to the grocery store would exceed \$64.00 per trip.

¹⁶ See Appendix D for calculations.

Table 3 Distance traveled to grocery store with associated costs. “Percentage of People” refers to those respondents who traveled particular distances to buy groceries.

Distance traveled (one-way)	Percent of People	Cost One-way (US\$)
0 to 15 miles	45.6	0.405 to 6.08
16 to 30 miles	10	6.48 to 12.15
31 to 60 miles	4.4	12.56 to 24.30
61 to 80 miles	8.9	24.71 to 32.40
Over 80 miles	31.1	Over 32.40

During an interview, Blanche Moore, a member of the Karuk Tribe, discussed store-bought salmon (personal interview, 2005):

Oh, yeah. I’ve seen ‘em sell salmon in stores, in the meat departments, and it’s like seven dollars and something a pound. And a lot of them, like the elders will buy it. You know... not me. I can go without it.

Price and availability deter or prohibit Karuk from buying salmon. When asked to estimate the number of times per year that individuals bought salmon at the store, 86.5 percent of survey respondents stated that they never buy salmon at the store, 11.2 percent said that they buy salmon several times a year or for special occasions and only 2.2 percent said that they buy salmon several times a month (2005 Karuk Health and Fish Consumption Survey). No survey respondent reported buying salmon on a weekly basis.

Some interviewees also reported trading for or buying salmon from the Yurok Tribe. Yet 60 percent of respondents reported that they never trade for or buy salmon from other tribes. Thirty-six percent of respondents trade for or buy salmon from other tribes several times a year or for special occasions and a mere 3.3 percent trade for or buy salmon from other tribes one to three times a month.

This means that in years when Klamath River salmon populations are too low to provide for the Karuk Tribe, at least 60 percent of respondents go without salmon. Consequently, people must rely more heavily on store-bought foods that are often either expensive or less healthful than salmon.

When asked why salmon was not purchased, 58.3 percent of respondents said that they only eat salmon caught by friends or family. Thirty-five percent of respondents said that salmon is too expensive and 44.4 percent of respondents noted that they do not buy salmon because they do not feel good about it. (More than one answer could be chosen.) Thus, cost is shown to be one deterrent, but a greater percentage of survey respondents reported that they simply do not feel good about buying salmon. Interviewees iterated these thoughts. Again, Blanche Moore (personal interview, 2005) discusses:

And as far as, you know, our salmon of course. That's really gone down. It has gone down so bad. We just barely got enough this year, 'cause we do a Tribal Reunion and invite all the Tribal members. And we just, my son... and an elder here caught most of the salmon that was used for our Tribal Reunion and it was just, we barely had enough. There were, I'll say ten years ago, we just had so much salmon. It's just really going down each year. You know. And there was times that the salmon was so bad that we had to buy it, commercially, and that's just not us. That's not our way. We don't believe in it. Or I don't believe in it anyhow.

At a focus group of Karuk Tribal members living in Yreka, California, the topic of purchasing salmon was raised. There is a large population of Karuk Tribal members living in Yreka, as there are Karuk housing and health facilities located in the town. Yreka is located outside of the ancestral territory so individuals living there do not have direct access to the Karuk fisheries. When asked about buying salmon, people responded

that it is too expensive and it does not taste as good as salmon caught fresh from the river.

The women present also discussed that there was something about store-bought salmon that was not right:

Woman One: It's pretty expensive.

Robert Grant: I remember one time her uncle, we traveled quite a bit, and... we were in a Safeway store and he come from down river when they had a lot of fish and he enjoyed fish. And he seen this piece of fish and he told me, he says, 'Let's buy that fish.' It was only a piece about that ... It's only \$2.49.' So I says,... 'No, that's \$2.49/lb.' He says, 'Oh, I couldn't even digest it if I had to pay that much.' Yeah, that was a long time ago.

Woman One: There's something about it. I just don't like to buy fish. (agreement from others) I won't buy it. And I don't know... To me it looks different. It's white. (laughter) It has no color. When you get one out of Ishi Pishi... (another woman interjects, 'It's beautiful') ...it's pink. There is a difference.

Even though these tribal members were living away from the ancestral territory and traditional fisheries, salmon from Ishi Pishi Falls were shown great respect and reverence.

This highlights the sacredness of consumption of salmon from the Klamath River.

Consumption of salmon is about connection to place, community, and culture. During an interview with Ron Reed (personal interview, 2005), Cultural Biologist for the Karuk Tribe, he discussed that many of Karuk ceremonies revolve around the harvest and consumption of salmon and he described to us the effects of not having access to these and other subsistence foods:

We caught two fish at Ishi Pishi Falls a day before, and so we went and offered those to the ceremony. So that was two fish. And I think the ceremonial leader also went down and got fish from down the Yuroks to supplement the traditional catch. So then we go to Kat'a'min, and I think we was only able to get three or four fish up at that ceremony. So you can see there's a tremendous impact on

their ceremony... We should have abundance in every traditional food there. We shouldn't have go out to buy and go to the store. We should have things the way it used to be. People would go out and gather acorns. People would go out and do things specifically. That's ceremony... So I think that's one of the biggest impacts you see today is the traditional foods at our ceremonies. Again, the denied access, the availability of these foods to us as a people.

In the past, every part of Karuk life was centered around the gathering of subsistence foods, which is exemplified by the fact that villages were sited at the best fishing spots along the river. Further evidence to this end was provided by the 2005 Karuk Health and Fish Consumption Survey. Results showed that 46.4 percent of respondents got exercise as teenagers fishing for salmon and 51.2 got exercise packing salmon as teenagers.¹⁷

The high prices of salmon at grocery stores present a financial barrier to Karuk Tribal members who would buy salmon to replace the lost resource of wild stocks of salmon in the Klamath River. Yet, there is also a cultural barrier present, reflected in the fact that many survey respondents and interviewees stated, "they just don't feel right about buying salmon."

Salmon is a main staple of the Karuk diet and salmon fishing is the foundation of Karuk ceremonies, culture, and lifestyle. People talk of fishing spots as hubs of the community, as intergenerational meeting spots where stories and traditions are passed on from elders to children as they sit and watch men fishing. What is lost with the decline in

¹⁷ Historically, Karuk women were not allowed to fish or pack salmon. However, female interviewees and survey respondents indicated that though they are still not allowed to fish, as children, they were allowed to pack salmon.

the Klamath River fisheries is not just a food source that can be replaced with the right amount of money. No amount of money can replace the cultural and spiritual void that is left when the fish do not run.

When the salmon are gone, the people are gone. There won't be any more. Maybe that'll be a good thing. They will all just melt into the mainstream society. Not as long as I'm alive. I hope the hell not as long as my kids are alive. My grandfather was a medicine man. His name was Francis Davis. He told me, 'Let it go. Too much has been lost already.' I'm sorry, papa, but I can't let it go. I won't let it go.

David Arwood, Karuk Tribe, personal interview, 2005

Costs of Licenses, Fees, and Fines

I'd like to see all Native Americans, I don't care what age, what group, but all Native Americans who have concerns in the National Forests... I'd like to see them have access. None of this God 'dern permit stuff. How can we educate our people when we have to keep going to get a permit.

Charlie Thom (testimony from Karuk Department of Natural Resources, 1999)

The federal government has converted the majority of Karuk gathering grounds to National Forest land. In order to hunt, fish (outside of Ishi Pishi Falls), and gather traditional foods, Karuk must follow regulations of the United States Forest Service and California Fish and Game. The high cost of gathering fees and the heavy fines for hunting and fishing offenses dissuade many Karuk from gathering traditional foods.¹⁸

¹⁸ See Chapter Four of this report for more statistics on the decrease in gathering due to regulations.

Mushrooms are gathered as part of the subsistence diet. Seventy-three percent of survey respondents indicated that they got exercise as teenagers or children gathering berries or mushrooms. However, many interviewees and survey respondents reported that they no longer gather mushrooms because of heavy fees. One survey respondent wrote that “[I] don’t want to have to pay to look for mushrooms I usually don’t find.”

The federal government regulates gathering of mushrooms in the National Forest: “Permits are valid for both commercial and personal gathering of mushrooms including but not limited to, Morels, Boletus, Shaggy Mane and Puff Balls” (U.S. Department of Agriculture, Forest Service, 2005a). Table 4 gives the costs of mushroom gathering permits in 2005.

Table 4 Klamath National Forest mushroom harvesting permit fees

Klamath Nation Forest Mushroom Harvesting Permits	
10-day, non-consecutive permit	\$20
30-day consecutive permit	\$50
Seasonal permit	\$100

In an interview, Marge Houston, member of the Karuk Tribe, discussed her feelings about mushroom harvesting.

Well, the mushrooms, unfortunately they put a price on ‘em... The regulations from Forest Service are getting ridiculous. I don’t see why I need a permit to go out there and gather my basket material or food that my people have been doing here forever... It’s against my belief.

Marge Houston, Karuk Tribe, personal interview, 2005

Many individuals indicated that in addition to mushrooms, they are also no longer able to gather enough wood to warm their homes because of the economic cost or regulations. Firewood can be gathered from National Forest land for \$10 a cord:

Permits can be purchased for no less than two cords (\$20) and no more than ten cords (\$100) for the total of one year. Firewood can be gathered in designated areas of national forest. If there are no areas designated, firewood can be gathered anywhere but on private property, in active timber sales areas, or in areas restricted by road, fire and other closures. Only dead and down trees can be cut for firewood. You can cut any dead down tree for firewood with the exception of cedar. Cedar is marketable timber for fences and shakes but is not suitable for firewood.

(U.S. Department of Agriculture, Forest Service, 2005b)

Interviewees and survey respondents stated that they had stopped gathering firewood because fees are too high, regulations too strict, and economic consequences for offenses too steep. The following responses were given to a survey question asking why gathering had stopped: “Can’t afford wood permit.” “Continuously worrying about harassment, jail, fines, loss of chainsaw, etc...” “Can’t afford to lose my chainsaw.”

Additional survey responses to the question asking why gathering of firewood, basketry materials, and cultural plants and animals had stopped included: “Avoid imperial complications.” “Cannot afford hassles with the law.” “Afraid of encounters. Who wants to go to court?”

Many interviewees and respondents to the 2005 Karuk Health and Fish Consumption Survey indicated that hunting still provides food (Table 5). Deer is the most heavily relied upon mammal, but many Karuk stressed that the hunting season for deer is not long enough to adequately provide food for the year.

Table 5 Percent of respondents whose households hunt for food

Animal Hunted	Percent of households that hunt for food
Deer	66.7
Elk	21.1
Bear	16.7
Squirrel	13.3
Birds	27.8
Other	11.1

At least 67 percent of households still rely on upslope subsistence resources for food and at least 59 percent still rely on riverine resources. However, the fees for licenses are expensive and the economic consequences for offenses exorbitant. It would cost an adult member of the Karuk Tribe a total of \$706 annually (in 2005 fees) to gather limited amounts of salmon, steelhead, trout, abalone, bear, elk, deer, small game birds and mammals, mushrooms and 10 cords of firewood (Tables 6 and 7).¹⁹ Note that the limits defined by these permit regulations would not adequately provide means for subsistence.

¹⁹ California Duck Stamp, Upland Game Bird Stamp, and Federal Duck Stamp prices are not included in this figure but would add an additional \$35.00 to the total cost.

Table 6 2005 Hunting and fishing permit fees

Permit Type	2005 Annual Fee (in US Dollars)
Resident Sport Fishing License	33.35
Abalone Permit Report Card	16.00
Salmon Punch Card	11.60
Steelhead Report Card	5.25
Resident Hunting License	33.35
Junior Hunting License	8.65
Hunter Education Stamp	3.15
Resident Bear Tag	32.30
Duplicate Bear Tag	7.25
Bobcat Hunting Tags	11.50
Elk Drawing Application	7.25
Elk Tag, Resident Only	303.25
First-Deer Tag Application, Resident	22.05
Second-Deer Tag Application, Resident	27.55
Duplicate/Exchange Deer Tag	7.25

(California Department of Fish and Game, 2005a, b, d)

Lifetime licenses for sport fishing and hunting are available from California Department of Fish and Game. Sport Salmon Punch Cards and Steelhead Report Cards are provided annually with the Sport Fishing Lifetime License (California Department of Fish and Game, 2005c). Limited income could prove prohibitive for purchase of lifetime licenses.

Table 7 2005 Lifetime license fees

Lifetime Licenses		
Age	Sport Fishing License	Hunting License
9 years of age or younger	370.5	370.50
10 to 39 years of age	609	609.00
40 to 61 years of age	548	548.00
62 years of age or older	370.5	370.50

(California Department of Fish and Game, 2005c)

Free fishing licenses are available for:

Any American Indian or lineal descendant who is a resident of the State and whose total annual income does not exceed \$9,310.00 for the head of the household, plus \$3,180 for each additional family member living with them. Certification by the Bureau of Indian Affairs (B.I.A.) or proof of being on a tribal registry is required. Verification of income on Form FG371 is required annually. (California Department of Fish and Game, 2005e)

However, no members of the Karuk Tribe who were interviewed or surveyed made reference to the availability of free licenses. Many individuals indicated that the cost of hunting licenses was too expensive and that seasons were not long enough to provide adequate food supplies. Many individuals noted that adequate food for subsistence purposes could not be gathered under California Department of Fish and Game and United States Forest Service regulations.

When survey respondents who stated that they no longer hunted or fished for food due to regulations or negative encounters with agency employees were asked for further explanation as to why gathering had stopped, the following responses were given: “Avoid complications, stay home.” “Can’t afford to purchase permits/licenses, so keeps us [from] hunting/fishing.” “I will not be bullied around.” “I never hunt or fish anymore, it cost too much.” “Over-regulated – everything against the law.” “Need license to hunt or fish.” “Afraid of being caught.” “Hunting license costs too much, we stopped getting fishing license, too much money.”

There are also high fines and jail terms associated with trying to live a subsistence lifestyle.²⁰ Base fees and Total bails are listed in Tables 8 and 9. "M" stands for misdemeanor. The maximum penalty for a misdemeanor, unless otherwise noted, is six months in jail or a fine of \$1,000 or both. "I" stand for infraction. Infractions are punishable by fines but not by imprisonment. The Total Bail is the combined cost of the base fine, added penalties, and a surcharge. The total bail is that suggested by the Judicial Council of California. The adoption of these penalties is not compulsory by the deciding courts.

²⁰ See Appendix E for forestry offenses related to traditional management of upslope resources using controlled burns.

Table 8 Hunting Offenses

Section	Offense	M or I	Base Fine	Total Bail
Hunting				
2012	Failure to Show License, Equipment or Game	M	\$100	\$340
2016	Trespass while Hunting	M	\$200	\$680
2080	Importing/Taking/Possessing Any Rare or Endangered Animal	M	\$300	\$1,020
3000	Hunting during Closed Hours	M	\$200	\$680
3081	Possession of Unmarked Game Meat	M	\$150	\$510
3511 (a)	Taking or Possessing Any Fully Protected Bird	M	\$500	\$1,700
3800	Taking of One Nongame Bird	M	\$400	\$1,360
	Plus for each additional bird		\$100	\$340
	A fine of not more than \$5,000 except in accordance with sections 12001 and 12010			
4330	No Deer License Tag	M	\$150	\$510
4336	Untagged Deer	M	\$150	\$510
4753	Bear Tag License Violation	M	\$150	\$510
300	Pheasants - Season and Area	M	\$200	\$680
	Plus for each over-limit bird		\$20	\$68
307	Tree Squirrels - Season and Area	M	\$200	\$680
	Plus for each over-limit animal		\$20	\$68
308	Rabbits - Season and Area	M	\$200	\$680
	Plus for each over-limit animal		\$20	\$68
310	Shooting Hours - Small Game Animals	M	\$200	\$680
310.5	Shooting Hours - Game Birds	M	\$200	\$680
352	Shooting Hours - Big Game	M	\$200	\$680
360 (a,b)	Deer - Season and Area	M	\$500	\$1,700
360 (c)	Plus for each over-limit deer		\$200	\$680
365 (a,b)	Bear - Season and Area	M	\$500	\$1,700
	Plus for each over-limit bear		\$250	\$850
700 (b)	Hunting License in Possession	M	\$200	\$680
	Without proof of correction		\$300	\$1,020

(California Court of Rules, 2004)

Table 9 Fishing Offenses

Section	Offense	M or I	Base Fine	Total Bail
Fishing				
5508	Fish of Indeterminate Size	M	\$250	\$850
	Base fine of not less than \$250			
	Plus for each additional fish		\$20	\$68
5515	Taking or Possessing a Fully Protected Fish	M	\$500	\$1,700
7121	Unlawful Sale or Purchase of Fish	M	\$2,000	\$6,800
	Sport Fishing			
7145	Fishing without a License	I	\$100	\$340
	Infraction punishable by not less than \$100 or more than \$1000			
	With Proof of Valid License to Court		\$25	\$96
1.17	Excess of Bag Limit - Fish	I	\$100	\$340
	Plus for each over-limit fish	I	\$20	\$68
	Excess of Bag Limit - Fish	M	\$250	\$780
	Plus for each over-limit fish	M	\$20	\$68
	Infraction punishable by not less than \$100 or more than \$1000			
1.62	Undersize Fish	M	\$250	\$850
	Plus for each over-limit fish		\$20	\$68
700(a)	Display of Fishing Licenses	M	\$200	\$680
2	Fishing Methods - With two poles	I	\$100	\$340
	Fishing Methods - With net	I	\$150	\$910
	Fishing Methods - With two poles	M	\$200	\$680
	Fishing Methods - With net	M	\$300	\$1,020
2.1	Fishing Methods - With hooks	I	\$100	\$340
	Fishing Methods - With hooks	M	\$200	\$680

(California Court of Rules, 2004)

Gathering of fish and game has decreased in many households due to the potential for fines or arrest. As one survey respondent stated, individuals “have to be selective about when-where-how you hunt, fish, [and] gather or the economic consequences can be devastating to [your] entire family if arrested.” Other reasons that survey respondents noted that they had stopped hunting and fishing included: “For fear of being imprisoned.” “We are limited but find ways.” “Unable to pay fines.” “Why? Who

wants to go to court or worst [sic] jail.” “We can’t afford to get arrested, have to be careful about hunting.” “They don’t recognize our rights and I don’t want to spend my life in jail.”

The Karuk Tribe is being denied the right to gather subsistence foods from the ancestral territory on the grounds that it has no reservation. However, Congress never abrogated nor did the Karuk ever cede their aboriginal hunting and fishing rights. Yet in order to hunt or fish (in places other than Ishi Pishi Falls) the Karuk must obtain licenses and follow state and federal regulations on season and harvest limits. The expenses associated with these licenses prohibit many Karuk from gathering subsistence foods and, as many interviewees reiterated, the amount of game that regulations allow them to harvest is minimal and would not support a subsistence diet.

Concluding Thoughts

Salmon, lamprey, and other subsistence foods were intrinsically valuable to the Karuk Tribe. It is impossible to place a monetary value on resources that were vital to the culture and ceremony of the Tribe. These resources physically sustained the Karuk for countless generations over thousands of years. Many Karuk would find the attempt to place a dollar value on these resources offensive. Thus stated, any dollar values in this report are vastly underestimated as they are not inclusive of the true value of the resources to the Tribe.

What can be deduced from this section is that the loss of access to subsistence resources is a financial burden to the Karuk Tribe. Fish and up-slope plants and animals provide a relatively free source of food for the Karuk people who are suffering economically. Resources have been depleted and those still existing are highly regulated. Fees for gathering are financial barriers to many Karuk, while regulations do not allow for adequate subsistence harvesting. The cost of replacing these food items with store-bought foods is financially harmful to the Karuk Tribe.

CHAPTER SEVEN
SOCIAL AND DEMOGRAPHIC ANALYSIS OF THE
CURRENT SITUATION WITHIN THE
KARUK TRIBE OF CALIFORNIA

Kevin Gover, Assistant Secretary-Indian Affairs Department of the Interior made the following comments at the ceremony acknowledging the 175th Anniversary of the Establishment of the Bureau of Indian Affairs, September 8, 2000:

This agency forbade the speaking of Indian languages, prohibited the conduct of traditional religious activities, outlawed traditional government, and made Indian people ashamed of who they were. *Worst of all, the Bureau of Indian Affairs committed these acts against the children entrusted to its boarding schools, brutalizing them emotionally, psychologically, physically, and spiritually.* Even in this era of self-determination, when the Bureau of Indian Affairs is at long last serving as an advocate for Indian people in an atmosphere of mutual respect, the legacy of these misdeeds haunts us. The trauma of shame, fear and anger has passed from one generation to the next, and manifests itself in the rampant alcoholism, drug abuse, and domestic violence that plague Indian country. Many of our people live lives of unrelenting tragedy as Indian families suffer the ruin of lives by alcoholism, suicides made of shame and despair, and violent death at the hands of one another. So many of the maladies suffered today in Indian country result from the failures of this agency. Poverty, ignorance, and disease have been the product of this agency's work.

(Keohane, 2005)

Nationally, the poverty rate for American Indians is 25.9 percent, more than twice the 12 percent national average across all races (U.S. Census, 2000). Yet the poverty rate for the Karuk Tribe exceeds 80 percent. As part of the relicensing process for the PacifiCorp dams, the company initiated a socioeconomic study of communities that would be affected by Project changes. This study found that Indian populations living within a

five-mile buffer of the Klamath River had higher poverty rates than communities outside the buffer (PacifiCorp, 2004). The following chapter opens with a summary of PacifiCorp's rudimentary study, and then augments this information with demographic statistics compiled by the Karuk Tribe of California and the United States Census Bureau.

Demographic Information

PacifiCorp's Socioeconomic Resources Study

In accord with the relicensing requirements of the Klamath dams, PacifiCorp completed a small-scale study of the socioeconomic impacts of potential Project changes to communities within 5- and 50-mile distances of the Klamath River with the assumption that those communities closest to the river could absorb a disproportionate share of Project impacts (PacifiCorp, 2004). The report found that most communities within 5-miles of the river had higher unemployment rates and lower median household and per capita incomes than the county and state levels. Orleans, Somes Bar, and Happy Camp (within the Karuk ancestral territory) all had lower-than-county ratios of owner-occupied housing units. Orleans and Somes Bar had the second and third highest rates of substandard housing units with 43 percent and 24.8 percent respectively. Happy Camp, with nine percent substandard housing units, was still above the county average. The above data is based on people of all races living within the communities but further information will be given on Karuk Tribal members specifically in the following sections.

Of Indian communities within the Project boundaries, the report noted:

The per capita income of the American Indian population in each of the six counties is significantly lower (about 50 percent lower) than that observed for the entire population in each of the six counties. In addition, the proportion of low-income American Indians is higher in the 5-mile buffer area than for the general population in all counties except for Curry County. The communities within the 5-mile buffer area are characterized by pockets of American Indians with incomes below poverty level. With lower personal income, higher poverty rates, higher unemployment rates, and greater reliance on the Klamath River for their livelihood, communities within the 5-mile buffer have a keen interest in how changes in the current Project and PM&E measures may affect their livelihood and way of life.

(PacifiCorp, 2004, p. 2.136)

PacifiCorp's study highlights that Indian communities in the Klamath Basin living within a five-mile buffer of the river, have disproportionately higher rates of poverty than other communities in the basin. The report recognizes that the livelihoods of communities within the five-mile buffer are affected by changes in the Project but fails to explore the source of poverty or how poverty is currently affecting residents' well-being. Further, the study looks merely at existing conditions and does not discuss change over time. Tribes along the Klamath River were once wealthy due in a large part to the runs of anadromous fish in the River. Over time, however, fish populations have declined and congruently so has the quality of life for these Tribes.

Demographic and Housing Data from the Karuk Tribe's Enrollment and Housing Offices

The following information was obtained by personal visits to the Karuk Tribal Offices in Happy Camp, California. All information, except that on housing, was obtained from the Karuk Tribal Census Office, which is continuously collecting census

data on enrolled Karuk tribal members. The Karuk Service Area includes all of Siskiyou County and Orleans.

Households that are impoverished are often not able to save money, as they must use all that they make to fill their immediate needs (Sachs et al., 2004). As a result, people living in poverty often live in substandard housing. Almost 14 percent of Indian families (all tribes) living in Humboldt and Siskiyou Counties live in substandard housing or over-crowded conditions, with 537 families on the Karuk Tribe Housing Authority's waiting list for low-rent housing (Karuk Tribe of California, 2004). This tells us that Indian communities within the Klamath Basin and the Karuk in particular, do not have the money to obtain adequate housing and this is not likely to change so long as high rates of poverty persist.

Education summary

Higher levels of education have been linked to reductions in poverty, hunger, and child mortality, lower fertility rates, and better nutritional management (Sachs et al., 2004). Improved education is also associated with increased employment opportunities, and greater economic growth per capita (Sachs et al., 2004). In 1993, male workers between the ages of 25 and 34 with college degrees were earning about 70 percent more over their lifetimes than those who only had high school diplomas (Niemi et al., 2001; Dadres & Ginther, 2001).

While the High School graduation rate for the Karuk Tribe is 74.5 percent, only 34 percent of adults surveyed had attended a college or university, with only 49 percent

of those graduating (Karuk Tribe of California, 2005d). The national High School graduation rate is 80.4 percent with 52 percent of the population attending college, 22 percent attaining a bachelors or associates degree, and another 9 percent a graduate or professional degree (U.S. Census, 2000). Two percent of surveyed Karuk adults had attended a business school with 68 percent having graduated. Six percent of adults surveyed had attended vocational school with 78 percent graduating.

Of those that attended college or university, only seven percent received funding assistance from the government and less than six percent received funding assistance from their college or university. Thirteen percent received funding assistance to attend business school and seven percent funding for vocational school. Results from the Karuk Tribe of California Community Services and Development Needs Assessment Survey for the Happy Camp Area showed that 45 percent of respondents stated that financial reasons were the greatest barrier to furthering their education while 26 percent listed distance to educational institutions as the greatest barrier (Karuk Tribe of California, 2005b).

Approximately 33 percent of Karuk Tribal members have completed education beyond high school with the main obstacle being financial reasons. Improved education is shown to be one of the best means to raise per capita economic growth (Sachs et al., 2004). Both educational attainment and alleviation of poverty enhance nutrition and health, and on a larger scale, increase human capital within communities.

Employment

Slightly more than half of all Tribal members are currently employed, with 42 percent either employed part-time, seasonally, or not employed (Table 10) (Karuk Tribe of California, 2005e). These statistics are for *all* Karuk Tribal members, not only those living in the Karuk Service Area.

Table 10 2004 Karuk employment pattern for respondents over the age of 18 who were not retired

Employment	Percent of population
Full-time	53.2
Self-employed	4.9
Part-time	8.4
Seasonal	3.5
Not employed	30

Tribal members over the age of 18 who were not employed and not retired were asked to explain the reason behind their employment status; some respondents identified more than one specific reason (Table 11). Only 10 percent reported that they were not working because they had no desire to do so, 26 percent had a disability or handicap, 19 percent had dependent family members thus could not work, and another 19 percent stated that there was no work available. Four percent of total surveyed households receive unemployment benefits.

Table 11 Reasons Karuk respondents over the age of 18 and not retired were not employed

Reason not employed	% of respondents
Disability or handicap	26.3
Dependent family members	19.1
No work was available	19.0
No desire	10.4
Other areas	9.6
Seasonal lay-off (temporary)	4.4
No reliable transportation	1.5
Discouraged after extensive search	1.6

The unemployment rate jumps to 53 percent in the area of the ancestral territory. Of Tribal members living in the Karuk Service Area, which includes all of Siskiyou County as well as Orleans, CA, and available for work, 21 percent are employed, but still living below the poverty line, and 53 percent are unemployed (U.S. Department of the Interior, Bureau of Indian Affairs, 2004).

These statistics illustrate the scarcity of employment opportunities on and around the ancestral territory. For the entire Tribe, including those living away from the ancestral territory, 30 percent of individuals are not employed. However, over half of adults available for employment and living in the Karuk Service Area, which includes all of the major communities of the ancestral territory, are unemployed. In that same population over 20 percent of individuals are employed but still living below poverty level. In total, over 70 percent of the population living in the service area is under-employed.

Unemployment and lower levels of education are explicitly linked to poverty, food insecurity, hunger, poor nutrition, and poorer wages. Any action by federal or state governments or corporations that effectively reinforces the Karuk's state of poverty must be identified as such. As will be shown later in this chapter, job opportunities on the Klamath River have decreased with the decline of river fisheries. Thus, any action that exacerbates the already poor health of the Klamath River, including the continued presence of the PacifiCorp dams, must be amended.

Income and Poverty

I went to the college and played basketball a couple years at a community college, went to Chico State for a year, and I found out that I didn't really fit into mainstream society. Everything I wanted to get away from, which is the river, which is my people, which is my family, which is a lot [of] different things that I remember that I associated with poverty... Even though I wasn't studying anything in particular... I wanted to get away from this environment because there was too much pain associated with the environment of growing up and seeing the atrocities that happened in the modern-day world. Atrocities happening. It goes with poverty. It's associated with poverty, something we dealt with.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

The Karuk Tribe's Enrollment Office maintains up-to-date demographic information on all Tribal members. This information, supported by United States Census Bureau data, reveals the Tribe's high level of poverty. Norgaard (2004) found that 80 to 85 percent of all Karuk households lived below the poverty line of \$18,850 in 2004. Of the Karuk households living in Siskiyou County, 88 to 92 percent were living below the poverty line (Norgaard, 2004).

The poverty line for a family of four in 2005 was \$19,350 (U.S. Department of Health and Human Services, 2005). In 2005, according to data from the Karuk Tribal Enrollment Office, the mean household income for the Karuk Tribe was \$13,530 (Karuk Tribe of California, 2005c). Census Office employees indicated that this figure is probably high as a few Karuk outside of the Service Area have very high incomes, and many people with extremely low incomes are not comfortable reporting; 41.4 percent of the households did not respond to the question on income. Table 12 uses the information available from the Tribal Enrollment Office to show the income distribution of all Karuk households.

Table 12 2005 Karuk income distribution

Percent of households	Annual income range
18.8	>\$13,530
3.3	\$10,959 - \$13,530
6.4	\$6,900 - \$10,958
6.4	\$4,149 - \$6,899
23.7	\$0 - \$4,148
41.4	Unavailable

Table 13 below gives the average per capita income for areas with large populations of Karuk people (U.S. Census, 2000). Per capita incomes are given for both “white only” and “American Indian and Alaska Native” populations. Although these figures are not exclusive for Karuk, they are indicative of the situation of the Tribe. The 2005 poverty line for household comprising of one person is \$9,570 (U.S. Department of Health and Human Services, 2005).

Table 13 Per capita incomes by area

Area	Per Capita (white)	Per Capita (A.I.)
Hoopa	\$14,505	*\$9,221
Orleans	\$14,447	\$11,113
Somes Bar	\$12,414	*\$6,215
Forks of Salmon	\$18,422	\$11,121
Happy Camp	\$15,546	\$9,683
Yreka	\$19,987	*\$6,405

Per capita incomes less than the poverty line are indicated by an (*).

Thirty percent of children ages zero to five have head of households who are divorced, single, separated or widowed. Forty-nine percent of children ages zero to five live in households with incomes below the Tribe's median income of \$13,530. This means that at least 49 percent of children ages zero to five are living in households with incomes well below the poverty line (Karuk Tribe of California, 2005a). Children living in conditions of poverty are likely to suffer from high levels of stress and poor nutrition (Sinha, 1976), both of which can affect school performance and psychological and physiological well-being (Sachs et al., 2004).

Conditions of poverty can be considered as the "relative deprivation from social and economic norms" (Sinha, 1976, p. 171; Meyer-Zangri Associates, Inc., 1982). Stress results from persistent conditions of need and lack of control over one's environment. This may behaviorally manifest in social withdrawal, passivity, alcohol and drug use, theft, assault, homicide and suicide (Meyer-Zangri Associates, Inc., 1982).

Fifteen percent of respondents to the 2005 Karuk Health and Fish Consumption Survey reported that they had a problem with alcoholism while 67 percent reported a

family history of the disease. Moreover, 18 percent of survey respondents reported that their father had died of alcoholism, 7 percent their mother, 8 percent their grandfather on their mother's side, 6 percent their grandfather on their father's side, and 7 percent their grandmother on their father's side.²¹ Carrie Davis (personal interview, 2005), member of the Karuk Tribe, described alcoholism in her family in an interview, "But with my grandpa and my aunts and uncles, they were mostly alcoholics. A lot of them died because of that in their sixties. I think it was mostly alcohol-related."

Poverty and low socioeconomic status are associated with "lower life expectancy, higher overall mortality rates, [and] higher rates of infant and perinatal mortality" (Link & Phelan, 1995, p. 81). Poverty is associated with lower levels of education and poor nutrition (Sachs et al., 2004). Improved nutrition for infants and children increases cognitive development, school attendance, and learning outcomes (Sachs et al., 2004). The UN Millennium Project (Sachs et al., 2004) found that better health effectively raises "the level and growth rate of income" (p. 199).

Employment opportunity, education, and nutrition are key components of the cycle of poverty. With healthy fish runs on the Klamath River and increased access to traditional subsistence gathering grounds up-slope, the cycle of poverty that the Karuk are facing can begin to be broken. Increased access to nutritious food will enhance health. Children's school attendance and cognitive development will rise. The virtually "free" sources of nutritious foods can alleviate some of the dependence on store-bought foods increasing people's financial capital. Control over the local environment will

²¹ On average, 60 percent of survey respondents answered the questions regarding death of family members as a result of alcoholism.

decrease personal stress and increase social capital. Subsistence foods enrich tribal life and culture and help to overcome socioeconomic deprivation. During an interview, Susan Gehr (personal interview, 2005), Karuk Tribe, Language Program Director, talked about need:

You were talking about work before. It's hard to try to have so many needs... you know we've had so many things taken away that there's so much that people lack. And sometimes it feels like it's infinite. A person can work twenty-four hours a day, seven days a week and still feel like they are incredibly behind. And it feels like your head will explode because people need so many different things just to get back...

Health

High levels of disease and poor health influence both social and economic well-being. Jenny Jackson, a Karuk nutritionist who works at Potowat Health Village in Arcata, CA and Dr. Kari Norgaard, PhD, have both conducted extensive research on the effects of altered diet on the health of the Karuk peoples.

It's like alcoholism, all relates back to where your system hasn't evolved having to cope with it. That's why we have such a high rate of diabetes or alcoholism. Our bodies haven't changed, it takes a long while for it to reach that point, to get accustomed to the food, all the high sugar content, the high starch. We never had that. We ate deer meat. We didn't have all that fat content and those chemicals... I tell our doctor, our main problem is we need to get these people on some sort of a diet. It's hard for them to understand from a cultural point of view, because they were never brought up with it. I mean, I lived it, and it's hard for me to explain what's what. I always knew I was Indian, and never knew any other. If you know what you are, who you are, what you are all about, you don't have those problems.

Alvis Johnson (testimony from Karuk Department of Natural Resources, 1999)

Jackson (2005) notes that American Indians have disproportionately higher rates of nutrition-related health problems as compared to the national average. The rate of obesity among the Karuk is 39 percent (this estimate is not based on all tribal members and the actual rate is suspected to be higher) as compared to a national average of 23 percent (Jackson, 2005). Norgaard (2004) found that the rate of diabetes in the Karuk Tribe is two times that of the United States national average. The estimated cost for the treatment of diabetes amounts to about \$47,240 per patient over a thirty-year period (Norgaard, 2004).

Jackson (2005) asserts, “Especially for the Karuk, one of the most influential factors is the dramatic change in dietary practices stemming from denied access to traditional foods as a result of genocide and forced assimilation and depletion of resources by non-Indian groups” (p. 3). Norgaard (2004) estimated that pre-contact, the Karuk consumed approximately 450 lbs. of fish per year per person, about 1.2 lbs. per day per person; the current annual consumption rate is less than 5 lbs. per person. Pre-contact, salmon provided up to 50 percent of energy and total protein in the Karuk diet (Norgaard, 2004). Government commodities and supplemental food programs consisting of highly processed and refined foods and high-fat meats have replaced salmon and other traditional foods as staples in the Karuk diet (Jackson, 2005). Type II diabetes, hypertension, heart disease, kidney trouble, strokes, decreased life expectancy, increased infant mortality, and increased spontaneous abortions and premature births have all been associated with diabetes, altered diet, and poor nutrition (Norgaard, 2004). Results of the 2005 Karuk Health and Fish Consumption Survey show high rates of these and other diet

related diseases in Karuk peoples living in the ancestral territory (Table 14). The resulting social and economic effects have proven devastating to the Tribe (Norgaard, 2004; Jackson, 2005). Please see Norgaard and Jackson's reports for further information on this subject.

Table 14 Disease rates in individuals and families (From The Karuk Health and Fish Consumption Survey)

Disease	Percent present in respondents	Percent present in respondents' families
High blood pressure	45.8	83.3
Hypertension	26.9	50
Diabetes	23.8	75
Obesity/Overweight	50	61.6
Heart Condition	17.3	62.3
Cancer	4	53.1
Alcoholism	14.5	67.1

And of course they made their own flours and their own breads. But all the meat was taken off the mountains. Therefore, no steroids. No artificial food. They... fed themselves. So those people were healthy. They didn't have the heart problem because... the fish was available. I can remember as a child when we wanted one we went to the creek and speared a salmon or a steelhead and we had fresh fish for a couple days... But you can't do that anymore. For one thing, they're not there. It's sad.

Marge Houston, Karuk Tribe, personal interview, 2005

The high rate of diabetes and other diet related diseases is reducing the average life span for tribal people. We talked to many individuals who spoke of grandparents who had lived healthily for over 100 years. Anecdotal data suggests that the average life expectancy for Karuk Tribal member is currently between 60 and 70 years. As elders are dying at younger ages, children are not given the opportunity to learn from the experiences and stories of elders. Opportunities are lost to pass knowledge along to the

future generations. Elders are essential members of the community and of the family.

When elders pass too early there is a loss of knowledge and tradition, deterioration of community and family bonds, and a decrease in social capital. David Arwood (2005) and Blanche Moore (2005) discuss their personal experiences:

I don't know as much about food as I probably should. The most of what I should have known was lost when my great-grandmother died. I have tried to find out a lot of things about it. I had a difficult year last year. My mom passed away. My aunt, my other aunt, my uncle... So I went out on the point one time down to the Ti Bar. We [the family] had a little place where we sit and overlook the road and the place down below it and everything. I went out there, I sat down, and everybody shuffled around. I got out. I looked around. The best seat in the house was there. So I went down. I sat down. I realized, all of a sudden, I was the oldest person there. Worse from being like them, the youngest, innocent, naïve, is being the oldest. Supposedly knowledgeable and alive.

David Arwood, Karuk Tribe, personal interview, 2005

Last year, we was going to have the Brush Dance here in Happy Camp for the first time in a lot of years. And there was just too many deaths, you know, in our Tribe. So we just couldn't do it.

Blanche Moore, Karuk Tribe, personal interview, 2005

Water Quality

My water just now got straightened up. I couldn't even have my grandkids over here because they did that [sprayed] the whole side of this hill up here. And for 10 years I wouldn't let nobody drink the water. Now the water's good. I had them test the water. They would not bring me back the results. And I had to pay for the tests and they won't let me see the results because it would put them in hot water because there was poison in it. That's why I don't drink the water.

Les Bennett Jr. (testimony from Karuk Department of Natural Resources, 1999)

Many Karuk are worried about the safety of drinking water on the ancestral territory. Fifty-seven percent of individuals surveyed obtain their water from a public water source while 43 percent have private wells, springs, creeks, or other sources of

home drinking water (2005 Karuk Health and Fish Consumption Survey). According to local community members, the United States Forest Service has continually treated local forestlands with pesticides and herbicides to reduce invasive plant species and other plant and animal species harmful to Douglas fir trees. Applications of herbicides limit production of culturally important plants and pesticides decimate local populations of porcupines and other native animals.

And then with our drinking water springs up the mountain when they dump the herbicides right in the spring and they killed all the salamanders and the skunks and the deer had boils all over them... I remember watchin' them dump it right there, tryin' to kill all the hardwoods.

William Tripp, Karuk Tribe, Air Quality Coordinator, personal interview, 2005

Worries of health effects related to conifer relief spraying are not unfounded. In 1976, the health clinic in Orleans serviced 24 pregnancies; one-third of these ended in miscarriages after the first trimester, one child was born with deformities, and there were three molar pregnancies²² (McCovey, 1981). Public pressure led to the suspension of applications of 2,4,5-T on local forestlands after the negative health affects to pregnant women were recognized by forest communities (O'Malley, 2004).

Interviewees discussed health affects that they felt were associated with the high rates of chemicals applied to local land.

Harold Tripp: Yeah, there was a lot of deformities in kids born at that time.

William Tripp: Cleft lips and a lot of still-births. And a lot of people got sick.

²² Molar pregnancies involve abnormal placentas or fetuses and usually end in miscarriage (Hill, 2005)

Harold Tripp: That's back when they were saying that it was totally harmless and they would drink a cup of it if they had to. I never did see anybody drink it.

Applications of herbicides to control for spotted knapweed in the Salmon River watershed were suspended in the 1990s after intensive efforts by the Salmon River Restoration Council to gain control over invasive plant removal in the watershed (Salmon River Restoration Council, 2005). The Salmon River Restoration Council, under an agreement with the United States Forest Service, coordinates a large group of volunteers who manually remove invasive species (Salmon River Restoration Council, 2005).

Pesticides are recognized as having negative effects on aquatic species as well as humans and terrestrial species (Ewing, 1999). Ewing (1999) noted that herbicides could affect salmonid species by disrupting immune system functions, increasing stress, disrupting migration patterns, and altering food sources.²³

O'Malley (2001) found that although the application of 2,4,5-T had been suspended, many chemicals are still being applied to forestlands throughout the Klamath River Basin. Some Karuk people are worried that regular applications of chemicals are affecting the safety of local sources of drinking water. The 2005 Karuk Health and Fish Consumption Survey found that 43 percent of respondents get their drinking water from private wells, springs, creeks, or sources other than a public water supply, while 37.8 percent of all respondents buy drinking water at the store. Forty-two percent of respondents worry that their drinking water is not safe to drink and 32 percent of

²³ See Appendix C for a more complete discussion of the affects of pesticides and herbicides on salmonids.

respondents specifically worry that chemicals, herbicides or pesticides contaminate their water.

The following excerpt from an interview with Marge Houston (personal interview, 2005) describes additional concern over the application of fire suppression chemicals to local landscapes and gathering grounds.

Marge: Yeah, it's like the Forest Service spraying Borate. I had a tan oak tree down over here that I've been eating oyster mushrooms off of for about four years. This year the mushrooms grew pink. Same color as the borate.

Ron Reed: Give you a little background on that... This summer... there was a less than an acre fire here on the Indian allotment here and what happened was the Forest Service came in after it was under control... they did a fire retardant, they wanted to come down and do another one 'til we had to get out there and start screaming at them. And basically they said, 'Well, we'll only do two drops...' First of all it was under control. Second, it was less than an acre of fire. And now we have a contaminated subsistence harvest area along with other culturally sensitive areas...

Marge: They cut down my acorn trees. And they missed the fire to begin with....Sprayed it everywhere but on the fire.

Ron Reed: So what's that mean? That means that now she cannot go harvest her acorns in this area.

Marge: I couldn't even breathe for three days.

Ron Reed: This area is less than 100, 200 feet from this house.

Marge: Yeah, all the oyster mushrooms that I got up here on this [tree] I cannot eat. 'Cause they come up and they're pink. Just like the chemical that they sprayed. I can't eat that. I'm not going to be able to eat a mushroom off that tree again. Damn.

Chemical applications of herbicides, pesticides, and fire retardants continue to pollute the Karuk environment contaminating water supplies and subsistence foods, like Marge Houston's mushrooms. Recent generations have suffered direct health effects from exposure to chemicals applied to the landscape by the U.S. Forest Service. Many Karuk are particularly worried about coming into contact with contaminated basketry materials as the technique used to weave baskets requires women to hold plant materials, such as bear grass and willows, in their mouths. The application of potentially harmful chemicals in an area where it is known that nearly half of the population obtains their household water supply directly from ground or surface water and a large portion of the population harvests subsistence resources directly from the landscape is irresponsible. Regulations governing the use of chemicals on Karuk subsistence gathering grounds must account for the use of the land by the local community.

Economic Opportunity and the Movement of Tribal Members Away from the Ancestral Territory

The government moved them out of here. A lot of the people didn't move by choice. They set up these reservations up in Scott Valley and down in Hoopa. Actually, all of the Indians were supposed to go there. Every one of us. But, there was a few families that hung on and refused to go and that's the only reason that we're still here. That's why half the people in Hoopa are Karuks. And all the people out in Yreka are Karuks. And that's Shasta land. And they won't move back down here... Families were still scattered around and it would be nice if they could want to come back to those places. Even if they got to buy the land back. You know, somebody else owns most of it now but nobody's using it and a lot of it comes up for sale now and again. Tribe purchases whenever they can. But... that was my dream anyway, my vision was to get people back here. People went away and got educated, come home and make us a better Tribe... But instead we went the other way... the government's way and we got everybody living in

housing... I see less and less [reason] for people to want to come back here, because they're providing them opportunities out there away from home. Somebody else's territory.

Harold Tripp, Karuk Tribe, Cultural Resources Specialist, personal interview, 2005

The official Tribal enrollment for the Karuk Tribe of California was 3407 in 2004 with 1448, or 42.5 percent, of Tribal members living within the Karuk Service Area, encompassing Siskiyou County and the town of Orleans, in Humboldt County (U.S. Department of the Interior, Bureau of Indian Affairs, 2004). The 2005 Karuk Health and Fish Consumption Survey found that approximately 300 Tribal members over the age of 18 recorded official home addresses on the ancestral territory. Many of these individuals had moved away and had not updated their information with the Tribal Enrollment Office and the number of Karuk adults living in the ancestral territory is probably closer to 250.

In a survey recently conducted by the Karuk Tribe of California in the Happy Camp area (Karuk Tribe of California, 2005b), 86 percent of Tribal members responded, "Our children have to leave this area to find employment because there is no future here." Nine percent had no opinion on this topic and only four percent disagreed with this statement.

[People leave the area] for work. There wasn't much work in [my parents'] time. It was kind of like my grandpa tells me that his mom said that, 'There isn't enough for you. You've got to move. All the jobs are in Eureka.' So that's where they moved to make money and buy a house and raise a family.

Scott Quinn, Karuk Tribe, Land Manager, personal interview, 2005

The Klamath River provides a potentially viable economic opportunity for those living on the ancestral territory. Recreational fishing provides both direct and indirect

economic benefits to communities located on rivers and lakes (Postel & Carpenter, 1997). Expenditures by anglers include purchase of equipment and licenses and travel costs and river communities benefit when anglers shop at local stores, eat at local restaurants, and stay in local accommodations (Postel & Carpenter, 1997). The National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Census Bureau, 2002) documented 34 million recreational anglers spent \$36 billion dollars in 2001; of these 26,439,000 were freshwater anglers. Fishing expenditures included \$17 billion for equipment, \$15 billion for trip-related expenses, and \$4 billion in other related costs (U.S. Census Bureau, 2002).

The recreational fishing industry and other businesses supported by fishing-related tourism to the area have declined sharply in the last twenty-five years. Blythe Reis, a local business owner commented:

My business as a fishing lodge has been severely affected by the lack of fish and I have entered comments with FERC in April of 2004 as to that effect. So I have this fishing business and it's not doing so great and I also have a summer cabin business that was started in response to the fact the fishing business was declining. And, in 2002, there was something like 10,000 juvenile fish killed at Perch Creek, which is the swimming hole where my lodge is. So you can imagine how the people might feel when they're swimming with dead fish... The other thing I wanted to bring up was that I work with fishing guides here, and there were 26 guides at one point between Happy Camp and Weitchpec and now there's 6. So the declining businesses on the river is pretty well documented.
(Statement to the Federal Energy Regulatory Commission during the Karuk Government to Government Meeting, 2005, emphasis added)

Reis also noted that the number of fishing lodges in Orleans had declined from seven in 1992 to four in 2001 and that the one hotel in town had closed (McCarthy, 2001).

Barbara Short, a local citizen expressed similar concerns over declines in local businesses:

Had you all come to visit us back then [25 years ago], you would have found four or more fishing lodges just here in Orleans, two stores, a hotel, a motel, a couple of places to eat. Up river they sold gas and had a store and had two fishing lodges right there in Somes Bar and on it went up the river. Boats lined up with people in them – you know, commercial fishing, winnebagos and campgrounds overflowing to the point of obnoxiousness. And all that has changed, not to mention just the cultural impact of Indian families. Everybody had a big smoke house and they were all full a lot – full all the time. And all that's changed in 25 years. It's pretty frightening.

(Statement to the Federal Energy Regulatory Commission during the Karuk Government to Government Meeting, 2005)

The number of sport fishing licenses sold in Del Norte, Humboldt, and Siskiyou Counties has declined during the late-nineties and early 2000s (Figure 8, Figure 9, and Figure 10, California Department of Fish and Game, 2005f, g, i). Information on more long-term trends in sport fishing license sales was not readily available. However, statewide statistics showed that the number of resident sport fishing licenses sold in California in the past ten years was 39 percent less than the number sold in the 1970's (California Department of Fish and Game, 2005g).

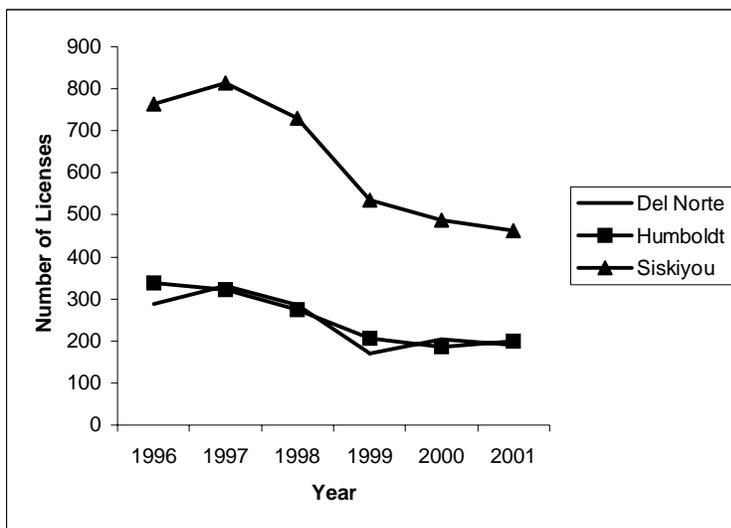


Figure 8 10-day Nonresident sport fishing licenses sold in Del Norte, Humboldt, and Siskiyou Counties, 1996-2001

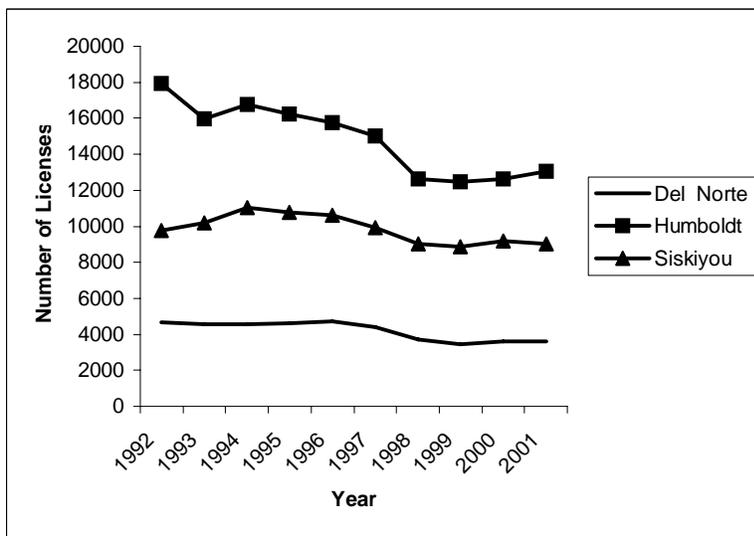


Figure 9 Resident sport fishing licenses sold in Del Norte, Humboldt, and Siskiyou Counties, 1992-2001

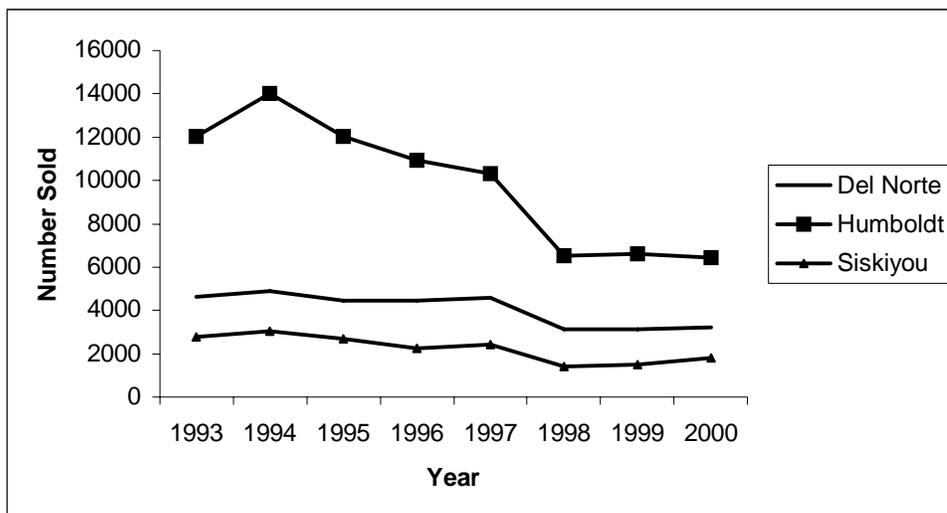


Figure 10 Steelhead Report Cards sold in Del Norte, Humboldt, and Siskiyou Counties, 1993-2000

Results from the 2005 Karuk Health and Fish Consumption Survey found that fishing related businesses, including fishing guide services, hotels, motels, lodges, campgrounds, restaurants, and stores, provide employment for Karuk Tribal members (Table 15). Employment opportunities in these businesses appear to have decreased dramatically. Information gathered from the survey on years worked by individuals in the above fields was summed by decade with each year worked by an individual counting as one job/year. In the 1980s, Karuk Tribal members worked 103 job/years in the above businesses. The number decreased to 62 job/years in the 1990s.

Table 15 Employment in industries affected by recreational fishing in the area

Occupation	Percent employed in field currently or in the past	Percent currently employed in field
Fishing Guide	6	1
Lodging	21.7	2.4
Restaurant	30.6	1

This information illustrates that the percent of people employed as fishing guides or in industries that benefit, and often rely on tourism, such as that brought to the area by recreational fisheries, has dropped sharply. As these figures represent only those Karuk currently living on the ancestral territory, it is likely that they do not fully represent the loss of jobs, as many individuals who had worked in these industries may have left the area to find employment after the recreational fishing industry collapsed. Leon Hillman, a Karuk Tribal member, comments on the consequences of fishery declines:

I've lived here... 37 years. And about 30 years back... there was a lot of fish. You see sports fishermen up and down the river thick, a great place, the campgrounds full. Today you don't see that. Thirty years ago, during the ceremonies, a lot of people, a lot of fish, a lot of people to feed. And now it's getting harder and harder to come up with fish.

(Statement to the Federal Energy Regulatory Commission at the Karuk Government to Government Meeting, 2005)

There is an observable lack of information regarding the decline of the sport fishing industry in the mid-Klamath River watershed. The data presented here shows evidence that the recreational sport fishing industry has declined and that there has been an associated loss of employment opportunities for local communities, including members of the Karuk Tribe. The lack of employment opportunities on the ancestral territory is

forcing many families to move away from their cultural center. Restored Klamath River fisheries would bring jobs back to the mid-Klamath area and allow Tribal members the opportunity to make a living in their ancestral homelands.

Scott Quinn (2005) discussed how fisheries brought together families and communities. David Arwood (2005) described the loss of social capital that has accompanied the loss of the fisheries.

There's a lot less people now on the river. Before you had a whole family. You had your brothers and sisters. You had your kids. You had your grandparents... The fishermen would catch [the salmon], then the clubber would who pack it back and clean them, pack them up the hill, and take it back to the family, and the wife would can them up. You'd smoke them and can them up. It's so few people now being able to have a job and [being] able to live on the river, it's really getting hard to process fish. It's a lot of work.

Scott Quinn, Karuk Tribe, Land Manager, personal interview, 2005

Our way of life is gone. How much we can hang on to? That's the question. I'll be the first one to go to jail. I've gone to jail for some stupid things. I wouldn't mind going to jail for something I really believe in. I believe in fishing. I believe in anything that our ancestors did to help their way of life be better. I believe in that. There are so many things that are going on nowadays that go against the traditional ways. When you had something, you didn't just keep it to yourself. You shared it. The family was a strong bond. Nowadays, we see our families scattered. Everybody go here. Everybody go there. For the life of me, I can't believe why people want to leave this area and go to the city, but a lot of people do. I can't stand that.

David Arwood, Karuk Tribe, personal interview, 2005

Concluding Thoughts

Demographic data gathered from the Karuk Tribal Enrollment Office and the U.S. Census Bureau indicate that the Karuk Tribe is living in extreme poverty. Both poverty and unemployment levels are greater for those Tribal members who are living on or near the ancestral territory. This data supports PacifiCorp's conclusion that Klamath Basin communities living within a five-mile buffer of the river suffer disproportionate amounts of poverty to those living outside of the buffer. This poverty is due in part to a lack of employment opportunities for communities living near the river.

Statistical and anecdotal evidence identify that the lack of employment opportunities within the ancestral territory is related to the declining Klamath River fisheries. Healthy fish runs on the Klamath provided employment opportunities in the recreational fishing industry. Further, recreational fishing brought an influx of tourists into the ancestral territory. These seasonal visitors supported local businesses including hotels, motels, campgrounds, restaurants, and stores. Declining fish runs has meant the near collapse of the recreational fishing industry in the mid-Klamath Basin. Jobs were lost and many Karuk had to leave the area to find work.

The decline of Klamath River fisheries has severely impacted the quality of life for Karuk living in the ancestral territory. Not only have employment opportunities been lost but also a reliable and healthy food source. When fisheries are healthy, salmon, eel, and steelhead provide an easily accessible and healthy source of food for those without economic capital. Thus, the return of the fish runs would immediately improve the quality of life of those living on the ancestral territory. Returning fish to the diet would

decrease hunger and food insecurity. Research shows that good nutrition improves mental and physical health, which are linked to increased labor and higher incomes. Healthy fish runs would revitalize the recreational fishing industry, providing employment and restoring tourism-based industries. Restoration of the Klamath River fisheries is essential to the alleviation of poverty on the Karuk ancestral territory.

CHAPTER EIGHT ECONOMIC JUSTIFICATION FOR THE RESTORATION OF THE KLAMATH RIVER SYSTEM

The economic benefits of a restored Klamath River system must be considered in the relicensing of the Klamath Hydroelectric Project. Benefits derived from river restoration must be weighed against benefits derived from both status quo agricultural practices and hydroelectricity produced from Project dams.

Hydroelectricity and Agriculture in the Basin

Agricultural Efficiency

Irrigation efficiency in the Klamath River Basin can be improved. Flood irrigation, which is utilized by the majority of irrigators in the Oregon portion of the basin, is about 20 to 40 percent less efficient than irrigation using sprinklers (Broad & Collins, 1996; Niemi et al., 2001). In the Oregon portion of the basin, approximately 63 percent of the water withdrawn for irrigation “later evaporated, seeped into the ground, or ran off irrigated lands and returned to canals, streams or lakes” with only 36 percent of the water actually absorbed by crops (Niemi et al., 2001, p. 10). Other irrigators in the Western United States have minimized inefficiencies to less than 20 percent (Niemi et al., 2001).

Hydro-electricity

Dams alter flow patterns, decrease water quality, and block fish passage while excessive water diversions can damage ecosystems by depleting flows (Postel & Carpenter, 1997; California Energy Commission, 2003a). The California Energy

Commission, (2003b) affirmed that hydropower is a significant stressor to aquatic ecosystems in California. King (2004) notes that Klamath River water quality problems associated with hydro-electric dams and agriculture in the basin include: 1) Agricultural runoff pollutes Klamath River water, 2) reservoirs behind Klamath River dams alter water temperature, 3) sediment deposit builds up in cold-water holes, critical refugia for fish when water temperatures are too warm, and 4) freshets, normal periodic flushing flows that wash sediment downstream and remove gravel and sand bars from tributary mouths, have been terminated in the river. Iron Gate dam has been implicated as contributing to erosion and declining fish populations and low flows from the dam are considered to be among the leading causes of the large Klamath River fish kill in 2002 (King, 2004). Fish passage to the upper reaches of the Klamath River Basin is completely blocked by Iron Gate dam and Copcos 1 and 2 (California Energy Commission, 2004).

The total output of the Klamath Hydroelectric project is approximately “1.8 percent of California’s total annual hydroelectric production” (California Energy Commission, 2003a). The California Energy Commission stated that the decommissioning and removal of the Klamath hydro units would not have a significant impact on the adequacy of statewide electricity resources and that replacement energy would be available in the near future (California Energy Commission, 2004).

Economic Benefits of a Restored System

Considering the California Energy Commission's statement that decommissioning is a feasible alternative to relicensing and the tremendous impacts of the Klamath Hydroelectric Project dams on the health of the Klamath River, assets of a restored ecosystem should be considered in the relicensing process. A restored Klamath River ecosystem would increase opportunities for recreation and tourism throughout the basin, revitalize commercial and recreational fishing industries, and contribute to economic growth of the communities along the river, including tribal communities (Alkire, 1993; Niemi et al., 2001).

Waterfowl and riparian vegetation would benefit from a restored ecosystem increasing revenues in the area from hunting, bird-watching, and tourism (Niemi et al., 2001). The 2001 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted by the United States Fish and Wildlife Service found that 39 percent of individuals over the age of 16 participated in wildlife-related recreational activities (U.S. Census Bureau, 2002). This included 34 million anglers, 13 million hunters, and 66 million wildlife watchers who spent about \$108 billion on related expenditures (U.S. Census Bureau, 2002). Wildlife watchers alone spent \$23 billion on equipment, \$8 billion on travel-related expenses, and another \$7 billion of other related expenditures (U.S. Census Bureau, 2002). In the Klamath Basin, Tulelake National Wildlife Refuge sees about 200,000 visitors a year bringing in an estimated \$6 million (Niemi et al., 2001). Of the total visitors, about 10,000 are hunters; the value associated with hunting visitations is about \$470,000 annually (Niemi et al., 2001).

Spain (1998) derived a net asset value of the Klamath River's anadromous fishery of at least \$4.5 billion. If non-market values were included, this figure would increase to between \$12 and \$37 billion. A healthy run of fish on the Klamath would provide \$137.4 million/year in total personal income and sustain 6,870 full-time jobs at \$20,000/year (Spain, 1998). A healthy fishery would provide an increased supply of salmon, new jobs and business opportunities, and would reinforce efforts to accomplish other important goals of clean water and open space, as well as enhancing the quality of life of people in the region (ECONorthwest, 1999). Restoring the salmon is a one-time cost with restoration values that will continue to grow in the future. If changes in management are not made soon, "These fish, upon which the very survival of [the Karuk, Yurok and Hupa] culture depend, will soon be gone forever" (Spain, 1998, p. 6).

With an unemployment rate for the Karuk near 30 percent, a median income for families of \$13,000, and 80 to 85 percent of households being below poverty line, a once wealthy people, subsisting in a natural resource based economy, is now one of the poorest socioeconomic groups in California (Norgaard, 2004). In 2004, the Yurok and river recreational fisheries caught their quotas of 12,698 and 2,350 fish respectively. The Karuk tribe caught 100 fish (Pennington, 2004). Norgaard (2004) noted that without traditional food sources, notably salmon, the Karuk Tribe suffers high rates of both food insecurity and hunger. The cultural biologist for the Karuk Tribe, Ron Reed, stated, "If the river was a healthy system there would be a better economy in this area. As it is our young people have to move away because the economy is so bad" (Salter, 2003, p. 64). Toz Soto, fisheries biologist, iterated, "The Klamath run doesn't exist, but can you

imagine if there were [Spring-run Chinook] still running through here, the economic benefit to that? The loss of this run carries a huge cost” (Salter, 2003, p. 60).

The meaning of Klamath River fisheries to basin Tribes is emphasized in the following quotes:

Although the tribal significance of fishing for salmon extends well beyond its commercial value and its value as a food source, these economic factors are nonetheless important considering the high percentage of American Indians in the study area earning below poverty level incomes. Salmon fishing continues to play a role in the economic well-being of the American Indian people in the study area.

(PacifiCorp, 2004, p. 2-138).

My target group right now is my children, and the only way to make them whole too is to understand, to always talk about the connectedness of the holistic lifestyle that we live and it's about our elders. Unfortunately, in my family, I am an elder now, because all the siblings from my grandma and grandpa are gone now. And now it's up to us. There's an old Karuk saying. Don't fight until I'm gone. My people are gone. I think that's what, ultimately, the fishery means. I think, ultimately, that's one of the small things we have left, that people actually come down to on a voluntary basis. Besides their ceremonies, I think those are the threads that we're holding on to right now, and I think it's up to this generation to really make a significant impact, because if we don't, we're very vulnerable as a people.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

CHAPTER NINE
THE IMPORTANCE OF A HEALTHY KLAMATH
RIVER SYSTEM TO THE SOCIAL AND ECONOMIC
STABILITY OF THE KARUK TRIBE OF CALIFORNIA

Conclusions and Recommendations

Last year we caught an all-time low, less than a hundred fish at Ishi Pishi Falls with extended effort...What about the lamprey? What about the sturgeon? What about the spring salmon? What about now? What about the fall run? So we're talking about a total collapse in our fishery and now it is after 20 years [of the] Klamath Act. That's identifying that status quo management is not all right, because right now, we're feeling the cumulative effects of management, and I think the Karuk people are unfairly taking that burden on our shoulders.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

Changes in the Klamath River associated with the Klamath Hydroelectric Project have been detrimental to the Karuk Tribe's cultural, spiritual, economic, and physical well-being. As other reports have documented the cultural, spiritual, and physical importance of fish to the Tribe, it has been the purpose of this report to highlight the socioeconomic value of fish to the Karuk. Healthy fish runs have provided Karuk people with a nutritious, protein-rich, relatively free food source for countless centuries and innumerable generations.

In the last 150 years many obstacles have come between the Karuk and the fisheries that they rely upon. All of these are associated with the settlement of the Western United States by Euro-Americans. In the 1850s the Karuk were displaced from their homelands and forbidden access to fishing sites. Gold mining and over-harvest by commercial fishers downstream commenced the decline of the fisheries. The conversion of wetlands and the introduction of large-scale agriculture to the upper Klamath Basin in

the early 20th century further damaged the integrity of the Klamath ecosystem. The final blow to the fisheries came in 1964 with the completion of Iron Gate Dam, the last in a series of seven dams on mainstem Klamath, that effectively cut-off anadromous fish from hundreds of miles of riverine habitat.

While the Karuk were losing their fisheries physically to environmental degradation, a period of forced assimilation resulted in social deprivation and the loss of the cultural knowledge of these resources that had evolved over millennia. In the 20th century Karuk children were sent away from their homes and families and taught the ways of their colonizers. They were forbidden to speak their native language or learn the traditional ways. New foods, detrimental to the native physiology were introduced, as knowledge of traditional management and harvest of local resources was lost. Access was denied to subsistence aquatic and terrestrial harvesting areas resulting in a dependence on store-bought foods. Further, individuals were hassled, fined, and arrested for subsistence fishing.

Yet, despite all of the obstacles, the Karuk Tribe still relies on salmon, steelhead, and lamprey from the Klamath and Salmon Rivers to provide for subsistence and to meet cultural, ceremonial, and economic needs. This is evidenced by The 2005 Karuk Health and Fish Consumption Survey that found that 59 percent of respondents live in households that gather steelhead for food, 38 percent live in households that gather spring chinook for food, and 50 percent live in households that gather fall chinook for food. Karuk actively harvest Klamath River fish, but regulations and low fish populations often impede their efforts. Eighty-six percent of respondents stated that they are not able to

fulfill their needs for eel, 83 percent are not able to fulfill needs for salmon, 67 percent are not able to fulfill their needs for steelhead, and 90 percent are not able to fulfill their needs for sturgeon.

Forty percent of survey respondents reported that there are fish that their families once gathered that are no longer harvested. Additionally, 58 percent of respondents indicated that they eat less salmon now than as a teen. When asked why gathering had stopped and why less fish is currently consumed, the majority of respondents answered that there are insufficient numbers of fish in the river to harvest.

Survey data indicating the Karuk Tribe's continued reliance on fish for food was corroborated with interview data. Many individuals interviewed identified salmon and eel as staples of their childhood diets. Fish was salted, canned, or frozen to provide a nutritious food source throughout the year. Pre-contact, Karuk Tribal members were eating about 1.2 lbs. per person of salmon a day contrasting to the current amount of less than 5 lbs. per person of salmon eaten in a year (Norgaard, 2004). The change in diet has led to an increase in diabetes and other diet-related diseases within the Tribe (Norgaard, 2004).

The financial burden associated with diet-related diseases is troubling to a population with a median income of \$13,530, well below the national poverty line of \$19,350 for a four-person household (U.S. Department of Health and Human Services, 2005). Eighty to 85 percent of the Karuk population lives below the poverty line (Norgaard, 2004) but for those Tribal members living in Siskiyou County, the poverty rate is higher, between 88 and 92 percent (Norgaard, 2004). These differences cannot be

attributed to geographic isolation alone. There are less economic opportunities in the area; however, American Indian populations suffer lower per capita incomes than their white counterparts (U.S. Census, 2000).

Poverty is due to in part to high rates of unemployment. For the Karuk Tribe, as a whole, 30 percent of Tribal members are not employed with another 12 percent employed either part-time or seasonally (Karuk Tribe of California, 2005c). Unemployment is greater for those living on the ancestral territory. Of those Karuk individuals living in Siskiyou County and Orleans, CA, and available for work, 53 percent are unemployed with another 21 percent employed but living below the poverty line (U.S. Department of the Interior, Bureau of Indian Affairs, 2004).

As is typified in any impoverished society, overcoming financial hardships is extremely difficult. Economic growth is engendered by improved education, yet education is most readily available to those in higher income brackets. The rate of high school graduation for the Tribe is 74.5 percent; however, the percentage of people who have graduated from college is only 18 percent, and another 7 percent have graduated from business or vocational schools (Karuk Tribe of California, 2005d). Financial barriers were listed as being the reason that 45 percent of surveyed individuals in the Happy Camp area did not further their education (Karuk Tribe of California, 2005b).

There are many reasons that the Karuk Tribe suffers such a low socioeconomic position. The transition from a subsistence economy to a market economy changed the entire social structure of the Tribe. There was much stress associated with this transition as it was forced upon the people. The population has incurred numerous hardships

including forced assimilation into a foreign culture, an almost complete loss of homeland, intentional and inadvertent killings of Tribal members, separation of families, the decimation of local resources, and denied access to manage and harvest extant subsistence and cultural resources. Paradoxically, the only local employment opportunities available to the Karuk in the new economy were those that exploited the natural resources that they were restricted from harvesting for their own needs.

The isolation of the ancestral territory, due in part to rugged terrain and narrow, winding roads, predestined the people of the area to be dependent on the extraction of local natural resources as capital for means of exchange in the market system. The logging and mining industries became important to the local economy providing seasonal jobs for people in the area. Yet the boom-and-bust nature of these industries contributed to the cycle of poverty while disrupting healthy ecosystems and the services that they provided. During the 20th century, recreational fishing became an important industry on the Klamath River directly providing jobs as fishing guides, and providing further employment in businesses that were dependent upon the flux of tourists coming into the area, with stores, restaurants, motels, hotels, fishing lodges, and campgrounds providing reliable employment.

Evidence suggests that Klamath River fisheries started declining in the 1920s with the canning industry followed by a second decline beginning sometime in the 1960s and continuing through the present. By the late 1990s, the salmon fisheries had virtually collapsed and eel, sturgeon, and steelhead fisheries were in drastic decline. The recreational fishing industry now provides almost no employment in the mid-Klamath

River as few fish reach these stretches. The economic impacts of the loss of these fisheries are substantial. The economic value of the Karuk salmon fishery, if the Tribe were able to gather historical amounts of salmon from the Klamath and Salmon Rivers, would provide between \$450,000 and \$6.75 million a year in salmon for sale or for trade.

The loss of fisheries has also impacted the diet of the Karuk as few fish can be gathered for subsistence. To eat a traditional diet of salmon by replacing wild-caught salmon from the Klamath River with store-bought wild salmon would cost each member of the Tribe well over \$4,000 annually. To feed the entire Karuk Tribe a traditional diet of salmon would cost over \$13 million a year. This figure is for the purchase of the salmon only. Additional costs would have to be accrued to feed Tribal members living on the ancestral territory, as there are no local stores that sell fresh salmon. Indeed, 31 percent of Karuk people living on the ancestral territory travel over 80 miles one-way to buy their groceries. Per family costs associated with round-trip travel of this distance are over \$60.

The loss of the salmon, steelhead, and lamprey fisheries cannot be overcome by mere economy as the weight of this loss carries far-reaching consequences. Over 60 percent of Karuk living on the ancestral territory never buy or trade for salmon. Thirty-five percent do not buy salmon because it is too expensive, 58 percent only eat salmon caught by friends or family, and 44 percent of people do not feel good about buying salmon. Consumption of Klamath River salmon is a way of bonding with and supporting family, culture, and community. Store-bought salmon does not possess the same value.

Further, harvesting of salmon presents Karuk the chance to exercise their bodies while securing community attachments. Gathering salmon takes physical exertion and 46 percent of survey respondents (2005 Karuk Health and Fish Consumption Survey) indicated that they got exercise as teenagers fishing while 51 percent of individuals indicated that they got exercise as teenagers packing salmon. Packing salmon involves carrying the salmon from the fishermen on the river upslope to where elders and others were waiting for fish. Fisheries are socially and culturally significant, building inter-generational community and familial bonds. No monetary value can be placed on the fisheries for these purposes.

The Klamath River fisheries are the foundations for the Karuk culture and ceremony. Since the 1980s when the Karuk Tribe regained federal recognition, the Tribe has been in a state of recovery. The Tribal Government has secured funding for housing and health care and provides services to Karuk in need. Health care employees transport elders to medical appointments and disseminate knowledge on nutrition and disease to the community. Currently, the Karuk Tribe of California is one of the largest employers on the ancestral territory. The Karuk Department of Natural Resources is actively involved with restoration projects throughout the mid-Klamath Basin, partnering with individuals, federal and state agencies, and non-governmental organizations.

The past 150 years have been destructive, but the Karuk are working to restore their spiritual, mental, physical, and economic health. Key to this recovery is the revitalization of their culture. Ceremonies are being restored and the Karuk language is taught in local schools. Karuk Department of Natural Resource employees visit local

schools and lead field trips to teach future generations about natural resources. The Tribe is also working with state and federal agencies to try to restore various traditional land management practices. The Karuk Tribe has the ambition and ability to restore its culture, yet, because culture is about ongoing and active relationships with the land, if the Klamath River salmon, steelhead, and lamprey fisheries do not recover, there is no hope of full recovery for the Tribe.

The Karuk are fish people. The salmon are the center of Karuk ceremony and have sustained the Tribe mentally and physically for thousands of years. Current management of the Klamath River is negatively affecting the Karuk Tribe. It is the responsibility of the United States government to consider impacts of every management decision to all communities along the Klamath River. In the case of the Klamath Hydroelectric Project, this is not a question of farming against fishing but of the need of current governments to consider all communities on the Klamath River equally. The salmon and lamprey fisheries are essential to the well being of the Karuk as well as the Yurok and Hoopa Valley Tribes. These Tribes are bearing an unequal burden of impacts from management decisions. If the salmon and lamprey fisheries are lost, the core of the Karuk culture will be lost with them. Individuals and families will persist, but the Karuk community and culture as it has existed for tens of thousands of years will not.

If the fisheries recover, the Karuk will be allowed the chance to thrive. Fisheries provide employment opportunities, a nutritious and reliable source of food, and the foundation of the Karuk culture and ceremony. In order to achieve recovery-oriented goals, the Klamath River must be managed for the health of the fisheries. The

significance of the spring-run chinook salmon must be recognized. As the life history requirements of spring chinook differ from those of fall chinook these too must be considered in decisions regarding timing and allocation of flow released from the dams. It is imperative that fish passage to the upper Klamath Basin and associated habitat be restored. Co-management must be the standard for all decisions relating to the well-being of Karuk subsistence resources and Tribal Trust species. With the recovery of traditional subsistence resources will come the recovery of the people. The Karuk are “fix-the-world” people who have been sustainably managing their local resources for millenia. The Karuk have knowledge that is essential to the recovery of their landscape and the people throughout the Klamath River Basin.

Closing thoughts

The link between dams and the poor health, both physical, mental – and let's not forget spiritual - of our people and of all indigenous people along this river, that link is not so well understood outside this basin. That link is...very well understood by people up and down this river system...The conditions of our physical health today, the fact that average life expectancy for the Karuk man or the Karuk woman is substantially lower than that of the national average or even the state average...We don't take time to ponder these things often. We don't take time to ponder the fact that this clinic right next door here sees patients day in and day out who suffer from diabetes and heart diseases at rates three, four times the national average. It's no secret. Maybe to the rest of the world they might be invisible. It's not invisible to us. In addition to the effects on the health of our people, the effects don't end there. Imagine being a trespasser in your own country. Imagine being made into a criminal in your own country trying to maintain traditions that are thousands of years old. For this, we're called criminals. The effects on our young people – this our home. This is their home – our children's home. Our children will be born here. They will continue to be born here. This is our home. What do they have to look forward to? The economic conditions on the river, as everyone knows, don't do a very good job of sustaining our communities. They don't provide what they need to provide, what they once provided for our children. The opportunity to grow up, to be raised here and to feed your families here, to maintain a standard of living that is adequate is very difficult today. And this river that runs through our country and through our territory, our homeland, our home – this river is like the blood that runs through our veins. It supports us. It has always supported us. We wouldn't be here today if it were not for that river. The river is life to everything in our world.

Leaf Hillman (testimony from Karuk Government to Government Meeting with the Federal Energy Regulatory Commission, 2005)

...[We're] trying to get this message out, trying to get these people to understand that we're not looking for a zillion dollars, or we're not looking for any kind of recognition. Other than the recognition that we deserve as far as-- You need to recognize that we have keys to this process that can make things function properly...

We can actually jump start this process by... [getting] these younger kids out there walking with our elders through the forest, like it used to be, and gathering, and telling them stories right there where they're harvesting, rather than coming back into a room like this where we set up this little micro-management situation where, oh, it's nice that we can get these elders to meet in here in this little classroom, but ultimately, we want to get back to where we once was, and we want to get out there to be able to take our children out there, exercise their mind while our elders are exercising their muscles and their storytelling capabilities and revitalizing them.

Ron Reed, Karuk Tribe, Cultural Biologist, personal interview, 2005

You can do your own way. Follow the spirit. Follow your heart. That's the biggest, hardest problem nowadays, because the very minute you try to follow your heart, then this thing [pointing to his head] right here gets in the way. You've got to rationalize, justify. Economize. Got [to find] some way to save a dollar doing it. That's not the way it is. No, it's not about money. It's about how you feel. Are you happy about what you've done? Do you do your best? Respect is the biggest thing that's being lost in this world.

David Arwood, Karuk Tribe, personal interview, 2005

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Appendix A
ESTIMATES OF HISTORIC FISH RUNS ON THE KLAMATH RIVER

Although estimates vary, this system produced an abundance of fish. Following are figures from relevant texts.

In 1947, Hewes estimated yearly consumption of salmon in California at 15 million lbs. (Swezey & Heizer, 1993).

A quote from 1877: “All the Indians in the upper half of California could be healthfully lodged and bountifully fed along the Klamath River, and that almost wholly with aboriginal products” (Powers, 1975, p. 200).

Swezey and Heizer (1993) quote William McGarvey, 1872, saying “The Yurok catch is enormous.” McGarvey continues saying that “he has often seen a ton of dried salmon hanging in the smoky attic of some cabin” (p. 305).

Snyder quotes an undated paper by R.D. Hume saying “In 1850 in this river during the running season, salmon were so plentiful, according to the reports of early settlers, that in fording the stream it was with difficulty that they could induce their horses to make the attempt, on account of the river being alive with the finny tribe” (Swezey & Heizer, 1993).

“Salmon crowded the rivers each season in runs so thick that at their height people found it difficult to ford the river” (Margolin, 1981, p. 52).

Pre-contact runs would have been between .66 and 1.1 million fish. A harvest rate of 50% would yield 328,750 to 545,000 fish and 4,218,750 to 7,462,5000 lbs. of fish (Spain, 1998, p. viii).

The Bureau of Indian Affairs estimates takes for the Lower Klamath Tribes of 36,000 Chinooks each winter. This equated to approximately a half-a-million lbs. Other estimates range from 2 million lbs. annually to nearly 9 million lbs.; the later based on estimates of Central Valley populations. The Sacramento “yielded roughly 10 million pounds per annum between 1880 and 1883” (McEvoy, 1986, p. 22).

The Klamath has the highest record of Coho salmon and steelhead production and Chinook are comparable with the Sacramento River (Smith, 1978).

The loss of the Klamath fisheries has cost 3,700 jobs and 660-tons of commercial catch annually (Pope, 2002). 660-tons equates to between 1.3 and 1.4 million lbs. of fish.

Appendix B
2005 KARUK HEALTH AND FISH CONSUMPTION SURVEY METHODS

Survey Construction

The socioeconomic portion of the survey was divided into four main categories: 1) Expenditures on food and water; 2) Effects of regulations and presence of federal and state agencies on gathering; 3) Fishery-dependent employment; and 4) Household utilities. Rationales for each follow.

1) Expenditures on food and water (questions #1 - #18)

- I asked questions regarding gathering and consumption of subsistence foods in order to quantify the percent of individuals whose diets contain local plants and animals.
- Information obtained from interviews led us to believe that most Karuk do not purchase salmon at the store, though some purchase from other tribes. We developed survey questions to substantiate these deductions and try to assess the reason behind such choices.
- There are limited food stores on the Karuk ancestral territory. Survey questions quantified how far and how often households travel to buy groceries. Two questions were asked to quantify average amounts spent per month on meat and food.
- A final section documented reliance on federal or Tribal food assistance programs.

2) Effects of regulations and presence of federal and state agencies on gathering (questions #19 - #22)

- Interviewees suggested that many people have stopped gathering subsistence foods and cultural resource plants and animals because of regulations or negative interactions with federal and state agencies. We added questions to document the prevalence of this.

3) Fishery-dependent employment (questions #23 - #27)

- There is little to no documentation of the loss of fishery-dependent jobs in the middle-Klamath region. Through personal communications and documentation of other interviews I learned that the mid-Klamath region, including the Karuk ancestral territory, supported a large recreational fishing industry until recent decades. I added questions to quantify job loss in recreational fishing-dependent industries for Karuk Tribal members living on the ancestral territory.

4) Household utilities (questions #28 – #38)

- Through my personal experiences working and living on the Salmon and mid-Klamath Rivers, I learned that there is a large portion of the ancestral territory that does not benefit from public utilities including electricity, phone, and water. I added

- questions to the survey to document the number of households that must generate their own power, do not have phone service, or maintain their own water supply.
- Interviewees noted many concerns about water quality. I added questions to address these concerns.

Survey Distribution

The sampling frame for the survey consisted of a list of names, generated by the Karuk Tribe's Enrollment Office, of enrolled Karuk Tribal members eighteen years of age or older and living on the ancestral territory. Each generated name was given a number. We then coded each survey with one of these numbers.

A week before the survey was distributed, we sent out a letter of intent informing people that the survey would be delivered to their homes and requesting their participation. Community Health workers delivered the majority of the surveys over a three week period on personal visits to people's homes though some surveys were delivered through personal networks. Individuals delivering surveys offered assistance to those who needed help filling in the survey because of physical impairment or illiteracy. Most surveys were collected on follow-up visits to people's homes, though there were confidential drop-boxes located at both the Happy Camp and Orleans Tribal Offices. We funded a lottery incentive with cash and food prizes.

Response Rate

There were 298 names generated by the Karuk Tribal Enrollment Office. Of these one was a duplicate and 32 were known bad addresses (people who had moved out of area, were in jail, etc.). Removing these names from the original list gave us a sample size of 266. Of these, 90 surveys were returned, and we know that 10 were refused and 33 went undelivered after multiple attempts. There are 133 surveys left unaccounted for.

We attribute the fact that this number of surveys are unaccounted for to the following facts. We chose to have the surveys delivered by members of the Tribe; as a result we had problems keeping personal records of delivery and collection of the surveys. Record keeping was difficult for Health Workers as they voluntarily took on the responsibility of distributing the survey on top of their already heavy workloads and often distributed the surveys at medical appointments. However, we infer that the majority of the surveys that were not accounted for were not delivered due to either bad addresses or because those delivering the survey were not able to connect with all individuals on their list. Assuredly some surveys were also refused.

We must calculate a conservative response rate using only those surveys whose outcomes are known. We subtracted the 33 undelivered surveys from the 266 original surveys to give us a total of 233 surveys. Of these, 90 were returned giving us an extremely conservative response rate of 39%. The response rate is certainly higher, but impossible to determine.

Sex and Age Distribution of Respondents

The sex and age distribution of respondents was balanced.

- 51% male
- 49% female

Age distribution was also balanced.

Decade in which respondent was born.

Year Born	Percent Respondents (n = 88)
1920-1929	10
1930-1939	17
1940-1949	14
1950-1959	15
1960-1969	20
1970-1979	13
1980-1987	11

Interview Methods

We conducted a total of ten interviews over a five-month period. A total of 18 individuals were interviewed, either individually or in pairs, and we had one focus group of individuals living in Yreka, CA. All interviews were transcribed verbatim. Socioeconomic questions focused on perceptions of employment, the local economy, food gathering, and emigration.

Appendix C
LIFE HISTORIES AND STRESSORS FOR CHINOOK AND COHO SALMON

Chinook Salmon

The following section reflects information from Allen and Hassler's 1988 biological report, entitled "Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates: Chinook salmon," completed for the U.S. Fish and Wildlife Service.

Food

The cold water that salmonids require throughout their lives is low in nutrients; thus, after a year in the river, juvenile salmonids migrate to the ocean to find food. As fry in the river, they eat drift insects and zooplankton, and juveniles eat dipteran insects. Smolts eat gammarid amphipods and larval fish; and marine adults eat fish and crustaceans in the form of krill, larval crab, and insects. After three or four years in the ocean, adults migrate back to their home river to spawn and die, but when the adults enter freshwater, they no longer feed.

Spawning and Rearing

Surveys indicate that Chinook spawning has decreased in all rivers. Fall-run Chinook in the Klamath River lay about 3,500 eggs on average, but the redds are especially vulnerable to shock injury such as bottom scouring during activities, such as dredging, and from mechanical impaction. Additional causes of egg mortality include low dissolved oxygen, high contamination of toxic chemicals, high-water temperatures, fungi, predation, and heavy sedimentation. Under ideal conditions, egg mortality is as low as 10 percent, but negative conditions such as the ones listed can degrade the river environment and lead to mortality rates as high as 95 percent.

Environmental Requirements for Chinook Salmon

1. Cold water

Chinook salmon require cold water for all life stages but are more tolerant than other Pacific salmon of higher temperatures. However, even within the tolerated range, abrupt temperature changes can kill fish, and temperatures above 23 degrees Celsius in the river delta are lethal to most smolts.

2. Dissolved oxygen

Specific requirements are unknown, and they differ, depending on the specific life stage of the fish. Low dissolved oxygen can cause delayed hatching; premature hatching; abnormal embryo development; reduced size and strength at hatching; reduced growth, feeding, and swimming ability; and increased susceptibility to disease, predation, and toxic contaminants (Davis, 1975; Orsi, 1967).

3. Unconsolidated materials of the appropriate size

The female builds her redds by moving gravel and fine sediment with her tail and then burying her eggs 20-60 centimeters below the gravel surface. However, too much fine sediment decreases substrate quality. Fine sediment reduces the intra-gravel water flow necessary to transport oxygen to and remove metabolic waste from incubating egg surfaces. Additionally, fine sediment can trap alevins and reduce the food production habitat and escape cover.

4. Depth

Adequate water depth is vital for upstream migration and spawning,

5. Water Movement

If water velocity is too low, it hinders redd excavation. Flows less than 60 meters per hour increase egg mortality.

6. Turbidity

Juveniles can tolerate 1,000 ppm, but at this level, primary food production and feeding efficiency are reduced. Migration is inhibited at 4,000 ppm. If given a choice, Chinook salmon avoid turbidity, because severe turbidity abrades and clogs their gills.

7. Heavy Metals

Copper and zinc, common pollutants from mining waste, are highly toxic to Chinook, but the sub-lethal effects of chronic exposure to these metals are not known.

Chart 1 below delineates the preferred, tolerated, and lethal temperatures; levels of dissolved oxygen; substrate size; and water depth and velocity, as related to the life stage of Chinook salmon.

Chart 1

	Preferred	Tolerance	Lethal
Life Stage	Temperature degrees Celsius		
Adult up-stream migration	10.6 - 19.4 Fall-run		
	3.3 - 13.3 Spring-run		
Spawning	5.6 - 13.9		
Egg incubation	5.8 - 14.2		< 0.6
Juvenile Rearing	12 - 13		< 0.8 or >25.1
	Dissolved Oxygen (mg/l)		
Adult up-stream migration	> 5.0		
Egg incubation			< 1.6
Juvenile Rearing	> 4.5		
	Substrate Size (cm)		
Spawning	1.3 - 10.2		
Juvenile Rearing	silt	silt-rubble	
	Water Depth (m)		
Adult up-stream migration		> 0.24	
Spawning	> 0.24		
Juvenile Rearing	0.3 - 1.22		
	Water Velocity (m/s)		
Adult up-stream migration		<= 2.4 max sustained current	
		<= 6.1 max obstacle current	
Spawning	0.3 - 0.91		
Juvenile Rearing	0.06 - 0.24		

Coho

The following section is resourced from the 1986 biological report of Laufle et al., entitled "Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates: Coho salmon," completed for the U.S. Fish and Wildlife Service.

Runs of Coho take place on the Klamath River between August and February with a peak in November. Females lay between 1,000 and 7,000 eggs, and during various life stages, Coho eat aquatic insects, dipterans, ephemeropterans, fish, and crustaceans. The following chart exhibits limiting factors for Coho.

Chart 2

	Preferred	Tolerance	Lethal
Life Stage	Temperature °C		
Adult up-stream migration	11.8 - 14.6	7.2 - 15.6	25.8
Spawning	4.4 - 9.4		
Egg incubation	4.4 - 13.3		
	Space (m²)		
average redd size	2.8		
area per spawning pair	11.7		
year+ fish	2.4 - 5.5 per fish		
	Substrate Size		
Spawning	20% fine sediment <6.4 mm in riffle substrate		
	Silt Loads		
	< 25 mg/l		
	Depth (m)		
Spawning	shallow/ 0.18		
Juvenile Rearing	0.3 - 1.2		
	Water Velocity (m/s)		
Adult up-stream migration	2.44		
Spawning	1		
Juvenile Rearing	1		
Invertebrate Food	0.15 -1.22		

Additionally, Coho require good overhead cover from woody debris for shade and protection as well as good submerged cover for shelter from the current and from predators. They also prefer a riffle to pool ratio of 1:1, and high water velocities are beneficial as they reduce sediment.

Stressors

Previous to white settlement, Coho occurred in 582 streams in California, from the Smith River near the Oregon border to the San Lorenzo River in Central California. Of 248 of those streams, for which current Coho population information is available, 46 percent of them do not now contain Coho. It is important to note that the further south a stream is located, the more likely it is not to contain Coho (Brown et al., 1994). According to Brown et al. (1994), today's Coho population sizes are only 6 percent of population sizes of the 1940s, which includes a 70 percent decrease since the 1960s. The same study indicates that between 1987 and 1991, an average of 31,000 Coho entered California streams each year with 57 percent of these being hatchery fish. Therefore, only 13,000 Coho were non-hatchery spawners, 9,000 of which were naturalized fish of hatchery decent. This means that less than 5,000 were native Coho, and these fish came mostly from individual populations comprised of less than 100 individuals (Brown et al., 1994).

To fully understand the causes of the significant declines in both Coho and Chinook populations, human-caused stressors to the system must be examined.

Turbidity and Suspended Solids

A study by Brown and Krygier (1971) found that increased sediment production reduces light penetration causing a decrease in the production and abundance of plant material, leading to a decrease in fish food, and thus decreased production of salmonids. Bash et al. (2001) indicated that the most prevalent causes of increased sediment load to streams, either in periodic pulses or chronic levels, are logging, grazing, agriculture, mining, road building, devegetation, urbanization, and commercial construction. Brown and Krygier (1971) noted that sediment production after road building was doubled and that it was tripled after burning and clear-cutting.

Bash et al. (2001) categorized the negative effects to salmonids of unsuitable levels of turbidity, total suspended solids, and water clarity into groups:

1. Physiological effects: gill trauma; blood physiology stress from increased blood sugars, plasma glucose, and cortisol, all of which lead to decreased immunity and hindrance of osmoregulation, the smolt transition from fresh-water to saline-water-tolerant forms.
2. Behavioral effects: avoidance; changes in territoriality; foraging, and ability to escape predation; homing and migration; and the abundance and diversity of prey and microfauna are decreased.

3. Habitat: embeddedness; reduction of habitat complexity and abundance; reduction of refugia and hyporheic inputs, which are the flows that reduce water temperatures that are too high.

Additionally, increased sedimentation clogged streambed gravels, increased temperature and lowered levels of dissolved oxygen.

Temperature

Armour (1991) indicated that temperature is the single most likely critical factor affecting fish health and survival. His study stated that temperature affects migration, egg maturation, spawning and incubation success, growth, inter- and intra-specific competitive ability, and resistance to parasites, disease, and pollutants. He also added that temperatures above 22 degrees Celsius are too high for salmonid reproduction and that prolonged exposure to such temperatures can influence the success of salmonids.

Pesticides

Pesticides are a “broad class of chemical and biological agents that are purposely introduced into the environment to kill or damage organisms” (Ewing, 1999, p. 3). Pesticides are used throughout the Klamath and Salmon River basins by foresters, farmers, state, federal and local agencies, fishermen, and homeowners. Pesticides do not remain at the site of application but are carried on soil particles and in rain and irrigation water into streams and rivers, where they move downstream and come in contact with aquatic organisms. Pesticides do not always degrade over time, and some transform chemically and accumulate in plant and animal tissues, at times becoming much more concentrated in aquatic species than in the water around them. “Pesticides are capable of killing salmon and other aquatic life directly and within a short time” (Ewing, 1999, p. 4).

Ewing (1999) notes the following effects to salmonids of long-term exposure to pesticides:

- Increased stress in juveniles, making them more susceptible to predation.
- Certain pesticides are known to alter swimming ability, which affects ability to feed, increases risk of predation, and decreases ability to defend a territory or maintain a position in the river.
- Disruption of immune system functions.
- Endocrine disruption in early life stages, which can mimic or block sex hormones, leading to abnormal sex ratios, unusual mating behaviors, and the feminization of males.
- Interruption of schooling behavior, which is very common.
- Some pesticides and pollutants cause fish to seek sub-optimal temperatures.
- Some herbicides inhibit normal migration to the sea.
- Some pesticides impair the ability of salmon to complete the necessary transformations to prepare them to move from river water to seawater.

- Adult migration patterns are, at times, altered in attempts to avoid pollution, which can disrupt spawning.
- Herbicides and pesticides can interfere with food supply and cause habitat alterations.

Stressor Sources:

Logging

According to Laufle et al. (1986), logging increases sediment in streams, increases water temperature, decreases cover, increases the decomposition of organic matter in the water, increases the biological demand for oxygen, and causes severe erosion and rapid water runoff.

Genetics

Many streams contain introduced fish that came from areas outside the natural drainage of the system. That means most small populations are no longer genetically distinct (Brown & Moyle, 1991).

Commercial and Recreational Fishing

When at sea, Coho often swim within 10 meters of the water surface, which is where recreational fishing is concentrated (Laufle et al., 1986). These fish spend two years at sea; then at the end of the second summer, they converge at the mouth of the river, where they are susceptible to large commercial and recreational fishing, the majority of which occurs near shore (Laufle et al., 1986).

Climatic Factors

Factors--such as droughts, floods, and El Nino effects--have negatively impacted salmonid productivity (Brown & Moyle, 1991).

Roads

Flanagan et al. (1998) noted that on federally managed lands in the Pacific Northwest, there are over 250,000 road-stream crossings; that is, locations where roads cross natural drainages. Many of these crossings have culverts that will plug or deteriorate without maintenance and fish will be blocked from passing. These crossings can also lead to chronic sedimentation of streams or have catastrophic effects during floods (Flanagan et al., 1998). The study concludes that sediment delivery and resource damage can include negative effects on fish, the domestic water supply, refugia, flows, and access to spawning habitat.

Irrigation

Laufle et al. (1986) state that irrigation methods lead to many negative effects on salmonids beyond the obvious negative impact of removing water from the system. Damming can have a critical impact, since dams can block migration, spawning, and rearing habitat. Spillways increase mortality, and there is increased predation above and below reservoirs. Additionally, more pollutants may enter the system from irrigation ditches and canals, and juveniles may be entrained.

Hatcheries

Allen and Hassler (1988) have pointed out that hatchery-raised fish compete with wild salmon for food and space, and their presence may encourage native fish to immigrate to the ocean, prematurely affecting their growth and survival rate. Additionally, hatchery Chinook are known to prey on smaller wild Chinook.

Additional Sources of Stress to River Systems

Laufle et al. (1986) list additional stressors to river systems such as industrial projects which both consume large amounts of water and increase pollution; channelization, which eliminates pools and riffles and increases siltation; and residential development, which causes flooding and erosion, paper mills, forest roads, livestock grazing, and silviculture.

Appendix D
REPLACEMENT COSTS OF WILD SALMON AS A FOOD SOURCE

Norgaard (2004) found that denied access to traditional food sources, including wild salmon, is related to illnesses including diabetes, obesity, heart disease, tuberculosis, hypertension, kidney troubles and strokes. The Karuk Tribe's enrollment now exceeds 3,000 individuals; in 2004, fishing at Ishi Pishi Falls harvested a mere 100 fish (Pennington, 2004). Replacement costs of denied access salmon with store-bought salmon are explored below:

Cost of salmon in stores within close geographic proximity to Somes Bar, CA (2005):

Store Location	Distance from Somes Bar	Store Type	Farmed	Wild	Price/lb. Wild salmon
Arcata	86 miles	Supermarket	yes	no	N/A
		Local Grocer	no	yes	\$9.99
		Local Grocer	no	yes	\$12.99
Eureka	93 miles	Supermarket	yes	no	N/A
		Supermarket	no	yes	\$10.99
Yreka	113 miles	Supermarket	no	yes	\$7.49
		Supermarket	no	yes	\$8.99
Etna	56 miles	Supermarket	yes	no	N/A

No stores within 50 miles of the ancestral territory sold fresh salmon. The closest store was in Etna; however, this store sold farmed salmon. Members of the Tribe living on the ancestral territory would have to travel at least 86 miles to buy fresh, wild salmon.

The median cost for a pound of fresh, wild-caught salmon is \$9.99 or, for the sake of calculations, \$10.00. It would cost a Karuk Tribal member living in or near the ancestral territory close to \$4400 a year to eat a traditional diet of salmon.

1.2 lbs./day per person * 365 days/year = 438 lbs./year per person
438 lbs./year * \$10.00/lb = \$4380/year per person

Using a Tribal enrollment figure of 3,000 people we can estimate the current annual cost of replacement salmon for the Karuk Tribe:

1.2 lbs./day * 3000 people * 365 days/year = 1,314,000 lbs./year
1,314,000 lbs./year * \$10.00/lb = \$13,140,000/year

Appendix E
 COSTS OF FINES AND TOTAL BAILS FOR FORESTRY VIOLATIONS

Section	Offense	M or I	Base Fine	Total Bail
Forestry				
4421	Burning Lands of Another	M	\$100	\$340
4422(a,b)	Allowing Fire to Escape	M	\$150	\$510
4423	Permit Required for Burning	M	\$100	\$340
4423.5	Restricted Use of Fire	M	\$100	\$340
4426	Setting Backfire without Supervision	M	\$150	\$340
4436	Refusing to Fight Forest Fire	M	\$100	\$340

Source: Uniform Bail and Penalty Schedules. California Rules of Court. Rule 4.102. January 2004 Edition. The Judicial Council of California, San Francisco, CA.

Appendix F
COPY OF SURVEY INSTRUMENT*

Thank you for your assistance with the survey. We begin with questions about where food in your household comes from.

1. Does anyone in your household hunt for any of the following animals for food? Please mark all that apply.

- Deer
- Elk
- Bear
- Squirrels
- Birds
- Other, please specify _____

2. Does anyone in your household fish for any of the following for food? Please mark all that apply.

- Steelhead
- Spring Chinook
- Fall Chinook
- Coho
- Eels
- Sturgeon
- Other, please specify _____

3. How many meals do you eat per month that include subsistence food (e.g. from hunting, fishing, gathering acorns or other food)?

- None
- About one meal per month
- Two to three meals per month
- One or more meals per week
- Meals contain food from subsistence on a daily basis

4. When you were a teenager, how many of your meals per month included subsistence food including hunting, fishing, gathering acorns or other food?

- None
- About one meal per month
- Two to three meals per month
- One or more meals per week
- Meals contain food from subsistence on a daily basis

**Font and layout have been adjusted to fit into the format of this report. The original survey was 11 pages long.*

5. How often do you buy salmon at the store?
- Never
 - Several times a year or for special occasions only
 - Several times a month
 - 1 or 2 times a week
 - 3 to 5 times a week
6. How often do you buy or trade for salmon from other tribes (e.g. Yurok)?
- Never
 - Several times a year or for special occasions only
 - Once a month
 - Two or three times a month
 - Once a week
 - Several times a week
7. How much money do you spend on salmon in a year (from all sources)?
- None, I don't buy salmon
 - Less than \$25.00 a year
 - Between \$25.00 and \$100.00 a year
 - Between \$100.00 and \$200.00 a year
 - Over \$200.00 a year
8. If you don't purchase salmon, why not? You may mark more than one category.
- I only eat salmon that I catch or that family or friends catch for me
 - I don't like the taste
 - Salmon is not available at my local store
 - It is too expensive to purchase salmon
 - I do not feel good about buying salmon
 - Other, _____
9. How many people do you buy food for in your household? _____
10. Please estimate the amount your household spends on average on meat and fish at the store in a week?
- None
 - Less than \$10.00 a week
 - Between \$10.00 and \$20.00 a week
 - Between \$20.00 and \$30.00 a week
 - Over \$30.00 a week

11. Please estimate the amount your household spends on average on food at the store in a week?

- None
- Less than \$20.00 a week
- Between \$20.00 and \$40.00 a week
- Between \$40.00 and \$100.00 a week
- Over \$100.00 a week

12. Do you buy drinking water at the store? Yes No

13. How far do you have to drive on average to buy your groceries?

- 0 to 15 miles one way
- 16 to 30 miles one way
- 31 to 60 miles one way
- 61 to 80 miles one way
- Over 80 miles one way

14. How often does someone in your household buy food at the store?

- Once a month
- Two or three times a month
- Once a week
- More than once a week

15. Does your household receive Food Assistance?

- Yes (answer 16 & 17, skip 18) No (skip questions 16 and 17, start again at 18)

16. If your household does receive food assistance, which do you receive?

- Senior lunch from Tribe
- Food stamps
- The commodity truck
- Commodities distributed in Hoopa
If yes, approximately how far do you drive to Hoopa

Other, please explain _____

17. How many meals per month in your household include food from food assistance?

- None
- About one meal per month
- Two to three meals per month
- One or more meals per week
- Meals contain food from food assistance on a daily basis

18. If your household does not receive food assistance please explain why not:

- Not needed
 - Our household would like food assistance but we don't qualify
 - Our household would like food assistance but we don't have information
 - Our household would like food assistance but we cannot get it for other reasons. Please explain
-

We are also interested in learning more about the relationship between federal and state agencies and subsistence and ceremonial activities.

19. Has anyone in your household been questioned/harassed by game wardens (e.g. arrested, questioned, hassled) while doing any of the following activities for food or ceremonial purposes?

- Gathering mushrooms
- Fishing
- Hunting
- Eeling
- Other, please specify _____
- Nobody in my household has been questioned.

20. Have any of the above activities decreased in your household due to the presence of regulations or negative encounters with game wardens?

- Yes
- No

If yes, please explain: _____

21. Has anyone in your household been questioned/harassed by Forest Service employees while gathering any of the following materials for cultural purposes?

Firewood

Basketry materials

Other cultural use plants or animals

Please specify _____

Other, please explain _____

22. Have any of the above activities decreased in your household due to the presence of regulations or negative encounters with the Forest Service?

Yes

No

If yes, please explain: _____

We are also trying to understand the economic impacts of the change in fish runs on the Klamath River. We have some questions about your experience of changes in fishing and tourist related employment on the river.

EMPLOYMENT in fisheries dependent fields

For the following questions, please specify on work done **ONLY** in the **Klamath River Basin**.

23. Do you currently, or have you in the past, worked as a fishing guide for any part of the year?

Yes

No

If yes, between what years did you work as a fishing guide? _____

24. Do you currently, or have you in the past, worked at a hotel, motel, lodge, or campground?

Yes

No

If yes, between what years did you work in a hotel, motel, lodge, or campground?

25. Do you currently, or have you in the past, owned a hotel, motel, lodge, or campground?

Yes No

If yes, between what years did you own a hotel, motel, lodge, or campground?

If you have sold this establishment, why did you sell it?

26. Do you currently, or have you in the past, worked at a restaurant or store?

Yes No

If yes, between what years did you work at a restaurant or store? _____

27. Do you currently, or have you in the past, owned a restaurant or store?

Yes No

If yes, between what years did you own a restaurant or store? _____

If you have sold this establishment, why did you sell it?

Now we have some questions about the kinds of houses people live in:

ELECTRICITY

28. Does your home have electricity? Yes No

29. If your home has electricity, do you (check one):

Receive power from a public utility

Generate the electricity ourselves

30. If you generate electricity yourself, which method(s) is used?

Generator

Water wheel

Solar panels

Other, please specify _____

31. If you do not have public electrical service, why is this?

- No public service is provided in my home area
 Public electrical service is too expensive
 Other, please specify_____

PHONE SERVICE

32. Does your home have phone service? Yes No

33. If your home does not have phone service, why is this?

- No phone service is provided in my home area
 Phone service is too expensive
 Other, please specify_____

HOME WATER SUPPLY

34. Does your home have running water?Yes No

35. If yes, what is the source of your water?

- Public water supply
 Private well or spring
 Private creek
 Other, please specify_____

If your water comes from a well, spring or creek, please indicate your response to the following statements based on a scale of 1 to 7.

1 – strongly disagree, 4 – no opinion, 7 – strongly agree.

36. I have worried that my water is not safe to drink.

Strongly disagree - 1 2 3 4 5 6 7 - Strongly agree

37. I have worried that my water is contaminated by chemicals such as herbicides and pesticides.

Strongly disagree - 1 2 3 4 5 6 7 - Strongly agree

38. When maintained, my water supply does not run dry.

Strongly disagree - 1 2 3 4 5 6 7 - Strongly agree

Now we have some questions about how diet, lifestyle and health may have changed in your family over time.

DIET

39. When did you eat salmon this past year?

- Never
 Only during ceremonies
 Only when the fish were running
 Both during ceremonies and when the fish were running but at no other times
 Throughout the year

40. Please indicate how much salmon you ate in each month last year by placing an "X" in the appropriate box.

	none	one or two times	once a week	more than once a week	once a day or more
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

41. How often did you eat salmon as a teenager?

- Never
 Only during ceremonies
 Only when the fish were running
 Both during ceremonies and when the fish were running
 Throughout the year

42. Please indicate how often you ate salmon as a teenager by placing an “X” in the appropriate box.

	none	one or two times	once a week	more than once a week	once a day or more
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					

43. If you eat less salmon now than as a teenager, why is this?

- Don't like the taste
 No longer live on the river, don't have access to salmon
 Less salmon in the river than before
 Nobody brings salmon to me anymore
 Other, please specify _____

44. Please estimate how many of the following you gathered for food this year by placing an “X” in the appropriate box:

	Eel	Spring Chinook	Fall Chinook	Coho	Sturgeon	Steelhead Trout
None						
10 or less						
11-50						
51-100						
101-500						
501-1,000						
1,001 or more						

45. Given the number of fish and eel in the river and regulations on harvest, are you able to adequately gather the following to fulfill your needs:

- Eel Yes No
- Salmon Yes No
- Sturgeon Yes No
- Steelhead trout Yes No

46. If not, why not? Please check all that apply.

- There are too few fish
- The fish are not healthy
- Regulations do not allow me to harvest what I need
- I cannot provide for myself and have no one to provide for me
- Other, please specify _____

47. Are there fish that your family gathered that you no longer harvest? Yes

No

If no, skip to question number 50.

48. If yes, for each food please estimate the time period in which gathering stopped or became an insignificant food source in your family by marking an X in the appropriate box:

	Eel	Spring Chinook	Fall Chinook	Coho	Sturgeon	Steelhead trout
before 1950						
1950's						
1960's						
1970's						
1980's						
1990's						
2000's						

49. For each food please specify the reason that gathering stopped in your family by marking an X in the appropriate box.

	Eel	Spring Chinook	Fall Chinook	Coho	Sturgeon	Steelhead trout
knowledge of gathering lost						
no longer enough to catch						
family moved away from the river						
no longer think they taste good						
Other						

EXERCISE

50. It is important to document any additional changes in lifestyle that may affect health patterns including exercise, smoking and alcohol. How many times a week do you engage in some form of exercise for 20 min or more (e.g. go for a walk, bicycle ride, jogging, other).

- Rarely to never
- Several times a month
- Once a week
- Twice a week
- Three or more times a week
- Daily

51. Did you get exercise doing any of the following as a child or teenager?

- Gathering acorns
- Packing salmon
- Fishing for salmon
- Gathering berries or mushrooms
- Gathering wood

52. Do you get exercise gathering food now?

- Yes
- No

53. Do you smoke tobacco:

- Daily
- Weekly
- Monthly
- Never

54. Do you consume alcohol:

- Daily
- Weekly
- Monthly
- Never

HEALTH CONDITIONS

We are trying to better understand the kinds of health problems Karuk people experience today, as well as how these may have changed over time. Please remember that this survey is confidential; your name will not be attached to any information that you give to us.

55. Do you experience any of the following:

- | | | |
|---------------------|------------------------------|-----------------------------|
| High blood pressure | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Hypertension | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Diabetes | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Obesity/overweight | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Heart condition | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Cancer | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Alcoholism | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

56. Do you have a family history (parents, siblings, grandparents) of any of these conditions? Please mark Yes or No for each condition.

- | | | |
|---------------------|------------------------------|-----------------------------|
| High blood pressure | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Hypertension | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Diabetes | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Heart condition | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Obesity/overweight | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Cancer | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Alcoholism | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

57. Please estimate the year this condition first appeared in your family by placing an X in the appropriate box.

	Before 1950's	1950's	1960's	1970's	1980's	1990's	2000's
Hypertension							
Diabetes							
Heart conditions							
Obesity/overweight							
Cancer							

58. What year were you born? _____

59. Are you: Female Male

To better understand all of the ways in which peoples' lives have been affected by the changes in health, we would like to respectfully ask you about the age and reason that members of your family have passed on.

60. If you do not know the exact age of death you can put a question mark (?) in the box, or if you know the approximate age, you can put a range in the box (60-65, or in their 90's).

	Age of Death
Husband, Wife or Partner	
Father	
Mother	
Grandfather on mother's side	
Grandmother on mother's side	
Grandfather on father's side	
Grandmother on father's side	
Other (please indicate relationship)	

61. Please place an “X” in the appropriate box.

	Old age	Diabetes	Heart Problems	Cancer	Alcoholism	Suicide	Other	Don't know
Husband/Wife or Partner								
Father								
Mother								
Grandfather mother's side								
Grandmother mother's side								
Grandfather father's side								
Grandmother father's side								
Other								
Other								
Other								

*Thank you for your time and assistance with this project.
Results from the survey will be printed in an upcoming Tribal newsletter.*

If there is anything else you'd like us to know please let us know here or attach a separate page

