WATERSHED HEALTH FACTORS ASSESSMENT

Rogue Basin Coordinating Council

Rogue River Basin,
Jackson, Josephine, and Curry Counties, Oregon.

Rogue Basin Coordinating Council Mission:
The Rogue Basin Coordinating Council helps promote the success of member councils in watershed protection and restoration, encouraging activities that transcend individual watershed boundaries.

Rogue Basin Coordinating Council Vision:
Citizens of the Rogue Basin will enjoy the quality of life they desire because their choices promote a healthy ecosystem for native forms of flora and fauna and promote the productive capacity of the watershed to ensure sustainable economies.

March 31, 2006

Document prepared for the Rogue Basin Coordinating Council
in conjunction with OWEB grant #204-939

Dedication

This document is dedicated to Pamela Jean Galey. Pamela's love of her watershed was reflected in her personal life, her business and in her work as coordinator of the Upper Rogue Watershed Council.

Whispering Pine

Old Pine Tree whispered,
"Brother Wind,
I fear what I see coming.

Your breath is full
Of toxic waste,
And I, deformed, am dying.

What curse have we
Brought to ourselves?
I hear the babies crying."

Old Pine Wind blew
"Fear not the truth,
I see our time here ending.

Our souls move on
By Universal Law,
Each end a new beginning."

by
Pamela Jean Galey
March 22, 1959 – December 24, 2005

Whispering Pine printed with the permission of The Estate of Pamela Jean Galey (see: Galey, 2006).

Acknowledgements

In November 2004 watershed councils of the Rogue Basin were tasked with developing limiting factor priorities for watershed council areas in Southwestern Oregon. Several key individuals were invaluable in the facilitation and completion of this final document. Special thanks are given to John Ward for his leadership of Rogue Basin Coordinating Council through this process. And to Mark Grenbemer and Ken Bierly from OWEB for their valuable feedback to the process, ensuring OWEB requirements were being met. Lastly, included among these is Rose Marie Davis for her volunteer service as project manager and contract officer, as well as her all around efforts to smooth the process, which included nourishing us with goodies.

A heartfelt thank you to the watershed councils of the Rogue Basin and watershed council representatives to the watershed health factors assessment process including Daniel Newberry and Zach Stevenson of the Applegate River Watershed Council; Dana Hicks and Peter Aspinwall of the Lower Rogue Watershed Council; Lu Anthony of the Little Butte Watershed Council; Rose Marie Davis, Jeannine Rossa, Kara King, John Ward, Jim Hill and Beth Franklin of the Bear Creek Watershed Council; Gail Perrotti, Dave Graham and John Nally from Seven Basins Watershed Council, and Pam Galey, Paula Trudeau and Don and Ruth Nelson from the Upper Rogue Watershed Council. Among this distinctive group, an exceptional thank you is given to Brad Carlson of the Middle Rogue Watershed Council and Kevin O'Brien of the Illinois Valley Watershed Council for believing in the project enough to co-chair it from start to finish.

Instrumental to the completion of this process were Jay Doino of the Oregon Department of Fish and Wildlife (ODFW), Randy Frick from the US Forest Service (USFS) and Dale Johnson of the Bureau of Land Management (BLM). They provided valuable oversight, input and direction for the process, of which this final document is a result. Roy Quackenbush, also of the Bureau of Land Management, provided an invaluable service in keeping the restoretherogue.org website updated as the prioritization process proceeded. Leilani Sullivan and Maribeth Mattson at the Oregon Watershed Enhancement Board (OWEB) worked tirelessly to prepare the draft for printing. Local stakeholder, Pat Whitney, provided priceless computer assistance in times of great need. Finally, Jacob Gavin, network administrator extraordinaire, completed work and resolved problems at all hours. Particular thanks goes to each of them.

A very BIG thank you to the contract team consisting of team leader, Tatiana Bredikin, retired ODF&W fisheries biologist, Jerry MacLeod, and retired USFS forest ecologist, Tom Atzet. Time and time again the contract team went above and beyond their call of duty to patiently work with councils and stakeholders to produce a document of watershed health factors both relevant and consistent with the needs and concerns of all interested parties.

Finally, a genuine thank you to every volunteer from all over the Rogue Basin who helped in the creation of this document. Whether providing feedback on a draft, attending one of the council or public review meetings, or lending general oversight, your help is truly appreciated.

Through countless meetings, miles in the car, hours on the telephone, cups of coffee, trips to the copy center, and pages of notes, the Rogue Basin Coordinating Council presents this Watershed Health Factor Assessment of the Rogue Basin and extends a sincere thank you to all those who made it possible.

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Abbreviations

Table 1: Abbreviations

Abbreviation:	Stands for:
ade	adequate
ARWC	Applegate River Watershed Council
Barr	Barriers
BCWC	Bear Creek Watershed Council
BLM	Bureau of Land Management
Chem	Chemistry
Chnl Mod	Channel Modification
Cmplxity or Comp	Stream Complexity
Cover or Cvr	Upland Vegetation Cover
DEQ	Department of Environmental Quality
Devlmnt	Development
FS	Forest Service
Gra or Grav	Gravel
Invasive	Invasive Species
IVWC	Illinois Valley Watershed Council
LBCWC	Little Butte Creek Watershed Council
limit	limiting
LRWC	Lower Rogue Watershed Council
Mod	Channel Modification
mod	moderate
MRWC	Middle Rogue Watershed Council
ODFW	Oregon Department of Fish & Wildlife
OWEB	Oregon Watershed Enhancement Board
P/R or Pl/Rfl	Pool/Riffle Ratio
Quan	Water quantity
Rds	Roads
Rip	Riparian shade
RRP	Regional Restoration Priorities
RVCOG	Rogue Valley Council of Governments
SBWC	Seven Basins Watershed Council
Sed or Sedi	Sediment
Seral	Seral Stage
Shade	Riparian Shade
Temp	Temperature
URWC	Upper Rogue Watershed Council
USFS	United States Forest Service
WC	Watershed Council
WCA	Watershed Council Area
Wd Src, WoodS	Wood Source
WHF	Watershed Health Factor
WHFA	Watershed Health Factor Assessment
Wood, Wd, LgWd	Large wood

Executive Summary

This report identifies factors limiting to watershed health in the Rogue Basin. We describe the degree to which instream factors (water quality, water quantity, instream habitat, barriers, and channel modification), upland factors (hydrologic function, development, roads and invasive species), and riparian factors (shade and wetlands) are functioning in the watershed to produce high quality water and healthy fish populations.

The geographic scope of this report is the eight Watershed Council Areas (WCAs) making up the Rogue Basin. Each watershed council area was represented in the matrix with seven to 13 streams covering an area between approximately 30,000 and 80,000 acres each. Streams were selected from each watershed council area based on their ability to represent other streams within that area and on the availability of data for the streams.

For the purpose of this project, a watershed is defined as the area in which the water from all surface areas drains to one point. The Rogue Basin is a single watershed comprised of many smaller ones. Watershed health is the watershed's ability to produce high quality water and healthy fish populations. A watershed health factor is one element that is a measurable environmental condition or process, the state of which is indicative of the health of the watershed. A limiting factor is an environmental resource or process, in short supply or in a state of dysfunction, which is inhibiting the watershed's health.

Purpose of the project

The purpose of the project was to create a strategic planning document that identifies factors limiting to watershed health in the Rogue Basin. This document will fulfill a legislative mandate to the Oregon Watershed Enhancement Board (OWEB) to establish priorities that will help guide funding decisions.

The intended uses for this document go beyond its initial purpose. The document can, in some instances, be used by Watershed Councils to identify potential restoration projects based on their particular priorities. The document may also be valuable as an educational and outreach tool to Watershed Council members and landowners with potential projects. Lastly the project has been considered a potential broad-scale monitoring tool. With the availability of new data we may be able to evaluate whether we are making progress on the basin as a whole and are improving the health of the watershed.

Background

The OWEB Board received a mandate from the Oregon legislature to establish regional priorities that may be considered in funding decisions by regional review teams and the Board (ORS 541.371(1)(c). OWEB approached the Rogue Basin Coordinating Council (RBCC) regarding developing regional priorities for the Rogue Basin. A meeting was held January 5, 2005 with Ken Bierly, OWEB Deputy Director, Mark Grenbemer, OWEB Regional Representative, and representatives of the South Coast and Rogue Basin watershed councils to discuss the process. From this meeting two guidelines for the process were developed: Priorities should address

watershed functions in a gross scale with the logic behind the priorities apparent and there must be local buy-in.

Under the leadership of co-chairs, these two guidelines were the basis for developing a Scope of Work consisting of eleven tasks that outlined watershed councils' responsibilities. A component of six of the tasks was to secure local feedback on the document at that stage of development.

Character of the Rogue Basin

The Rogue Basin is known for its ecological, economic and social diversity. Residents value its natural beauty, watershed functionality and productive capacity.

The eight Watershed Council Areas (WCA) within the 3,300,000-acre Basin vary from the Lower Rogue WCA, which is mostly wild, to Bear Creek WCA, where a considerable proportion is agricultural and urban. The landscape is mountainous throughout the basin, with small river valleys at the foot of three mountain ranges: the Coast Range, the Siskiyous, and the Cascades. Vegetation varies from coastal wet forests to dry shrub dominated fields. Rainfall varies from approximately 80 inches per year in the Coast Range to approximately 20" per year in the inland valleys. Roughly 60 percent of the Rogue Basin is publicly owned.

Examined from a ridge-top to river-bottom perspective, upland forests now face the overstocking of conifers and woody shrubs from fire suppression and commercial timber harvesting. Additionally road building has led to an increase in in-stream sediment deposition. Livestock and motorized vehicle traffic has resulted in the spread of non-native invasive exotic plant species.

Continuing downslope, agricultural practices in floodplain areas have led to the over allocation of water, increases in water temperature and the input of chemical and biological wastes to streams. Alterations to instream habitat have also resulted from barriers to fish passage (such as diversions dams and ditches), and habitat simplification through channelization and the removal of large wood.

Yet, the Rogue Basin also supports a highly valued asset: one of the most diverse and productive fish populations in the Pacific Northwest. Fish, inexorably linked to healthy streams and surrounding forests, not only add economically to the area, but the condition of their habitat is an indication of how well we are caring for our environment.

Methods

A *Watershed Health Factors Matrix* (WHFM) was used to visually describe the existing condition of the watershed by representative stream and instream, terrestrial, and riparian condition factors as well as some human activities (e.g. roads). The intent was to identify factors limiting to watershed health.

The scope of work included interactive presentations to watershed councils and regular meetings with agency and watershed council representatives thereby creating ongoing feedback loops regarding the process to develop a document that would be responsive to the needs of users.

A list of watershed health factors that would be most useful in identifying the state of watershed health was identified. The instream factors include temperature, chemistry, sediment, water quantity, large wood, gravel, pool/riffle ratio, migration barriers, stream complexity and channel modification. Upland factors include wood source, vegetation cover, seral stage, fire risk, development, roads and invasive species. The riparian factors are composed of shade and wetlands.

The project was designed to be a review of easily accessible data and not to include new research. After review of the available data a conclusion of limiting, moderate, or adequate was drawn regarding the condition of each watershed health factor for each representative stream. Refer to the glossary for definitions of limiting, moderate, adequate. (See: Glossary of Terms, pages 92-96)

Limiting factor priorities were identified within the representative streams and extrapolated to the WCA level. Watershed council and agency representatives met together with the sub-contracted fish biologist and terrestrial ecologist to establish a system for prioritizing the limiting factors. It was decided to prioritize those factors most limiting to watershed health using the science-based data available and not to include additional factors such as socio-economic feasibility. The 17 watershed health factors with data available, when concluded to be "limiting" or "moderate," were prioritized into three tiers. Factors within each tier are relatively equal.

The scale of this analysis applies to the watershed, although streams were used to focus on the limiting factors. This scale of resolution is not applicable for project level work.

Rogue Basin Results

There are several outstanding problems common to all the WCAs in the Basin. Many streams are temperature limited, some because flows are limited. There is a need to increase stream complexity and large wood and to decrease sediment. Aquatic health will experience immediate and dramatic benefits from a number of instream habitat improvement projects. Lack of fire, early seral conditions, and extensive, inadequately located and poorly constructed roads are having a negative impact on streams.

Watershed Council Area Priorities Summary

Table 2: Watershed Council Area's Aquatic Priorities Summary

Watershed Council Area's Aquatic Priorities Summary			
WCA	**Priority One**	**Priority Two**	**Priority Three**
Applegate River	Barriers Large Wood Temperature Sediment Water Quantity	Channel Modification Stream Complexity	Gravel Chemistry Pool/Riffle Ratio
Bear Creek	Channel Modification Chemistry Large Wood Temperature Water Quantity	Barriers Sediment Stream Complexity	Gravel Pool/Riffle Ratio
Illinois Valley	Large Wood Sediment Temperature Water Quantity	Barriers Channel Modification Stream Complexity	Chemistry Pool/Riffle Ratio
Lower Rogue	Temperature Water Quantity	Chemistry Large Wood Sediment Stream Complexity	Channel Modification
Little Butte Creek	Chemistry Sediment Temperature Water Quantity	Channel Modification Large Wood Pool/Riffle Ratio Stream Complexity	Barriers Gravel
Middle Rogue	Temperature Water Quantity	Channel Modification Large Wood Sediment Stream Complexity	Barriers Chemistry Gravel
Seven Basins	Temperature Water Quantity	Channel Modification Large Wood Pool/Riffle Ratio Sediment Stream Complexity	Barriers Chemistry Gravel
Upper Rogue	Barriers Temperature Water Quantity	Channel Modification Large Wood Pool/Riffle Ratio Sediment Stream Complexity	Gravel

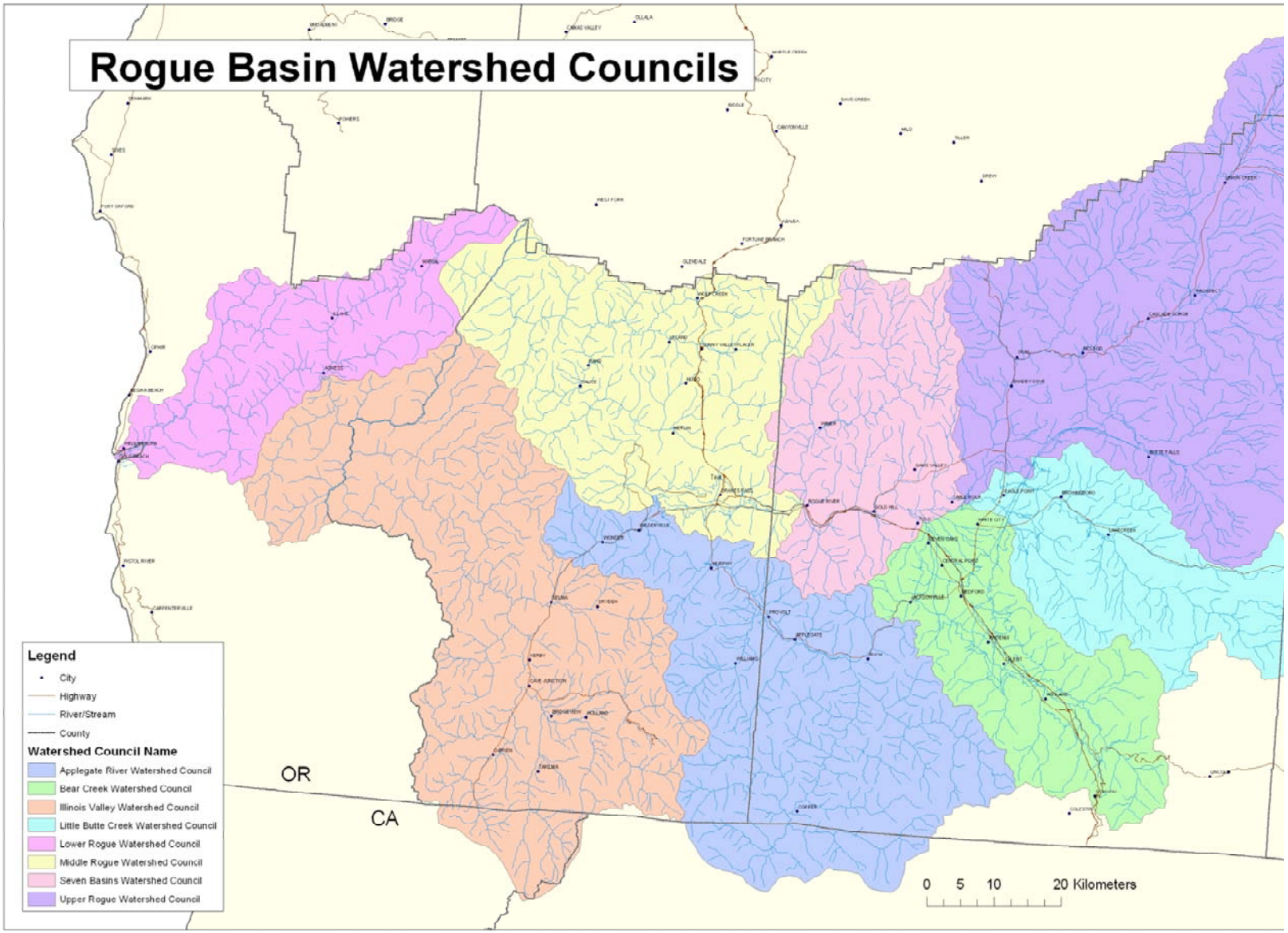
Note: In many of the WCAs, the terrestrial priorities were addressed in the first two tiers, leaving the third priority tier blank. This is a result of the fine line between priorities and in these cases the limiting watershed health factors were top priorities.

Table 3: Watershed Council Area's Terrestrial Priorities Summary

Watershed Council Area's Terrestrial Priorities Summary			
WCA	**Priority One**	**Priority Two**	**Priority Three**
Applegate River	Fire Risk Seral Stage	Riparian Shade Roads	Wood Source
Bear Creek	Development Roads	Riparian Shade Wood Source	Fire Risk Seral Stage
Illinois Valley	Fire Risk Roads Seral Stage	Riparian Shade Wood Source	/
Lower Rogue	Roads Seral Stage	Wood Source	/
Little Butte Creek	Roads Seral Stage	Fire Risk Wood Source	/
Middle Rogue	Fire Risk Roads Seral Stage	Development Wood Source	/
Seven Basins	Fire Risk Roads Seral Stage	Development Wood Source	/
Upper Rogue	Fire Risk Roads Seral Stage	Riparian Shade Wood Source	/

Refer to the *Master Limiting Factors Priorities Table* to view the complete list of representative stream priorities by Watershed Council Area. (See: Appendix E: Master Limiting Factors Priorities Table)

Figure 1: Rogue Basin Watershed Councils Map



Watershed Council Areas Summaries

The following section is arranged according to Watershed Council Area. Each two-page spread provides a summary of information about that area. A map indicating the area boundary and the representative streams that were used in this project follows a brief narrative describing the area.

The *Watershed Health Factors Matrix* lists the representative streams and their conclusion rating for each of the 19 instream, terrestrial and riparian factors evaluated. Definitions for the conclusions were:

Limiting: the watershed health factor is unhealthy and a significant amount of restoration activities are needed to improve watershed conditions.

Moderate: the watershed health factor is less than desired and moderate to significant levels of restoration activities are needed to improve existing conditions.

Adequate: the watershed health factor is functional and minimal restoration activities are needed to maintain existing condition.

"ND" indicates either no data or insufficient data is available at this time.

Following the *Watershed Health Factors Matrix* is the *Limiting Factor Priorities Table* that identifies the top limiting factors in each representative stream. Factors listed within each tier are relatively equal and are not ranked.

Abbreviations for watershed health factors were used to work within the size constraints of the tables. (See: Abbreviations, page 5)

Applegate River Watershed Council Area

The Applegate Watershed Council Area encompasses the entire Applegate River sub-basin. The Applegate River, located on the northeastern flank of the Siskiyou Mountains in southwestern Oregon, is a major tributary of the Rogue River. The 770 square mile drainage is located in Jackson County (53%), Josephine County (35%) and Siskiyou County in California (12%).

The Applegate system has one of the lowest annual precipitation rates and some of the highest summer temperatures west of the Cascades. The lack of summer rainfall and over allocation of water for irrigation usually results in very low summer stream flows.

The Applegate River has significant populations of coho, fall chinook, winter and summer steelhead and resident trout (rainbow and cutthroat). The main stem Applegate is a primary spawning area for fall chinook. Steelhead and coho focus on the 700 miles of tributaries for both spawning and rearing.

Applegate Dam, located at River Mile (RM) 48, blocks all fish passage. However, releases from the dam provide additional summer and fall flows assisting fish movement up to the dam. Murphy Dam, at about RM 10, has a fish ladder to facilitate fish passage. Passage for both adult and juvenile salmonids is impacted by numerous push-up dams on the mainstem and irrigation diversions on a number of tributaries

Low summer flows are detrimental to aquatic life and cause high summer water temperatures. DEQ lists water temperature, flows and water chemistry as limiting in the main stem and many of its tributaries.

Soil disturbance from current and past logging, mining, road construction and development significantly increases the sediment load in the system. The lack of large wood in the stream, caused by channel modifications, reduces stream complexity.

Much of the Applegate Watershed Council Area has been burned recently, leaving part of the watershed in early seral stages with a high fire risk. Natural fires once burned in close sequence with subsequent fires reducing the accumulated fuel load. That is not the case now and the fuel accumulation and associated fire risk is markedly increased.

The system has been extensively surveyed by resource agencies in recent years, providing information used by the active Applegate River Watershed Council to develop an effective array of stream habitat improvement projects.

Figure 2: Applegate River Watershed Council Area Map

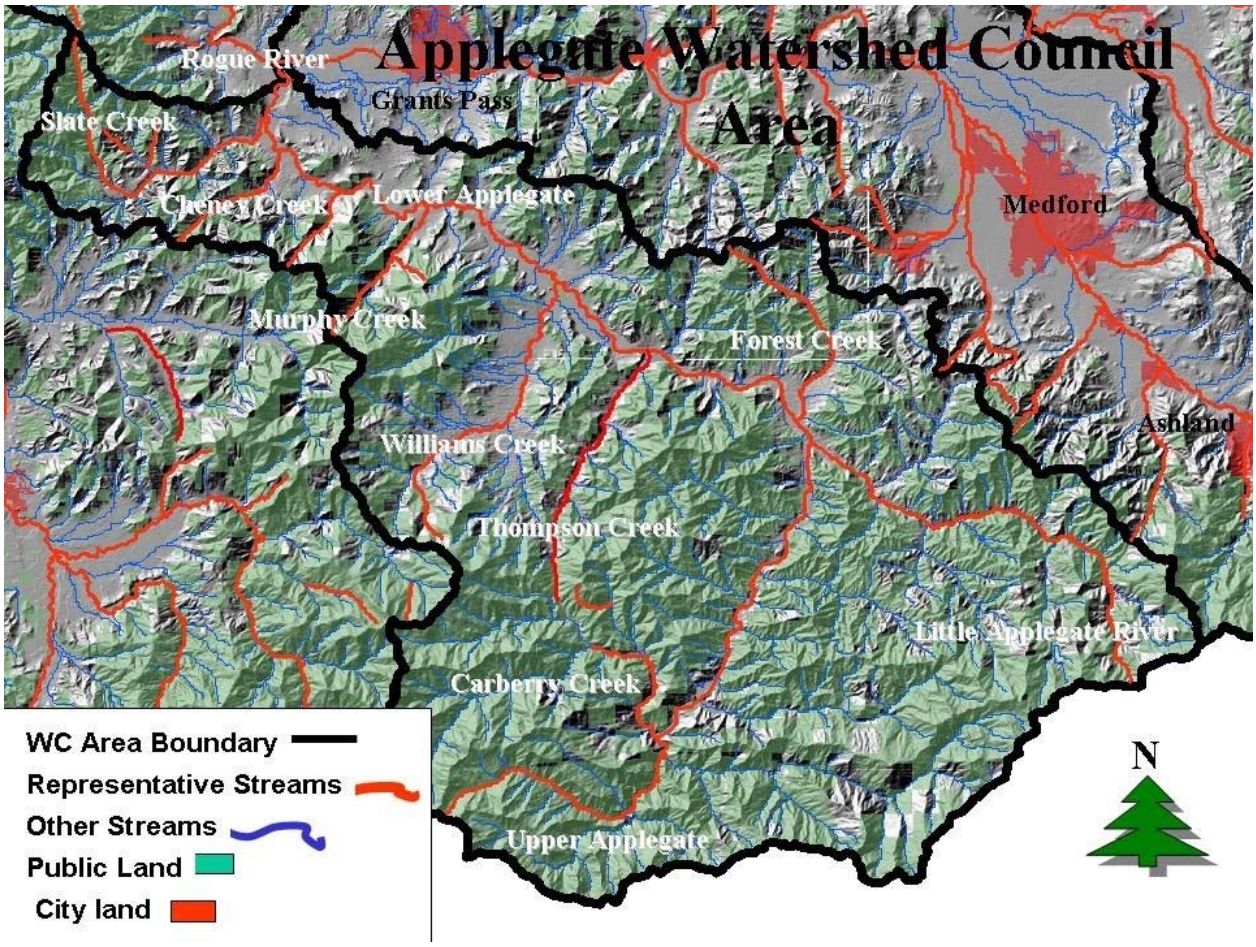


Table 4: Applegate River Watershed Council Area Results

APPLEGATE RIVER WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
Geographic Delination	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Applegate River, Lower	limit	ade	limit	mod	ade	ade	mod	ade	mod	limit
Applegate River, Middle	limit	ade	limit	mod	limit	ade	ade	limit	ade	limit
Applegate River, Upper	limit	ade	ade	mod	limit	ade	ade	mod	limit	limit
Carberry Creek	ade	ade	mod	mod	mod	limit	mod	limit	ade	limit
Cheney Creek	ade	ade	mod	limit	limit	ade	ade	ade	mod	ade
Forest Creek	limit	limit	limit	limit	limit	ade	ade	limit	ade	limit
Little Applegate River	limit	ade	limit	limit	limit	ade	ade	limit	limit	limit
Murphy Creek	mod	ade	ade	limit	limit	ade	ade	limit	mod	limit
Slate Creek	limit	mod	limit	limit	limit	ade	ade	mod	limit	mod
Thompson Creek	limit	limit	mod	limit	limit	ade	ade	limit	mod	limit
Williams Creek	limit	limit	mod	limit	limit	ade	ade	limit	limit	limit

	LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities				
Representative stream	One		Two		Three
Applegate River, Lower	Sediment,Temperature		Channel Modification		Barrier,Pl/RflRat,WtrQuan
Applegate River, Middle	Large Wood,Temperature		StrmComplxty,Sediment,ChnlMod		Water Quantity
Applegate River, Upper	Barriers, Large Wood,Temperature		Channel Modification		StrmComplexity,Wtr Quant
Carberry Creek	Gravel, Sediment		ChlMod,StrmComplxty,WtrQuant		LrgWood,Pool/Rfl Ratio
Cheney Creek	Water Quantity		Large Wood		Barriers,Sediment
Forest Creek	Chem,LWood,WtrQuan,Sedi,Temp		ChannelMod,StrmComplxty		/
Little Applegate River	Barr,LgWood,Quant,Sedi,Temp		Stream Complexity		Channel Modification
Murphy Creek	Water Quantity		ChnlMod,LgWood,StrmComplxty		Temperature,Barriers
Slate Creek	Barriers, LrgWood,Temp,WtrQuant		Sediment		ChnlMod,Chem,StrmComp
Thompson Creek	Chemisrty,WtrQuant,Temperature		ChnlMod,LgWood,StrmComplxty		Barriers,Sediment
Williams Creek	Barriers,Chemisrty,WtrQuant,Temp		ChannelModification,LargeWood		Sediment,StrmComplxty
WCA Summary	**Barr,LgWood,Temp,Sed,WtrQuant**		**ChannelMod,StrmComplxty**		**Chemistry,Gravel,Pool/Rfl**

APPLEGATE RIVER WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)							Riparian		
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Applegate River, Lower	limit	ade	limit	limit	mod	limit	ND	ade	ND	Limiting (limit):
Applegate River, Middle	limit	ade	limit	limit	mod	limit	ND	ade	ND	Watershed health factor is unhealthy
Applegate River, Upper	mod	ade	limit	limit	ade	limit	ND	mod	ND	and a significant amount of restoration
Carberry Creek	limit	ade	limit	limit	ade	limit	ND	ade	ND	activities are needed to improve
Cheney Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	watershed conditions.
Forest Creek	limit	ade	limit	limit	ade	limit	ND	mod	ND	
Little Applegate River	mod	ade	limit	limit	ade	mod	ND	mod	ND	Moderate (mod):
Murphy Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	Watershed health factor is less than
Slate Creek	mod	ade	limit	limit	ade	limit	ND	mod	ND	desired and moderate to significant levels
Thompson Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	of restoration activities are needed
Williams Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	to improve existing conditions.

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One		Two	Three
Applegate River, Lower	Fire Risk, Seral Stage		Riparian Shade, Roads	Wood Source
Applegate River, Middle	Fire Risk, Seral Stage		Riparian Shade, Roads	Wood Source
Applegate River, Upper	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Carberry Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	Wood Source
Cheney Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Forest Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	Wood Source
Little Applegate River	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Murphy Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Slate Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Thompson Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	/
Williams Creek	Fire Risk, Seral Stage		Riparian Shade, Roads	/
WCA Summary	**Fire Risk, Seral Stage**		**Riparian Shade, Roads**	**Wood Source**

Adequate (ade):
Watershed health is functional and minimal restoration activities are needed to maintain existing conditions.

No Data (ND):
Data are either not available or are insufficient at this time.

Factors within each priority (one, two, three) are relatively equal and are listed alphabetically, not rank-ordered.

Bear Creek Watershed Council Area

The Bear Creek Watershed Council Area, approximately 400 square miles located entirely within Jackson County, is composed of Bear, Upton and Whetstone Creek drainages. Whetstone and Upton Creeks drain directly into the Rogue River. Mainstem Bear Creek flows northwesterly for 28.8 miles and enters the Rogue River at RM 127. Upton and Whetstone Creeks drain the White City area, which encompasses the Agate Desert vernal pool ecosystem. The vernal pools support the Threatened vernal pool fairy shrimp, two Endangered plants and a newly discovered "hairy water flea."

Annual rainfall in the Bear Creek watershed averages approximately 20 inches annually, one of the lowest in western Oregon. Thirty-five percent of Bear Creek's flow comes from irrigation storage reservoirs capturing water outside the watershed and piping it in for irrigation. Added to extensive irrigation and domestic use withdrawals, an unnatural flow regime results with the highest flows at the head and reduced flows at the mouth causing extremely high water temperatures in the summer months.

Bear Creek tributaries originate in the Siskiyou and Cascade Mountains. The steep terrain creates erosion and transport of sediment. Historically this energy and sediment was dissipated in oxbow pools, braided channels, wetlands and riparian forest on the valley floor. Extensive channelization for agriculture, transportation and urban growth has eliminated almost all stream complexity and severely compromised instream habitat. Yet, Bear Creek supports a diverse fish community of fall chinook, coho salmon, summer and winter steelhead and resident rainbow trout, along with a number of other species.

Eighty-seven percent of Jackson County's population lives in the Bear Creek watershed, primarily in Ashland, Talent, Phoenix, Medford, Central Point and Jacksonville. Rapid population growth threatens already compromised water quality, water quantity and instream habitat.

Historically about half of the watershed was covered with oak woodland and some shrubland. With settlement, this vegetation has largely disappeared. The wildland urban interface has a high fire risk. Ashland and the US Forest Service have designed and implemented a number of fuel load reduction projects in the watershed.

A number of stream improvement projects in the watershed council area, including riparian planting and removal of fish barriers, have enhanced fish passage and improved water quality, resulting in increased fish populations. Noteworthy among these projects providing fish access to the upper reaches of Bear Creek and its tributaries was the removal of the Jackson Street Dam in Medford.

Figure 3: Bear Creek Watershed Council Area Map

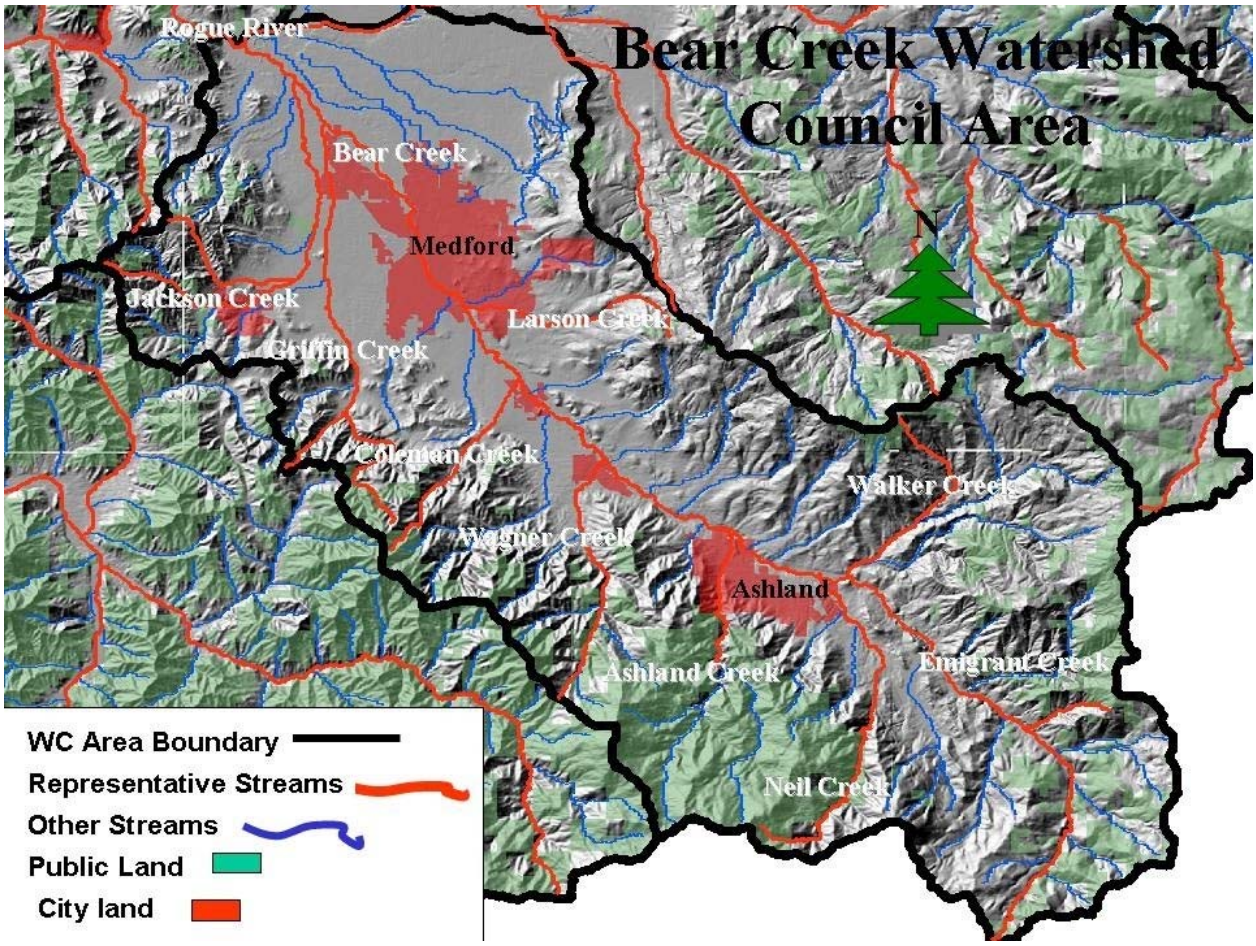


Table 5: Bear Creek Watershed Council Area Results

BEAR CREEK WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality			Instream Habitat						
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Ashland Creek	mod	limit	mod	limit	limit	ade	mod	limit	limit	limit
Bear Creek, Main stem	limit	limit	limit	limit	limit	mod	limit	limit	mod	limit
Coleman Creek	limit	limit	ade	limit	limit	mod	mod	limit	mod	limit
Emigrant Creek, above dam	limit	mod	mod	limit	limit	ade	ade	limit	limit	limit
Emigrant Creek, below dam	limit	limit	ade	limit	limit	limit	ade	limit	ade	limit
Griffin Creek	limit	limit	mod	limit	limit	ade	ade	limit	mod	limit
Jackson Creek	limit	limit	limit	limit	limit	mod	ade	limit	mod	limit
Larson Creek	limit	limit	limit	limit	limit	mod	ade	limit	mod	limit
Neil Creek	limit	mod	mod	limit	limit	ade	ade	ade	mod	ade
Wagner Creek	limit	mod	mod	mod	limit	ade	ade	limit	mod	limit
Walker Creek	limit	mod	limit	limit	limit	ade	ade	limit	ade	limit

	LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities		
Representative stream	One	Two	Three
Ashland Creek	Barriers,Chemistry,Channel Mod,Water Quantity	LargeWood,StreamComplexity	Pl/Rfl,Sediment,Temp
Bear Creek, Main stem	ChnlMod,Chemistry,LgWood,Temp,WaterQuant	Sediment, Stream Complexity	Barriers
Coleman Creek	Chemistry,LgWood,Temperature,WaterQuantity	ChannelModificatn,StreamComplexity	Barrier,Gravel,Pl/Rfl Ratio
Emigrant Creek, above dam	Barriers,LargeWood,Temperature,WaterQuantity	ChannelMod,StreamComplexity	Chemistry,Sediment
Emigrant Creek, below dam	Chem,Gravel,LgWdTemperature,WaterQuantity	ChannelMod,StreamComplexity	/
Griffin Creek	ChnlMod,Chemistry,Temperature,WaterQuantity	Barriers,LgWood,Sedi,StrmComplexity	/
Jackson Creek	Chem,ChnlMod,LgWd,StrmComp,Temp,WtrQuan	Barriers, Sediment	Gravel
Larson Creek	ChannelMod,LargeWood,Temperatr,WtrQuantity	Barriers,Chemistry,Gravl,StrmComplx	/
Neil Creek	Temperature,Water Quantity	Large Wood	Sediment
Wagner Creek	Large Wood,Temperature	Barriers,StreamComplexity	ChMod,Chem,Sed,WQuan
Walker Creek	LargeWood,Sediment,Temperature,WtrQuantity	ChannelMod,StreamComplexity	Chemistry
WCA Summary	**ChnlMod,Chem,LgWood,Tempertr,WtrQuantity**	**Barriers,Sediment,StrmComplexity**	**Gravel, Pool/RiffleRatio**

BEAR CREEK WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)							Riparian		
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Ashland Creek	ade	ade	ade	limit	ade	mod	ND	ade	ND	Limiting (limit):
Bear Creek, Main stem	limit	mod	limit	limit	ade	limit	ND	limit	ND	Watershed health factor is unhealthy
Coleman Creek	limit	ade	limit	limit	limit	limit	ND	mod	ND	and a significant amount of restoration
Emigrant Creek, above dam	limit	mod	limit	limit	ade	limit	ND	mod	ND	activities are needed to improve
Emigrant Creek, below dam	limit	ade	limit	mod	mod	mod	ND	mod	ND	watershed conditions.
Griffin Creek	limit	mod	limit	limit	limit	limit	ND	mod	ND	
Jackson Creek	limit	ade	mod	limit	limit	limit	ND	mod	ND	Moderate (mod):
Larson Creek	limit	mod	limit	limit	limit	limit	ND	mod	ND	Watershed health factor is less than
Neil Creek	ade	ade	limit	limit	mod	mod	ND	ade	ND	desired and moderate to significant levels
Wagner Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	of restoration activities are needed
Walker Creek	limit	ade	mod	limit	ade	mod	ND	mod	ND	to improve existing conditions.

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One	Two	Three
Ashland Creek	FireRisk, Roads		
Bear Creek, Main stem	Development,Roads,WoodSource	Riparian Shade	FireRsk,SeralStg
Coleman Creek	Devlp,Fire,Roads,Seral,WoodSrc	Riparian Shade	
Emigrant Creek, above dam	Devlp,Fire,Seral,Roads,WoodSrc	Riparian Shade	
Emigrant Creek, below dam	Development, Wood Source	Roads	FireRsk,SeralStg
Griffin Creek	Development, Roads, WoodSrc	Riparian Shade	FireRsk,SeralStg
Jackson Creek	Development,Roads,WoodSource	Riparian Shade	FireRsk,SeralStg
Larson Creek	Development,Roads,WoodSource	Riparian Shade	FireRsk,SeralStg
Neil Creek	Developenmt,FireRisk,SeralStage	Roads	
Wagner Creek	Fire Risk, Roads, Seral Stage	Development,WoodSource	
Walker Creek	Seral Stage, Wood Source	Riparian Shade, Roads	
WCA Summary	**Development, Roads**	RiparianShade,WoodSourc	FireRsk,SeralStg

Adequate (ade):
Watershed health is functional and minimal restoration activities are needed to maintain existing conditions.

No Data (ND):
Data are either not available or are insufficient at this time.

Factors within each priority (one, two, three) are relatively equal and are listed alphabetically, not rank-ordered.

Illinois Valley Watershed Council Area

The Illinois Valley Watershed Council Area encompasses the entire Illinois River subbasin. The Illinois River flows into the Rogue River at RM 27 near the town of Agness, approximately 20 miles northeast of Gold Beach. It is a major tributary of the Rogue system and drains all of southwestern Josephine County and a small portion of eastern Curry County. In addition, the headwaters of both the East and West Forks of the Illinois River drain small areas of Del Norte County, California. The total area drained by the Illinois is approximately 982 square miles and makes up about one-fifth of the Rogue Basin system.

Annual precipitation varies widely, ranging from a high of 100 inches in the Lower Illinois River Canyon area to about 35 inches per year in the Cave Junction area.

The upper reaches of the Illinois are steep and rugged but flatten out into an alluvial plain in the Cave Junction area of the watershed. Elevations range from 1,400 feet up to 7,000 feet.

As with most watersheds in the Rogue Basin, stream flows are low in the summer with water supplies not always meeting existing needs. Summer water temperatures are also very high, significantly impacting aquatic life.

The Illinois River hosts substantial runs of coho, fall chinook, winter steelhead, sea-run cutthroat and resident trout. Summer steelhead hold in the cooler waters of the lower Illinois River for a period of time, but do not spawn or rear in the system. The Illinois anadromous fish runs are of particular importance because a significant number of wild coho and winter steelhead spawn in the Illinois.

Former mining and logging practices have significantly impacted many of the major Illinois River tributaries. This has resulted in extensive channel modification and reduction of stream complexity.

The Illinois Watershed Council Area includes significant areas of high fire risk, with some woodland/urban interface, early seral conditions and high road densities that influence water runoff and aquatic functions.

Watershed Council efforts include removing fish passage barriers, establishing functional floodplains, and increasing stream complexity. The Watershed Council also promotes extensive tree planting to improve riparian habitat, stabilize stream banks, reduce erosion and increase stream shading.

Figure 4: Illinois Valley Watershed Council Area Map

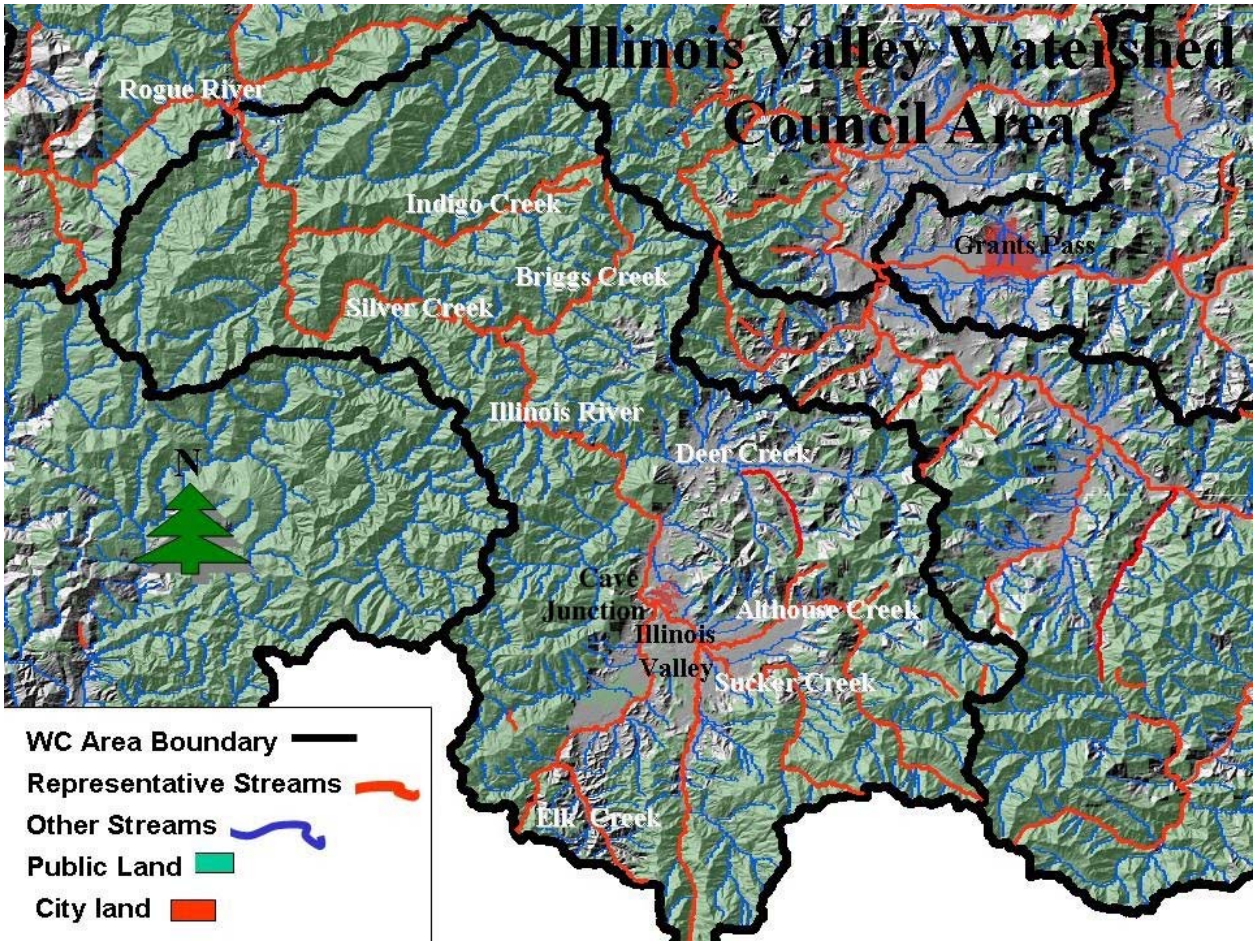


Table 6: Illinois Valley Watershed Council Area Results

ILLINOIS VALLEY WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Althouse Creek	limit	ade	limit	limit	limit	ade	ade	mod	ade	mod
Briggs Creek	limit	ade	limit	limit	ade	ade	ade	ade	ade	mod
Deer Creek	limit	ade	limit	ade	ade	ade	ade	mod	limit	limit
Elk Creek	limit	mod	limit	limit	limit	ade	ade	limit	mod	limit
Illinois River, East Fork	limit	ade	ade	ade	limit	ade	ade	ade	ade	ade
Illinois River, Lower	limit	ade	limit	limit	limit	ade	ade	limit	limit	limit
Illinois River, Upper	limit	mod	limit	limit	limit	ade	mod	ade	limit	limit
Illinois River, West Fork	limit	ade	limit	limit	limit	ade	ade	limit	limit	mod
Indigo Creek	limit	ade	mod	ade	ade	ade	ade	ade	ade	ade
Silver Creek	limit	ade	limit	mod	ade	ade	ade	ade	ade	ade
Sucker Creek	limit	ade	limit	limit	limit	ade	limit	limit	mod	limit

LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities			
Representative Stream	One	Two	Three
Althouse Creek	Sediment, Temperature, Water Quantity	Channel Modification	/
Briggs Creek	Temperature	Barriers,Channel Mod,Sediment	Stream Complexity
Deer Creek	ChnlMod,LgWood,Sedi,Temp,WtrQuan	Chemistry, Stream Complexity	Barriers
Elk Creek	Temperature	Large Wood	/
Illinois River, East Fork	ChnlMod,Sediment,Temperatr,WtrQuan	Large Wood, Stream Complexity	Barriers
Illinois River, Lower	LargeWood,Temperature,WaterQuantity	Sediment, Stream Complexity	Channel Modification
Illinois River, Upper	ChnlMod,LgWood,Sedi,Temp,WtrQuan	Barriers, Chemistry	Pool/Riffle Ratio
Illinois River, West Fork	Sediment, Temperature, Water Quantity	Barriers,StrmComplexity,LgWood	Channel Modification
Indigo Creek	Temperature	Sediment	/
Silver Creek	Temperature	Sediment	Water Quantity
Sucker Creek	ChMod,LgWd,Sed,StComp,Temp,WQuan	Pool/Riffle Ratio	Barriers
WCA Summary	**LgWood,Sed,Temp,WtrQuant**	**Barriers,ChnlMod,StrmComp**	**Chem,Pool/Riffle Ratio**

ILLINOIS VALLEY WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)							Riparian		
Representative Stream										
Althouse Creek	limit	ade	limit	mod	mod	ade	ND	ade	ND	Limiting (limit):
Briggs Creek	mod	ade	limit	mod	mod	limit	ND	ade	ND	Watershed health factor is unhealthy
Deer Creek	mod	ade	limit	limit	ade	mod	ND	ade	ND	and a significant amount of restoration
Elk Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	activities are needed to improve
Illinois River, East Fork	mod	ade	limit	ade	ade	limit	ND	ade	ND	watershed conditions.
Illinois River, Lower	mod	ade	limit	limit	mod	limit	ND	mod	ND	
Illinois River, Upper	ade	ade	limit	ade	ade	limit	ND	mod	ND	Moderate (mod):
Illinois River, West Fork	mod	ade	limit	limit	ade	limit	ND	mod	ND	Watershed health factor is less than
Indigo Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND	desired and moderate to significant levels
Silver Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND	of restoration activities are needed
Sucker Creek	limit	ade	mod	ade	ade	limit	ND	ade	ND	to improve existing conditions.

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One	Two	
Althouse Creek	Fire Risk, Roads, Seral Stage	/	
Briggs Creek	Fire Risk, Roads, Seral Stage	/	
Deer Creek	Fire Risk, Roads, Seral Stage	Wood Source	
Elk Creek	Roads, Seral Stage	/	
Illinois River, East Fork	Fire Risk, Roads, Seral Stage	Riparian Shade, WoodSource	
Illinois River, Lower	Fire Risk, Roads, Seral Stage	/	
Illinois River, Upper	Fire Risk, Roads, Seral Stage	/	
Illinois River, West Fork	Fire Risk, Roads, Seral Stage	Riparian Shade, WoodSource	
Indigo Creek	Roads, Seral Stage	/	
Silver Creek	Roads, Seral Stage	/	
Sucker Creek	Roads, Seral Stage	Wood Source	
WCA Summary	FireRisk,Roads,SeralStage	Riparian Shade, WoodSource	

Adequate (ade):
Watershed health is functional and minimal restoration activities are needed to maintain existing conditions.

No Data (ND):
Data are either not available or are insufficient at this time.

Factors within each priority (one, two, three) are relatively equal and are listed alphabetically, not rank-ordered.

Little Butte Creek Watershed Council Area

The Little Butte Creek Watershed Area includes the entire Little Butte Creek system. Little Butte Creek enters the Rogue River from the east at River Mile (RM) 132 near the community of Eagle Point. It flows from its headwaters in the Cascade Mountains 43 miles until it meets the Rogue River. The Basin consists of roughly 374 square miles located entirely in Jackson County. Elevations range from 1,200 feet above sea level where Little Butte Creek enters the Rogue to 7,311 feet at Little Butte Creek's origin.

Rainfall levels, as well as water withdrawal for irrigation and lack of shade along certain reaches, influence the stream flow and water temperature, which are critical to aquatic life. Precipitation varies from an average of 19 inches annually around Eagle Point to over 50 inches in higher elevation areas and includes a pattern of wet winters and dry summers. Consequently, low flows and high water temperatures are common in the summer.

The basin has a history of water shortages. The North Fork of Little Butte Creek flows from Fish Lake, which is a natural lake enhanced by a dam. Fish Lake receives most of its water from the Klamath Basin. The water is then diverted to the Rogue system for irrigation. Four irrigation districts operate in the watershed, resulting in heavy withdrawals. Over 12,000 acre-feet of water from Little Butte Creek are diverted through canal systems for major irrigation developments elsewhere in the Rogue Valley.

Fall chinook salmon, coho salmon, and winter and summer steelhead use the Little Butte system for spawning and rearing. Resident cutthroat, brook and rainbow trout are also present in good numbers. Little Butte Creek contributes significantly to the fishery resource of the Rogue River.

Water temperature and flow, sedimentation, chemistry and the lack of instream habitat, such as lack of pools and cool water refuges, limit aquatic life in the system. Logging, road construction, rural development, and agricultural activities contribute to the instream impacts. Early seral vegetation limits wood delivery to the streams and roads adversely affect watershed function.

As the fastest growing community in Jackson County, the Little Butte Creek Watershed Council Area is beginning to have the urban interface problems of Bear Creek and Applegate basins. Considering the dynamic proportion of the changes, thoughtful planning for the growth to include a prevention strategy could mitigate potentially harmful effects.

Figure 5: Little Butte Creek Watershed Council Area Map

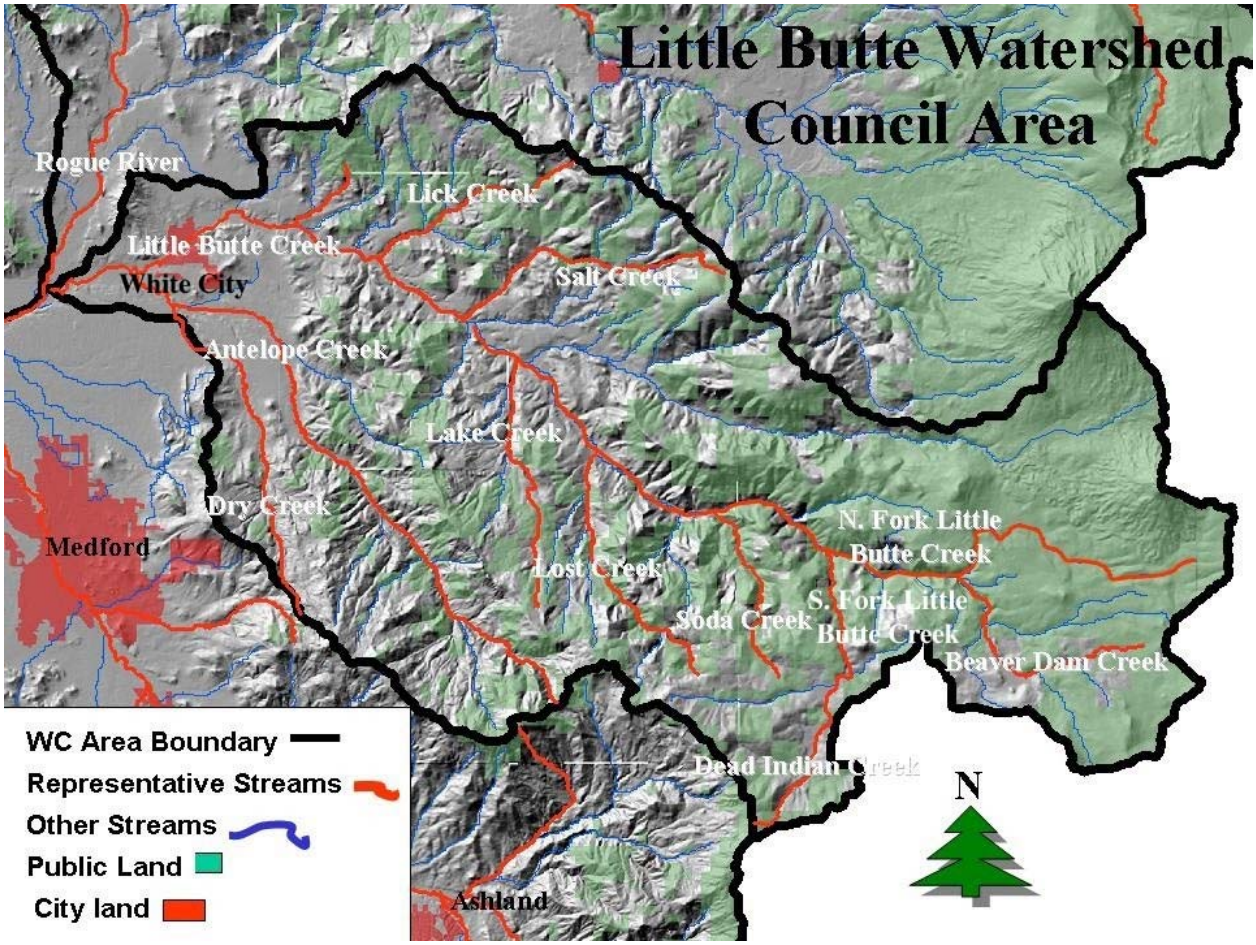


Table 7: Little Butte Creek Watershed Council Area Results

LITTLE BUTTE CREEK WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Antelope Creek	limit	limit	limit	limit	limit	limit	limit	limit	limit	limit
Beaver Dam Creek	ade	ade	ade	mod	ade	ade	ade	ade	ade	ade
Dead Indian Creek	limit	ade	ade	limit	limit	ade	limit	ade	ade	mod
Dry Creek	limit	ade	ade	limit	limit	limit	limit	limit	ade	limit
Lake Creek	limit	limit	limit	limit	limit	ade	limit	ade	ade	mod
Lick Creek	mod	limit	ade	limit	limit	ade	limit	ade	ade	ade
Little Butte Creek, Main stem	limit	limit	limit	limit	limit	mod	limit	limit	limit	limit
Little Butte Creek, North Fork	limit	limit	ade	limit	limit	ade	limit	limit	limit	limit
Little Butte Creek, South Fork	limit	ade	limit	limit	limit	ade	ade	limit	limit	ade
Little Butte Creek, Upper South Fork	ade	ade	ade	mod	mod	ade	ade	ade	ade	ade
Lost Creek	limit	ade	limit	limit	mod	ade	limit	ade	mod	ade
Salt Creek	mod	limit	ade	limit	mod	ade	mod	ade	limit	ade
Soda Creek	limit	ade	limit	mod	limit	ade	limit	ade	mod	ade

LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities			
Representative stream	One	Two	Three
Antelope Creek	Chemistry,Lg Wood,Temperature,Water Quantity	Bar,ChMod,Sed,StComp,Pl/Rfl	Gravel
Beaver Dam Creek	Water Quantity	/	/
Dead Indian Creek	LgWood,Pl/Rfl Ratio,Temperature,Water Quantity	Channel Modification	/
Dry Creek	Gravel,Large Wood,Temperature,Water Quantity	Stream Complexity	Channel Mod,Pool/Riffle Ratio
Lake Creek	Chemistry,Sediment,Temperature,WaterQuanity	Large Wood,Pool/Riffle Ratio	Channel Modification
Lick Creek	Chemistry, Water Quantity	Large Wood,Temperature	Pool/Riffle Ratio
Little Butte Creek, Main stem	Chemistry,LgWood,Sediment,Temp,WtrQuantity	ChnlMod,StrmComp,Pl/RflRatio	Barriers, Gravel
Little Butte Creek, North Fork	Chemistry,LgWood,Temperature,WaterQuantity	Barriers,ChnlMod,StrmComplx	Pool/Riffle Ratio
Little Butte Creek, South Fork	Sediment, Temperature, Water Quantity	LargeWood,StrmComplexity	Barriers
Little Butte Creek, Upper South Fork	Water Quantity	Large Wood	/
Lost Creek	Sediment, Temperature, Water Quantity	Pool/Riffle Ratio	Barriers, Large Wood
Salt Creek	Chemistry, Water Quantity	Barriers,Temperature	Large Wood, Pool/Riffle Ratio
Soda Creek	Sediment, Temperature	Large Wood,Pool/Riffle Ratio	Barriers, Water Quantity
WCA Summary	**Chemistry,Sediment, Temperature,WtrQuantity**	**ChMod,LgWd,StrComp,Pl/Rfl**	**Barriers, Gravel**

LITTLE BUTTE CREEK WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)						Riparian			
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Antelope Creek	limit	ade	mod	limit	limit	mod	ND	limit	ND	Limiting (limit):
Beaver Dam Creek	ade	ade	limit	ade	ade	limit	ND	ade	ND	Watershed health factor is unhealthy
Dead Indian Creek	ade	ade	limit	mod	ade	limit	ND	ade	ND	and a significant amount of restoration
Dry Creek	_	_	mod	limit	limit	mod	ND	limit	ND	activities are needed to improve
Lake Creek	limit	ade	limit	limit	ade	limit	ND	mod	ND	watershed conditions.
Lick Creek	mod	ade	limit	limit	ade	mod	ND	mod	ND	
Little Butte Creek, Main stem	limit	ade	mod	limit	mod	limit	ND	mod	ND	Moderate (mod):
Little Butte Creek, North Fork	mod	ade	limit	mod	mod	limit	ND	ade	ND	Watershed health factor is less than
Little Butte Creek, South Fork	limit	ade	limit	limit	ade	limit	ND	ade	ND	desired and moderate to significant levels
Little Butte Creek, Upper South Fork	ade	mod	ade	ade	ade	limit	ND	ade	ND	of restoration activities are needed
Lost Creek	limit	ade	limit	mod	ade	limit	ND	ade	ND	to improve existing conditions.
Salt Creek	limit	ade	mod	limit	ade	limit	ND	ade	ND	
Soda Creek	_	_	limit	mod	ade	limit	ND	ade	ND	Adequate (ade):
										Watershed health is functional and

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

	One		Two		Three	
						No Data (ND):
Antelope Creek	FireRisk,RiparianShade,WoodSrc		Roads, Seral Stage		Development	Data are either not available
Beaver Dam Creek	Roads, Seral Stage		Fire Risk		/	or are insufficient at this time.
Dead Indian Creek	Roads, Seral Stage		Fire Risk		/	
Dry Creek	Fire Risk, Riparian Shade		Roads, Seral Stage		Development	
Lake Creek	Fire Risk,Roads,Seral Stage		Wood Source		/	
Lick Creek	Fire Risk, Seral Stage		Roads, Seral Stage		Wood Source	
Little Butte Creek, Main stem	Fire Risk,Roads,Wood Source		/		/	
Little Butte Creek, North Fork	Roads, Seral Stage		FireRisk, WoodSource		/	
Little Butte Creek, South Fork	Fire Risk,Roads,Seral Stage		Wood Source		/	
Little Butte Creek, Upper South Fork	Roads		/		/	
Lost Creek	Roads, Seral Stage		FireRisk, WoodSource		/	Factors within each priority
Salt Creek	Fire Risk,Roads,Wood Source		Seral Stage		/	(one, two, three) are relatively equal and
Soda Creek	Roads, Seral Stage		FireRisk, WoodSource		/	are listed alphabetically, not rank-ordered.
WCA Summary	**Roads, Seral Stage**		**FireRisk, WoodSource**		***/***	

Lower Rogue Watershed Council Area

The Lower Rogue Watershed Area includes all of the Lower Rogue River and its tributaries downstream from RM 55. The Lower Rogue Watershed Council also recognizes the Illinois River and its tributaries below RM 6.6 as part of its project area. The area is noted for steep, rugged terrain, narrow winding valleys and sharp divides. Most of the region is subject to considerable soil instability. The Lower Rogue Basin drains about 530 square miles.

Land use is primarily forestry related. The only communities in the Watershed Area are the tiny hamlet of Agness at the mouth of the Illinois River and the town of Gold Beach at the mouth of the Rogue.

The climate of the Lower Rogue Basin is mild because of its proximity to the Pacific Ocean. Heavy rains and strong winds are common during the winter months. Rainfall ranges from 80-120 inches per year. Summers are relatively dry.

Stream flows in the main stem Rogue are augmented during the dryer portions of the year by releases from Lost Creek and Applegate dams. The additional flows do not, however, alleviate the higher than desired water temperatures which have occasionally resulted in large losses of spring chinook salmon by temperature enhanced diseases. Temperature and flow are also a problem in the tributaries but not in the magnitude experienced in other parts of the Rogue Basin.

The Lower Rogue mainstem is basically a conduit for the substantial runs of summer and winter steelhead, fall and spring chinook and sea-run cutthroat moving through the Rogue system. From approximately1970 - 1990, very little fall chinook spawning was observed in the lower Rogue mainstem, possibly due to relatively low runs and in part to the flow regime in the river. In the last two years, however, surveyors have recorded record spawning count numbers in the area between Lobster Creek and Illahe.

The estuary provides a nursery and transition area for juvenile salmonids as they prepare to enter the ocean. The Rogue River drainage is the second largest in Oregon, yet, due to the geology, the estuary is one of the smallest. The quality of the estuary is impacted by fill (jetties, marina, riprap) near the mouth, commercial and residential development, and substrate removal for gravel and boat passage.

Most of the tributaries in the watershed area offer some of the best spawning and rearing areas for both salmon and steelhead. Several streams are in relatively pristine condition. The unstable soils cause sedimentation problems and the high, flashy, winter flows limit the amount of large wood able to remain in the stream as habitat.

The Lower Rogue averages over 80 percent upland vegetation cover, but the trees are relatively small (early seral condition) and the disruptive influence of roads is significant. Debris flows associated with road failures can deliver unneeded sediment to stream channels.

Figure 6: Lower Rogue Watershed Council Area Map

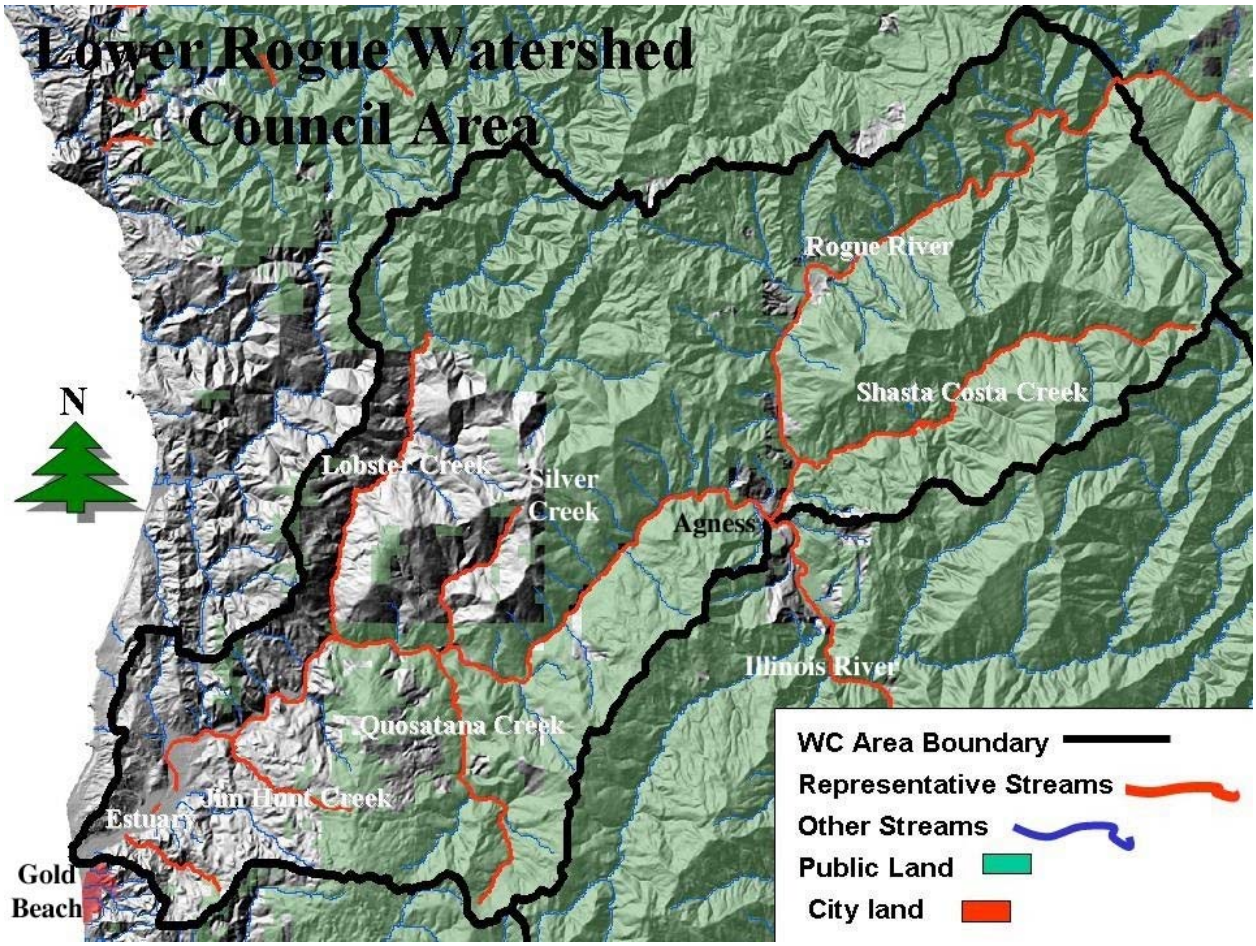


Table 8: Lower Rogue Watershed Council Area Results

LOWER ROGUE WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Estuary	ade	mod	ade	ade	ade	ade	ade	ade	ade	limit
Jim Hunt Creek	limit	ade	mod	limit	limit	ade	ade	ade	ade	ade
Lobster Creek	limit	ade	limit	limit	mod	ade	ade	ade	ade	ade
Quosatana Creek	limit	ade	mod	ade	mod	ade	ade	ade	ade	ade
Rogue River, below Illinois	limit	mod	mod	mod	limit	ade	ade	limit	ade	mod
Rogue River, Illinois - Grave Creek	limit	ade	mod	limit	mod	ade	ade	ade	ade	mod
Shasta Costa Creek	limit	ade	mod	ade	mod	ade	ade	ade	ade	ade
Silver Creek	ade	ade	ade	mod	ade	ade	ade	ade	ade	ade

LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities			
Representative stream	One	Two	Three
Estuary	Channel Modification	Chemistry	/
Jim Hunt Creek	Temperature, Water Quanity	Large Wood, Sediment	/
Lobster Creek	Temperature, Water Quanity	Sediment	Large Wood
Quosatana Creek	Temperature	Sediment	Large Wood
Rogue River, below Illinois	Temp,LargeWood,StrmComplx	Chemistry, Water Quantity	Channel Mod, Sediment
Rogue Rvr, Illinois-Grave Creek	Temperature, Water Quanity	Large Wood	Channel Mod, Sediment
Shasta Costa Creek	Temperature	Large Wood	Sediment
Silver Creek	Water Quantity	/	/
WCA Summary	**Temperature, Water Quanity**	**Chem,LgWood,Sedi,StrComp**	**Channel Modification**

LOWER ROGUE WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)						Riparian			
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
										Limiting (limit):
Estuary	limit	limit	limit	ade	mod	limit	ND	limit	ND	Watershed health factor is unhealthy
Jim Hunt Creek	limit	ade	mod	ade	ade	limit	ND	mod	ND	and a significant amount of restoration
Lobster Creek	limit	ade	mod	ade	ade	limit	ND	ade	ND	activities are needed to improve
Quosatana Creek	limit	ade	limit	ade	ade	limit	ND	ade	ND	watershed conditions.
Rogue River, below Illinois	mod	ade	limit	ade	ade	limit	ND	ade	ND	
Rogue River, Illinois - Grave Cree	mod	ade	limit	limit	ade	limit	ND	limit	ND	Moderate (mod):
Shasta Costa Creek	mod	ade	limit	ade	ade	mod	ND	ade	ND	Watershed health factor is less than
Silver Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND	desired and moderate to significant level
										of restoration activities are needed

LIMITING FACTORS PRIORITIES TABLE
Terrestrial Priorities

Representative Stream	One		Two	Three	
					Adequate (ade):
Estuary	RipShade,Roads,SeralStg		Wood Source	Development	Watershed health is functional and minimal restoration activities are needed
Jim Hunt Creek	Roads		FireRisk,Roads,SeralStg		to maintain existing conditions.
Lobster Creek	Roads, Wood Source		FireRisk,Roads,SeralStg		
Quosatana Creek	Roads, Seral Stage		Wood Source	Wood Source	No Data (ND):
Rogue River, below Illinois	Roads, Seral Stage		Wood Source		Data are either not available
Rogue River, Illinois - Grave Cree	FireRisk,Roads,SeralStage		Riparian Shade	Wood Source	
Shasta Costa Creek	Seral Stage		Roads, Wood Source		Factors within each priority
Silver Creek	Seral Stage				(one, two, three) are relatively equal and
WCA Summary	Roads, Seral Stage		Wood Source		are listed alphabetically, not rank-ordered

Middle Rogue Watershed Council Area

The Middle Rogue Watershed Area includes the main stem of the Rogue River from the Josephine County line (RM 55) upstream to the mouth of Evans Creek (RM 110) and all the tributaries in between. Almost all of the 660 square mile watershed area is in Josephine County.

The watershed area is made up of five sub-watersheds: Wild and Scenic, Grave, Jumpoff Joe, Galice and Grants Pass. Each sub-watershed is different from the others in ownership patterns, stream conditions and topography

Residential developments line both sides of the Rogue River in this watershed area and the city of Grants Pass is growing rapidly along with the communities of Hugo, Merlin, Galice, Shan Creek, Leland, Wolf Creek and Sunny Valley.

This increasing development generates concerns about the impact on the extensive spawning and rearing habitat available for anadromous fish in this area.

Stream flows and, to some extent, water temperatures are regulated by releases from both Lost Creek and Applegate Dams.

This Watershed Area is used extensively for spawning by fall chinook. Spring chinook pass through the area and primarily spawn further upstream. Both summer and winter steelhead, along with coho, utilize the tributaries for both spawning and rearing. The Grave Creek system, entering the Rogue from the north, is one of the larger tributaries and is an important fish stream. Extensive irrigation withdrawals in this system create flow and temperature problems.

Savage Rapids Dam at RM 106 is laddered but is considered a major fish passage problem. This irrigation dam is scheduled to be removed and replaced with pumps in 2009.

The Middle Rogue Watershed Area naturally experiences frequent fires but modern fire suppression programs have significantly affected that pattern. There is a considerable amount of woodland/urban interface where both land values and fire risk is high. Large wood delivery to streams is minimal since most stands do not have large diameter trees.

Figure 7: Middle Rogue Watershed Council Area Map

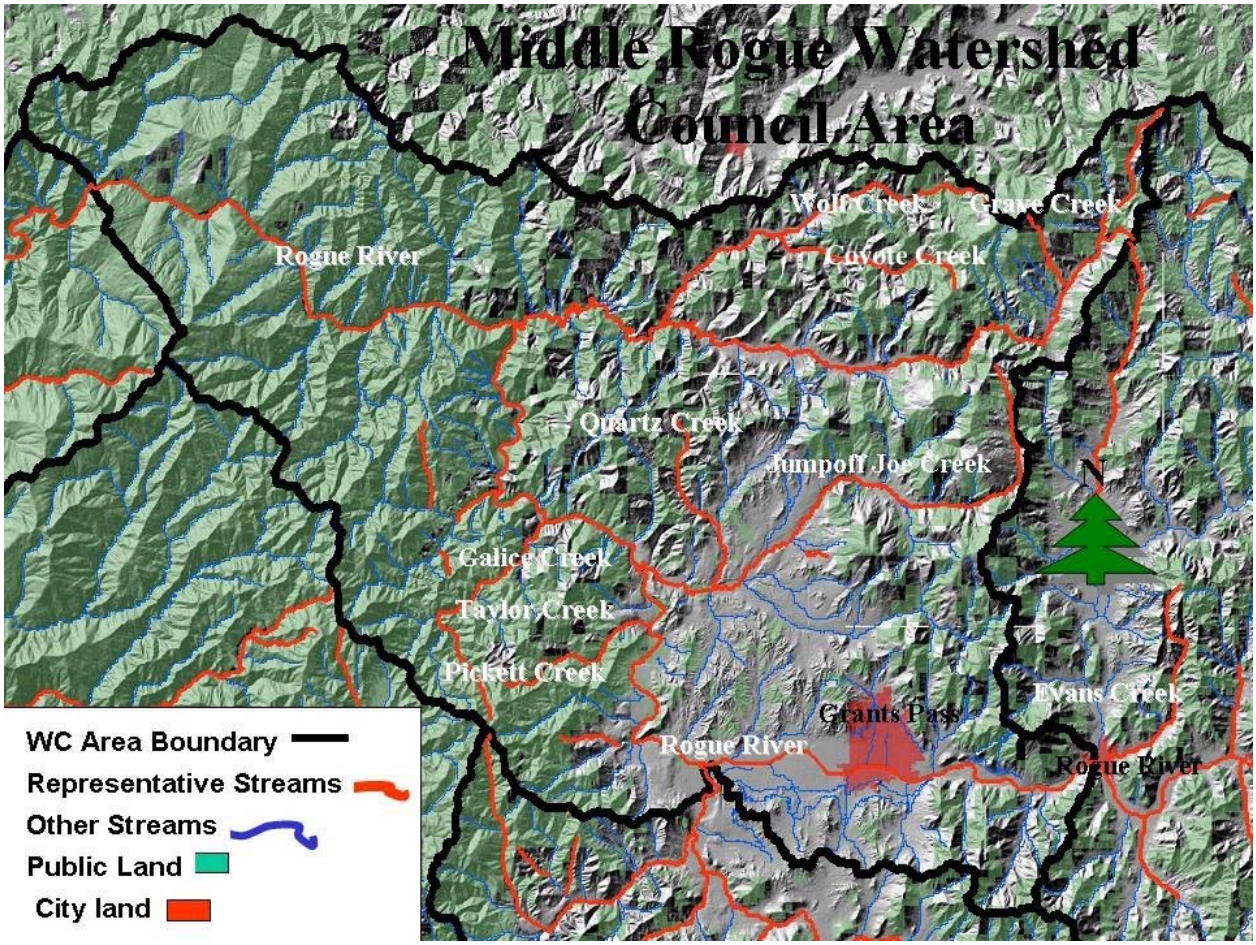


Table 9: Middle Rogue Watershed Council Area Results

MIDDLE ROGUE WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Coyote Creek	limit	ade	limit	limit	limit	ade	ade	mod	ade	limit
Galice Creek	limit	ade	limit	limit	limit	ade	ade	limit	mod	limit
Grave Creek	limit	ade	limit	limit	limit	ade	ade	limit	ade	limit
Jumpoff Joe Creek	limit	ade	limit	limit	limit	mod	ade	ade	limit	limit
Pickett Creek	limit	ade	mod	limit	limit	ade	ade	ade	mod	limit
Quartz Creek	limit	ade	ade	mod	limit	ade	ade	mod	ade	mod
RogueRiver,JosCoLine-EvansCrk	limit	mod	mod	mod	limit	ade	ade	limit	limit	limit
Taylor Creek	limit	ade	ade	limit	limit	ade	ade	ade	ade	ade
Wolf Creek	limit	ade	limit	limit	limit	ade	ade	mod	mod	limit

	LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities		
Representative stream	One	Two	Three
Coyote Creek	Temperture	ChnlMod,LargeWood,Sediment,WtrQuantity	Barriers, Strm Complexity
Galice Creek	Temperature,Water Quantity	ChnlMod,StrmComp,LgWood,Sedi	Barriers
Grave Creek	Sediment,Temperature,Wtr Quantity	Channel Modification, Large Wood	StreamComplexity
Jumpoff Joe Creek	Barriers,LgWood,Temperatr,WtrQuant	Channel Modification,Sediment	Gravel
Pickett Creek	ChnlMod,Temperature,WaterQuantity	Large Wood	Barriers, Sediment
Quartz Creek	Large Wood, Temperature	Channel Modification,Water Quantity	StreamComplexity
RogueRiver,JosCoLine-EvansCrk	Barriers,Chemistry,ChnlMod,Temprtr	Large Wood,Sediment,Stream Complexity	Water Quantity
Taylor Creek	Temperature, Water Quantity	Large Wood	
Wolf Creek	ChnlMod,Temperature,WaterQuantity	Large Wood, Sediment	Barriers,StrmComplexity
WCA Summary	Temperature, Water Quantity	**ChnlMod,LrgWood,Sediment,StrmComplexity**	Barriers,Chemistry,Gravel

MIDDLE ROGUE WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)						Riparian			
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Coyote Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	Limiting (limit):
Galice Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	Watershed health factor is unhealthy
Grave Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	and a significant amount of restoration
Jumpoff Joe Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	activities are needed to improve
Pickett Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	watershed conditions.
Quartz Creek	mod	ade	limit	limit	ade	mod	ND	ade	ND	
RogueRiver,JosCoLine-EvansCrk	mod	ade	limit	limit	mod	limit	ND	ade	ND	Moderate (mod):
Taylor Creek	mod	ade	limit	mod	ade	mod	ND	ade	ND	Watershed health factor is less than
Wolf Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	desired and moderate to significant levels
										of restoration activities are needed

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One	Two	
Coyote Creek	FireRisk,Roads,SeralStage	Wood Source	
Galice Creek	FireRisk,Roads,SeralStage	Wood Source	
Grave Creek	FireRisk,Roads,SeralStage	Wood Source	
Jumpoff Joe Creek	FireRisk,Roads,SeralStage	Development,WoodSource	
Pickett Creek	FireRisk,Roads,SeralStage	Wood Source	
Quartz Creek	FireRisk,Roads,SeralStage	Wood Source	
RogueRiver,JosCoLine-EvansCrk	FireRisk,Roads,SeralStage	Development,WoodSource	
Taylor Creek	FireRisk,Roads,SeralStage	Wood Source	
Wolf Creek	FireRisk,Roads,SeralStage	Wood Source	
WCA Summary	**FireRisk,Roads,SeralStage**	**Develpmt,WoodSrc**	

to improve existing conditions.

Adequate (ade):
Watershed health is functional and
minimal restoration activities are needed
to maintain existing conditions.

No Data (ND):
Data are either not available
or are insufficient at this time.

Factors within each priority
(one, two, three) are relatively equal and
are listed alphabetically, not rank-ordered.

Seven Basins Watershed Council Area

The Seven Basins Watershed Area does not include any of the mainstem Rogue River but encompasses all of the Rogue tributaries between RM 110 near the City of Rogue River and RM 135 below the City of Shady Cove. The 405 square mile watershed area is split between Jackson and Josephine Counties and is dominated by two large valleys: the Evans Creek Valley and Sams Valley.

Elevations range from 1,000 to approximately 4,000 feet above sea level with steep slopes covered with heavy vegetation.

The miles of road per square mile is one of the highest in the Rogue River Basin and fire risk is very high. However, riparian cover is surprisingly good.

Numerous vernal pools that exist in the Sams Valley and Table Rocks areas contain the Threatened vernal pool fairy shrimp and two species of Endangered plants.

Low summer rainfall, high temperatures and extensive irrigation withdrawals cause many of the small tributaries in this area to dry up in the summer. These streams are still used extensively by summer steelhead for spawning. After hatching, the juvenile steelhead migrate to the mainstem Rogue before the tributaries dry up. In some streams water withdrawals can dry the stream up before the juvenile steelhead have had a chance to reach larger tributaries or the main stem Rogue River, resulting in stranding and ultimately significant losses.

Late run summer steelhead spawning is highest in the small tributaries of the Rogue between river miles 111 and 123. This subbasin is essentially the “breadbasket” for late run summer steelhead in the Rogue, and will be a top priority for restoration efforts in the future.

Evans Creek provides spawning habitat to a few fall chinook and both spawning and rearing habitat to coho and summer and winter steelhead. The lower and middle reaches of this system are in agricultural use with the upper reaches managed for forest activity. Consequently, water withdrawals for irrigation are extensive. The low stream flows also result in high summer water temperatures. Mining, road construction and channelization has limited stream complexity and instream habitat.

Figure 8: Seven Basins Watershed Council Area Map

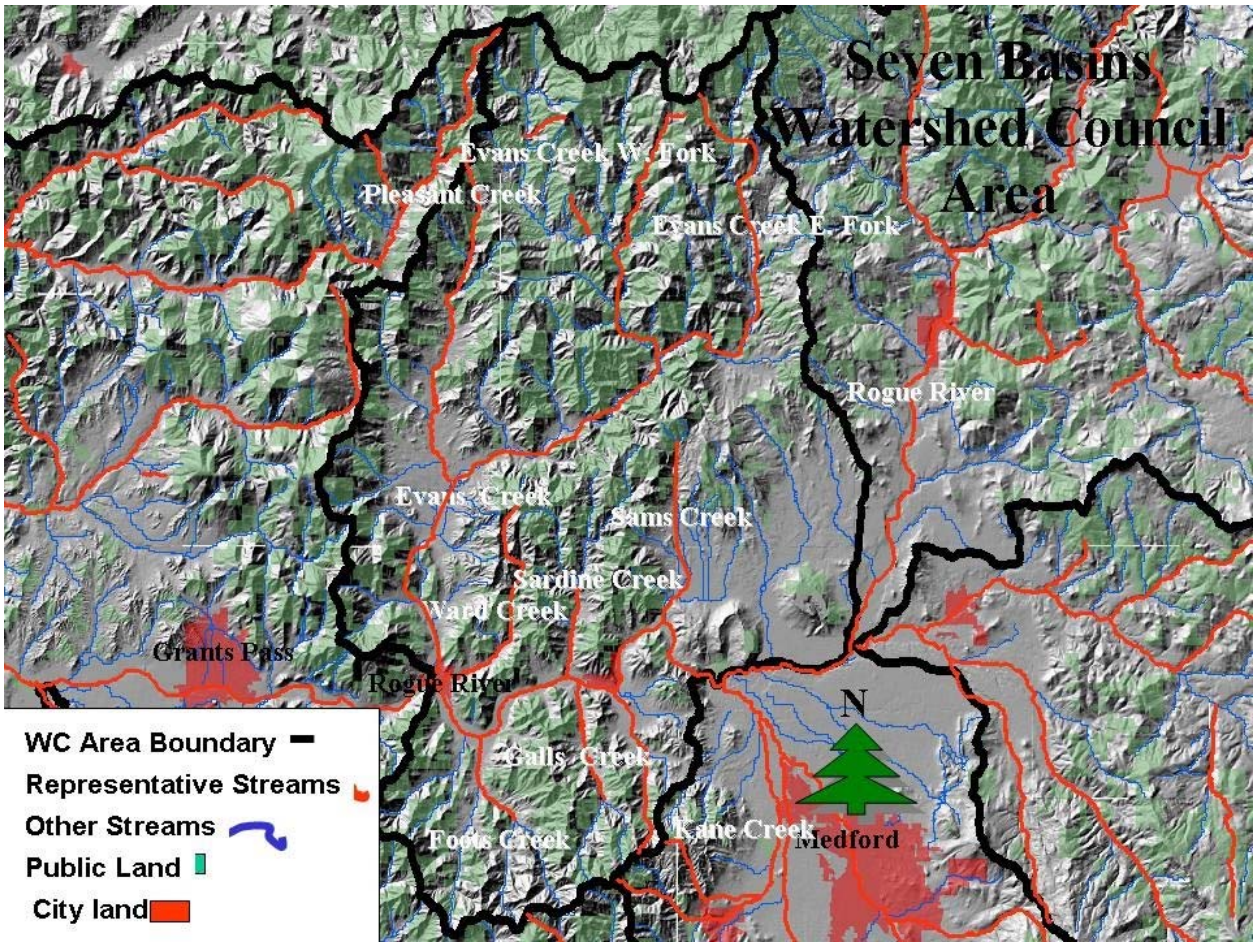


Table 10: Seven Basins Watershed Council Area Results

SEVEN BASINS WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Evans Creek, East Fork	limit	ade	ade	limit	limit	ade	mod	ade	mod	mod
Evans Creek, Mainstem	limit	mod	mod	limit	limit	ade	mod	limit	limit	limit
Evans Creek, West Fork	limit	ade	mod	limit	ade	ade	mod	ade	mod	mod
Foots Creek	limit	ade	mod	limit	mod	ade	ade	mod	mod	limit
Galls Creek	limit	ade	mod	limit	mod	mod	mod	ade	mod	mod
Kane Creek	limit	ade	limit	limit	ade	ade	ade	ade	ade	ade
Pleasant Creek	limit	ade	mod	limit	ade	ade	ade	ade	limit	mod
Sams Creek	limit	ade	ade	limit	limit	ade	ade	ade	mod	mod
Sardine Creek	limit	ade	mod	limit	mod	ade	mod	ade	mod	mod
Ward Creek	limit	ade	mod	limit	limit	mod	mod	mod	ade	mod

LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities			
Representative stream	One	Two	Three
Evans Creek, East Fork	Temperature, Water Quantity	Large Wood,Pool/Riffle Ratio	Barriers,Channel Modification
Evans Creek, Main stem	Channel Mod,Temperature,WtrQuantity	Barr,LgWood,Sed,StrmComp,Pl/Rfl	Chemistry
Evans Creek, West Fork	Temperature, Water Quantity	Pool/Riffle,Sediment	Barriers,Channel Modification
Foots Creek	Temperature, Water Quantity	Barr, ChnlMod,LgWood,StrmComp	Sediment
Galls Creek	Temperature, Water Quantity	Gravel, Large Wood, Sediment	Barriers,Chnl Mod,Pl/Rfl Ratio
Kane Creek	Temperature, Water Quantity	Sediment	/
Pleasant Creek	Barriers, Temperature, Water Quantity	Channel Modification,Sediment	/
Sams Creek	Lg Wood,Temperature, Water Quantity	Channel Modification	Barriers
Sardine Creek	Temperature, Water Quantity	ChnlMod,LgWood,Pl/Rfl Rat,Sedi	Barriers
Ward Creek	Lg Wood,Temperature, Water Quantity	ChnlMod,Gravel,Sedi,StrmComplx	Pool/Riffle Ratio
WCA Summary	**Temperature, Water Quantity**	**ChMod,LgWd,Sed,StrComp,Pl/Rfl**	**Barriers,Chemistry,Gravel**

SEVEN BASINS WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

Representative Stream	Uplands (Hydrologic Function)						Riparian			
	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Evans Creek, East Fork	ade	ade	limit	limit	mod	limit	ND	ade	ND	Limiting (limit):
Evans Creek, Mainstem	mod	ade	limit	limit	ade	limit	ND	mod	ND	Watershed health factor is unhealthy
Evans Creek, West Fork	ade	ade	limit	limit	ade	limit	ND	ade	ND	and a significant amount of restoration
Foots Creek	limit	ade	limit	limit	ade	limit	ND	ade	ND	activities are needed to improve
Galls Creek	limit	ade	mod	limit	mod	limit	ND	ade	ND	watershed conditions.
Kane Creek	limit	ade	mod	limit	mod	limit	ND	ade	ND	
Pleasant Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND	Moderate (mod):
Sams Creek	mod	mod	limit	limit	limit	limit	ND	mod	ND	Watershed health factor is less than
Sardine Creek	ade	ade	limit	limit	mod	limit	ND	mod	ND	desired and moderate to significant levels
Ward Creek	limit	ade	limit	limit	mod	limit	ND	ade	ND	of restoration activities are needed
										to improve existing conditions.

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One		Two	
				Adequate (ade):
Evans Creek, East Fork	FireRisk,Roads,SeralStage		Development	Watershed health is functional and
Evans Creek, Main stem	FireRisk,Roads,SeralStage		/	minimal restoration activities are needed
Evans Creek, West Fork	FireRisk,Roads,SeralStage		Wood Source	to maintain existing conditions.
Foots Creek	FireRisk,Roads,SeralStage		Seral Stage	
Galls Creek	Fire Risk, Roads		Development	No Data (ND):
Kane Creek	Fire Risk, Roads		Development	Data are either not available
Pleasant Creek	FireRisk,Roads,SeralStage		/	or are insufficient at this time.
Sams Creek	FireRisk,Roads,SeralStage		Development	
Sardine Creek	FireRisk,Roads,SeralStage		Wood Source	
Ward Creek	FireRisk,Roads,SeralStage		Development	Factors within each priority
WCA Summary	**FireRisk,Roads,SeralStage**		**Development, Wood Source**	(one, two, three) are relatively equal and
				are listed alphabetically, not rank-ordered.

Upper Rogue Watershed Council Area

The Upper Rogue Watershed Area includes all of the Rogue River Basin above RM 110. This area is located in the northeastern corner of the Rogue Basin and encompasses 1,250 square miles. Approximately 75 percent of the area is located in Jackson County with 200 square miles in Klamath County and 105 square miles in Douglas County. About 100 square miles is located within the boundaries of Crater Lake National Park.

A dominant feature in the Watershed Area is Lost Creek Dam that was constructed in 1977 at RM 157, primarily for flood control. A substantial amount of the water stored in the reservoir has been set aside for fish enhancement, irrigation, municipal, industrial and domestic use. However, only a small percentage has actually been purchased so most of the releases are allocated to benefit fish. The dam is a total barrier to anadromous fish but Cole Rivers Hatchery, located immediately below the dam, was built to mitigate for the loss of spring chinook, coho, and summer and winter steelhead spawning and rearing area. The hatchery also provides for production of rainbow trout for local fisheries.

The partially completed Elk Creek Dam, located about one mile upstream from the Rogue on Elk Creek, is also a barrier to anadromous fish (see: Bibliography, US House of Representatives). Chinook, coho, steelhead and cutthroat are collected in a trap below the dam and trucked above the dam to maintain the integrity of the wild runs.

Spring and fall chinook, coho and summer and winter steelhead all migrate up to the regulating dam at the hatchery. Fish then spawn below the hatchery or are captured at the hatchery for their eggs that are hatched and eventually released back into the Rogue. Resident rainbow, cutthroat, brook and brown trout utilize the Rogue and tributaries above the dam.

Water quality problems, including water temperatures and flow, are less severe in the Upper Rogue area than elsewhere in the Rogue Basin. Except for residential development along the Rogue River, Trail and Elk Creeks, and some expansion of the city of Shady Cove, there is relatively little population or development within this area and limited potential for future growth. Most water temperature and flow concerns are on the tributaries, which are used extensively by both salmon and steelhead. Large water diversions by the Eagle Point Irrigation District and the city of Medford aggravate the problems by further reducing instream flows.

All streambeds and stream reaches downstream from Lost Creek Dam, with the exception of the river, suffer from diminished water quantity during the summers, and much of that situation is not the result of natural conditions. The worst example of that situation is Trail Creek. The middle and lower reaches of the streambed go dry every summer, regardless of whether the water year is a wet one or not. The mouth of the creek goes dry before any other part of the stream does, which prevents juvenile fish from migrating upstream.

Riparian and upland cover, averaging 82 and 75 percent respectively, are high for the relatively young seral condition of the terrain. Road densities are generally high between Gold Ray Dam and Lost Creek Dam but low throughout the rest of the watershed.

Figure 9: Upper Rogue Watershed Council Area Map

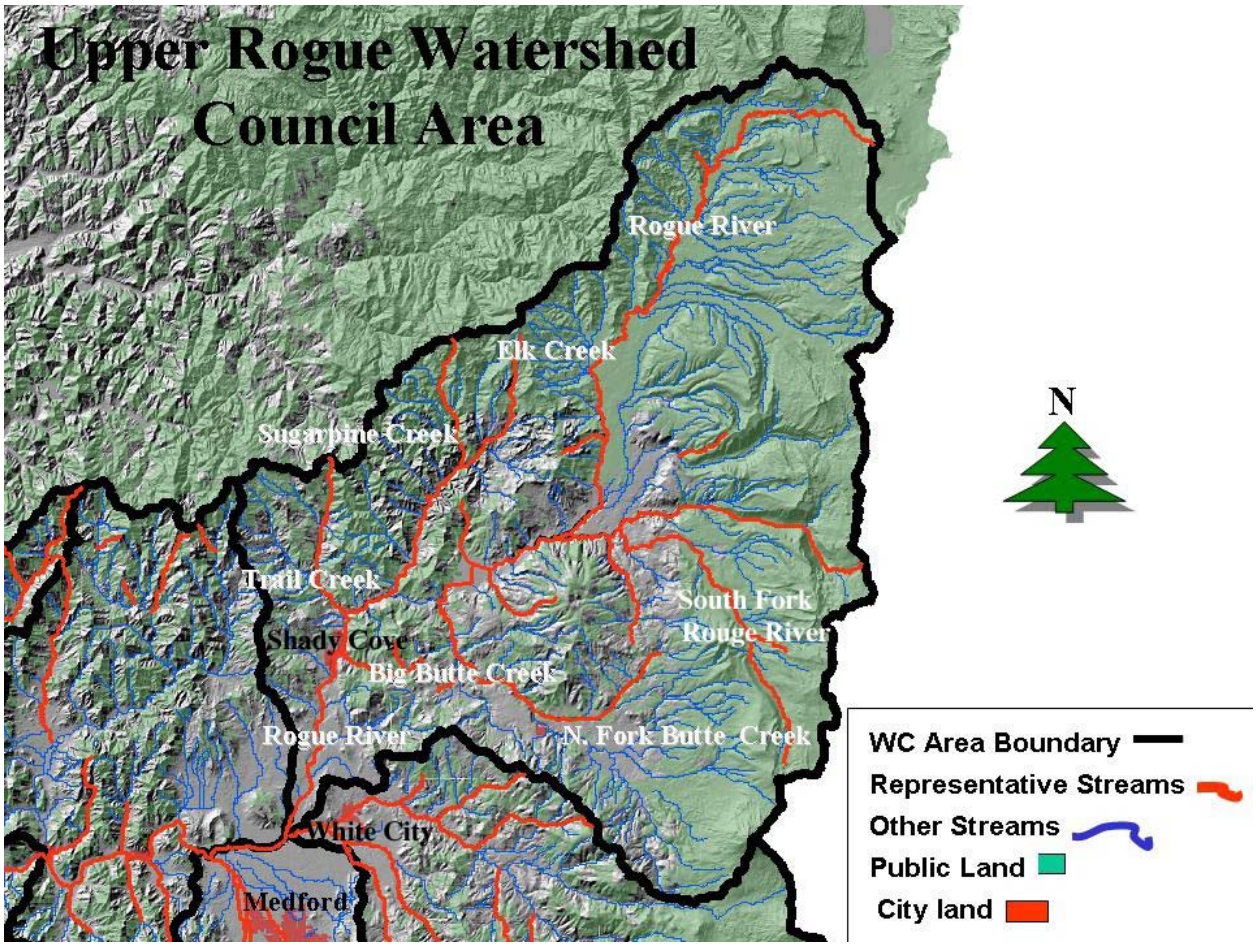


Table 11: Upper Rogue Watershed Council Area Results

UPPER ROGUE WATERSHED COUNCIL AREA										
Watershed Health Factors Matrix										
	Instream									
	Water Quality				Instream Habitat					
Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	channel modification
Big Butte Creek	limit	ade	mod	limit	limit	ade	ade	limit	limit	limit
Elk Creek	limit	ade	limit	limit	limit	mod	limit	limit	limit	limit
North Fork Butte Creek	limit	ade	limit	limit	ade	mod	ade	ade	ade	ade
Rogue River, above Lost Creek Dam	ade	ade	ade	ade	limit	limit	limit	ade	mod	ade
Rogue River, Evans Crk-Lost Ck Dam	ade	ade	mod	ade	mod	mod	ade	ade	ade	ade
Rogue River, South Fork	ade	ade	ade	limit	ade	ade	limit	ade	mod	mod
Sugarpine Creek	limit	ade	ade	limit	ade	limit	limit	ade	ade	ade
Trail Creek	limit	ade	mod	limit	limit	ade	limit	ade	ade	limit

	LIMITING FACTORS PRIORITIES TABLE Aquatic Priorities				
Representative stream	One		Two		Three
Big Butte Creek	Barriers, Temperature ,Water Quantity		ChnMod,LgWood,Sedi,StrComp		/
Elk Creek	Barriers,StrmComp,Temperature,WtrQuan		ChnlMod,LgWood,Pl/Rfl,Sedi		Gravel
North Fork Butte Creek	Temperture, Water Quanity		Gravel, Sediment		/
Rogue River, above Lost Creek Dam	Gravel, Large Wood		Pool/Riffle Ratio		Barriers
Rogue River, Evans Crk-Lost Ck Dam	Large Wood		Sediment		Gravel
Rogue River, South Fork	Pool/Riffle Ratio, Water Quantity		Barriers		Channel Modification
Sugarpine Creek	Temperature, Water Quanity		Gravel, Pool/Riffle Ratio		/
Trail Creek	Temperature, Water Quanity		Large Wood, Pool/Riffle Ratio		Channel Mod,Sediment
WCA Summary	**Barriers,Temperature,Water Quantity**		**ChMod,LgWd,Pl/Rfl,Sed,StCmp**		**Gravel**

UPPER ROGUE WATERSHED COUNCIL AREA

Watershed Health Factors Matrix

	Uplands (Hydrologic Function)						Riparian			
Representative Stream	wood source	vegetation cover	seral stage	fire risk	develpment	roads	invasive species	riparian shade	wetland	
Big Butte Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND	Limiting (limit):
Elk Creek	mod	ade	limit	mod	ade	limit	ND	ade	ND	Watershed health factor is unhealthy
North Fork Butte Creek	limit	ade	mod	limit	ade	limit	ND	ade	ND	and a significant amount of restoration
Rogue River, above Lost Creek Dam	limit	ade	mod	mod	ade	limit	ND	ade	ND	activities are needed to improve
Rogue River, Evans Crk-Lost Ck Dam	limit	mod	limit	limit	limit	limit	ND	mod	ND	watershed conditions.
Rogue River, South Fork	limit	ade	mod	limit	ade	limit	ND	ade	ND	
Sugarpine Creek	mod	ade	limit	mod	ade	limit	ND	ade	ND	Moderate (mod):
Trail Creek	limit	ade	mod	mod	ade	limit	ND	mod	ND	Watershed health factor is less than
										desired and moderate to significant levels
										of restoration activities are needed
										to improve existing conditions.

LIMITING FACTORS PRIORITIES TABLE

Terrestrial Priorities

Representative Stream	One		Two	
Big Butte Creek	Development,FireRisk,SeralStg		Fire Risk, Wood Source	Adequate (ade):
Elk Creek	Seral Stage		Wood Source	Watershed health is functional and
North Fork Butte Creek	Fire Risk, Roads		FireRisk,RiparnShade,SeralStg	minimal restoration activities are needed
Rogue River, above Lost Creek Dam	Roads, Wood Source		Development,WoodSource	to maintain existing conditions.
Rogue River, Evans Crk-Lost Ck Dam	FireRisk,Roads,SeralStage		Seral Stage, Wood Source	
Rogue River, South Fork	Fire Risk, Roads		Fire Risk, Wood Source	No Data (ND):
Sugarpine Creek	Roads, Seral Stage		Seral Stage, Wood Source	Data are either not available
Trail Creek	Roads, Wood Source		Fire Risk, Seral Stage	or are insufficient at this time.
WCA Summary	**FireRisk,Roads,SeralStage**		**Riparian Shade,WoodSource**	
				Factors within each priority
				(one, two, three) are relatively equal and
				are listed alphabetically, not rank-ordered.

Conclusion: Watershed Council Areas Summaries

The *Master Watershed Health Factors Matrix* lists the conclusions for watershed health factors for each representative stream in each Watershed Council Area. (See: Appendix D: Master Watershed Health Factors Matrix.)

The *Master Limiting Factor Priorities Table* summarizes both aquatic and terrestrial priorities for the representative streams in each of the Watershed Council Areas. (See: Appendix E: Master Limiting Factors Priorities Table.)

To assist Watershed Councils and applicable stakeholder groups and organizations with project development, a *Crosswalk Table* has been developed. (See: Appendix F: Crosswalk Table). This table identifies relevant OWEB project types with corresponding limiting watershed health factors.

Ecosystem Concepts

Tom Atzet

Ecosystem Concepts

- **Ecosystems are connected in time and space**

We are all aware of what we might do today in our own house or backyard. The context is here and now, easy to grasp. Some of us may be aware of the new subdivision planned for the land next door, or of the four-year election cycle. As temporal and spatial scales increase, fewer and fewer people can relate to the associated dynamics. If they do, the lack of immediacy often puts them off. But, understanding healthy stream function requires considering broad temporal and spatial context.

Table 12: Temporal and Spatial Framework

TEMPORAL AND SPATIAL FRAMEWORK

Past Present Future

Temporal

Frequency……How often
Intensity……How severe
Duration……How long including effects

Spatial

Extent……How big (scale)
Location……Where
Juxtaposition…….What it is near

Our Cascade WCAs (Upper Rogue, Little Butte and parts of Bear Creek) are products of at least 60 million year old geology (the Klamath Province is about 4 times that old) containing several geologic rock types, each having its own water-handling capacity, erosive properties and nutritional capabilities (compare serpentine with granite, for example). Over the years, climate and gravity (the major process drivers) have built and redistributed soil and water, and have modified the character of the geology and the landscape. Current conditions are but a brief reflection of long-term processes that have taken many centuries to develop. Restoration not only requires fixing current conditions, but understanding the processes responsible, the connections that will continue to shape the landscape after our project work has been completed.

- **Separation between terrestrial and aquatic is artificial**

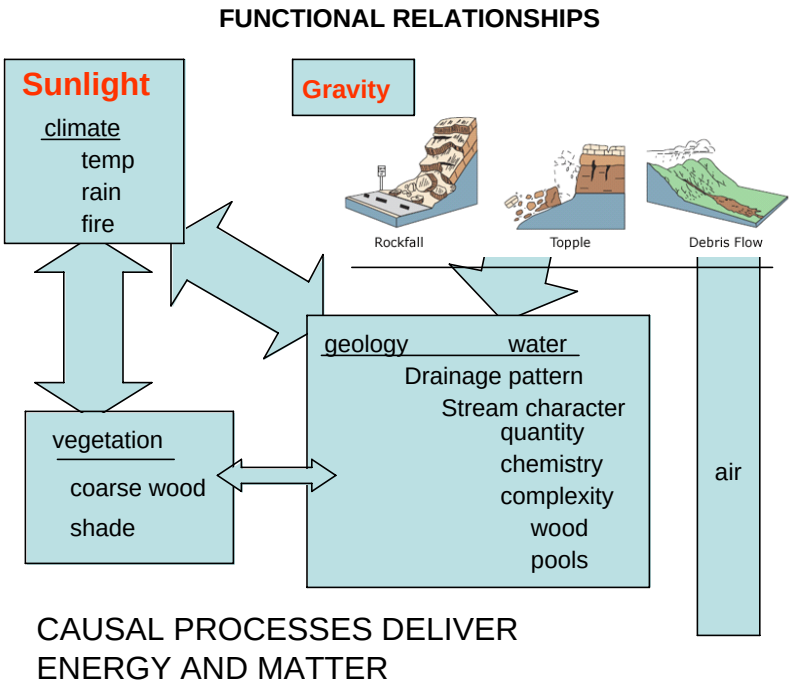
A popular TV ad states: “What happens in Vegas, stays in Vegas.” Not so with the uplands. What happens in the uplands (the so-called terrestrial ecosystem) ends up lower on the landscape or ultimately within the riparian and aquatic division of the ecosystem. In fact, that division is artificial. Ecosystems are continuous in time and space and only defined by the scale you wish

to apply. Either the aquatic system is from mid-stream to the ridge-top, or the terrestrial system spans to midstream. While our projects may affect instream structure, it is a good idea to know what is coming down from the uplands (water, various pieces of earth, fire). The landscape is more difficult to think of as a whole because it requires broadening our spatial and temporal considerations. Division, however, is fine. It helps us focus on issues and needs we can most effectively manipulate or locally restore. Just keep the broader context in mind.

- **Ecosystems are interdependent and dynamic**

Society values constancy and stability. Change, particularly acute change, is difficult for humans to accept. However, change is the bread and butter of a healthy, diverse ecosystem. Healthy is dynamic. Delivery of gravel, sediment, coarse wood, and rocks create stream complexity. Succession, growth, fire and floods assure constant regeneration (testing of new genes) and vary the landscape's ability to deliver water and provide habitat. Changes that occur as headwalls "fail" produce material and energy that changes the stream. (See: Figure 10: Functional Relationships.) We may label the process as good or bad (i.e. "failure); nevertheless, the process is a necessary dynamic for ecosystem health.

Figure 10: Functional Relationships



- **Economic and social needs are interdependent with ecosystem function**

Our best chance of living well is living within a healthy, functional system. Air, water, vegetation and associated habitat are all basic human needs. All are deliverable services from a functioning ecosystem. Sustainable economic systems are intimately integrated. Short-term

disruption of processes or cycles may yield short-term social and economic benefits, but in the long-term, there may be unexpected consequences**.**

Thus, expanding temporal and spatial considerations is important in planning restoration projects and monitoring potential benefits. The most popular example of meeting short-term needs, but reaping unintended long-term consequences, is fire suppression. Suppression actually amplified fire severity in the long run and depressed diversity. We can help assure positive long-term biological and economic effects if restoration is applied within a long-term context.

- **Forests, agriculture, urban areas and cities are part of the total connection**

Humans are an integral and influential part of the ecosystem. They are subject to the same consequences as other animals. Physical process will continue to occur at some frequency and intensity regardless of human needs. However, humans have the capacity to change rates and intensities and delay consequences (see the fire suppression example above). Thus, long-term thinking is necessary to assure concurrence with ecosystem processes. A recent example is the flooding in the south.

Hurricanes occur frequently and occasionally with high intensity (like our fire regime in southern Oregon, it is certain that fires will continue to occur). At the Delta, it is difficult and expensive to maintain below sea level human habitat that will withstand the most intense storms. A long-term approach includes considering the temporal and spatial framework below. Knowing frequency, intensity and extent is basic. In the long run it may be less expensive with fewer social consequences to recognize natural cycles and their context.

Temporal Concepts

- **History and preconditioning have shaped our systems**

Fire and flooding have been an integral influence on our WCAs. Current condition is a result of these processes (preconditioning) and our efforts to manage them. Our only window to these processes and their rates is the past. We assume that the cycles of the past will continue to operate similarly in the future. That is not necessarily a good assumption. Our own day-to-day behavior fits that assumption, but extension based on the past and projection into the future is tenuous. Your functional rates and consumption as a teen were likely more intense. Similarly, ecosystem processes depend on maturity, but are shaped by preconditioning.

- **Current condition and trend gives us a faint view of the future**

Restoration is based on current conditions and trends. No secret there! As we work to maintain a fully functional ecosystem including urban development and human needs, we need to remind ourselves that uncertainty increases with projection in time and space. However, if we understand the temporal and spatial questions (see: Table 12: Temporal and Spatial Framework) with regard to the landscape processes affecting our watershed, any proposed project will crystallize. This temporal and spatial framework also provides a monitoring structure for learning and adaptation of future work.

Processes and drivers:

- **Solar energy and gravity drive ecosystem processes**
- (See: Figure 11:Riparian Management Zone/Project Level Influence)

Solar energy and gravity redistribute soil and water. Our values persuade us to label some of these processes as good or bad (debris flow for example). Such bias can be a disservice without considering spatial context or rates (temporal issues). Salt, for example, can be an effective seasoning when lightly added, but may become lethal when applied liberally. Similarly, slides and fire can be beneficial or harmful depending on frequency and intensity of application. In medicine, this is called dosage.

Light (the visible part of solar energy) produces vegetation, which provides landscape stability (the antagonist of gravitational processes), shade, coarse wood, and modification of water transport. Almost all stream flow is processed by the terrestrial landscape before it becomes fish habitat. Stream complexity and water quality are partly controlled by upland processes. Healthy uplands can help maintain acceptable water quantity and quality, including water temperature.

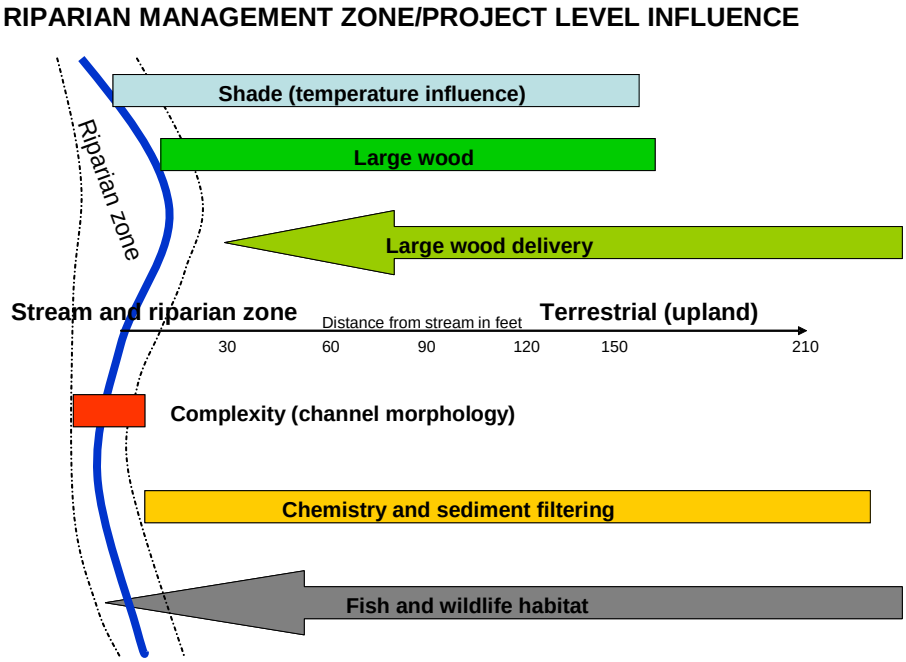
Climatic cycles (sun spot cycles, el niño, and long-term changes) can make or break a project. Recently the periodicity of hurricanes has been in the news. Drought, fire, and floods are also periodic. As with hurricanes, fire severity seems to be increasing along with periods of drought. Whether or not the changes are real, it may be prudent to consider timing as well as location when planning projects.

Restoration without complete knowledge

- **Dealing with uncertainty**

It has been said that the ecosystem is not only more complex than we think, but is more complex than we can think. The many interconnections between physical and biological elements make it difficult to predict the direction and rates of processes and the results of restoration projects. It is a fact of life that all decisions will be made in the absence of certainty. The best we can do is to evaluate current conditions and implement the project or strategy that has the highest probability of success ecologically, sociologically and economically. Over time, the wisdom gained from monitoring and reassessment will sharpen application and maintain ecosystem function.

Figure 11:Riparian Management Zone/Project Level Influence



Project scale interactions between aquatic and adjacent terrestrial ecosystems.

Appendices

Appendix A: Methodology and prioritization system

Watershed Health Factors Matrix

An extensive list of aquatic and terrestrial condition factors was provided by RBCC to the contract team. A team of *Watershed Health Factors Assessment* (WHFA) representatives met with the contractors to refine that list so that the limiting factors would net useful information about the condition of the watershed. The final list of instream factors included: water temperature, water chemistry, in-channel sediment, water quantity, large instream wood, gravel, pool/riffle ratio, migration barriers, stream complexity and channel modification. The final list of upland factors included wood source, vegetation cover, seral stage, fire risk, development, roads, and invasive species; riparian factors included shade and wetlands.

Streams selected for review and inclusion in the *Watershed Health Factors Matrix* (WHFM) were intended to represent the character of the Watershed Council Area. The streams selected as representative streams had data available from physical stream surveys and other inventory studies and/or were familiar to Jerry MacLeod (subcontractor). Watershed council representatives participated in the process of selecting streams to the degree that interested their watershed council.

The Bear Creek Watershed Council Area, for example, divided their watershed into eight geographic areas. The eleven streams selected represent six of the eight areas. Streams were not selected in the two non-represented areas, known as the East Delta and the Eastern Cascades, because of the lack of adequate information to complete the categories included in the Matrix.

The contractors reviewed data that were supplied by watershed councils and agencies as well as that to which they had personal access. The project was designed to be a review of the resources available and not to include new research. Consistency in measurement across the basin was impossible due to data presented in a variety of scales of measurement, formats and types of reporting. This is a living document. As new information becomes available, it may be reviewed and incorporated for future use. A list of the resources reviewed is included in Appendix G: Resources.

The initial intention was to include measurable data from the reports in the limiting factors matrix. The range of methods by which samples were taken and the inconsistencies in distances surveyed would have resulted in an inaccurate and misleading outcome. Some streams had no available data at all, and the expertise and professional judgment of the contractor was used.

After review of the available data, a conclusion was drawn regarding the condition of each instream, terrestrial and riparian factor in each representative stream based on evaluation standards (see: Appendix C: Evaluation Standards). Due to the wide range of data availability and accuracy, only three categories were used. The categories were:

Limiting: the watershed factor health is unhealthy and a significant amount of restoration activities are needed to improve watershed conditions;
Moderate: the watershed factor health is less than desired and moderate to significant levels of restoration activities are needed to improve existing conditions;
Adequate: the watershed factor health is robust and minimal restoration activities are needed to maintain existing condition.

Prioritization System

Priorities were to be identified within the representative streams and extrapolated to the WCA level. Basin-wide priorities are not identified as a result of feedback from watershed councils expressing concern over potentially inequitable competition for funds given basin-wide priorities and initial satisfactory review of the *Watershed Health Factors Matrix* by OWEB.

Watershed council and agency representatives met together with the contractors to establish a system for prioritizing those factors limiting to watershed health. This group determined to prioritize those factors using the science-based data reviewed for the *Watershed Health Factors Matrix*. The ability of a project to be funded would not be considered in the prioritization system. Socio-economic aspects of project selection were left for the watershed councils to address individually.

Seventeen of the 19 specific watershed health factors listed above (in *Watershed Health Factors Matrix*) were used for the purpose of this prioritization. Due to the current lack of data available, invasive species and wetlands were not included in the prioritization.

All factors determined to be “limiting” or “moderate” in the *WHFM* were categorized into a three-tier system. The tier system was used because the data behind the initial categorization was not accurate, nor consistent enough to allow specific ranking of factors. Each tier (one, two and three) includes factors deemed to be relatively equal in weight and are not ranked within that tier. Factors determined in the *WHFM* to be “adequate” were not included in this prioritization system, but may be considered by the reader as comprising a fourth tier of factors in adequate condition.

Aquatic and terrestrial priorities are in separate tables both for ease of viewing and because OWEB projects address aquatic issues. The *Watershed Council Area Summaries* include maps indicating representative streams and public (state and federally owned) land within a watershed council area (see: Watershed Council Areas Summaries). OWEB funding will focus primarily on private lands.

Outreach / Collaboration Strategy

As this was to be a collaborative process, engaging members of the communities being addressed, several steps were taken to ensure opportunities for participation. Outreach for inclusion in the process included electronic slide presentations by the contractors to each of the eight watershed councils at their regular monthly meetings. The presentation described the purpose of the project, the process to accomplish it, including the development and meaning of the *WHFM*, findings for the particular watershed council and opportunities for input. The draft was presented and input was requested at four public review meetings around the region. An electronic mail list of all (approximately 70 people) who participated in meetings and presentations was compiled. Those in that database received updates on the project including highlights of meetings and detailed notes from those meetings.

Agency representatives were invited and participated on the project team and in meetings and processes that were of particular interest to them. Mutual collaboration was assisted by the use of agency space for many of the meetings.

Data Gaps

A notable data gap was found in the inconsistent reporting of data among the resources. Measurements were taken differently among the various studies. For example, samples may have been taken at different times of year, taken multiple times in a year on some streams and only once on other streams; or a sample may have been taken at one point in a stream or from multiple locations. This inconsistent sampling and reporting precludes making direct comparisons.

Only shade and wetlands were included in the riparian portion of this assessment due to data constraints. The lack of information that is available on riparian condition factors (e.g. the amount of large, structurally diverse patches of riparian woodland; the percentage of native shrubs in different riparian habitats) is an important data gap that limits our ability to develop a comprehensive analysis of watershed health factors. Collecting such data should also be considered a priority for future funding. This will improve our ability to monitor riparian restoration project effectiveness.

While wetland condition and invasive species were deemed to be important indicators of watershed health, data on these two factors was not available. The columns will remain in the *Watershed Health Factors Matrix* (WHFM) as placeholders until the data become available. Within the next year, the U.S. Fish and Wildlife Service is expected to update the National Wetlands Inventory data.

Appendix B: Roles and Responsibilities of Key Players

Rogue Basin Coordinating Council

Rogue Basin Coordinating Council created the *Regional Restoration Priorities* (RRP) sub-committee to lead the development and oversight of the project. In turn, a budget committee, project task team, project team and contract review committee were set up as needed to respond to the aspects of the process as they arose. RBCC members took on the roles and responsibilities of co-chair, project manger and contract manager for the project.

Watershed Councils

Watershed Councils took responsibility for ensuring the project outcome would be useful to them. They provided their watershed assessments and other planning and resource documents for review by the contract team. Members of the watershed council teams reviewed the technical findings specific to their watersheds and participated in development of the prioritization system. Watershed Council coordinators and representatives also participated in and provided comments for draft review and revisions. Watershed Council coordinators and representatives ensured outreach to their constituents, including coordination and planning of project presentations in their areas.

Agency Representatives

Agency representatives participated along with RBCC members in steering the early development of the project by serving on several of the ad hoc committees. Agency representatives participated along with Watershed Council representatives in the review of technical findings and in the development of the of the prioritization system. Agency representatives also participated in and provided comments for draft review and revisions.

Contractors

The contractor was hired for the purpose of coordinating the overall process, including presentations to watershed councils, meeting facilitation and writing the draft document. The contractor hired a forest ecologist and a fisheries biologist, for their scientific expertise in the region, to contribute the technical aspects of the project and to serve as consultants in the prioritization process. The subcontractors also participated in presentations and provided text for the draft, including watershed council area narratives and *Ecosystem Concepts*.

Appendix C: Evaluation Standards

Aquatic Evaluation Standards

WATER QUALITY

Temperature: Summer instream water temperatures are measured with data loggers, thermographs or hand-held thermometers taken with various methodologies at various times and for various lengths of time. High water temperature increases the risk of disease and can be lethal to salmonids. Refer to specific references (See: Appendix G: Resources) for more information.

LIMITING	MODERATE	ADEQUATE
> 70 degrees F	65-70 degrees F	42-64 degrees F

Chemistry: Chemical pollution can be toxic or impact fish and insect production. It is also a public health hazard. Other parameters in water, such as dissolved oxygen, pH, bacteria, algae, etc. (that occur naturally in streams) can severely impact aquatic life if occurring at levels exceeding DEQ standards. Refer to specific references (see: Appendix G: Resources) to see what stream chemistry factor was measured for a particular stream.

ADEQUATE: Meets DEQ standards, i.e.: DO - > 5 ppm,
MODERATE: Marginally meets DEQ standards.
LIMITING: Exceeds DEQ standards

Sediment: Excessive volumes of sand, silt and clay suspended in water can be limiting to aquatic life. Fine sediment can impair filter-feeding organisms, circulation of dissolved oxygen in redds, smother eggs in the gravel and reduce sight-feeding visibility. Gill abrasion may occur in extreme cases.

LIMITING	MODERATE	ADEQUATE
> 15% Fines	6-15% Fines	< 5% Fines

WATER QUANTITY

Water Quantity and Timing: Adequate summer stream flows are needed for fish and other aquatic organism. Low flows can limit fish production and increase water temperatures. Many streams in the Rogue Basin have too little water in the summer (e.g. from irrigation use) and too much in the winter (e.g. from road run-off),

LIMITING	MODERATE	ADEQUATE
< 6 cfs	6-10 cfs	>10 cfs

INSTREAM HABITAT

Large Wood: Refers to fallen trees within the stream channel, which are generally over 12" in diameter. Different surveyors used different size and location criteria to count large wood; refer to specific references for more information. Large wood functions to stabilize channels, promote sediment storage and revegetation, develop pools and habitat complexity, increase roughness to reduce water velocity, provide cover, trap gravel and woody material, and enhance macro invertebrate diversity and processing of nutrients and organic matter.

LIMITING	MODERATE	ADEQUATE
< 10 pieces/ 100 meters	10-20 pieces / 100 meters	> 20 pieces / 100 meters

Gravel: Refers to the abundance of suitable spawning gravel in a stream and/or the frequency of gravel accumulations in bars that could be used by spawning salmonids. Generally, suitable gravel ranges in diameter from 0.5-3.0 inches, with trout and steelhead using the smaller gravel and chinook using the larger gravel. Salmonids require clean, stable gravel beds for spawning. They must be located in portions of the stream with adequate flows that do not dewater during lower flows and are not subject to heavy sediment loads.

ADEQUATE: 1-3" Diameter with no imbeddedness. >35% of Area.
MODERATE: < 1" or 5-7" Diameter with some imbeddedness – 15-35% of area.
LIMITING: Sand or silt covered gravel, or rubble and considerable imbeddedness <15% of area.

Pool to Riffle Ratio: A balance of pools to riffles provides a mix of habitat for both spawning and rearing. In a stream, the ratio of pool habitat (usually by area or volume) to riffle habitat, or more generally, the ratio of slow water (i.e. slow velocity), deep habitat to fast water, shallow habitat. Different stream habitat methodologies classify stream habitat differently; however, they all use some sort of slow vs. fast classification. Therefore, this factor is relatively comparable across streams as long as similar lengths of stream were surveyed. Refer to specific references (see: Appendix G: Resources) for more information.

ADEQUATE: Ratio: ≥ 35/65
Pool Frequency: 5-8 channel widths between pools.
Pools with wood complexity: > 2.5
MODERATE: Ratio: 20/80 – 35/65
Pool Freq: 8-20 channel widths between pools
Pools with wood: 1-2.5
LIMITING: Ratio: < 20/80
Pool Freq: > 20 channel widths between pools
Pools with wood: < 1

Stream Complexity: A qualitative assessment of whether a stream has appropriate amounts of the different kinds of habitats normally available in a stream. Side channels, alcoves, oxbows, beaver dams, and wetlands, all provide diversity and desirable rearing habitat.

ADEQUATE: A meandering stream with a complex channel containing a mixture of habitat types that provide areas with different velocity and depth for use at different fish life stages.

MODERATE: A stream that contains features that lie between the above definitions.

LIMITING: A straight, simple channel containing a fairly uniform flow and few habitat types.

FISH PASSAGE

Barriers to migration: Barriers include man-made structures such as dams and culverts that do not meet state guidelines for passage of adult and juvenile salmonids. Salmonids need to pass during spawning migration, while rearing, and while over wintering, to escape from high velocity flows.

ADEQUATE: There are no barriers.

MODERATE: Barriers restrict fish passage during at least part of the year.

LIMITING: Barriers block fish migration.

CHANNEL MODIFICATION

Channel Modification: An assessment of how altered a stream channel is from its normal movement and flow. Typical channel modifications include gravel extraction, channel straightening, bank armoring and channel relocation. These actions reduce key habitat features such as pools, gravel bars, lateral scour pools, side channels and habitat complexity.

ADEQUATE: Natural channel, no human impacts.

MODERATE: Some instream work that has healed, to some extent or has not caused a significant loss of instream habitat.

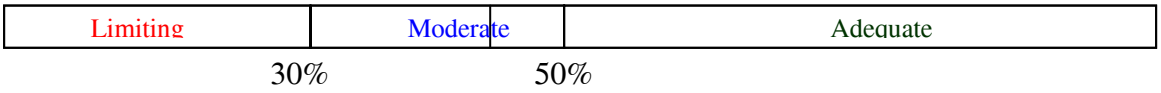
LIMITING: Stream has been impacted by extensive instream or riparian work. The stream has been channelized or relocated

Terrestrial Definitions and Evaluation Standards

Below, "population" and "measurement" refer to the data layers and criteria used in a Geographic Information System (GIS) computer program (ArcMap 9, Build 538) to analyze each terrestrial factor.

Wood Source (Large wood potential delivery)

Conifers greater than 24 inches in diameter near the stream or on the uplands that could fall or slide into the stream and help create aquatic habitat.
Population: proportion in key stream upland
Measurement: % Conifers greater than 24 inches



Vegetation Cover

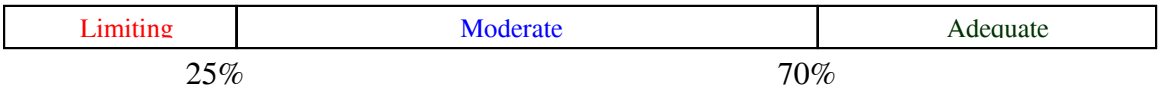
The cover of branches and foliage formed by the crowns of trees and other woody growth. Upland cover protects the soil, regulates runoff and indicates the maturity of the landscape.
Population: More than150 feet from each side of the stream edge
Measurement: Total cover including conifers and hardwoods.

Riparian Shade

Riparian shade (150 feet from the stream's edge) shades the stream, reducing stream heating and provides nutrient input.
Population: 150 feet from each side of the stream edge
Measurement: Total cover including conifers and hardwoods.

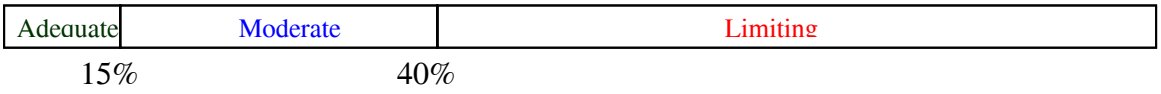
Seral Stage

Seral stage is determined by canopy cover, species (hardwoods/conifers) and tree diameter. As landscapes move from early seral to late seral, habitat, both stream and upland, generally becomes more diverse. Seral stage relates the progressive development of the forest.
Population: The scale relates to upland landscapes by 5th field watershed (not just riparian area)
Measurement: % trees in diameter class > 24 inches



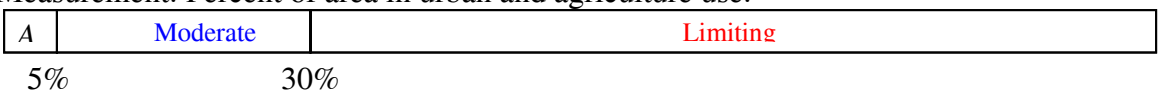
Fire Risk

Fire risk increases with succession. (The accumulation of biomass, live and dead including trees, shrubs, grass and fuel associated with forest activities such as logging slash.) Ignition probability increases with forest uses and development.
Population: 5th field watershed landscape
Measurement: combination of factors (see Atzet, 2005) % of 5th field at risk



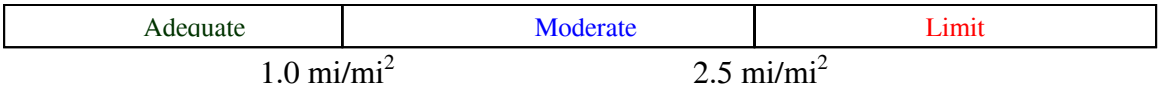
Development

Land not having tree or shrub coverage is classified as development. Urban, agricultural and small grassland areas are included in the classification. Human development of roads, housing, agriculture, diversions and some recreational activities can have adverse effects on anadromous fish and landscape functionality.
Population: 5th field watershed landscape
Measurement: Percent of area in urban and agriculture use.



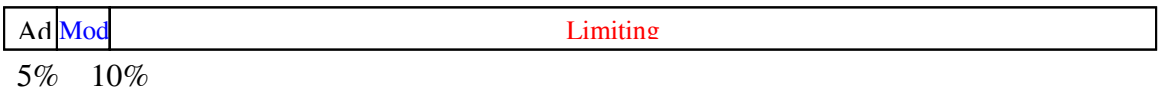
Roads

Roads deliver sediment, interrupt ground water flow, and provide a pathway for non-native exotic species.
Population: Roads in riparian habitat
Measurement: Miles of roads per square mile of riparian habitat



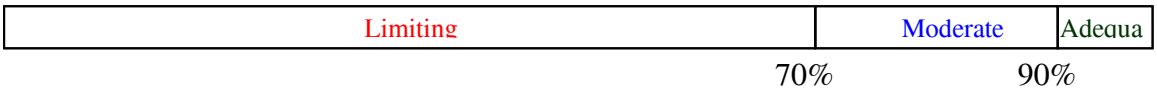
Invasive Species

Invasive species (not native to the Rogue Basin) displace natives, usually reduce diversity and have negative effects on ecosystem processes.
Population: In watersheds or 5th field watershed
Measurement: Cover or presence



Wetlands

An area that is usually saturated and is characterized by vegetation that has adapted to saturated soil conditions such as bogs, marshes, oxbows and estuaries. Wetlands are a crucial part of the coho life cycle. Wetlands store and filter water, capture sediment and provide alternative habitat and cover.
Population: Natural wetlands in the 5th field watershed
Measurement: % left natural



Appendix D: Master Watershed Health Factors Matrix

The *Master Watershed Health Factors Matrix* lists the representative streams for each Watershed Council Area and the conclusion rating for each of the 19 instream, terrestrial and riparian factors evaluated.

Definitions for the conclusions were:

Limiting: the watershed health factor is unhealthy and a significant amount of restoration activities are needed to improve watershed conditions.

Moderate: the watershed health factor is less than desired and moderate to significant levels of restoration activities are needed to improve existing conditions.

Adequate: the watershed health factor is robust and minimal restoration activities are needed to maintain existing condition.

"ND" indicates either no data or insufficient data is available at this time.

WATERSHED HEALTH FACTORS MATRIX FOR THE ROGUE BASIN REPRESENTATIVE STREAMS											
		Instream									
		Water Quality				Instream Habitat					
WCA	Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complxity	barriers	chnl mod
APPLEGATE RIVER											
	Applegate River, Lower	limit	ade	limit	mod	ade	ade	mod	ade	mod	limit
	Applegate River, Middle	limit	ade	limit	mod	limit	ade	ade	limit	ade	limit
	Applegate River, Upper	limit	ade	ade	mod	limit	ade	ade	mod	limit	limit
	Carberry Creek	ade	ade	mod	mod	mod	limit	mod	limit	ade	limit
	Cheney Creek	ade	ade	mod	limit	limit	ade	ade	ade	mod	ade
	Forest Creek	limit	limit	limit	limit	limit	ade	ade	limit	ade	limit
	Little Applegate River	limit	ade	limit	limit	limit	ade	ade	limit	limit	limit
	Murphy Creek	mod	ade	ade	limit	limit	ade	ade	limit	mod	limit
	Slate Creek	limit	mod	limit	limit	limit	ade	ade	mod	limit	mod
	Thompson Creek	limit	limit	mod	limit	limit	ade	ade	limit	mod	limit
	Williams Creek	limit	limit	mod	limit	limit	ade	ade	mod	limit	limit
BEAR CREEK											
	Ashland Creek	mod	limit	mod	limit	limit	ade	mod	limit	limit	limit
	Bear Creek, Main stem	limit	limit	limit	limit	limit	mod	ade	limit	mod	limit
	Coleman Creek	limit	limit	ade	limit	limit	mod	mod	limit	mod	limit
	Emigrant Creek, above dam	limit	mod	mod	limit	limit	ade	ade	limit	limit	limit
	Emigrant Creek, below dam	limit	limit	ade	limit	limit	limit	ade	limit	ade	limit
	Griffin Creek	limit	limit	mod	limit	limit	ade	ade	limit	mod	limit
	Jackson Creek	limit	limit	limit	limit	limit	mod	ade	limit	mod	limit
	Larson Creek	limit	limit	limit	limit	limit	mod	ade	limit	mod	limit
	Neil Creek	limit	mod	mod	limit	limit	ade	ade	ade	mod	ade
	Wagner Creek	limit	mod	mod	mod	limit	ade	ade	limit	mod	limit
	Walker Creek	limit	mod	limit	limit	limit	ade	ade	limit	ade	limit
ILLINOIS VALLEY											
	Illinois River, Lower	limit	ade	limit	limit	limit	ade	ade	mod	ade	mod
	Althouse Creek	limit	ade	limit	limit	ade	ade	ade	ade	ade	mod
	Briggs Creek	limit	ade	limit	ade	ade	ade	ade	mod	limit	limit
	Deer Creek	limit	mod	limit	limit	limit	ade	ade	limit	mod	limit
	Elk Creek	limit	ade	ade	ade	limit	ade	ade	ade	ade	ade
	Illinois River, East Fork	limit	ade	limit	limit	limit	ade	ade	limit	limit	limit
	Illinois River, Upper	limit	mod	limit	limit	limit	ade	mod	ade	limit	limit
	Illinois River, West Fork	limit	ade	limit	limit	limit	ade	ade	limit	limit	mod
	Indigo Creek	limit	ade	mod	ade	ade	ade	ade	ade	ade	ade
	Silver Creek	limit	ade	limit	mod	ade	ade	ade	ade	ade	ade
	Sucker Creek	limit	ade	limit	limit	limit	ade	limit	limit	mod	limit
LITTLE BUTTE CREEK											
	Antelope Creek	limit	limit	limit	limit	limit	limit	limit	limit	limit	limit
	Beaver Dam Creek	ade	ade	ade	mod	ade	ade	ade	ade	ade	ade
	Dead Indian Creek	limit	ade	ade	limit	limit	ade	limit	ade	ade	mod
	Dry Creek	limit	ade	ade	limit	limit	limit	limit	limit	ade	limit
	Lake Creek	limit	limit	limit	limit	limit	ade	limit	ade	ade	mod
	Lick Creek	mod	limit	ade	limit	limit	ade	limit	ade	ade	ade
	Little Butte Creek, Main stem	limit	limit	limit	limit	limit	mod	limit	limit	limit	limit
	Little Butte Creek, North Fork	limit	limit	ade	limit	limit	ade	limit	limit	limit	limit
	Little Butte Creek, South Fork	limit	ade	limit	limit	limit	ade	ade	limit	limit	ade
	Little Butte Creek, Upr So Fork	ade	ade	ade	mod	mod	ade	ade	ade	ade	ade
	Lost Creek	limit	ade	limit	limit	mod	ade	limit	ade	mod	ade
	Salt Creek	mod	limit	ade	limit	mod	ade	mod	ade	limit	ade
	Soda Creek	limit	ade	limit	mod	limit	ade	limit	ade	mod	ade

WATERSHED HEALTH FACTORS MATRIX FOR THE ROGUE BASIN REPRESENTATIVE STREAMS											
		Uplands (Hydrologic Function)							Riparian		
WCA	Representative Stream	wood source	vegitation cover	seral stage	fire risk	development	roads	invasive species	riparian shade	wetland
APPLEGATE RIVER											
	Applegate River, Lower	limit	ade	limit	limit	mod	limit	ND	ade	ND
	Applegate River, Middle	limit	ade	limit	limit	mod	limit	ND	ade	ND
	Applegate River, Upper	mod	ade	limit	limit	ade	limit	ND	mod	ND
	Carberry Creek	limit	ade	limit	limit	ade	limit	ND	ade	ND
	Cheney Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Forest Creek	limit	ade	limit	limit	ade	limit	ND	mod	ND
	Little Applegate River	mod	ade	limit	limit	ade	mod	ND	mod	ND
	Murphy Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Slate Creek	mod	ade	limit	limit	ade	limit	ND	mod	ND
	Thompson Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Williams Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
BEAR CREEK											
	Ashland Creek	ade	ade	ade	limit	ade	mod	ND	ade	ND
	Bear Creek, Main stem	limit	mod	limit	limit	limit	limit	ND	limit	ND
	Coleman Creek	limit	ade	limit	limit	limit	limit	ND	mod	ND
	Emigrant Creek, above dam	limit	mod	limit	limit	ade	limit	ND	mod	ND
	Emigrant Creek, below dam	limit	ade	limit	mod	mod	mod	ND	mod	ND
	Griffin Creek	limit	mod	limit	limit	limit	limit	ND	mod	ND
	Jackson Creek	limit	ade	mod	limit	limit	limit	ND	mod	ND
	Larson Creek	limit	mod	limit	limit	limit	limit	ND	mod	ND
	Neil Creek	ade	ade	limit	limit	mod	mod	ND	ade	ND
	Wagner Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Walker Creek	limit	ade	mod	limit	ade	mod	ND	mod	ND
ILLINOIS VALLEY											
	Illinois River, Lower	limit	ade	limit	mod	mod	ade	ND	ade	ND
	Althouse Creek	mod	ade	limit	mod	mod	limit	ND	ade	ND
	Briggs Creek	mod	ade	limit	limit	ade	mod	ND	ade	ND
	Deer Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Elk Creek	mod	ade	limit	ade	ade	limit	ND	ade	ND
	Illinois River, East Fork	mod	ade	limit	limit	mod	limit	ND	mod	ND
	Illinois River, Upper	ade	ade	limit	ade	ade	limit	ND	mod	ND
	Illinois River, West Fork	mod	ade	limit	limit	ade	limit	ND	mod	ND
	Indigo Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND
	Silver Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND
	Sucker Creek	limit	ade	mod	ade	ade	limit	ND	ade	ND
LITTLE BUTTE CREEK											
	Antelope Creek	limit	ade	mod	limit	limit	mod	ND	limit	ND
	Beaver Dam Creek	ade	ade	limit	ade	ade	limit	ND	ade	ND
	Dead Indian Creek	ade	ade	limit	mod	ade	limit	ND	ade	ND
	Dry Creek	_	_	mod	limit	limit	mod	ND	limit	ND
	Lake Creek	limit	ade	limit	limit	ade	limit	ND	mod	ND
	Lick Creek	mod	ade	limit	limit	ade	mod	ND	mod	ND
	Little Butte Creek, Main stem	limit	ade	mod	limit	mod	limit	ND	mod	ND
	Little Butte Creek, North Fork	mod	ade	limit	mod	mod	limit	ND	ade	ND
	Little Butte Creek, South Fork	limit	ade	limit	limit	ade	limit	ND	ade	ND
	Little Butte Creek, Upr So Fork	ade	mod	ade	ade	ade	limit	ND	ade	ND
	Lost Creek	limit	ade	limit	mod	ade	limit	ND	ade	ND
	Salt Creek	limit	ade	mod	limit	ade	limit	ND	ade	ND
	Soda Creek	_	_	limit	mod	ade	limit	ND	ade	ND

WATERSHED HEALTH FACTORS MATRIX FOR THE ROGUE BASIN REPRESENTATIVE STREAMS												
		Instream										
		Water Quality				Instream Habitat						
WCA	Representative Stream	temperature	chemistry	sediment	quantity	large wood	gravel	pool/riffle ratio	stream complexity	barriers	chnl mod	
LOWER ROGUE												
	Estuary	ade	mod	ade	ade	ade	ade	ade	ade	ade	limit	
	Jim Hunt Creek	limit	ade	mod	limit	limit	ade	ade	ade	ade	ade	
	Lobster Creek	limit	ade	limit	limit	mod	ade	ade	ade	ade	ade	
	Quosatana Creek	limit	ade	mod	ade	mod	ade	ade	ade	ade	ade	
	Rogue River, below Illinois	limit	mod	mod	mod	limit	ade	ade	limit	ade	mod	
	Rogue River, Illinois-Grave Creek	limit	ade	mod	limit	mod	ade	ade	ade	ade	mod	
	Shasta Costa Creek	limit	ade	mod	ade	mod	ade	ade	ade	ade	ade	
	Silver Creek	ade	ade	ade	mod	ade	ade	ade	ade	ade	ade	
MIDDLE ROGUE												
	Coyote Creek	limit	ade	limit	limit	limit	ade	ade	mod	ade	limit	
	Galice Creek	limit	ade	limit	limit	limit	ade	ade	limit	mod	limit	
	Grave Creek	limit	ade	limit	limit	limit	ade	ade	limit	ade	limit	
	Jumpoff Joe Creek	limit	ade	limit	limit	limit	mod	ade	ade	limit	limit	
	Pickett Creek	limit	ade	mod	limit	limit	ade	ade	ade	mod	limit	
	Quartz Creek	limit	ade	ade	mod	limit	ade	ade	mod	ade	mod	
	Rogue River, Jos co line-Evans Crk	limit	mod	mod	mod	limit	ade	ade	limit	limit	limit	
	Taylor Creek	limit	ade	ade	limit	limit	ade	ade	ade	ade	ade	
	Wolf Creek	limit	ade	limit	limit	limit	ade	ade	mod	mod	limit	
SEVEN BASINS												
	Evans Creek, East Fork	limit	ade	ade	limit	limit	ade	mod	ade	mod	mod	
	Evans Creek, Mainstem	limit	mod	mod	limit	limit	ade	mod	limit	limit	limit	
	Evans Creek, West Fork	limit	ade	mod	limit	ade	ade	mod	ade	mod	mod	
	Foots Creek	limit	ade	mod	limit	mod	ade	ade	mod	mod	limit	
	Galls Creek	limit	ade	mod	limit	mod	mod	mod	ade	mod	mod	
	Kane Creek	limit	ade	limit	limit	ade	ade	ade	ade	ade	ade	
	Pleasant Creek	limit	ade	mod	limit	ade	ade	ade	ade	limit	mod	
	Sams Creek	limit	ade	ade	limit	limit	ade	ade	ade	mod	mod	
	Sardine Creek	limit	ade	mod	limit	mod	ade	mod	ade	mod	mod	
	Ward Creek	limit	ade	mod	limit	limit	mod	mod	mod	ade	mod	
UPPER ROGUE												
	Big Butte Creek	limit	ade	mod	limit	limit	ade	ade	limit	limit	limit	
	Elk Creek	limit	ade	limit	limit	limit	mod	limit	limit	limit	limit	
	North Fork Butte Creek	limit	ade	limit	limit	ade	mod	ade	ade	ade	ade	
	Rogue Rvr, above Lost Creek Dam	ade	ade	ade	ade	limit	limit	limit	ade	mod	ade	
	Rogue Rvr, EvansCrk-Lost Ck Dam	ade	ade	mod	ade	mod	mod	ade	ade	ade	ade	
	Rogue River, South Fork	ade	ade	ade	limit	ade	ade	limit	ade	mod	mod	
	Sugarpine Creek	limit	ade	ade	limit	ade	limit	limit	ade	ade	ade	
	Trail Creek	limit	ade	mod	limit	limit	ade	limit	ade	ade	limit	

WATERSHED HEALTH FACTORS MATRIX FOR THE ROGUE BASIN REPRESENTATIVE STREAMS										
		Uplands (Hydrologic Function)							Riparian	
WCA	Representative Stream	wood source	vegitation cover	seral stage	fire risk	development	roads	invasive species	riparian shade	wetland
LOWER ROGUE										
	Estuary	limit	limit	limit	ade	mod	limit	ND	limit	ND
	Jim Hunt Creek	limit	ade	mod	ade	ade	limit	ND	mod	ND
	Lobster Creek	limit	ade	mod	ade	ade	limit	ND	ade	ND
	Quosatana Creek	limit	ade	limit	ade	ade	limit	ND	ade	ND
	Rogue River, below Illinois	mod	ade	limit	ade	ade	limit	ND	ade	ND
	Rogue River, Illinois-Grave Creek	mod	ade	limit	limit	ade	limit	ND	limit	ND
	Shasta Costa Creek	mod	ade	limit	ade	ade	mod	ND	ade	ND
	Silver Creek	ade	ade	limit	ade	ade	mod	ND	ade	ND
MIDDLE ROGUE										
	Coyote Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Galice Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Grave Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Jumpoff Joe Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Pickett Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Quartz Creek	mod	ade	limit	limit	ade	mod	ND	ade	ND
	Rogue River, Jos co line-Evans Crk	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Taylor Creek	mod	ade	limit	mod	ade	mod	ND	ade	ND
	Wolf Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
SEVEN BASINS										
	Evans Creek, East Fork	ade	ade	limit	limit	mod	limit	ND	ade	ND
	Evans Creek, Mainstem	mod	ade	limit	limit	ade	limit	ND	mod	ND
	Evans Creek, West Fork	ade	ade	limit	limit	ade	limit	ND	ade	ND
	Foots Creek	limit	ade	limit	limit	ade	limit	ND	ade	ND
	Galls Creek	limit	ade	mod	limit	mod	limit	ND	ade	ND
	Kane Creek	limit	ade	mod	limit	mod	limit	ND	ade	ND
	Pleasant Creek	mod	ade	limit	limit	mod	limit	ND	ade	ND
	Sams Creek	mod	mod	limit	limit	limit	limit	ND	mod	ND
	Sardine Creek	ade	ade	limit	limit	mod	limit	ND	mod	ND
	Ward Creek	limit	ade	limit	limit	mod	limit	ND	ade	ND
UPPER ROGUE										
	Big Butte Creek	mod	ade	limit	limit	ade	limit	ND	ade	ND
	Elk Creek	mod	ade	limit	mod	ade	limit	ND	ade	ND
	North Fork Butte Creek	limit	ade	mod	limit	ade	limit	ND	ade	ND
	Rogue Rvr, above Lost Creek Dam	limit	ade	mod	mod	ade	limit	ND	ade	ND
	Rogue Rvr, EvansCrk-Lost Ck Dam	limit	mod	limit	limit	limit	limit	ND	mod	ND
	Rogue River, South Fork	limit	ade	mod	limit	ade	limit	ND	ade	ND
	Sugarpine Creek	mod	ade	limit	mod	ade	limit	ND	ade	ND
	Trail Creek	limit	ade	mod	mod	ade	limit	ND	mod	ND

Appendix E: Master Limiting Factors Priorities Table

The *Limiting Factor Priorities Table* identifies the top limiting factors in each representative stream and for the WCA. Factors listed within each priority (one, two, and three) are relatively equal and are not ranked. No order is implied within the priorities, they are listed alphabetically.

Abbreviations for watershed health factors were used to work within the size constraints of the tables. (See: Abbreviations, page 5)

		Aquatic Limiting Factors Priorities		
WCA	Representative Stream	One	Two	Three
Applegate River				
	Applegate River, Lower	Sediment,Temperature	Channel Modification	Barrier,Pl/Rf,WQuan
	Applegate River, Middle	Large Wood,Temperature	Complxty,Sedi,ChMod	Water Quantity
	Applegate River, Upper	Barriers, LgWood,Temperature	Channel Modification	StrmCompx,WQuant
	Carberry Creek	Gravel, Sediment	ChMod,Complxty,Quan	LgWood,Pool/Rfl
	Cheney Creek	Water Quantity	Large Wood	Barriers,Sediment
	Forest Creek	Chem,LWood,Quan,Sedi,Temp	ChnlMod,StrComplxty	/
	Little Applegate River	Barr,LgWood,Quant,Sed,Temp	Stream Complexity	Channel Modification
	Murphy Creek	Water Quantity	ChMod,LgWood,Comp	Temp,Barr
	Slate Creek	Barriers, LgWood,Quant,Temp	Sediment	Chem,Comp,Mod
	Thompson Creek	Chemisrty,WtrQuant,Tempertur	ChMod,LgWood,Comp	Barriers,Sediment
	Williams Creek	Barr,Chemisrty,WtrQuant,Temp	ChnlMod, Lg Wood	Sediment,StrmComp
	WCA Summary	**Barr,LgWood,Temp,Sed,Quant**	**ChnlMod,StrmComplxty**	**Grav,Chem,Pool/Rfl**
Bear Creek				
	Ashland Creek	Barr,Chem,ChnlMod,WtrQuan	LgWood,StrmComplx	Pl/Rfl,Sedi,Temp
	Bear Creek, Main stem	Chem,Mod,Quan,Temp,Wood	Sediment,StrmComplx	Barriers
	Coleman Creek	Chem,LgWood,Temp,WtrQuan	ChlMod,StComplx	Barriers,Gravel,Pl/Rfl
	Emigrant Creek, above dam	Barr,LgWood,Temp,WtrQuantity	ChnlMod,StrmComplx	Chemistry,Sediment
	Emigrant Creek, below dam	Chem,Grav,LgWd,Temp,Quant	ChnlMod,StrmComplx	/
	Griffin Creek	ChnlMod,Chem,WQuan,Temp	Barr,Comp,Sed,Wood	/
	Jackson Creek	Chm,Cmp,Mod,Quan,Temp,Wd	Barriers, Sediment	Gravel
	Larson Creek	ChnlMod,LgWood,Quan,Temp	Barr,Chem,Grav,StComp	/
	Neil Creek	Water Quant,Temperature	Large Wood	Sediment
	Wagner Creek	Large Wood,Temperature	Barriers,StrComplexity	Chem,Mod,Quan,Sed
	Walker Creek	LgWood,Sedi,Temp,WtrQuan	ChnlMod,StrmComplxty	Chemistry
	WCA Summary	**Chem,ChMod,Quan,Temp,Wd**	**Barr,Sedi,StrmComp**	**Gravel, Pool/Riffle**
Illinois Valley				
	Althouse Creek	Sediment,Temp,WaterQuantity	Channel Modification	/
	Briggs Creek	Temperature	Barr,ChnlMod,Sedi	Stream Complexity
	Deer Creek	ChlMod,LWood,Quan,Sed,Temp	Chem,StrmComplxty	Barriers
	Elk Creek	Temperature	Large Wood	/
	Illinois River, East Fork	ChnlMod,Sedi,Temp,WtrQuan	LgWood,StrmComplx	Barriers
	Illinois River, Lower	LgWood,Temp,WaterQuant	Sediment,StrmComplx	Channel Modification
	Illinois River, Upper	ChlMod,LWood,Quan,Sed,Temp	Barriers,Chemistry	Pool/Riffle Ratio
	Illinois River, West Fork	Sedi, Temperature, WtrQuantity	Barr,StComp,LgWood	Channel Modification
	Indigo Creek	Temperature	Sediment	/
	Silver Creek	Temperature	Sediment	Water Quantity
	Sucker Creek	Comp,Mod,Quan,Sed,Temp,Wd	Pool/Riffle Ratio	Barriers
	WCA Summary	**LgWood,Sed,Temp,WtrQuant**	**Barr,ChnlMod,StComp**	**Chem,P/R**
Lower Rogue				
	Estuary	Channel Modification	Chemistry	/
	Jim Hunt Creek	Temperature, Water Quanity	LargeWood,Sediment	/
	Lobster Creek	Temperature, Water Quanity	Sediment	Large Wood
	Quosatana Creek	Temperature	Sediment	Large Wood
	Rogue River, below Illinois	Temp,LargeWood,StrmComplx	Chemistry,WtrQuantity	ChnlMod,Sediment
	Rogue Rvr, Illinois-Grave Crk	Temperature, Water Quanity	Large Wood	ChnlMod,Sediment
	Shasta Costa Creek	Temperature	Large Wood	Sediment
	Silver Creek	Water Quantity	/	/
	WCA Summary	**Temperature, Water Quanity**	**Chem,Comp,Sed,Wd**	**Channel Modificatn**

		Aquatic Limiting Factors Priorities		
WCA	Representative Stream	One	Two	Three
Little Butte Creek				
	Antelope Creek	Chem,LgWood,Temp,WtrQuan	Sed,Cmp,Mod,P/R,Bar	Gravel
	Beaver Dam Creek	Water Quantity	/	/
	Dead Indian Creek	LgWood,Pl/Rfl,Temp,WtrQuan	Channel Modification	/
	Dry Creek	Grav,LgWood,Temp,WtrQuant	Stream Complexity	ChnlMod,Pl/Rfl Ratio
	Lake Creek	Chem,Sedimnt,WtrQuan,Temp	LgWood,Pool/Riffle	Channel Modification
	Lick Creek	Chemistry, Water Quantity	LgWood,Temperature	Pool/Riffle Ratio
	Little Butte Creek, Main stem	Chem,LWood,Quan,Sed,Temp	ChMod,StrComp,Pl/Rf	Barriers,Gravel
	Little Butte Creek, North Fork	Chem,LgWood,Temp,WtrQuan	Barr,ChnlMod,StComp	Pool/Riffle Ratio
	Little Butte Creek, South Fork	Sediment,Temp,WaterQuantity	LgWood,StrmComplx	Barriers
	Little Butte Creek, Upr So Fk	Water Quantity	Large Wood	/
	Lost Creek	Sediment,Temp,WaterQuantity	Pool/Riffle Ratio	Barriers, LargeWood
	Salt Creek	Chemistry, Water Quantity	Barriers,Temperature	LgWood, Pl/RflRatio
	Soda Creek	Sediment,Temperature	LargeWood,Pl/Rfl Rat	Barriers, WtrQuan
	WCA Summary	**Chem,Sedi,Temp,WtrQuantity**	**Mod,Comp,P/R,LgWd**	**Barriers, Gravel**
Middle Rogue				
	Coyote Creek	Temperature	Mod,Sed,Quan,Wood	Barr, StrmComplexity
	Galice Creek	Temperature, Water Quantity	Comp,Mod,Sed,Wood	Barriers
	Grave Creek	Sediment,Temperatr,WtrQuan	ChnlMod,LargeWood	Stream Complexity
	Jumpoff Joe Creek	Barriers,LgWd,Temp,WtrQuan	ChnlMod,Sediment	Gravel
	Pickett Creek	Chnl Mod,Temp,Water Quantity	Large Wood	Barriers,Sediment
	Quartz Creek	LgWood,Temperature	ChnlMod,WtrQuantity	Stream Complexity
	RogueRiver-JoCo line-EvansC	Barriers,ChnMod,Chem,Temp	LgWood,Sed,StComp	Water Quantity
	Taylor Creek	Temperature, Water Quanity	Large Wood	/
	Wolf Creek	Chnl Mod,Temp,Water Quantity	LgWood,Sediment	Barriers,StrmComp
	WCA Summary	**Temperature, Water Quanity**	**Comp,Mod,Sed,Wood**	**Barr,Chem,Gravel**
Seven Basins				
	Evans Creek, East Fork	Temperature, Water Quantity	LgWood,Pool/Riffle	Barriers,ChnlMod
	Evans Creek, Mainstem	ChnlMod,Temp,WaterQuantity	Bar,Comp,P/R,Sed,Wd	Chemistry
	Evans Creek, West Fork	Temperature, Water Quantity	Pool/Riffle,Sediment	Barriers,ChnlMod
	Foots Creek	Temperature, Water Quantity	Barr,Comp,Mod,Wood	Sediment
	Galls Creek	Temperature, Water Quantity	Gravl,LgWood,Sedi	Barr,ChnlMod,Pl/Rfl
	Kane Creek	Temperature, Water Quantity	Sediment	/
	Pleasant Creek	Barriers,Temp,WaterQuantity	ChnlMod,Sediment	/
	Sams Creek	LgWood,Temp,WaterQuantity	Channel Modification	Barriers
	Sardine Creek	Temperature, Water Quantity	ChMod,P/R,Sed,Wood	Barriers
	Ward Creek	LgWood,Temp,WaterQuantity	Grav,Mod,Sed,StComp	Pool/Riffle Ratio
	WCA Summary	**Temperature, Water Quantity**	**Cmp,Mod,Sed,Wd,P/R**	**Barr,Chem,Gravel**
Upper Rogue				
	Big Butte Creek	Barriers,Temp,WaterQuantity	Comp,Mod,Sed,Wood	/
	Elk Creek	Barr,StrmComp,Temp,WtrQuan	ChMod,P/R,Sed,Wood	Gravel
	North Fork Butte Creek	Temperature, Water Quanity	Gravel, Sediment	/
	Rogue Rvr, above Lost Creek Dam	Gravel, Large Wood	Pool/Riffle Ratio	Barriers
	Rogue River,EvansCrk-Lost Cr Dam	Large Wood	Sediment	Gravel
	Rogue Rvr, South Fork	Pool/Riffle, Water Quantity	Barriers	Channel Modification
	Sugarpine Creek	Temperature, Water Quanity	Gravel,Pool/Riffle	/
	Trail Creek	Temperature, Water Quanity	LgWood,Pool/Riffle	ChnlMod,Sediment
	WCA Summary	**Barriers,Temp,Water Quantity**	**Cmp,Mod,P/R,Sed,Wd**	**Gravel**

Appendix F: Crosswalk Table

In this table, OWEB Project Types, as listed on *OWEB Restoration Applications*, (see Bibliography, OWEB) are correlated with the corresponding limiting watershed health factors that are addressed by each project type. One or more limiting watershed health factor may apply for each project type. N/A: no watershed health factor applies.

OWEB Project Types	Limited Watershed Health Factors
Channel and Bank Alteration (CBA)	
Reestablish historical channel (RHC)	Channel Modification
Develop meanders / side channels (DMSC)	Stream Complexity, Channel Modification
Channel relocation (CR)	Stream Complexity, Channel Modification
Bank bioengineering (BB)	Stream Complexity, Channel Modification
Bank sloping (BS)	Stream Complexity, Channel Modification
Gully control (GC)	Sediment
Bank stabilizing barbs (BSB)	Sediment
Stream Habitat Enhancement (SHE)	
Large wood placement (LWP)	Gravel, Stream Complexity, Large Wood, Pool/Riffle Ratio
Instream boulder placement (IBP)	Gravel, Stream Complexity, Pool/Riffle Ratio
Off-channel habitat creation (OCHC)	Stream Complexity
Miscellaneous full spanning weirs (MFSW)	Gravel, Stream Complexity, Pool/Riffle Ratio
Pool construction (PC)	Gravel, Pool/Riffle Ratio
Miscellaneous deflector structures (MDS)	Gravel, Pool/Riffle Ratio
Log, boulder structures (LBS)	Gravel, Stream Complexity, Large Wood, Pool/Riffle Ratio
Salmonid carcass placement (SCP)	N/A
Beaver management (BM)	Large Wood, Stream Complexity, Channel Modification
Instream Water Enhancement (IWE)	
Irrigation efficiency projects (IEP)	Water Quantity
Water right acquisition	Water Quantity
Estuarine Restoration/Enhancement (ERE)	
Tidegate removal / improvement (TRI)	Channel Modification
Dike breaching / removal (DBR)	Channel Modification
Channel reconfiguration (CR)	Channel Modification
Wetland Enhancement (WE)	
Excavation / removal of fill (ERF)	Wetlands
Elimination of drainage structures (EDS)	Wetlands

OWEB Project Types	Limited Watershed Health Factors
Upland Erosion Control (UEC)	
Road improvement (RI)	Roads
Road removal (RR)	Roads
Road drainage improvement (RDI)	Roads
Water/sediment control basins (WSCB)	Sediment
Windbreaks (W)	Wood Source, Vegetation Cover
Upland terracing (UT)	Sediment
Planting upland areas (PUA)	Wood Source
Meadow protection (MP)	Vegetation Cover, Seral Stage, Invasive Species
Reduced Tillage (RT)	Sediment
Grazing Management (GM)	
Grazing management plans (GMP)	Water Quality
Water gap development (WGD)	Water Quality
Livestock water / off-channel (LWO)	Water Quality, Water Quantity, Riparian Shade
Range seeding (RS)	Invasive Species, Sediment
Vegetation Management (VM)	
Brush / weed control / eradication (BWCE)	Invasive Species
Controlled burning (CB)	Fire Risk, Seral Stage
Conifer thinning (CT)	Fire Risk, Seral Stage
Juniper clearing (JC)	Fire Risk, Water Quantity
Invasive species management (ISM)	Invasive Species, Riparian Shade, Temperature, Chemistry
Riparian Area Enhancement (RAE)	
Riparian vegetation planting (RVP)	Temperature, Riparian Shade, Water Quality, Water Quantity, Stream Complexity
Riparian fencing (RF)	Water Quality, Riparian Shade, Sediment, Chemistry
Riparian conifer restoration (RCR)	Temperature, Riparian Shade, Seral Stage
Riparian conservation programs (RCP)	Water Quality, Water Quantity, Instream Habitat
Fish Passage Improvement (FPI)	
Fish passage structures (FPS)	Migration Barriers
Alternatives to push-up dams (APD)	Migration Barriers, Sediment
Correcting road/stream crossings (CRSC)	Migration Barriers, Sediment

Appendix G: Resources

The following resources are listed by source. To access the listed documents contact the organization that provided it directly. (See: Appendix M: Contact Information.)

#	Title	Date	Author
	Applegate River Watershed Council		
1	Murphy Watershed Analysis	Feb-00	USDI, BLM, Medford District, Grants Pass Resource Area
2	Beaver Creek, Palmer Creek & Adjacent Watershed Analyses	/	USFS RRNF
3	Carberry Creek Watershed Analysis 1996	Jun-96	Whitall, Sitton, Rose, etal. Applegate Ranger District, RRNF
4	Stream Habitat & Water Quality in Applegate Basin	Nov-04	ARWC
5	Squaw, Elliot, Lake Watershed Analysis	1995	/
6	Applegate River Watershed Assessment	Nov-94	ARWC
7	Slate Creek Watershed Analysis	Sep-02	ARWC
8	Cheney Creek Watershed Assessment	/	ARWC, Reeve, Piaskowski, Maier, Livingston, Franklin
9	Little Applegate River Watershed Assessment	Jan-01	ARWC
10	Aquatic Monitoring Program 2002-2003 Report	May-04	ARWC
	Bear Creek Watershed Council		
11	Southwest Oregon Salmon Restoration Initiative, Coho	/	Prevost, Horton, MacLeod, Davis
12	Southwest Oregon Salmon Restoration Initiative, Steelhead	8/7/97	Prevost, Horton, MacLeod, Davis
13	Emigrant Creek Watershed Demonstrtion Project	Dec-01	Friends of the Greensprings
14	Bear Creek Watershed Assessment	/	BCWC, Horton
15	Cascade-Siskiyou National Monument MP/EIS	/	BLM
16	Rogue Basin Fish Access Team Strategic Plan	Sep-00	Bird, Follansbee, Hudson, etal.
17	Tyler Creek Wastewater Stabilization	Mar-04	USDI BOR, Lower Columbia Area Office
18	Tyler Creek Waterway Restoration Design	10/23/04	Insight Consultants
19	Jackson Creek Watershed Assessment	Mar-01	Lockhard, Franklin, Cross, Horton
20	Jackson Creek Watershed Action Plan	Dec-01	Lockhard
21	RVCOG Water Quality Monitoring Program: 2002-2003 Biannual Report Draft	Jun-04	RVCOG
22	Natural Hazard Mitigation Reference	May-00	/
23	Bear Creek Low Flow study	Dec-95	Prevost, Pierce, Chesbough
24	Bear Creek Watershed Riparian Planting Plan	Oct-04	RVCOG
25	Ecological Resources of Bear Creek Greenway	Nov-89	Sharp, Wilson, Kruger, Northwest Soil Consulting
26	Bear Creek Watershed Flow Study	1997	Robert W. Pierce
27	Bear Creek Watershed Physical stream surveys	/	BLM, ODFW, USFS,

#	Title	Date	Author
	Illinois Valley Watershed Council		
28	Illinois River Watershed Assessment	Dec-99	NRCS, Roy Manning
29	Illinois River Stream & Shade Channel Assessment	2002	/
30	Illinois Valley Surface Hydrology Project	/	/
31	Lower Sucker Creek TMDL&Water Quality Managmt Plan	Oct-01	ODEQ
32	Illinois River Watershed Assessment & Action Plan	Mar-95	IVWC
33	Illinois Valley Groundwater Assessment OWEB # 200-040 Project Completion Report	May-05	IVWC, OWRD
	Little Butte Creek Watershed Council		
34	Little Butte Creek Watershed Action Plan	Feb-95	Anthony& Grenbemer
35	Little Butte Creek Watershed Council Projects	2005	Lu Anthony
36	Little Butte Creek Watershed Barrier Removal to date	3/3/05	Lu Anthony
37	Little Butte Creek WatershdCncl Assessment&Action Plan	Aug-03	Steve Mason
	Lower Rogue Watershed Council		
38	Rogue Basin Restoration Projects In OR W Restoration Inventory	/	/
39	Lower Rogue Watershed Assessment	Aug-05	Dana Hicks
	Middle Rogue Watershed Council		
40	Grave Creek Watershed Assessment, Plan & Education	Jan-02	/
41	Grave Creek Watershed Assessment, 2002 Temprature Study: methods, results & action plan	Jul-03	Rene F. Pellissier
42	Grants Pass Irrigation District Water Management Study	Mar-94	David J. Newton Assoc. Inc.
43	Jumpoff Joe Watershed Analysis	Jun-98	USDI, BLM, Medford District, Grants Pass Resource Area
44	Rogue-Grants Pass Watershed Analysis	Aug-98	USDI, BLM, Medford District, Grants Pass Resource Area
45	Rogue-Recreation Section Watershed Assessment 1999	Jan-99	USDI, BLM, Medford District, Grants Pass Resource Area
46	Wild Rogue North Watershed Analysis	Dec-99	Bornstein, Simodynes, Eichamer, etal.
47	Wild Rogue South Watershed Analysis 2000	Mar-00	USDI, BLM, Medford District, Grants Pass Resource Area
48	Middle Rogue Watershed Action Plan 2001	Jun-01	MRWC
49	Middle Rogue Watershed Action Plan 2001	Jun-01	MRWC
50	Middle Rogue Watershed Action Plan	Jan-95	MRWC
51	Middle Rogue Watershed Assessment 2001	Jun-01	MRWC
52	MRWA Assessment, GIS data layers	1998	/
53	MRWA Assessment, GIS data	1998?	/
54	Middle Rogue Watershed Council Assessment	Mar-01	MRWC
55	Wolf Creek Water Survey 1997	2/19/97	Grace Zilverberg
56	Middle Rogue SubBasin Limiting Factors & Project priority	/	/
	Upper Rogue Watershed Council		
130	URWA Watershed Assessment	1995	URWC

#	Title	Date	Author
	Seven Basins		
57	Watershed Analysis-East Fork Evans Creek	Mar-96	Bergin, Dinwiddie, Hale, etal.
58	Watershed Analysis-West Fork Evans Creek	Apr-95	Coffey, Glover, Harper, etal.
59	Ladscape Analysis - Middle Fork Evans Creek	May-94	Bergin, Budena, Dinwiddie, etal.
60	South Rogue-Gold Hill Watershed Analysis	Aug-01	/
61	Seven Basins Watershed Fish Distribution	/	/
62	Rogue Basin Fish Distribution Database/Comments	5/5/03	Jay Doino
63	Seven Basins Watershed Council Watershed Assessment	2/27/04	Environmental Mngmt Svcs Inc.
64	Seven Basins WatershedCnclWatershed AssessmentFigs	2/27/04	Environmental Mngmt Svcs Inc.
	Rogue Valley Council of Governments		
65	Bear Creek Watershed Plan and EIS 1995	1995	/
66	Agate Dessert Vernal Pool Surveys	3/19/01	David Evans & Assoc, Inc.
67	Regional NPDES Phs II Stormwater Program Guide	Mar-04	Tetra Tech & RVCOG
68	RVCOG Water Quality Monitoring Program: 2000-2001 Annual Report Draft	Dec-02	RVCOG
69	RVCOG Water Quality Monitoring Program 2002-2003 Biannual Report Draft	Jun-04	RVCOG
70	Roca Creek Watershed Assessment	10/15/97	Richard Hart
71	City of Gold Hill Fish Passage Improvements a the Municipal Water Supply Diversion: Phs II	Sep-01	BOR
72	Bear Creek Water Quality Analysis and Action Plan	2000	Lori M. Olson
73	Instream Water Use Inventory for the Bear Creek Basin	Dec-94	Eric Dittmer
74	Bear Creek/Little Butte Creek Water management Study Appraisal Report	Feb-01	USDI, BOR, Pacific NW Region, Lower Columbia Area Office
75	Bear Creek/Little Butte Creek Water management Study Appraisal Report Appendix	Feb-01	USDI, BOR, Pacific NW Region, Lower Columbia Area Office
76	Level II Stream Survey Report, Neil Creek	Feb-00	Ecosystems Northwest
77	Oregon's Living Landscape	1998	Heagerty, Imeson, Flores, etal.
78	Ashland Creek 2000 Level II Stream Survey Report	Jan-01	Siskiyou Reasearch Group
79	Final EIS Ashland Watershed Protection Project	Jan-01	Kristi Mastrofini
80	Rogue River Basin Project Talent Division - Oregon, Facilities and Operations	Apr-02	Larry Vinsonhaler
81	1995 Bear Watershed Analysis	1995	USFS RRNF, Ashland Ranger District
82	1995 Bear Watershed Analysis Appendices	1995	USFS RRNF, Ashland Ranger District
83	Upper Rogue District Guide to Restoration Site Selection	Nov-97	ODFW
84	Bear Creek Watershed Plan and EIS	Jul-95	USDA, Natural Resources Conservation Services
85	Bear Creek Valley "2050" Municipal Water Supply Plan	11/5/97	/
86	Draft Environmental Assessment, Larson Creek Pipeline & Fish Passage Project	Aug-04	USDI BOR, Lower Columbia Area Office
87	Wagner Creek Watershed Assessment	May-99	RVCOG, William Meyers
89	Silver Creek Watershed Analysis	Apr-95	Tom Link, et.al.
90	Illinois River Watershed Assessment and Action Plan	Mar-95	IVWC

#	Title	Date	Author
	Rogue Valley Council of Governments		
91	Middle Applegate Watershed Analysis v1.3 Exec Summary	Aug-95	USDI BLM Medford Office, Ashland Res Area
92	Watershed Council projects Funding list	/	/
93	Illinois River Basin Temperature Study 1992-93	1993	David A. Krebs
94	Illinois River Snorkel Study	Sep-92	Pete & Susan Baughman
95	GWEB appl:Bear Creek Assessment and Action Plan	1997	BCWC
96	Griffin Creek Stream Survey and Assessment	Nov-98	Quinby, Meyers, Smith
97	Rogue Basin Fish Management Plan	4/26/93	Fustish, Satterthwaite, MacLeod, et.al.
98	Rogue River Erosion/Deposition Study	Dec-93	Klingeman, Cordes, Nam
99	Rogue River Basin Study	Jan-83	Water Resouces Dept. Young
100	Oregon Geography, The people, the place, the time	/	Samuel Dicken
105	Coastal Salmon Recovery Initiative for Coho	1996	RVCOG, Horton, MacLeod, Prevost, Davis
106	Coastal Salmon Recovery Initiative for Steelhead	1997	RVCOG, Horton, MacLeod, Prevost, Davis
134	AshlandBelowRes-AveShade.xls	/	RVCOG excel file, Craig Harper
135	Bear Ck assessment.xls	/	RVCOG excel file, Craig Harper
136	Bear Ck assessmÉshlandCalcs.xls	/	RVCOG excel file, Craig Harper
	The Nature Conservancy		
101	Klamath Mountains Ecoregional Assessment	2004	
133	The Nature Conservancy's Klamath Mountains and Cascades Ecoregional Assessments	4-1-04	conserveonline.org/coldocs/2004/10/Klamath_Mountains_Ecoregional_Assessment_report.pdf
	Oregon Department of Fish and Wildlife		
108	Stream survey - Applegate System	1990's	ODFW
109	Stream survey -Carberry Creek	1990's	ODFW
110	Stream survey -Forest Creek	1990's	ODFW
111	Stream survey -Thompson Creek	1990's	ODFW
112	Stream survey -Williams Creek	1990's	ODFW
113	Stream survey -Cheney Creek	1990's	ODFW
114	Stream survey -Murphy Creek	1990's	ODFW
115	ODFW spawning surveys	1990's	ODFW
116	Stream Survery - Althouse	1990's	ODFW
117	Stream survey -Briggs Creek	1990's	ODFW
118	Stream survey -West Fork Illinios	1990's	ODFW
120	Stream surveys -Silver Creek	newer	ODFW
121	ODFW Stream survey Silver Creek	1990's	ODFW
122	ODFW Estuary survey for Rogue River	1990's	ODFW
123	ODFW Stream survey - Grave Creek	1990's	ODFW
125	ODFW Stream survey - Quartz Creek	1990's	ODFW
127	ODFW Stream survey for Evans Creek (includes private land)	1990's	ODFW
129	ODFW stream survey - Little Butte Creek	1990's	ODFW
	Upper Rogue District Guide to Restoration Site Selection	1997	ODFW

#	Title	Date	Author
	Miscellaneous Sources		
102	Rogue Restoration Project Summary	3/14/05	Bobbi Riggers
103	Rogue Basin Fish Passage Barrier Removal Strategic Plan	Aug-00	Rogue Basin Fish Access Team, RBCC
104	Interagency Vegitaton Mapping Program		www.or.blm.gov/gis/projects/vegetation/
107	The 2002 303(d) List of Impaired Waters in Oregon	2002	www.deq.state.or.wq.wqfact/final2002_303(d)list.pdf
119	USFS Stream survey Indigo Creek	newer	USFS Siskiyou National Forest
124	USFS Stream survey - Taylor Creek		USFS
126	BLM stream survey Evans Creek (BLM lands only)		USDI BLM, Butte Falls Resource Area
128	USFS stream survey - Neil Creek		USFS - RRNF, Ashland Ranger District
131	Fuels Reduction Projects, GAO-01-1114R	8-31-01	Government Accounting Office
132	Oregon Wildlife Conservation Strategy	Sep-06	dfw.state.or.us/conservationstrategy
#	**Description**	**Date**	
200a	Jerry MacLeod personal observation of spawning survey; Lower Illinois Valley and Lower Rogue in 1960's	1960's	
200	Jerry MacLeod Personal observation of spawning survey; Upper Rogue above Illinois Valley and Applegate in 1990's	1990's	
201	Jerry MacLeod personal observation - inspected the sight.		
202a	Jerry MacLeod physical stream survey: Lower Illinois Valley and Lower Rogue in 1960's	1960's	
202	Jerry MacLeod walked or floated the stream: Above the lower Illinois Valley in 1990's	1990's	
203	Personal experience as district biologist, including work with Corps of engineers, PGE, and other state and federal agencies sharing information and knowledge.		

Appendix H: Watershed Health Factors Matrix Conclusion Resources

The *Database Matrix of Aquatic Resources* that follows indicates the data resources used to draw the conclusions listed in the *Watershed Health Factors Matrix*. (See: Appendix D: Master Watershed Health Factors Matrix.) Numbers in the cells of this matrix refer to the descriptive document number in the *Resources*. (See: Appendix G: Resources.)

Conclusions for the terrestrial portion of the *Watershed Health Factors Matrix* were drawn using data available through the *Interagency Vegetation Mapping Project*. (See: Appendix I: Interagency Vegetation Mapping Project.)

Several of the terrestrial factors were derived from remotely-sensed satellite imagery: multi-spectrum photographs of the Earth's surface taken by satellite. The imagery is then classified into different vegetation categories. These 1996 satellite data were analyzed and classified in an interagency effort from the US Forest Service and US Department of Interior. (See: Appendix I: Interagency Vegetation Mapping Project.) Although these satellite data have some limitations, satellite data were used because they offered coverage of the entire Rogue Basin. This allowed for a more consistent analysis of upland watershed health factors. Many watershed assessments do not include an analysis of upland factors and local agency data are not consistent across jurisdictions.

One of the primary limitations of satellite data is that they cannot measure anything underneath the forest canopy. Vegetation layers or fuel loadings, important components affecting the health of forests and riparian areas, are invisible. Therefore, a substitute must be used to estimate these factors. For example, for this document, the amount of vegetation in a late seral stage was estimated by calculating the percentage of trees in a particular diameter class (>24‰ diameter-breast-height) across each representative stream. When calculating fire risk, late seral vegetation was then used as a substitute for fuel loading, based on the assumption that more fuels are present on the ground as forest stands age. (This assumption is not accurate for all plant communities and forest stands; however, it allows us to make a rough estimate of fire risk across the entire Rogue Basin.)

Database Matrix of Aquatic Resources					
WCA	Representative Stream	Temperature	Chemistry	Sediment	Water Quantity
ARWC					
1	Applegate River, Lower	76, 77, 107	107	6	107
2	Applegate River, Middle	107	107	6, 107	107
3	Applegate River, Upper	107	107	107	107
4	Carberry Creek	107	107	3	3
5	Little Applegate River	9, 105, 107	107	9, 105	9, 106
6	Slate Creek	7, 107	7, 107	7	7, 105
7	Forest Creek	107	107, 202	4, 202	4, 202
8	Thompson Creek	107	107	107	6
9	Williams Creek	107	107	7, 105, 107	6, 105
10	Cheney Creek	8, 107	8, 107	8	8, 105
11	Murphy Creek	1, 107	1, 107	1, 107	1
BCWC					
1	Bear Creek, Main stem	107	72, 107	14, 202	26, 107, 202
2	Ashland Creek	14, 27, 78	107	107, 202	14, 28, 202
3	Coleman Creek	107	107	14, 127	14, 27
4	Emigrant Creek, above dam	107	107	14, 127	14, 27
5	Emigrant Creek, below dam	107	107	14, 202	14, 27, 202
6	Jackson Creek	107	107	19	14, 19
7	Griffin Creek	107	107	14, 96	14, 96
8	Larson Creek	107	107	14, 27	14, 27
9	Neil Creek	107	107	14, 81	14, 81, 106
10	Wagner Creek	107	14, 107	14, 87	14, 87
11	Walker Creek	107	107	14, 27	14, 27
IVWC					
1	Illinois River, Lower	107	107	28	28
2	Illinois River, Upper	107	107	28	28, 107
3	Althouse Creek	107	107	105	28, 105
4	Briggs Creek	107	107	117	117
5	Deer Creek	107	28	28	28
6	Illinois River, East Fork	107	107	105, 202	107
7	Illinois River, West Fork	107	107	28	107
8	Indigo Creek	107	107	119	119
9	Silver Creek	107	107	120	120
10	Sucker Creek	107	106	1, 106, 202	107
11	Elk Creek	107	107	28, 105	28, 105
LRWC					
1	Estuary	107, 122	107, 122	107, 122	122, 102
2	Rogue River, below Illinois	107	107, 202a	39, 107	39, 202a
3	Rogue River, Illinois - Grave Creek	107	107	39, 202a	39, 202a
4	Lobster Creek	107	107	39, 106	39, 106
5	Jim Hunt Creek	39, 202a	107	39, 202a	39, 202a
6	Quosatana Creek	107	107	39, 105	105, 202a
7	Shasta Costa Creek	107	107	39, 105	39, 105
8	Silver Creek	107	107	39, 106	39, 106

Database Matrix of Aquatic Resources						
WCA	Large Wood	Gravel	Pool/Riffle Ratio	StrmComplexity	Barriers	Chanl Modifictn
ARWC						
1	6, 108	108, 200,	108, 200,	6	6	6, 200,
2	108	108, 200,	6, 108	6	108, 200,	6
3	108, 2	108, 200,	200	6, 200,	6, 201	6
4	3	3	3	3	3, 109	3
5	9, 106	9, 106	106	9, 106	9, 106	9, 106
6	7, 105	7, 105	7, 105	7, 105	7, 105	7, 105
7	110, 202	110, 202	110, 202	110, 202	110, 202	110, 202
8	111	111	6, 111	6	6, 111	6
9	6, 105, 202	6, 105, 202	6, 105	6, 105, 202,	5, 112, 202	6, 105, 202
10	8, 113	8, 113	8, 105	8, 105	8, 105	8, 105
11	114	1, 114	114	1	1, 114	1
BCWC						
1	14, 27, 106, 202	14, 106	14, 106	14, 106, 202	14, 16, 202	106, 107, 202
2	14, 28	14, 78	78, 202	78, 202	16, 202	78, 202
3	14, 27	14, 27	14, 27	14, 27	14, 16	14, 27
4	14, 27	14, 27	14, 27	14, 27	14, 27, 201	14, 27
5	14, 27, 202	14, 27, 202	14, 27, 202	14, 27, 202	14, 27, 202	14, 27
6	14, 19	14, 19	14, 19	14, 19	14, 19, 16	14, 19
7	14, 96	14, 96	14, 96	14, 96	14, 16	14, 96
8	14, 27	14, 27	14, 27, 202	14, 27, 202	16, 202	14, 27, 202
9	14, 81, 106	14, 106	14, 81, 106	14, 81, 106	14, 16, 81	14, 81, 106
10	14, 87	14, 87	14, 87	14, 87	14, 16	14, 87,
11	14, 27	14, 27	14, 27	14, 27	16, 27	14, 27
IVWC						
1	28	200a	200a	200a, 202a	28, 202a	28, 202a
2	28, 29	115, 200,	115, 200,	2, 200, 202	28, 202	28, 202
3	28, 105	116	105, 116	28, 105, 115	28, 105	28, 105
4	117	117	117	117	117, 201	117, 202
5	28	115	115	28, 115	28, 115	28, 115
6	105	105, 115, 202	105, 115	105, 115	115	105, 115, 202
7	28, 118	118	118	118	118, 202	202
8	119	115	115, 118	118	115, 118	118
9	120	120, 121	120, 121	120, 121	120, 121	120, , 121
10	31, 106	31, 106	106, 31	106	201, 106	31, 106, 202
11	105	115, 28, 200,	115, 200,	115, 200, 202	202	28, 115, 202
LRWC						
1	122, 202a	122, 202a	122, 202a	122, 202a	122, 202a	122, 202a
2	39, 202a	202a	202a	39, 202a	202a	39, 202a
3	39, 202a	115, 202a	115, 202a	115, 202a	115, 202a	115, 202a
4	39, 202a	39, 106	39, 106	39, 106, 202a	202a	39, 106, 202a
5	39, 202a	39, 112, 102	39, 115, 202a	39, 115, 202a	202a	39, 115, 202a
6	39, 105	105, 202a	105, 202a	105, 202a	202a	105, 202a
7	39, 105, 202a	39, 105, 202a	105, 202a	105, 202a	202a	105, 202a
8	106, 202a	106, 202a	106, 202a	106, 202a	202a	106, 202a

Database Matrix of Aquatic Resources					
WCA	Representative Stream	Temperature	Chemistry	Sediment	Water Quantity
LBCWC					
1	Little Butte Creek, Main stem	107	107	37, 107	37
2	Antelope Creek	107	107	106	37, 106, 107
3	Beaver Dam Creek	107	107	37	37
4	Dead Indian Creek	107	107	37	37
5	Lake Creek	107	107	107	37
6	Salt Creek	37	107	37	37
7	Dry Creek (in Antelope layer)	37, 202	107	37	37
8	Lick Creek	37, 202	107	37	37
9	Lost Creek	107	107	107	37
10	Soda Creek	107	107	107	37
11	Little Butte Creek, North Fork upr & lwr	107	107	37	37
12	Little Butte Creek, South Fork	107	107	107	37, 106
13	Little Butte Creek, Upper South Fork	107	107	37, 106	37, 106
MRWC					
1	Rogue River, JosCo line to Evans Crk	107	107	47, 48, 107	, 48, 107, 202
2	Galice Creek	107	51, 202	51, 107, 202	51
3	Grave Creek	107	107	41, 123	41, 123
4	Jumpoff Joe Creek	107	43, 202	43, 107, 202	43, 107, 202
5	Pickett Creek	107	51	51	51, 107
6	Wolf Creek	107	107	51, 106	51, 106, 107
7	Coyote Creek	107	107	106, 107	51, 106, 107
8	Taylor Creek	107	107	124	51, 124
9	Quartz Creek	107	107, 125	125	51, 125
SBWC					
1	Evans Creek, Main stem	107	6, 107	63	63
2	Evans Creek, West Fork	107	107	61, 106	61, 106
3	Evans Creek, East Fork	63	107	63	63
4	Foots Creek	107	107	63, 106	63, 106
5	Kane Creek	107	107	63, 127	63, 127
6	Galls Creek	107	107	63, 127	63, 127
7	Sams Creek	107	107	63, 127	63, 127
8	Sardine Creek	107	107	63, 127	63, 127
9	Pleasant Creek	107	107	63	63
10	Ward Creek	107	107	63, 127	63, 127
URWA					
1	Rogue River, GldReyDam-LostCkDam	130, 203	107	130, 203	130, 203
2	Rogue River, above Lost Creek Dam	130, 203	107	130, 203	130, 203
3	Big Butte Creek	107	107	106	106, 130,
4	Elk Creek	107	107	105, 130	105, 130,
5	Trail Creek	107, 202	107	106	106, 202, 203
6	Rogue River, South Fork	107, 13	107	130	130
7	N Fork Butte Cr	107	107	106	106
8	Sugarpine Cr	107	107	105	105, 202

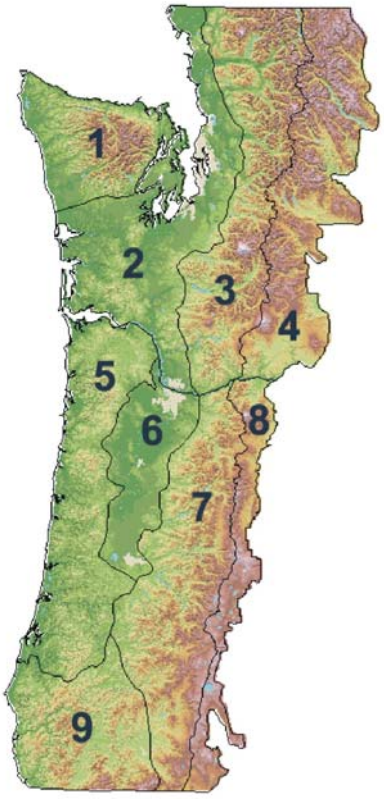
Database Matrix of Aquatic Resources						
WCA	Large Wood	Gravel	Pool/Riffle Ratio	StrmComplexity	Barriers	Chanl Modifictn
LBCWC						
1	37, 129	37, 129	37, 129	37	36, 37, 129	37, 129
2	37, 106	37, 106	37, 106	37, 106	37, 106	37, 106
3	202	202	202	202	37, 202	37, 202
4	37	37, 115	37, 115	37	37, 115	37
5	37, 202	37, 115, 202	37, 115	37, 115, 202	37, 202	37, 202
6	37, 115	37, 115	37, 115	37, 115	37	37, 115
7	37, 202	202	202	202	36, 202	37, 202
8	37, 202	37, 202	37, 202	37, 202	37, 202	37, 202
9	37	37, 115	37, 115	37	37, 115	37
10	37	115	115	37	37, 115	37
11	37	37, 115	37, 115	37	37, , 115	37
12	37, 106	37, 106, 115	37, 106, 115	37, 106	37, 106	37, 106
13	37, 106	37, 106	37, 106, 202	37, 106	37, 106	37, 106, 202
MRWC						
1	47, 48, 202	47, 48, 115, 202	47, 48, 115, 202	47, 48, 115, 202	47, 48, 201	47, 48, 2020
2	51	51	51	51	51	51, 201
3	41, 123	41, 123	41, 123	41, 123	41, 123	41, 123
4	43, 202	43, 202	43, 202	43, 202	43, 201	43, 202
5	51, 202	51, 115, 202	51, 115, 202	51, 115, 202	51, 202	107, 202
6	51, 106	51, 106	51, 106	51, 106	51, 106	106, 107, 51
7	51, 106	51, 106	51, 106	51, 106	51, 106	51, 106, 201
8	51, 124	51, 124	51, 124	51, 124, 201	124	51, 124
9	105, 115, 125	105, 115, 125	105, 125	105, 125, 202	125	105, 125
SBWC						
1	63, 126	126	126	63, 126, 202	63, 126, 127	63, 126
2	61, 126	61, 126	126	61, 126	121, 127	127
3	63	63, 127	63, 127	63	63	63, 127
4	63, 106, 115	63, 106, 115	63, 106	63, 106	63, 106	63, 106
5	63, 127	63, 127, 115	69, 127	63, 127	127	63, 127
6	63, 127	63, 127, 115	63, 127	63, 127	127	63, 127
7	63, 127	63, 127, 115	115, 127	127	127	63, 127
8	63, 127	63, 127, 115	63, 127	63, 127	127	63, 127
9	63, 127	63, 127	63, 127	63, 127	127	63, 127
10	127, 202	115, 127, 202	127, 202	63, 127, 202	127, 202	127, 202
URWA						
1	130, 201	130, 203	130, 203	130, 202	130, 201	130, 202
2	130, 202	130, 202	130, 202	130, 202	202, 203	130, 202
3	106, 130	130, 106, 202	130, 106, 202	106, 202	106, 201	106, 202
4	105, 130,	105, 130,	105, 130,	130, 202	130, 201	130, 202
5	106, 202	106, 202	106, 202	106, 202	202	106, 202
6	130	130	130	130	130, 203	130
7	106	106	106	106	106	106
8	105, 202	105, 202	105, 202	105, 202	105, 202	105, 202

Appendix I: Interagency Vegetation Mapping Project

Effectiveness monitoring for the Northwest Forest Plan requires comprehensive and consistent maps of existing vegetation. The Plan area includes 24 million acres of federal land in Washington, Oregon, and northern California, primarily on the western side of the Cascade Mountains. The Forest Service and the Bureau of Land Management jointly funded the Interagency Vegetation Mapping Project (IVMP) to develop maps of existing vegetation for the Northwest Forest Plan area in Oregon and Washington. These layers were used to estimate the current conditions for the Rogue River Basin.

The IVMP approach combines remotely sensed satellite imagery with FS, BLM, and Forest Inventory and Analysis (FIA) inventory plot field data and plot photo interpreted information to produce existing vegetation maps. The final products include canopy cover maps for conifer, broadleaf, and combined vegetation, and size (quadratic mean diameter).

The project area is stratified into 9 physiographic provinces:



1. Olympics
2. Western Washington Lowlands
3. Western Cascades Washington
4. Eastern Cascades Washington
5. Oregon Coast Range
6. Willamette Valley
7. Western Cascades Oregon
8. Eastern Cascades Oregon
9. Klamath Province Oregon

We were particularly interested in the continuous coverage for the Western Oregon Cascades (7) and the Klamath Province (9).

IVMP data were used to assess the current condition of the Rogue River Basin. Refer to the definitions for terrestrial watershed health factors. (See: Appendix C: Evaluation Standards) Wood source was based on cover and quadratic mean diameter (QMD) continuous coverage. Vegetation cover was estimated directly and seral stage was estimated from a combination of conifer cover and QMD. Development and agricultural cover was classified as part of overall coverage and could be estimated directly. A road layer from RVCOG (Rogue Valley Council of Governments) was used to estimate road mileage by area. Fire risk was based on vegetation cover and QMD. Riparian Shade was estimated using streamside vegetation within 150 feet from the stream centerline. Stream coverage was also provided by RVCOG. There was no consistent Basin information for wetlands or invasive species.

Web sites: Latest IVMP information and map data downloads:
http://www.or.blm.gov/gis/projects/vegetation/.

Contact Information:

Melinda Moeur, Forest Service Region 6, (503) 808-2811
Jim Alegria, BLM, (503) 952-6090
Ralph Warbington, Forest Service Region 5, (916) 454-0809

Appendix J: List of Meetings Held

Meeting	Date
Regional Restorations Priorities Committee	11/18/04, 1/24/05, 2/14/05, 2/28/05, 3/14/05, 3/28/05, 4/11/05, 4/25/05, 5/9/05, 5/18/05, 6/13/05, 6/27/05, 7/25/05, 8/22/05, 11/10/06
Contractor and Subcontractors	7/20/05, 9/8/05, 10/5/05, 10/17/05, 3/16/06
WHF Matrix and Document Format	8/3/05, 12/30/05, 1/30/06
Watershed Council Presentations (Task 4)	10/10/05 BCWC, 10/13/05 LRWC, 10/17/05 URWC, 10/18/05 SBWC, 10/24/05 MRWC, 10/26/05 LBCWC, 10/27/05 ARWC, 10/17/05 IVWC, 2/13/06 BCWC
Prioritization System Development (Task 5)	11/7/05, 11/17/05, 11/29/05, 12/1/05, 12/20/05
Rogue Basin Coordinating Council (Contractor reports)	7/25/05, 8/22/05, 9/26/05, 10/24/05, 11/28/05, 12/19/05, 1/23/06, 2/27/06, 3/27/06
Draft Review (Tasks 6,7, 8)	1/3/06, 1/30/06, 2/10/06
Public Review Presentations (Task 9)	3/6/06 Eagle Point, OR 3/9/06 Grants Pass, OR 3/10/06 Medford, OR 3/16/06 Gold Beach, OR
Project Team Comment Review (Task 10)	3/20/06

Appendix K: Comments Received

RESPONSE TO THE
WATERSHED HEALTH
FACTORS ASSESSMENT

At the meeting at the Eagle Point Ashpole Center on March 6, 2006, the RBCC sponsored draft copy of the Watershed Health Factors Assessment was presented. This is my response to that presentation.

First and foremost, Tatiana, Jerry and Tom deserve a heartfelt thanks for the difficult job of putting together this assessment. It was not easy, and making viable judgments about the individual factors that interact to give a comprehensive view of each watershed is a difficult process. They have done a great job and should be commended.

My problems with the assessment deal not with the document itself, but with the limited scope that was mandated for the team to work with.

It is my understanding that the original concept was to provide quantitative data about each watershed, and to evaluate the relative health factors on a regional basis. That concept was changed to a more general and non-basin evaluation, looking at each watershed on its own merits without regional correlation.

I realize that there are a lot of factors at work when dealing with a number of volunteer organizations who are vying for grant dollars at the state level. The avoidance of confrontation between the watershed councils appears to be a major factor in the redirection of the project midstream.

This project is a very viable first step. It has brought the eight watershed councils together cooperatively better than almost any other situation has in terms of working for a common purpose and achieving a unified goal, however general that goal may be. This is to be commended and applauded. It also needs to be built on to provide a far more comprehensive regional plan that encompasses scientific data so as to be able to look at where those scarce dollars must go to get the “most bang for the buck” (to coin a phrase.)

Unfortunately, there are flaws in the overall project definition, over which the team had no control.

The major flaw as I see it is the lack of any quantitative evaluation that could give a cumulative overview of the health of the watersheds as seen on a regional basis. This lack of a quantitative evaluation negates much of the work that was done, since it does not provide any structure upon which priority judgments as to future projects and emphasis can be made.

It is difficult at best to quantify the various conditions that affect watershed health, and all but impossible to show correlations between varied and seemingly unrelated factors (which are in reality related, albeit in a secondary or tertiary way).
However, even a ‘best guess’ weighting of these factors and an overall averaging of the independent variables in this equation would be better than the nebulous non-conclusions that can be drawn from this report.

It is a great primer on the individual watersheds. It describes the various factors that go into the data that is presented. It goes into detail about where the data came from. It has good graphics that show the individual watersheds and some graphical data. For the totally uninitiated, it may be a viable educational tool as to the various problems faced by Rogue Basin Watersheds. If that was its intent, then it has achieved its goal.

That being said, it is relatively useless as a tool to determine priorities and to place emphasis on those problems. It makes no comparison between the relative health of the various watersheds on a regional basis. The individual watersheds and streams within them have problem variables identified, but no ability to prioritize which of these streams needs the most urgent work can be drawn from the report.

The original name for the project, “Regional Restoration Priorities”, defines in my mind what the project should have done. There should have been an “educated guess” from the well-respected and qualified scientists on the team as to the focus needed within the basin for restoration. We seem to have gone from a promise of a great hearty breakfast to getting a bowl of pablum. There is nothing in this project report that could not be obtained from the individual watershed assessments that are already available or in process throughout the basin.

I hesitate to place a value on this project and its conclusions. The team did an outstanding job in putting this data together under the restrictions placed on them by the project plan. It may be of value to OWEB and the legislature in an educational venue, but as an evaluation tool in project prioritizing and funding, I personally find it almost unusable in terms of making those judgments, even on an individual watershed basis.

Patricia A. Whitney
Stakeholder
South Fork Little Butte Creek
3-9-06

Appendix L: Watershed Council/Agency Team

Organization	Team Member	Position
RBCC	Kevin O'Brien	Watershed Health Factors Assessment Co-chair
	Brad Carlson	Watershed Health Factors Assessment Co-chair
	Pam Galey	WHFA Contract Officer
	Rose Marie Davis	WHFA Project Manager, Acting Contract Officer
	John Ward	RBCC president
	Janelle McFarland	RBCC president
ARWC	Daniel Newberry	Watershed Council Coordinator & WHFA volunteer
	Joe MacAleavey	WHFA Representative
	Zach Stevenson	Watershed Council Coordinator
	Chris Vogel	WC Monitoring Coordinator, WHFA Representative
BCWC	Kara King	WC Coordinator and WHFA Representative
	Jeannine Rossa	WHFA Representative
	Beth Franklin	Watershed Council Coordinator
IVWC	Kevin O'Brien	Watershed Council Coordinator
LRWC	Dana Hicks	Watershed Council Coordinator
	Peter Aspinwall	Watershed Council Chair
LBCWC	Lu Anthony	Watershed Council Coordinator
MRWC	Brad Carlson	Watershed Council Coordinator
SBWC	Gail Perrotti	Watershed Council Coordinator
	Dave Graham	WHFA Representative
	John Nally	WHFA Representative
URWA	Pam Galey	Past Watershed Council Coordinator
	Paula Trudeau	Assisting with coordination
	Don Nelson	WC Coordinator & WHFA Representative
	Ruth Nelson	WC Coordinator's Assistant
ODFW	Jay Doino	Watershed Liaison/Fishery Biologist
BLM	Dale Johnson	Fishery Biologist
FS	Randy Frick	Fishery Biologist
OR DEQ	Bill Meyers	Rogue Basin Coordinator, Western Region
OWEB	Mark Grenbemer	SW OR Regional Representative

Ad Hoc Committee	Members
Budget	Pam Galey, John Ward, Dave Graham
Project Committee	John Ward, Dale Johnson, Brad Carlson
Project Team	Kevin O'Brien, Daniel Newberry, Brad Carlson, Mark Grenbemer
Contract Review	Daniel Newberry, Randy Frick

Appendix M: Contact Information

To access updates to this document go to www.restoretherogue.org. For questions or comments regarding this document contact the Co-chairs, Brad Carlson at Middle Rogue Watershed Council or Kevin O'Brien at Illinois Valley Watershed Council.

Applegate River Watershed Council
6941 Upper Applegate Road, Jacksonville, OR 97530
541-899-9982
staff@ARWC.org
www.arwc.org

Bear Creek Watershed Council
PO Box 1548, Medford, OR 97501
541-840-1810
coordinator@bearcreek-watershed.org
www.bearcreek-watershed.org

Illinois Valley Watershed Council
102 S Redwood Highway, PO Box 352, Cave Junction, OR 97523
541-592-3731
ivwc@cavenet.com

Little Butte Creek Watershed Council
RestoretheRogue.org

Lower Rogue Watershed Council
PO Box 666, Gold Beach, OR 97444
541-247-2755
dana.hicks@oacd.org
www.currywatershed.org

Middle Rogue Watershed Council
576 NE E Street, Grants Pass, OR 97526
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mrwc@charterinternet.com

Seven Basins Watershed Council
P.O. Box 909
Gold Hill, OR 97525
541-261-7796
contact@sevenbasins.org

Upper Rogue Watershed Council
urwatershed@hotmail.com
RestoretheRogue.org

Visit www.oregonwatersheds.org to locate the watershed council in your area.

Rogue Basin Coordinating Council (RBCC)
www.restoretherogue.org

Oregon Watershed Enhancement Board (OWEB)
Attn: SW OR Regional Representative
221 Stewart Ave, Suite 201, Medford, OR 97501
541-776-6010 ext 231
grenbemer.mark@deq.state.or.us
www.oregon.gov/OWEB

Oregon Department of Environmental Quality (OR DEQ)
Attn: Rogue Basin Coordinator
221 Stewart Ave, Suite 201, Medford, OR 97501
541-776-6010

Oregon Department of Fish and Wildlife (ODFW)
Rogue Watershed District Office
1495 E. Gregory Road
Central Point, OR 97502
(541) 826-8774, Fax: (541) 826-8776
www.dfw.state.or.us

Rogue Valley Council of Governments (RVCOG)
P.O. Box 3275
Central Point, OR 97502
541-664-6674, Fax: 541-664-7927
admin@rvcog.org
www.rvcog.org

Bureau of Land Management (BLM)
Attn: District Fish Biologist
Medford District, 3040 Biddle Rd., Medford, OR 97504
(541) 618-2200

Rogue River-Siskiyou National Forest
333 West 8th Street, Medford, OR 97504
541-858-2270
Randy Frick, Fisheries Biologist
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Appendix N: Contractor Team

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Tom Atzet received his B.S. in Forest Science at Humboldt State University (1966). He completed his master's work at Oregon State University (M.Sc. 1969). He earned his PhD from Oregon State University (1979). For the past 30 years, Tom has worked as Southwest Oregon Area Ecologist. He developed *Plant Association Guides for Southwest Oregon* and participated in the *Rogue River, Umpqua, and Siskiyou National Forest plans* as well as the *Northwest Forest Plan*. His work centers on project level consultation, but he also works on regional and national scale efforts including *Vegetation Management EIS*, *Survey and Manage EIS*, "Forest Ecosystem Management Plan" (FEMAT), Ecosystem Analysis Process Team, Late Seral Reserve Analysis Review Team, Riparian Review Technical Team, Pacific yew conservation committee, and the National Polyvegetation Database Team. He has worked with the Vegetation Dynamics Development Tool and the Ecosystem Management Decision Support Model.

Jerry MacLeod, Fish Biologist, Subcontractor
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Jerry MacLeod completed his Bachelor of Fish Science, Fish and Wildlife Management in 1964 from Oregon State University in Corvallis, Oregon. The American Fisheries Society has named him a Certified Fisheries Scientist. Jerry has been working as a Consulting Fisheries Biologist since 1996 during which time he co-authored the *Southwestern Oregon Salmon Restoration Initiative Coho Plan* and the *Southwestern Oregon Salmon Restoration Initiative Steelhead Plan*. Jerry's career includes over 30 years with the Oregon Department of Fish and Wildlife as a staff biologist, Assistant District Fish Biologist and District Fish Biologist managing fishery resources in locations including Gold Beach, Coos Bay, Portland, the Siuslaw Fish District and the Rogue Basin. He culminated his career with the Department of Fish and Wildlife as the Watershed Health Program Coordinator for Southern Oregon.

Tatiana Bredikin, Project Coordinator, Contractor
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Tatiana Bredikin holds a Bachelor of Business Administration from Roanoke College, Salem, Va. (1979) and a Master of Psychology from Hollins University, Roanoke, Va., (1988). Tatiana provides meeting facilitation, strategic planning and project coordination services to organizations, assisting them to effectively achieve their goals. Her work with organizations addressing natural resource issues includes facilitation of the Rogue Basin Fish Access Team (RBFAT), Applegate Communities Collaborative Fire Protection Strategy, *Willamette National Forest Fire Plan*, Southern Oregon Land Conservancy's strategic planning and board retreats, and the Applegate Demonstration Project

Glossary of Terms

Adequate (ade): Watershed health factor is functional and minimal restoration activities are needed to maintain existing condition.

Anadromous: Fish that are born and rear in freshwater, move to the ocean to grow and mature and return to freshwater to reproduce. Salmon and steelhead are examples.

Aquatic ecosystem: Any body of water, such as a stream, lake or estuary, and all organisms and nonliving components within it functioning as a natural system.

Aquatic habitat: Waters that support fish or other organisms which live in water and which includes the adjacent land area and vegetation (riparian habitat) that provides shade, food, and/or protection for those organisms.

Aspect: The direction toward which a slope faces (exposure).

Buffer: A zone or strip of land that shields one area from another. Commonly used along streams or as a visual barrier.

Canopy: A collective term for the layer formed by the crowns of the taller trees in a forest.

Canopy cover: The vegetation that projects over the stream. Can arbitrarily be divided into two levels: Crown cover is more than 1 meter above the water surface. Overhang cover is less than 1 meter above the water surface.

Conifer: A tree belonging to the order Coniferae, usually evergreen with cones, needle-shaped leaves, and producing wood known commercially as "softwood."

Critical habitat: Under the Endangered Species Act, critical habitat is defined as (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species, when it is determined that such areas are essential for the conservation of the species.

Crown: The canopy of green leaves and branches formed by a tree. The amount of ground shaded by crowns is often referred to as "crown cover" and is expressed as a percent of the total ground area shaded.

Diversity: The variety of natural, environmental, economic, and social resources, values, benefits, and activities.

Drainage: The topographic region from which a stream receives runoff and groundwater flow.

Ecosystem: The living and non-living components of the environment which interact or function together, including plant and animal organisms, the physical environment, and the energy systems where they exist. All the components of an ecosystem are inter-related.

Ecosystem management: A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual species.

Endangered species: Any species in danger of extinction throughout all or a significant portion of its range.

Endangered species act: A federal law passed in 1973 for the purpose of providing a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved.

Enhancement: Management activities, including rehabilitation and supplementation that increase fish production beyond the existing levels.

Fine sediment: The fine-grained particles in stream banks and substrate. These have been defined by diameter varying downward from 6 mm.

Fingerling: Fish that have recently emerged as fry and have begun feeding.

Fish habitat: The aquatic environment and the immediately surrounding terrestrial environment that, combined, afford the necessary biological and physical support systems required by fish species during various life history stages.

Floodplain: Level lowland bordering a stream or river into which the flow spreads at flood stage.

Forest canopy: The cover of branches and foliage formed collectively by the crowns of adjacent trees and other woody growth.

Freshet: A small, sudden flood or rise in the level of a stream, caused by heavy rainfall or a rapid thaw, especially after a period of dry weather.

Fry: Recently hatched fish that have not started feeding.

Fuels: Combustible material that has accumulated on the forest floor.

Habitat: The place where a plant or animal naturally or normally lives and grows.

Habitat diversity: The number of different types of habitat within a given area.

Hydrologic Unit Class (HUC): A measure of the size of a watershed.

Instream: Situated or taking place within the stream, rather than on its banks.

Instream cover: Areas of shelter in a stream channel that provide aquatic organisms protection from predators or competitors and/or a place in which to rest and conserve energy due to a reduction in the force of the current.

Large organic (woody) debris: Any large piece of relatively stable woody material having a diameter greater than 10 cm and a length greater than 1 m that intrudes into the stream channel.

Limiting (limit): Watershed health factor is unhealthy and a significant amount of restoration activities are needed to improve watershed conditions.

Limiting Factor (LF): An environmental resource or process in short supply or in a state of dysfunction, which is inhibiting the watershed's ability to produce high quality water and a healthy fish and wildlife populations.

Moderate (mod): Watershed health factor is less than desired and moderate to significant levels of restoration activities are needed to improve existing conditions.

Old growth: Trees that are generally 200 years old and older. They are usually 26" DBH and larger. Ponderosa pine old growth have yellowish to orange-colored platy bark.

Overstory: That portion of the trees in a stand forming the upper crown cover.

Reach: (a) Any specified length of stream. (b) A relatively homogeneous section of a stream having a repetitious sequence of physical characteristics and habitat types. (c) A regime of hydraulic units whose overall profile is different from another reach.

Reforestation: The natural or artificial restocking of an area with forest tree species. The natural restocking of a site is often referred to as "natural regeneration".

Rehabilitation: Short-term management actions which may include fish stocking, habitat improvement, harvest management, or other work, that restore fish populations depressed by natural or man-made events.

Representative Stream: A stream selected for the Watershed Health Limiting Factors Assessment based on its similarity to other streams in that watershed council area with less data available.

Restore: Revitalizing, returning, or replacing original attributes and amenities, such as natural biological productivity, aesthetic and cultural resources, which have been diminished or lost by past alterations, activities, or catastrophic events.

Riparian: Situated or taking place along the bank of a river or other waterway.

Riparian zone: That area adjacent to rivers and streams identified by vegetation, wildlife, and other qualities unique to these locations.

Salmonids: This is a category of fish in the salmon and trout families. They can be anadromous or resident.

Seral: A stage in forest development. Early seral stage forests are the stage that includes seeding, sapling, and pole-sized trees.

Silviculture: The act and science of producing and tending a forest; the theory and practice of controlling forest establishment, composition, growth, and quality of forests to achieve the objectives of management.

Slash: Treetops, branches, bark, and other debris left after a forest operation. Slash can be a fire hazard.

Snag: A standing, dead tree or a standing section of the stem of a tree broken off at the height of 20 feet or more. If it is less than 20 feet, it is properly termed a "stub".

Spawning: The act of fish depositing their eggs and sperm for the purpose of reproduction.

Spawning area: The area in the stream or lake that provides suitable habitat for fish to deposit their eggs and sperm (spawn).

Species: A category of biological classification of related organisms or populations potentially capable of interbreeding. (Example – coho salmon)

Stand: A group of trees in one geographic area that are uniform enough in species composition, age, and arrangement to be distinguishable from adjoining areas of forest.

Stand density: A relative measure of the amount of tree stocking on an area compared with other areas.

Structure: Anything constructed or installed on land or in the water. It usually enhances the location by stabilization, protection or adds habitat to the area.

Succession: The replacement of one plant community by another in progressive development toward climax vegetation.

Terrestrial: Belonging to the land, rather than sea or air.

Threatened species: Any species likely to become an endangered species within the near future throughout all or a significant portion of its range.

Underbrush: The brush growing under a forest canopy.

Under story: The underlying layer of low vegetation in a forest environment. Plants include small trees, grasses, forbs, and brush.

Upland: Land that has a high elevation or a region of such land.

Urbanization: Percent of impervious surface.

Watershed: Any sloping area that sheds water; an area of land that collects and discharges water into a single stream or other outlet.

Watershed Council (WC): A voluntary group of interested citizens who work together to protect and enhance their watershed.

Watershed Council Area (WCA): The land area covered by a particular watershed council.

Watershed Health: The watershed's ability to produce high quality water and a healthy fish and wildlife populations.

Watershed Health Factor: One element that is a measurable environmental condition or process, the state of which is indicative of the health of the watershed.

Wetlands: Land areas where excess water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life.

Woodland-Urban Interface: Where wild or partially wild woodlands (e.g. oak, oak-brush, oak-pine) edge moderately dense human settlement, (e.g. 5 - 25 acre "country" or forested lots with houses).

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