c.1

# EVANS CREEK WATERSHED ASSESSMENT

**Prepared for**
**State of Oregon Watershed Health Program**
**and**
**Strategic Water Management Group**

**Prepared by**
**Evans Creek Watershed Council**

**February 1995**

***"When the well's dry, we know the worth of water."***
Benjamin Franklin

# EVANS CREEK WATERSHED ASSESSMENT
**February 1995**

## TABLE OF CONTENTS

**CHAPTERS**

# CHAPTER I

## INTRODUCTION

The Evans Creek Watershed Assessment is the initial step in providing a framework for the community to address many of the difficult natural resource issues we must face in the coming years. It is hoped that this initial step will lead to a process where by the community can come together to analyze issues and problems and develop and implement solutions. The objectives of this process are to:

1. Enhance and restore the watershed for all species, including humans.
2. Promote the recovery of anadromous fish stocks in the Rogue River Basin by improving habitat conditions in the Evans Creek Watershed and other tributaries to the Rogue River.
3. Involve the community in caring for their watershed.
4. Provide educational opportunities.
5. Create sustainable jobs for residents of our community through our watershed restoration efforts.
6. Provide avenues to accomplish our objectives.

The watershed assessment was prepared by the Evans Creek Watershed Council (ECWC) for the State of Oregon Watershed Health Program and the Strategic Water Management Group. Assistance was provided by the Watershed Health Field Team and Central Staff and many local experts and the Applegate River Watershed Council. The imposed time constraints did not allow this draft document to reflect the involvement of community residents that we feel is essential. Public involvement in the refinement of the assessment and the development of a strategy for improving and maintaining health in the watershed will be an ongoing process achieved through personal contacts by ECWC staff in the daily operation of project work. This assessment is a living document and will be changing to reflect the needs of our community and the environment.

The Evans Creek Watershed Council consists of local community members concerned with watershed health issues. All members of the community are invited to participate. We meet regularly on the second Wednesday of every month at 6:00 P.M. at the Rogue River City Hall Council Chambers. All meetings are open to the public.

The Evans Creek Watershed Council and the Watershed Health Program recognize the importance of considering the interconnectivity of all components in the watershed to properly manage the resources. A ridge top to ridge top approach to view watershed health is used. The cooperation of all landowners is essential for improving the conditions of our resources. To that end, the Evans Creek Watershed Council will work towards creating partnerships, eliminating political boundaries, creating common goals moving towards sustainable jobs, sustainable communities and sustainable forests.

Preliminary investigation reveled a lack of available data for the planning area. In an effort to facilitate moving forward with project work to involve members of the community, the Evans Creek Watershed Council decided to parallel the efforts of the USDI Bureau of Land Management, by dividing the planning area into "Landscape Analysis Units" and assessing each unit or subwatershed. Our hope is to develop cooperative efforts working across ownership boundaries to achieve common goals.

At this time we will focus this assessment on a broad overview of the entire planning area, with more detailed analysis of the Mid-Evans Creek Subwatershed to identify potential projects. In time additional subwatersheds will be added, with the goal of completing the initial assessment by the year 2000. Data collection and project work will be ongoing and will offer training and education opportunities for members of the community, as we build a "skills bank" to fully implement a comprehensive watershed health program, while continually enhancing and updating the assessment.

This assessment is based on readily available information available at this time. As new information or ideas are developed, they will be integrated. Information gleaned from accounts of residents regarding current and historic conditions will be integrated with the scientific data obtained. Results derived from current studies and monitoring will also be used to update the assessment.

# CHAPTER II

# WORKING ASSESSMENT

## WATERSHED CHARACTERIZATION

### GEOGRAPHIC SETTING

The Evans Creek Watershed Council's planning area is an important part of the diverse 3,300,000 acre (5,156 square mile) Rogue River Basin. Map 1 shows the location of the planning area within the Rogue River Basin (not available at this time). The approximate 261,760 acre (409 square mile) Evans Creek Watershed Council's planning area includes lands in Jackson County (approximately 406 square miles) and Josephine County (approximately 3 square miles) of Southwest Oregon. The area is bordered on the North by the Umpqua River Basin, and shares common boundaries with other Watershed Council's planning areas encompassing the entire Rogue River Basin.

The main stem of the Rogue River flows in a westerly direction through the planning area. Evans Creek rises from the northern divide separating the Rogue River Basin from the Umpqua River Basin and travels in generally a south-southwest direction to its confluence with the Rogue main stem at the City of Rogue River. Numerous small watersheds flow into the Rogue River and are included in the planning area.

Map 2 shows the rural communities, primary tributaries and peaks in the planning area. Major communities include Rogue River and Gold Hill, with other populations centered around Wimer, Sams Valley and Foots Creek (not available at this time).

**Issues:** The watershed is large, spans several political jurisdictions, and has no central meeting place. The watershed residents represent a minority in the political arena, much the same as Southern Oregon is a minority when considering state wide issues.

**Data Gaps:** Detailed and or site specific geographic information is not readily available for the planning area. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

### GEOLOGY

The planning area lies entirely within the Klamath Mountains physiographic province, which has the oldest rocks in Western Oregon and may contain some of the oldest formations in the state. The Klamath Mountains region is typically mature and rugged with narrow winding valleys and sharp divides. Local differences in elevation range from 1000 up to 5100 feet, although differences between valley bottoms and nearby ridges are usually less than 3500 feet. Slopes of 30 degrees are common in the mountains. All the valley lands in the basin lie below the 1300 foot level with those of Sams Valley between 1250 and 1300 and along Evans Creek from 950 to 1200.

Stream gradients vary widely from headwaters to mouth throughout the planning area, with the Rogue averaging approximately nine feet of drop per mile and Evans Creek dropping 270 feet per mile in its headwater area and then leveling off to an average of 30 feet of drop per mile below rive mile 28.

Episodic vertical movement of the earth's crust is clearly displayed throughout the geologically old Klamath Mountains province. The region has experienced at least three successive cycles of erosion and considerable faulting, folding and weathering, resulting in a very complex geologic structure. The first cycle produced what is known as the "Klamath peneplain," remnants of which appear only at the higher elevations in the basin. The second cycle produced the flatter valleys from which numerous terraces and benches still remain, the elevation up to 300 feet above the level of the nearest stream. The third cycle produced the steep valleys along the present streams and the recent valley fill in the open valleys. Most of the alluvial material in the larger valleys in the basin originates for this third cycle of erosion.

**Issues:** Variability exists in the geology of the planning area. Steep slopes and complex soils present problems when making management decisions. Proper site attribute identification is required for management decisions.

**Data Gaps:** Site specific data of a geologic nature, either does not exist or is not readily available to the general public, for the private nonindustrial lands within the planning area. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## SOILS

Soil is the most critical ecosystem component. The interaction of soil and climate generate the inherent productivity of the site. Healthy soils are airy, permeable, fertile, (high organic carbon content), protected from surface erosion, and productive. They transmit and store heat, water, and other chemicals. Soils host plants, animals, nutritional elements, and regulate water flow. Any damage to the physical or chemical properties, particularly the organic components of soil, has potentially extensive impacts on vegetation, water, nutrition, and microsite temperatures.

Most of the soils in the planning area are relatively shallow gravelly soils derived from granitic or metamorphic rocks. Timber production and pasture are the primary uses of these soils.

Within the valleys formed by the Rogue River and Evans Creek, the soils are deeper and support a diverse agricultural industry. In a few areas, the soil contains a high proportion of clay which may restrict drainage. This problem is most common near the upper end of the basin in the Sams Valley area and reflects the volcanic rock origin of these soils.

**Issues:** Soils and their characteristics should be identified to verify likelihood of success for proposed land use.

**Data Gaps:** Soil data is available for the planning area. Reliability of data as mapped is in question throughout the planning area. Local expertise is needed to verify data on a site specific basis. The current GIS soil layer is somewhat ineffective and is therefor perceived as an existing data gap, until this information becomes available in a verifiable format to the public.

## CLIMATE/WEATHER

The planning area experiences mild wet winters and hot dry summers. Average annual precipitation is less than 20 inches in the Sams Valley area and as exceeds 55 inches at Goolaway Gap. Actual precipitation can vary by more than fifty percent from year to year throughout planning area. Less than 20 percent of the annual precipitation occurs during the irrigation season, May 15 through October 30. Precipitation usually occurs in the form of rainfall in most of the watershed. However, in the higher elevations the precipitation during the winter months could be in the form of snow. Between 3,500 feet and 5,000 feet snow and rain are dominant. This elevation band is called the transient snow zone. Rain on snow events in this range can cause very high peak flows causing severe erosion.

Southern Oregon typically experiences severe drought conditions; with 7 of the last 9 years having less than average precipitation. Long and short-term climatic cycles are critical to the ecosystem's current and future condition. Pollen studies suggest that hot, dry periods may have persisted for 4000 years of the last 10,000 years after the Ice Age. Jeff LaLande (personal communication), archeologist for the Rogue River National Forest analyzed Dendrochronology records (tree rings) and found evidence of a severe drought lasting for 30-40 years about 300 years ago. A more recent drought, also recorded in tree-rings, occurred around 1880 for a period of about 20 years duration. Hot, dry weather coupled with continued development in the area should raise awareness that community involvement to plan for our future, regarding water use and ways to protect our property from the high potential fire risk, is essential.

**Issues:** Drought conditions are typical in the planning area; consequently, water conservation measures and water storage should be encouraged and implemented where possible. Peak winter stream flows could be conserved to supplement low summer precipitation. Seek support from governmental agencies for realistic incentives to encourage conservation.

**Data Gaps:** Climate and weather data is collected at scattered locations mostly outside the planning area. Data is then interpolated for the planning area. Soil moisture is one of the limiting factor for the functioning of ecosystems. Data does not exist on soil moisture levels or other climate and weather related issues specific to the planning area or subwatersheds. Knowledge of soil moisture and aquifers would facilitate decision making and aid in

probability of program success. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## HYDROLOGY

In the planning area, there is currently one active gaging station on the Rogue River at Gold Ray Dam. The discharges for the Rogue River are now partially regulated by Lost Creek Reservoir which reduces the peak natural flows with its flood control storage. Data on other streams in the planning area is not available.

Stream flow in the planning area mirrors the precipitation pattern. Approximately 80 to 90 percent of the annual water yield occurs from December through May. Run-off usually peaks in February and March. Historic extreme flood events have come in December and January as a result of rain on snow events. Summer flows are usually quite low reflecting the low summer precipitation.

The greatest water needs occur during the summer months when water is in high demand for irrigation, recreation, domestic use, road construction and power generation. This is also the time of lowest water yield. Naturally low summer stream flows are directly affected by withdrawals for agriculture and domestic use. The result is seriously depleted stream flows which affect instream fish habitat. An increase in rural population density has been accompanied by an increase in surface and ground water diversion. This trend is expected to continue.

Water quality of streams in the planning area is not known. Principal water quality concerns are:

- Above optimum water temperatures for salmon and trout in the summer.
- High turbidity during major winter storms.
- Surface water runoff contamination from agriculture (livestock and chemical).
- Human waste contamination from recreation use of the Rogue River.
- Other nonpoint sources of pollution.

For purposes of this report, the planning area has been divided into seven subbasins based on BLM specifications. Table 3 lists the basin names and sizes in acres and square miles (acres and miles not available). Map 3 and Plate 2 show their location in the watershed (not available).

**Issues:** Water is a limited resource, especially in the tributaries, with many competing demands vying for its use. The probability of over allocation of this resource is high, with stream flows down to zero during the summer months in all tributaries.

**Data Gaps:** Information on stream flows and other hydrological data is not available for the planning area. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

TABLE 3 EVANS CREEK WATERSHED SUB-BASINS

| SUB-BASIN | TRIBUTARY | ACRES | SQUARE MILES |
|---|---|---|---|
| WEST EVANS | West Evans Creek | | |
| | Battle Creek | | |
| | Rock Creek | | |
| | Cold Creek | | |
| | Salt Creek | | |
| | Sand Creek | | |
| PLEASANT | Queens Creek | | |
| | Ditch Creek | | |
| | Pleasant Creek | | |
| | Fry Gulch | | |
| | Murphy Gulch | | |
| EAST EVANS | Morrison Creek | | |
| | Evans Creek* | | |
| | Sprignet Creek | | |
| MID EVANS | Sykes Creek | | |
| | May Creek | | |
| | Evans Creek* | | |
| | East Evans Creek* | | |
| | Neathammer Gulch | | |
| LOWER EVANS | Evans Creek * | | |
| | Red Ditch | | |
| | Bear Branch | | |
| | Fielder Creek | | |
| | Trimble Creek | | |
| ROGUE GOLD HILL | Sardine Creek | | |
| | Wards Creek | | |
| | Little Savage Creek | | |
| | Birdseye Creek | | |
| | Foots Creek | | |
| | Galls Creek | | |
| | Kane Creek | | |
| ROGUE GOLD HILL WEST | Sams Creek | | |
| | Rock Creek | | |
| | Snider Creek | | |

* Indicates only a portion of the stream in the subbasin.

## VEGETATION

### Riparian Zones

Riparian zones are the areas immediately adjacent to rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows. The vegetation and microclimate

conditions in riparian zones are products of the combined presence and influence of perennial or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Riparian zones provide stream bank stability, physical filtering of water, water storage, aquifer recharge, and insulation for the streams from summer and winter extremes. Riparian zones are key components of biological diversity in a watershed, displaying a greater variety of plant and wildlife species and vegetative structure than adjoining ecosystems. Many wildlife species depend on food, water, shade and cover, and other unique and diverse habitat niches offered by riparian zones.

Logging, residential and agricultural clearing of riparian areas, and drought caused mortality of conifers have impacted the naturally occurring riparian vegetation in the planning area. Residential development has removed considerable riparian vegetation, usually to facilitate construction, lawn development and a view. A healthy riparian zone is characterized by water-loving plants such as willows, alder, ash, cottonwoods and others. Conifers, which will provide future shade and large woody debris to both the stream and to the riparian area are an important component, but logging and agricultural clearing have removed most of the conifers in the riparian zone in the planning area.

Preservation and restoration of riparian areas are essential for maintaining wildlife habitat and the other benefits riparian areas provide such as improved water quantity and quality and stream shading to reduce stream temperatures. In some areas blackberries have out-competed overstory vegetation. Clearing blackberries in selected areas to allow overstory vegetation to reestablish may be necessary.

The Lost Creek dam (up river of the planning area) has altered the condition of riparian areas along the Rogue River by regulating winter flows. Previously, high flows kept stream side vegetation in an early seral state. Many side channels, which provide important fish habitat have become clogged with debris and are no longer functional.

Riparian areas serve as connecting corridors among late successional areas and between upland and lower slope areas. Corridors provide migration pathways essential for both wildlife and plant communities.

### Valley floor

The valley floor supports a vegetative type, described as native valley woodlands. This plant association occurs adjacent to the riparian zone and includes Ponderosa pine, Douglas fir, incense cedar and oaks, with additional black cottonwood, Oregon ash, blackberries and a diverse understory. This plant association is becoming increasingly rare, due to clearing for agricultural use and residential development although it once characterized the valley floor.

Preservation of this habitat is a high priority. The native valley woodlands provide excellent wildlife habitat and are particularly valuable for perching and nesting for large birds such as hawks, ospreys, herons and owls that utilize adjacent riparian habitat or farmland.

The similar oak woodland occurs in the foothills up to an elevation of 2200 feet and includes white oak, California black oak, madrone, deerbrush and manzanita.

### Upland Forests

The planning area is dominated by heavily cut over (estimate 95 percent cut) mixed conifer and mixed conifer/hardwood forests. Dense stands of low vigor are characteristic across the area, with some productive areas mixed in, relative to topography and soils. In general, the species mix changes with elevation, aspect and soil type. Early seral state vegetation dominates the landscape. Only a handful of small pockets of old growth forests exist scattered across the planning area.

**Issues:** Native vegetation should be reestablished in riparian areas to a minimum level that will afford protection of the resources of the State. Forest health should be a focus in upland areas on private and federal lands, in an effort to reduce or eliminate risk. Planning tools that allow a look at the spatial and temporal distributions of vegetation should be made available to the public.

**Data Gaps:** Information on habitat types or plant associations is not available for private nonindustrial lands within the planning area. A new plant association guide for the region is in development through the Federal Agencies. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## SENSITIVE PLANT SPECIES

Several plant species occur in the planning area which may be at risk of declining significantly or disappearing over time. Managing for the viability of these species in the planning area will reduce the need for listing them as threatened or endangered, and maintain the flexibility of land management options in the area. Table 4 includes ten species (in 29 populations) that are listed or are candidates for listing as threatened or endangered by the state of Oregon or the U.S. Fish and Wildlife Service. The data is representative of the Middle Rogue HUC (17100308).

**Issues:** T&E plant species exist in the planning area and should be protected. Before any restoration activities occur, the Evans Creek Watershed Council should check to determine the proximity of threatened or endangered plants which could be harmed.

**Data Gaps:** No inventory of T&E has occurred on private nonindustrial lands. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

TABLE 4. THREATENED AND ENDANGERED PLANT SPECIES WITHIN THE MIDDLE ROGUE HUC (17100308)

| PLANT SPECIES NAME | STATUS | NO. OF POPULATIONS |
|---|---|---|
| Umpqua mariposa-lily (Calochortus umpquaensis) | L | 1 |
| Cook's desert-parsley (Lomatium cookii) | L | 12 |
| Henderson's bentgrass (Agrostis hendersonii) | C | 1 |
| Clustered lasy's slipper (Cypripedium fasciculatum) | C | 10 |
| Oregon willow-herb (Epilobium oreganum) | C | 1 |
| Henderson's horkelia (Horkelia hendersonii) | C | 1 |
| Slender meadowfoam (Limnanthes gracilis var. garcilis) | C | 2 |
| White meconella (Meconella oregana) | C | 1 |
| Southern Oregon buttercup (Ranunculus austro-oreganus) | C | 11 |
| Howell"s tauschia (Tauschia howellii) | C | 1 |

Data source: Oregon Natural Heritage Program C= Candidate species, L= Listed species

## FIRE ECOLOGY

Fire has been an important historic agent of change in the planning area. "Natural" fire frequencies range from 10 to 80 years. Native Americans used low-intensity fires extensively every 2 to 10 years to manage both game and vegetation. Prescribed fires were used to keep the forests open for hunting and gathering, stimulate berry and seed production, produce quality wildlife forage, reduce disease and insect infestations, maintain food, fiber and medicinal plants, and increase water quantity. Native American land management was at least partly responsible for the composition and distribution of plant communities in the pre-European historical landscape. Later, miners and ranchers burned to clear the land, and to protect their stock, fields and homes from wildfire (time between burns in the lowlands averaged less than 10 years). By the early 1920's, valley forests were dominated by early developmental stages and older fire-resistant stands covered only the higher elevations.

In the last 80 years, fire suppression has increased the biomas productivity of the forests by changing the composition and structure of vegetation across the landscape, allowing for more species diversity and site occupancy. Today the effects of decades of fire exclusion are evident. Rural homes are surrounded by dense continuous vegetation, and composition is changing to a less fire resilient complement of species, such as Douglas firs. The recent drought has accelerated the decline in tree vigor. Dense overstocked stands along with large accumulations of fuel from insect mortality have greatly increased the risk of catastrophic

wildfire. The risk is compounded by an increased population of rural residential dwellings throughout the watershed at the forest interface.

Virtually all forests within the planning area currently have high to extreme risk of catastrophic loss from drought, bark beetles and wildfire. Map 4 shows the fire hazard ratings for the planning area (not available). Fire hazard assesses the kind, arrangement, volume, condition and location of vegetative fuels that form the threat of ignition, spread and difficulty of control. Map 5 shows fire risk (not available). Risk is defined as the chance of various ignition sources causing a fire, threatening valuable resources, property and life.

Wildfire has been a recurring threat for most residents of the planning area, with large catastrophic fires (arson related) destroying or threatening homes and resulting in the loss of life. Within the past 15 years, over fifty percent of the planning area has burnt, with some lands burning two or three times.

Catastrophic fires under these conditions are not part of the natural healthy ecosystem. These fires often destroy all components of the forest rather than burning the understory. Soils are often altered making recovery a very slow process. Increased sedimentation on unstable slopes damages water quality.

**Issues:** Wildfire causes loss of property and life. Fuel management is needed to reduce losses and protect resources.

**Data Gaps:** Fire hazard information is not available for lands within the planning area. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## WILDLIFE

The planning area contains a variety of habitats for different wildlife species. Habitats on most lands have been heavily modified. Wide river valley areas have been developed and riparian and marsh-like areas have been channelized and drained. After white settlers arrived, private lands likely sustained significant drops in populations of specific groups of animals, such as waterfowl, fur-bearers, and amphibians. Roosevelt elk probably frequented the valley lowlands, along with grizzly bear and gray wolf.

Species viability is a complicated subject, and definitive data are not available for many wildlife species (Marcot and Murphy 1992). However, maintenance of species viability depends on maintaining a diversity of wildlife habitats at appropriate levels. Table 5 shows the animal species listed as threatened and endangered for the Middle Rogue HUC (17100308).

**Issues:** Historically wildlife has taken a back seat to other forest resources. The need to protect T&E species and provide habitat to avoid listing additional species is evident. The

public perception of wildlife values is changing, with wildlife given a higher value than traditional forest products.

**Data Gaps:** Information on wildlife populations and spatial distributions of habitat and other wildlife issues is not available. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

TABLE 5. THREATENED AND ENDANGERED ANIMAL SPECIES WITHIN THE MIDDLE ROGUE HUC (17100308)

| ANIMAL SPECIES NAME | STATUS | NO. OF POPULATIONS |
|---|---|---|
| Northern spotted owl (Strix occidentalis caurina) | L | 40 |
| Bald eagle (Haliaeetus leucocephalus) | L | 3 |
| Lewis' woodpecker (Melanerpes lewis) | C | 7 |
| Sharptail snake (Contia tenuis) | C | 5 |
| Pacific western big-eared bat (Plecotus townsendii townsendii) | C | 8 |
| Three-toed woodpecker (Picoides tridactylus) | C | 1 |
| Northwestern pond turtle (Clemmys marmorata marmorata) | C | 5 |

Data source: Oregon Natural Heritage Program L=listed species C=candidate species

## LAND OWNERSHIP

Land ownership is shared by the Forest Service, Bureau of Land Management and private residential, agricultural, business and corporate landowners. A checkerboard ownership pattern exists throughout the planning area although private residential and agricultural landowners control the majority of the Evans Valley and most of the other major tributary stream frontage and associated riparian areas and alluvial valleys. The upper forested slopes ownership is mostly split between the USDI Bureau of Land Management and private corporate holdings. The settlement patterns associated with population increase and inmigration have been dispersed in the rural areas, creating a large forest/residential interface. The added population is associated with an increase in water demand and other services, and increased recreation on public forest lands.

**Issues:** Cooperation between landowners will be necessary to achieve restoration goals in the watershed because of the mixed ownerships. Projected continued growth will stress natural resources even further in the future.

**Data Gaps:** The lack of a coordinated effort on the part of the public reduces the effectiveness of ecosystem based management. Information on landscape planning issues and tools for effective project coordination is not readily available. Private landowners often have management objectives that conflict with their neighbors. The desired future conditions

of the landscape have not been discussed. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## SOCIAL

Southern Oregon continues to undergo steady social and economic change. The economic structure of the area is shifting from the natural resource sectors (agriculture and timber) to trade and service sectors (recreation, tourism and retirement). In addition to the inmigration of retired people, a significant portion of immigrants are younger, more educated ex-urbanites. These newcomers tend to have strong environmental values but little experience with land management in general or the southern Oregon ecosystem in particular. The social complexion of forest management has also changed: more diverse publics, more questions about forest management, and greater scrutiny of agency decision making have characterized recent years, partly as an outgrowth of these demographic changes.

**Issues:** Public outreach and education are needed to promote ecosystem based management and sustainability.

**Data Gaps:** No information is available on social issues within the planning area. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## POPULATION AND GROWTH

Consistent with the "greening" of citizens throughout the nation, residents of the Evans Creek watershed district are concerned about growth, and its effect on the environment. At a 1994 Rogue River town-hall meeting, many residents expressed concern about further development in the area. Following the meeting, Rogue River Mayor Larry Miller said that his perception of the attendee's attitudes toward growth was, "no how, no way!"

Part of the anxiety about growth in the Evans Creek area stems from residents' observations of what has been happening county-wide. Table 1 shows that, for the 1980-90 decade, growth occurred at a more rapid rate in Jackson County's cities than in its unincorporated areas.[1] Growth occurred especially rapidly in Rogue River, the largest city in census tract 029 (which corresponds roughly to the Evans Creek watershed district). During this period, Rogue River's growth-rate far exceeded that of Jackson County, and even that of Medford (Table 1). Traffic increased as well, and at an even faster rate than the population, leaving residents with concerns about county-wide mismanagement of growth.[2]

Table 1
1980-1990 Population Change for Selected Areas of Jackson County

| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|---|
| County total | 132,456 | 146,389 | 13,933 | 10.5 | 1.1 |
| Medford | 39,746 | 47,021 | 7,275 | 18.3 | 1.8 |
| Unincorp. areas | 57,993 | 59,831 | 1,838 | 3.2 | 0.3 |
| Census Tract 029 | 5,701 | 6,095 | 394 | 6.9 | 0.7 |
| Rogue River | 1,308 | 1,759 | 451 | 34.5 | 3.5 |

In the 1992-93 period, population growth spilled outward into the unincorporated areas of Jackson County. In that period, the *one-year* growth rate in the unincorporated areas equaled the approximate growth rate for the preceding *ten* years (Table 2).

Table 2
1992-1993 Population Change for Selected Areas of Jackson County

| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
|---|---|---|---|---|
| County total | 152,900 | 157,000 | 4,100 | 2.7 |
| Medford | 49,900 | 51,215 | 1,315 | 2.6 |
| Unincorp. areas | 60,495 | 62,385 | 1,890 | 3.1 |
| Rogue River | 1,815 | 1,820 | 5 | 0.3 |
| Gold Hill | 1,175 | 1,225 | 50 | 4.3 |

Growth in the unincorporated areas of Jackson County is reflected in the growth of the two incorporated cities of the Evans Creek watershed. Had the growth rate of the City of Rogue River not been curtailed artificially (secondary to a moratorium on growth resulting from problems with its water supply), thus continuing its 1980-1990 growth rate, it would have joined Gold Hill (the second-largest incorporated city in the Evans Creek watershed) in reflecting this pattern of increasing growth in the outlying areas of Jackson County.

- Effects on Local Water and Sewage

Obviously, population growth affects water usage. Table 3 shows census tract 029 water source increases from 1980 to 1990 .

Table 3
1980-1990 Water Sources for Census Tract 029

| | | | | |
|---|---|---|---|---|
| Public system or private company | 387 | 910 | 523 | 135 |
| Individual drilled well | 894 | 1688 | 794 | 89 |
| Individual dug well | 52 | 18 | (34) | (65) |
| Some other source | 33 | 117 | 84 | 355 |
| **TOTAL** | 1366 | 2733 | 1367 | 200 |

Table 3 shows that population growth in census tract 029 led to an increase in water use (measured indirectly by changes in water sources) far exceeding the rate of population growth in the tract. With population growth of 6.9% in the 1980-90 period, the 200% increase in sources of water acquisition outpaced population growth by a factor of *thirty*, or *3,000%*.

Population growth also affects waste disposal. Table 4 shows census tract 029 sewage method changes from 1980 to 1990.

Table 4
1980-1990 Sewage Disposal Methods for Census Tract 029

| | | | | |
|---|---|---|---|---|
| Public sewer | 379 | 899 | 520 | 141 |
| Septic tank or cesspool | 977 | 1798 | 821 | 84 |
| Other means | 10 | 36 | 26 | 266 |
| **TOTAL** | 1366 | 2733 | 1367 | 100 |

Again, these data show that population growth in census tract 029 has a disproportionate effect, with sewage disposal sites increasing at a geometrically faster pace than the underlying population growth.

- Conclusion

All populations can grow exponentially, but environmental forces eventually limit growth. This process is termed carrying capacity. Populations with birthrates continuing at the base level of 45 per 1,000 people per year, and with death rates well below 20 per 1,000 people per year, are growing by as much as 3.5% per year. This results in population doubling over 20 years. Mounting population strains carrying capacity. Many Americans still hold

industry responsible for environmental degradation. Increasingly, however, the sheer number of people is becoming the source of water problems.

As the population in the watersheds has grown, so has the environmental impact of each of those people. Watershed inhabitants use four times as much land to build homes as they did forty years ago, for example. Population growth increases nitrogen and phosphorus release into ground water, triggering extensive biological consequences in the watershed. Population pressure also spurs land development in the watershed, hampering the watershed's natural ability to rebound from environmental blows. Forests act like sponges, moderating water flow and cushioning the impact of floods and droughts. Wetlands purify water by trapping sediment and filtering out nutrients.

This report shows unequivocally that population growth in the Evans Creek watershed district places increased demands on ground water resources. The population distribution map of the Evans Creek watershed district (Appendix A) shows that housing density in census tract 029 is heaviest along the creek beds. How the population increase in the Evans Creek watershed district generally, and along the creek beds particularly, affected the watershed's long-term health during the ten years of drought is unknown. The effect may be incalculable. Possible indirect measures of the interaction between population growth and the drought include changes in indicators such as number of wells redrilled, the number of new wells at established home sites, and the date within the irrigation season at which specific irrigation rights are shut off. This data is not immediately available. Its acquisition, however, might enhance planning for the Evans Creek watershed district.

Government regulations and pollution-cutting technologies have slowed the environmental degradation resulting from increases in population. However, growth ultimately swamps the benefits of regulation and technology. Pollution control devices, for example, have made automobile exhausts cleaner. However, those gains have been overwhelmed by increases in the number of miles driven.

The ancient idea that population is a source of economic well-being and power still prevails in places. Governments need to be aware, however, that regional well-being—not to mention individual welfare—is more likely to be attained with fewer people.

**Issues:** Southern Oregon is experiencing a population explosion that is stressing resources required to maintain the desired quality of life. The question of sustainability is being researched, to develop standards and guidelines.

**Data Gaps:** Information on resource sustainability is not available. The current watershed health approach is a "band aid" type effort that should be expanded. Information on sustainability needs to be collected to facilitate distribution and decision making.

## WATERSHED HEALTH AN ENVIRONMENTAL PERSPECTIVE

The environmental viewpoint on watershed health recognizes connections between various zones within the watershed to each other. Therefore, activities in the uplands effect the streams and the streams are the basis for the food chain which nourishes the fauna and flora of the uplands.

Activities performed by the human population such as mining, logging and agriculture effect these systems directly. The basis for maintenance of a healthy watershed is the mitigation and minimizing of these effects so that the natural systems may perform their designed functions most efficiently.

The modern environmental movement in forestry got its start with the passage of the Wilderness Act in the 1960's. Subsequent environmental laws were passed in response to extensive logging in the Pacific Northwest starting after World War II.

In 1969 and the early 1970's, the National Forest Management Act, The National Environmental Policy Act, the Endangered Species Act and other legislation was passed by Congress in response to concern expressed by Forest Service planners and wildlife biologists for the future of old growth species and timber supply. Through these legislative acts were to insure species survival and a sustained yield of timber, cutting continued at unsustainable levels. Federal land management agencies did not complete mandated forest plans until the early 1990's, delaying the debate.

In the meantime, Government scientists found that old growth forests contained unique ecological values. The scientific community documented the decline in populations of species dependent on old growth habitat. The Northern Spotted Owl, Marbled Murrelet and 214 species of anadromous fish all suffered loss of habitat causing declines in species richness. In 1988 and 1989, a series of successful lawsuits were brought by various environmental groups to save the Owl and the remaining old growth forests. Since that time, lawsuits and congressional overrides have kept the Pacific Northwest embroiled in controversy. Failure of Congress to resolve this controversy was the driving force behind the best of the best in the scientific community to develop the Presidents Forest Plan. The resulting document (Forest Ecosystem Management: An Ecological, Economic, and Social Assessment) attempts to incorporate the science of New Forestry and ecosystem management. The report recognizes cumulative impacts and the interdependency of all populations of the ecosystems. Through inventory and monitoring, we realize that a healthy forest produces more than just timber.

Logging on private lands is governed by the Oregon Forest Practices Act. Like the Federal Government, the State of Oregon has adopted changes to increase the levels of protection for the resources of the State (water and wildlife). Efforts from the State come from many directions and coordinating these efforts at a "Grass Roots" level is the Watershed Council.

Although no environmental organization exists in the planning area, many residents prescribe to one or more organizations in the surrounding area. Each environmental organization has their own policy regarding the major issues, with a range of acceptability relative to logging from "no cut" to "wise use". Some of the major issues are discussed below;

- A healthy non compacted soil is the basis of a healthy forest. Soil provides habitat for fungi and microorganisms that facilitate tree growth and nourish the forest ecosystem as a whole.

- Upland vegetation should reflect multiple age, species and class diversity with deciduous species allowed to play their natural role in succession. Upland vegetation should include snags of all decomposition classes and large down woody debris. Tree planting could be encouraged in areas which are under stocked using native species. Thinning could be encouraged in densely stocked areas to promote increased growth. Genetic diversity should be encouraged at all times.

- Predators living at the top of the food chain indicate the status of ecosystem health by demonstrating the ability of the system to support all species. Cavity nesting birds are natural enemies of forest pests, helping to maintain each species at sustainable levels. Small animals that decompose forest vegetation and contribute to nutrient cycling are important contributors to forest health and require adequate habitat.

- Health riparian zones are buffers between streams and uplands. They contain vegetation that provides shade for control of water temperature, necessary for anadromous fish habitat. The same vegetation stabilizes the stream banks, reducing nonpoint source pollution. Down woody material in and out of streams filters the water and provides important nutrients for stream dwellers. Proper water chemistry, channel structure, sinuosity, pools, and clean gravel are indicative of stream health, and are required in the stream as a whole and in any particular stream reach. Many diverse populations of invertebrates and vertebrates live in the riparian or stream habitat and should be protected and managed.

- Fire is a natural part of the forest ecosystem. Human intervention after fires should be done with extreme care with regards to soil compaction and erosion. Erosion controls should be monitored as to effectiveness at various intervals. consideration should be given to the natural recovery cycle of the forest following fire.

- Use of herbicides, pesticides and fertilizers can have deleterious effects on birds, soil, riparian microorganisms, and desirable species. Their use should be limited. The natural enemy approach such as the use of birds and ants to control forest pests should be applied whenever possible.

- All watershed health projects should be monitored as to their effectiveness with clear written records. Monitoring should be sufficient to predict the need for follow up treatments to insure project effectiveness.

- Restoration forestry is recommended throughout the planning area. Restoration forestry restores the health of the forest as well as sustaining rural communities, by putting people to work building the forest resource base. Responsible forest management must minimize adverse environmental impacts in terms of wildlife, biodiversity, water resources, soils, nontimber and timber resources while maintaining sustainable harvest levels.

**Issues:** The environmental movement is well established. Scientific data supports many of the principals and policies of some organizations. Cooperation and coordination of watershed health issues, with all stake holders is a must if work is to progress.

**Data Gaps:** There is a great deal of confusion over the "best science" for ecosystem based management. Many professionals contradict each other, as recent research is slow to emerge. Information specific to the planning area is not readily available. Information in the form of the "best science" needs to be collected to facilitate distribution and decision making.

## SUSTAINABILITY

The concept of sustainability is underlying in ecosystem based management. The shift from sustained yield of forest lands to sustainability of resources starts with a careful inventory and analysis or existing resources. Determining sustainability brings up the question "What Should Forests Sustain?". This question was examined in two ways. One exploring the ecological diversity within a forest, to determine a range of sustainability. The other is to identify concepts that emphasize forest sustainability (Gale and Cordray, 1991). They report on eight approaches to sustainability ranging from "Dominant Product Sustainability" to "Ecosystem-Centered Sustainability". Each approach varies is scope, scale and the meeting of human needs.

The Pacific Certification Council (PCC) is an organization dedicated to sustainable practices. Their membership includes nonprofit organizations throughout the Pacific Northwest and British Columbia. Their approach to sustainable forest practices is to use marked based incentives to drive ecologically sound management practices. Their standards and guidelines are based on the following ten elements of sustainability:

1. Forest practices will maintain and/or restore the aesthetics, vitality, structure and functioning of ecological processes of the forest ecosystem and its components.

2. Forest practices will maintain or restore surface and groundwater quality and quantity, with special attention given to aquatic and riparian habitat.

3. Forest practices will maintain or restore soil productivity and stability.

4. Forest practices will maintain or restore the diversity of native species of the area, including flora, fauna, fungi, and microbes, for the purposes of the long-term health of ecosystems.

5. Forest practices will encourage a natural regeneration of native species to protect valuable native gene pools.

6. Forest practices will not include the use of chemical fertilizers or pesticides.

7. Forest practitioners will address the need for local employment and community stability and will respect workers' rights, including occupational safety, fair compensation, and the right of workers to collectively bargain.

8. Sites of archaeological, cultural and historical significance will be protected.

9. Forest practices executed under a Certified Forest Management Plan will be of the appropriate size, scale, time frame, and technology for the parcel. Working in conjunction with RIEE, landowners are encouraged to monitor the effects of forest practices. This will allow RIEE to adapt forest practices to ensure long-term forest health.

10. Ancient forests will be subject to a moratorium on commercial logging during which time the Institute will monitor research on the ramifications of management in these areas.

From the ten elements of sustainability we see the effort to balance the needs of humans with those of the environment. The application of these ten elements in defining sustainability for all parts of the ecosystem could be applied anywhere in the world through a consensus approach of defining each element.

**Issues:** Making resources available for the next generation of decision makers is a primary concern and driving force in land management today. The "best science" is required for decision making, which offers biological reasons for project development.

**Data Gaps:** Information on the sustainability of the resources in the planning area is not available. Information needs to be collected and made available to everyone effecting planning area resources.

## RESOURCES IN THE WATERSHED

### FISHERIES

The planning area has significant populations of coho, fall chinook, winter and summer steelhead and resident trout (rainbow and cutthroat). Several other species also exist in the basin.

Salmon and steelhead are anadromous fish which migrate from the ocean as adults into fresh water streams to reproduce young which return to the ocean to grow to maturity. These migrants can travel far out into the Pacific Ocean, a very rich pasture, and grow very rapidly. When large numbers of salmon return with the calcium, nitrogen and phosphorus from the ocean; so important to growth of other plants and animals, they recycle nutrients to the ecosystem. They are also an important food source for humans and other animals.

Anadromous fish return from the ocean to their natal stream for spawning. All anadromous species require a freshwater environment for spawning. Each species, however, differs in the extent to which they rear in fresh water. All anadromous species dig a nest (redd) in the gravel bottom of streams where the eggs are deposited by the female and fertilized by the male. Incubation of the egg depends upon the species and is water temperature dependent. After incubation, an alevin (a small fry with an attached egg yolk sac) emerges from the egg into the gravel. Once the egg sac has been completely absorbed, the alevins emerge from the gravel as developed fry.

The anadromous life cycle involves a confusing and complex web of instream habitats, ocean conditions and harvest pressure that regulates anadromous populations. Collectively it will require the partnership of all landowners in the planning area and cooperation from groups on the coast to allow salmon stocks to rebound. Salmon are one of those connecting threads that tie us inexorably to the forests, the rivers and the oceans.

Each of these species prefer specific habitat niches in the watershed. The following is a brief description of the habitat preference for spawning and rearing of the three anadromous species:

- Coho Salmon (Oncorhynchus kisutch)

Coho salmon, also known as silver salmon, enter the Rogue River in September. Adults begin their journey up tributaries in late October and most spawn in November and December.

Fry begin to emerge in April. Since coho are fall spawners, they are susceptible to sedimentation of redds (nests) over the winter. Coho juveniles spend a year in freshwater before migrating to the ocean where they will stay for two years before returning to spawn. Some coho mature after only one summer of ocean life. These are known as "jacks" and are much smaller than normal mature coho.

Coho are most linked to the complex riverine habitats that were once prevalent in the streams. Coho prefer pools, glides, or slow velocity areas with overhead cover for rearing. Juveniles are territorial and prefer plunge pools, lateral scour pools, and glides during the summer months. They spend the winter months in low gradient braided channel areas where side channels, sloughs, and beaver ponds, were present, before migrating to the ocean. They depend on smaller streams that have wide riparian areas with marshes and

side channels and pools in off-channel areas, alcoves along the edges of streams and rivers and beaver dams for summer and winter freshwater habitat.

The upper lethal temperature for coho salmon is 78.4 degrees F. and their preferred range is 53 to 58 degrees F.

The Rogue Basin is on the southern end of the coho range. Coho are the least abundant wild anadromous (with the exception of sea run cutthroat) that use the Rogue system.

Coho are a prized sport and commercial fish. Low escapement has recently forced closures of the ocean fishery for coho in many areas. The Rogue River coho salmon are listed as a sensitive species by ODFW. The sensitive species designation is meant to bring attention to the possibility that the Rogue River species of coho could be listed as threatened or endangered if measures are not implemented to improve coho salmon production. Many of the historic river conditions that coho depended upon for successful production are now degraded.

- Chinook Salmon (Oncorhynchus tshawytscha)

Rogue River chinook salmon, also known as king salmon, migrate south and rear off California prior to returning to the Rogue River. Fall chinook migrate up tributaries in the fall. The majority of the population spawns in October and November. The juvenile fall chinook emerge from the redds in March and April, and usually migrate out of the streams to the ocean at a small size (2-3 inches) by late June. They stay in the ocean about 4 years before returning to spawn in the fall and die.

Their life history makes this fish less susceptible to problems resulting from warm summer stream temperatures than coho or winter steelhead. They are however susceptible to sedimentation of redds from unstable stream banks and channels. Passage over diversion structures also poses a significant problem to returning adults during low water years.

Most spawning and rearing occurs in the lower segments of larger tributaries. Mainstem river edge habitat is used for refuge by fry in the early spring prior to their migration downstream to the estuary. Drought has impacted fall chinook because of reduced water levels.

Chinook are prized by sport and commercial fisherman in the ocean and sport fisherman in the lower and middle Rogue River. ODFW lists fall chinook as sensitive in the Lower Rogue, and little data has been collected for the planning area.

Studies are needed to determine the minimum flows required for fall chinook to pass over instream passage barriers. Adequate flows would lessen delay and reduce pre-spawn moralities. ODFW recommends that habitat projects for fall chinook should be directed at maintaining, improving, or reestablishing the quality and quantity of spawning gravel in suitable spawning streams.

- Steelhead (Oncorhynchus mykiss)

Steelhead are rainbow trout which migrate to the ocean. Of the three species, (chinook, coho, and steelhead) , steelhead are the most adaptive. The planning area is home to two distinct runs of steelhead: summer run and winter run..

The winter steelhead migrate into tributaries from December to May and have incredible swimming ability. steelhead are primarily tributary spawners. They will use mainstem channels when access to the tributary of their choice is limited by a barrier or when flows are inadequate. These fish migrate over waterfalls if conditions are favorable during the time of year when streams have high flows. They are late winter through spring spawners and are not as susceptible to the fall and winter storms involving sediment movement as the other species. They stay in fresh water from one to four years before migrating to the ocean.

Adult summer steelhead enter the Rogue River from May 1 through November 30. This run can be broken up into two categories: half pounder run and adult run. Half pounders reenter fresh water three months after first entering the ocean as a smolt, but do not spawn that year. Over 95% of the summer steelhead have a half-pounder life cycle. The fish that survive this run will return a year later along with the adults that did not make the immature run to spawn.

Steelhead spawn and rear throughout the planning area, but seem to prefer headwater streams or upper segments of streams. Juvenile steelhead reside in small streams and the mainstem of the Rogue River if temperatures are cool. Unlike the salmon which prefer pools and glides, steelhead are able to rear in fast-moving water. This trait and their variable stay in fresh water - one to four years - makes them most adaptive to changing habitat conditions, but also most susceptible to high water temperatures. They can compensate somewhat for elevated stream temperatures by seeking turbulent water with more oxygen. Many of the streams preferred by steelhead for spawning dry up in the summer. Drought, which is exacerbated by water withdrawals, has impacted both adult and juvenile steelhead. Low flows limit adult access to spawning tributaries, forcing Steelhead to spawn in the mainstem, resulting in a lower juvenile survival rate.

Steelhead are a prized sport fish in the Rogue River system. steelhead are not exploited in the ocean by commercial fishing. ODFW recognizes summer steelhead as a species of concern throughout the Rogue Basin, but the winter steelhead population appears healthy.

- Resident Trout

The resident rainbow population is somewhat unusual for coastal basins. Usually either cutthroat or steelhead (anadromous rainbow) are dominant. Cutthroat trout (Oncorhynchus clarki clarki) are ubiquitous in upper tributaries and headwater streams.

## Factors Affecting Fisheries

Many factors have contributed to the decline of anadromous fisheries and are discussed below. The ODFW draft Rogue Basin Fish Management Plan contains an excellent description of the early impacts on fisheries caused by human activities in the Rogue Basin.

- Sedimentation

Most of the planning area is characterized by highly dissected slopes and narrow steep canyons. Granitic and serpentine rock types as well as other soil types are highly erodible especially in this steep terrain. Logging and road building have caused extensive upland erosion, in some cases creating or exacerbating landslides, causing sedimentation of stream beds and consequent loss of spawning and rearing habitat. Amaranthus, et. al. (1985) found that erosion rates on roads were 100 times greater than those on undisturbed areas. Road density is a rough indication of potential risk for sedimentation. Grazing practices allowing livestock in riparian zones, over-grazing in general and residential clearing, in and outside of riparian zones, have also contributed to increased sedimentation. Landslides and bank erosion can occur as a result of natural forces, but are accelerated by vegetation removal, and steepening of slopes by road and ditch construction and seepage from ditches. Annual maintenance of many diversion structures (especially push-up gravel dams) also causes sedimentation. Activities which could cause soil erosion problems should be avoided in all areas. (When all of the soils information from Jackson and Josephine counties is entered into the GIS system, we will be able to generate a map showing areas of erodible soils across the watershed.)

Sedimentation increases turbidity (the presence of suspended solids) and increases embeddedness. The FEMAT report summarizes that Increased levels of sedimentation often have adverse effects on fish habitats and riparian ecosystems. Fine sediment deposited in spawning gravel can reduce survival of eggs and developing alevins. Primary production, benthic invertebrate abundance, and thus, food availability for fish may be reduced as sediment levels increase. Social interaction and feeding can be disrupted by increased levels of suspended sediment. Pools and important habitat types may be lost due to increased levels of sediment. In general, the highest productivity and diversity of aquatic invertebrates seems to occur in riffle habitats with medium cobble and gravel substrate. Areas of shifting sands commonly have reduced species abundance and richness. Where excessive fines are washed into the streams a "mat" is formed on top of the coarser bed materials. The filing of gravel with finer sediments can reduce inter-gravel flow rates, suffocate eggs, limit burrowing activity and trap emerging young.

- Water Quality

Low flows from drought and irrigation withdrawals reduce stream flows and increase water temperatures. Temperatures above 68 degrees F. jeopardize salmonoid species by increasing their susceptibility to disease and favoring warm water fish. Logging, residential and

agricultural clearing of riparian areas, have impacted the naturally occurring riparian vegetation which shade the stream, further contributing to higher water temperatures.

Temperature data is not available for most of the planning area (see subwatershed assessments). Temperatures in smaller tributaries which are critical to spawning and rearing for coho and summer steelhead, are most affected by high summer temperatures.

No data has been gathered measuring chemical properties throughout the watershed. The effects of variations in various chemical properties of water on fish and other aquatic life, have been studied. In many cases, there is insufficient data to determine whether these properties are limiting factors in the planning area. Additional work in this area will be proposed.

The pH of a stream (a measure of the hydrogen ion concentration) can have direct and indirect effects on the aquatic ecosystem. Some of the effects of various pH ranges are listed below:

- pH range of 5 to 9: not directly toxic to fish
- decline from 6.5 to 5: .reduction in anadromous egg production and hatching success
- less that 6.5: emergence of certain aquatic insects decline

Dissolved oxygen (DO) is critical to the biological community instream and to the breakdown of organic material. As DO concentrations decrease species begin to exhibit symptoms of oxygen distress. DO concentrations are critical to the stream. Sedimentation affects gravel DO values in spawning beds. When water temperatures increase, oxygen concentrations decrease.

Nutrients includes nitrogen and phosphorus. Nitrogen is one of the most important nutrients in aquatic systems because it stimulates production, e.g. growth. However, certain nitrogen compounds have toxic effects at relatively low concentrations. Low concentrations have been shown to be toxic to rainbow trout, but for the most part salmon and trout are not very sensitive to nitrates. Human and livestock wastes are sources of phosphorus.

Aquatic species are usually exposed to pesticides for only a short duration and at low concentrations, therefore they are not usually considered a limiting factor for fish. However, immediate runoff after application, wind drift and spills can result in concentrations that can impact aquatic life.

Elevated water temperatures and low flows will stimulate a number of diseases that can significantly affect fish. Dermosystidium and columnaris both have killed thousands of salmon in the past.

High summer temperatures are a primary water quality problem in the planning area. Low flows from drought and irrigation withdrawals reduce stream flows and increase water temperatures. Logging, drought-caused mortality of conifers and residential and

agricultural development have decreased riparian vegetation which shades the stream, exacerbating the problem.

- Water Quantity

Low summer flows characterize most of the tributaries in the planning area. Flows tend to mirror rainfall amounts which are often very low in the summer months. Low flows cause fish passage problems and elevated temperatures, which can stimulate excessive aquatic plant and bacteria growth and reduce oxygen concentrations.

The planning area is crisscrossed by a network of irrigation systems. Many of these systems were constructed in the late 1800's and early 1900's to provide water for irrigation and mining operations. Agricultural development followed with more ditch construction. Irrigation systems impact fisheries in many ways. Diverted water reduces stream flows causing higher summer temperatures. Unauthorized water use is also a problem. Because instream water rights for fish are relatively recent, irrigators have precedent over fish and may divert all the water from a stream if their water right allows. Obviously these low flows inhibit fish passage and raise temperatures to unhealthy ranges.

Extended periods of drought of 10 years or more is common in the planning area. This severely stressed fish and other aquatic and wildlife populations. Many tributaries dried up completely this summer, stranding anadromous and resident fish in shrinking pools to eventually die.

Soil has a large infiltration and storage capacity for water. Water from this storage reservoir is released slowly back to the stream. Often soil is compacted during activities such at construction or logging, and consequently the system reduces its ability to store water. Fragile soils can loose plasticity and productivity from compaction.

- Fish Passage

Barriers to fish passage can prevent adult fish from reaching spawning gravel and can prevent juveniles from finding safe rearing areas or from migrating out to the ocean. Barriers to fish passage can be natural or man-made. Some will affect juveniles and not adults. Irrigation diversions are often difficult for spawning adult fish to circumvent. Some diversions stretch nearly all the way across the stream. Ditches which are unscreened or improperly screened cause direct juvenile fish mortality. Culverts which are blocked or poorly constructed are difficult for fish to navigate through especially juveniles. Low flows also cause barriers to migration.

## OVERVIEW OF RESOURCE AGENCY DESIGNATIONS ON CURRENT ANADROMOUS POPULATIONS

The Medford District, BLM Proposed Resource Management Plan / Environmental Impact Statement lists the following population trends for anadromous fish in the planning area from 1979 to 1989:

- Coho salmon-increasing due to hatchery product
- Fall chinook salmon-increasing due to the combined effects of dam operation and reduced commercial fishery
- Spring chinook-stable due to the combined effects of dam operation and light commercial fishery
- Summer steelhead-stable or increasing
- Winter steelhead-increasing

ODFW list coho in the Rogue Basin as sensitive and summer steelhead as a species of concern in the Rogue Basin. They have very little information on streams in the planning area.

**Issues:** The fisheries in the planning area are at risk of loss, mainly due to habitat loss. Cumulative impacts are just as responsible as any single past action for degrading the resources and habitat.

**Data Gaps:** Very little information exists in the planning area about fisheries. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## WATER

The Oregon Water Resources Department, Administrative Rules Chapter 690, Division 515 Program defines the use of water for the entire Rogue Basin. A partial list of the classifications specific to the planning area are as follows;

(1) Classifications

(a) The maximum economic development of this state, the attainment of the highest and best use of the waters of the Middle Rogue River Basin and the attainment of an integrated and coordinated program for the benefit of the state as a whole will be furthered through utilization of the aforementioned waters only for domestic, livestock, municipal, irrigation, agricultural use, power development, industrial, mining, recreation, wildlife and fish life uses and the waters of the Middle Rogue River are hereby so classified with the following exceptions:

(C) The waters of the following streams and tributaries are classified only for domestic use, livestock consumption and instream use for recreation, fish life and wildlife except for the use of stored water. Water stored between November 1 and March 31 of any year may be used for any purpose specified in subsection (a). Domestic use does not include irrigation of lawns and gardens.

(i) Galls Creek

(ii) Foots Creek

(iii) Birdseye Creek

(iv) Sardine Creek

(v) Sams Creek

(vi) Kane Creek

(viii) Ward Creek

(E) The waters of the following streams and tributaries, are classified only for domestic, livestock and irrigation of one-half acre noncommercial garden, mining during the period November 1 to May 1, power development and instream use for recreation, fish life and wildlife except for the use of stored water. Water stored between November 1 and March 31 of any year may be used for any purpose specified in subsection (a).

(ii) Evans Creek

(b) Applications for the use of the waters of the Middle Rogue River Basin shall not be accepted by any state agency for any other purpose than those specified in section (a) and the granting of applications for such other purposes is declared to be prejudicial to the public interest and the granting of applications for such other uses would be contrary to the integrated, coordinated program for the use and control of the water resources of the state.

(c) Structures or works for the utilization of the waters in accordance with the aforementioned classifications, are also declared to be prejudicial to the public interest unless planned, constructed, and operated in conformity with applicable provisions of ORS 536.310 and any such structures or works are further declared to be prejudicial to the public interest which do not give proper cognizance to the multiple-purpose concept.

(2) Storage

(a) All applications for appropriation of water for storage in structures impounding more than 3,000,000 gallons of water shall be reviewed by the Water Policy Review Board prior to approval. During the review the Water Policy Review Board may establish additional minimum flows on the natural flow of the stream to support aquatic life or minimize pollution. Storage projects consistent with the purposes of minimum perennial streamflows shall be encouraged.

(b) Potential reservoir sites should be identified in the comprehensive land use planning process for possible future development or until alternative methods of meeting water needs have been developed. Immediate consideration should be give to the following sites:

(C) Evans Creek, SE 1/4, Section 19, Township 34 South, Range 2 West, Willamette Meridian.

(D) West Fork Evans Creek, SE 1/4, Section 32, Township 33 South, Range 3 West, Willamette Meridian.

(3) Minimum Perennial Stremflows

(a) For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life and minimize pollution, no appropriations of water shall be made or granted by any state agency or public corporation of the state foe the waters of the Rogue River or tributaries above Raygold for flows of the Rogue River below 1200 cubic feet per second, except that this limitation shall not apply to:

(A) Waters legally stored or legally released from storage.

(B) Domestic and livestock uses. Domestic use does not include irrigation of lawns and gardens.

(b) For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life and minimize pollution, no appropriations of water shall be made or granted by any state agency or public corporation of the state for the waters of the Rogue River or tributaries above Savage Rapids Dam for flows of the Rogue River below 1,200 cubic feet per second, except that this limitation shall not apply to:

(A) Water legally stored or legally released from storage.

(B) Domestic and livestock uses. Domestic use does not include irrigation of lawns and gardens.

(c) For the purpose of maintaining a minimum perennial streamflow sufficient to support aquatic life and minimize pollution, no appropriations of water except for domestic or livestock use shall be made or granted by any state agency or public corporation of the state, except that this limitation shall not apply to water legally stored or legally released from storage, for the waters of the Rogue River tributaries listed in Table 4, Section B when flows are below the specified levels. Domestic use does not include irrigation of lawns and gardens.

(d) (A) To support aquatic life and minimize pollution in accordance with Section 3, Chapter 796, Oregon Laws 1983, no appropriations of water shall be made or granted by any state agency or public corporation of the state for the waters of the Rogue River tributaries listed in Table 4, Section C when flows are below the levels specified. This limitation shall not apply to :

(i) Domestic and livestock use. Domestic use does not include irrigation of lawns and gardens.

(ii) Water legally stored or released from storage subject to provisions of subsection (2)(a).

(B) Attainment of the specified flow levels during some portions of the year will require development of water storage or implementation of other measures to augment flows.

4) Water Quality

Rights to use water for industrial, power development, or mining purposes granted by any state agency shall be issued only on condition that any effluent or return flows from such uses shall not significantly interfere with recreational, fish life or other beneficial uses of water.

(5) Existing Rights

This program does not modify, set aside or alter any existing right to use water or the priority of such use established under existing laws.

Managing our water resources is an extremely difficult task. The Evans Creek Watershed Council is concerned about the water resources in the planning area. Increasing demands on this limited resource, especially in these drought years, have focused attention on this question in the community.

**Issues:** Water is the most valuable resource in the planning area. Water shortages are becoming more and more frequent, as consumption increases.

**Data Gaps:** Information on total water available, aquifers, use and need is not available. Information needs to be collected and entered into a geographic information system to facilitate distribution and decision making.

## FOREST PRODUCTS

This section will be developed further at a later date. Data on the conditions of forests on private lands is not readily available. Efforts to attain this information will be made in 1995.

## SPECIAL FOREST PRODUCTS

This section will be developed later.

## AGRICULTURE

This section will be developed later.

## RECREATION

This section will be developed later.

**Table 4**
**Middle Rogue River Basin**
**Minimum Perennial Streamflows**
**(cfs)**

| | Oct[1] | Nov | Dec | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Priority Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SECTION B | | | | | | | | | | | | | |
| Sardine Creek: at mouth | 8 | 12 | 12 | 12 | 12 | 12 | 12 | 4 | 1 | 1 | 1 | 1<br>8 | 9/29/69 |
| Kane Creek: above confluence of Blackwell Creek | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 1 | 1 | 1 | 1 | 9/29/69 |
| Sams Creek: at mouth | 2<br>5 | 5 | 5 | 5 | 5 | 5 | 5 | 2 | 1 | 1 | 1 | 1<br>2 | 9/29/69 |
| SECTION C | | | | | | | | | | | | | |
| Evans Creek: from Pleasant Creek to mouth | 70<br>150 | 150 | 150 | 100 | 100 | 100 | 100 | 80 | 60<br>40 | 20 | 15<br>8 | 25<br>75 | 11/3/83 |

[1]Where two flow levels are shown, the first flow level is for the 1st through the 15th and the second flow level is for the 16th through the last day of the month

## SUB-BASIN ASSESSMENTS

An assessment for each of the seven subbasins is included below. Not all are completed at this point. The amount of information available on each subbasin varies widely. Information is not available for much of the planning area. The format of each subbasin section is designed to allow a reader to excerpt that section for use during project development. Findings regarding the planning area as a whole are included in the program strategy chapter. We estimate the initial effort to describe the ecological attributes for each subbasin to be a two year process. Community development projects will be ongoing during that time.

### MID-EVANS CREEK SUBWATERSHED

The Medford District, Bureau of Land Management, Butte Falls Resource Area completed a landscape analysis of the Mid Evans Creek area in May of 1994. Very little additional information exists in this part of the planning area.

#### Soils

The new soil survey for Jackson County (1993) displays the soil series and complexes on aerial photograph prints, and has supporting descriptions and pertinent information in two volumes comprising 700 pages. The soil survey data are being digitized and put in a Geographic Information System (GIS) format by Jackson County. This product will be available in the spring of 1995. Taping this information is the key to successful planning.

The soils in the Mid-Evans Creek area are not highly productive. Dominant soils are those formed in material weathered from altered sedimentary and igneous rock on ridges and hillsides. Slopes range from about 25 to 70 percent on a full range of aspects. The soils are moderately deep, well drained soils that have a surface layer of gravelly loam or loam. Forestry is the principal use for these soils, but the site quality is low, mainly site class IV and V for Douglas-fir (95 to 125 feet tall dominant trees at age 100).

Another smaller, but important group of soils in the area is the Langellain-Bader loam. A portion of this complex is on gentler slopes, and is used for livestock grazing, irrigated hay and pasture, in addition to forestry uses. Those soils on the steeper slopes are used for forestry are comparable to the major soils described previously.

An evaluation of the soil type prior to any on the ground action will assist landowners in evaluating the likelihood of project success. The GIS information should be made readily available to landowners.

## Fisheries

The Oregon Department of Fish and Wildlife reports very little current information on streams in this area, with the exception of Sykes Creek, The following is a summary of that information from ODFW.

### East Evans Creek

According to ODFW, East Evans Creek contains populations of summer and winter steelhead, coho salmon, and resident trout. No recent fish population surveys have been conducted on this stream.

### Sykes Creek

This stream contains populations of resident trout and summer steelhead. ODFW conducted summer steelhead (StS) spawning surveys on this stream since 1987 and have seen a real decline in steelhead redds over that period (see enclosed table). A coho redd was observed in 1994. Large beaver dams that have been built during the drought may be limiting access for migrating adults.

### May Creek

This stream contains summer steelhead and resident trout. No recent fish population surveys on this stream.

### Neathammer Gulch

This stream contains a resident trout population. No recent fish population surveys on this stream.

### Evans Creek (main stem)

Evans Creek contains populations of summer and winter steelhead, coho, fall chinook salmon and resident trout. No recent fish population surveys have been conducted on this stream.

**SUMMER STEELHEAD COUNTS**
**ROGUE DISTRICT INDEX STREAMS**
**SYKES CREEK**

| | | | TOTAL REDDS | | REDDS/MILE | |
|---|---|---|---|---|---|---|
| YEAR | # COUNTS | MILE | STS | CO | STS | CO |
| 1987 | 4 | 2.5 | 62 | 0 | 24.8 | 0 |
| 1988 | 2 | 2.5 | 97 | 0 | 38.8 | 0 |
| 1989 | 2 | 2.5 | 12 | 0 | 4.8 | 0 |
| 1990 | 2 | 1.3 | 4 | 0 | 3.2 | 0 |

| SUMMER STEELHEAD COUNTS<br>ROGUE DISTRICT INDEX STREAMS<br>SYKES CREEK | | | | | | |
|---|---|---|---|---|---|---|
| | | | TOTAL REDDS | | REDDS/MILE | |
| YEAR | # COUNTS | MILE | STS | CO | STS | CO |
| 1991 | 2 | 1.3 | 6 | 0 | 4.8 | 0 |
| 1992 | 2 | 1.3 | 2 | 0 | 1.6 | 0 |
| 1993 | 1 | 1.3 | 1 | 0 | 0.8 | 0 |
| 1994 | 2 | 1.3 | 0 | 1 | 0 | 0.8 |

This information conflicts with the USDI Bureau of Land Managements information that in general states the population trend is increasing. Additional information is required to evaluate the situation. More importantly the cause of the trends in populations needs evaluation to determine the best plan of action. Generally any action that improves habitat conditions will provide for the likely hood of increasing populations trends for all fish stocks.

The USDI BLM landscape analysis identified seven preliminary management objectives, they are:

1. Increase natural production of salmon, steelhead, and trout.
2. Providing for a sustainable harvest of forest commodities.
3. Creating and maintaining connectivity between late successional reserves.
4. Improving forest ecosystem health, diversity and resiliency.
5. Increasing late successional forest conditions in designated connectivity block.
6. Reducing potential for catastrophic fire.
7. Managing habitat for elk away from rural interface areas.

The USDI BLM landscape analysis identified the following factors limiting fish production:

1. Lack of shade to provide cooler water temperatures (rearing).
2. Lack of standing conifers to contribute to large woody debris (rearing).
3. Limited salmon habitat due to lack of large woody debris in the stream (rearing).
4. High water temperatures (rearing).
5. Spawning gravel sedimented (spawning).
6. Pools aggraded due to granitic sands (rearing and migration).
7. Lack of accessibility for juvenile and adults to migrate throughout the drainages (spawning, rearing, and migration).
8. Lack of winter coho refugia, side channels.
9. Lower insect production and quality.

The USDI BLM landscape analysis identified areas where more information is needed. The Evans Creek Watershed Council is in the planning stages to work cooperatively with the BLM in filling data gaps and working across ownership boundaries to effectively manage the resources.

**Issues:** Fish populations are not stable in this subwatershed. Species are moving towards listing as threatened and endangered. Cumulative impacts of habitat degradation need to be reversed to improve the fisheries.

**Data Gaps:** Only a small amount of information is available for the planning area. Although some study data is available for this subwatershed, contradicting information is confusing management objectives. Information needs to be gathered across ownership boundaries and placed in a central geographic information system for use by everyone.

## SECTION III

## PUBLIC INVOLVEMENT STRATEGY

The Evans Creek Watershed Council recognizes the importance of public involvement in watershed health issues and projects. The goals and objectives of ECWC are consistent with ecosystem based management and strive to improve and maintain forest health to preserve ecological, economic and social stability in the watershed.

Achieving this goal, as basic as it seems, is more than just understanding the scientific principles behind the interaction between soil, water, and growing trees. The trees are part of an integrated ecosystem, and people are also an essential part of this equation. The Bureau of Land Management and U.S. Forest Service found that pursuing projects without public input often leads to confrontations and costly reevaluations or court challenges after considerable investments of time and money.

To learn more about the concerns of the Evans Valley citizens, ECWC will interview citizens on a subwatershed basis. The objectives of these interviews are to:

- Help ECWC understand how the community works.
- Identify issues within subwatersheds.
- Improve community participation in planning and implementation in order to gain the support of the community.
- Create jobs to provide diversified economic opportunities in the community consistent with ecosystem management.
- Identify potential for landscape level planning and projects.

The need to communicate with area residents is great. ECWC has learned that the most effective way of reaching people is neighbor talking to neighbor. The working assessment was developed with little input from the community because of the very short time line and funding given the Council. Residents have information regarding current and historic conditions which is not available in public sources. Residents who have witnessed changes in the ecosystem over the years may have an understanding of local processes which are important to developing strategies for maintaining and improving the watershed. It is also important to incorporate people's vision of the future into the planning process.

### PUBLIC OUTREACH

Outreach will be ongoing work, offering an opportunity for representatives of ECWC to make personal contacts with all members of the community willing to participate in open conversation. This team while conducting information gathering to fill data gaps, will

contact landowners to assess participation, identify key issues and offer assistance in planning and coordination of proposed projects. They will discuss information regarding the watershed assessment and the Watershed Health Program and record information received from the residents. As issues are identified and prioritized by citizens, the same geographic areas will be evaluated by the technical advisory team to determine the technical requirements. Issues given high priority of both a social and technical nature will be given high priority by ECWC. The objectives of this project are to:

- Engage in outreach and educational activities designed to raise the awareness of the valley residents about watershed issues;
- Increase the capacity of community members to respond to current and future funding opportunities for watershed enhancement;
- Identify additional data gaps and methods of collecting data;
- Record for the council and the community a summary of the major issues, ideas for projects, informal leaders, and interested participants in each subwatershed; and
- Develop projects in conjunction with local residents.
- Identify the needs of the ecosystem to protect, enhance and restore our resources.

ECWC views such community outreach to be a critical ongoing component of any watershed assessment or action plan, because community investment in these activities is a primary determinant of long-term community involvement and an indicator of likelihood of project success.

Long term community involvement will be encouraged through hands on involvement in project work that enhances and restores watershed health. Project ownership offers benefits to the community through environmental, social and economic avenues.

PUBLIC EDUCATION

Educational outreach program will consist of flyers and mailing to residents which contain information relative to watershed health issues. Coordination with local schools to develop and implement educational outreach will provide educational opportunities at all possible levels. This outreach effort will stress the need for the following;

- Project participation
- Monitoring participation
- Educational programs at schools, e.g. STEP program

- Workshops for all ages
- Field trips
- Train high school students in resource management activities to create a new generation of land stewards
- Develop a "skills bank" to implement projects.
- Find cost effective methods of implementing ecosystem based management.
- Cooperation across ownership boundaries for project success.
- Develop brochures to educate and inform residents about watershed issues

Efforts will be made to involve all segments of the community. These activities will be coordinated with existing programs already offered to area residents.

## SECTION IV

## WATERSHED HEALTH STRATEGY

This section will be further defined by the beginning of 1996. A preliminary approach is outlined below. Further development of this strategy will evolve from public outreach programs which will be implemented as soon as possible.

### ASSESSMENT REVIEW

The assessment of existing conditions in the watershed has identified limiting factors throughout the planning area. The individual subwatershed assessments will be used to focus restoration efforts to the important conditions in the subwatersheds.

Using the existing data, priorities for certain types of restoration projects will be determined for each subwatersheds. Opportunities and local support for these types of projects in specific subwatersheds can then be assessed.

### PUBLIC OUTREACH

Through the public outreach proposal outlined in Chapter III, contacts will be made in each of the subwatershed. Residents will be encouraged to share their concerns about the watershed and to contribute additional information to the assessment and to suggest ideas for possible projects. The watershed council will integrate these ideas into the subwatershed strategy and will follow up on all offers of participation.

### PROJECT IDENTIFICATION AND PRIORITIZATION

Project ideas will be reviewed in the field and analyzed in the context of the assessment and the priorities outlined by the Evans Creek Watershed Council. The council coordinating staff will provide the initial review and determine the need for further technical review. Projects which address high priority needs will be given priority. In areas where limiting conditions are known to exist that need restoration, landowners will be contacted to determine if local support exists for developing a solution.

Consideration will also be placed on the geographic distribution of projects. Even though conditions in some areas of the watershed may warrant greater emphasis, involving as many segments of the population in the watershed as possible is also a goal. Therefore projects may be recommended that may not have the obvious immediate benefits to fisheries that others may on the basis of community involvement and education. The future of this program is dependent on widespread public support not on isolated scientific success stories.

The council will cooperate with local, state and federal agencies to develop projects which complement objectives identified by these agencies. Landscape level planning will be used to define land use allocations as per public input.

Proposals for projects which address these critical needs of the watershed will be submitted for funding.

## IMPLEMENTATION

Projects will be implemented in a professional and timely manner. All opportunities for education will be incorporated into each project.

With the exceptions of public outreach, education and long term strategy infrastructure, only projects supported through subwatershed assessments will be promoted by ECWC.

# CHAPTER V

## MONITORING PLAN

The Evans Creek Watershed Council will be coordinating activities among many individuals, organizations and agencies and will be helping these groups vie for public moneys to address resource management issues. Any program that spends large sums of public money must be accountable to the public and to interest groups affected by the program. The best way to provide that accountability is through a coordinated monitoring program that recognizes the importance of trend and program effectiveness (cumulative) monitoring on a basin-wide level, and defines an implementation strategy to accomplish these kinds of monitoring. A monitoring program should include: identification of what conditions need to be monitored; summary of existing monitoring efforts; identification of overlaps/gaps; a strategy to address gaps, including coordination of priorities, funding, and staff from existing agency programs; and, recommendations on achieving funding of monitoring strategy. Following is a description of a monitoring program for the planning area.

In developing a monitoring program, a basic understanding must be reached on the kinds of monitoring. There are at least four different and distinct kinds of monitoring relevant to a watershed monitoring program.

### AMBIENT MONITORING

Ambient monitoring provides information on current and past conditions and trends over a broad area (sometimes called baseline or trend monitoring). This level of monitoring looks at indicators of watershed health as measured over space and time in a defined sub-basin or watershed. It involves collecting samples (to be analyzed for many parameters) from a specific location on a defined schedule usually for a period of many years. Because of the need for an ongoing commitment of resources, this kind of monitoring is generally done by permanently funded agencies at a limited number of sites. For example, DEQ maintains an ambient monitoring network for water quality. This network provides for only a few sampling locations in a given watershed. It provides general information on the quality of water but it usually cannot provide detailed information on subtle changes caused by an individual program or project. Other agencies do similar kinds of monitoring for fish, range conditions, etc. This kind of monitoring is outside the scope of a watershed association. The Evans Creek Watershed Council should, however, be aware of this monitoring, make use of it where possible, and provide a coordination role for information storage and distribution.

### PROGRAM EFFECTIVENESS MONITORING

Program effectiveness monitoring provides information on changes in conditions that result from carrying out a plan of action designed to improve conditions (relevant to specific parameters of interests; cumulative effects). This involves the collection of samples (to be

analyzed only for specific parameters of interest) from several locations within a limited geographic area on a defined schedule for a period of a few years. This is the only way to measure effects of action plan implementation, including groups of projects on a cumulative basis. It does not necessarily require the establishment of many new, dedicated monitoring sites. Data being collected by a variety of agencies for similar purposes may be used. In most cases, however, some new sites will need to be established (especially on or below private land) in order to evaluate change resulting from implementation of a program of restoration and resource management activity.

## PROJECT EFFECTIVENESS MONITORING

Project effectiveness monitoring provides information on whether or not a specific project resulted in the environmental change it was intended to produce. This involves tailoring monitoring strategies to each project. This can be a very large task when there are many projects involved in a program. It is often very difficult, or impossible, to measure the effect of an individual project on a specific parameter when that parameter is being influenced by many diffuse sources that may be unrelated to the project. For this reason, it may be more appropriate to monitor cumulative project effects under program effectiveness (cumulative) monitoring as specified in action plans. Example: It is intuitive that stabilizing a stream bank will reduce sediment, but measuring the effect of fixing that one spot will be difficult if there are 100 similar spots up-stream all contributing sediment.

## PROJECT IMPLEMENTATION MONITORING

Project implementation monitoring provides information on whether or not the elements of a project (structures, practices, seminars, etc.) were actually installed or carried out on a previously agreed to schedule. This generally involves site visits, taking photographs, reviewing billings and reports. Implementation monitoring is the only way to document that grant agreements or contracts have been adhered to. If done properly, and if some assumptions are made, it can also provide some qualitative information about effectiveness. This is a relatively inexpensive type of monitoring.

## MONITORING STRATEGY

The setup of an effective monitoring program is dependent on what question the monitoring is intended to answer. For the purpose of Watershed Health, monitoring needs to answer:

1. What is the trend of watershed health in planning area? (Ambient Monitoring)
2. How effective are Watershed Health actions in improving watershed conditions in the basins and sub-basins? (Program effectiveness monitoring)
3. How effective are individual projects in treating watershed health conditions? (Project effectiveness monitoring)
4. Are projects being implemented correctly? (Project implementation monitoring)

### Ambient Monitoring

Long term ambient monitoring is important and should continue to be (or be established) promoted to maximize the Evans Creek Watershed Council's ability to document watershed

conditions and contributions to improvements as a result of Council activities. Since conducting ambient monitoring is outside the scope and ability of the Council, agencies and organizations that have historically done long-term trend monitoring will be encouraged to continue these activities. In this regard, the Evans Creek Watershed Council can play an important role by giving support to agency requests for budgets to continue long term monitoring.

strategy for program effectiveness monitoring tiers off of the summary of who is already doing monitoring, where, what parameters are being measured, and what are the expectations for the future describe above. While all of the additional monitoring needs identified above are important to filling the gaps in knowledge necessary to achieve watershed health, we do recognize that constraints exist. With limited financial and human resources to conduct monitoring and the short term needs to reduce immediate risks, in a social and biological view, a strategy has been developed for implementing the monitoring components. The strategy developed is dependent on how the monitoring components related to the following criteria:

- an immediate need to reduce risk
- a need to obtain basic knowledge
- the need to address complex ownership, resources, and sociological concerns
- a need to develop an interdisciplinary research effort to evaluate interactions, tradeoffs and risks
- the need to improve/promote good management practices

From that the Evans Creek Watershed Council will devise a strategy to facilitate the implementation of this monitoring through existing agencies and organizations.

Project Implementation and Effectiveness

Project implementation and effectiveness monitoring provides a role of illustrating and documenting the success of projects implemented as a result of activities associated with the Evans Creek Watershed Council. Project monitoring provides a means by which individual land owners and organizations can prove to themselves and interested parties that they have indeed made a difference and support their beliefs that they are good stewards of the land. For these reasons implementation and effectiveness monitoring for individual projects should be promoted in such a way that individuals and organizations can document the results of their projects without these efforts being excessively burdensome, either through time or expense. Examples of project monitoring that would be acceptable would be photo documentation, and plant, animal and pool counts. Copies of monitoring data will be maintained by the individuals associated with the project and will be stored with the Evans Creek Watershed Council.

The following monitoring information is provided to assist in the identification of appropriate monitoring of projects. Monitoring design will vary per project based upon the project goals. The parties responsible for monitoring will also vary per individual site proposal. As a result, monitoring commitments and what entity the information will be reported to will be identified in detail on individual project applications.

Some monitoring reference materials that are good sources of information are:

Bauer, Stephen B., Timothy A. Burton. 1993. Monitoring protocols to evaluate water quality effects of grazing management on Western rangeland streams. EPA, Region 10, 1200 Sixth Avenue, Seattle, WA 98101, Surface Water Branch. EPA 910/R-93-017.

Cook, C.W., and J. Stubbendieck. 1986. Range research; Basic principles and techniques. Society for Range Management, Denver, CO. 317 p.

Hayslip, G.A., editor. 1992. EPA Region 10 in-stream biological monitoring handbook for wadable streams in the Pacific Northwest. Draft. EPA, Reg. 10, Seattle, WA, 56 p.

MacDonald, L.H., A.W. Smart and R.C. Wissmar. 1991. Monitoring guidelines to evaluate effects of forestry activities on streams in the Pacific Northwest and Alaska. EPA Region X, 910/9-91-001, Seattle, WA.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross, and R.M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. EPA. Office of Water, Wa., D.C., EPA/444/4-89-001.

Platts, W.S., W.F. Megahan, and G.W. Minshall. 1983. Methods for evaluating stream, riparian and biotic conditions. Gen. Tech. Rpt. INT-138. USDA Forest Service, Ogden, UT.

Whitfield, P.H. 1988. Goals and data collection designs for water quality monitoring. Water Resources Bulletin, 24:775-780.

Project Effectiveness Monitoring.

Physical or "on-the-ground" restoration projects will be in place for years. We need to keep this perspective when selecting monitoring parameters. Although this guidance focuses on monitoring conducted within the stream channel and/or riparian zone, the concepts for developing a monitoring plan are applicable to upland sites. These kinds of projects often require years or decades to fully achieve their goals. Monitoring is our only means for measuring progress and determining project success. Numerous books have been written on how to monitor habitat restoration projects. The equipment needs of most protocols are generally quite minimal (e.g. measuring tape and rod), but they require trained personnel and consistency in application. There are three main criteria that may assist in parameter selections:

1. Applicability to the projects objectives.
2. Objectivity and ability to detect change.
3. Cost and labor requirements.

Photo documentation is an important component for any project which will produce visible changes in the environment. The establishment of set photo points increases the value of photographic data. Permanent markers make excellent reference points for long-term photo documentation. For example, a marker on the bank can be used as a reference point for a cross-channel photo. A tape stretched between opposing markers can be used to locate a reference point for upstream and downstream photos. This site-specific information needs to be recorded when the photo point is established. All photos MUST be dated.

Following are examples of restoration objectives and the parameters and/or methods that should be considered for monitoring.

1. Riparian restoration:

a. Hardwoods and conifers planted at a minimum density of xx trees per acre and have a survival rate of xx%. Define who and how stocking surveys will be done. Survival of plantings will be monitored by landowners and/or agency personnel on an annual basis and follow up treatment will occur as needed utilizing volunteers, landowners, or agency resources as funding allows, until the outlined survival goals are achieved.

b. Water quality monitoring will target stream temperatures and flow. Turbidity measurements
during peak flows will indicate sediment transport. Water chemistry monitoring will provide data
on pH and dissolved oxygen. Evaluation will occur on a yearly basis at selected sites as continued staffing allows. Long term monitoring may be included in landowner agreements. Local schools will also conduct long term monitoring programs. This information will be compared to established baseline data to evaluate conditions.

c. Canopy coverage/shading will be measured by densitometer at the time of project implementation to document baseline conditions. Vegetation inventory plots will describe status of vegetation in riparian areas. These conditions will be monitored on a regular basis (annually, and every three or every five years).

2. Riparian Planting Protection:

Protection of newly planted riparian areas will be accomplished by whatever means may be necessary including fencing and individual tree protection. Where fencing is chosen, a livestock management plan will be developed that ensures protection of riparian areas. If vegetation inventories indicate threatened survival of planted areas due to competition with non-native species, such as Himalayan blackberry, a manual release program will be implemented.

3. Off Channel Habitat:

Seeding levels and spawning surveys will be generated at selected sites on a yearly basis to determine resource use of this habitat component. Water quality monitoring at these project sites will include dissolved oxygen, temperature, turbidity, and flows.

4. Instream Structure:

Selected instream structures will be inspected to determine resulting functions. Any changes in structure will be documented including recruitment of woody debris and sedimentation. Follow up habitat surveys will document changes in pool riffle ratios within

restored watersheds and instream fish counts will document fish usage around these structures. Water quality monitoring parameters will include temperature, flow, chemistry, and turbidity.

5. Upland Vegetation:

Status of upland vegetation and periodic inventories will provide a landscape perspective of changes in plant community structure and diversity.

6. Desired Future Conditions:

The desired future conditions of the landscape as determined by the communities will provide guidance for land managing agencies, while coordinating planning efforts to enhance program effectiveness.

SAMPLE EFFECTIVENESS MONITORING PLAN.

Will be developed latter.

## SECTION VI

## MECHANISM FOR UPDATING THE WATERSHED ACTION PLAN

The Evans Creek Watershed Council will form an advisory committee to review possible revisions of the action plan as needed. All revisions will be consistent with existing laws. Where action plan revisions conflict with agency policy, recommendations to the appropriate agency to revise their policy will be made.

## SECTION VII

## DISPUTE RESOLUTION

The Evans Creek Watershed Council currently operates through consensus. For the purpose of initial organization, we decided to avoid issues where consensus could not be reached, or simply agree to disagree on that issue. Knowing funds are limited, the possibility of a need to address non concensus issues in the near future may not arise. Eventually through an educational process of the "Best Science", we believe concensus will be reached.

## SECTION VIII

## BUILDING LOCAL CAPABILITIES: LONG TERM STRATEGY

The Evans Creek Watershed Council seeks to ensure sustainability of the resources in the planning area. Creating jobs in our communities through watershed restoration and enhancement efforts is our primary goal. Worker retraining to develop a "skills bank" to fully implement a watershed health program is the first step toward involving the entire community in the decision making processes.

The Evans Creek Watershed Council will form a nonprofit organization that will hire local citizens to perform all aspects of a watershed health program. Members of the community working with the community towards the common goal of sustainable resources will be the conduit to achieve concensus on resource issues.

Capitalizing on existing programs for start up costs, the long term goal will be to reduce then eliminate the need for state agency assistance either financially or through personnel. Operating as a distribution center for the "Best Science" of ecosystem based management will give the credibility the Evans Creek Watershed Council will need to assess watershed condition and move projects forward.

A business plan will be developed.

# BIBLIOGRAPHY


Oregon Water Resources Department, 1985, *Rogue River Basin Study.*

Applegate River Watershed Assessment, 1994,.

Applegate Partnership Ecological Assessment Team, 1994, *Ecological Assessment Applegate Watershed, Concepts, Considerations and Information Needs.*

USDA/USDI, 1994 draft, *Beaver/Palmer Watershed Analysis*

USDI, Bureau of Land Management, 1992, *Medford District Resource Management Plan.*

USDA, Soil Conservation Service, *Soil Survey of Josephine County, Oregon.*

USDI, Bureau of Land Management, 1994, *Medford District, Proposed Resource Management Plan / Environmental Impact Statement.*

USDA Forest Service, Rogue River and Siskiyou National Forests and PNW Research Station/USDI Bureau of Land Management, Medford District, 1994, *Applegate Adaptive Management Area Ecosystem Health Assessment.*

Preister, Kevin, 1994, *Words into Action: A Community Assessment of the Applegate Valley*

Oregon Department of Environmental Quality, 1988, *1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution.*

Oregon Department of Fish and Wildlife, 1993, *Draft Rogue Basin Fish Management Plan.*

Amaranthus, et. al., 1985, Logging and forest roads related to increased debris slides in southwestern Oregon. J. Forestry 83:229-233

Forest Ecosystem Management Assessment Team, 1993, *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment.*

Environmental Protection Agency, 1991, *Monitoring Guidelines.*

Shindler Bruce and Shelby Bo, *Rogue River User Study: Wild Rogue Planning and Policy Study*, Department of Forest Resources, Oregon State University, Corvallis Oregon, 1992.

Rogue Institute for Ecology and Economy, *Philosophy of Community Forestry*, 1994

Richard P. Gale and Sheila M. Cordray, What Should Forests Sustain? Eight Answers, *Journal of Forestry*, May 1991.

Butte Falls Resource Area, *Landscape Analysis of Mid Evans Creek*, UDSI BLM. May 1994