SEVEN BASINS WATERSHED

ACTION PLAN

Prepared for:

Prepared by:

Seven Basins Watershed Council
Action Plan Committee

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INTRODUCTION

The Watershed Approach

The watershed approach is a framework for environmental management that focuses public and private sector efforts to address the highest priority problems within a hydrologically-defined geographic area (a watershed). This process addresses water resources at the watershed scale taking into consideration both surface water and groundwater resources. The watershed approach allows local citizens, landowners, management agencies, and other stakeholders to have hands on involvement in defining and implementing a program to evaluate and improve the health of their watershed. An important component of the approach is that those people most affected by management decisions are involved throughout the process and help formulate key decisions. When implemented correctly, this process ensures that environmental objectives are well integrated with those for economic stability and other social and cultural goals. The process also allows those people who depend upon the natural resources within the watershed the most to be well informed of and participate in critical planning and implementation activities. Collectively, watershed stakeholders employ sound scientific data, tools, and techniques in an iterative decision making process. The process includes:

- Assessment and characterization of the natural resources and the communities that depend upon them;
- Goal setting and identification of environmental objectives based on the condition or vulnerability of resources and the needs of the aquatic ecosystem and the people within the community;
- Identification of priority problems;
- Development of specific management options and action plans;
- Implementation and evaluation of effectiveness and revision of plans, as needed. (EPA, 1996).

A watershed action plan is the foundation of watershed management. It, formulates visions, sets goals and targets, and thus guides all aspects of management. The development of a good action plan does not happen overnight. The amount of time and effort required to develop the plan depends on several factors including:

- The size of watershed;
- The complexity of natural features and land use patterns; and

- The number of stakeholders and how opposed their views may be.

The key components of a well designed watershed plan include:

- A background section that outlines watershed resources and issues; a description of the planning process;
- Goal statements;
- Watershed health targets (that address issues on either side of the watershed health equation);
- Management actions;
- An implementation schedule and strategy;
- A long-term funding model that accounts for all management actions, including monitoring;
- A strategy for performance evaluation; and
- A schedule for reviewing the plan (Jones et. al, 2002).

Monitoring is a critical component because it begins and completes each cycle. The overall process is usually started by some preliminary study to identify issues, followed by collection of historical data, conducting health assessments, and identifying data gaps. Once targets are set, performance evaluation becomes an important component to determine whether implemented activities are successful. General surveillance over subsequent cycles is typically required to determine trends in data sets that are vital to ongoing prioritization of issues in the watershed. These activities answer questions such as:

- How does stream health change from year to year?
- How does the fish populations and distribution change in a downstream direction through a given subwatershed?

Goals and targets are usually modified over time using data collected as part of the surveillance and performance evaluations. In evaluating program successes, performance evaluation provides feed back and is the bridge to the next phase of watershed management (Jones, et. al, 2002).

About the SBW Action Plan

This document is the Seven Basins Watershed Action Plan prepared by the Seven Basins Watershed Council (SBWC) and funded by the Oregon Watershed Enhancement Board. The Action Plan is based on findings presented in the Seven Basins Watershed Assessment. The assessment identified numerous data gaps in the existing data base for the Seven Basins Watershed (SBW). The purpose of this action plan is to develop a framework for watershed-wide actions that will generate the necessary data to fill the recognized data gaps. This framework will guide the Council in developing site specific actions that will address various projects to be completed throughout the watershed. The scope of each project will be developed in a project specific workplan that will address schedule, monitoring, stakeholder, involvement, expected results, project costs, and funding sources.

This Action Plan should be viewed as an organic document in that it will grow and change over time as the SBWC grows and changes. The ideas and goals presented in this version of plan are not cast in stone and should change with time as projects are accomplished and new ideas and goals are developed by the Council. The document needs to be flexible and broad in scope to accommodate long-term projects as well as being able to encompass opportunities that may arise that are not be explicitly called out in the plan.

The Action Plan is based upon shared information and a common understanding of the roles, priorities, and responsibilities of all involved stakeholders. It is hoped that the iterative nature of the plan encourages partners to set goals and targets and to make maximum progress based on available information while continuing analysis and verification in areas where information is incomplete. It is envisioned that many of the elements of the plan can be implemented in parallel allowing the Council to address several issues at once.

Once the Action Plan is implemented, completed actions should be moved to an accomplishment section and additional actions and opportunities incorporated as needs arise. Annually, the Council will conduct a Self Evaluation of the plan so that they can ensure that the plan is still focused on their goals and needs. The evaluation should include the following or similar tasks:

- Conduct a progress tour of the watershed to view and discuss accomplishments;
- Identify protection and restoration opportunities based on ongoing monitoring and assessment;
- Identify restoration actions with voluntary landowners;
- Reevaluate the plan to ensure it is consistent with Council's overall goals and objectives.

The Action Plan should be updated to focus the plan for upcoming years. The plan should be updated every five years with comparisons made of "actual results" versus "targeted results." New actions and targets should be generated as goals are accomplished and new ones set.

DESCRIPTION OF THE SBW

Physiography

The Seven Basins Watershed (SBW) lies in southwestern Oregon and encompasses some 258,615 acres or about 405 square miles. The SBW is located in an east-west trending mountain range that connects the Cascade and Klamath Mountains. The watershed is semi-mountainous and comprises several wide valleys, such as the Evans Creek Valley which cuts through the central portion of the watershed in roughly a northeast southwest direction and Sams Valley on the eastern margin of the watershed. The Rogue River flows through the southern portion of the watershed. Main tributaries include Kane Creek, Galls Creek, and Foots Creek south of the Rogue River and Sams, Sardine, Wards, and Evans Creeks north of the Rogue River. Elevations range from approximately 1,000 to 4,000 feet above mean sea level (amsl) with steep mountain slopes that have a heavy cover of vegetation. Figure 1-1 shows the boundaries and major features of the SBW.

Ecoregions

The state of Oregon has been divided into ecoregions that have been identified based on climate, geology, physiography, vegetation, soils, land use, wildlife, and hydrology. Four ecoregions occur within the SBW. They are:

- Inland Siskiyous;
- Rogue/Illinois Valleys;
- Siskiyou Foothill; and
- Southern Cascades.

The primary ecoregion within the SBW is the Inland Siskiyous. It encompasses the majority of the SBW with the exception of the eastern margin. Along the eastern margin of the watershed, the northern portion lies in the Southern Cascades Ecoregion, the central portion of the SBW is in the Siskiyou Foothills Ecoregion, and the southern portion is in the Rogue/Illinois Valley Ecoregion.

Climate

The southwestern interior of Oregon is situated in the Climatic Zone 3 which is one of the more rugged portions of the state. Mountains and ridges are separated by deeply incised river valleys, with most of the rivers flowing westward towards the Pacific

Ocean. Much of the area lies in the rain shadow of the Coast Range to the west. However, many of the higher elevation sites receive abundant precipitation with some locations receiving in excess of 120 inches per year (Oregon State Climatological Service [OCS], 2003). The climate in the SBW is characterized by mild, damp winters and hot, dry summers.

Temperature

Due to its separation from the coast, Zone 3 has greater temperature extremes than the remainder of western Oregon. During summer, it is generally the warmest part of the state. Winter temperatures can be quite cold. The average extreme low temperature in Medford during December and January is about 18°F, and an average of twenty days in January has low temperatures of 32°F or below. Medford's monthly mean temperature ranges from 72.5°F in July to 37.7°F in December, a range greater than most other stations west of the Cascades. Valley locations typically have longer growing seasons than those located at higher elevation.

Cloud cover is greatest during the winter months, averaging more than 80 percent of total potential cloud cover during December and January. Mid-latitude storms generally produce extensive middle and high clouds, while fair weather periods between storms often produce extensive valley fog, sometimes lasting for many days. Summers are mostly cloud-free, averaging only about 20 percent mean sky cover (OCS, 2003).

Precipitation

Total precipitation in a given area is strongly influenced by elevation. In general, the driest areas are those at the lowest valley locations, while precipitation increases steadily at higher elevations. The driest areas in Zone 3 all receive less than 20 inches of precipitation per year. Low elevation mountains and higher peaks within the SBW average 35 to 50 inches of precipitation annually. The greatest precipitation amounts are observed in the upland areas in the northern portion of the watershed with lesser amounts measured in the valley bottoms. Table 1 lists mean annual precipitation for the subwatersheds within the SBW.

In southwestern Oregon, most precipitation falls during the months of November through March. As much as 75 percent of average annual precipitation falls during this five month period. Occasional summer thunderstorms cause precipitation during the warmer months, but average monthly totals during summer are quite low.

Table 1
Elevation and Precipitation Breakdown for the Subwatersheds in the Seven Basins Watershed

Subwatershed Name	Min. Elevation (ft)	Max. Elevation (ft)	Mean Precipitation (in)
Foots Creek	986	4411	28.7
Rogue/Galls Creek	1022	4123	25.1
Rogue/Ward Creek	982	4007	28.6
Rogue/Sardine Creek	986	3370	27.9
Lower Evans Creek	985	3995	31.3
Rogue/Sams Creek	1016	3486	26.6
Rogue/Snider Creek	1105	2790	24.6
Evans Creek/Sykes Creek	1157	3694	31.6
Pleasant Creek	1108	4432	39.5
Lower West Fork Evans Creek	1452	4649	42.7
Upper West Fork Evans Creek	1837	5095	48.5
Upper Evans Creek	1452	4777	41.2

Snow falls nearly every winter in southwestern Oregon. In the valleys, the annual total is about 20 to 30 inches per year, although snow on the ground seldom lasts more than a few days at a time. At higher elevations, a great deal more snow is reported. At Sexton Summit (3,836 feet), for example, the average annual snowfall is about 100 inches. The frequency of snowstorms also varies widely with elevation differences. Medford, for example, has an average of three days per year with at least one inch of snow while Sexton Summit averages 30 inches (OCS, 2003).

Temperatures in the winter months occasionally fall below freezing, and snow is common in the higher elevations. The upland portions of many of the subwatersheds are situated at elevations greater than 3,900 feet amsl (Table 1) indicating that they have the potential to receive a large portion of their precipitation in the form of snow.

Land Use

Private land is primarily used for residence, ranching, and timber. Public lands are used for grazing and timber harvest in addition to recreation. Recreation activities are also a significant land use activity on much of the public lands throughout the watershed. Table 2 is a breakdown of major land uses in the SBW.

Much of the land in the watershed has been used for timber production. Trees have been commercially harvested from the SBW since the late 1800s. Logging has occurred on public and privately owned timber lands across the watershed. Logging activity increased during the 1960s and peaked in the 1970s. Logging began to decrease in the1980s and has continued to decline through the present. During this time, extensive road building was conducted opening the upper portions of the watershed for timber extraction and other human activities.

In addition to forestry, agriculture and ranching have been important land uses across the watershed. These activities include the production of hay, grain, and seed crops as well as the raising of beef cattle, poultry, sheep, and the dairy industry. The majority of the agriculture occurs in the Sams Valley on the eastern margin of the watershed and in lower Evans Creek Valley in the central portion of the watershed in the general vicinity of Wimer, Oregon.

Mining has been an important part of the economy in southern Oregon and specifically the SBW. In the mid 18th century, hydraulic mining began for gold placer deposits in the streams of the area. By the early 20th century, lode mining was common for both gold and cinnabar, a sulfide of mercury. Historically, mining has been a major land use activity throughout a significant portion of the watershed. Placer mining has accounted for the most of the gold produced in the area. The earliest mining activity began in the 1850s at the beginning of the southern Oregon gold rush.

Gold mining stopped during World War II and never recovered. The highest output in the area was in 1940 and has dropped steadily to a negligible amount after 1965. Today, most mines are lode mines for gold with some for copper, manganese, cinnabar, and chrome. Additionally, gravel and quarrying operations are found in the area (Atwood and Lang, 1995).

Table 2
Distribution of Land Use Within Subwatersheds in the Seven Basins Watershed

Subwatershed	% Forest Land	% Ag and Range Land	% Urban	% No Data
Foots Creek	91.9	6.1	2.0	0.0
Rogue/Galls Creek	69.3	22.1	8.6	0.0
Rogue/Ward Creek	85.0	6.9	8.1	0.0
Rogue/Sardine Creek	80.2	16.3	3.5	0.0
Lower Evans Creek	71.1	15.1	9.0	4.8
Rogue/Sams Creek	57.5	38.1	4.4	0.0
Rogue/Snider Creek	36.7	57.1	6.2	0.0
Evans Creek/Sykes Creek	92.2	7.3	0.5	0.0
Pleasant Creek	80.5	8.8	3.8	3.8
Lower West Fork Evans Creek	99.8	0.2	0.0	0.0
Upper West Fork Evans Creek	96.5	0.0	0.0	3.5
Upper Evans Creek	92.0	8.0	0.0	0.0

Land Ownership

The SBW includes a mix of public and private lands. The ownership is split between public and private lands. There is very little state or Forest Service Land in the SBW. The northern portion of the watershed is predominately BLM land while the areas around Wimer, Oregon and Sams Valley are mostly private land. Table 3 lists the ownership of lands in the Mid Evans Creek, West Evans Creek, East Evans Creek, and Rogue-Gold Hill subwatersheds based on BLM data. Table 4 lists the distribution of ownership for the entire SBW.

Table 3
Distribution of Land Ownership in Four Subwatersheds in the Seven Basins Watershed Based on BLM Reports

Subwatershed	Acres	BLM	U.S. Forest Service	Boise Cascade	Medite	KOGAP	Oregon State Forest	Woodlot	Other Private	Farm
Mid Evans Creek	33,980	14,520 (42%)	0	2,400 (7%)	4,080 (12%)	160 (<1%)	0	8,450 (25%)	0	4,370 (13%)
West Evans Creek	38,170	21,310 (56%)	160 (<1%)	0	15,900 (42%)	0	640 (2%)	0	160 (<1%)	0
East Evans Creek	21,136	7,863 (37%)	896 (4%)	2,757 (13%)	8,143 (39%)	0	41 (<1%)	0	1,199 (7%)	237 (1%)
Rogue-Gold Hill	41,029	15,494 (38%)	0	0	0	0	0	0	25,534 (62%)	0
Total Acres	134,315	59,178 (44%)	1,056 (<1%)	5,157 (4%)	28,123 (21%)	160 (<1%)	681 (<1%)	8,450 (6%)	26,893 (20%)	4,697 (4%)

From BLM 1994, 1995, 1996, and 2001.

Soils

Specific soils types are derived from the host rock present in the watershed. The rock types in the SBW include metamorphic schists, gneisses, quartzites, and amphibolites found in conjunction with serpentinite, granitic intrusions and volcanic flows, breccias, and tuffs. The metamorphic rock types are mapped as the May Creek Schist, an amphibolite and the Galice Formation. The May Creek Schist includes mica schists, garnet-biotite-quartz schists, gneisses, and quartzites. The amphibolite consists of alternating layers of hornblende and feldspar. The Galice formation includes a metavolcanic member with an andesite or basalt protolith and a sedimentary member of shales and mudstones. The granitic rocks are a two-mica quartz diorite and a hornblende gabbro.

Table 4
Distribution of Land Ownership for All Subwatersheds in the Seven Basins Watershed

Subwatershed	Total Acres	BLM	Private	State	USFS
Foots Creek	16,497	5,899 (36%)	10,599 (64%)	0.0	0.0
Rogue/Galls Creek	18,572	5,227 (28%)	13,346 (72%)	0.0	0.0
Rogue/Ward Creek	14,547	6,297 (43%)	8,250 (57%)	0.0	0.0
Rogue/Sardine Creek	19,099	8,286 (43%)	10,814 (57%)	0.0	0.0
Lower Evans Creek	21,750	5,540 (25%)	16,211 (75%)	0.0	0.0
Rogue/Sams Creek	18,076	4,617 (26%)	13,459 (74%)	0.0	0.0
Rogue/Snider Creek	28,541	3,414 (12%)	25,126 (88%)	0.0	0.0
Evans Creek/Sykes Creek	23,823	11,541 (48%)	12,283 (52%)	0.0	0.0
Pleasant Creek	27,437	10,320 (38%)	17,118 (62%)	0.0	0.0
Lower West Fk Evans Creek	23,146	11,746 (51%)	11,220 (48%)	0.0	91
Upper West Fk Evans Creek	16,012	9,606 (60%)	6,266 (39%)	0.0	140 (0.87%)
Upper Evans Creek	31,112	11,178 (32%)	19,247 (62%)	38.3 (0.12%)	649 (2.1%)

The Bureau of Land Management (BLM) described the rock formations and soils in the Rogue-Gold Hill subwatershed as being primarily metamorphic rocks composed of metasediments and metavolcanics (78%) with the remainder being composed of granitic rocks. The soils that have developed from the metamorphic rocks are described as being shallow, composed of silts and clays with variable amounts of rock fragments. Generally, the upper fractured bedrock has only a thin weathering rind (BLM, 2001).

The soils derived from granitic rocks in this subwatershed are generally described as being moderately deep over decomposed bedrock and are highly erosive because of low cohesive coarse textured particles. Throughout the subwatershed, granite is found in discontinuous outcrops (less than two square miles) in the headwaters of Kane Creek, midslope along Galls Creek, the headwaters to the Left and Middle Forks of Foots Creek, midslope of Right Fork of Foots Creek, and the headwaters of Birdseye Creek (BLM, 2001).

The Evans Creek drainage cuts through several major rock types from the headwaters to its confluence with the Rogue River. The West Fork of Evans Creek heads in intrusive granitic rocks. As it moves downslope, it enters a zone of metamorphic rocks mapped as amphibole. Near the confluence with the East Fork of Evans Creek, it crosses into another metamorphic zone dominated by schist. Just east of the town of Wimer, Evans Creek crosses into another intrusive body dominated by granitic type rocks. As it continues south toward the Rogue River, it meanders across bedrock composed of granitic rocks and rocks associated with the Galice Formation. This formation is composed of shales and metavolcanics. Thus, soils along Evans Creek can be quite varied and can be expected to change as the streams move across the various bedrock units along its length.

For example, the BLM described the soils in the West Fork Evans Creek subwatershed as 65% derived from granitic rocks, 25% from schist (metamorphic), and 10% from metavolcanics/metasedimentary rocks. In the watershed analysis conducted by the BLM for the East Fork of Evans Creek, the geology was described as being dominated by metamorphosed volcanic rocks composed of amphibole and schist. The dominate soil types in this subwatershed were described as being formed from decomposed schist. The most extensive soils in the watershed are the Musty and Goolaway soil series. Both are described as being silty loams, moderately deep (20-40 inches), well drained, and have water erosion hazards. The Musty soils are skeletal (>35%) rock fragments in the subsoil over fractured bedrock. The Goolaway soil has a silt loam subsoil and underlain by weathered bedrock. These soils are prone to slumping and sliding, particularly on steeper slopes (>60%), and under saturated conditions (Johnson, 1993). Near the bottom of the watershed the soils are characteristically deep alluvial silt deposits.

Soils along the eastern margin of the SBW in the vicinity of Sams Valley vary also depending on the location within the valley. Soils along the western margin and to the north of Sams Valley are typically derived from metamorphic parent rock. Those soils in the central and eastern portion are composed primarily of sedimentary rock such as sandstones most likely from the Payne Cliffs Formation. Those located furthest to the east are derived from volcanic tuffs and breccias associated with Tertiary Volcanic deposits located to the east of the Sams Valley area.

The soils in the immediate vicinity of the Table Rock area are derived from volcanic tuffs and breccias. The soils in the Table Rock out crop complex are derived from andesite and sandstone. Soils to the north of the Table Rock area are from the metamorphic and granitic rocks located to the north of the Table Rocks.

WATERSHED COUNCIL GOALS

The SBWC developed a workplan for the period July 1, 2003 to June 30, 2005. In this workplan five key elements were listed that the Council wanted to address during the two year period. The key elements of the workplan were:

IDENTIFY AND ADDRESS THE PRIORITY PROTECTION, RESTORATION, AND ENHANCEMENT NEEDS FOR THE SBW

- *ACTION PLAN*

  Objective: Establish priorities for the restoration, protections and enhancement needs of the watershed.

- *COMMUNITY FIRE PLAN/FUELS REDUCTION PROJECT*

  Objective: Community education, development of neighborhood fire plans, and completion of fuel load reduction work identified in fire plans. Project completion date, January 2004.

- *WATERSHED RESTORATION, PROTECTION, AND ENHANCEMENT PROJECTS*

  Objective: To implement on the ground projects for watershed restoration, protection, or enhancement.

MONITOR AND EVALUATE WATERSHED CONDITIONS AND FUNCTIONS

- *WATERSHED ASSESSMENT*

  Objective: To inventory and evaluate watershed conditions and functions.

- *JOINT WATER QUALITY MONITORING PROJECT*

  Objective: Implement a water quality monitoring program for the SBWC, Lower Rogue River Watershed Council (LRWC), and Upper Rogue River Watershed Council (URWC) for the 2003 season.

- *ODFW WEST FORK EVANS CREEK MONITORING PROJECT*

  Objective: To implement an integrated monitoring program in the West Fork of Evans Creek.

- *DEQ FLIR AND TEMPERATURE MONITORING PROJECTS*

  Objective: Develop longitudinal heating profile for Evans Creek using FLIR. Identify, map, and analyze cold water habitat and areas of excessive heating. Create a temperature baseline from which to measure results of shade, channel flow improvements on instream temperatures.

- *CULVERT MONITORING PROJECT*

  Objective: To monitor culverts seasonally to document conditions, fish passage problems, and sediment problems.

ENCOURAGE AND TRACK CITIZEN PARTICIPATION IN WATERSHED PROJECTS

- *PROVIDE OPPORTUNITIES FOR PARTICIPATION IN WATERSHED PROJECTS*

  Objective: To increase stakeholders awareness of, and involvement in watershed projects and the SBWC.

PROMOTE AND EVALUATE CITIZEN LEARNING ABOUT WATERSHED RESOURCE ISSUES

- *WATERSHED ASSESSMENT AND COMMUNITY FIRE PLAN PROJECTS*

  Objective: Provide watershed education opportunities through workshops, events, monitoring and fuel reduction work.

- *SBWC MEETINGS*

  Objective: All meetings of the SBWC are advertised and open to the public.

- *OUTREACH*

  Objective: To increase stakeholder awareness of SBWC and watershed resource issues.

- *DEVELOPMENT OF AN EDUCATIONAL PROJECT WITH THE LOCAL SCHOOLS*

  Objective: To promote interest in and education about watershed resource issues in the next generation of stakeholders.

- *WATERSHED TOURS*

  Objective: To promote the activities of the SBWC by showing stakeholders features and problems in the watershed.

- *QUARTERLY NEWSLETTER*

  Objective: To improve outreach and education of stakeholders.

BUILD PARTNERSHIPS, ORGANIZATIONAL CAPACITY, AND COUNCIL EFFECTIVENESS

- *BUILD PARTNERSHIPS*

  Objective: Build critical partnerships with landowners and other stakeholders. This concept should be part of everything the council does.

- *BUILD ORGANIZATIONAL CAPACITY AND EFFECTIVENESS*

  Objective: To develop the organizational capabilities of the SBWC.

ACTIONS TO ADDRESS COUNCIL GOALS AND IDENTIFIED DATA GAPS

The following key programmatic elements have been developed to address the Councils goals and the data gaps identified in the SBW Assessment.

- **Element 1--**Address wildfire issues and impacts on the SBW;
- **Element 2--**Develop a comprehensive water quality monitoring program;
- **Element 3--**Develop a comprehensive program to evaluate SBW hydrology;
- **Element 4--**Develop a process to map and document sediment sources;
- **Element 5--**Create a program to evaluate and enhance riparian conditions;
- **Element 6--**Develop a strong working relationship with agencies to assess key issues throughout the SBW;
- **Element 7--**Improve fish passage and habitat throughout the SBW; and
- **Element 8--**Develop strong education, community outreach, and internship programs to promote environmental awareness and good stewardship of the land.

For each element listed above, a narrative description of the element is provided. In addition, a matrix was prepared for each element (except Element 6) that lists general action items, partners, resources required, rough estimated cost, product(s), evaluation criteria, and schedule. As the SBWC moves forward, specific actions and/or projects will be added to the matrix for each element.

Seven Basins Watershed Action Plan

Element 1: Wildfire

Objective: Develop a Comprehensive Program for Minimizing the Impact of Wildfire in the SBW

Narrative Description of Element: Jackson County is one of the two most "fire-prone" counties in the state. Thousands of rural homeowners are surrounded by areas of dense, highly flammable vegetation, the product of decades of fire suppression. Moderate to extreme fire hazard characterizes most areas in the Wildland-Urban Interface (WUI).

Risk from wildfire is no longer limited to the physical and/or biological impacts to a forest or watershed. Risks associated with loss of real property or human life, have become critical issues with respect to fire management. In response to these concerns much effort is currently being given to the WUI. This boundary is of particular concern because wildfires that encroach upon this boundary can cause significant damage to property, structures, and communities. Efforts are currently being undertaken by land management agencies, watershed councils, and others to reduce the risks associated with wildfire along this boundary.

Reducing the risk of catastrophic wildfire is a high priority for residents of the SBW. Residents' concerns relate to loss of homes and property, damage to forests and other habitat, and watershed impacts. In recent decades, there have been several large, high severity fires in the watershed, as well as numerous smaller fires, both lightning and human-caused. The overabundance of fuels greatly increases the likelihood that fires in the watershed will be uncharacteristically intense.

High intensity wildfires have several potential effects on watershed functions:

- Formation of hydrophobic (impermeable) soils resulting in accelerated soil erosion;
- Increase in surface, rill, and gully erosion over background rates due to loss of vegetative cover;
- Increase in mass wasting including road and slope failures and debris flows due to loss of rooting strength;
- Increase in stream flows, including peak flows;
- Increase of nutrients in streamflow.

In addition to the potential for harmful effects from high-intensity wildfire, the fuels buildup itself results in undesirable impacts on ecosystem functioning. These include:

- Lower stand vigor, resulting in increased susceptibility to insect attack
- Accelerated loss of large ponderosa and sugar pine
- Shift in species composition
- Loss in ecosystem diversity (e.g., understory plants, species dependent on more open conditions and frequent fire).

The Seven Basins Neighborhood Fire Planning project is a collaborative effort of several organizations to improve community awareness of wildfire issues and reduce fire and safety risks in our neighborhoods. Participating groups include the OSU Extension Service, Seven Basins Watershed Council, Bureau of Land Management, and Oregon Department of Forestry. To date, the project has resulted in creation of 15 neighborhood phone trees and several collaborative fuels reduction projects.

The Southwest Oregon District of the ODF is responsible for protecting public and private lands throughout Jackson and Josephine Counties from wildfire. This includes, but is not limited to lands owned by BLM, municipalities, the Corps of Engineers, and State Parks. The ODF works to control wildfires, while other agencies work to protect structures within the watershed. This partnership has proven to be operationally beneficial.

The Oregon State University (OSU) Extension has been involved in leading a cooperative program, partnering with the ODF, BLM, and the Seven Basins Watershed Council to develop the Seven Basins Neighborhood Fire Planning Project (SBNFPP). The Job Council, three local Fire Districts, Jackson County Sheriff's Department, and Jackson County Emergency Management have also been included in this project. This group has worked to create neighborhood fire plans, emergency phone lists, inventories of neighborhood resources, and the implementation of fuel load reductions.

The SBNFPP was formed in December 2002. The steering committee members included representation from OSU Extension, ODF, BLM, and the Seven Basins Watershed Council. This committee meets monthly to continue guiding the project.

A mass mailing to 6,400 households was the first undertaking by the committee. This mailing was intended to introduce the Fire Planning Project to watershed residents as well as invite them to educational workshops. This mailing was well received within the community and resulted in three workshops which were held in Wimer, Gold Hill, and Sams Valley in February 2003. These workshops were led by community volunteers and were attended by more than 90 residents. Residents signed up for ODF homesite consultations and neighborhood interest in fire planning was expressed to workshop leaders. This community interest lead to 12 initial neighborhood fire planning meetings. Others have followed due to word of mouth and publicity for the project. As of September 2003, 57 neighborhood meetings have taken place and more than 100 property owners have agreed to have ODF homesite consultations. At this time, due to the participation in the program, there is a waiting list for consultations.

The SBNFPP has been instrumental in creating a bridge between private land owners and public agencies within the watershed. Large acreage fuels reduction projects are planned by ODF and BLM Ashland Resource Area to take place on both BLM and private lands in the Foots Creek and Galls Creek sub watersheds. This project will take place in Fall/Winter 2003 on 1,500 acres of BLM land and a minimum of 100 acres of private land including both Foots and Galls Creek sub watersheds. Future plans include fuels treatments to take place on 2,400 acres of BLM land in the Foots Creek sub watershed. However, this project has not yet been scheduled.

BLM Butte Falls Resource Area is currently planning to conduct fuels reductions on their lands which are adjacent to private lands taking part in the SBNFPP. This project will treat a total of 400 acres of fuels. The specific sites where this project will take place are still being determined at this time.

Other public involvement in the SBNFPP has included the Jackson County Road Department. They will be conducting a pilot project within one of the participating neighborhoods of the watershed to address the fuel load concerns in the county-right-of-way. This project was developed by ODF and the local fire district. The Job Council is also conducting fuels reduction with private property owners in the watershed as a result of the SBNFPP. This reduction had already occurred on two private access roads and is scheduled to be conducted on three more.

Fire, whether lightning or human-ignited, cannot be excluded from the watershed. However, measures can be taken to improve the survivability of homes in fire-prone areas. In addition, forests can be treated to make them more fire-resilient, i.e., able to survive a wildfire.

The key determinants of home survivability in wildfires are the type of roofing material and quality and extent of defensible space surrounding the home. Homes with wood shake roofs are much more likely to be ignited by burning embers than those made with non-flammable materials. Creating defensible space involves removing dead vegetation and ladder fuels around the homesite, spacing out trees and shrubs, and incorporating fire-resistant plants into the landscaping. As borne out in the wildfires in southern California, the size and quality of the defensible space often made the difference between home survival or loss.

Thinned stands on the Blacks Mountain Experimental Forest in northern California, on BLM lands in the Applegate Watershed in Jackson County, Oregon and in other locations have survived recent wildfires that completely burned adjacent, untreated stands. These experiences and a body of scientific evidence regarding vegetation and fire behavior lend strong support to the concept of creating fire-resilient forests. A fire-resilient forest is capable of surviving a wildfire under many conditions because the fuels profile has been substantially modified. The four key steps to creating a fire-resilient forest are 1) reduce surface fuels; 2) increase the height to the base of the live crown; 3) reduce canopy bulk density (space out crowns); and 4) retain, larger, more fire-resistant trees. Fuels treatments involving various combinations of thinning, pruning, and surface fuels treatments can accomplish these four steps. Where feasible given escape risk and smoke management concerns, prescribed fire (e.g. underburning) can be used to help reduce fuel loads and thin out smaller trees. Failure to treat forests in the SBW will continue the fuels buildup and increase the risk, severity, and extent of high intensity wildfires.

Many homeowners in the SBW have completed, or are in the process of completing defensible space work. Much remains to be done. The Bureau of Land Management has completed understory thinning and fuels treatments in some areas of the SBW. Additional treatments are in the planning stages.

Table 5
Goal: Promote Strategic Fuels Reduction in the Watershed to Reduce Potential Impact of Wildfire

Action Plan (Steps or Tasks)	Responsible Partners	Resources Needed	Estimated Cost	Product(s)	Evaluation	Time Line
Assessment/Monitoring Actions						
Inventory existing and potential water chance locations throughout the SBW	SBWC, ODF, BLM, OSU	Volunteer time	2.5K	Completed fuel hazard plans and number of acres cleared	Competed Inventory of pump chance locations	6/04-12/04
Monitor the effects of wildfire on soils, erosion, and slope stability	SBWC, ODF, BLM, OSU, Consultant	Volunteer time, consultant	10K	Monitoring reports	Amount of data collected on a monthly basis	Ongoing
Monitor the effects of fuel reduction treatments versus no treatment on soils, erosion potential, noxious weeds and slope stability. Develop quantitative metrics to measure effectiveness	SBWC, ODF, BLM, OSU	Volunteer time, possible SOU intern opportunities, monitoring equipment	10K	Monitoring reports	Subjective; based on amount and type of information collected	Ongoing
Develop an environmental database coupled w/GIS* to track conditions and fuel reduction projects	DCC, PM, Consultant	Computer, Software	5K	Functional interactive database	Subjective; based on amount and type of information collected	Ongoing
Education/Outreach Actions						
Help arrange demonstrations of fuels reduction techniques and equipment	SBWC, ODF, BLM, OSU	Volunteer time, equipment, curriculum development	2.5K	Educated stakeholders	Number of stakeholders obtaining education	Ongoing
Help promote wildfire awareness and defensible space work to watershed residents through education and outreach.	SBWC, ODF, BLM, OSU	Volunteer time	1.5K	Increased awareness of land owners. Workshops, meetings	Number of owners completing defensible space work; number of land owners participating in neighborhood fire planning; number of acres treated	Ongoing
Restoration/Enhancement Actions						
Assist with identification of high fuel hazard most in need of treatment and strategically important fuels reduction opportunities	SBWC, ODF, BLM, OSU	Volunteer time	2K	Educated stakeholders	Number of owners completing defensible space work	Ongoing
Help recruit individuals and neighborhoods for neighborhood planning and fuels reduction	SBWC, ODF, BLM, OSU	Volunteer time	2K	Educated stakeholders	Number of owners completing defensible space work	Ongoing
Assist with developing demonstration areas for fuels reduction treatments on both public and private land	SBWC, ODF, BLM, OSU	Volunteer time	5K	Educated stakeholders	Number of owners completing defensible space work	Ongoing

*Represents the wildfire component of a comprehensive SBW environmental database

Seven Basins Watershed Action Plan

Element 2: Water Quality Monitoring Program

Objective: Establish Baseline Water Quality Conditions in Priority Streams Throughout the SBW

Narrative Description of Element: There are numerous factors that can affect water quality in a watershed both spatially and temporally. These factors need to be well known in order to develop a thorough understanding of the "wellness" of a stream ecosystem. Water quality monitoring can be used for many purposes that include:

- Identifying whether waters are meeting designated water quality criteria;
- To identify specific pollutants and sources of pollution;
- To evaluate trends; and
- To determine if adverse impacts have occurred.

The purpose of this action is to develop a program that will allow the water quality of the watershed to be evaluated in a quantitative manner. Several of the streams in the SBW are 303(d) listed streams for one or more parameters. Water quality information is needed to assess the factors that may be impacting the quality of water in the SBW and to determine the impact on fish, fish habitat, and other critical aquatic and terrestrial habitats in the watershed.

Water quality monitoring is critical to understanding the processes active in a watershed that have a direct impact on the quality of water. Water quality varies naturally both in time and space. As a result, a monitoring program must be flexible and comprehensive in order to evaluate such changes. Factors that can affect water quality include climate, geology, and geomorphology, and sources of pollutions. A water quality program must take into account spatial scales, temporal scales, sampling density, short-term variability, seasonal variations, impacts of natural phenomena such as wildfire, and must produce adequate data to effectively assess long-term trends.

Water chemistry based approaches seek to measure individual parameters and are usually related to specific water quality criteria. These investigations take a surrogate approach in that measured parameters are assumed to reflect some ecological response; e.g. suspended solids may be measured as a surrogate for enrichment or as a measure of soil erosion within a basin.

Hydrochemical monitoring provides the basic building blocks for understanding the overall health of a watershed. Data collected through a well designed and implemented monitoring program provides the basis for developing restoration plans and also for determining the effectives of the restoration once it is implemented. Hydrochemical approaches tend to give partial coverage in time and space because the data reflect instantaneous conditions at the site where the data were collected.

Water quality monitoring should not be limited to just the surface regime. As discussed in the SBW Assessment, groundwater can have major impact on the overall water quality and quantity in a watershed. Discharging groundwater can provide cool water to streams during the summer months and warm water to stretches of a stream during the winter months. The interaction of these two sources of water in a watershed is critical to maintaining habitat for fish and other organisms throughout the year. Because groundwater has been shown to interact with stream flow, it is important to know the hydrochemistry of the discharging groundwater as well. If contaminants are being transported by groundwater it is possible that they could enter the stream as dissolved or separate phases and degrade the surface water body they enter.

Water quality monitoring alone, however, may not be sufficient to determine whether aquatic stream habitats are stable in a stream. While some constituents (such as DO and temperature) are important to maintaining healthy fish and aquatic insect populations, other factors, such as the physical structure of the stream and the condition of the habitat, play an equal or greater role. In many instances, biological monitoring methods are better suited to determining the condition of aquatic life within the stream environment. Biological approaches, especially those using benthic invertebrates, fish, and periphyton as indicators are very useful to assess the health of all types of aquatic habitats. Bioassessment approaches blend with hydrochemical monitoring programs because they measure cumulative effects. Rather than measuring surrogates, they evaluate biological responses of the aquatic environment thus represent a top down approach.

Bioindicators are organisms whose presence, absence, or condition provides information about environmental quality. Every organism has particular environmental requirements for it to be healthy and reproduce successfully. The presence or absence of healthy populations of organisms within their habitats provides valuable information regarding the environmental conditions in a water body. The advantage of using bioindicators over chemical and physical tests to evaluate water quality is that the presence of living organisms inherently provides an integrated indication of water quality. In contrast, chemical and physical tests typically provide information related to the conditions that exist at the time the sample was taken. The presence of a mixed population of healthy aquatic species indicates that the water quality has been good for some time. The absence of bioindicators in water that appears to be of good quality, according to chemical and physical sampling, should indicate that further investigation as to the cause for the lack of bioindicators.

Macroinvertebrate stream populations are sensitive to anthropogenic disturbance, making them good indicators of stream health. Salmonids feed on these populations, providing a direct link between salmonid health and macroinvertebrate health. Changes in macroinvertebrate populations indicate non-point source pollution, sporadic events, or low levels of pollution that can accumulate within the stream. Surveys to monitor these populations can be cost effective and provide great insight into the water quality of the stream.

The data gathered from this activity should be entered into an interactive environmental database that is coupled with GIS capabilities. Such a system would allow the information to be queried rapidly and be used to generate maps and other useful documents for evaluating trends or changes in water quality. The data generated would be used to determine programs to maintain and improve overall water quality throughout the watershed.

The development of a water quality monitoring program for the SBW is consistent with elements described in the CWA, SDWA, Senate Bill 1010, ESA, and the Oregon Plan for Salmon and Watersheds, Oregon Forest Practices Act, etc. A well designed monitoring program would provide additional temperature data that could be used in conjunction with the information generated by the FLIR Survey that was conducted by DEQ on the Rogue River and Evans Creek in 2003.

Table 6
Goal: Design and Implement a Comprehensive Water Quality Monitoring Program Throughout the SBW

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Assessment/Monitoring Actions						
Prioritize streams to be monitored in the SBW	SBWC, DCC, DEQ, ODFW	SBWC assessment	NA	Prioritized list of Streams	Subjective	Ongoing; evaluated annually
Locate and map stations	SBWC, DCC, DEQ, ODFW	GPS, Computer, software, printer	2K	Maps showing Sampling points	Subjective	Ongoing
Develop specific data objectives based on questions to be answered by the monitoring program. Water quality program data objectives should be coupled with data objectives for sediment and ecological evaluations. Data objectives should be revaluated annually as part of the evaluation of the overall monitoring program	SBWC, DCC, DEQ, ODFW, Consultant	Volunteers, assistance from stakeholders, SBWC assessment	5K	Specific data objectives consistent with other hydrochemical, geochemical, and biological components of the monitoring program	Evaluation of data quality to meet program requirements	Ongoing; evaluated annually
Determine type of data to be collected (e.g. chemical parameters, macroinvertebrates, continuous temperature, etc.); monitoring frequency, etc. This list should be evaluated annually along with data objectives and overall monitoring program	SBWC, DCC, DEQ, ODFW, BLM	Volunteers, assistance from stakeholders, SBWC assessment	NA	Detailed Sampling Schedule	List of monitoring parameters	Ongoing; evaluated annually
Evaluate currently available sampling and testing equipment. Determine if it is capable of producing results required based on defined data objectives	SBWC, DEQ, ODFW, ODA, BLM	Trained volunteers, sampling and testing equipment,	10K	List of equipment needs for meeting data objectives	Capability of equipment to meet data objectives	Ongoing; evaluated annually
Prepare or identify existing data collection procedures (DEQ, OWEB, EMAP, etc.)	SBWC, DEQ, ODFW, ODA, BLM	Volunteers, assistance from stakeholders, SBWC assessment	1-5K	Data collection manual	Accepted Manual	4/04-8/04

Table 6
Goal: Design and Implement a Comprehensive Water Quality Monitoring Program Throughout the SBW

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Funding Level	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Establish or adopt existing QA/QC procedures (DEQ, OWEB, EMAP, etc.)	SBWC, DEQ, ODFW, ODA, BLM	Volunteers, assistance from stakeholders, SBWC assessment	1-5K	QA/.QC manual	Accepted Manual	4/04-8/04
Data Collection	SBWC, DCC,	Trained volunteers, sampling and testing equipment	1-5K	Data reports	Subjective	Ongoing
Develop a water quality data base coupled w/GIS*	SBWC, DCC, consultant	GPS, Computer, software, printer, consultant	5K	Functional Interactive Data base	Amount of data entered into database on an annual basis; ease of generating reports	Ongoing
Data Evaluation	SBWC, DEQ, ODFW, ODA, consultant	Computer, software, printer	10K	Annual peer reviewed data reports	Completion of annual data reports	Ongoing
Evaluate need to modify monitoring program (addition or deletion of streams, sites, parameters, etc.)	SBWC, DEQ, ODFW, ODA	Volunteers, assistance from stakeholders	5K	Reevaluation of monitoring program	Subjective	Annually
Education/Outreach Actions						
Training of Volunteers	SBWC, DCC, DEQ	DCC, education committee	NA	Trained volunteers to collected defensible data	Number of interns/volunteers trained	As required
Develop Outdoor Education Opportunity for Students and Stakeholders	SBWC, DEQ, ODFW, ODA, BLM	DCC, education committee	5-10K	Outdoor education program coordinated with education program	Success of the program(s) determ	Ongoing

*Represents the water quality component of a comprehensive SBW environmental database

Seven Basins Watershed Action Plan

Element 3: Watershed Hydrology

Objective: Develop a Comprehensive Understanding of the Hydrology of the SBW

Narrative Description of Element: Water is the common thread that ties all other components of a watershed together. Water is the primary driving force of most phenomena that occur within a watershed. It is responsible for providing critical habitat for fish and other organisms throughout the watershed. It is also the primary force responsible for weathering of rocks that generate soils and then for transporting those soils overland to streams resulting in sediment deposition. In most mountain streams baseflow late in the year is maintained by discharging groundwater. Groundwater is typically the primary source of cool water in the summer months and warmer water in the winter months to many small streams. Geochemical conditions, contaminant and nutrient fluxes, and the occurrence of benthic and hyporheic aquatic life are related to the magnitude and direction of water movement in a streambed.

At the watershed scale the greatest emphasis with respect to hydrologic study has historically focused on the surface water regime. However, it is evident that it is necessary to examine all components of the water cycle in order to fully understand the impact water has on the various environmental components of a watershed. In order to evaluate the "wellness" of a watershed, the influence of both surface water and groundwater needs to be taken into account. Taken as a whole, the hydrologic system influences all major ecosystems throughout a watershed (aquatic and terrestrial). Streams drain water from the land surface and in a similar fashion aquifers drain water from the subsurface. These systems are almost always connected and these connections create unique ecotones throughout a watershed. Surface water systems such as lakes, streams, and wetlands are ecologically important components of the environment because they provide habitat for a diverse array of plants and animals. Most surface water bodies exchange water and nutrients with the surrounding terrestrial environment. In addition, organisms play an important role in the hydrologic cycle. Water balance, soil moisture, groundwater recharge, and streamflow are all impacted by the process of evapotranspiration by terrestrial and aquatic vegetation within an ecosystem.

Many of the hydrologic elements that need to be addressed will require a significant amount of partnering and cooperation between the SBWC, landowners, OWRD, BLM, and others to develop a meaningful program. Many of the issues discussed above are fundamental to understanding how water, nutrients, and pollutants move through a watershed. A well designed program coupled with the water quality program and addresses many of the factors identified in major environmental legislation (i.e. CWA, SDWA, Senate Bill 1010, ESA, and the Oregon Plan for Salmon and Watersheds, Oregon Forest Practices Act, etc.

Table 7
Goal: Develop a Conceptual Model of Water Movement Through the SBW

Action Plan (Steps or Tasks)	Responsible Party(s)	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Assessment/Monitoring Actions						
Review existing hydrologic data	SBWC, OWRD, BLM	Volunteer time, agency files	NA	List of hydrologic data gaps	Subjective; based on amount and type of information collected	6/04-12/04
Ground-truth selected reaches of priority streams to redefine CHC as presented in assessment	SBWC, NRCS, BLM, Contractor	Volunteers, survey equipment, GIS	5-10K	Accurate definition of CH types for priority reaches of streams in SBW	Number of reaches classified	Ongoing
Determine locations for measurement of streamflow	SBWC, OWRD, BLM, USGS	Volunteer time, maps, information re: historical gauging stations/data	NA	Data Reports, stream hydrographs, estimates of peak flows, data for conducting a water balance	Number of gauging stations established in SBW	Ongoing
Install permanent stream gauging stations on critical stream reaches throughout the SBW	SBWC, OWRD, BLM, Contractor	Volunteers, staff gauges, flumes, continuous flow meters, computer, transducers, data logger, survey equipment, contractor	20K	Estimates of peak flow on priority stream reaches, understanding of surface flow mechanisms, information to be used to estimate water balance	Number of stations installed in the SBW	Ongoing
Measure flow rates and volumes on selected reference stream reaches	SBWC, OWRD, BLM	Volunteers, portable flow meter, survey equipment, computer, GPS	10K	Estimates of surface flow to be used in developing subbasin water balances	Number streams measured	Ongoing
Map and estimate volume of off channel storage faculties in the SBW (i.e., ponds, water chances, pushup dam impoundments, irrigation dam impoundments, etc.). Evaluate the need for additional off channel storage projects in the SBW	SBWC, OWRD, BLM	Volunteers, ODFW water right information, cooperative landowners, computer, GIS database	3-5K	Documented location of all surface water bodies in SBW, estimated storage volume, identification of potenial areas of off channel storage	Subjective; based on amount and type of information collected	8/04-1-05
Establish a monitoring well network for measuring groundwater levels	SBWC, OWRD, BLM, ODFW, Contractor	Volunteers, landowners, water level meters, data loggers, GPS, OWRD files, Computer	10K	Water level data, maps showing water table surface, groundwater flow directions, information related to surface water groundwater interaction	Subjective; based on amount and type of information collected	Ongoing
Evaluate areas of surface water/ground water Interaction	SBWC, OWRD, BLM, Contractor	Data from surface water groundwater monitoring activities, equipment	10K	Maps depicting gaining and losing sections of streams, understanding of baseflow conditions	Subjective; based on amount and type of information collected	Ongoing
Develop an interactive hydrologic database coupled with GIS*	SBWC, Contractor	Computer, software	5K	Functional Database	Completion of a working interrelational database	Ongoing

Table 7
Goal: Develop a Conceptual Model of Water Movement Through the SBW

Action Plan (Steps or Tasks)	Responsible Party(s)	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Determine number, location, and amount of water allocated for existing water rights in the SBW	SBWC, OWRD, BLM, Contractor	OWRD files, computer, software	10K	Maps of water right locations, points of diversion, estimated water use in SBW, input to water balance estimates, database of water right information	Subjective; based on amount and type of information collected	Ongoing
Establish weather stations at selected locations throughout the SBW.	SBWC, OWRD, BLM, OCS, Contractor	Volunteer time, weather stations, training	7K	Information will be used to better understand the timing of water movement through the watershed. Critical to estimating water balances	Number of stations established, amount of data collected	Once established, ongoing
Develop a conceptual model of water movement through the SBW	SBWC, OWRD, Contractor	Monitoring data collected from all monitoring programs		A semi-quantitative understanding of how water cycles through the SBW	Completion of a workable conceptualization of the hydrology of the SBW	Ongoing
Education/Outreach Actions						
Develop an interactive presentation that Illustrates water resource components of the SBW	SBWC, Contractor	Assessment, computer, monitoring information, GIS	7K	Presentation that can be used for educational purposes	Number of presentations made annually	Ongoing
Develop an outdoor school hydrology program to introduce students and other stakeholders in the hydrologic elements of a watershed. This program should be compatible with other education programs described in the Education Element	SBWC, Education Committee, BLM, OWRD, Jackson County	Volunteer, educational information	5K	Increased awareness of land owners. Workshops, meetings	No. of owners completing defensible space work; No. of owners / acres participating in neighborhood fire planning	Ongoing
Work with landowners to promote more efficient irrigation techniques	SBWC, OWRD	Volunteers, educational information	1K	Increased awareness of water use, reduction of water consumed	Number of landowners who are willing to make changes, amount of water saved	Ongoing
Action Plan (Steps or Tasks)	**Responsible Party(s)**	**Resource Needs**	**Estimated Cost**	**Product(s)**	**Evaluation Criteria**	**Time Line (Begin/End)**
Restoration/Enhancement Actions						
Work with landowners to discourage groundwater pumping in areas near off-channel habitat such as springs and wetlands.	SBWC, OWRD, NRCS	Volunteers, landowner cooperation	5K	Increased awareness of water use, reduction of water consumed	Number of landowners who are willing to make changes, amount of water saved	Ongoing
Improve riparian conditions to promote retention and slow discharge of storm flows and increase low flow conditions	SBWC, BLM, NRCS, SWCD, OWRD	Volunteers, landowner cooperation	5K	A measurable change in stream flow	Number of riparian areas improved annually	Ongoing
Create and maintain pump chances and ponds	SBWC, OWRD, BLM, NRCS, SWCD	Volunteers, landowner cooperation	20K	Increase in water storage that can be used to fight wildfire	Number of sites created throughout the SBW	Ongoing
Work to acquire or lease water rights to increase the amount of water appropriated for in-stream uses	SBWC, OWRD, BLM	Volunteers, cooperation of landowners and OWRD	20-50K	Increased water in streams	Number of water rights converted to instream flows	Ongoing

*Represents the hydrologic component of the comprehensive SBW environmental database

Element 4: Evaluation of Sediment Issues

Objective: Develop a Program to Reduce Sediment Discharge to Streams

Narrative Description of Element: The inherent erosion potential of an area is determined by four principal factors:

- Soil characteristics;
- Vegetative cover;
- Topography; and
- Climate (rainfall).

Sediment is defined as unconsolidated solid material that is derived from weathering of rock and carried by, suspended in, or deposited by water or wind. The sediment load carried by a stream is a natural attribute of the stream system. The processes controlling sediment transport are necessary for maintenance of the relative stability among streambed and stream bank, erosion, and deposition. All rivers and streams transport sediments. The amount of sediment transported is dependent on the amount of sediment derived from the upstream watershed and the velocity and turbulence of the flowing water. The ultimate source of sediments to a stream is from hillslope erosion with lesser contributions being supplied from the streambed and stream banks. Hillslope erosion can be in the form of surface erosion of fine sediments or more dramatically as slope failures leading to debris flows

Sediment load determines channel shape and pattern. Changes in sediment yield reflect changes in basin conditions, including climate, soils, erosion rates, vegetation, topography, and land use. Fluctuations in sediment discharge affect a great many terrestrial processes, including ecosystem responses, because nutrients are transported together with the sediment load. For example, to reproduce effectively, salmon and trout need gravel stream beds for spawning. Silt and clay deposits formed by flooding or excessive erosion can destroy these spawning beds. Stream deposits can also represent huge potential sinks for, and sources of, contaminants.

Stream sediment storage and load affects virtually all environmental issues in drainage basins. Stream sediments may affect, for example, the health of aquatic organisms or may result in the silting-up of reservoirs. They may also store chemical contaminants that can be subsequently released into the environment by flood events or other disturbances such as mining, construction, or dam removal.

Streams are dynamic systems subject to rapid changes in channel shape and flow pattern. Water and sediment discharges determine the dimensions of a stream channel (width, depth, and meander wavelength). Dimensionless characteristics of stream channels, types of pattern (braided, meandering, straight) and sinuosity are significantly affected by changes in flow rate, sediment discharge, and by the type of sediment load in terms of the ratio of suspended load to bed load.

Anthropogenic activities within a watershed typically result in increased erosion of hillslopes. Rural road systems, urban surfaces, and agricultural activities are all sources of fine sediments in a watershed. Fine sediments present the greatest adverse impact on fish and insects. Fine sediments decrease the suitability of streambeds for spawning by silting in gravel beds typically used for spawning. High turbidity levels caused by fine sediment during the incubation period of embryos and alevins of salmon and trout will reduce the percentage of young fish that survive and emerge from the redd.

Soils derived from granitic rocks in the SBW tend to be highly erodible and prone to gully erosion and debris slides. These soils typically have a low clay content and a coarse single grain structure that contributes to a lack of cohesion. In turn, such characteristics make stabilizing these soils very difficult after they have been disturbed. This is particularly true along the many roads present in the watershed where cutbank erosion and channel erosion are common. Roads and skid trails are the major contributors of sediments in much of the watershed (BLM, 1994, 1995, 2001).

Soils derived from metamorphic rocks seem to be more stable than those associated with granitic environments. However, some of the metamorphic areas are prone to instability because of the tendency for these rocks and their corresponding soils to undergo mass wasting when they become wet or saturated (BLM, 1994, 1995, 2001).

The impacts to soils in much of the SBW are cumulative in nature. They result from the compaction by road building, skid trails, and landings constructed for logging. Once compacted, these soils are prone to rapid runoff, channelization of flow, and increased erosion. All of which result in increased sedimentation of stream channels (BLM, 1994, 1995, 2001).

In the upland areas of the SBW, logging has contributed to a greater potential for rain on snow pack that can lead to flooding and peak flow conditions. Such conditions can result in destabilization of stream banks and reorientation of stream channels. In addition, logging on slopes in these drainages has contributed to an increase in mass wasting, particularly in areas dominated by decomposed metamorphic parent rock.

BLM and private land owners have constructed hundreds of miles of road throughout the SBW. The roads were constructed primarily for log hauling and administrative purposes. In the BLM Watershed Analysis Units (WAUs), roads range from primitive four wheel drive roads to paved highways. Many of these roads have been used for recreational purposes such as motorcycling and most recently by off road vehicles (ORVs). These activities greatly increase the potential for erosion. The use of ORVs is creating major sediment problems in many parts of the SBW, especially along reaches of the West Fork of Evans Creek. There are numerous minor sediment areas along the entire stretch of the West Fork of Evans Creek primarily between Rock Creek and Elderberry Flats. The waterbars in many locations have been worn down and runoff flows over the waterbars causing erosion of the roads.

Streambank erosion is occurring at many locations throughout the SBW. Undercutting has been shown to provide improved habitat for fish by providing cover and refuge. However, if it is not stabilized in problem areas, high water will continue to wash soil away from tree roots and the tree will fall. Once this occurs, the roots of the tree will no longer be available to stabilize the bank and further erosion will occur.

Mass movement processes can move large quantities of sediment down slope and deposit it in streams. Sediments can be transported rapidly by catastrophic events, such as landslides or debris flows, or can occur slowly by processes such as earthflows or creep. These events can alter stream channel flow and have adverse impacts on fish and other organisms present in the stream.

Slope failures have the greatest potential to introduce large amounts of sediment into stream channels over relatively short (hours to days) periods of time. Dirt roads in close proximity to stream channels have a high potential to deliver sediments into channels. Proper road maintenance, drainage (culvert spacing and sizing), revegetation of hillslopes and cutbanks, and minimizing future road construction in riparian areas and on slopes >60% have been recognized as being important to reducing the risk of slope failure resulting in sedimentation of local streams. Slope failures occur naturally throughout the Pacific Northwest and the SBW is no exception. The greatest frequency and volume of slope failures occur in areas associated with forest roads, rural roads, and clearcuts.

Extensive mining activity has occurred throughout portions of the SBW since the mid 1800s. At the time the mining was being conducted, it had a large impact on the health of the watershed. It destroyed large sections of riparian habitat, was responsible for altering many reaches of streams, adversely affected water quality by the introduction of toxins and increasing sediment loads, and physically destroying salmonid spawning habitat. These effects were devastating to many reaches of streams resulting in stream channels becoming incised and permanently removed from their floodplains. The physical effects of mining can still be recognized in areas such as Foots Creek and Pleasant Creek where large mechanical dredges were used to remove huge volumes of sediments from the stream channels. These sediments were redistributed along stream banks as tailings that significantly altered the stream channels and buried riparian vegetation. Those areas where large scale hydraulic mining was conducted still bear the scars of this activity.

Other remnants of the mining history within the SBW watershed are still lingering and may pose adverse impacts on the local ecosystems. These impacts are not as easy to discern as the physical scars. Typically, the majority of the mining that occurred within SBW was for the extraction and processing of gold and to a lesser degree, cinnabar. The chemical processing of gold bearing ores was potentially extremely harmful to the environment. The degree to which the ore processing steps impacted the ecosystem was based primarily on how careful the miners were that conducted the processing. Unfortunately, in the past, miners as a group were not as concerned about the environment as much as they were with the extraction and processing of the commodities they were mining.

The extraction of gold typically utilized several chemicals that are known toxins. Most notably the chemicals of concern were cyanide and mercury. Sodium cyanide is a lethal poison. Low levels of mercury have been demonstrated to have chronic effects on a wide variety of organisms.

Mining operations such as those on Murphy Gulch were prevalent throughout the SBW until the mid 1940s when mining was stopped because of World War II. The remnants of these operations may pose a threat to stream ecosystems because of residual levels of contaminants that may remain in sediments derived from the mining areas. One area of concern is the sediments that have been deposited behind dams in the watershed. This is not a concern for all dams, only those located down gradient and in close proximity to areas that underwent extensive mining and processing of ores. These sites should be evaluated to determine if residual contaminants are present.

Suction dredging conducted in sediments behind at least one dam in the SBW found gold and elemental mercury in the sediments. These metals have been transported down stream from mining areas and have been deposited in the sediments behind the dam. The presence of mercury in the sediments is problematic based on the factors discussed above with respect to mercury partitioning in the aquatic environment. This is also a potential issue with respect to removal of this and other similar dams or major barriers in the SBW.

Prior to removal of any dam or other barrier structure that could allow sediments to accumulate a comprehensive evaluation of the chemical character of the sediments should be conducted. The characterization process will provide valuable information regarding the distribution of contaminants, the concentration level of contaminants, and their chemical form. The results of the characterization will allow informed management decisions to be made as to disposition of the sediments.

Table 8
Goal: Reduce Excessive Sediment Production By Restoring Key Sediment Source Areas and Protecting Areas Sensitive to Erosion

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Assessment/Monitoring Actions						
Correlate geology with soil type	SBWC, Consultant	Regional geologic and soil maps, volunteers, GIS, mapping tools	10K	Understanding of the relationship between watershed geology and soil development and distribution	Completed evaluation	7/04-12/04
Map and estimate volume of sediment in critical source areas	SBWC, BLM, ODF, ODFW, NRCS	Volunteers, cooperation with resource management agencies	5K	Semi-quantitative estimate of source volume and distribution	Completed estimates	Ongoing
Prioritize those areas that represent a high potential for sediment production. These may be related to mass wasting, stream crossings, road maintenance, or other factors.	SBWC, BLM, ODF, ODFW, NRCS, Contractor	Volunteers, cooperation with resource management agencies, computer, GIS	10K	Prioritized list of high risk source areas and target list for restoration projects	Completed assessment	Ongoing
Characterize sediment in priority streams. Characterization should include chemical and physical aspects of sediments. This program should include the development of a peer reviewed sampling and analysis plan and QA/QC plan	SBWC, BLM, ODFW, Contractor	Volunteers, landowner cooperation, sampling and testing equipment, GPS, GIS, analytical support, contractor	5-7K	A thorough understanding of the distribution and chemical characteristics of stream sediments.	Completed assessment	8/04-8/05
Develop a characterization program to assess the impact to sediments from historical mining activities throughout the watershed. This program should include the development of a peer reviewed sampling and analysis plan and QA/QC plan	SBWC, BLM, ODF, ODFW, NRCS, Contractor	Volunteers, landowner cooperation, sampling and testing equipment, GPS, GIS, analytical support, contractor	10K	Mapped location of key mining sites, characterization results, evaluation of mining site as continued sources of contaminants to the SBW	Completed assessment	Ongoing
Conduct a comprehensive characterization program to evaluate the contaminate potential of sediments located behind dams in the SBW. This program should include the development of a peer reviewed sampling and analysis plan and QA/QC plan	SBWC, BLM, ODF, ODFW, NRCS, Contractor	Volunteers, landowner cooperation, sampling and testing equipment, GPS, GIS, analytical support, contractor	50-75K per structure	A thorough understanding of the physical and chemical characteristics of stream sediments. Accurate estimates of sediment volumes. Results will allow informed decisions regarding dam removal to be made	Completed assessment	6/05-12/05
Develop a sediment database coupled w/GIS to track characterization, monitoring and restoration projects*	DCC, PM, Consultant	Computer, software, GIS	5K	Functional Interactive database	Completed and fully functioning data base	Ongoing

Table 8

Goal: Reduce Excessive Sediment Production By Restoring Key Sediment Source Areas and Protecting Areas Sensitive to Erosion

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Education/Outreach Actions						
Educate watershed residents and other stakeholders about sediment issues and problems	SBWC, BLM, ODF, ODFW, NRCS	Volunteers, education materials, stakeholder/partner support	2.5K	A well informed group of stakeholders	Number of stakeholders reached	4/04
Promote awareness of rural surface roads as major sediment sources	SBWC, BLM, ODF, ODFW, NRCS	Volunteers, education materials, stakeholder/partner support	1.5K	A well informed group of stakeholders	Number of stakeholders reached	Ongoing
Restoration/Enhancement Actions						
Rehabilitate areas determined to be critical sources of sediment to streams (e.g., selected key stream crossings).	SBWC, BLM, ODF, ODFW, NRCS, SWCD	Volunteers, cooperation with resource management agencies	25-50K per location	Reduction in sediment production	Number of site restored	Ongoing
Develop a cooperative program with local, state and federal agencies for addressing sediment issues such as road closures, road removal, dam removal, restriction of ORVs, and developing criteria for riparian buffer zones.	SBWC, BLM, ODF, ODFW, NRCS, SWCD	Volunteers, cooperation with resource management agencies, stakeholder/partner support	10K	Reduction in sediment production	Number of projects undertaken	Ongoing

*Represents the sediment component of a comprehensive SBW environmental databas

Seven Basins Watershed Action Plan

Element 5: Riparian Conditions

Objective: Develop a Comprehensive Riparian Management Program for the SBW

Narrative Description of Element: Streamside vegetation is a source of food, provides shade which prevents excessive water temperatures, provides cover, and gives stability to the soil along the stream. If land-use activity on the slopes around a stream creates erosion or pollution hazards, streamside vegetation can intercept and filter sediments and contaminants before they enter the stream (Mahoney and Erman, 1997). Vegetated riparian areas perform many beneficial functions throughout a watershed. These functions may be grouped into the broad categories of habitat creation, food supply, water quantity, and water quality. Properly functioning riparian areas assist in limiting excess nutrient loading, excessive sedimentation, elevated stream temperatures, and other pollutants including pesticides, herbicides, as well as a wide range of other industrial chemicals (Cohen, 1977).

The failure to maintain vegetative cover on or keep impervious surfaces out of riparian areas adjacent to smaller creeks and streams can result in a significant loss of groundwater discharge and increase the frequency, duration, and severity of low flow conditions. In the smaller streams, where flows are already modest in size to begin with, a reduction in baseflow would be especially harmful. Small streams deprived of groundwater flow may even dry up completely, a condition that is obviously extremely stressful if not fatal to fish and other aquatic organisms (Cohen, 1997).

Baseflow is critical to lotic ecosystems and water quality. Low flow periods are typically the most stressful periods for aquatic organisms, resulting in crowding due to less available habitat, elevated water temperatures in the summer and greater freezing in the winter. Fish, animals, and water plants typically require a stable, continuous flow of water. Groundwater discharge is an important element to maintaining adequate water levels and temperatures in streams to support aquatic life. Riparian areas moderate the rate and location of discharge, naturally mitigating times of low flow by slowly releasing water to the stream (Cohen, 1977).

Small streams and creeks are especially vulnerable to excessive sediment, nutrients loading and other pollutants, simply because there is a smaller volume of water available to flush out and/or and assimilate these pollutants. Thus, maintaining a living filter of natural vegetation along smaller creeks and streams serves two important purposes:

- Intercepts pollutants before they reach and degrade the sensitive smaller streams and
- Enables groundwater discharge and low flow augmentation to help dilute pollutant concentrations.

Due to the small ratio of stream bottom width to shoreline, small headwater streams are especially vulnerable to harmful increases in temperature. This can be exacerbated by the removal of shade producing vegetation from stream banks.

Logs, stumps and other large woody debris in and/or overhanging the water (even where undercut by the current) should be left undisturbed as much as possible to maximize its value as a food source and in stream habitat for fish and other aquatic organisms as well as helping to keep harmful sediment movements under control. Connections between rivers and adjacent floodplains should also be maintained, as floodplains are valuable foraging, spawning and nursery habitat for some fish species.

The goals of the SBWC with respect to riparian areas are as follows:

- Foster a practical and scientific understanding of riparian areas and wetlands,
- Promote sound management of riparian areas and wetlands through demonstration and education,
- Promote communication and coordination among all people interested in riparian areas and wetland,
- Ensure that the long-term benefits of the riparian areas and wetlands of the SBW are maintained or improved,
- Advance the effort to conserve existing forested riparian areas,
- restore and conserve buffers on public lands and on private lands through programs that protect land from excessive development, and
- Develop a Riparian Buffer Implementation Plan for the SBW.

Accomplishing this element will require the cooperation of the SBWC, Oregon Department of Fish and Wildlife, Bureau of Land Management, U. S. Department of Agriculture, private landowners (forest industry), and other stakeholders.

Table 9
Goal: Enhance or Restore Riparian Habitat Along Priority Stream Reaches to Provide Multiple Benefits, Including Fish Survival and Water Quality

Action Plan (Steps or Tasks)	Responsible Partners	Resources Needed	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Monitoring and Assessment Actions						
Assess, and map riparian conditions for the watershed, focusing on priority streams.	SBWC, DCC, NRCS, BLM, ODF, ODFW, OSU	Volunteers, basic survey equipment, GPS, computer, GIS	5K	List of riparian conditions, prioritization of areas requiring restoration or enhancement	Number of miles of riparian corridor assessed	Ongoing
Compare riparian conditions map with ODFW habitat surveys, DEQ 303(d) assessments, FLIR data, etc.	SBWC, DCC, NRCS, BLM, ODF, ODFW, OSU	Assessment maps, computer, GIS	2K	Maps illustrating interrelationship of watershed conditions	Number of miles of riparian corridor mapped	4/04-4/05
Ground truth riparian conditions, map and revise	DCC, PM, SBWC	Volunteers, maps, cameras, etc.	7.5K	Maps illustrating interrelationship of watershed conditions	Number of miles of riparian corridor ground truthed	4/04-4/06
Prioritize key streams and stream reaches for enhancement projects, based on potential for significant contributions to stream shading, and/or significant contributions to habitat, both aquatic and terrestrial, and/or significant contributions to streambank stability or floodplain maintenance. Use methods such as PFC to prioritize locations	DCC, SBWC, Volunteers	Volunteer time	2-3K	Prioritized list of restoration areas along key streams reaches	Number of site identified for restoration or enhancement	Ongoing
Develop a riparian database coupled w/GIS to track conditions and restoration projects. This component of the database will be consistent with the database being developed for other elements*	SBWC, Consultant	Computer, Software	5K	Functional Interactive database	Subjective	Ongoing
Develop comprehensive monitoring programs to quantitatively assess the effectiveness of any restoration or enhancement projects implemented	SBWC, NRCS, BLM, ODF, ODFW, OSU	Volunteers, required equipment	20K	Project specific, peer reviewed monitoring plans	Number of completed and approved plans	Ongoing
Evaluate need to modify monitoring program(s)	SBWC, NRCS, BLM, ODF, ODFW, OSU	Volunteer time, outside peer review of program	4K	Evaluation criteria that critically examines the efficacy of monitoring activities	Ability of the evaluation process to effectively screen monitoring process	Annually

Table 9
Goal: Enhance or Restore Riparian Habitat Along Priority Stream Reaches to Provide Multiple Benefits, Including Fish Survival and Water Quality

Action Plan (Steps or Tasks)	Responsible Partners	Resources Needed	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Education and Outreach Actions						
Develop an outreach program to educate landowners and community members about the importance of riparian habitat and voluntary actions that can improve riparian conditions (e.g., planting native trees and shrubs, increasing the width of riparian buffer zones)	SBWC, NRCS, BLM, ODF, ODFW, OSU	Volunteers, involvement of stakeholders, landowners, and resource management agencies	2K	Developed awareness of the importance of riparian areas to a watershed	Number of landowners contacted, number of landowners willing to make changes on their property	Ongoing
Work with local schools and other groups to involve students and community members in riparian assessment and enhancement projects	SBWC, NRCS, BLM, ODF, ODFW, OSU	Volunteers, involvement of stakeholders and resource management agencies	2K	Developed awareness of the importance of riparian areas to a watershed	Number of students involved in programs	4/04
Restoration/Enhancement Actions						
Develop a riparian planting program. Key steps include obtaining funds to purchase stock, developing lists of appropriate trees and shrubs, securing quality planting stock, identification of sites, recruiting landowners, assistance with site preparation, planting, and follow-up maintenance/monitoring.	SBWC, NRCS, BLM, ODF, ODFW, OSU	Volunteers, involvement of stakeholders, landowners, and resource management agencies	10K	Enhancement of key reaches of priority streams	Number of feet of priority stream reaches involved in enhancement projects	Ongoing
Conduct enhancement projects along priority reaches. Examples include tree planting / bioengineering for streambank stability, in-stream placement of LWD, revetment trees, etc.	SBWC, NRCS, BLM, ODF, ODFW, OSU, SWCD	Volunteers, involvement of stakeholders, landowners, and resource management agencies	15K	Enhancement of key reaches of priority streams	Number of feet of priority stream reaches involved in enhancement projects	Ongoing
Action Plan (Steps or Tasks)	**Responsible Partners**	**Resources Needed**	**Estimated Cost**	**Product(s)**	**Evaluation Criteria**	**Time Line (Begin/End)**
Assist landowners in developing grazing management plans that address concerns associated with riparian health	SBWC, NRCS, BLM, ODF, ODFW, ODA, OSU, SWCD	Volunteers, involvement of stakeholders, landowners, and resource management agencies	5K	Enhancement of key reaches of priority streams	Number of landowners willing to make changes on their property	Ongoing
Work with landowners to develop alternative watering techniques on sites where livestock use streams for accessing water	SBWC, ODA, OWRD, BLM	Volunteers, involvement of stakeholders, landowners, and resource management agencies	10K	Enhancement of key reaches of priority streams	Number of owners participating in voluntary riparian/stream enhancement activities	Ongoing

*Represents the riparian component of a comprehensive SBW environmental database

Seven Basins Watershed Action Plan

Element 6: Agency Partnerships

Objective: Develop a strong working relationship with agencies to assess key issues throughout the SBW

Narrative Description of Element: Much of the following discussion has been excerpted from the Williams Creek Watershed Action Plan. In that plan the Williams Creek Watershed Council (WCMC) provided a very concise and well organized discussion of the agencies and/or organizations that have a major influence on activities a watershed council may want to undertake. Many of the issues that the WCWC are trying to address are similar to those faced by the SBWC and thus require assistance and cooperation from many of the same agencies.

Agencies and organizations representing federal, state, and regional interests have varying degrees of involvement in the Seven Basins Watershed. The council needs to coordinate with these groups to protect and enhance watershed resources on both private and public lands. To assist the Council in implementing this Action Plan, further participation is needed through consultation, information sharing, project collaboration, and funding. The following briefly describes ways in which each agency or organization can support the Watershed Council in meeting the goals of our Action Plan.

Jackson County

- Replace culverts on county roads that have fish barrier problems.
- Reduce or eliminate the use of herbicides for controlling roadside vegetation.
- Explore alternatives to traditional roadside ditch systems that increase the rate of run-off and transport sediment and pollutants into waterways.
- Collaborate with SBWC, BLM, and ODFW to determine possible sediment sources and develop restoration projects where needed.
- Work with Council to develop outdoor learning centers to assist in the education of students and the general public regarding the importance of the "Watershed Approach."

Jackson County Soil and Water Conservation District (SWCD)

SWCDs help landowners and farmers plan and implement water and soil conservation measures, while working cooperatively with watershed councils and other natural resource management agencies.

- Assist the council in collaborating with landowners to improve irrigation techniques, including alternatives to diversion dams and traditional flood irrigation systems.

Rogue Basin Coordinating Council (RBCC)

The mission of the council is to promote the success of member councils in watershed protection and restoration, encouraging activities that transcend watershed boundaries.

- Work with the Council and obtain assistance related to coordination, technical services, and funding as required.

Rogue Basin Fish Access Team (RBFAT)

The mission of RBFAT is to improve fish passage throughout the Rogue Basin. The first step in fulfilling this mission was the generation of a biologically prioritized list of the over 800 fish passage barriers in the Rogue Basin. The second step was the development of a Strategic Plan for addressing these barriers. Rogue Basin Coordinating Council is now working on the third step of establishing a Basin Fund for the removal or modification of the barriers.

- Work with RBFAT to develop projects in the SBW related to fish passage.

Oregon Department of Forestry (ODF)

ODF regulates timber harvesting and forest regeneration on all non-federal lands. The department enforces policies that set requirements in regards to wildlife habitat, fish habitat, and water quality.

- Assist the Council in soliciting the support of local timber companies to reduce sediment source problems on private commercial timber lands.

Oregon Department of Agriculture (ODA)

Under Senate Bill 1010, ODA assists farmers and ranchers through education and technical assistance for solving problems associated with non-point source water pollution.

- Collaborate with the Council and local landowners to solve livestock-related, riparian health and water quality problems.

Oregon Department of Fish and Wildlife (ODFW)

ODFW manages and protects fish and wildlife in Oregon. In addition, the department provides technical assistance for state regulatory agencies and watershed councils.

- Work with the Council to expand the water quality and macroinvertebrate monitoring program started in the SBW.
- Partner with the Council to develop workshops and demonstration projects for local landowners.
- Work with the Council to develop habitat improvement projects on degraded streams and tributaries.
- Collaborate with the Council on developing a strategy to solve fish passage problems associated with diversion dams and culverts throughout the watershed.
- Collaborate on ways to educate landowners about the importance of improving fish screen devices on irrigation diversions, and to encourage their participation in the ODFW fish screening cost-share program.
- Assist the Council in conducting stream surveys on streams and tributaries in the watershed that have not been surveyed.
- Provide information and management guidelines as needed to protect and enhance fish habitat in the watershed.

Oregon Department of Environmental Quality (DEQ)

Several streams in the SBW have been placed on the 303(d) list for this water quality limitation.

- Assist the Council in addressing sediment quality issues associated with removal of dams to improve dish passage in the SBW.
- Collaborate with the Council in developing outreach programs to improve riparian habitats on private properties in order to reduce stream temperatures.

- Collaborate on developing programs to educate and assist landowners to reduce non-point source nutrient and sediment pollution.

Oregon Water Resources Department (OWRD)

OWRD regulates water withdrawal, issues water rights, classifies, and regulates stream flow according to beneficial uses, and establishes minimum stream flow levels.

- Assist the Council in evaluating issues associated with surface water/groundwater interactions throughout the SBW.
- Assist the Council in addressing water resource issues associated with removal of dams to improve dish passage.
- Collaborate with the Council on developing an outreach program that educates landowners about the importance of water conservation and encourages the use of more efficient irrigation techniques.
- Work with the Council to evaluate water rights to determine how in-stream flow requirements can be met.
- Work with the Council and local water users to develop a strategy that would increase summer stream flows.

Division of State Lands (DSL)

DSL determines and issues permits required for the removal and fill of any state waterways and wetlands.

- Assist the Council with permits needed for restoration projects, such as stream bank stabilizations.
- Assist the Council in addressing requirements and permitting issues associated with removal of dams to improve dish passage.

Oregon Department of Transportation (ODOT)

- Work with the Council on retaining streamside vegetation at bridge crossings and utilizing fish-friendly bank stabilization techniques.

Oregon State University Extension Service

- Continue to work with the Council on issues related wildfire in the watershed
- Continue to assist the Council in offering local landowners educational programs and materials about ways to improve watershed conditions.

Oregon Water Trust

- Collaborate with the Council on developing an outreach program that educates landowners about the importance of water conservation and encourages the use of more efficient irrigation techniques.
- Collaborate with the Council on outreach efforts to encourage landowners to transfer water rights to in-stream use.
- Assure that minimum in-stream flow requirements are realistic and in keeping with pre-development conditions.

Oregon Trout

- Assist the Council in implementing Salmon Watch programs at local schools.

Southern Oregon Land Conservancy

- Collaborate with the Council and local landowners on developing conservation easements on private lands.

Commercial Timber Companies

- Work with private timber companies with land holdings in the SBW on determining possible sediment sources and develop restoration projects where needed.

Bureau of Land Management (BLM)

The mission of the BLM is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations. The BLM administers 37% (~94,000 acres) of the land in the entire SBW and 45% (~60,000 acres) of the land in critical headwater areas of the SBW. Given extensive land holdings and the location of the land owned by the BLM within the SBW it is a critical entity with respect to affecting change with in the SBW.

- Assist the Council in addressing sediment quality issues associated with removal of dams to improve dish passage in the SBW.
- Collaborate on implementing a program to close or eliminate roads into areas that generate high volumes of sediment to streams within the SBW.
- Collaborate on replacing problem culverts with bottomless bridges, installing gates, and repairing sediment problems on BLM lands.

US Forest Service

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. There is very little land within the boundaries of the SBW owned and administered by the US Forest Service. However, they represent a wealth of knowledge related to issues such as forest management and riparian health that are critical to watershed health.

National Resource and Conservation Service (NRCS)

NRCS (formerly the Soil Conservation Service) is a funded under the U.S. Department of Agriculture. This group provides National leadership in a partnership effort to help people conserve, maintain, and improve America's natural resources and environment. NRCS provides leadership for conservation activities on the Nation's 1.6 billion acres of private and other non-Federal land. This agency provides technical assistance and information to individuals; communities; tribal governments; Federal, State and local agencies; and others. The NRCS staff partners with staff of the local conservation district and state agencies and with volunteers. The benefits of these activities include not only sustaining and improving agricultural productivity, but also cleaner, safer, and more dependable water supplies; reduced damage caused by floods and other natural disasters; and an enhanced resource base to support continued economic development, recreation, and other purposes.

- Provide technical and financial assistance to landowners who are interested in implementing conservation practices.
- Work with the Council to develop additional workshops for council members and other stakeholders related to riparian area management (Proper Functioning Conditions) and other related topics.

Southwest Oregon Resource Conservation and Development (RC&D)

RC&D is also a USDA program funded through NRCS. This non-regulatory organization provides assistance for watershed councils, landowners, and other groups in helping to implement the Oregon Plan.

U.S. Fish and Wildlife Service (USFWS)

USFWS is responsible for maintaining viable populations of plant and animal species. It also oversees the listing, restoring, and protection of endangered and threatened species, including the northern spotted owl, which is present in the watershed.

- Provide technical and financial assistance to the Council for monitoring species of concern in the watershed.

National Marine Fisheries Service (NMFS)

NMFS is responsible for managing and sustaining living marine resources, including anadromous fish. Coho and chinook salmon, steelhead, and Pacific lamprey are four anadromous species that spawn in the watershed.

U.S. Department of Agriculture (USDA)

- Assist the Council and local landowners in effectively implementing Senate Bill 1010 and USDA incentive programs, such as the Conservation Reserve Enhancement Program (CREP), the Wetlands Reserve Program (WRP), and other land stewardship programs.

Element 7: Fish Passage and Habitat

Objective: Develop a Program to Improve Fish Passage and Habitat throughout the SBW

Narrative Description of Element: Each salmonid specie has specific habitat needs; however, in general, salmonids require cold water, clean spawning gravel, and minimal turbidity. The Oregon Department of Fish and Wildlife (ODFW) have determined habitat benchmarks for salmonids. These benchmarks are used by ODFW to describe stream health and determine the parameters for habitat improvement. Habitat condition benchmarks have been developed to consider pools, riffles, shade, large woody debris, and riparian areas. In addition to habitat benchmarks, it is critical to consider any modifications which have been made to the stream channel and how those changes may affect salmonid populations.

A channel modification is an anthropogenic alteration that influences channel geomorphology and often disrupts biotic function of a stream. Modifications can be of various sizes and types, and include channelization, dams, roads, bridges, rip rap, ditches, culverts, in-stream mining, dredging, levee building, and other bank stabilizing structures. Channel modifications can move a stream from its natural channel, affect water velocities and temperature, and reduce available habitat for aquatic organisms. For example, channelization activities such as the narrowing, straightening, or moving of a stream can cause change in substrate distribution by creating unnatural areas of sediment loss or deposition and can reduce habitat for aquatic organisms

Areas within the SBW have experienced urbanization and population increases, particularly along the Rogue River in the vicinity of Gold Hill and the City of Rogue River. The portion of the watershed that includes Evans Creek and its tributaries has maintained a primarily rural character, which usually tends to have fewer channel modifications. However, mining and logging activities in this area have led to the construction of many roads with bridge and culvert crossings over streams. Additionally, several irrigation and flood control dams are located on the main stem and tributaries of Evans Creek.

Data on channel modifications were acquired from the Rogue Basin Barrier Database compiled by the Rogue Basin Fish Access Team (RBFAT). The database was developed by RBFAT in conjunction with the Southwest Oregon Salmon Restoration Initiative, Southwest Oregon Province Resource Information GIS data CD set, American Fisheries Society, and the Rogue Watershed Office of ODFW (Restore the Rogue, 2003). The database prioritizes over 800 fish passage barriers throughout the Rogue Basin. The database included information for approximately 150 channel modifications located within the Evans Creek drainage.

Approximately 150 fish passage barriers are present within the SBW, based on the RBFAT Barriers Database. The barriers consist of concrete dams, metal culverts, box culverts, and corrugated metal pipe. The highest ranked barriers within the SBW are found on the Rogue River. This ranking is due to the type of barriers, the presence of threatened or endangered species, and the position of the barrier within the watershed. A scoring system was developed to prioritize each barrier with points assigned based on the following criteria:

- The location of the barrier within the watershed;
- The percentage of total Rogue Basin salmonids found above the barrier;
- The presence of coho, summer steelhead, spring chinook, fall chinook; and the severity of the barrier.

Points for each barrier were tallied and listed from highest to lowest; the higher the ranking, the greater the need for removal. RBFAT and ODFW have determined the 20 most critical barriers to be removed throughout the entire SBW. The Rogue River contains the greatest number of barriers on the list. It is followed by Evans Creek. Most of the dams in the SBW were originally used for mining and/or irrigation. Today, these dams are considered by RBFAT and ODFW to be a hindrance to fish passage in the SBW.

Table 10
Goal: Improve Fish Habitat and Passage Through the SBW

Action Plan (Steps or Tasks)	Responsible Party(s)	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Assessment/Monitoring Actions						
Ground-truth RBFAT fish passage barrier inventory and refine as needed	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers	5K	An accurate inventory that addresses specific barriers in the SBW	Subjective	6/04-6/05
Flow issues in relation to salmonid life cycles needs to be addressed. Monitoring flow throughout the SBW should be a high priority.	SBWC, RBFAT, ODFW, BLM, OWRD	Volunteers, equipment	15K	An understanding of flow regimes in critical habitat areas throughout the watershed	Number of stream reaches where flow is measured	Ongoing
Information concerning channel modifications other than stream crossings and barriers to fish passage should be obtained using analysis of aerial photographs and field verification.	SBWC, RBCC, RBFAT, ODFW, BLM	Aerial photographs, volunteers	5K	An accurate inventory that addresses specific occurrences in the SBW	Number of modifications or additions made to the database each quarter/year	Ongoing
Evaluation of push up dams should be conducted to determine potential impacts to fish passage.	SBWC, ODFW, OWRD, BLM	Volunteers, landowner cooperation	2K	Maps illustrating location of push up dams, estimates of volume of water stored or diverted	Number of push up dams located and mapped, number of dams removed	8/04-8/05
Culverts should be evaluated to determine if they are fish friendly	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers	1.5K	Maps illustrating location of culverts, list of properly functioning culverts, list of problem structures	Number of culverts identified for removal or modification	8/04-8/05
Evaluate and map natural barriers such as slides, trees, stumps, boulders.	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers	2.5K	Maps illustrating the location of natural barriers	Number of barriers identified for removal or modification	Ongoing
Evaluate and map septic and gray water lines emptying into creeks	SBWC, ODHS	Volunteers, landowner cooperation	2.5K	Location and estimated number of sources	Number of sources eliminated from discharge into streams	10/04-10/05
ODFW fish surveys should continue and expand throughout the entire watershed. Use of trained watershed council volunteers will aid in expansion of resources and labor.	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers, training	2K	Survey results for specific stream reaches	Number of surveys conducted, number of new surveys conducted	Ongoing
Conduct fish surveys of species other than salmonids; i.e. lamprey, etc. in the SBW	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers, training, partner cooperation	7.5K	Survey results for specific stream reaches	Number of surveys conducted, number of new surveys conducted	Ongoing
Conduct an ecological risk assessment to determine risks posed by water quality and/or sediment quality	SBWC, ODFW, Contractor	Computer, software, water and sediment quality data from monitoring programs	30K	Quantitative evaluation of risk posed to fish as a result of water and sediment quality, peer reviewed technical report	Completed risk assessment	Ongoing

Table 10
Goal: Improve Fish Habitat and Passage Through the SBW

Action Plan (Steps or Tasks)	Responsible Party(s)	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
SBWC members and volunteers should work closely with ODFW staff and RBFAT to combine the fish database and barrier database into one useful and accessible database that utilizes a GIS component. The database should be updated quarterly.*	SBWC, RBCC, RBFAT, ODFW, BLM, consultant	Volunteers, training, consultant	5K	A functional interactive database	Number of modifications or additions made to the database each quarter/year	Ongoing
Education/Outreach Actions						
Watershed council and agencies should be instrumental in local education regarding fisheries life cycles, effects of barriers, flow issues, and land use effects on fisheries.	SBWC, RBCC, RBFAT, ODFW, BLM	Volunteers, education materials	5K	An implementable community education program related to fish habitat and passage through the SBW	Amount of quality educational material developed; number of people reached; number of workshops presented, etc.	Ongoing
Educate irrigators about ODFW Grants & Cost Share Programs for the installation of fish screens	SBWC, RBCC, RBFAT, ODFW	Volunteers, education materials	3K	Increased awareness of landowners with respect to fish passage	Number of new screens installed or existing screens upgraded	Ongoing
Restoration/Enhancement Actions						
Collaborate with BLM, private landowners, and Jackson County to replace problem culverts with fish-friendly passages	SBWC, BLM, Jackson Co.	Volunteers, stakeholder cooperation	2K	Replacement of problematic culverts in the SBW	Number of culverts removed or modified	Ongoing
Field check irrigation suction pipes for fish screens.	SBWC, ODFW	Volunteers, landowner cooperation	1.5K	An inventory of fish screens in the SBW	Number of screens required, number of screens installed	6/04-6/05
Evaluate the issues associated with the removal of irrigation dams in the SBW (permitting, landowner rights, hydrologic, environmental, demolition, etc.)	SBWC, RBCC, RBFAT, ODFW, DEQ, DSL, BLM, NOAA Fisheries, consultant	Volunteers	10K	A thorough understanding of the issues involved in the removal of specific irrigation dams in the SBW	Number of dams removed form the SBW	6/04-6/05

*Represents the fish passage component of a comprehensive SBW environmental database

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Element 8: Education and Community Outreach

Objectives: Develop a Comprehensive Watershed Education Program

Narrative Description of Element: Education and community outreach has been identified as a high priority by the SBWC. Developing a strong education program is essential to conveying the concept of the "Watershed Approach." This is particularly true in grade school through high school age children. They are very interested in learning and being involved in activities that enforce the information that they have learned. Hands-on outdoor learning is an extremely successful method of teaching. Education about the watershed in which they live will instill ownership in the concepts and processes taking place within their community. Education of youth will also provide a mechanism to bring teachers, parents, students, and the SBWC together in a pro-active environment.

Education Program

To build a strong education program it is necessary to address the issue from a series of fronts. These should include:

- Talking to science and environmental education teachers at local schools;
- Invite teachers, principals, etc. to attend SBWC meetings;
- Attend PTA meetings to let parents know about SBWC and try to gain interest of parents to help students and the SBWC;
- Encourage them to join the SBWC;
- Create a partnership with the schools and involve them in SBWC activities;
- Develop a series of outdoor educational facilities throughout the SBW where students can go for field trips;
- Post SBWC activities on bulletin boards at schools;
- Make presentations to science classes;
- Instruct students how to conduct water quality monitoring in the watershed; and
- Assist schools in developing a watershed curriculum applicable to various age groups

Developing a comprehensive outdoor education program will not only involve the students but is can also be used to attract the parents of students to become involved. This could further extend the outreach and provide the Council with new members that would not have jointed if their children had not been exposed to the importance of a watershed at school.

The SBW has several schools within its boundaries. Efforts should be extended to include students from:

- Rogue River Elementary School
- Rogue River Middle School
- Rogue River High School
- Evans Valley Elementary School (Wimer)
- Sams Valley Elementary
- Patrick Elementary School (Gold Hill)
- Hanby Middle School (Gold Hill)
- Invitations for involvement should also be extended to appropriate departments within Rogue Community College (RCC) and Southern Oregon University (SOU).

Community Outreach

Outreach also needs to be extended to the general community. A strong effort needs to be made to educate the general public about the importance of the "watershed approach" and how it can benefit them to be aware and participate in efforts made by the Council and other stakeholders. This can be accomplished by:

- Hold weekend outdoor meetings for the public and stakeholders that focus on activities being conducted in the watershed.
- Sponsor and present workshops related to specific watershed issues
- Develop strong relationships with local businesses and municipalities
- Encourage participation in watershed functions by local communities
- Efforts need to be made to solicit participation by stakeholders such as Trout Unlimited, Jackson County, National Fish and Wildlife Foundation, etc.

Internship Program

SOU has an environmental studies program that allows students to choose one or more pathways to obtain a degree in environmental studies. The learning pathways are geology, biology, chemistry, and geography. Each year seniors are required to complete a CAPSTONE project as a requirement of graduation. It is often difficult for them to find projects that they can work on in the time frame they have to complete the work (usually 7-10 weeks) in the spring of the year. These students represent a body of educated volunteers who need to complete a project in their chosen field of study. The SBW can serve as an outdoor laboratory where these students can lean how to apply the knowledge they have obtained in school. Such a relationship represents a win-win situation in that the students have an opportunity to work in the field to satisfy their CAPSTONE requirement and the SBWC get volunteers to assist them in completing projects. Geology students from SOU have been working for the past seven years in the South Fork of Little Butte Creek so the university is familiar with the types of projects that need to be completed.

The university identifies several outstanding students each year that can work on a particular project for an extended period (~ one year). This provides the SBWC with an opportunity to identify longer term projects that one or students could focus on. Once again, developing an intern program represents an excellent opportunity for both the students and the SBWC.

Developing an intern program is another way that the SBWC can provide outreach to the community regarding the watershed approach and demonstrate why watersheds are important to everyone.

Table 11
Goal: Develop a Comprehensive Education and Outreach Program

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Education Actions						
Talk with science and environmental education teachers at local schools regarding watershed activities	SBWC, Education Committee	Volunteers, education materials	NA	Educated community	Number of teachers and programs contacted	Ongoing
Invite teachers, principals, etc. to attend SBWC meetings	SBWC, Education Committee	Volunteers, education materials	NA	New partnerships	Number of teachers attending meetings	Ongoing
Encourage individuals and/or schools to join the SBWC	SBWC, Education Committee	Volunteers, education materials	NA	Increased number of SBWC members	Number of new members	Ongoing
Create partnerships with schools and involve them in watershed activities	SBWC, Education Committee	Volunteers, education materials	2K	New partnerships	Number of schools or students involved in programs	Ongoing
Develop a series of outdoor education facilities throughout the SBW where students can go for field trips	SBWC, Education Committee, Jackson County, BLM, ODFW, DEQ, ODF	Volunteers, education materials	10-15K	Outdoor education facilities at various locations within the SBW	Number of facilities constructed, number of people using facilities	Ongoing
Post SBWC activities on bulletin boards at local schools	SBWC, Education Committee	Volunteers, education materials	NA	Increased community outreach	Subjective	Ongoing
Develop and make presentations at local schools	SBWC, Education Committee	Volunteers, education materials	1.5K	Educated community	Number of presentations made	Ongoing

Table 11
Goal: Develop a Comprehensive Education and Outreach Program

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Instruct students to conduct various field measurement techniques (collect water quality samples, macroinvertebrate sampling, tree planting, identification of plant species, etc.)	SBWC, Education Committee, Jackson County, BLM, ODFW, DEQ, ODF, OSU	Volunteers, education materials	5K	Educated community, students that are aware of watershed issues	Number of schools or students involved in programs	Ongoing
Assist schools to develop watershed curriculum applicable to various age groups	SBWC, Education Committee	Volunteers, education materials	7K	Development and implementation of watershed curriculum program (s)	Number of new programs developed	Ongoing
Training of Volunteers	SBWC, Education Committee	Volunteers, education materials	2K	Trained staff of volunteers that can lead in various educational areas	Number of volunteers trained	Ongoing
Develop a strong internship program with local universities and community colleges	SBWC, Education Committee, OSU	Volunteers, education materials, equipment	2K	Educated community, students that are aware of watershed issues, trained and enthusiastic volunteers	Number of students involved in program, number of institutions involved in program	Ongoing
Outreach Actions						
Participate in local community activities	SBWC, Education Committee	Volunteers, education materials	3K	Council awareness	Number of activities attended, number of new members to SBWC	Ongoing
Hold meetings for the public and stakeholders that focus on activities being conducted in the watershed	SBWC, Education Committee	Volunteers, education materials	3K	Council awareness	Number of activities sponsored, number of new members to SBWC	Ongoing
Develop Outdoor Education Opportunities for Stakeholders	SBWC, Education Committee	Volunteers, education materials	2K	Educated stakeholders, Council awareness	Number of opportunities provided, number of attendees	Ongoing
Develop strong relationships with local businesses and municipalities	SBWC, Education Committee	Volunteers, education materials	NA	Educated stakeholders, Council awareness	Number of new business and municipal supporters	Ongoing

Table 11
Goal: Develop a Comprehensive Education and Outreach Program

Action Plan (Steps or Tasks)	Responsible Partners	Resource Needs	Estimated Cost	Product(s)	Evaluation Criteria	Time Line (Begin/End)
Encourage participation in watershed functions by local communities	SBWC, Education Committee	Volunteers, education materials	NA	Educated stakeholders, Council awareness	Number of new participants and/or members	Ongoing
Solicit participation in the watershed by stakeholders such as Trout Unlimited, Jackson County, National Fish and Wildlife Foundation, etc.	SBWC, Education Committee	Volunteers, education materials	NA	Educated stakeholders, Council awareness, development of new partnerships	Number of new partners working in the SBW	Ongoing
Restoration/Enhancement Actions						
Get schools involved in tree and other planting activities	SBWC, Education Committee, Jackson County, BLM, ODFW, DEQ, ODF, OSU	Volunteers, equipment, plants, materials	5K	Completed restoration projects, Council awareness	Number of project completed, number of participants	Ongoing
Develop an adopt a stream program with various schools	SBWC, Education Committee, Jackson County	Volunteers, education materials	2K	Informed and educated volunteers and stakeholders	Number of participants, number of stream miles addressed	Ongoing
Develop a native plant nursery program with local schools	SBWC, OSU, BLM	Volunteers, equipment, plants, materials	7K	Constant source of healthy native plants for restoration projects	Number of plants produced and planted on an annual basis	Ongoing

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ATTACHMENT 1

DATA GAPS AND ACTION PLAN RECOMMENDATIONS FROM THE SEVEN BASINS WATERSHED ASSEEEMENT

DATA GAPS

Chapter 3: Channel Habitat Type Classification

- Channel confinement designations have not been determined.
- Field verification has not been conducted for any CHT classifications.
- Stream size was not incorporated into this analysis due to the unavailability of ODF Stream Classification maps for the SBW.

Chapter 4: Hydrology and Water Uses

- Stream gage information is not available for all streams in the SBW. Historical data exists only for Evans Creek.
- There are no accurate records of the actual number of wells located in the SBW. A detailed well inventory documenting locations is not available.
- No information is available regarding the amount of water used as a result of exempt uses in the watershed. A survey should be conducted to quantify this gap.

Chapter 5: Riparian

- Riparian Conditions Assessment has not been completed for the entire SBW.
- Riparian Conditions Assessment must be mapped.
- Riparian Conditions Assessment must be ground truthed.
- Habitat surveys have only been located for six years (1994-2000). Recent riparian conditions need to be evaluated.
- All streams throughout the watershed need evaluation as conducted by DEQ in the Riparian Condition Assessment of 303(d) listed streams.
- 303(d) streams have not been mapped in relation to riparian condition.
- Riparian condition of 303(d) streams has not been ground truthed.
- Broad community education of importance of riparian areas and effects of land use practices on riparian areas is needed.

Chapter 5 (cont.): Wetlands Assessment

- National Wetlands Inventory Map is not complete.
- Baseline wetland water quality data is not available.

Chapter 6: Impact of Wildfire

- Fuels research.
- Comparison of efficiency of fuels reductions methods within the watershed.
- Community education of the benefits of fuels reductions.
- Affects of fire on soils, erosion potential, and slope stability.
- Inventory of current water chance locations within the SBW.
- Impacts of fire on water quality.
- Understanding of cumulative effect of fire on salmonid habitat.

Chapter 7: Sediment Sources

- No comprehensive field inventory or mapping of recent and historical landslides and severely eroded terrain is available.
- Quantification of landslide and erosion rates for both anthropogenic and natural areas has not been conducted.
- Inventory of roads by type, road density, and distance from riparian areas has not been completed.
- Mapping and evaluation of mine properties located upstream from major barrier structures is insufficient to evaluate impacts on stream sediments and aquatic habitat.
- Geochemical characterization of sediments behind dams that may be impacted by mine tailings has not been conducted.
- Inventory and mapping of streambank erosion has not been completed.

Chapter 8: Channel Modification Assessment

- The exact type and significance of each of the 645 modifications detected from the topographic map inspection is unknown.
- Topographical map inspections for channel modifications are lacking for a portion of the watershed.

- Information concerning channel modifications other than stream crossings and barriers to fish passage is lacking.
- Analysis of aerial photographs and field verification of identified channel modifications has not been conducted.

Chapter 9: Water Quality

- Water quality data are completely lacking for Rogue-Table Rock subwatershed, Evans-May/Sykes subwatershed, and Evans-Rock/Salt subwatershed.
- Limited and/or historical water quality data are available for Evans Creek-Upper subwatershed, Evans Creek-Lower subwatershed, West Fork Evans subwatershed, Pleasant Creek subwatershed, Rogue-Kane/Galls subwatershed, Rogue-Sardine subwatershed, Rogue-Birdseye/Ward subwatershed, and Foots Creek sub watershed.
- Available data sets are random and discontinuous both spatially and temporally.
- Existing data does not represent current water quality conditions in the SBW.

Chapter 10: Fish Assessment

- Random coho spawning surveys have only been conducted for the last two years. This is currently an incomplete data set in that insufficient data are available spatially and temporally to allow trends to be observed.
- Coho and steelhead smolt trapping surveys have only been conducted from 1999-2002, along West Fork Evans Creek. This is not a complete representation of the entire watershed.
- Summer steelhead redds/mile surveys do not encompass enough sample years or streams surveyed to adequately understand the trends in these data.
- Non-native species inventories are lacking for the entire watershed.

ACTION PLAN RECOMMENDATIONS

The Action Plan Recommendations are based on the data gaps present within the SBW. No attempt has been made during this assessment to prioritize the recommendations.

Chapter 3: Channel Habitat Type Classification

- Channel confinement designations should be determined.
- Field verification should be conducted for the channel confinement designations once completed.
- Stream size should be incorporated into this analysis as ODF Stream Classification maps become available for the SBW.
- Highly sensitive and moderately sensitive CHTs should be prioritized for monitoring efforts with regards to LWD, fine sediments, coarse sediments, and peak flows.
- Field verification should be conducted for all CHT classifications.
- A database should be assembled to efficiently manage future data. A GIS component should be used with this database in order to make it fully functional, accessible, and current.

Chapter 4: Hydrology and Water Uses

- Use prediction equations developed by OWRD to estimate peak flows for primary streams in each subwatershed. Develop a data base of subwatershed characteristics needed for calculations.
- Design a stream gauging program and establish gauging stations in each subwatershed. Data can be used to evaluate the peak flow estimates based on prediction equations.
- Develop a plan to establish several weather stations within the SBW. Stations should be located various locations throughout the watershed that have different weather conditions (i.e., upland areas, Sams Valley, etc.) Data could be collected and by volunteers.
- Work with OWRD to develop a data base of wells with emphasis given to location and flow.
- Develop and interactive environmental data base coupled with GIS to document information collected and map spatial data.
- Provide educational information regarding surface water and ground water resources in the SBW.

Chapter 5: Riparian

- Riparian Conditions Assessment should be completed for the entire SBW.

- Riparian Conditions Assessment should be mapped for the entire SBW. By mapping this data in GIS, this component will become fully accessible, functional, and easily updated.
- Riparian Conditions Assessment should be ground truthed. Seven Basins Watershed Council members and community volunteers should conduct ground truthing to increase understanding of riparian processes and effects of land use practices.
- Current riparian conditions need to be evaluated through continued ODFW habitat surveys. The contribution of SBW volunteers will aid in the continuation, regular occurrence, and community understanding of these surveys.
- All streams throughout watershed need evaluation as conducted by DEQ in the Riparian Condition Assessment of 303(d) listed streams. 303(d) streams should be mapped in relation to riparian condition. The use of GIS will make this data fully functional and accessible.
- Riparian condition of 303(d) streams should be ground truthed. SBW volunteers will provide DEQ with extra labor, and provide the Council with an enhanced understanding of agency processes and assessment goals.
- Baseline riparian data should be generated regarding plant and animal species within the SBW that are dependent on riparian areas during specific life cycle stages. SBW volunteers should produce a database and GIS component to make this data functional, accessible, and easy to update.
- Broad community education of the importance of riparian areas and the effects of land use practices on riparian areas is needed. The Seven Basins Watershed Council should provide community education and outreach with regard to basic riparian processes, effects of land use practices, and proactive land use practices which should be used by landowners.

Chapter 5 (cont.): Wetlands Assessment

- Seven Basins Watershed Council volunteers should work with agencies to create a database for baseline wetland water quality. This should be coupled with a GIS mapping component to make this database easy to update and readily accessible.
- Field verification of wetland locations should be conducted by Seven Basins Watershed Council volunteers to enhance understanding of location of wetlands, characteristics of wetlands, and effects of local land use practices.

- Community education regarding wetland functions, processes, characteristics, and effects of land use practices should be provided by the Seven Basins Watershed Council.

Chapter 6: Impact of Wildfire

- Investigate the relation between rainfall intensity and peak water discharge from burned watersheds, a relation that depends on the size of the rainstorm, the size of the burned area and burn severity, and the changes in infiltration capacity of the soil.
- Investigate hillslope and channel erosion and deposition processes after wildfire.
- Evaluate water quality impacts of wildfire and develop post-fire water-quality sampling protocols.
- Development of additional water chance sites.
- Develop an interactive environmental data base of fire information coupled with GIS to allow mapping and tracking of changes in the watershed as a result of fire activity.

Chapter 7: Sediment Sources

- Work with federal and state agencies to develop a program for characterization of sediments behind dams that have a high potential for contamination based on historic mining activity.
- Develop a program to map areas that have a high potential for slope instability. This should include field checking of areas mapped by ODF as having high to moderate potential for debris flows.
- Devise a strategy for mapping roads throughout the watershed and continue to map sediment sources associated with roads. This should include mapping distances from streams and determining widths of buffer zones along stream reaches.
- Develop an approach for quantifying the amount of sediment transport potential and impact to steams from both natural and anthropogenic sources. This should be coupled with sediment evaluations related to wildfire.
- Develop an interactive environmental data base coupled with GIS to document inventory information and map spatial data. All information collected as part of Action Items listed above.

- Provide community education related to the importance of sediment issues. This program should include ways that stakeholders can get involved in the characterization effort.

Chapter 8: Channel Modification Assessment

- The types and significance of the 645 modifications detected from the topographic map inspection should be studied and identified using aerial photographic analysis and field verification.
- Additional topographical map inspection should be completed for the entire watershed. This should be conducted in conjunction with aerial photographic analysis and field verification.
- Information concerning channel modifications other than stream crossings and barriers to fish passage should be obtained using analysis of aerial photographs and field verification.
- Research should be conducted to determine priorities with respect to channel modification mitigation. These issues should be addressed with the cooperation of watershed council volunteers, RBFAT and ODFW.
- All information thus obtained should be assembled into one useful and accessible database. A GIS component should be used with this database to make it fully functional.

Chapter 9: Water Quality

- Seven Basins Watershed Council and community volunteers should be involved in water quality sampling and monitoring within the SBW.
- Develop a comprehensive strategy to address specific water quality monitoring needs to include other watershed assessment components such as sediments, fire, toxics, urbanization and development, riparian areas, wetlands, fisheries, and fish habitat.
- Devise a sampling and analysis plan which takes into account collection, analysis, location, protocol, and frequency. This plan should include a Quality Assurance/Quality Control program to ensure high quality data is collected.
- Seven Basins Watershed Council should coordinate water quality sampling, monitoring, and analysis efforts with state and federal agencies to maximize efficiency and promote broad dissemination of water quality results.
- Develop an interactive environmental data base coupled with GIS to document inventory information and map spatial data.

- Provide community education related to the importance of water quality issues. This program should include ways that stakeholders can get involved in the sampling, monitoring, and analysis.

Chapter 10: Fish Assessment

- Watershed council members and volunteers should work closely with ODFW staff and RBFAT to combine the fish database and barrier database into one useful and accessible database. This should be maintained and updated quarterly. A GIS component should be used with this database to make it fully functional.
- Barrier priorities should be addressed with the cooperation of watershed council volunteers, RBFAT, and ODFW.
- Flow issues in relation to salmonid life cycles needs immediate attention. Monitoring flow throughout this watershed should be a top priority.
- ODFW fish surveys should continue and expand throughout the entire watershed. Use of trained watershed council volunteers will aid in expansion of resources and labor.
- Watershed council and agencies should be instrumental in local education regarding fish life cycles and the effects of barriers, flow issues, and land use effects on fish populations.