Working Draft:

MID-KLAMATH SUBBASIN FISHERIES RESOURCE RECOVERY PLAN

Prepared for: **Karuk Tribe of California**
Department of Natural Resources

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Section 1: Introduction

The Klamath River Fisheries Task Force determined the need for individual plans from the Klamath River subbasins that were identified in their 1991 Long Range Plan (Kier Associates, 1991). The Middle Klamath subbasin is defined as the portion of the Klamath River watershed encompassing all sub-watersheds (excluding the Salmon River, Scott River and Shasta River) between the Trinity River (River Mile 43.4) and Iron Gate Dam (River Mile 190.1).

The primary goal for this plan is to improve Middle Klamath River subbasin contribution to the Klamath River Basin's anadromous fish. This working draft identifies actions needed, whether it may be on-the-ground manipulation of impaired aquatic or terrestrial conditions, or more passive protection of unimpaired conditions.

Aquatic conditions and fisheries resources in the Klamath Basin have steadily declined for the past 150 years, and more rapidly during the past 50 years. The Klamath River fishery has a very complex and wide variety of problems, and public concerns about deteriorating salmon stocks have heightened in light of a recent large-scale fish kill that occurred in the Klamath River system. This plan only addresses problems within the scope of the Middle Klamath subbasin. Basin wide fisheries recovery will take a cooperative planned effort from all subbasins and Basin stakeholders.

Declines in Klamath River anadromous fish have impaired river ecosystem function, and have equally impacted tribal, sport and commercial fisheries. In addition, other land and water uses are restricted by management regulations that have been put into effect in response to these ecological system failures. Combined, these factors make planning recovery actions complex and challenging. The Middle Klamath River subbasin is especially challenging due to its large size and diversity in terms of landscape, land jurisdiction, socio-economic conditions, politics, and cultural representation.

The purpose of the Draft Mid-Klamath Subbasin Plan is to identify the set of core variables pertaining to ecological function in the subbasin, and to provide management priorities and objectives to guide land managers and stakeholders in their efforts to improve conditions within the subbasin. The 1991 Long Range Plan suggests that cooperation between stakeholders must take place in order to fully address the restoration needs in the Basin. The plan will be administered by the Karuk Tribe of California, in cooperation with federal and state managing agencies, private landowners, and local communities. Public input solicited through meetings, bulletins, and personal interface was incorporated into this plan through actions of the Karuk Tribe's subbasin coordinator.

The focus of this document is on the primary physical and biological processes in the subbasin that contribute to the Klamath River's unique ecological and evolutionary attributes (most importantly, its anadromous fish runs). Active restoration will focus on those processes most degraded by historic and current land uses. Passive restoration will focus on protection of currently functioning subbasin processes.

In this document, land use history is divided into three major eras: Native Inhabitation (prehistory-1850), Western-European Entrance and Settlement (1850-1950), and Resource Extraction and Contemporary Setting (1950-present day). Cumulative Watershed Impacts affecting specific regions in the Mid-Klamath subbasin are discussed. Upland management is considered, as it pertains to aquatic and ecological integrity. Discussion of upland management includes: grazing, mining, timber harvest, road building, and fire management. Opportunities for protection of wilderness and or unmanaged pristine areas are described. Regional wildlife is briefly described and species are listed. Biological and physical monitoring needs are described. Public comments from meetings held in Happy Camp, Orleans, and Scott Bar are included. Areas identified for future inclusion in upcoming Mid-Klamath land management proposals are summarized in "Planning Needs and Information Gaps".

Section 2: Mid-Klamath Subbasin Description

Mid-Klamath General Description

The Mid-Klamath subbasin, as defined by the Klamath Basin Fisheries Task Force, drains an area between Weitchpec (Klamath-Trinity River Confluence) and Bogus Creek (at Iron Gate Dam). This is an artificial construct, within an unbounded portion of the greater Klamath Watershed. "Unbounded" specifically refers to the influence of the Upper Klamath, Lower Klamath and the Trinity River drainages on Mid-Klamath ecosystem function. Within the subbasin, "unbounded" also refers to the direct effects of the Shasta, Scott, and Salmon River watersheds on the Mid-Klamath main stem.

Within this artificial construct, the watershed has been divided into eight distinct sub-watersheds for purposes of this plan. These sub-watershed regions are titled: Volcanic Outer Region, Checkerboard, Red Butte, Grider-Elk, Siskiyou, Western Marble Mountain, Orleans, and Red Cap. These regions were chosen based on the following factors:

- Influential Tributaries
- Biological and Physical Processes
- Cumulative Watershed Impacts (low or high)
- Key Issues and Priorities
- Land jurisdiction and management
- Land use history
- Geographic Area
- Restoration Action Opportunities

The lower Mid-Klamath includes the main stem and all watersheds from Weitchpec to Grider Creek, excluding the Salmon River. The upper Mid-Klamath includes all watersheds from Seiad Creek to the Iron Gate Reservoir, excluding the Scott and Shasta Rivers. This break loosely separates the Pacific Maritime influenced western subbasin, from the Interior and Continental climates of the eastern subbasin. It also captures the

general shift from United States Forest Service (USFS)-based land ownership in the west to mixed federal and private ownership in the east.

Lower Mid-Klamath:

The lower Mid-Klamath subbasin is characterized by a coastal–influenced, pacific-maritime climate, grading to interior climates of the Klamath Range. The communities of Weitchpec, Orleans, Somes Bar and Happy Camp are included within this area, which comprises the Ancestral Karuk Territory. Karuk lands are now controlled by the USFS Klamath and Six Rivers National Forests. A Memorandum of Understanding between the Karuk Tribe and the USFS increases Tribal participation in management of these lands. Private ownership is restricted to small parcels, principally along river and creek corridors, often associated with homesteads, patented mining claims, or the communities of Weitchpec, Orleans, Somes Bar, and Happy Camp.

Currently, the highest integrity fisheries of the Mid-Klamath subbasin reside within the lower watersheds, particularly the "Key Watersheds" defined by the North West Forest Plan: Bluff, Red Cap, Camp, Dillon, Clear, Elk, Indian and Grider Creeks (excluding the Salmon River subbasin). The lower subbasin tributaries afford the largest quantities of cold, high quality water and accessible habitat.

These watersheds tend to be highly vegetated with rugged, steep slopes. Most stream channels are defined by very steep headwater channels. The southern and western Siskiyou Crest, western Salmon Mountains, and western and northern Marble Mountains form the principle divides of this region.

Highly productive mixed hardwood / conifer forests transition upslope to mixed conifer evergreen and true fir forests, with sub-alpine forests / meadows at the highest elevations. Extensive areas of fire-induced early seral and montane chaparral create a complex mosaic across much of the landscape. The Siskiyou Crest is characterized by large ultramaphic (e.g. Serpentine / Peridotite) exposures. Unique plant assemblages with reduced productivity and increased rarity correspond with this geology.

Large roadless areas remain in many of the most rugged areas that are peripheral to the Trinity Alps, Marble Mountains, Siskiyou and Red Butte Wilderness Areas. The rugged topography of the landscape in the subbasin is one factor that has contributed to these areas remaining roadless. Accessible National Forest lands within the subbasin, other than wilderness areas, have been utilized for timber production with accompanied road systems development. Wilderness designation was afforded in 1964 to parts of the Trinity Alps and Marble Mountains (previously primitive areas), and expanded in 1984 along with the additions of the Siskiyou and Red Buttes. These protected areas and peripheral roadless areas form the core reserve of functioning wildlands in the Mid-Klamath (see Roadless Areas: Mid-Klamath Subbasin, page 25).

Upper Mid-Klamath:

The upper Mid-Klamath subbasin is characterized by an interior montane climate, grading to the true continental climate of the Great Basin. The communities of Seiad, Hamburg, Horse Creek, Hilt and Hornbrook, are included within this area. Karuk Ancestral Territory borders Shasta Tribal Lands, further shifting to the Klamath Tribal lands of the upper basin. Land ownership changes at Horse and Beaver Creeks from contiguous jurisdiction under the USFS to a mixed checkerboard of small private land ownership and large corporate commercial ownership.

The fisheries of the upper Mid-Klamath are impaired in terms of habitat quality, quantity, and availability (Kier 1991). This is partially due to the presence of Iron Gate Dam at the eastern edge of the subbasin, which restricts fish passage. In addition, there is concern about the fish hatchery at Iron Gate Dam and its potential impacts to the genetic and biological integrity of wild salmonids. High densities of naturally spawning chinook salmon in Bogus Creek could be attributed to the fish blockage at Iron Gate Dam and the close proximity of Iron Gate Hatchery. Spawners in Bogus Creek are included in the natural escapement numbers used for the Klamath River run size estimate. This may lead fisheries managers to overpredict wild salmon run size. However, this is an issue that should be investigated with further research.

The drainages of the upper Mid-Klamath transition from the rugged montane topography of the interior Klamath range to the volcanic derived features of the Cascades and Modoc Plateau. Constrained by the inner canyons and steep slopes of the Interior, the Klamath River opens into the tableland plateaus and subdued relief of the upper basins. Tributaries are often deeply cut and narrow, with moderate-low relief terrain above. Cottonwood Creek and Willow Creek consist of broad valley floors and that are now largely agricultural. The east-west (upstream-downstream) transect from Seiad to Bogus Creek results in a steep climatic gradient from interior and pacific maritime influences to a true continental climate. A resultant shift in vegetation pattern from Klamath Range to Great Basin Alliances occurs. Mixed conifer / hardwood associations of Seiad, Walker, O'Neil, Horse and Beaver Creeks gives way to the Chaparral Scrub, Sagebrush Steppe, and Juniper Woodland types of Humbug, Cottonwood, Willow, and Bogus Creeks. Upper slopes allow for the maintenance of mixed-conifer dominated canopies along the higher elevation slopes and ridges of the eastern periphery.

The climate, conditions, and vegetation types of the upper Mid-Klamath directly influence human settlement and land disposition patterns. The economy of the lower Mid-Klamath is primarily based on timberland resources, whereas grazing and water-intensive irrigated agriculture is central to the upper Mid-Klamath. The historic importance of railroad arteries with respect to the commerce of communities such as Hornbrook, has given way to the Highway 5 corridor.

Some of the primary ecological issues pertaining to the upper Mid-Klamath include:

- Dams, diversions, and groundwater utilization
- Mining influences along the main stem and tributaries

- Introduction of non-native plant and animal species.
- Small-scale agricultural and municipal development, such as water diversions for cattle and alfalfa fields from Cottonwood Creek, Bogus Creek, Willow Creek, Horse Creek, Humbug Creek, Doggett Creek, Barkhouse Creek, Beaver Creek, and Seiad Creek.
- Tribal cultural forest and range management.
- Loss of habitat supportive of migratory water fowl and the Pacific Flyway.

In addition, the following are issues that affect both the lower and upper Mid-Klamath:

- Hatchery influence on genetics of wild anadromous fish
- Extirpation of many fish and mammal species (e.g. beaver, grizzly, wolf, and upper basin salmonids)
- Decrease in quality and quantity of fisheries habitat

Mid-Klamath Land History Synopsis

The history of human presence within the Mid-Klamath subbasin is divided into three major eras:

- Native American Residence (pre-history-1850)
- Exploration, Western European Entrance, Settlement and Statehood: (1850-WWII);
- Resource Extraction / Contemporary Setting (WWII-Present).

Native American Residence (prehistory-1850):

The Karuk Tribe's ancestral territory makes up roughly half the land base in the Mid-Klamath subbasin, including the area downriver of Seiad Valley to Aikens Creek. The subbasin includes a small section of the Yurok and Hupa reservations between Aikens Creek and the Trinity River. The Shasta Tribal territory makes of the rest of the subbasin above Seiad Valley. The earliest origin dates of native presence in the Mid-Klamath region are not known, though some have estimated that indigenous habitation originated in the area as early as 10,000 years ago.

Settlement patterns were focused along the river corridor. Principle nutritional staples were anadromous fish, upland game, plants and plant products. In general, the tribes of the Mid-Klamath managed natural resources through the use of prescribed fire and by limiting take of plant and animal species. Spiritual practices and ceremonies, such as the annual world renewal ceremonies and first salmon ceremonies, were at the root of tribal land management.

European settlement in the mid nineteenth century had devastating impacts on the tribes of the Mid-Klamath. Efforts of Western settlers to gain control of tribal lands resulted in the extirpation of the majority of indigenous people in the area. Tribal people quickly went from being primary land managers to having little management power in the subbasin. In spite of this change, the Karuk Tribe continues to have increased

involvement in land management efforts, continues to practice spiritual ceremonies, and still relies on anadromous fish for subsistence.

Exploration, Western European Entrance, Settlement and Statehood: (1850-World War II):

The earliest known interior Klamath exploration, conducted by Jedediah Smith, did not occur until 1827-1829. Smith explored the Trinity River and lower Klamath in this expedition. Ogden and Fremont explored the eastern Klamath region in 1829-1830 and 1845-1846, respectively. However, the true entrance, occupation, and settlement of the Klamath region did not begin until and the declaration of California statehood in the early 1850s. Within the condensed period of 1850-World War II, major changes affecting the Mid-Klamath occurred, including:

- Alteration of tribal presence and land management
- Initiation of modern resource extraction, such as gold mining and logging
- Extirpation of beaver, wolf, grizzly, and elk
- Draining of bottomlands
- Watershed diversions, and
- Building of the Copco dam across the Klamath

The Gold rush of the late nineteenth century, though productive, turned bust, and the highest population densities of the Mid-Klamath had come and gone. By the close of the period, the transition from early occupation to settlement to resource extraction had been completed.

Resource Extraction / Contemporary Setting (World War II-Present):

Following the events of World War II, attention was redirected back to the hard work of nation building. The emphasis was on resource extraction, including timber resources in the Mid-Klamath. Due to the productivity of Mid-Klamath forests, the region contributed significantly to the production of timber products for consumption. Fire suppression was put into effect to protect these resources from combustion. A large agency structure was developed and funded to oversee resource management in the region.

This period also saw the completion of major water projects, dams and aqueducts. The Iron Gate and Copco II dams were built on the Klamath River. The upper Klamath basin was promoted for its irrigated agriculture: incentives were given to veterans and complex diversions, ditches, and irrigation schemes were developed. This hydrological alteration cut off a large portion of salmon habitat in the upper basin, and is now believed to be a critical factor in the deterioration of anadromous fisheries in the watershed.

Sub-Watershed Region Descriptions

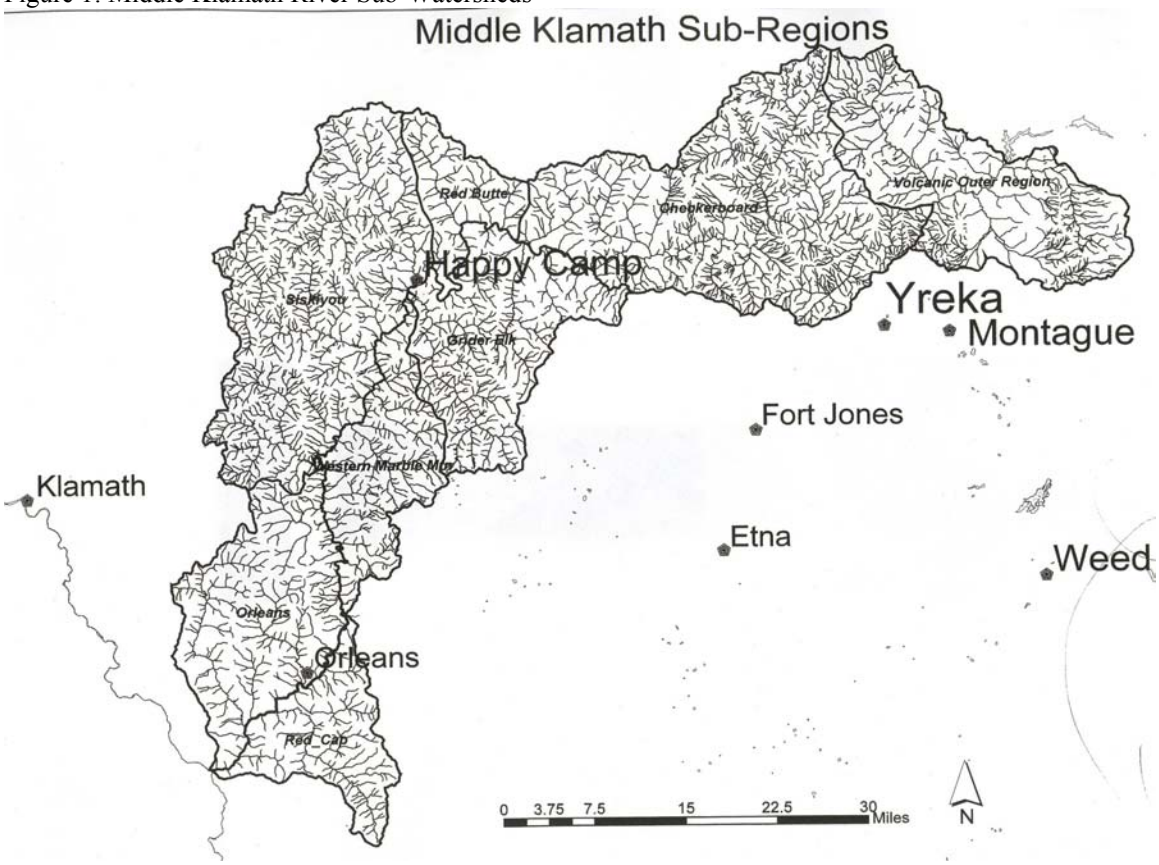
Eight sub-watersheds are identified within the Mid-Klamath Subbasin. These sub-watersheds were chosen based on landscape / watershed contiguity, biogeography, and

the specific land management circumstances distinct to each. There is a direct relationship between the natural features of these areas, their derived uses, resultant alterations, and future restoration. The eight sub-watersheds are:

- Volcanic Outer Region
- Checkerboard
- Red Butte
- Grider Elk
- Siskiyou
- Western Marble Mountain.
- Orleans
- Red Cap

(see Figure 1.)

Figure 1: Middle Klamath River Sub-Watersheds



Each sub-watershed description includes:

Influential Tributaries:

Significant and influential direct tributaries to the Klamath River main stem are listed at the beginning of each sub-watershed description. These often have historic fisheries importance, either as direct suitable habitat or as sources of freshwater. The linkage of contiguous tributaries into these sub-watershed regions have seamless boundaries, and do

not exclude any terrestrial surface of the Mid-Klamath. Seventy-nine named tributaries have been identified within the eight sub-watersheds. The Shasta, Scott, and Salmon are excluded.

Area Description:
A brief description of included lands and tributaries of each sub-watershed, focusing on boundary creeks as well as physical geography, is given.

Cumulative Watershed Impacts
Influential sources of anthropogenic disturbance are summarized. Topics include:

- Land ownership and use
- Aquatic influences (e.g. dams, diversions, use, alterations to water quality / quantity)
- Hydrology and fisheries affects of land management.
- Resource extraction (e.g. mining, timber harvest, grazing influences)
- Specific management influences (e.g. fire suppression and transportation systems)

Attempts are made to accentuate site specificity, and include sources of cumulative watershed impacts.

Key Issues:
Specific critical watershed influences from the Cumulative Watershed Impacts summary are described in more detail. This section is used to prioritize the most influential sources of Cumulative Watershed Impacts specific to each sub-watershed region.

Key Priorities:
Restoration priorities that are likely to return the greatest net advantage to watershed function, specifically focused on the health of the anadromous fisheries of the Mid-Klamath, are identified. Management opportunities directed toward restoration and landscape protection are given. Community outreach, education, and cooperation needs are summarized.

Restoration Action Opportunities:
Restoration opportunities are described, specific to the source of influence to be mediated or alleviated. Upland, in-Stream, road-System, mining, and grazing related restoration opportunities are emphasized.

Volcanic Outer Region

Maps of this region are located in Appendix A, pages 2-4.

Influential Tributaries:
Bogus Creek
Dry Creek
Little Bogus Creek
Willow Creek
Cottonwood Creek

Williams Creek

Area Description:

The Volcanic Outer Region consists of combined slopes and tributaries of the Main Stem Klamath River. It ranges from Cottonwood Creek to the Iron Gate Reservoir, including south side tributaries (Bogus, Willow). It drains the Oregon-California border, Siskiyou / Cascade National Monument, Willow Mountain., and an open volcanic plateau.

Cumulative Watershed Impacts:

- Fish hatchery: 1) Artificial propagation results in competition pressure from hatchery fish on wild salmon stocks, and can increase disease susceptibility in the wild fish. 2) Collection of carcasses and eggs at the hatchery decreases food and nutrient recycling, and may indirectly affect juvenile salmonids that depend on those nutrient sources.
- Major and minor impoundments (especially Iron Gate Dam), diversions, groundwater utilization: associated hydrological affects
- Gravel extraction
- Grazing (especially riparian grazing), agricultural conversion, exotic species introduction, dispersal, and colonization
- Transportation corridor (Highway 5, Railroad)
- Timber harvest on upper slopes, and road system management
- Land Management: Bureau of Land Management / United States Forest Service Checkerboard with extensive private commercial, industrial, residential, and agricultural lands

Key Issues:

- Water diversion, impoundment, ground water utilization
- Grazing (especially riparian grazing)
- Fish hatchery affects on salmonid ecology
- Timber harvest on forested slopes

Key Priorities:

- Riparian exclusion of cattle and revegetation
- Removal and restoration of (or fish passage at) main stem dams (Iron gate, Copco 1, Copco 2)
- Fish hatchery reevaluation

Restoration Action Opportunities:

- Grazing: Riparian fencing, cattle exclusion, revegetation, exotic species eradication.
- In-Stream: Removal of hydrologic impediments, and diversions. Fish screens
- Long term regeneration of Main Stem Klamath River channel, hydrology and habitat.
- Road System: Site specific road decommissioning, seasonal closures.
- Uplands: Wetland inundation, historic fire regime return.

Checkerboard

Maps of this region are located in Appendix A, pages 5-7.

Influential Tributaries:
Ash Creek
Dutch Creek
Empire Creek
Humbug Creek
Vesa Creek
Little Humbug Creek
Lumgrey Creek
Barkhouse Creek
Beaver Creek
McKinney Creek
Doggett Creek
Kohl Creek
Horse Creek
Seiad Creek

Area Description: The checkerboard sub-watershed region consists of combined slopes and tributaries to the Main Stem Klamath River. It ranges from Ash Creek to Seiad Creek (north side), to the Humbug Creek to McKinney Creek (south side). It drains the Eastern Siskiyou crest, and Northern Scott Bar Mountains.

Cumulative Watershed Impacts:

- Historic mining (mineral) on tributaries and main stem, including limited gravel mining
- Timber harvest and fire management
- Road systems: road density and location, and road-related slope failures. Hwy. 96 channelization effects on Main Stem, with fish barriers
- Hydrological impacts of Iron Gate dam
- Upland water diversions: quantity / quality affects, fluvial geomorphology alterations.
- Non-native species introduction and dispersal.
- Land Management: USFS-Checkerboard management: corporate commercial timberlands, small private agriculture, grazing, residential.

Key Issues:

- Checkerboard land jurisdiction
- Road systems,
- Grazing, Timber harvest,
- Mining (historic and current)

Key Priorities:

- Education, communication, cooperation
- Cross-jurisdictional watershed management

Restoration Action Opportunities:

- Mining: Tailing reclamation, riparian restoration

- Road System: Decommissioning, seasonal closure, storm proofing, maintenance / upgrading, slope stabilization / landslide prevention
- Grazing: Riparian fencing, cattle exclusion, revegetation
- Uplands: Fuels reduction, return to historic fire regime; roadless area protection.
- In-Stream: Remove diversions, modernize ditches and irrigation, fish screens, fish access, habitat improvement structures.

Red Butte

Maps of this region are located in Appendix A, pages 8-10.

Influential Tributaries:
Portuguese Creek
Fort Goff Creek
Thompson Creek
Cade Creek

Area Description:
The Red Buttes sub-watershed region consists of combined northern slopes and tributaries to the Main Stem Klamath River: Portuguese Creek to Cade Creek. It drains Red Buttes Wilderness, bounded by Devils Peak Ridge to the east, and Thompson Ridge / Slater Butte to the west.

Cumulative Watershed Impacts:
- Low cumulative impacts are associated with Portuguese, Fort Goff and Upper Thompson Creeks. Due to the extensive roadless nature of the Red Butte sub-watershed region, many terrestrial processes have been retained.
- Fire suppression and management
- Timber harvest, especially salvage logging (lower Thompson and Cade Creeks)
- High road density (>4 roaded miles per square mile (USFS, 1998))
- Land Management: Klamath National Forest

Key Issues:
- Wilderness expansion opportunity (Red Buttes Roadless Area: Upper Thompson, Fort Goff and Portuguese Creek watersheds)
- Road system management: Lower Thompson and Cade Creeks
- Fire suppression and management

Key Priorities:
- Wilderness expansion.
- Road decommissioning
- Return to historic fire regime
- Fish access: Improve fish passage at Hwy 96 crossings

Restoration Action Opportunities:
- Road System: Decommissioning, seasonal closure, storm proofing, maintenance / upgrading, slope stabilization / landslide prevention.
- Roadless area protection
- Uplands: Return to historic fire regime, fuels reduction, wilderness expansion

- In-Stream: Replace culverts on Hwy. 96 with structures allowing for fish passage during all life stages, and flow regimes (Cade, Portuguese and Fort Goff)

Grider-Elk

Maps of this region are located in Appendix A, pages 11-13.

Influential Tributaries:
Tom Martin Creek
Mill Creek
Kuntz Creek
O'Neil Creek
Walker Creek
Grider Creek
West Grider Creek
Joe Miles Creek
China Creek
Elk Creek

Area Description: Grider-Elk Sub-Watershed region consists of the following combined slopes and tributaries to the Main Stem Klamath River: Tom-Martin Creek to Elk Creek, Northern slopes of the Marble Mountain Wilderness, Slinkard Ridge / Lake Mountain Divide (East), and Titus Ridge (West).

Cumulative Watershed Impacts:

- Grazing within Marble Mountain Wilderness in upper Grider and Elk Creeks (i.e Cliff Valley, Big Ridge) and lower Grider Creek valley (private)
- High road density (>4 roaded miles per square mile (USFS, 1998)), unstable steep geology, catastrophic road failures in 1997 flood event
- Timber extraction Extensive recent wildfire (especially 1987) and flood affects (especially 1997), (see de la Fuente and Elder, 1998)
- Fire suppression and fire management related alterations, including salvage timber harvest following the 1987 fire
- Limited agriculture (i.e. lower Grider and Elk Creeks)
- Limited small scale suction-dredge mining
- Land Management: Klamath National Forest, small mining claims, residential
- Highway 96 blocks fish passage at Tom Martin and O'Neil Creeks

Key Issues:

- Timber harvest
- Road building
- Fire suppression
- Cattle grazing within the Marble Mountain Wilderness.
- Historic and current mining (especially main stem Klamath River and lower Elk Creek)

Key Priorities:

- Reduction in road system related watershed impacts

- Return to a historic fire regime, and maintenance of fire induced vegetation patterns
- Opportunities for roadless area protection
- Reevaluation of cattle grazing within the Marble Mountain Wilderness

Restoration Action Opportunities:

- Road System: Decommissioning, seasonal closure, storm proofing, maintenance, upgrading slope stabilization / landslide prevention
- Grazing: Consideration of cattle exclusion. Potential compensation and land exchange for spring / summer foraging values within protected areas
- Revegetation, exotic species removal, and bank stabilization
- Uplands: Fuels reduction, return to historic fire regime, roadless area and unique bio-geographic asset protection (e.g. Foxtail Pine populations)
- In-Stream: Fish Accessibility (especially O'Neil Creek. and Tom Martin Creek.) maintain fish access at mouths of creeks

Siskiyou

Maps of this region are located in Appendix A, pages 14-16.

Influential Tributaries:

Indian Creek
Little Grider Creek
Oak Flat Creek
Wingate Creek
Clear Creek
Crawford Creek
Coon Creek
Swillup Creek
Elliot Creek
Aubrey Creek
Dillon Creek

Area Description:

The Siskiyou sub-watershed region consists of the following combined lands and tributaries along the Northwestern slopes of the Main Stem Klamath River: Indian Creek to Dillon Creek. It drains an area from the Thompson Creek Ridge (eastern), Southeastern Siskiyou Crest, to the Dillon Mountain-Rock Creek Butte Divide (western).

Cumulative Watershed Impacts:

- Urbanization: Happy Camp- 1,100 residents.
- Industrial sites (especially historic lumber mills in Happy Camp and Indian Creek)
- Mining (historic placer, hard rock, hydraulic)
- Luther Gulch Superfund site at Indian Creek and the Siskon Mine Superfund site (cyanide barrel and settling pond cap) at Dillon Creek
- High Road Density (>4 roaded miles per square mile (USFS, 1998)): Indian Creek

- Moderate Road Density (2-4 roaded miles per square mile (USFS, 1998)): Clear Creek, Dillon Creek, Swillup Creek, Wingate Creek, Little Grider Creeks
- Low Road Density (<2 roaded miles per square mile (USFS, 1998)): Aubrey Creek, Elliot Creek, Crawford Creek, Coon Creek
- Timber harvest and management, leading to increased vegetation homogeneity, even age relationships, and stand density, and significantly altering the historic fire regime
- Sport fishing
- Limited small-private agriculture (lower Indian Creek)
- Land Management: Klamath National Forest (majority of land area), small mining claims, residential

Key Issues:

- Road density and road disturbances
- Fire suppression and timber management effects on terrestrial and aquatic systems
- Superfund toxic mine sites (Dillon Creek and Indian Creek) and industrial sites
- Roadless area protection

Key Priorities:

- Road decommissioning
- Fire hazard/ fuels reduction, return to historic fire regime
- Education, communication, and cooperation
- Wilderness expansion

Restoration Action Opportunities:

- Road System: Road decommissioning, road storm proofing / upgrading, road maintenance
- Mining: Mine clean-up (of contamination and sediment sources), mine tailings reclamation
- In-stream: Woody structure implementation in Indian Creek, (strategically placed habitat structures). Restore summer Steelhead and Spring Chinook critical over-summering habitat
- Uplands: Fuels reduction, thinning, slash piling / burning, and prescribed fire

Western Marble Mountain

Maps of this region are located in Appendix A, pages 17-19.

Influential Tributaries:

Titus Creek
Independence Creek
Kings Creek
Ukonom Creek
Thomas Creek
Carter Creek
Burns Creek
Ti Creek
Sandy Bar Creek

Stanshaw Creek
Rodgers Creek

Area Description:

The Western Marble Mountain region consists of the combined slopes and tributaries along the Eastern side of the Main Stem Klamath River (below Happy Camp and above Somes Bar). It drains Titus Ridge, Sandy Ridge and Western Marble Mountain Crest / Wooly Creek Divide to Offield Mountain.

Cumulative Watershed Impacts:

- High road density (>4 roaded miles per square mile (USFS, 1998))
- Timber extraction and related disturbances
- Large fire disturbance events, especially 1987 (Titus, Independence, Kings, Ukonom Creeks)
- Salvage logging, high fuel loading
- High elevation grazing in wilderness
- Fish passage: Rodgers Creek, Sandy Bar Creek., Stanshaw Creek., Hwy. 96 culverts, as well as forest road stream crossings (i.e. Ti Creek, Sandy Bar Creek)
- Land Management: Klamath and Six Rivers National Forest, small mining claims, residential

Key Issues:

- Critical cold water contribution and excellent water quality
- Road-related deterioration of tributary water quality (especially sediment inputs)
- Fire management and suppression impacts
- No watershed analysis for Titus, Independence, and Kings Creeks
- Wilderness expansion opportunities along Marble Mountain Wilderness periphery

Key Priorities:

- Road decommissioning, storm proofing / upgrading
- Fuels reduction
- Stanshaw Creek diversion
- Grazing at upper elevation meadows and forests within the Marble Mountain Wilderness Area
- Fish passage at Rodgers Creek and Stanshaw Creek
- Protection of roadless areas (especially Ukonom, Kings and upper Independence Creeks)
- Forest thinning, prescribed fire, and return to historic fire regime

Restoration Action Opportunities:

- Road System: Decommissioning, seasonal closure, storm proofing / upgrading, road maintenance. Slope stabilization / landslide prevention
- Grazing: Cattle exclusion within wilderness. Potential compensation and land exchange for spring / summer foraging values within protected areas. Revegetation, exotic species removal and bank stabilization
- Uplands: Fuels reduction / treatment. Maintain vegetation age, composition, and species diversity. Hwy. 96 sediment dump /storage plan
- Roadless area protection
- In-Stream: Fish accessibility associated with tributary Main-stem habitat connectivity (especially off-channel refugia: Stanshaw, Independence, and Sandy

Bar Creeks). Fish Screens at diversions (Stanshaw Creek). Road stream crossing fish passage

Orleans

Maps of this region are located in Appendix A, pages 20-23.

Influential Tributaries:
Dobbins Creek
Rock Creek
Halverson Creek
Reynolds Creek
Teneyck Creek
Natuket Creek
Mud Creek
Wilson Creek
Camp Creek
Crawford Creek
Ullathorne Creek
Slate Creek
Bluff Creek
Aikens Creek

Area Description:
The Orleans sub-watershed is bounded by: Dillon Mountain, Rock Creek Butte, Lonesome Ridge (Blue-Bluff Divide), Bee Mountain (east corner of Yurok Reservation), and Burrill Peak. Includes all west-side tributaries, south of Dillon Creek, to the confluence of the Klamath and Trinity Rivers at Weitchpec. Includes communities of Somes Bar, Orleans, and Weitchpec. Includes Karuk and Yurok ancestral territories.

Cumulative Watershed Impacts:

- Limited agriculture (Orleans, Klamath River flood terraces)
- High Road Density (>4 roaded miles per square mile (USFS, 1998)), unstable steep geology
- Timber extraction (Six Rivers / Klamath N.F.), primarily "matrix" and LSR lands
- Fire suppression and management
- Crawford Creek (Orleans community water supply)
- Land Management: Six Rivers National Forest management, small mining claims, residential

Key Issues:

- Road systems
- Fire and fuels management
- Fish passage
- Timber harvesting
- Tribal and National Forest cooperation
- Community involvement and education

Key Priorities:

- Reduction in road system-related watershed impacts
- Fuels reduction, especially around homes and private property in the towns of Orleans, Somes Bar, and Weitchpec, along routes through public lands leading to private inholdings, and managed lands such as roads and timber harvest areas.
- Fish passage at Crawford and Ullathorne Creeks
- Hwy 96 culverts
- Feasibility study of barrier removal in lower Rock Creek

Restoration Action Opportunities:

- Road System: Decommissioning, seasonal closure, storm proofing, maintenance / upgrading, slope stabilization / landslide prevention, road stream crossings
- Grazing: Presence of feral cattle in upper Bluff Creek (needing removal).
- Uplands: Fuels reduction, particularly associated with previously harvested lands and road corridors. Return to historic fire regimes
- In-Stream: Maintain fish accessibility (especially Camp Creek, Red Cap, and Rock Creek), barrier modification at Ullathorne and Crawford Creek (Hwy. 96). In-stream structure maintenance: Bluff, Camp, and Red Cap Creek. Rock Creek barrier, near mouth

Red Cap

Maps of this region are located in Appendix A, pages 24-27.

Influential Tributaries:

Ikes Creek
Pearch Creek
Cheenitch Creek
Boise Creek
Red Cap Creek
Hopkins Creek

Area Description:

The Red Cap sub-watershed region consists of the combined slopes and tributaries to the Klamath Main-stem, draining the Salmon Divide (Humboldt / Siskiyou County line), Somes Mountain, Orleans Mountain, Whitney's Peak, Salmon Mountain (Humboldt / Trinity County line), Devil's Backbone, Packsaddle Ridge, Mill Creek Ridge, to Klamath / Trinity divide. All lands along the Klamath River between the Salmon River and the Trinity / Klamath Confluence along the east side are included.

Cumulative Watershed Impacts:

- High road density (>4 roaded miles per square mile (USFS, 1998))
- Timber extraction, and related disturbances.
- Fire management (suppression and salvage harvest).
- Land Management: Six Rivers National Forest, small mining claims, residential
- Pearch Creek (Orleans Community Water Supply)

Key Issues:

- Timber harvest
- Road systems

- Fire management
- Roadless area protection
- Tribal and National Forest co-operation
- Community involvement and education

Key Priorities:

- Reduction in road system-related watershed impacts
- Return to historic fire regime on upper slopes and wilderness areas
- Fuels treatment along road corridors and previously managed lands
- Roadless area protection

Restoration Action Opportunities:

- Road System: Decommissioning, seasonal closure, storm proofing, maintenance / upgrading, slope stabilization / landslide prevention
- Uplands: Fuels reduction, thinning, slash piling, prescribed burning. Return to historic fire regime in roadless areas, and along wilderness periphery. Roadless area protection
- In-Stream: Fish accessibility (Red Cap Creek), maintain fish access at mouths of creeks. Upgrade existing in-stream structures (Red Cap Creek). Maintain main-stem tributary habitat continuity

Section 3: Mid-Klamath Status and Current Condition

Mid-Klamath River Anadromous Fish

Chinook	(*Oncorhynchus tshawytscha*)
Coho	(*Oncorhynchus kisutch*)
Steelhead	(*Oncorhynchus mykiss*)
Green Sturgeon	(*Acipenser medirostris*)
Pacific Lamprey	(*Lampetra tridentate*)

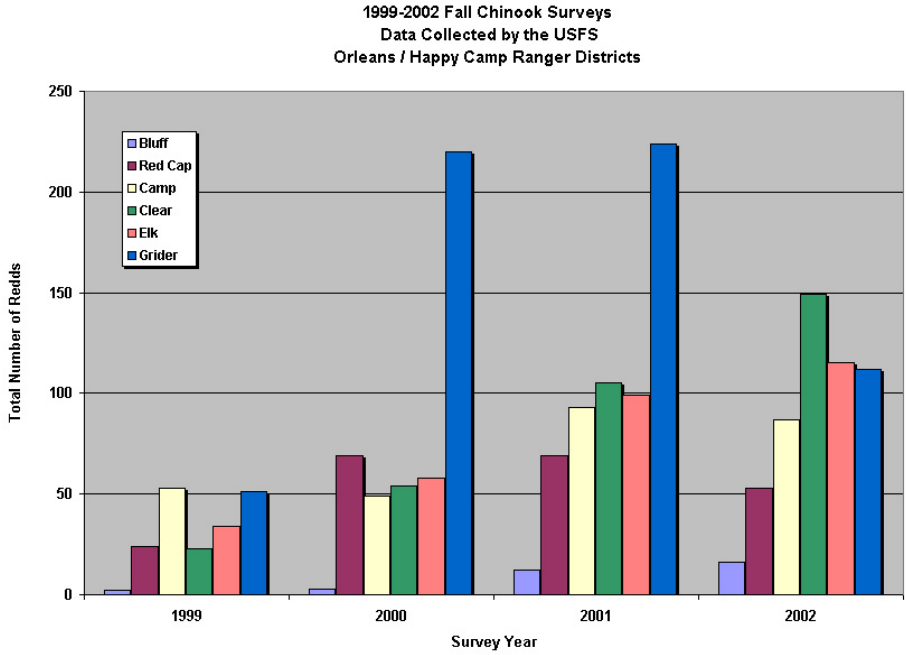
Chinook

Adult chinook salmon runs return to the Klamath River in the spring and in the fall months. Two distinct life-history types are displayed by Mid-Klamath chinook: spring returning (spring chinook) and fall returning (fall chinook) types. Fall chinook life-history type is described as having shorter freshwater residency and is sometimes referred as "ocean type" while spring chinook are described as having longer freshwater residencies and referred to as "stream type" (Spence et al. 1996).

Fall Chinook

Fall chinook spawn in the main stem Mid-Klamath River, predominately from Happy Camp to Iron Gate Dam. Many fall chinook are artificially spawned at Iron Gate Hatchery below the dam. Larger Mid-Klamath tributaries such as Bluff, Red Cap, Camp, Dillon, Clear, Indian, Thompson, Grider, Horse, Beaver, Cottonwood and Bogus Creeks host spawns most years (see Figure 2). Small tributaries such as Seiad, China, Little Grider, Independence, Swillup, Ti, Rock, Irving, Pearch, Boise, Slate and Hopkins Creeks host spawning, but are dependant on seasonal rains to provide flow for access.

Figure 2-Fall Chinook Redd Counts for Selected Mid-Klamath Tributaries



Spring Chinook

Spring chinook can be found in Mid-Klamath tributaries with cold deep pool holding habitat such as Dillon, Clear, Elk, Indian and Thompson Creeks, but usually numbers are less than ten fish per tributary (see map in Appendix A, page 1). Historically, many more spring-run salmon migrated through the Mid-Klamath to the Upper Klamath River Basin, but fish passage has since been blocked by dams. The spring run may once have been the dominant run of chinook in the Klamath River Basin (Myers et al., 1998). Warm Klamath River main stem water temperatures limit critical holding habitat for returning spring chinook.

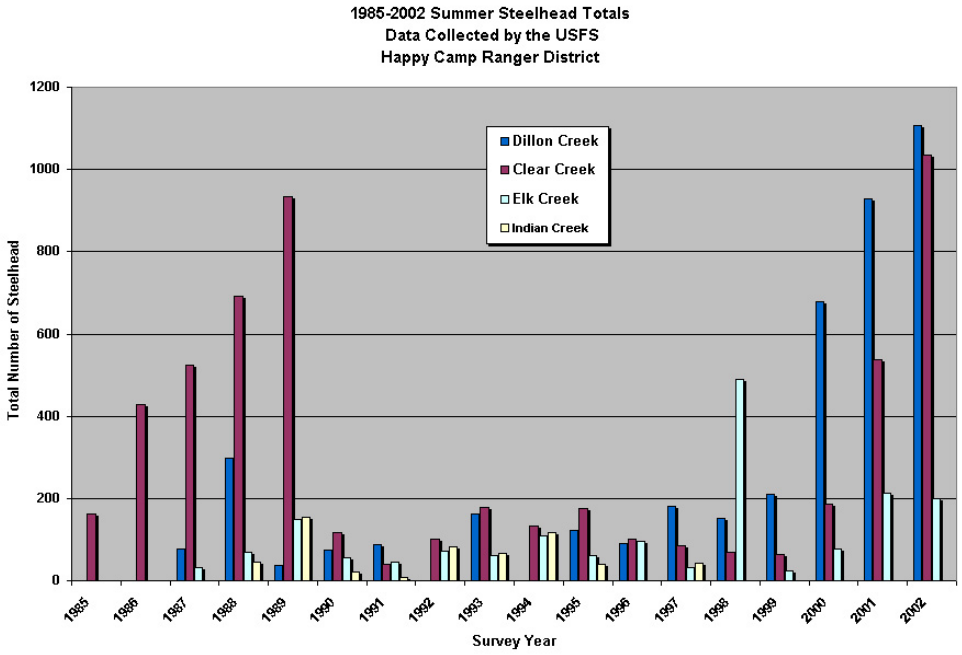
Coho

Adult coho salmon return to the Mid-Klamath River main stem and it tributaries during the fall and early winter (mid-October through mid-January). They then spawn from November through mid-January. Juvenile coho spend one to two growing seasons in freshwater before migrating to the ocean. They require summer and winter rearing areas that are protected from high winter flows and warm temperatures, which can be limited in the Mid-Klamath River main stem and its tributaries. Summer rearing occurs in many cold-water tributaries and other thermal refugia sites along the main stem Klamath River. Karuk tribal fisheries biologists have documented juvenile coho using off-channel thermal refugia ponds at the mouths of cold tributaries such as Beaver, Horse, Tom Martin, O'Neil, Independence, Sandy Bar, and Stanshaw Creeks. However, adult coho salmon have not been documented well in the subbasin. Known adult spawning coho populations are documented in Bluff, Red Cap, Camp, Boise, West Fork Clear, Elk, Indian, Seiad, Grider, Horse, Beaver, Barkhouse, Humbug, Cottonwood, Willow and Bogus. Other tributaries have juvenile coho present, but adult spawning in those tributaries are unknown.

Steelhead

Adult steelhead are present in the Mid-Klamath River twelve months of the year. Summer steelhead return to the Klamath River in the late spring and throughout the summer, and hold in larger tributaries and at coldwater tributary mouths. Tributaries such as Dillon, Clear, Elk and Indian support a large portion of the Klamath Basin summer steelhead run (see Figure 3). Other known summer steelhead streams are Red Cap, Bluff,Camp, Ukonom, Grider and Beaver. Fall and winter run steelhead hold in the main stem of the river and spawn in subbasin tributaries (usually from March through April) after seasonal rains increase flows. The "half-pounder", a small (1/2 pound to 2 pounds) sexually immature steelhead, is very prominent in the Klamath River and is popular with its anglers.

Figure 3-Summer Steelhead Population Census Numbers for Selected Mid-Klamath Tributaries



Sturgeon

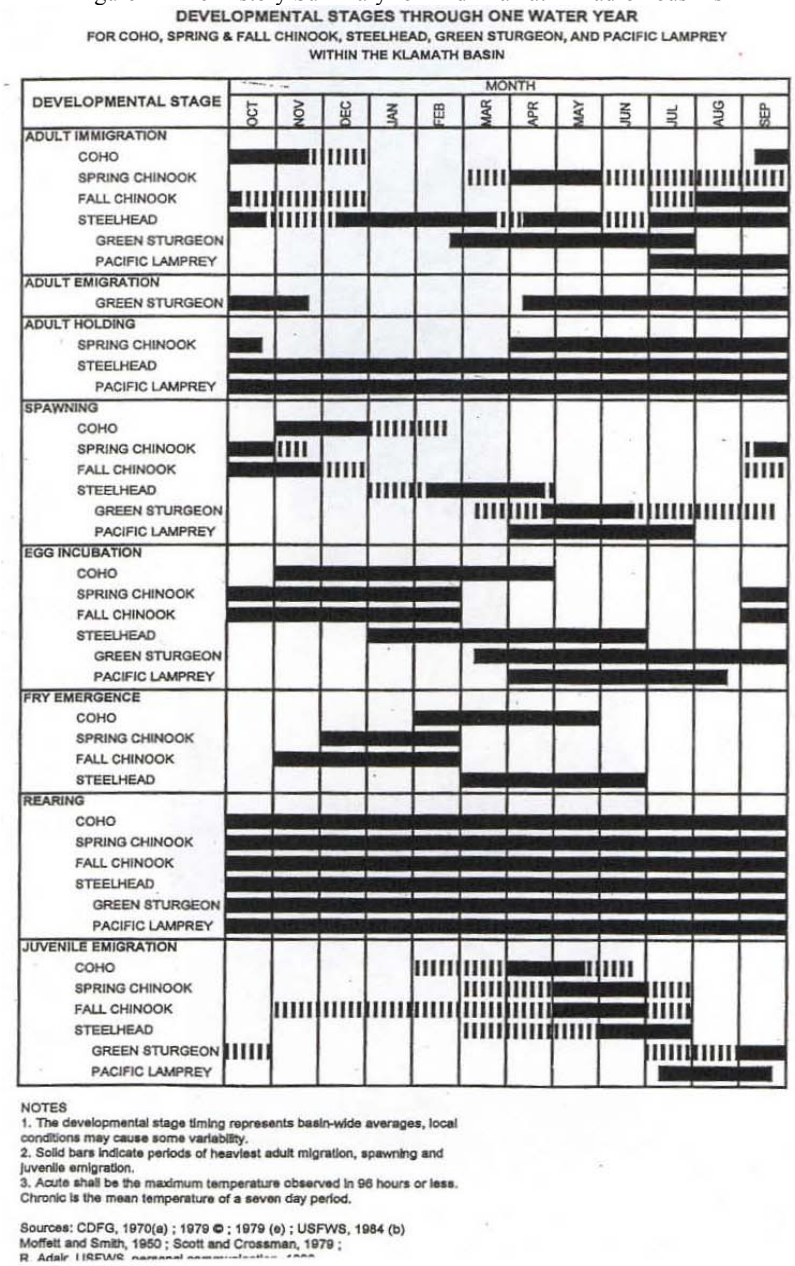
Both green and white sturgeon have been observed in the Mid-Klamath subbasin, but green sturgeon is the dominant species (CH2MHILL, 1985). The green sturgeon spawning migration begins in late February and continues through late July. Mature males typically spawn at age 15 to 35 years, and mature females at age 18 to 40 years old. Local residents have reported sturgeon above Ishi Pishi Falls, but most are seen below Ishi Pishi Falls. Sturgeon spawn during late spring and early summer, and migrate back to the ocean during the summer and fall. Little information exists on the life history of sturgeon in the Klamath River.

Pacific Lamprey

Pacific lampreys generally migrate to freshwater in the early spring to mid-summer. Karuk tribal fishermen catch lamprey in the main stem Mid-Klamath River during the spring and early summer. Spawning takes place generally from April to July, and then

the fish die. Lamprey eggs hatch into "ammocoetes" within 2 to 3 weeks after they are fertilized (CH2MHILL, 1985). Ammocoetes live in the substrate of the main stem river and tributaries for up to 6 years until they immigrate to the ocean.

Figure 4- Life History Summary for Mid-Klamath Anadromous Fish



Geology of the Mid-Klamath

Mid-Klamath Subbasin Overview

The Mid-Klamath subbasin is bounded to the west by marine-sedimentary and metasedimentary rock. This geology is associated with the subduction of the Pacific

Plate (dense / heavy ocean crust), under the North American Plate (less dense / lighter continental crust). Thus, the mountians in the Mid-Klamath are, in broad terms, located between unconsolidated coastal sedimentary and metasedimentary materials to the west and volcanic derived materials associated with the Cascade complex to the east. (For a list of rock types that occur in the Mid-Klamath subbasin, and their descriptions, see Appendix B)

Mid-Klamath Hydrology

The hydrologic traits of the Mid-Klamath subbasin are predominantly influenced by local climate and topography. The most easterly part of the subbasin, near Iron Gate Dam, receives about 15 inches of total rainfall, while the most westerly part of the subbasin, near the Trinity confluence, receives about 50 inches in a normal year. This difference in rainfall between eastern and western regions is primarily due to the rain shadow effect. The majority of precipitation occurs from November through March, with February being the wettest month. (USFS, 1998).

"Peak stream flows typically occur between November and March, although sustained high flows can last into June. The majority of peak flows and floods in this landscape are caused by rain-on-snow storms where warm winter rains melt accumulations of snow, adding snowmelt to rainfall runoff" (USFS, 1998). Rain-on-snow events are more common in the transitional snow zone. Summer thunderstorms are common causes for localized flooding and can make tributaries quite turbid after such events.

1997 Flood Effect

The flood event of 1997 caused substantial changes in stream channels throughout the Mid-Klamath subbasin. In the Klamath National Forest (KNF), mostly in the Mid-Klamath subbasin, the storm caused $27 million worth of damage to forest roads (de la Fuente and Elder, 1998). Flood effects were greatest in tributaries near the Happy Camp and Seiad Valley portion of the subbasin. De la Fuente and Elder found that flood effects were highest in a recently burned (1987) and highly roaded strip of land that encompasses Elk Creek, Grider Creek and Walker Creek. Other watershed such as Dillon Creek and Clear Creek, both recently burned in 1994, maintained high fish habitat and water quality values (Kier, 1999). Recent surveys in Grider Creek show high numbers of spawning chinook and steelhead, which may be an indication that the watershed is recovering (Grunbaum, J. 2001, personal communication). Surveys of summer steelhead show a steady population increase in the years following the 1997 flood event (complete data summaries are not yet available).

Vegetation Summary

The Mid-Klamath is characterized by vegetation heterogeneity and habitat diversity across latitudinal, longitudinal, and elevational scales. Changes associated with the transition from pacific-maritime to continental climate, as well as elevational change, disturbance, and the diverse geology of this area, all significantly influence the diversity

of vegetation patterns. The spatial mosaic patterning of plant distribution is also influenced by fire history, geological parent material, geographic and site specific conditions.

In the western Mid-Klamath, vegetation structure can be characterized by conifer-dominated overstories with multi-tiered canopies that support diverse understories. In the east, it changes to chaparral scrub, sagebrush step, and juniper woodlands similar to those found in the Great Basin.

The connected role of vegetation, wildfire, and anadromous fish is just beginning to be understood. Woody debris on site as snags, as downed wood on slope, or as woody structure in riparian and in-stream locations is very important to both fish and wildlife species.

Vegetation in the Mid-Klamath has been altered by a variety of land management practices and structures, including dams and diversions, grazing, mining, road systems, timber harvest, and fire suppression. The overall effect of these influences has been to homogenize vegetation and decrease habitat diversity, as well as to increase susceptibility to invasive species.

See Appendix C for a list of plant associations that occur in the Mid-Klamath.

Fire Ecology and Management

Our knowledge of the historic role of fire within the Mid-Klamath region has improved as a result of recent scientific investigation. The critical role of historic fire regimes with respect to terrestrial system processes, structure and function, is now recognized. Two pre-western causes of fire are evident:

- Natural ignition associated with lightning events (atmospheric)
- Native American use of fire for cultural and management purposes (anthropogenic)

Natural fire events (lightning ignition), prior to western settlement and fire suppression, were dynamic and, to a certain degree, chaotic. It is evident from research that there is a wide array of influences determining fire behavior within the wild or natural state. In general, lightning increases in frequency and intensity from west to east, further exacerbated at higher elevations. Therefore, potential fire starts are more likely along peaks, ridgelines and upper slope positions, and toward the eastern edges of the region.

Fire suppression in the Mid-Klamath was initiated in the early 1900s. This effort has expanded through time, with increasing applications of technology, funding, and training. Initially, fire suppression was developed as a protection against a disturbance event that was considered a threat to timberland resources. Today, however, it is widely recognized that natural wildfire is critical to functioning forest ecosystem types such as those that occur in the Klamath region.

Fire suppression, in concert with timber harvest (especially even-age prescriptions), have led to Mid-Klamath landscapes that are more susceptible to fires of greater intensity and stand replacing capability. Even age, closed canopy stands of high density, with elevated fuel accumulations, now comprise the majority of matrix lands and old plantations. These altered stands are at increased risk of burning at high intensity, if ignited (Key, 2000).

Salvage logging following fire tends to remove material critical to stream channel structure, such as large woody dead and downed debris from slopes and channels. This exacerbates soil erosion and transport within upland and stream systems. These factors directly affect anadromous fish, as downed woody debris is a critical structure to salmonid habitat. Downed woody debris is important for pool formation, sediment retention, overall channel stability, and provides cover complexity for species such as juvenile coho salmon. Lack of downed woody debris and standing dead trees (future downed woody debris recruitment) decreases habitat complexity and channel stability (Spence et al., 1996).

Road System Interpretation

Road systems have been constructed within the Mid-Klamath subbasin principally for the purpose of resource extraction, utilization and management. The current, extensive USFS road system on the upland slopes of the Mid-Klamath was developed in support of resource-related entry following WWII, particularly during the period from 1960 to 1989. This era of rapid road construction facilitated the transition from a mineral based economy (gold), to one based on forest resources.

Long term road maintenance, though considered initially, was not implemented. In addition, there was limited knowledge of the hydrological affect of roads on slopes, or how to construct appropriate systems of channel / creek crossings. Culverts tended to be undersized for flood events, and were further stressed due to upslope management that exacerbated mass movement, landslope failures, and erosion. Creek channels were also utilized for tractor yarding / skidding and other activities. This historic treatment of slopes and drainages is now considered deleterious to aquatic and terrestrial habitat, as viewed within current land management and ecological frameworks.

Currently, roads are considered to be critical sources of watershed impairment. Scientific analysis has explicitly correlated increased sediment transport due to upland land management (timber harvest, road networks) with the decline of anadromous (especially salmonid) fish populations (Meehan, 1991). Road maintenance, decommissioning, upgrading, stormproofing, and protection of roadless areas are critical to the restoration of the Mid-Klamath subbasin, (especially its anadromous fisheries). These efforts will require significant funding, as well as the prioritization of road decommissioning and maintenance.

Section 4: Recovery Action Plan

There are two major types of restoration: 1) active restoration (e.g. on-the-ground projects), and 2) passive restoration, (involving implementation of policies meant to protect existing resources). Both types of restoration are represented throughout the Recovery Action Plan recommendations for the Mid-Klamath subbasin. The Mid-Klamath Sub-Watershed Regions Action Matrix included in this section corresponds with the following outlined restoration actions, identifying specific sub-watersheds for which each action would be appropriate. Data from ongoing monitoring efforts (described in Section 5) should be used to prioritize these recovery actions, as well as to provide feedback about the success of the efforts.

On-the-Ground Restoration Actions

Goal: *Mimic natural processes or allow natural process to function.*

A. Mid-Klamath Upslope Restoration Actions

1. Road decommissioning / slope stability
2. Storm proofing roads / hydrologic disconnection
3. Hazard fuels reduction
4. Toxic mine clean up
5. Develop a landslide sediment disposal plan for State Hwy 96 and County Roads to prevent waste from entering stream channels
6. Maintain vegetation age and species diversity

B. Mid-Klamath In-stream Restoration Actions

1. Improve fish passage at public and private road crossings
2. Screen diversions and modernize ditches / domestic water supplies
3. Improve in stream habitat at thermal refugia areas and near tributary mouths

C. Riparian and Stream Bank Restoration

1. Relocate/Eliminate roads segments from inner-gorge and riparian areas
2. Livestock exclusion from riparian areas
3. Mine tailing reclamation and revegetation
4. Riparian planting and stream shading

Management Actions

Goal: *Protect existing high quality watershed elements and critical fish habitat.*

A. Critical Habitat Protection

1. Limit land management activities in roadless area and designated wilderness areas
2. Implement sport fishery closures at thermal refugia sites during critical periods of poor main stem water quality
3. Limit other recreation based anthropogenic disturbances at thermal refugia sites during critical periods of poor main stem water quality

Public and Community Outreach Actions

Goal: *Include a variety of subbasin stakeholders with recovery actions to completely address problems across land jurisdictions, public, private and tribal.*

A. Education and Communication

1. Support Elementary school level watershed education programs
2. Conduct educational fisheries restoration focused workshops
3. Solicit public and community involvement with restoration projects
4. Support watershed restoration focused stakeholders
5. Solicit private landowner cooperation with restoration projects

B. Cooperation

1. Form restoration partnerships between private landowners
2. Form restoration partnerships between local, state and federal agencies
3. Form restoration partnerships between agencies and private landowners

Monitoring Actions

Goal*: Use short and long term monitoring results to steer direction of recovery actions.*

A. Long Term Monitoring

1. Develop long term restoration project effectiveness monitoring plan
2. Monitor restoration project effectiveness
3. Stream Flow and Water Quality
4. Priority Fish Population and Run Size
5. Habitat Conditions

B. Short term Monitoring

1. Stream Flow and Water Quality
2. Fish disease and health monitoring
3. Harvest Monitoring
4. Priority Fish Population and Run Size

Middle Klamath Sub- watershed Region Actions Matrix

Actions	Sub-watershed Region: Volcanic Outer Region	Checkerboard
Upslope Restoration		
Road decommissioning	Low Need	High Need
Storm proofing roads/Upgrading	Low Need	High Need
Hazard fuels reduction	Moderate need	Moderate Need
Toxic mine clean up	Data gap	Data Gap
Maintain vegetation age and species diversity	Moderate need	High Need
Develop road failure waste storage plan	Low Need	Moderate Need
In-stream Restoration		
Fish Barrier Removal	High Need	Low Need
Screen Diversions	High Need	High Need
Modernize ditches/pipe water (Water Conservation)	High Need	High Need
Upgrade Existing In-stream Structures	Low Need	Moderate Need
Maintain Main stem/Tributary Habitat Connectivity	Moderate Need	Moderate Need
Riparian Restoration		
Relocate roads out of riparian areas	Moderate Need	High Need
Cattle exclusion fencing	High Need	High Need
Mine Tailing reclamation	Low Need	High Need
Riparian planting	High Need	Moderate Need
Education and Communication		
Watershed Education	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need
Community based restoration planning meetings	High Need	High Need
Foster restoration focused watershed groups	High Need	High Need
Cooperative Restoration Projects		
between landowners	High Need	High Need*
between tribal, county, state and federal agencies	High Need	High Need*
between private landowners and agencies	High Need	High Need*
Monitoring		
Develop effectiveness monitoring plan	High Need	High Need

*Cooperative projects are critical in this highly mixed public/private ownership region.

Middle Klamath Sub- watershed Region Actions Matrix

Actions	Sub-watershed Region		
	Red Butte	**Grider Elk**	**Siskiyou**
Upslope Restoration			
Road decommissioning	Moderate Need	High Need	High Need
Storm proofing roads/Upgrading	Moderate Need	High Need	High Need
Hazard fuels reduction	High Need	High Need	High Need
Toxic mine clean up	Low Need	Low Need	High Need
Maintain vegetation age and species diversity	Moderate Need	High Need	High Need
Develop roads failure waste storage plan	Moderate need	Moderate Need	Moderate Need
In-stream Restoration			
Fish Barrier Removal	High Need	Moderate Need	Low Need
Screen Diversions	None	Low Need	High Need
Modernize ditches/pipe water	None	Moderate Need	High Need
Upgrade Existing In-stream Structures	Low Need	Low Need	Moderate Need
Maintain Main stem/Tributary Habitat Connectivity	High Need	High Need	High Need
Riparian Restoration			
Relocate roads out of riparian areas	Low Need	Moderate Need	Moderate Need
Cattle exclusion/fencing*	None	Moderate Need	Low Need
Mine Tailing reclamation	Low Need	Low Need	Moderate Need
Riparian planting	Low Need	Moderate Need	Moderate Need
Education and Communication			
Local School Watershed Education	High Need	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need	High Need
Community based restoration planning meetings	High Need	High Need	High Need
Foster restoration focused watershed groups	High Need	High Need	High Need
Cooperative Restoration Projects			
between landowners	Moderate Need	Moderate Need	High Need
between tribal, county, state and federal agencies	High Need	High Need	High Need
between private landowners and agencies	High Need	High Need	High Need
Monitoring			
Develop effectiveness monitoring plan	High Need	High Need	High Need

*Cattle grazing in high elevation wilderness areas of Elk Creek and Grider Creek.

Middle Klamath Sub- watershed Region Actions Matrix

	Sub-watershed Region		
Actions	**W. Marble Mountain**	**Orleans**	**Red Cap**
Upslope Restoration			
Road decommissioning	High Need	High Need	Moderate Need
Storm proofing roads/Upgrading	High Need	High Need	High Need
Hazard fuels reduction	High Need	High Need	High Need
Toxic mine clean up	None	Low Need	Low Need
Maintain vegetation age and species diversity	Moderate need	High Need	High Need
Develop roads failure waste storage plan	Moderate need	Moderate Need	Moderate Need
In-stream Restoration			
Fish Barrier Removal	Moderate Need	Moderate Need	?
Screen Diversions	High Need	None	None
Modernize ditches/pipe water	High Need	None	None
Upgrade Existing In-stream Structures	None	Low Need	Low Need
Maintain Main stem/Tributary Habitat Connectivity	High Need	High Need	High Need
Riparian Restoration			
Relocate roads out of riparian areas	Low Need	Moderate Need	Low Need
Cattle exclusion/ fencing	None		None
Mine Tailing reclamation	Low Need	Low Need	Low Need
Riparian planting	Low Need	Low Need	Low Need
Education and Communication			
Local School Watershed Education	High Need	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need	High Need
Conduct community restoration focused workshops	High Need	High Need	High Need
Community based restoration planning meetings	High Need	High Need	High Need
Foster restoration focused watershed groups	High Need	High Need	High Need
Cooperative Restoration Projects			
between landowners	Moderate Need	High Need	Moderate Need
between tribal, county, state and federal agencies	High Need	High Need	High Need
between private landowners and agencies	High Need	High Need	High Need
Monitoring			
Develop effectiveness monitoring plan	High Need	High Need	High Need

*Local residents have reported feral cows in upper Bluff Creek.

Roads Restoration Actions

A main component of active restoration is and will continue to be fixing roads which block or degrade salmonid habitats. Roads are the primary source of sediments to Middle Klamath streams, as both chronic erosion and as starting points of mass failure during large storm events (de la Fuente and Elder, 1998). De la Fuente and Elder's assessment of the 1997 flood for the Klamath National Forest provides a detailed description of road failures in Middle Klamath watersheds and also provides good recommendations on how to minimize the risk of failures during large storm events like the 1997 Flood. A summary of recommended road treatments and categories of actions has been modified from *Road Sediment Source Inventory and Risk Assessment, Klamath National Forest* (USFS, 1999), and is included in this restoration actions section. Problem roads can be fixed either by upgrading /stormproofing or by decommissioning.

Many roads in the subbasin are not maintained, are poorly located or have faulty designs. For these roads, decommissioning is the only feasible solution. The cost-effective solution to problem roads that aren't used is decommissioning. Problem roads identified as needed because of private access needs, management needs or recreation needs will be upgraded / stormproofed and maintained to a level that minimizes impacts to salmonid habitats.

The Klamath and Six Rivers National Forests, in cooperation with the Karuk Tribe and the public, have developed travel management plans that assess road needs in the subbasin. The Klamath and Six Rivers National Forests and the Karuk Tribe have cooperatively completed Road Sediment Source (RSS) inventories in most Middle Klamath watersheds, which can be used for determining risk-analysis and transportation planning. The intent of transportation planning (described in USFS, 1999) is to find a balance between the benefits of access and roads-associated effects on aquatic resources, such as clean water and fish. The newly developed long-term road policy is based on four primary objectives:

1. more carefully considered decisions to build new roads,
2. eliminate old, unneeded roads,
3. upgrade and maintain roads important to public access, and
4. develop new and dependable funding for forest road management.

Road System Management

The management of existing road networks presents a significant challenge to land managers. The following list summarizes some of the major tasks and options with respect to the management of existing road networks in the Mid-Klamath:

Road Management Actions

- **Road Upgrades and Stormproofing:** Redesign problem roads to better withstand large storms and require less maintenance.

- **Seasonal Road Closures:** Close unsurfaced secondary roads during the wet season.
- **Permanent Road Closures:** Close roads until decommissioning actions are implemented
- **Decommissioning:** Hydrologically disconnecting roads from stream channels, including stream crossing removal and recontouring.

Road System Upgrades and Stormproofing

- **Upgrade Culvert**
  - Replace undersized culverts to a larger size fitted for large 100 year type storms.
  - Miter existing culvert inlets to increase flow capacity.
- **Pull (clear) Ditches**
  - Clean debris from ditches to allow better water transport.
- **Unplug Culverts**
  - Clear all culverts of rock and earthen materials, as well as woody and organic material.
- **Road Surfaces**
  - Surface roads with crushed rock to minimize surface erosion.
  - Grade roads and place rolling - dips, water bars and other structures in order to get water off road surface.
  - Out slope in board ditched roads and pave primary roads.
- **Road-Crossings**
  - Re-contour creek crossings and reduce fill volumes.
  - Replace road stream crossings fill with rock fills.

Decommissioning

- Hydrologically disconnecting roads from stream channels
- Road recontouring
- Stream crossing and in-steam road removal

Mid-Klamath Roadless Area Protection

Ecologically significant roadless areas remain within the Mid-Klamath subbasin. The importance of these areas requires special management considerations with appropriate protective designations. Mid-Klamath roadless areas include wilderness designated lands and other areas rugged enough to prevent road building. In general, these areas have not been managed for timber, mining or other land disturbing actions. The remoteness of these lands has also prevented effective fire suppression; thus, most roadless areas are functioning under a historic fire regime. Roadless area protection is probably the most cost-effective recovery action that is needed in the Mid-Klamath.

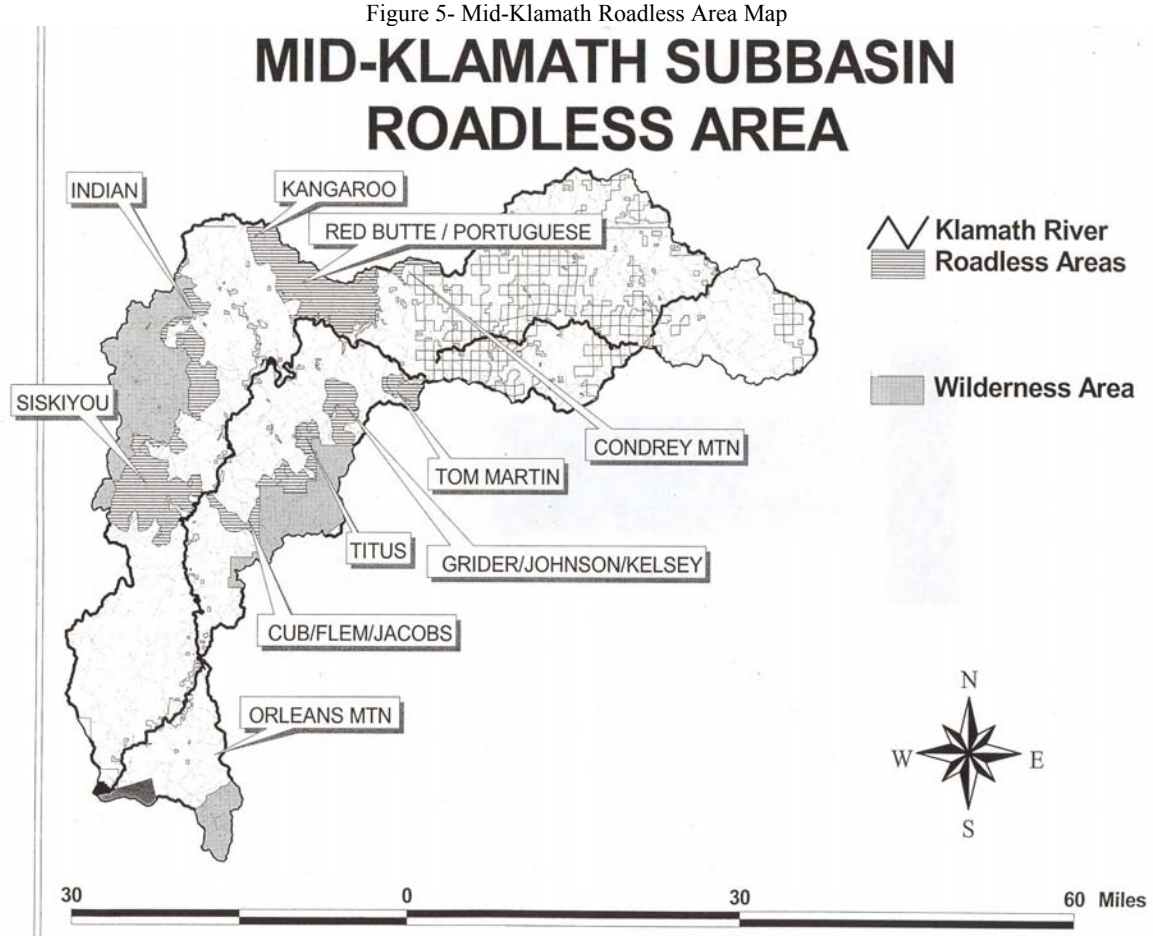
Within the Mid-Klamath subbasin, four wilderness periphery expansions (Siskiyou, Red Butte, Marble Mountain and Trinity Alps), and four adjacent roadless areas (Tom Martin

Peak, Lake Mountain, Condrey Mountain, and Titus) are recommended for protection (See Figure 5). These recommendations for Wilderness Expansion and addition are based on the 1978 *RARE II*, and more recent *Roadless Area Conservation Plan 2000*. However, larger areas with greater connectivity have also been identified to be considered for protection.

Area Code:	Area Name:	Gross Acres:	Comment:
5-701:	Siskiyou	(128,400)	1984 Wilderness Designation, significant Wilderness expansion opportunities around periphery.
5-272:	Cub	(200)	West Marble Mountain Wilderness Periphery
5-273:	Flem	(200)	Upper: Ukonom, Kings, Independence Creeks.
5-274:	Jacobs	(200)	Under-evaluation of potential wilderness area expansion and connectivity.
5-283:	Titus	(6,200)	Klamath River Corridor, across from Clear Creek.
5-067:	Grider	(11,000)	North Marble Mountain Wilderness Periphery
5-068:	Johnson	(9,300)	Upper: Elk Creek, Grider, Kelsey Creeks.
5-070:	Kelsey	(4,400)	Priority linkage and expansion opportunity
5-069:	Tom Martin	(9,400)	Scott River / Klamath River corridor confluence
5-074:	Portuguese	(39,100)	Southwest Marble Mountain Wilderness Periphery Salmon River / Klamath River corridor confluence Connection of Salmon River tributaries to Marble Crest (partly included in 1984 wilderness expansion)
5-079:	Orleans Mtn.	(100,700)	Northern and Northwestern Trinity Alps Periphery Upper tributaries to main stem and South Fork Salmon River. Large contiguous roadless opportunity, partially included 1984 expansion of Trinity Alps Wilderness.
5-702:	Indian Creek	(6,200)	Red Buttes Wilderness Periphery
5-703:	Kangaroo	(40,500)	Upper Indian, Thompson, Fort Goff, Seiad, Applegate partially included in 1984 Red Buttes Wilderness
5-704:	Condrey Mtn.	(3,100)	Seiad, Horse, Beaver Creeks, Cook and Green Area East

Acreage's attributed to Roadless Areas from RARE II summary, extended in our consideration
Synthesized from 1978 RARE II, California, USFS, Klamath National Forest

Figure 5- Mid-Klamath Roadless Area Map



Community Planning and Cooperative Restoration

In a mixed ownership landscape like much of the Middle Klamath, community and landowner cooperation is necessary. Large landscape-type restoration projects (e.g. hazard fuels reduction) that address both public and private lands are the most effective. Several cooperative community efforts and organizations focusing on work in the Mid-Klamath are currently in effect.

Subbasin Planning

The Karuk Tribe's Department of Natural Resources (KTDNR) has initiated community planning through its Mid-Klamath Subbasin Planning efforts, funded by the Klamath River Basin Fisheries Task Force. The Karuk Tribe's planning efforts began in 1997, when the Tribe was funded to begin Mid-Klamath subbasin planning. This draft subbasin plan is a product of that community planning effort.

Community planning begins with outreach to community about fisheries restoration issues, through education (school watershed education programs and community workshops) and communication (public meetings, requests for public comment, news letters, news bulletins).

The KTDNR's subbasin planning project, in the summer of 2000, involved coordinating informative meetings in the towns of Orleans, Happy Camp and Scott Bar. Three meetings in distinct locations were held due to the considerable distance between the communities. Information about current fisheries related restoration projects and the currents status of the subbasin's anadromous fish were presented, and comments about the same subjects were taken (see Appendix D). The subbasin planning project aims to assist restoration-focused watershed groups and other community planning groups with active cooperation and participation in recovery actions needed for fisheries restoration.

*Example***:** The formation of the Orleans/Somes Bar Fire Safe Council (OSFSC) was partly a product of outreach efforts implemented by the KTDNR's subbasin planning project. The OSFSC has developed a community fire planning strategy (see Appendix E) and implemented hazard fuels reductions projects in the subbasin.

*Example***:** The KTDNR's subbasin planning project in part is reponsible for the formation of the Middle Klamath Watershed Council (MKWC). This watershed group has implemented volunteer-based and funded restoration projects, and also publishes a restoration focused newsletter.

Orleans/Somes Bar Fire Safe Council

Since May of 2001, the Orleans/Somes Bar Fire Safe Council (FSC) has been planning and implementing fuels reduction projects on private lands. Through the creation of shaded fuelbreaks along roads and property boundaries and wildfire safety zones around structures, the FSC has reduced the risk of fires originating on private land spreading to surrounding National Forests. These fuels treatments also protect private resources from fires on public lands, and allow the Forest Service to use prescribed fire as a management tool without threatening private lands.

The FSC has organized 16 community volunteer workdays at the homes of elderly and disabled residents, held over 20 monthly meetings and workshops to collect community and agency input, conducted a Critical Info and Fire Protection Survey to gather information for the local volunteer fire department and prioritize fuels projects, and treated hazardous fuels on nearly 200 acres of private land.

The communities of the Mid Klamath are well aware that one of the major problems facing the subbasin today is fuels buildup due in part to fire suppression. The recent formation of Fire Safe Councils in the towns of Klamath River, Seiad, and Happy Camp show the willingness of communities to work together to protect private resources.

The long-term goal of this work is to re-establish historic fire regimes within the range of natural variability in the subbasin while reducing the risk of uncharacteristically intense fires and protecting public and private resources. Multiple watershed functions depend on fire. Less large wood recruitment to streams, decreased summer flows from increased

plant uptake and more frequent high intensity fires, and sedimentation are a few ways suppression has impacted the fisheries of the Mid Klamath.

By first treating around communities and protecting private and key public resources, such as major roads and watersheds that supply city water, public land managers can more quickly implement prescribed fire and wildland fire use at the landscape level.

Community members who have project ideas or are interested in getting involved with the FSC can contact Will Harling or Ben Riggan at the FSC office in Somes Bar ((530) 469-3216).

Mid-Klamath Watershed Council

Since April 2001, the Mid Klamath Watershed Council (MKWC) has been coordinating volunteer workshops and workdays in the subbasin, highlighting the need to protect our declining fisheries resource. Participants include local fisherman, fisheries biologists, farmers, botanists, Forest Service employees, Karuk Tribe DNR members, raft guides, loggers, forestry technicians, school teachers, and business owners. The MKWC has modeled its program after the Salmon River Restoration Council, to bring this type of community-based watershed planning to the Mid Klamath subbasin. Community members who would like to get involved with MKWC can contact Blythe Reis (mail@sandybar.com).

Cooperative Restoration

Cooperative restoration planning is a mechanism of implementing large landscape restoration treatments, but is also important for securing the necessary funding to complete large restoration projects. Cooperative partnerships between tribal, county, state and federal agencies are capable of generating multiple funding sources for large expensive projects (e.g. road decommissioning). The Karuk Tribe has entered into a "Watershed Restoration Partnership" and other restoration partnerships with the Six Rivers National Forest and the Klamath National Forest. Currently, road decommissioning and fuels reduction projects are being implemented through this partnership (See Appendix F)

An effective restoration partnership is need in the "Checkerboard" sub-watershed region of the Middle Klamath. This highly mixed ownership region is severely degraded by roads, principally in Beaver Creek and Horse Creek. Most roads in these watersheds dissect large blocks of private and public lands. Treatments need to addresses all segments of road within a given watershed to ensure projects are effective at the watershed level.

Section 5: Middle Klamath Monitoring Status Report

There are several watershed elements that are currently being monitored in the Mid-Klamath. They include 1) fish populations, 2) stream flow, 3) water quality, 4) physical

habitat, and 5) restoration sites. Monitoring is being carried out by multiple agencies, tribes and community groups. These groups include: Karuk Tribe, Yurok Tribe, United States Forest Service (USFS), United States Fish and Wildlife Service (USF&W), California Department of Fish and Game (DFG), the North Coast Water Quality Control Board (NCWQCB), United States Geological Survey (USGS), and the Mid-Klamath Watershed Council (MKWC). Coordination between these groups is essential to identify data gaps and to minimize redundancy in data collection. The following outline describes current monitoring efforts in the Mid-Klamath, and identifies who is administering them.

Fish Population Monitoring

Chinook Spawning

- Spawning escapement surveys for Chinook are conducted on the main stem Klamath River from Happy Camp to Iron Gate Dam (Karuk Tribe, Yurok Tribe, USFS, DFG, and USF&W).
- The Karuk Tribe, Yurok Tribe, USFS and DFG survey major tributaries below Iron Gate annually.

Summer Steelhead Holding Counts (USFS and Karuk Tribe)

- Surveyed Summer Steelhead Streams (see Appendix G):
    - Bluff Creek
    - Red Cap Creek
    - Camp Creek
    - Dillon Creek
    - Clear Creek
    - Elk Creek
    - Indian Creek
    - Thompson Creek

Steelhead Spawning

Steelhead spawning surveys were conducted by the USFS from the mid-1980's through the mid-1990's on major tributaries. An effort is currently underway by the Karuk Tribe's fisheries program to continue this monitoring on select tributaries.

Outmigrant Trapping:

Outmigrant rotary screw traps are operated on the main stem Klamath River and tributaries:

- Klamath River below Bogus Creek (USFS)
- Klamath River above Scott River (USF&W, Karuk Tribe)
- Klamath River at Big Bar below Orleans (USF&W, Karuk Tribe)
- Red Cap Creek (USFS, Orleans Ranger District)

Main stem thermal refugia surveys (USF&W, Yurok Tribe, Karuk Tribe):

As part of the Klamath River flow study, all, major and minor tributary confluences with the main stem Klamath River are monitored to assess fish use of thermal refugia. These areas are monitored to assess fish health during periods of poor water quality.

Stream flow Monitoring

USGS Stream Flow Gauges:
Stream flow gauges are present below Iron Gate Dam, below Seiad Valley, in Indian Creek and below Orleans.
Tributary Summer Discharge Monitoring (USFS, Karuk):
Summer low-flow discharge rates are measured annually on all major and most minor tributaries to the main stem Mid-Klamath River.

Water Quality Monitoring

Water Temperature Data Loggers (USFS, Karuk Tribe, Yurok Tribe, NCWQCB):
Continuous water temperature data has been recorded on most tributaries in recent years (data is available in the current version of KRIS). A complete compilation of current recording sites has not been produced.
Continuous Water Quality Data Loggers (Hydrolabs and Datasons) (USF&W, Karuk, NCWQCB):
Continuous water quality stations are present in the main stem Klamath River below Iron Gate Dam, Seiad Valley and most recently Orleans. Hydrolab water quality monitoring parameters include: pH, specific conductivity, dissolved Oxygen, turbidity, and water temperature.

Physical Habitat Monitoring

Habitat Typing (USFS):
Habitat typing has been completed for most of the major and minor tributaries of the Mid-Klamath. Highly altered stream channels (1997 flood effects) in Grider Creek, Elk Creek and Indian Creek were recently re-surveyed.
Klamath "Flow Study" (USF&W, Yurok Tribe, Karuk Tribe):
Assessment of in-stream flow needs for all salmonids species in the main stem Klamath River is presently underway.
Fish Barrier Assessment (USFS, Karuk Tribe):
Suspected migration barriers exist at road stream crossings on some subbasin tributaries. State Hwy 96 dissects much of the subbasin and suspected barriers are present at crossings of O'neil Creek, Portuguese Creek, Fort Goff Creek, Cade Creek, Sandy Bar Creek, Stanshaw Creek and Crawford Creek (below Orleans). The Forest Service and the Counties are in the process of assessing suspected barriers on their respective roads.

Restoration Site Monitoring

Periodic Project Site Visits:
Road decommissioning and other on the ground projects will be visited periodically and current follow up site descriptions will be completed.

Photo Monitoring:
Descriptive pre-project photos should be taken and followed up by post-project photos. Permanent photo points should be established so that site conditions through time can be tracked (e.g. revegetation, slope stability, etc.).

Section 6: Planning Needs and Information Gaps

Section 7: Sources Cited

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