OCSRI Plan
Appendix V: S. W. Oregon CSRI Documentation

- Introduction to the Initiative
- SW Oregon Ecosystem Conditions affecting Coho
- Coho Population Variability
- Coho Distribution
- High Value coho Areas and Priority Actions to Stabilize Populations
- Role of Watershed Councils
- Advantages and Limitations of the Initiative
- Core Area Habitat Assessments and Action Plans
- Federal, state and local Agency Actions to Protect core Areas
- Coho distribution Miles by Watershed

Appendix 1: WATERSHED CORE AREA HABITAT ASSESSMENTS AND ACTION PLANS

Abstract: **The nine Watershed Councils in the Rogue and South Coast Basins were asked to conduct a habitat assessment of the coho core habitat areas within their watershed, and prepare an action plan to protect and restore habitat conditions. Council coordinators collected stream surveys (or equivalent) and other environmental indicators from local resource agencies and recorded current conditions on 37 watershed parameters. These conditions were compared to reference parameters on desired fishery habitat qualities derived from the literature. The trend line for the environmental element was determined from stream survey data, estimated historical conditions, local observation by area residents and ecologists, and evaluated for the functionality of the element within the larger local river ecosystem. Habitat conditions that were severe or critically limiting salmonid propagation were judged as limiting factors. A near term vision and action plan for restoration was then prepared for deficient environmental elements. Restoration actions were then collated and prioritized for implementation and project proposals were prepared for funding. These watershed assessments and habitat conditions, as well as proposed protection and restoration actions are presented below.**

The Watershed Core Area Assessment Process.

Watershed Councils were asked to assess environmental conditions in core areas to identify current habitat conditions, list limiting factors requiring restoration action, and develop a workplan to undertake restoration actions that assure the future viability of coho stocks in Southwest Oregon. Recommendations from the Rogue and South Coast basins will be integrated into a basinwide watershed assessment and guidance plan under the direction of the Rogue Basin Watershed Steering Committee and South Coast Coordinating Watershed Council. The assessments and actions plans provided by the watershed councils are as follows:

Upper Rogue Watershed
- **Sugarpine Creek**
- **West Branch Elk Creek**
- **West Fork Trail Creek**

Little Butte Watershed
- **South Fork Little Butte Creek**

Bear Creek Watershed

Evans Creek Watershed
- **West Fork Evans Creek**

Applegate Watershed
- **Cheney /Slate Creek**
- **Williams Creek**

Middle Rogue Watershed
- **Quartz Creek**
- **Fourmile Creek**

Illinois Valley Watershed
- **Althouse Creek**
- **East Fork Illinois River and Dunn Creek**
- **Elk/Broken Kettle Creek**
- **Sucker/Grayback Creek**

Lower Rogue Watershed
- **Shasta Costa Creek**
- **Silver Creek**
- **South Fork Lobster Creek**
- **Quosatana Creek**

South Coast Watershed
- **Sixes River**
  - **Crystal Creek**
  - **Dry Creek**
  - **Edson Creek**
- **Elk River**
- **New River**
  - **Bethel Creek**
  - **Butte Creek**
  - **Floras Creek**
  - **Willow Creek**

Habitat Assessment Standards and Parameters

The habitat standards and/or parameters selected to evaluate stream habitat conditions are important, in that they provide the baselines to judge a condition in need of restoration, or provide benchmarks to monitor and measure the outcomes of restoration actions.

The standards

The purpose of the Phase 1 document is to encourage watershed councils to formulate habitat quality goals and objectives for their watershed, accumulate data on current conditions and formulate watershed action plans. The report uses habitat quality standards developed in the scientific literature, and in compliance with state standards and law. The Initiative report habitat goals are consistent with the State CSRI plan.

The stream water temperature of 14 C. (58 ° F) is an ideal reference point for healthy salmonid propagation identified in the scientific literature, that may not be attainable in all streams in the watershed context. DEQ standards adopted July 1, 1996 specified a stream water temperature of 13 C. (55 ° F.) (7-day moving average) in habitat providing for spawning, egg incubation, and fry emergence. Otherwise, the stream water temperature standard is 18 C. (64 ° F.) (7 day moving average).[1] Stream data should be collected and natural maximum temperature goals should be developed at a stream/site level in accordance with collected data and state standards, with local watershed restoration objectives established accordingly. The goal is to foster the best stream water temperature conditions and habitat attainable for salmonid propagation in the Rogue and South Coast Basins.

The riparian reserve standard used in this document was established by the Forest Ecosystem Management Team for the National Forest Management Plan. It requires buffers ranging from 150 to 300 feet along fish bearing streams. This is greater than the buffer required in the State Forest Practices Act, which provides for buffers up to 100 feet on the larger fish bearing streams. The 150-350 foot buffer is required on all federal lands, however, private lands do not have to exceed the standards set by the Forest Practices Act.

Other parameters used as recommendations to landowners were obtained from the best scientific information available provided by the state and federal resource agencies.

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[1] Oregon Department of Environmental Quality, Oregon Listing Criteria for Section 303(d) List. December, 1995. Approved July 1, 1996.

Habitat monitoring at the watershed level should be conducted to determine specific stream site habitat objectives for temperature, buffer width, and canopy (in compliance with state law).

It is not intended to create "habitat preserves" in the Phase 1 Initiative process. Core areas are used to identify stream sections of importance in protecting future coho propagation in the Rogue and South Coast basins, around which to focus efforts to protect and restore habitat quality. The restoration objectives and actions are to be developed by watershed councils in coordination with local stakeholders.

The original core areas were identified by the governor's CSRI team based upon coho distribution, abundance, and data provided by the ODFW District biologists. Both the Lower and Upper Rogue District Biologists expressed concern that some of the stream segments selected did not completely meet the criteria established for the core areas. The biologists recommended some changes and, after consultation with the CSRI Team, those changes were made.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Sugarpine Creek - Upper Rogue Subbasin

Section I. Sugarpine Watershed Analysis

Sugarpine is a tributary of Elk Creek, entering Elk Creek at about river mile 11. The Sugarpine watershed encompasses 7,940 acres. Many species of wildlife inhabit the Sugarpine watershed due to the diversity of habitat. The succession stage of zone one (0-25 feet) contains small alder and bigleaf maple intermixed with a few patches of Pacific yew and Douglas fir. Large Douglas fir and white fir are found in the outer zone (25-100 feet) in reach one. Douglas fir, white fir and western hemlock are dominant in the outer zone of reaches two and three.

Physical Qualities

The valley of Sugarpine Creek is a moderate V-shaped floor in reaches one and three, with a U-shaped valley in reach two. Valley widths range up to 100 meters wide in reaches one and two and less than 30 meters in reach three.

Within the last three decades large amounts of timber have been harvested along Sugarpine Creek. Before these logging operation, Sugarpine Creek was surrounded by old growth conifers and probably contained desired amounts of large woody material. At present, an average of 25 pieces of large woody material and 39 pieces of small wood per mile were observed.

Water Resources

The rainy and dry seasons are reflected in the flow of Sugarpine Creek with flow rates ranging from an estimated 25 cfs in early June to 1.35 cfs in mid-October. A peak flow rate approaching 1500 cfs may occur with a warm rain on a heavy snowpack. This variation in flow rates impacts salmonids during the phases of their life cycle.

Fish Barriers

Few migration barriers were observed in Sugarpine Creek. Elk Creek dam, located approximately one mile above the mouth of Elk Creek, is the major barrier. The disposition of Elk Creek Dam has been a controversial topic for years. In the spring of 1996 the U.S. Army Corps of Engineers decided the dam was not to be completed. The Corps is now exploring alternatives to provide fish passage up Elk Creek. Currently, anadromous fish are trapped below the dam by the Oregon Department of Fish and Wildlife, transported above the dam and released to spawn.

Land Uses

During the late 1800's upper Sugarpine Creek drainage was used for seasonal hunting and cattle grazing. Lower Sugarpine was heavily homesteaded about the turn-of-the-century.

Fishery Conditions

Effective cover for salmonids is fair in Sugarpine Creek. In reach one, the cover is in deep pools. In reach two several long riffles of cobble and small boulders make the substrate and turbulence the primary cover. Low stream flow during the dry season diminishes the effectiveness of this cover, making juvenile salmonids more susceptible to predators. Sinuosity is low in all reaches. Gradient averages 2-3% in reaches one and two, increasing to 4% in reach three. Restoring riparian vegetation and placement of logs and rootwads in Sugarpine Creek should lead to a healthy salmonid population, including coho.

Fish surveys made with an electrofisher showed populations of coho salmon, cutthroat trout, rainbow trout, anadromous steelhead and non-game fish. It is believed steelhead can ascend Sugarpine Creek as far as Coalmine Lick.

Table 1. Coho Life-Cycle Use Model for Sugarpine Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X*	X*	X*								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X - Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage. Determination by Technical Committee
* - Adults are trapped and hauled around Elk Creek Dam and released

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Sugarpine Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone	-				
Canopy/shade ** $\geq$75 %	Probably good, large conifers	Heavily harvested, narrow riparian zone, thin density	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ** $\geq$90% stable	Good, vegetated	Generally good	Stable	Acceptable	Enhance riparian areas
Macroinvertebrate Health $\geq$80% High $\leq$40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Spawning gravel *	Presumed good	Very spotty, probably limiting to some extent.	Stable	Limiting	Maintain and enhance supply. Better distribution
Substrate condition. ≤20% over natural delivery	Presumed good	Stable. Primarily bedrock and large boulders	Stable	Acceptable	Install structures to collect gravel
Sediment * ≤5%	Presumed low	Relatively Low	Improving	Acceptable	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Low. Averages about 35 pieces per mile.	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity. About 6% of system in side channels	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Poor pool-riffle ratio - 20/80	Stable	Limiting	Protect from sedimentation, add LWD
Sinuosity	Good	Poor	Stable	Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	None	None	Limiting	Develop some use on tributaries and educate landowners
Mining	None	None	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	Debris dam at RM 1.2 - Probably not a barrier	Stable	Acceptable	Modify to improve fish use/passage
Diversions	None	Very few currently	Stable	Acceptable	Reduce impact upon fish passage

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Push-up dams	None	None	Stable	Acceptable	No action
Culverts *	None	A few problem sites have been identified	Improving	Acceptable	Continue reconstruction.
Water Quality					
Temperature ** $\leq$64· degrees	Less than 64 degrees	Often over 65 degrees in summer, high of 70 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen $\geq$8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels	Deteriorating	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from forest practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** $\geq$10CFS	Flows probably adequate to good	Severe low flows during summer months	Stable	Limiting	Reduce diversions, improve forest practices
Diversions	None	Few or none	Stable	Acceptable	Eliminate unused rights. Acquire instream water rights.
Release regime	N.A.	Unknown	Stable	Acceptable	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Primarily from timber harvesting	Improving	Acceptable	Improve land use practices Monitor effectiveness

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increased forestry use	Improving	Acceptable	Restore controlled burning
Road density ** $\leq$2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Historically, farms and ranches were common. Now, managed for timber harvest	Stable	Acceptable	Limit adverse effects
Return flows	None	None	Stable	Acceptable	Monitor, and evaluate
Chemical use on lands	None	Moderate forestry use	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Sugarpine Creek watershed the following are the most critical limiting factors for coho production:

1. Lack of large woody debris.

Condition:

- Stream surveys indicate that high winter flows have moved in most of the available woody debris. There is a lack of large conifers close enough to the stream to provide a viable, continuous source. Currently, there is an average of about 35 pieces of large wood per mile in the stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future.
- Tree planting projects planned for 1997 will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. Lack of spawning gravel

Conditions:

- Stream surveys have indicated that spawning gravel is limited and widely scattered. Available gravel is moved out of the system due to high flows and the lack of stable structure to collect it.

Actions:

- Installation of instream structures, both logs and boulders, will help collect and hold gravel Some structures are being specifically designed to gather gravel for spawning salmonids.

3. Low Pool-Riffle ratio:

Condition:

- The Pool-Riffle ratio on Sugarpine Creek is only 20:80.

Actions:

- Specific placement of logs and boulders to create pools will help move the Pool-Riffle ration closer to 50:50.

4. Lack of Riparian diversity and density.

Condition:

- The riparian area in many areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be on areas needing shade.

5. High summer water temperatures.

Condition:

- Temperature monitoring have recorded temperatures near 70 degrees F. during the warmest summer months.

Actions:

- Emphasis will be on reestablishing vegetation adjacent to the stream and improving the canopy in areas where the riparian vegetation is sparse.

- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

6. Low summer flows.

Condition:

- Summer flows are very low limiting fish distribution to a few deep holes or requiring juvenile salmonids to move downstream to locate suitable habitat.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade.

- The OWRD is evaluating water use in the entire Trail Creek system to establish a more efficient water management program that may result in more water being in the stream.

7. Poor winter habitat

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing monitoring stations above and below project sites and evaluate before and after project completion.
- Updating stream surveys at least every five years.
- Conducting periodic spawning ground counts.
- Conducting a regular temperature monitoring program.
- Conducting a juvenile sampling program.

C. Implementation Plan

Much of the Sugarpine Creek watershed is managed for timber harvest by both USFS and private timber companies. The USFS has committed to restoring fish habitat in the Elk Creek watershed. A five-year management plan includes considerable habitat work in the Elk Creek and Sugarpine drainages.

Fish passage into the Elk Creek system is limited by the unfinished Elk Creek Dam. The U.S. Army Corps of Engineers has decided to not complete the dam. Current plans are to remove part of the dam to allow Elk Creek to flow freely. Although it will probably take several years, when completed, fish passage into all streams in the Elk Creek watershed will be greatly enhanced.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Elk Creek watershed the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spend considerable funds in the drainage with several projects completed, some underway and many more being planned. Private timber companies, particularly Boise Cascade have also committed considerable resources to improve fish habitat in the watershed, and to determine natural stream temperature levels on their lands in the Elk Creek watershed.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
West Branch Elk Creek - Upper Rogue Subbasin

Section I. West Branch Elk Creek Watershed Analysis

The West Branch is a tributary of Elk Creek, entering Elk Creek at about river mile 3. The West Branch watershed encompasses 8,407 acres.

Many species of wildlife inhabit the West Branch watershed due to the diversity of habitat. The succession stage of zone one (0-25 feet) contains small alder and bigleaf maple intermixed with a few patches of Pacific yew and Douglas fir. Large Douglas fir and white fir are found in the outer zone (25-100 feet) in reach one. Douglas fir, white fir and western hemlock are dominant in the outer zone of reaches two and three.

Physical Qualities

The lower reaches of West Branch of Elk Creek is a broad, multi-terraced valley. The stream has a gentle (2-4 percent) gradient throughout most of its four miles of length. Stream surveys indicate that habitat is dominated by riffles (roughly 81 percent) with some cascades and substrates dominated by cobbles, boulders and bedrock. Some deep pools were identified in the lower 0.5 miles and appear to be fairly numerous. There were very few deep pools above that point. Spawning substrate was marginal and not abundant.

Within the last three decades large amounts of timber have been harvested along the West Branch. Before logging, the stream was surrounded by old growth conifers and probably contained desired amounts of large woody material. Today, an average of 25 pieces of large woody material and 39 pieces of small wood per mile were observed.

Water Resources

The rainy and dry seasons are reflected in the flow of the West Branch. Flow rates range from an estimated 30 cfs in early June to 1.5 cfs in mid-October. A peak flow rate approaching 1500 cfs may occur with a warm rain on a heavy snowpack. This variation in flow rates may impact salmonids positively or negatively, during the phases of their life cycle, depending upon the flow rate.

Fish Barriers

No migration barriers were observed in the West Branch of Elk Creek. Elk Creek Dam, located approximately one mile above the mouth of Elk Creek, is the major barrier. The disposition of Elk Creek Dam has been a controversial topic for years. In the spring of 1996 the U.S. Army Corps of Engineers decided the dam was not to be completed. The Corps is now exploring alternatives to provide fish passage up Elk Creek. Currently, anadromous fish are trapped below the dam by the Oregon Department of Fish and Wildlife, transported above the dam and released to spawn. Some fish are specifically released into the West Branch.

Land Uses

During the late 1800's the upper West Branch drainage was used for seasonal hunting and cattle grazing. Lower West Branch was heavily homesteaded about the turn-of-the-century.

Fishery Conditions

Effective cover for salmonids is fair in the West Branch In the lower mile cover is in deep pools. Much of the rest of the stream is dominated by long riffles of cobble and small boulders. The substrate and turbulence provide the primary cover. Low stream flow during the dry season diminishes the effectiveness of this cover, making juvenile salmonids susceptible to predators.

Sinuosity is low in all reaches. Gradient averages 2-3% in the lower three miles, increasing to 4% in the upper reaches. Restoring riparian vegetation and placement of logs and rootwads in the West Branch should improve coho habitat.

Fish surveys made with an electrofisher showed populations of coho salmon, cutthroat and, rainbow trout, anadromous steelhead and non-game fish.

Table 1. Coho Life-Cycle Use Model for West Branch Elk Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X*	X*	X*								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
* - Adults are trapped and hauled around Elk Creek Dam and released

Section II. Current Habitat Indicators.

Table 2. West Branch Elk Creek Watershed Habitat Conditions.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** $\geq$75%	Probably good, large conifers	Harvested, narrow riparian zone, thin density	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity; conduct a stocking survey
Bank stability * $\geq$90% stable	Good, vegetated	Fairly stable	Improving	Acceptable	Limit cattle access, enhance riparian areas
Macroinvertebrate Health $\geq$80% High $\leq$40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Poor, could be a limiting factor	Stable	Limiting	Maintain and enhance supply
Substrate condition. $\leq$20% over natural delivery	Presumed good	Dominated by bedrock and large cobble	Stable	Acceptable	Reduce sedimentation

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Sediment * $\leq 5\%$	Presumed low	Variable, moderate during high flow periods	Improving	Acceptable	Reduce sediment load, monitor/ control bank erosion
In stream LWD ** ≥ 20 pieces/100 meters	High	Low , density about 10-20 pieces per mile	Stable	Limiting	Need large conifers, structures
Side channels * $\geq .5$ mile	Probably good, good sinuosity	Numerous in lower .5 mile	Stable	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good but limited	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** $\geq 50\%$	Good	Low pool-riffle ratio - 20/80	Stable	Limiting	Protect from sedimentation, add LWD
Sinuosity	Good	Fair, in mainstem and some tributaries Some channelization	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Fairly good in lower reach. Poor in upper areas	Stable	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Deteriorating	Limiting	Develop some use on tributaries and educate landowners
Mining	None	None	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No Action
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action
Culverts *	None	Several problem sites identified	Improving	Limiting	Continue reconstruction.
Water Quality					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Temperature ** $\leq$64· degrees	Less than 64 degrees	Often over 65 degrees in summer, high of 70 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen $\geq$8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels	Stable	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from forest practices	Improving	Acceptable	Use Best Management Practices
Water Quantity					
Flow - low period ** $\geq$10CFS	Flows probably adequate to good	Severe low flows	Stable	Limiting	Reduce Ag. diversions. Improve riparian habitat
Diversions	None	Creating low flow problems. Stream is oversubscribed.	Stable	Limiting	Eliminate unused rights acquire instream water rights, control withdrawals with headgates
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest, Cattle induced erosion	Improving	Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management. Increased agricultural use and logging disturbing basin	Improving	Acceptable	Restore controlled burning, monitor forest practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Road density $\leq$2miles/sq.mile *	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate. Several farms and ranches. Converting to residential	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Unknown	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the West Branch of Elk Creek watershed the following are the most critical limiting factors for coho production:

1. High summer water temperatures.

Condition:

- Temperature data collected in 1993 recorded seven-day average maximum temperatures of 68.8 degrees F., with a high of 70 degrees during the hottest week of the year. No data has been collected since that date.

Actions:

- An electronic thermograph will be placed in the lower reach of the stream by Boise Cascade.
- Stream shading and riparian stocking will be assessed.
- Native hardwoods and conifers will be planted in the Resource Management Area (RMA) if it is determined that they will help shade the stream.

2. Lack of large woody debris.

Condition:

- A field visit of BLM, USFS, ODFW and Boise Cascade fisheries biologists confirmed there is a lack of large wood in the system. Stream surveys indicate that there is an average of only 10-20 pieces per mile.

Actions:

- A cooperative instream enhancement project has been developed between the ODFW, BLM, USFS and Boise Cascade Corporation. The project will include installing large wood structures in the stream to create slow water habitat and maintain pool depth by encouraging the stream to scour. The project will begin during the spring and summer of 1997.

3. Low summer flows.

Conditions:

- Low summer flows from natural and irrigation diversions significantly reduce flows during some months. Smolts are known to migrate out of mainstem channels during low flow periods, seeking improved habitat conditions.

Actions:

- Interagency and Watershed Council tree planting projects are planned in 1997 and 1998 to improve canopy conditions adjacent to the stream. Other instream projects in the planning stages will also contribute to improving riparian habitat and enhancing flows.
- Existing water rights will be researched and efforts will be made by the Oregon Water Resources Department to improve the efficiency of the water withdrawal program on the Elk Creek system.
- Instream water rights have been applied for by the ODFW.

4. Lack of spawning gravel.

Conditions:

- Stream surveys indicate that spawning gravel is of limited quality and quantity, due in part to some embeddedness in the stream channel.

Actions:

- The instream structures planned to be installed in 1997 will be designed to collect gravel for spawning.

5. Low Pool-Riffle ratio.

Conditions:

- Stream surveys indicate that the Pool-Riffle ratio is 20:80. A 50:50 ratio or greater is more desirable for coho production.

Actions:

- Additional pools will be created by the appropriate placement of large woody structures and large boulders in the stream. This is one of the primary objectives of the cooperative instream habitat project planned for 1997.

6. High levels of erosion and sedimentation.

Conditions:

- Streambank erosion caused by logging activities and agricultural practices cause excessive turbidity during high flow periods. The accumulated sediment reduces the productivity of the spawning gravel.

Actions:

- Timber harvest practices have been modified by state and federal laws to provide additional protection for streambanks, including non fish bearing tributaries.

- Studies are underway to evaluate cattle use adjacent to streams and develop fencing programs and alternative methods for providing water to livestock away from the stream.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing permanent transects above and below structure placements.
- Conducting a stream habitat inventory every five years or immediately after a large channel changing event.
- Conducting annual spawning surveys.
- Conducting juvenile snorkle counts.
- Conducting a regular temperature monitoring program.
- Conducting a study to determine the natural temperature for the stream.

C. Implementation Plan

Boise Cascade Corporation has budgeted for all actions in the "Project Action" and Milestones for Assessing Progress" sections. Boise owns approximately 0.25 miles of the West Branch of Elk Creek. The remaining land is owned by the USFS and BLM. Both of these agencies will assist with the surveys.

D. Requirements for Achieving Success.

There are no barriers for achieving the above actions and monitoring plans. Boise Cascade has committed funds and manpower for these projects. The USFS and BLM have also budgeted for the instream project in their 1997 fiscal year.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
West Fork Trail Creek - Upper Rogue Subbasin

Section I. West Fork Trail Creek Watershed Analysis

The West Fork of Trail Creek is a tributary of Trail Creek, and enters the ten mile long Trail Creek at about stream mile 3. Trail Creek enters the Rogue River at river mile 145. The Trail Creek watershed encompasses 54.5 square miles. The West Fork is a major tributary that encompasses about 30 percent of the watershed.

Many species of wildlife inhabit the Trail Creek watershed due to the diversity of habitat. The succession stage of zone one (0-25 feet) contains small alder and bigleaf maple intermixed with a few patches of Pacific yew and Douglas fir. Large Douglas fir and white fir are found in the outer zone (25-100 feet) in reach one. Douglas fir, white fir and western hemlock are dominant in the outer zone of reaches two and three.

Physical Qualities

The valley of the West Fork of Trail Creek is broad and multi-terraced in the lower reaches but fairly steep hillsides close in on the stream in the upper few miles. Valley widths range up to 100 meters wide in reaches one and two and less than 30 meters in reach three. The gradient is relatively gentle averaging 2.8 percent.

Within the last three decades large amounts of timber have been harvested along the West Fork. Before these logging operations, the West Fork was surrounded by old growth conifers and probably contained desired amounts of large woody material. Today, an average of about 40 pieces of large woody material and 39 pieces of small wood per mile were observed.

Water Resources

The rainy and dry seasons are reflected in the flow of the West Fork of Trail Creek with flow rates during 1992 and 1993 ranging from a high of 55 cfs in December to a low of 1.5 cfs in July. There are periods of time during the summer when there is no visible flow down the stream due to extensive irrigation withdrawals. A peak flow rate approaching 1000 cfs may occur with a warm rain on a heavy snowpack. This variation in flow rates impacts salmonids during the phases of their life cycle.

Fish Barriers

No fish migration barriers were observed on the West Fork of Trail Creek. There are a number of "push up" dams and other man-made diversions constructed during the spring and summer months to facilitate irrigation withdrawals. These usually do not impact anadromous adult salmonids but can limit juvenile fish movement.

Land Uses

During the late 1800's the Trail Creek drainage was used for seasonal hunting and cattle grazing. The lower part of Trail Creek, including much of the West Fork was heavily homesteaded about the turn-of-the-century.

Fishery Conditions

Effective cover for salmonids is fair in the West Fork. A few deep pools, a number of scour pool, two beaver dams and several side channels provide fairly decent coho habitat in the lower reaches. The upper reaches are dominated by long riffles of cobble and small boulders with the substrate and turbulence providing the primary cover. Low stream flow during the dry season diminishes the effectiveness of this cover, making juvenile salmonids more susceptible to predators.

Streambanks are predominantly stabilized by vegetation with less than 1 percent actively eroding, and undercut banks are infrequent. Trees in the riparian zone can be characterized as a mixture dominated 75 percent by hardwoods in the 3-50 centimeter diameter ranges. There were many habitat restoration structures in the first 1.2 miles of stream. Sinuosity is low in all reaches. Gradient averages 2-3% in reaches one and two, increasing to 4% in reach three.

Continuing to restore riparian vegetation and placing additional logs and rootwads in the West Fork should improve coho habitat. Fish surveys made with an electrofisher found populations of coho salmon, cutthroat trout, rainbow trout, anadromous steelhead and non-game fish.

Table 1. Coho Life-Cycle Use Model for West Fork of Trail Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committe

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. West Fork Trail Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Harvested, narrow riparian zone, thin density, canopy only about 33%	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Limited source supply.	Deteriorating	Limiting	Needs conifers and species diversity.
Bank stability * ≥90% stable	Good, vegetated	Generally good, some cattle grazing	Improving	Acceptable	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Fairly good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Acceptable	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low density. About 15-20 pieces per mile	Deteriorating	Acceptable	Need large conifers, structures

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Side channels ≥5 mile *	Probably good, good sinuosity	Numerous in lower reaches but many cut off by ag. use	*Deteriorating*	*Limiting*	Promote natural meandering of stream channel. Reestablish old channels.
Rearing areas **	Presumed good	Fairly good but limited by high water temperatures and low flows.	Deteriorating	Limiting	Increase summer flows. Reduce temperatures.
Pool freq ≥50% **	Good	Low pool-riffle ratio - 20/80	Stable	Limiting	Protect from sedimentation, add LWD to create pools
Sinuosity	Good	Fair in mainstem. Some tributaries are channelized in areas	Deteriorating	Limiting	Promote natural meandering of channels
Alcoves *	Good	A fair number remain in the lower reaches	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Several in lower reaches	stable	Acceptable	Develop some use on tributaries and educate landowners
Mining	None	None	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None of consequence	Improving	Acceptable	Evaluate for effect, provide alternative.
Culverts *	None	A number of sites identified	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Often over 65 degrees in summer, high of 75 measured	Improving	Limiting	Increase canopy and riparian cover Reduce width/depth ratio
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Acceptable	Maintain above 5 PPM

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Turbidity *	Good	Occasional high levels	Decreasing	Unknown	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural practices	Improving	Acceptable	Use Best Management Practices
Water Quantity					
Flow - low period ≥ 10CFS **	Flows probably adequate to good	Severe low flows	Stable	Limiting	Reduce Ag. diversions
Diversions	None	Extensive diversions creating low flow problems. Stream is oversubscribed	Stable	Limiting	Eliminate unused rights, establish in stream rights, control withdrawals by requiring headgates where needed
Release regime	N.A.	Unknown	Unknown	Unknown Monitor for condition	Enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest, Cattle induced erosion	Improving	Acceptable	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management. Agricultural use and domestic development is increasing	Improving	Acceptable	Restore controlled burning
Road density ≤2miles/sq.mile **	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Agriculture	Minor Indian use	Moderate number of farms and ranches. Converting to residential	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate ag and forestry use	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the West Fork of Trail Creek watershed the following are the most critical limiting factors for coho production:

1. High Winter Flows

Condition:

- The lack of large woody debris in the stream results in stretches of wide bedrock dominating the stream channel. The stream appears to be straightening, consequently, substrate is not being retained in the system. This leads to increasing the water velocity in the system.

Actions:

- Add large woody debris and boulders to bedrock stretches to capture substrate, create stream meanders, and provide refuges for overwintering salmonids during periods of high flows.
- Open existing backwater channels that have been filled with sediment to provide preferred coho habitat.

2. Lack of canopy and effective riparian habitat.

Condition:

- Riparian habitat consists primarily of hardwoods with an occasional small conifer interspersed. Shade is intermittent and inadequate in some areas.

Actions:

- Plant native mixed conifers and hardwoods in riparian zone where appropriate. Hardwoods are planted to reduce bank erosion and direct solar radiation. Conifers will provide for future large woody debris.
- Thin around conifers where beneficial to increase the growth rate of the conifers for shade and future large woody debris.

3. **Lack of adequate pool habitat.**

Condition:

- Pools comprise about 17 percent of the stream area. This low percentage limit salmonid rearing, particularly coho, during periods of low flows.

Actions:

- Adding large woody debris and opening side channels should increase the number of pools available for summer rearing through scouring, damming, and creation of plunge pools.

4. **Stream sedimentation.**

Condition:

- Traffic in wet weather on unsurfaced roads add sediment to streams.

Actions:

- Discourage access during wet weather
- Surface roads with rock or gravel
- Grade for proper drainage

5. **Summer stream temperatures.**

Condition:

- Stream temperatures rise due to low width/depth ratios and limited stream shade.

Actions:

- Add large wood to capture sediment and reduce width/depth ratio.

- Plant vegetation on streambanks to increase shade and canopy cover.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Instream large woody debris		X
Open side channels		X
Plant riparian vegetation		X
Release conifers in RMA		X
Road drainage, blocking, stabilization fix culverts		X

BCC and ODFW are cooperating with the Upper Rogue Watershed Council, Rogue River Guides, Rogue Aggregates, USFS, and Southern Oregon Flyfishers to undertake project actions.

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Permanent cross-sections above and below large woody debris placements.
- Conduct spawning surveys on BCC 'core area' timberlands.
- Stream habitat inventory every five years or following a large channel changing event.
- Juvenile snorkle counts, or possibly a smolt trap.
- Video recording, photo points
- Temperature monitoring/ monitoring effectiveness of habitat improvements

C. Implementation Plan.

Boise Cascade Corporation has budgeted for all actions in the "Project Action" and "Milestones for Assessing Progress"sections described above. Boise owns approximately 1.5 miles of the 3.0 miles of the proposed coho core reach on West Fork Trail Creek. In 1996, 0.5 miles of West Fork Trail Creek was enhanced with large wood and boulders. Preliminary results following the November storm show increased winter slow water habitat for juveniles, captured sediments - reducing width/depth ratio, capture of spawning gravel, deepening of pools, and creation of side channels. The road responsible for much of the stream sediment inputs was effectively blocked prior to the rainy season. In 1997, BCC and ODFW will place logs and boulders in the remaining 0.5 miles of BCC land to continue enhancement efforts. The remaining lands are owned by small private landowners.

To date, ODFW and Boise Cascade Corporation has cooperated to complete a stream habitat inventory in 1993 and installed large woody debris and large boulders in 0.5 miles of West Fork Trail Creek in the proposed core. Monitoring transects have been set up and pre-enhancement data collected. Spawning surveys will begin during the winter of 1996 with juvenile surveys starting the following summer. A smolt trap will be used if available through the local ODFW office.

D. Requirements for Achieving Success.

There are no barriers for achieving the above actions or monitoring plans. Boise Cascade has committed funds and manpower to this project. ODFW has also committed their cooperation in project design and implementation.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
South Fork of Little Butte Creek - Little Butte Creek Subbasin

Section I. Little Butte Watershed Analysis.

The Little Butte Creek watershed and its major tributaries originate high in the Cascade Range. The stream flows generally in a northwest direction for roughly 39 miles, reaching its confluence with the Rogue River at river mile 132. The Little Butte Creek Watershed consists of approximately 374 square miles. Elevations range from 7,311 feet (Brown Mountain) at the crest of the Cascade Range to a low of 1,200 feet at its confluence with the Rogue River.

Agriculture and logging are the basis for the economy in the area. Irrigated agriculture and livestock grazing dominate the lower portion of the system. These land uses account for 25% of the basin, and extend up Little Butte Creek and into the lower five miles of the North and South Forks. Forest land makes up 72% of the watershed. Most of the basin above the forks is publicly owned (USFS and BLM). Federal lands account for about 25% of the available habitat for anadromous fish, but 85 percent of the available year round habitat. Extensive logging has taken place on both public and private lands.

Wildlife habitats within the area are diverse, with various stages of conifer and hardwood timber stands. The valley floor contains grasslands, oak savannahs, chaparral and riparian vegetation. Historically, the habitat areas were created and maintained by fire disturbances and the present distribution of vegetation species have been modified by fire control measures. The predominant land use of the valley floor is agriculture and private forest land.

The South Fork Little Butte Creek is the largest subwatershed within the Little Butte Creek Watershed. It drains approximately 88,000 acres as it flows 22 miles in a northwesterly direction to its confluence with the North Fork. There the North Fork and South Fork form the mainstem of Little Butte Creek at river mile 17.2. Over half of this drainage is federally owned. The majority of the lower stream flows through rangeland and the lower three miles is owned by two cattle ranches. The South Fork of Little Butte Creek contains winter and summer steelhead, coho, fall chinook, and resident cutthroat, brook and rainbow trout. The South Fork has been identified by FEMAT as a Key Watershed and was selected by the state as a Core Coho Habitat stream.

Physical Qualities.

Upland stream channels within the watershed are mostly steep narrow mountainous slopes with predominantly cobble substrate. Stream habitat in the lower reaches are characterized by dammed pools, glides, plunge pools, rapids, riffles and scour pools. Pool habitat make up a very small percentage of the stream. Cobble is the most common substrate throughout, followed by gravel and boulders.

Water Resources.

The water resources of the Little Butte Creek Basin are an important part of the total resources available in the Rogue River Basin. In addition to supplying the basic needs for human and livestock consumption, water is also needed to maintain or develop other resources such as fish life and irrigated agriculture.

The basin has a history of low water shortages. A large contributor to this is the high level of diversion and irrigation withdrawals for local uses. Four irrigation districts operate in the Watershed: Medford Irrigation District, Rogue River Valley Irrigation District, Talent Irrigation District and Eagle Point Irrigation District. Water from Little Butte Creek is also diverted through canal systems for use as irrigation outside of the watershed (Bear Creek Basin). Diversions just above the confluence of the North and South Forks deplete stream flows to the point where there usually is only enough water left instream to satisfy prior downstream rights.

Fish Barriers.

Five irrigation diversions exist in the main stem South Fork. Of these five diversions, only one was identified as a possible barrier to fish passage. This diversion is the Medford Irrigation District Dam located at river mile 1.3. During the irrigation season, dam boards are installed in the concrete structure, which spans the stream, and water for fish passage flows down the fish ladder on the west side of the stream. The jump from the stream into the bottom of the fish ladder is approximately 2.5 feet, which could be a barrier to upstream migrating adults and probably limits upstream movement of juvenile salmonids. When the dam boards are removed from the diversion, the stream flows over the concrete apron and becomes very wide and shallow. At low flows, fish passage over the structure is probably impaired.

Land Uses.

The settlement pattern within the South Fork Little Butte Creek watershed is rural residential with scattered ranches, small farms, private forest lands, and large parcels of federal lands. Agriculture and logging are the basis for the economy in the area. Irrigated agriculture and livestock grazing dominate the lower five miles of the South Fork. Forest land makes up 72% of the watershed. Road density is moderate. Fire control practices have produced unnatural vegetation patterns throughout the watershed, increased tree density, and increased the fire hazard level.

Fishery Condition.

South Fork of Little Butte Creek supports the largest coho population in the Upper Rogue River area. Aquatic surveys indicate that there is some 25 miles of coho habitat within the South Fork Little Butte Creek system. Originally, two South Fork tributaries, Soda and Lake Creeks were designated as "core" streams. Consultation with ODFW biologists resulted in a decision that the entire South Fork should be the core area.

Pre-settlement fish habitat was excellent. After the 1964 flood the entire South Fork system was channelized by the Soil Conservation Service (NRCS), removing sinuosity, closing side channels, causing pool and riffle ratios to skew, and riparian vegetation was never replaced in many areas. In spite of this degradation, coho have continued to spawn and rear in this system in significant numbers.

Table 1. Coho Life-Cycle Use Model for the South Fork of Little Butte Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. South Fork Little Butte Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Harvested, narrow riparian zone, especially near home sites	Improving	Acceptable	Improve species diversity, and canopy to 80+% Educate landowners.
LWD Wood sources **	Good, abundant source material	Relatively good	Improving	Acceptable	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Impacted heavily by flooding but stabilizing. Erosion still a problem.	Improving	At risk	Limit cattle access, enhance riparian areas
Macro invertebrate Health ≥80% High ≤40 % severe low	Presumed good	Probably good	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel 1.3-3"dia. *	Presumed good	Fair, probably not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	At risk	Reduce sediment load, control bank erosion
Instream LWD ** ≥20 pieces/100 meters	High	Low, scoured by flooding	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quality. Stream channelized by flooding.	Improving.	Limiting	Promote natural meandering of stream channel. Create new channels where possible.
Rearing areas **	Presumed good	Fair, except summer months	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Fairly poor pool-riffle ratio - 30%	Stable	Limiting	Create and maintain 25 pools per mile. Increase pool/riffle ration to at least 40/60
Sinuosity	Good	Poor	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Stable	Limiting	Encourage use on tribs and educate landowners
Mining	None	Some at turn of the century, none now.	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	Irrigation dams on the North and South Forks are passage problems.	Stable	Limiting	NA
Diversions	None	Five diversion structures exist. One at RM 1.3 is a passage problem	Stable	Limiting	Modify to improve fish passage
Push-up dams	None	Variable, seasonal	Improving	Limiting	Evaluate for effect, provide alternative water supply.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	No problem culverts identified	Stable	Acceptable	NA
Water Quality					
Temperature ** $\leq 64\cdot$ degrees	Unknown	Often over 65 degrees in summer, high of 78 measured. Smolts may encounter sub-lethal levels in summer at lower elevations.	Improving	Limiting	Increase canopy and riparian cover to increase shade, increase summer flows,
D.Oxygen ≥ 8 PPM	Presumed Good	Adequate	Unknown	Acceptable	Maintain and improve
Turbidity *	Presumed Good	Frequently high levels	Unknown	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None known	Some from agricultural practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** ≥ 10CFS	Flows probably adequate to good	Frequent low flows from extensive irrigation withdrawals	Stable	Limiting	Reduce Ag. diversions, improve efficiency of water use, protect in-steam flows.
Diversions	None	Extensive irrigation withdrawals	Stable	Limiting	Eliminate unused rights, to instream rights, reconstruct diversion headgates
Release regime	N.A.	Peak flows are occurring higher, and earlier in year	Deteriorating	Limiting	Revegetate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest and residential development creating problems	Improving	Limiting	Improve land use practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management. increasing agricultural use and significant timber harvest	Improving	Limiting	Restore controlled burning. Logging has been limited in recent years.
Road density * $\leq$2miles/sq.mile	None	Moderate density	Improving	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate, farms and ranches. Converting to residential in areas.	Deteriorating	Unknown	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the South Fork of Little Butte Creek watershed, the most critical limiting factors for coho production (identified through integrating conditions in Tables 1 and 2 above) are:

1. **High summer water temperatures in rearing areas.**

Condition:

- During 1993 and 1994 continuous recording thermometers were placed throughout the system. During the third week of July in 1994, maximum 7-day average afternoon high stream temperatures at five of the recording sites reached heights ranging from 72 degrees to 78 degrees. The high temperatures of the South Fork mainstem can be partially attributed to the streams's high width to depth ratio, low flows which are influenced by water diversion for agriculture, and the disturbance and removal of riparian zone vegetation

Actions:

- Increase density and diversity of riparian vegetation to provide shade and reduce incident radiation.
- Provide buffer zone of 150 - 300 feet for protection of riparian area.
- Encourage greater pool formation and depth through placement of LWD.
- Increase subsurface water storage upslope to increase natural inflow during the summer months
- Limit irrigation return flows.

2. **Low summer flows in rearing areas.**

Condition:

- Low summer flows from natural and diversion conditions significantly reduce summer flows during some months. Smolts are known to migrate out of mainstream channels during low flow periods, seeking improved habitat conditions.

Actions:

- Increase in-stream flows through reduced diversion.
- Promote revegetation of riparian areas to improve water quality
- Increase pool depth to protect rearing habitat
- Encourage beaver dams on tributaries.

3. Riparian diversity and density.

Condition.

- The riparian zone has been narrowed and depleted through harvest and development, which has impaired riparian zone function.

Actions:

- Foster riparian growth and development through exclusions to protect critical vegetation.
- Limit forest harvest to create riparian zones of 1-2 tree height buffer areas.
- Plant trees and forbs along the waterway to increase canopy cover.
- Install large woody debris in the waterway to maintain and enhance pool structure.

Additional Conditions Of Concern:

- Low quantity of large woody debris for recruitment material
- Limited spawning gravel material for recruitment.

Section IV. Implementation Process

The local Watershed Council was asked to list the habitat problems to be addressed from the table developed on habitat conditions and limiting factors, identify and select restoration actions to be undertaken, and identify needs for assistance. The activities to be undertaken are as follows:

A. SPECIFIC ACTIONS:

- A significant portion of Lake Creek (S. Fk. Tributary) is badly degraded from extensive grazing through the stream. Some erosion has occurred, and vegetation in places is non-existent causing high water temperatures to enter the South Fork. Work began on Aug. 19, 1996 on Cascade Ranch to fence 2.5 miles of stream and to do intensive native species planting throughout riparian areas. In addition, 2.0 miles of old riparian fence will be rehabilitated; two livestock control gates will be installed; an unscreened diversion was screened; blackberries were replaced with other vegetation; a wetland area will be restored with native vegetation, and the ranch is considering converting from flood to sprinkle irrigation for water conservation. This project is funded by USFWS Displaced Timber Worker funds.

- Extensive instream structures have been installed on BLM, USFS and on private land, covering an eight mile stretch of spawning and rearing habitat for both coho and steelhead. Eight landowners participated in this project which was funded by Watershed Health Lottery Dollars. In addition to the instream structures, 10,000 native trees, both conifer and deciduous, were planted in 1994 within the riparian area with a high rate of survival. Several historic side channels were opened and several more identified for future action.

- Additional tree planting will take place with USFWS funds in the fall of 1996 and spring of 1997. They will also fund at least one fencing site that is targeted for summer, 1997.

- Work is underway to identify landowners that experienced severe bank erosion problems during the 1996 high flows.

- The Oregon Water Resources Department issued headgate notices to landowners on the South Fork during the spring of 1996. Work is currently underway to install these headgates. Several landowners repaired ditches to improve flow efficiency since withdrawal measurements will now be conducted.

- The major fish passage problem on the South Fork is the Medford Irrigation District diversion dam. The Bureau of Reclamation has agreed to reconstruct this diversion and completely rebuild the fish passage devices and screens. NEPA work has begun as has environmental and cultural assessments. Funding has been identified and the work is scheduled for the 1998 season.

- The entire Little Butte Creek system is "water quality limited" with quantity being the main factor in the spring, summer, and fall. A Water Flow Task Force has been put in place through the Watershed Council to deal with this issue. Since three major irrigation districts take water out of this system for use outside of the basin, the Council is working with those districts in an effort to find more water during low flow periods.

- Water quality is also influenced by extremely high temperatures during the summer and fall. Thirty five temperature monitoring devices have been placed within the basin in a coordinated effort by the Watershed Council, USFS, BLM, Boise Cascade and ODFW. All partners will use the same methods and share data. In addition the Watershed Council, USFS and ODFW partnered in a Thermal Imaging Project which flew 100 miles of streams within the watershed showing both thermal and infrared temperature information.,This project is promising to be an excellent tool in identifying and analyzing potential project sites.

- Fish screening within the system is basically complete. A final action on the Crandall Butte Creek Mill diversion on lower Little Butte Creek appears to be in agreement.

B. Prioritization of actions

	Restoration Priority Level	
Project Action	Immediate	On-going
Water quality improvements		X
Riparian planting	X	
Improve irrigation efficiency	X	
Screen water diversions	X	
Reduce return flows	X	
Road and culvert improvements	X	
Headgate construction	X	
Exclusions from riparian areas		X
Instream structures		X
Slope stabilization		X
Wetland development		X
Fish passage	X	
Education/local involvement		X

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Quartz Creek Watershed - Middle Rogue Subbasin

Section I. Quartz Creek Watershed Analysis.

The Quartz Creek watershed is a tributary to Jumpoff Joe Creek, which in turn flows into the Rogue River at RM 85, in the Middle Rogue Subbasin of Southwest Oregon. The watershed is located approximately 2 miles west of Merlin, Oregon, in the northern end of Josephine County. Most of the watershed is in private ownership but BLM does own a few small parcels in the headwaters area.

Wildlife habitats within the area are diverse, with various stages of conifer and hardwood timber stands. The valley floor contains grasslands, oak savannahs, chaparral and riparian vegetation. Historically, the habitat areas were created and maintained by fire disturbances and the present distribution of vegetation species have been modified by fire control measures.

Physical Qualities.

Upland stream channels within the watershed are mostly steep narrow mountainous slopes with predominantly cobble substrate. The 'core coho area' is low gradient (generally 3%), low width to depth ratio, with a gravel substrate. Stream sinuosity has been restricted by land development, and several tributary reaches have been channelized. Department of Environmental Quality (DEQ) surveys indicate that water quality is generally good, but seasonal low flows during the summer months produce water temperature problems within the watershed.[2]

Water Resources.

Hydrologic processes within the Quartz Creek watershed have been altered due to highly erosive soils, road construction, and clear-cut timber harvesting in the uplands. Water quality parameters are slowly recovering from these conditions. Agricultural diversions create summer low-flow problems. The consumptive uses are designated as irrigation, mining, agriculture, and domestic.

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[2] Oregon Department of Environmental Quality, 1988, 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Report updated in 1996.

Fish Barriers.

There are no barrier problems identified on Quartz Creek. There is occasional in-stream work from agricultural practices, and limited mining.

Land Uses.

The settlement pattern within the Quartz Creek watershed is rural residential (growing slowly), with scattered ranches, small farms, private forest lands, and small parcels of federal lands. Past mining has disturbed numerous sites, and still continues at low levels. Road density is moderate but they significantly alter hydrological patterns and degrade water quality of upland areas. Fire control practices has produced unnatural vegetation patterns throughout the watershed, increased tree density, and increased the fire hazard level (65% of the watershed is classified as high fire hazard areas).

Fishery Condition.

Quartz Creek is the most productive stream in the Jump-Off Joe Creek watershed. ODFW fry traps indicate the stream supports strong populations of coho, steelhead, cutthroat trout and even a few chinook salmon.

Surveys indicate there are about four miles of usable fish habitat in Quartz Creek. The lower reach is characterized by silt and sand laden pools while the upper part of the stream is primarily riffles with good spawning gravel.

Low summer flows and high water temperatures force many salmon and steelhead fry to move into the lower reaches of the stream or into the main stem of the Rogue River.

Habitat is relatively stable but increasing development, particularly for residential use has increased impacts on the stream itself and the riparian habitat. This development has also increased the risk of erosion. Much of the basin is dominated by decomposed granite. This material, when allowed in the stream will fill interspaces in the spawning gravel and increase imbeddedness.

Table 1. Coho Life-Cycle Use Model for Quartz Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

Section II. Current Habitat Indicators

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Quartz Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Fairly good except near residential development	Deteriorating	Acceptable	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Fair. Impacts from development	Deteriorating	Limiting	Enforce riparian setback ordinances. Enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Unknown	Unknown	Unknown	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Acceptable	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Fairly good numbers but being impacted in lower end by development	Deteriorating	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Winter rearing habitat is limiting	Stable	Limiting	Increase in stream structures
Pool frequency ** ≥50%	Good	Good pool-riffle ratio - 50%	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Fair. Residential development in the mainstem and some tributaries have channelized parts of the stream	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Good in lower end	Deteriorating	Acceptable	Develop some use on tributaries and educate landowners
Mining	None	Some limited gold mining	Improving	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	Several but most involve pumping	Deteriorating	Acceptable	Reduce impact upon fish passage
Push-up dams	None	Variable, seasonal	Improving	Acceptable	Evaluate for effect, provide alternative water supply.
Culverts *	None	None identified	Improving	Acceptable	Continue reconstruction where necessary
Water Quality					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Temperature ** ≤ 64· degrees	Less than 64 degrees	Generally good. Occasionally exceeding 70 degrees in summer	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥ 8 PPM	Good	Unknown	Unknown	Acceptable	Exceed 5 PPM
Turbidity *	Good	Occasional high levels	Unknown	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural and domestic practices	maybe improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** ≥ 10CFS	Flows probably adequate to good	Flows generally adequate with some low water problems in the summer.	Stable		Regulate water withdrawals. Improve riparian areas.
Diversions	None	Primarily pumps	Stable	acceptable	Eliminate unused rights, to in stream rights, reconstruct diversion headgate
Release regime	N.A.	Unknown	Unknown	Acceptable	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Moderate	Erosion primarily from development	Deteriorating	Acceptable	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increased ag use	Improving	Acceptable	Restore controlled burning

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate. A few small farms exist. Converting to residential	Stable	Unknown	Limit adverse effects
Return flows	None	Unknown	Stable	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Quartz Creek watershed the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 20 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by the state and volunteer groups in the near future.

- Tree planting projects are being planned for next year and Quartz Creek will be strongly considered for inclusion in this effort. The planting program will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. **Lack of Riparian diversity and density.**

Condition:

- Riparian habitat in some areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade.

3. **High summer water temperatures.**

Condition:

- Temperature monitoring has recorded temperatures near 70 degrees F. during the warmest summer months.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.
- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

4. Low summer flows.

Condition:

- Summer flows are fairly low limiting fish distribution to a few deep holes or requiring juvenile salmonids to move downstream to locate suitable habitat.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

5. Poor winter habitat

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris in stream		X
Monitor temperatures		X
Plant riparian vegetation		X
Conducting a detailed physical and biological stream survey		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing monitoring stations above and below project sites and evaluate before and after project completion.
- Updating stream surveys at least every five years.
- Conducting periodic spawning ground counts.
- Conducting a regular temperature monitoring program.
- Conducting a juvenile sampling program.

C. Implementation Plan

Much of the Quartz Creek watershed is privately owned although BLM does manage part of the headwaters. No stream survey has been conducted on this system but a cooperative program between ODFW and BLM will include Quartz Creek in a future survey program. BLM has committed to restoring fish habitat in their entire resource area and the importance of the Quartz Creek system for fish production will place this watershed high on their priority list.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat throughout the Rogue basin the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the watershed council and other volunteer groups. The BLM is committed to spending considerable funds in the basin and have already implemented an extensive habitat improvement program. A number of projects are complete, some are currently underway and many more are being planned. Private landowners have also committed considerable resources to improve fish habitat in the watershed.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
West Fork Evans Creek - Evans Creek Subbasin

Section I. West Fork Evans Creek Watershed Analysis

The West Fork of Evans Creek is a tributary of Evans Creek. It enters Evans Creek at about stream mile 20. Evans Creek flows into the Rogue River at river mile 118, at the town of Rogue River.

The West Evans watershed covers approximately 39,176 acres (61.2 square miles). The stream flows generally south for about 17 miles before entering the main stem of Evans Creek.

Many species of wildlife inhabit the Evans Creek watershed due to the diversity of habitat. The succession stage of zone one (0-25 feet) contains small alder and bigleaf maple intermixed with a few patches of Pacific yew and Douglas fir. Large Douglas fir and white fir are found in the outer zone (25-100 feet) in reach one. Douglas fir, white fir and western hemlock are dominant in the outer zone of reaches two and three.

Physical Qualities

The West Fork of Evans Creek is an important source of water flow and sediment deposition to downstream areas such as the Mid and Lower Evans Creek watersheds and ultimately the Rogue River. The West Fork is one of the main headwater drainages and as such serves as one of the last links to the entire drainage. This is an area where the majority of migrating fish come to spawn. Large depositions of granitic sediments both within and downstream of the West Fork adversely effect the quality of the fish habitat.

Elevation ranges from 1,520 feet on the valley floor to 5,103 feet at the top of Cedar Mountain. The dominant ridges forming this drainage are primarily north to south with many lateral finger ridges. The topography is highly dissected by deeply incised drainages. This broken and irregular ground results in many headwall and overly steep areas of instability.

Very little information is available on the condition of riparian habitat. Stream surveys were conducted in 1992 but they did not focus on riparian condition. Aerial photos display a fragmented canopy cover that lacks the conifer component needed for course woody debris. Most channels have been simplified by repeated harvesting of large trees in the riparian zone and the loss of key system structures.

Timber harvesting has changed the riparian vegetation and conifer condition along significant stretches of the West Fork. Significantly less shade protection occurs along the lower reaches. This allows for increased water temperatures.

Water Resources

The rainy and dry seasons are reflected in the flow of the West Fork. A peak flow rate approaching 800 cfs may occur with a warm rain on snow. This variation in flow rates impacts salmonids during the phases of their life cycle.

Water withdrawals from the West Fork are limited to a few households at the south end of the watershed that primarily utilize wells or springs for domestic water.

There are very few diversions of water from the West Fork for irrigation. This means the West Fork is an important link to regulating stream flows in the mainstem of Evans Creek where much of the summer flows are diverted for irrigation.

Fish Barriers

There are no natural barriers to migrating fish, however, several stream crossing culverts have been identified as limiting or restricting to fish passage.

Land Uses

The agricultural lands (0.5%) are positioned around the valley floor adjacent to Evans Creek and are all private. The agricultural lands are in grass but are not being used to produce hay or grazing. There are scattered residences throughout the bottom land.

The non-agricultural lands are forest lands and are classified as industrial forest lands (40%), woodlot (non industrial) forest lands (1.0 %) and federal forest lands (58%). BLM is the largest landowner controlling 54 percent of the watershed. Medite, a private timber company owns 40 percent. Other ownerships include USFS - 1 percent, State of Oregon - 2 percent, and other private ownership - 1 percent.

Fishery Conditions

The West Fork of Evans Creek supports populations of coho, steelhead and cutthroat trout. Anadromous fish are known to exist in the main stem of the West Fork and eight tributaries.

Stream surveys conducted in 1992 revealed the following findings regarding aquatic habitat:

a. Excessive amounts of sediments and sands (granitics) are filling pools and glides (reduces spawning habitat for coho and chinook).

b. Granitic sands reduce aquatic insect populations and simplify habitat complexity.

c. Pool frequency ranged from 20% to 43 % (threshold is 50% level)

d. Channel substrate is heavily embedded and provides minimal cover for small fish and reduces aquatic insect populations.

e. There is a low amount of large woody debris in the stream channel. Average was 28 pieces per mile, range was 10 to 48 pieces per mile.

f. Temperature is a limiting factor in several tributaries.

Table 1. Coho Life-Cycle Use Model for West Fork Evans Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. West Fork Evans Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Harvested, narrow riparian zone, thin density, fragmented by logging	Deteriorating	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Relatively poor. Riparian is primarily deciduous and small firs	Deteriorating	Limiting	Needs conifers and species diversity
Bank stability * ≥90% stable	Good, vegetated	Fair. Impacted by logging and some development	Improving	Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Fair. Impacted by substrate imbeddedness by granitic soils	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Fair to poor. Impacted by granitic soils	Deteriorating	Limiting	Maintain and enhance supply. Stabilize source of granetics.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Considerable embeddedness	Stable	Limiting	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Low. Average is 28 pieces per mile	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fair. Both Summer and winter *habitat is limiting*	Stable	Limiting	Maintain, increase summer flow. Improve in stream cover.
Pool frequency ** ≥50%	Good	Fair pool-riffle ratio - 35/65	Stable	Limiting	Protect from sedimentation, add LWD
Sinuosity	Good	Fairly good. Minimal impacts by man	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Fair, a few are available	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Fair. Several exist in mainstem and tributaries	Improving	Acceptable	Encourage use on tributaries and educate landowners
Mining	None	Some, limited gravel removal and recreational gold mining	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal. Some have been impacted by logging activities	Deteriorating	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	A few small diversions exist	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	Evaluate for effect, provide alternative water supply.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Several problem sites identified	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Often over 65 degrees in summer, high of 75 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels	Deteriorating	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	None identified	Stable	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Summer low flows are limiting to some extent but West Fork is the best in the Evans Creek System.	Stable	Limiting	Control. diversions and improve riparian habitat
Diversions	None	A few exist but not limiting as yet	Improving	Acceptable	Eliminate unused rights, acquire in stream rights, protect from additional withdrawals
Release regime	N.A.	No change documented	Stable	Acceptable	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Erosion from unstable granitic soils is extensive	Deteriorating	Limiting	Improve land use practice. Focus on soil stabilization.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Wild fire, logging and road construction	Improving	Limiting	Restore controlled burning. Improve forest practices.
Road density * ≤2miles/sq.mile	None	Moderate problem. About 4.8 miles per section	Deteriorating	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	A few small farms and ranches. Converting to residential.	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Minor	Stable	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the West Fork Evans Creek watershed the following are the most critical limiting factors for coho production:

1. Lack of large woody debris.

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 28 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future.
- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. Lack of spawning gravel

Conditions:

- Stream surveys have indicated that spawning gravel is limited and widely scattered. Available gravel is moved out of the system due to high flows and the lack of structure to collect it. Many of the existing gravel bars have been impacted by decomposed granite that has washed into the stream from upland areas.

Actions:

- Installation of instream structures, both logs and boulders, will help collect and hold gravel Some structures are being specifically designed to gather gravel for spawning salmonids.
- Serious erosion areas adjacent to the stream and also in upland areas will be targeted for stabilization. This is a high priority on BLM lands.

3. **Low Pool-Riffle ratio:**

Condition:

- The Pool-Riffle ratio on the West Fork of Evans Creek is only 35:65. A 50:50 or 60:40 ratio would provide better rearing habitat for coho.

Actions:

- Specific placement of logs and boulders to create pools will help move the Pool-Riffle ration closer to 50:50.

4. **Lack of Riparian diversity and density.**

Condition:

- The riparian area in many areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade and for bank stabilization.

5. **High summer water temperatures.**

Condition:

- Temperature monitoring has recorded temperatures near 75 degrees F. during the warmest summer months.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.

- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

6. **Low summer flows.**

Condition:

- Summer flows are low but they are the best in the Evans Creek system.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

7. **Poor winter habitat**

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

8. **Roads and culverts**

Condition:

- Road density is high with 4.8 miles per section. There are also a number of culverts that limit fish passage, particularly juvenile movement upstream during the winter months.

Actions:

- BLM is focusing much of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

9. **Bank stability and sedimentation.**

Conditions:

- Extensive logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Bill to provide wider buffers and a more stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing monitoring stations above and below project sites and evaluate before and after project completion.
- Updating stream surveys at least every five years.
- Conducting periodic spawning ground counts.
- Conducting a regular temperature monitoring program.
- Conducting a juvenile sampling program.

C. Implementation Plan

Much of the West Fork of Evans Creek watershed is managed for timber harvest by both BLM and Medite Timber Corporation. The BLM has committed to restoring fish habitat in the entire Evans Creek watershed. A five-year management plan includes considerable habitat work in the West Fork and Evans Creek drainages.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Evans Creek watershed the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The BLM is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Cheney/Slate Creeks Watershed - Applegate River Subbasin

Section I. Cheney/Slate Creeks Watershed Analysis.

The Slate and Cheney Creek watersheds are tributaries to the Applegate River in the Rogue Basin of Southwest Oregon. The watershed is located approximately 5 miles west, southwest of Grants Pass, Oregon, in the southwest corner of Josephine County. Elevations range from 800 feet near the Applegate River to 4,700 feet at the highest elevations within the watershed. There are about 48,915 acres within the WAU (watershed analysis unit), with the Bureau of Land Management and U.S. Forest Service administrating 45% (21,823 acres), most of the upland areas.[3] The State of Oregon, commercial timber companies and other private landowners own the remaining 27,092 acres (55%) of the watershed.

Land allocations in the greater Applegate watershed are designated in the Northwest Forest Plan's Record Of Decision and the Medford District, Bureau of Land Management Resource Management Plan (RMP). These land allocations include Adaptive Management Areas, Late Successional Reserves, Big Game Management Areas, Research Natural Areas, Riparian Reserves, and 100 acre core areas for the northern spotted owl. The Medford District RMP has designated Greyback Glades and Pipe Fork as RNA/ACEC (Area of Critical Environmental Concern). The RMP also includes elk management areas, and spotted owl habitat units.

Wildlife habitats within the area are diverse, with various stages of conifer and hardwood timber stands. The valley floor contains grasslands, oak savannahs, chaparral and riparian vegetation. Historically, the habitat areas were created and maintained by fire disturbances. The present distribution of vegetation species have been modified by fire control measures. There are 54 potential sensitive plant and animal species in the WAU. The predominant land use of the valley floor is agriculture and private forest land. Slate and Cheney Creeks contain winter and summer steelhead, coho, fall chinook, and cutthroat and rainbow trout.

Physical Qualities.

Upland stream channels within the watershed occur on steep mountainous slopes and are narrow with a predominantly cobble substrate. The 'core coho areas' range from high gradient (4-10%) to low gradient (3% or less), with low to moderate width to depth ratios, with a gravel substrate. Stream sinuosity has been restricted by land development, and several tributary reaches have been channelized. DEQ surveys indicate that water quality is generally good, but seasonal low flows during the summer months produce water temperature problems within the watershed.

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[3] Slate/Cheney Watershed Analysis. Grants Pass Resource Area, Medford District Office, Bureau of Land Management, U.S. Department of the Interior, March 1996.

Water Resources.

Hydrologic processes within the Slate/Cheney creeks watershed have been altered due to highly erosive soils, road construction, and clear-cut timber harvesting in the uplands. Water quality parameters are slowly recovering from these conditions. River flows tend to be peaking earlier and at higher levels, and with lower summer base flows. Annual runoff from Slate/Cheney Creek averages 47,000 acre-feet. Mean annual discharge from these two creeks is about 130 cfs. There are numerous water rights granted to the Cheney/Slate Creek systems. Domestic (including gardening) water use and agricultural diversions exacerbate summer low-flow problems. The consumptive uses are designated as irrigation, mining, agriculture, and domestic.

Fish Barriers.

To date no fish barriers have been identified within the watershed analysis unit.

Land Uses.

The settlement pattern within the Slate/Cheney Creek watersheds is rural residential, with scattered ranches, small farms, private forest lands, and small parcels of federal lands. Past mining has disturbed numerous sites, and still continues at low levels. Fire control practices have produced unnatural vegetation patterns throughout the watershed, including increased tree density and resulting in an increased fire hazard level (53% of the watershed is classified as high fire hazard areas).[4]

Forest Management

Timber has been harvested from the Cheney/Slate creeks watershed for over 50 years. Within the last 30 years, advances in harvesting technology and road access have led to the majority of the watersheds having been entered. The practice of clearcutting followed by site preparation, burning and replanting during the 1970's and 1980's has resulted in large blocks of land occupied by overstocked stands of young trees. This has resulted in a reduction in the amount of large trees across the landscape, including riparian zones. Current silvicultural practices based on selective harvesting are aimed at leaving behind more large trees in the interest of ecosystem management objectives beyond just timber harvesting.

Agriculture:.

Agriculture within the Slate/Cheney creeks watershed consists primarily of a few small farms and ranches. Hay and pasture irrigation and livestock watering are the major uses of water on these farms and ranches. Most water withdrawals within the watershed occur as a result of rural residential use of water for gardens, lawns and landscaping.

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[4] Slate/Cheney Watershed Analysis, 1996, op.cit.

Fishery Condition.

The Rogue basin is on the southern end of the coho range in Oregon. Coho are the least abundant wild salmonid (with the exception of sea-run cutthroat) that use the Rogue system Historically, the Rogue was a substantial producer of coho. Commercial harvests of coho began in 1861 and by 1888 the Rogue River fishery ranked third among the fisheries of the west coast. In the early 1900s, egg-taking stations were operated by both public and private interests on a number of Rogue tributaries including the Applegate River, despite concerns as early as 1911 that fish runs in the Rogue were declining. Between 1976 and 1989 the freshwater escapement of coho into the Rogue River basin was estimated at 7,000 hatchery and wild adults. The present estimate is approximately 3,600 hatchery and 3,200 wild age three adults .[5]

The Applegate system was not historically a major producer of coho in the Rogue Basin, however no definitive historic records are available. Adult coho enter the Rogue River system beginning in September, reach Gold Ray Dam around mid-October, and hold in the main river until rains allow them to move into the Applegate system and ultimately Slate/Cheney Creek to spawn in December and January. During large run years, spawning may continue into March. Fry emerge during the month of April and rear in lower Slate/Cheney Creek and the Applegate River for a year until they smolt. Smolts migrate to the lower river from mid-May through July. Young coho winter over in large pools and backwaters which provide cover during high water months. Most Rogue coho spend a year in freshwater and two years at sea before returning to their home stream to spawn. A small percentage of the population spends two years in freshwater and two at sea.

Slate and Cheney Creeks currently contain a modest but relatively stable run of coho salmon. Aquatic surveys indicate that there is some 29 miles of coho habitat within the Slate and Cheney Creek systems. Spawning habitat is generally good but rearing conditions are limited by low flows and resultant high stream temperatures in the summer. Besides coho, the Slate/Cheney Creek systems contains fall chinook, winter steelhead, summer steelhead and resident rainbow and cutthroat trout.

[5] Rogue Basin Fish Management Plan . Oregon Department of Fish and Wildlife, Draft, October, 1994.

Table 1. Coho Life-Cycle Use Model for Slate/Cheney Creeks .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✓	X	X	X	X	X	X	X	X	X✓	X✓	X✓
Juvenile migration						X	X	X	X✓	X✓		
Smolt out migration							X	X	X✓	X✓		

X Indicates presence at the life-cycle month stage.

✓ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.

Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Cheney Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Lower reaches harvested, narrow riparian zone, thin density	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Fair, some cattle grazing	Improving	Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Excellent, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Generally good, some sedimentation	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Fairly numerous but being impacted by development	Declining	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Fairly Good pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Fairly good but some areas have been channelized and riprapped	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Good	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Several throughout	Deteriorating	Acceptable	Maintain and promote. Educate landowners to encourage use.
Mining	None	Mined heavily in the past. Minor recreational mining currently	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas to expand pasture land	Deteriorating	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	One diversion dam in lower reach that should be removed shortly.	Stable	Acceptable	Modify to improve fish use/passage
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Limiting	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Some problem areas	Improving	Acceptable	Continue reconstruction.
Water Quality					
Temperature ** $\leq$64· degrees	Less than 64 degrees	Relatively good but occasionally over 65 degrees in summer	Improving	Acceptable	Increase canopy and riparian cover
D.Oxygen $\geq$8 PPM	Good	Unknown	Unknown	Acceptable	Improve to 5 PPM
Turbidity	Good	Occasional high levels	Improving	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** $\geq$10CFS	Flows probably adequate to good	Low flows a problem during summer	Improving	Limiting	Reduce Ag. diversions, improve riparian habitat
Diversions	None	Creating low flow problems. Oversubscribed.	Stable	Limiting	Eliminate unused rights, acquire water rights for in stream use.
Release regime	N.A.	Unknown	Unknown	Acceptable	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest, Mining and ag. use.	Improving	Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Disturbance history	Frequent-fire	Restrictive fire management, but increased ag use	Improving	Acceptable	Restore controlled burning
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate, farms and ranches. Converting to residential.	Deteriorating	Unknown	Limit adverse effects
Return flows	None	Unknown	Stable	Unknown	Monitor, and evaluate
Chemical use on lands	None	Minor	Unknown	Acceptable	Monitor, and evaluate use
Other					

Table 3. Slate Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Harvested, narrow riparian zone, thin density. Impacted by development	Deteriorating	Limiting	Improve species diversity, and canopy to 80+%

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability * $\geq$90% stable	Good, vegetated	Fair impacted by development	Deteriorating	Limiting	Enforce riparian setbacks., Enhance riparian areas
Macroinvertebrate Health $\geq$80% High $\leq$40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good in the tributaries. Marginal in the mainstem	Stable	Acceptable	Maintain and enhance supply
Substrate condition. $\leq$20% over natural delivery	Presumed good	Stable, some sedimentation	Stable	Acceptable	Reduce sedimentation
Sediment * $\leq$5%	Presumed low	Variable, moderate to high in some areas	Improving	Acceptable	Reduce sediment load, control bank erosion
In stream LWD ** $\geq$20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures
Side channels * $\geq$5 mile	Probably good, good sinuosity	Few and of limited quality	Deteriorating	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** $\geq$50%	Good	Fairly good pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Poor, in mainstem and some tributaries are channelized in areas	Deteriorating	Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	None	None	Limiting	Encourage use and educate landowners

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Mining	None	Some limited gold mining	Improving	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	Two diversion dams hinder fish passage.	Stable	Limiting	Modify to improve fish use/passage
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Limiting	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action
Culverts *	None	Several problem sites identified	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ** ≤58 64· degrees	Less than 64 degrees	Often over 65 degrees in summer, high of 75 measured. Smolts may encounter sub-lethal levels in summer	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels	Deteriorating	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural and domestic practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** ≥10CFS	Flows probably adequate to good	Low flows a problem during the summer months	Stable	Limiting	Reduce Ag. and domestic withdrawals
Diversions	None	Creating low flow problems. Oversubscribed.	Deteriorating	Limiting	Eliminate unused rights, acquire water rights for in stream use. Install headgate
Release regime	N.A.	Unknown	Unknown	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest, mining and development causing most erosion	Improving	Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested; converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increased ag use and development	Improving	Acceptable	Restore controlled burning, improve forest practices, control development
Road density * $\leq$2miles/sq.mile	None	Moderate problem	Deteriorating	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate number of farms and ranches. Converting to residential	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

There are a multitude of actions that are needed to restore and protect a watershed. Inevitably, the matrix of needs must be prioritized to select the most critical issues. Further, actions taken to address one limiting factor (such as low summer flows) often affect other habitat parameters (such as water temperature). Actions taken depend upon the limited resources that can be invested within the watershed, their impact upon the selected resources, and the fishery need at the respective lifecycle stage of use. In the Slate/Cheney creeks watershed, the most critical limiting factors for coho production (identified through integrating conditions in Tables 2 and 3 above) are:

1. **High summer water temperatures in rearing areas.**

Condition:

- Summer month stream water temperatures sometimes exceed 21°C (69.8° F) which forces fingerlings and smolts to migrate out of the area.

Actions:

- Increase density and diversity of riparian vegetation to provide shade and reduce incident radiation.
- Provide an adequate buffer zone for protection of riparian area.
- Encourage greater pool formation and depth through placement of LWD.
- Increase subsurface water storage upslope to increase natural inflow in summer months.
- Limit irrigation return flows.

2. **Low summer flows in rearing areas.**

Condition:

- Low summer flows from natural conditions and diversions reduce summer flows to 0-5 CFS during some months. Smolts are known to migrate out of mainstream channels during low flow periods, seeking improved habitat conditions.

Actions:

- Increase in-stream flows through reduced diversion.
- Promote revegetation of riparian areas to improve water quality
- Increase pool depth to protect rearing habitat
- Increase subsurface water storage upslope to increase natural inflow in summer months.
- Encourage beaver dams on tributaries.

3. Riparian diversity and density.

Condition:

- The riparian zone has been narrowed and depleted through harvest and development, which has impaired riparian zone function.

Actions:

- Foster riparian growth and development through the use of management practices which protect critical vegetation.
- Limit forest harvest to create riparian buffer zones of adequate size.
- Plant trees and forbs along the waterway to increase canopy cover.

4. Lack of Stream Channel Complexity and Off-channel Rearing Areas.

Condition:

- The stream channel has been straightened, beaver dams removed and large woody material removed from the stream channel. This has reduced the number of eddies, alcoves and rearing pools available for coho.

Actions:

- Promote the development of off channel alcoves and pools.
- Install large woody debris in the waterway to maintain and enhance pool structure.

Additional Conditions Of Concern:

- Low quantity of large woody debris for recruitment material
- Suspended sediment resulting in poor quality spawning and incubation gravels
- Limited spawning gravel material for recruitment

Section IV. Implementation Process

Local Watershed Councils have been asked to identify and select restoration actions to be undertaken within core areas based upon tables developed for habitat conditions, fish life cycles and resultant limiting factors. Needs for assistance are also identified. The following sections address these concerns.

A. Prioritization of actions

Project Action	Restoration Priority Level: Immediate	Restoration Priority Level: On-going
Water quality improvements		X
Riparian planting	X	
Improve irrigation efficiency	X	
Screen water diversions	X	
Reduce return flows	X	
Road and culvert improvements	X	
Headgate construction	X	
Instream structures		X
Slope stabilization		X
Wetland development		X
Fish passage		X
Education/local involvement		X

B. Milestones for Assessing Progress.

Specific indicators of progress in restoration efforts have been identified. Any and all of the following measures of habitat and watershed improvement may indicate progress in improving coho salmon production, however fish production is the ultimate measure of progress.

1. Number of projects.
2. Number of landowners participating.
3. Fencing: linear miles per drainage.
4. Off-channel stock watering: number of off channel stock watering opportunities developed per drainage.

5. Planting: hardwoods/acre, total acres per drainage.
   conifers/acre, total acres per drainage.
   shrubs/acre, total acres per drainage.
6. Stream miles per drainage of riparian diversification techniques: live-staking/acre, total acres per drainage.
7. Riparian setbacks: acres/stream mile, total acres per drainage.
8. Instream structures: structures/mile, total structures per drainage
   log weirs
   boulder deflectors
   scour structures
   cover structures
   spawning gravel
9. Off-channel alcoves:number/size, total structures per drainage.
10. Sediment removal, cubic yards (cy) per project, cy per drainage.
11. Vegetation management, square yardage.
12. Pool development: total projects per drainage, sediment removal, cy per project, cy per drainage.
13. Culvert treatment: number of culverts treated per drainage, miles of stream reach opened to fish.
14. Soil bio-engineering (resloping, willow waddles, rock barbs etc.): acres/stream mile, total acres per drainage.
15. Miles of roads and skid trails stabilized.
16. Acres of erosion control initiated.
17. Number of educational workshops held.

C. Implementation Plan.

Implementation of a restoration plan will be multifaceted, including landowner participation and acceptance, government action, enforcement and monitoring.

<u>**Landowner Participation and Acceptance**</u>

The focus of the landowner participation and acceptance portion of a restoration plan shall be increased community involvement through outreach and education programs. The watershed council has been involved with, and is continuing, a number of outreach and community education programs within the Applegate River watershed. Activities currently underway include:

Outreach and education program involving aggregate removal from the watershed.

- Community outreach with respect to land use planning and watershed improvement within the Williams Creek area including the identified core area.

- Continued cooperation with schools in education and monitoring efforts.
- The encouragement of the formation of "mini" watershed councils within the Applegate River basin. This is currently underway for the Williams Creek area.
- The continued provision for educational opportunities with respect to watershed and fisheries (e.g. workshops, presentations, etc)
- The continued development of a GIS system for the Applegate River basin that is available to the general public. This system is currently available to the public at three locations within the watershed.
- Continued tree-planting projects within riparian zones and on adjacent uplands.
- A project designed to add instream structure (i.e. large wood) to lower Slate Creek funded in part by U.S. Fish and Wildlife.
- Incentive programs, when available, will also be used to encourage landowner participation in watershed/fish restoration efforts.

<u>**Government Action**</u>

The government action portion of a restoration plan shall include the implementation of ordinances, resolutions and motions by City and County governments which further the objectives of a salmon restoration plan. In addition, affirming and sponsoring initiatives and memorandums of understanding, contracts, interagency agreements between cooperating agencies and the watershed council shall be pursued when beneficial to the improvement of the Applegate River watershed including anadromous fish stocks. Any number of the following agencies may be involved in cooperative efforts to restore salmonid fish stocks.

Jackson County Planning Department
◊ Josephine County Planning Department
◊ Oregon State Land Board
◊ Oregon Department of Water Resources
◊ Oregon Department of Forestry
◊ Oregon Department of Fish and Wildlife
◊ Oregon Department of Agriculture
◊ Oregon Department of Parks and Recreation
◊ Oregon Department of Transportation
◊ Oregon Department of Environmental Quality
◊ U.S. Department of Interior (e.g. Bureau of Land Management, etc)
U.S. Department of Agriculture (e.g. Forest Service, Natural Resources Conservation

Service, etc)
U.S. Army Corps of Engineers
◊ National Marine Fisheries Service

Enforcement

Watershed Councils do not have the legal authority to enforce watershed restoration activities. Instead councils pursue cooperative arrangements with landowners in order to carry out activities beneficial to watershed health and salmonid fish stocks. To date the Applegate River Watershed council has been involved with a wide array of projects ranging from tree planting to road improvement to instream habitat improvement. The Applegate River Watershed Council will continue to pursue these cooperative efforts and will increase our efforts within the identified coho core areas. Legal enforcement of laws which benefit salmonid fish stocks will be carried out by the appropriate federal, state, county and local entities. For example, the Oregon State Police Fish and Wildlife Division has formulated a policy for protection and enforcement of salmonid protection and enforcement of salmonid habitat areas.[6] They propose to establish interagency cooperation with state and federal natural resource agencies in enforcement of applicable habitat regulations and investigate environmental violations.

Monitoring

Monitoring actions shall be a part of the restoration plan. Monitoring, especially long term monitoring, is critical to evaluating the effectiveness of any watershed or fisheries improvement project. Baseline conditions will be identified for each project area followed by monitoring for construction effects, project effectiveness, and long-term trends. Data to be collected depends upon the nature of the project implemented. The party(ies) responsible for monitoring will depend upon both the nature of the project and who the cooperators in the project are. As a result, monitoring may be carried out by any of the following, singly, or in groups; landowners, the watershed council, state agencies or federal agencies. The following are examples of restoration objectives and the party(ies), parameters and/or methods that should be considered for monitoring.

1. Riparian restoration:

a. Hardwoods and conifers planted at a minimum density of 400 trees per acre and have a survival rate of 60%. Define who and how stocking surveys will be done. Survival of plantings will be monitored by landowners and/or agency personnel on an annual basis and follow up treatment will occur as needed utilizing volunteers, landowners, or agency resources as funding allows, until the outlined survival goals are achieved.

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[6] Letter from Lindsay A. Ball, Captain, Oregon Department of State Police, with document attached entitled Role of Enforcement in the Coastal Salmon Restoration Initiative. July 31, 1996.

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

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

2. Riparian Planting Protection:

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

3. Off Channel Habitat:

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

4. Instream Structure:

Selected instream structures will be inspected to determine resulting functions. Any changes in structure will be documented including recruitment of woody debris and sedimentation. Follow up habitat surveys will document changes in pool riffle ratios within restored watersheds and instream fish counts will document fish usage around these structures. Water quality monitoring parameters will include temperature, flow, chemistry, and turbidity.

5. Upland Vegetation:

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

6. Monitoring

A substantial monitoring program is currently underway within the Applegate River Watershed. The following is a partial list of these efforts including participants.

Temperature - Forest Service, Bureau of Land Management, Watershed Council, Schools, Environmental groups (e.g. Headwaters) and Individuals.

Spawning Surveys, Carcass Counts - Oregon Department of Fish and Wildlife.

Stream Surveys - Oregon Department of Fish and Wildlife, Forest Service, Bureau of Land Management.

Stream Chemistry - Department of Environmental Quality.

Efforts are underway to better coordinate monitoring among these participants. In addition, staff at the Applegate Watershed Council are in the process of developing a basin wide water quality and habitat monitoring plan, incorporating participation and coordination of the U.S. Forest Service, Bureau of Land Management, Department of Environmental Quality, Oregon Department of Fish and Wildlife, and Council staff efforts. The watershed is currently monitored by DEQ for water quality conditions. Data collection sites are to be coordinated, data is to be archived at the Watershed Council, and at the Rogue Valley Council of Governments.

D. Requirements for Achieving Success.

Achievement of coho habitat protection and restoration presents a number of challenges to watershed councils and state and federal agencies. The following is a list of barriers to the success of a restoration plan for coho salmon within the Applegate River system.

- Technical Assistance - Support for technical assistance from state and federal agencies is currently underway with the development of a memorandum of understanding detailing the sharing of technical expertise among state and federal agencies and the watershed councils. Whether this memorandum will provide adequate technical assistance remains to be seen.

- Funding - Obtaining adequate funding for projects, education, outreach and coordinator salaries continues to be a challenge. Coordinator funding is especially troublesome because the demand for coordination of projects, monitoring and education continues whether coordinators are funded or not.

- Involvement - Finding more effective ways to communicate the importance of involvement in improving fisheries habitat and watershed health to the general public is the key to the success of restoration efforts. We need to continue to find more innovative and effective ways of achieving public involvement.

- State and Federal Laws and Policies (including permitting) - Continued streamlining of processes to approve restoration activities is crucial. Often seemingly simple tasks become nearly insurmountable because of the maze of law, regulation, policy, agency involvement, etc.

Section I. Williams Watershed Analysis.

The Williams watershed is a tributary of the Applegate River, in the Rogue Basin of Southwest Oregon. Williams Creek enters the Applegate River at RM 20. The watershed is located approximately 12 miles south of Grants Pass, Oregon, in the southwest corner of Josephine County. Elevations range from 1,200 feet near the Applegate River, to 6,680 feet at Sugarloaf Peak. Most of the critical habitat area falls within the 2,000-4,000 foot range. The core area occurs at elevations ranging from 1375 to 1400 feet. There are about 51,971 acres within the WAU (watershed analysis unit), with the Bureau of Land Management administrating most of the upland areas.[7] Commercial timber companies own some 22,492 acres within the watershed.

Land allocations in the greater Applegate watershed are designated in the Northwest Forest Plan's Record Of Decision and the Medford District, Bureau of Land Management Resource Management Plan (RMP). These land allocations include Adaptive Management Areas, Late Successional Reserves, Big Game Management Areas, Research Natural Areas, Riparian Reserves, and 100 acre core areas for the northern spotted owl. The Medford District RMP has designated Greyback Glades and Pipe Fork as RNA/ACEC (Area of Critical Environmental Concern). The RMP also includes elk management areas, and spotted owl habitat units.

Wildlife habitats within the area are diverse, with various stages of conifer and hardwood timber stands. The valley floor contains grasslands, oak savannahs, chaparral and riparian vegetation. Historically, the habitat areas were created and maintained by fire disturbances and the present distribution of vegetation species have been modified by fire control measures. There are 54 potential sensitive plant and animal species in the WAU. The predominant land use of the valley floor is agriculture and private forest land. Williams Creek contains winter and summer steelhead, coho, fall chinook, and cutthroat and rainbow trout.

[7] Williams Watershed Analysis. Grants Pass Resource Area, Medford District Office, Bureau of Land Management, U.S. Department of the Interior, March 1996.

Physical Qualities.

Narrow upland stream channels within the watershed occur on mostly steep mountainous slopes with predominantly cobble substrate. The 'core coho area' is low gradient (generally <3%), low width to depth ratio, with a gravel substrate. Stream sinuosity has been restricted by land development, and several tributary reaches have been channelized. Department of Environmental Quality (DEQ) surveys indicate that water quality is generally good, but seasonal low flows during the summer months produce water temperature problems within the watershed.[8]

Water Resources.

Hydrologic processes within the Williams Creek watershed have been altered due to highly erosive soils, road construction, and clear-cut timber harvesting in the uplands. Water quality parameters are slowly recovering from these conditions. River flows tend to be peaking earlier and at higher levels, and with lower summer base flows. Annual runoff from Williams Creek averages 100,700 acre-feet. There are 390 water rights granted to the Williams Creek system, with an allocation rate of 128.89 cfs, and agricultural diversions exacerbate summer low-flow problems. The consumptive uses are designated as irrigation, mining, agriculture, and domestic.

Fish Barriers.

Over time, Williams Creek and tributaries are subject to push-up dam construction at various locations. A diversion dam exists at the confluence of Powell Creek, but is not considered a barrier. Six road culverts may restrict passage of juvenile salmonids.

Land Uses.

The settlement pattern within the Williams Creek watershed is rural residential (population 2,713, and growing slowly), with scattered ranches, small farms, private forest lands, and small parcels of federal lands. Past mining has disturbed numerous sites, and still continues at low levels. Road density is moderate, with 417 miles within the watershed (5.14 miles road/per square mile), which significantly alters hydrological patterns and degrades water quality of upland areas. Fire control practices have produced unnatural vegetation patterns throughout the watershed, increased tree density, and increased the fire hazard level (28% of the watershed is classified as high fire hazard areas).[9] Within the identified core coho habitat area, agriculture is the primary land use.

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[8] Oregon Department of Environmental Quality, 1988, 1988 Oregon Statewide Assessment of Nonpoint Sources of Water Pollution. Report updated in 1996.

[9] Williams Watershed Analysis, 1996, op.cit.

Forest Management

Timber has been harvested from the Williams Creek watershed for over 50 years. Within the last 30 years, advances in harvesting technology and road access have led to the majority of the watersheds having been entered. The practice of clearcutting followed by site preparation, burning and replanting during the 1970's and 1980's has resulted in large blocks of overstocked stands of young trees. This has resulted in a reduction in the amount of large trees across the landscape, including riparian zones. Current silvicultural practices based on selective harvesting are aimed at leaving behind more large trees in the interest of ecosystem management objectives beyond just timber harvesting.

Agriculture:.

Agriculture within the Williams Creek Watershed consists primarily of small farms, ranches and dairy farms. Hay, pasture and row crop irrigation and livestock watering are the major uses of water on these farms and ranches. Additional water withdrawals within the watershed occur as a result of rural residential use of water for gardens, lawns and landscaping.

Fishery Condition.

The Applegate system was not historically a major producer of coho in the Rogue Basin, however no definitive historic records are available. Adult coho enter the Rogue River system beginning in September, reach Gold Ray Dam around mid-October, and hold in the main river until rains allow them to move into the Applegate system and ultimately Williams Creek to spawn in December and January. During large run years, spawning may continue into March. Fry emerge during the month of April and rear in lower Williams Creek and the Applegate River for a year until they smolt. Smolts migrate to the lower river from mid-May through July. Young coho winter over in large pools and backwaters which provide cover during high water months. Most Rogue coho spend a year in freshwater and two years at sea before returning to their home stream to spawn. A small percentage of the population spends two years in freshwater and two at sea.

Williams Creek contains a modest but relatively stable run of coho. Aquatic surveys indicate that there are some 25 miles of coho habitat within the Williams Creek system, but only 5 miles (20%) have been designated as 'core area' habitat. ODFW estimated in 1976 that approximately 150 coho spawned in the 17.3 miles of available coho habitat in Williams Creek (6.7 fish/mile).[10] Normal production may fluctuate several times this number. Spawning habitat is generally good but rearing conditions are limited by low flows in the summer. If the habitat were improved to best available conditions, the Williams Creek fishery might support in the range of 25 to 45 adult coho/mile. Besides coho, the Williams Creek system contains fall chinook, winter steelhead, summer steelhead and resident rainbow and cutthroat trout.

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[10] Applegate Watershed Assessment. Oregon Watershed Health Program, Applegate River Watershed Council, November, 1994.

Table 1. Coho Life-Cycle Use Model for Williams Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✓	X	X	X	X	X	X	X	X	X✓	X✓	X✓
Juvenile migration						X	X	X	X✓	X ✓		
Smolt out migration							X	X	X✓	X✓		

X Indicates presence at the life-cycle month stage.
✓ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.

Section II. Current Habitat Indicators.

Table 2. Williams Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** $\geq 75\%$	Probably good, large conifers	Harvested, narrow riparian zone, thin density	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability * $\geq 90\%$ stable	Good, vegetated	Fair, some cattle grazing	Improving	Acceptable	Limit cattle access, enhance riparian areas
Macroinvertebrate Health $\geq 80\%$ High $\leq 40\%$ severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel * 1.3-3"dia.	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply
Substrate condition. $\leq 20\%$ over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * $\leq 5\%$	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
Instream LWD ** ≥ 20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Side channels ≥ 5 mile *	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good, except summer months	Stable	Acceptable	Maintain, increase summer flows
Pool frequency $\geq 50\%$ **	Good	Good pool-riffle ratio - 50%	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Poor, in mainstem and some tribs are channelized in areas	Stable	Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	None	Stable	Limiting	Develop some use on tribs and educate landowners
Gravel mining	None	Some, limited gravel removal	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	One diversion dam at RM 1.2	Stable	Acceptable	Modify to improve fish use/passage
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Limiting	Reduce impact upon fish passage
Push-up dams	None	Variable, seasonal	Improving	Limiting	Evaluate for effect, provide alternative water supply.
Culverts *	None	6 sites in uplands areas	Improving	Acceptable	Continue reconstruction.
Water Quality					
Temperature ≤ 64· degrees **	Unknown	Often over 65 degrees in summer, high of 75 measured. Smolts may encounter sub-lethal levels in summer	Improving	Limiting	Increase canopy and riparian cover to increase shade, increase summer flows,

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
D.Oxygen ≥8 PPM	Presumed Good	Adequate	Unknown	Limiting	Improve to 5 PPM
Turbidity	Presumed Good	Occasional high levels	Unknown	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None known	Some from agricultural practices	Improving	Unknown	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Severe low flows in summer may force smolt out migration	Stable	Limiting	Reduce Ag. diversions, improve efficiency of water use, protect in-steam flows.
Diversions	None	Creating low flow problems, 390 water rights with 129 CFS withdrawal - oversubscribed	Stable	Limiting	Eliminate unused rights, to instream rights, reconstruct diversion headgates
Release regime	N.A.	Peak flows are occurring higher, and earlier in year	deteriorating	Limiting	Revegetate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest, Cattle induced erosion	Improving	Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increased ag use	Deteriorating	Limiting	Restore controlled burning
Road density ≤2miles/sq.mile *	None	Moderate density	Improving	Limiting	Close roads and reconstruct drainage, vegetate.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Agriculture	Minor Indian use	Moderate number of farms and ranches. Converting to residential	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Unknown	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

There are a multitude of actions that are needed to restore and protect a watershed. Inevitably, the matrix of needs must be prioritized to select the most critical issues. Further, actions taken to address one limiting factor (such as low summer flows) often affect other habitat parameters (such as water temperature). Actions taken depend upon the limited resources that can be invested within the watershed, their impact upon the selected resources, and the fishery need at the respective lifecycle stage of use. In the Williams Creek watersheds, the most critical limiting factors for coho production (identified through integrating conditions in Tables 1 and 2 above) are:

1. High summer water temperatures in rearing areas.

Condition:

- Summer month stream water temperatures regularly exceed 21 °C , which forces fingerlings and smolts to migrate out of the area.

Actions:

- Increase density and diversity of riparian vegetation to provide shade and reduce incident radiation.
- Provide an adequate buffer zone for protection of riparian area.
- Encourage greater pool formation and depth through placement of LWD.
- Increase subsurface water storage upslope to increase natural inflow in summer months.
- Limit irrigation return flows.

2. Low summer flows in rearing areas.

Condition:

- Low summer flows from natural conditions and diversions reduce summer flows to 0-5 CFS during some months. Smolts are known to migrate out of mainstream channels during low flow periods, seeking improved habitat conditions.

Actions:

- Increase in-stream flows through reduced diversion.
- Promote revegetation of riparian areas to improve water quality
- Increase pool depth to protect rearing habitat
- Increase subsurface water storage upslope to increase natural inflow in summer months.
- Encourage beaver dams on tributaries.

3. Riparian diversity and density.

Condition.

- The riparian zone has been narrowed and depleted through harvest and development, which has impaired riparian zone function.

Actions: .

- Foster riparian growth and development through the use of management practices which protect critical vegetation.
- Limit forest harvest to create riparian buffer zones of adequate size.
- Plant trees and forbs along the waterway to increase canopy cover.

4. Lack of Stream Channel Complexity and Off-channel Rearing Areas.

Condition.

- The stream channel has been straightened, beaver dams removed and large woody material removed from the stream channel. This has reduced the number of eddies, alcoves and rearing pools available for coho.

Actions:

- Promote the development of off channel alcoves and pools.
- Install large woody debris in the waterway to maintain and enhance pool structure.

Additional Conditions Of Concern:

- Low quantity of large woody debris for recruitment material
- Suspended sediment resulting in poor quality spawning and incubation gravels
- Limited spawning gravel material for recruitment

Section IV. Implementation Process

Local Watershed Councils have been asked to identify and select restoration actions to be undertaken within core areas based upon tables developed for habitat conditions, fish life cycles and resultant limiting factors. Needs for assistance are also identified. The following sections address these concerns.

A. Prioritization of actions

Project Action	Restoration Priority Level: Immediate	On-going
Water quality improvements		X
Riparian planting	X	
Improve irrigation efficiency	X	
Screen water diversions	X	
Reduce return flows	X	
Road and culvert improvements	X	
Headgate construction	X	
Exclusions from riparian areas		X
Instream structures		X
Slope stabilization		X
Wetland development		X
Fish passage		X
Education/local involvement		X

B. Milestones for Assessing Progress.

Specific indicators of progress in restoration efforts have been identified. Any and all of the following measures of habitat and watershed improvement may indicate progress in improving coho salmon production, however fish production is the ultimate measure of progress.

1. Number of projects.
2. Number of landowners participating.
3. Fencing: linear miles per drainage.
4. Off-channel stock watering: number of off channel stock watering opportunities developed per drainage.

5. Planting: hardwoods/acre, total acres per drainage.
   conifers/acre, total acres per drainage.
   shrubs/acre, total acres per drainage.
6. Stream miles per drainage of riparian diversification techniques: live-staking/acre, total acres per drainage.
7. Riparian setbacks: acres/stream mile, total acres per drainage.
8. Instream structures: structures/mile, total structures per drainage
   log weirs
   boulder deflectors
   scour structures
   cover structures
   spawning gravel
9. Off-channel alcoves:number/size, total structures per drainage.
10. Sediment removal, cubic yards (cy) per project, cy per drainage.
11. Vegetation management, square yardage.
12. Pool development: total projects per drainage, sediment removal, cy per project, cy per drainage
13. Culvert treatment: number of culverts treated per drainage, miles of stream reach opened to fish
14. Soil bio-engineering (resloping, willow waddles, rock barbs etc.): acres/stream mile, total acres per drainage.
15. Miles of roads and skid trails stabilized.
16. Acres of erosion control initiated.
17. Number of educational workshops held.

C. Implementation Plan.

Implementation of a restoration plan will be multifaceted, including landowner participation and acceptance, government action, enforcement and monitoring.

<u>**Landowner Participation and Acceptance**</u>

The focus of the landowner participation and acceptance portion of a restoration plan shall be increased community involvement through outreach and education programs. The watershed council has been involved with, and is continuing, a number of outreach and community education programs within the Applegate River watershed. Activities currently underway include:

Outreach and education program involving aggregate removal from the watershed.

- ♦ Community outreach with respect to land use planning and watershed improvement within the Williams Creek area including the identified core area.
- ♦ Continued cooperation with schools in education and monitoring efforts.

- The encouragement of the formation of "mini" watershed councils within the Applegate River basin. This is currently underway for the Williams Creek area.

- The continued provision for educational opportunities with respect to watershed and fisheries (e.g. workshops, presentations, etc)

- The continued development of a GIS system for the Applegate River basin that is available to the general public. This system is currently available to the public at three locations within the watershed.

- Continued tree-planting projects within riparian zones and on adjacent uplands.

- A project designed to add instream structure (i.e. large wood) to lower Slate Creek funded in part by U.S. Fish and Wildlife.

- Incentive programs, when available, will also be used to encourage landowner participation in watershed/fish restoration efforts.

Government Action

The government action portion of a restoration plan shall include the implementation of ordinances, resolutions and motions by City and County governments which further the objectives of a salmon restoration plan. In addition, affirming and sponsoring initiatives and memorandums of understanding, contracts, interagency agreements between cooperating agencies and the watershed council shall be pursued when beneficial to the improvement of the Applegate River watershed including anadromous fish stocks. Any number of the following agencies may be involved in cooperative efforts to restore salmonid fish stocks.

- Jackson County Planning Department
- Josephine County Planning Department
- Oregon Department of Water Resources
- Oregon Department of Forestry
- Oregon Department of Fish and Wildlife
- Oregon Department of Agriculture
- Oregon Department of Parks and Recreation
- Oregon Department of Transportation
- Oregon Department of Environmental Quality
- U.S. Department of Interior (e.g. Bureau of Land Management, etc)
- U.S. Department of Agriculture (e.g. Forest Service, Natural Resources Conservation Service, etc)
- U.S. Army Corps of Engineers
- National Marine Fisheries Service

Enforcement

Watershed Councils do not have the legal authority to enforce watershed restoration activities. Instead councils pursue cooperative arrangements with landowners in order to carry out activities beneficial to watershed health and salmonid fish stocks. To date the Applegate River Watershed council has been involved with a wide array of projects ranging from tree planting to road improvement to instream habitat improvement. The Applegate River Watershed Council will continue to pursue these cooperative efforts and will increase our efforts within the identified coho core areas. Legal enforcement of laws which benefit salmonid fish stocks will be carried out by the appropriate federal, state, county and local entities. For example, the Oregon State Police Fish and Wildlife Division has formulated a policy for protection and enforcement of salmonid protection and enforcement of salmonid habitat areas.[11] They propose to establish interagency cooperation with state and federal natural resource agencies in enforcement of applicable habitat regulations and investigate environmental violations.

Monitoring

Monitoring actions shall be a part of the restoration plan. Monitoring, especially long term monitoring, is critical to evaluating the effectiveness of any watershed or fisheries improvement project. Baseline conditions will be identified for each project area followed by monitoring for construction effects, project effectiveness, and long-term trends. Data to be collected depends upon the nature of the project implemented. The party(ies) responsible for monitoring will depend upon both the nature of the project and who the cooperators in the project are. As a result, monitoring may be carried out by any of the following, singly, or in groups; landowners, the watershed council, state agencies or federal agencies. The following are examples of restoration objectives and the party(ies), parameters and/or methods that should be considered for monitoring.

1. Riparian restoration:

a. Hardwoods and conifers planted at a minimum density of 400 trees per acre and have a survival rate of 60%. Define who and how stocking surveys will be done. Survival of plantings will be monitored by landowners and/or agency personnel on an annual basis and follow up treatment will occur as needed utilizing volunteers, landowners, or agency resources as funding allows, until the outlined survival goals are achieved.

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[11] Letter from Lindsay A. Ball, Captain, Oregon Department of State Police, with document attached entitled Role of Enforcement in the Coastal Salmon Restoration Initiative. July 31, 1996.

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

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

2. Riparian Planting Protection:

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

3. Off Channel Habitat:

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

4. Instream Structure:

Selected instream structures will be inspected to determine resulting functions. Any changes in structure will be documented including recruitment of woody debris and sedimentation. Follow up habitat surveys will document changes in pool riffle ratios within restored watersheds and instream fish counts will document fish usage around these structures. Water quality monitoring parameters will include temperature, flow, chemistry, and turbidity.

5. Upland Vegetation:

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

6. Monitoring

A substantial monitoring program is currently underway within the Applegate River Watershed. The following is a partial list of these efforts including participants.

Temperature - Forest Service, Bureau of Land Management, Watershed Council, Schools, Environmental groups (e.g. Headwaters) and Individuals.

Spawning Surveys, Carcass Counts - Oregon Department of Fish and Wildlife.

Stream Surveys - Oregon Department of Fish and Wildlife, Forest Service, Bureau of Land Management.

Stream Chemistry - Department of Environmental Quality.

Efforts are underway to better coordinate monitoring among these participants. In addition, staff at the Applegate Watershed Council are in the process of developing a basin wide water quality and habitat monitoring plan, incorporating participation and coordination of the U.S. Forest Service, Bureau of Land Management, Department of Environmental Quality, Oregon Department of Fish and Wildlife, and Council staff efforts. The watershed is currently monitored by DEQ for water quality conditions. Data collection sites are to be coordinated, data is to be archived at the Watershed Council, and at the Rogue Valley Council of Governments.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Althouse Creek - Illinois River Subbasin

Section I. Althouse Creek Watershed Analysis

The Althouse Creek watershed consists of about 30,000 acres, and makes up 5 percent of the 628,000 acre Illinois River basin. The Illinois River basin, in turn, makes up 20 percent of the 3.3 million acre Rogue River basin.

Althouse Creek is about 17 miles long and flows in a southerly direction before entering the lower reach of the East Fork of the Illinois River, at River Mile 4. The East Fork enters the Illinois River at river mile 56 near the town of Cave Junction. .

The Althouse watershed is important to people of the Illinois Valley for many reasons, including: water for domestic, irrigation, wildlife and recreation use; minerals, especially gold; timber; mushroom harvesting; agriculture, including wine; and hunting. Historically, mining was a very important land use in Althouse Creek. The legacy from mining is visible today as one encounters old homesites, severely altered stream channels, and old ditches.

Physical Qualities

The Althouse Creek watershed is located near the geographic center of the Klamath Mountains geologic province. The valley floor is dominated by pasture, forest, and homesites. Elevations range between 1,400 feet at the confluence with the East Fork to a high of 6,300 feet at Althouse Mountain. Climate is Mediterranean, with cool wet winters and hot dry summers.

Althouse Creek is very turbid during winter flows, often much murkier than the other streams in the area. Several debris slides that are on the toe of an earth flow near Johnson Point are the source of the majority of the sediment. There are no planned nor foreseeable activities that will change the rate of sediment and wood supply from this feature.

Hillslope stability is a primary problem in this watershed. This strongly increases the risks associated with timber harvest and roading. All mass failures visible on photographs dating back to 1940 were recorded. The most common modes of failure are streamside slides and slides that originate in channel headwalls. A large failure in Run Gulch has contributed the greatest volume of material.

The stream channel meanders through a broad valley from its confluence with the East Fork upstream to just below Tartar Gulch. In this area and below Democrat Gulch the banks are well vegetated and there are few large gravel bars. Above Democrat Gulch, the area is extremely open; banks are not vegetated, there are numerous gravel bars, and the channel goes sub-surface during the summer months. The Althouse slough lies immediately west of this non-vegetated portion of the channel. The slough may have been the former channel and early miners altered the course of Althouse Creek in order to work the channel. The upper reach of this area is moderately well vegetated and has numerous gravel bars. This segment contains the portion of the channel that was extensively worked in the 1800's. It is very likely that the channel is working through the sediment that was brought to the surface as a result of that mining.

Above Tartar Gulch the channel is more confined by valley walls. Meanders are less sinuous, vegetation along the banks increases, and channel gradient steepens. This reach contains much of the human settlement, especially the Browntown site. There are several relict cabins and cabin sites.

The upper reaches become much steeper and the channel is more confined by valley walls.

Water Resources

Water quantity and temperature are significant issues in the Althouse Creek watershed, especially because summer low flows are associated with temperatures that are lethal for salmonids.

Summer water temperatures in Althouse Creek have been measured since 1992 at Browntown and several other sites were measured in 1995. High temperatures range in the low to mid 60's at Browntown and in the mid to high 50's near the West Fork. High temperatures exceed 65 degrees F. below the forest boundary. The lack of riparian vegetation along much of the lower reaches likely contribute to the increased temperatures.

Some water withdrawn for irrigation returns to the stream channel, either overland or subsurface. The quantity of this return flow has not been measured but water temperatures are also impacted by these return flows. High turbidity associated with winter flows are also a common feature.

Fish Barriers

There are no natural barriers to migrating fish, however, a number of "push up" dams for diverting irrigation water and several stream crossing culverts have been identified as limiting or restricting to fish passage

Land Uses

Sixty percent of the 30,000 acres in the Althouse Creek watershed is in public ownership (primarily by the U.S. Forest Service). This ownership is located entirely in the upper reaches of the watershed.

Mining, agriculture, timber harvesting and recreation have had a dramatic impact on the watershed since its settlement in the mid-1800s. Conflicts between different uses and values continue, despite many efforts at resolution.

The extent of mining and its influence on sediment delivery and transport is unique in Althouse Creek. Mining overturned channel beds, overturned riparian areas, and washed down hillslopes. The frequency of streamside debris slides along Althouse Creek may be related to mining activity. It seems probable, however, that extensive disruption of the channel, floodplain, and adjacent hillslopes would result in increased frequency of debris slides.

Timber harvest occurred on a small scale in the watershed between 1851 and 1945. After 1945, it increased dramatically because of demand and mechanized equipment. The harvest of federal lands was reduced sharply in 1990, when the northern spotted owl became protected under the Endangered Species Act. The reduction in federal timber harvest has encouraged harvest on private land which is currently at its highest level ever.

Timber management and roading have also likely changed the rate of sediment and wood delivery into the stream relative to background conditions. Most importantly, the rate of wood delivery has likely decreased due to streamside harvest, presence of roads in riparian areas, and culverts which are not sized to pass large wood. The rate of sediment delivery has likely increased due to roads, especially their construction.

Fishery Conditions

Anadromous and resident salmonid fish are native to the watershed. Anadromous species include fall chinook, coho, and winter steelhead. Resident salmonid species are rainbow and cutthroat trout. Other native fish species found within the watershed include Pacific lamprey and sculpin. Redside shiner and eastern brook trout are present but are not native to the watershed.

Althouse Creek provides approximately eighteen miles of stream habitat accessible to anadromous salmonids: winter steelhead - 18 miles, coho - 10 miles, fall chinook - 8 miles. Resident rainbow and cutthroat trout reside in about 26 miles of the system.

Basically, Althouse Creek provides a relatively cool stream for salmonids, compared to other watersheds in the Illinois River system. Mining activities have removed wood from channel and floodplain, pools are less complex with less refuge habitat.

Macroinvertebrate fauna is diverse with more species present that are tolerant of sediment. The stream has been straightened for agriculture and residential use resulting very little large wood and few deep pools.

Table 1. Coho Life-Cycle Use Model for Althouse Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Althouse Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Upper - good Lower - poor	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Poor, some cattle grazing	Improving	Limiting	Limit cattle access, enhance riparian areas Stabilize unstable areas.
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, frequently high	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Fairly good, 50-90 pieces per mile	Stable	Acceptable	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Pool-riffle ratio is 35-65	Stable	Limiting	Protect from sedimentation, add LWD
Sinuosity	Good	Fairly good in upper reaches. Some lower areas channelized	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Fair, a few remain	Stable	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Deteriorating	Limiting	Encourage use. Educate landowners
Mining	None	Extensive gold mining	Improving	Limiting	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	No permanent structures	Stable	Acceptable	No action needed
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Limiting	Reduce impact upon fish passage
Push-up dams	None	Numerous, seasonal	Improving	Limiting	Evaluate for effect. Work with landowners to develop alternatives

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Some problem sites exist in uplands areas	Improving	Acceptable	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Often over 65 degrees in summer, high of 75 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	No specific problem identified	Unknown	Acceptable	Maintain above 5 PPM
Turbidity *	Good	Frequent high levels	Deteriorating	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Severe low flows during summer months	Stable	Limiting	Reduce Ag. diversions
Diversions	None	Numerous water withdrawals creating low flow and temperature problems. Oversubscribed	Stable	Limiting	Eliminate unused rights. Acquire water rights in stream use., reconstruct diversion headgate
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Red sided shiners and suckers use increasing in lower end	Deteriorating	Limiting	Reduce water temperature and increase flows
Upland Conditions					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Erosion *	Minimal	Timber harvest, mining and cattle induced erosion. Several unstable areas.	Improving	Limiting	Improve land use practice. Stabilize unstable areas.
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management. Extensive mining, logging and increased agricultural use. Natural slides.	Improving	Acceptable	Restore controlled burning. Improve forest practices, and control mining.
Road density * $\leq$2miles/sq.mile	None	Moderate problem	Deteriorating	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate, farms and ranches	Stable	Acceptable	Limit adverse effects
Return flows	None	Creating temperature problems	Unchanging	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Althouse Creek watershed the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris, and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 10-20 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future.
- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream. The Illinois Watershed Council has sponsored and coordinated extensive tree planting projects for the entire Illinois River basin for the past several years.

2. **Mining**

Condition:

- Impacts of past mining are extensive. Stream morphology, riparian habitat, and general physical condition of the watershed have been dramatically modified by many years of unrestricted mining. A considerable amount of recreational mining and a few commercial operations still exist.

Actions:

- Current mining regulations prohibit the destructive hydraulic mining that was prevalent for many years. Recreational and commercial mining are now closely regulated by several state agencies.
- Plans are underway to restore many of the most heavily impacted areas. Most of this activity will be on USFS land but the Watershed Council is negotiating with several private landowners to initiate habitat improvement projects.

- The USFS proposes to break open old mining ditch walls that traverse across channels so that water is not diverted to new locations on the hillslope.

- Road improvements will be part of any future mining activities.

3. Low Pool-Riffle ratio

Condition:

- The Pool-Riffle ratio on Althouse Creek is only 35:65. A 50:50 or 60:40 ratio would provide better rearing habitat for coho.

Actions:

- Specific placement of logs and boulders to create pools will help move the Pool-Riffle ratio closer to 50:50.

4. Lack of Riparian diversity and density.

Condition:

- Riparian habitat area in some reaches of Althouse is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade and for bank stabilization.

5. High summer water temperatures.

Condition:

- Temperature monitoring has consistently recorded temperatures in the high 60's during the warmest summer months with temperatures over 70 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.

- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

6. **Low summer flows.**

Condition:

- Summer flows are frequently low due to the lack of riparian habitat and extensive water withdrawals.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

- The OWRD is investigating water withdrawals to insure they do not exceed existing water rights.

7. **Poor winter habitat**

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

8. **Roads and culverts**

Condition:

- Road density is moderate but there are many stream crossings including a number of culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

9. Bank stability and sedimentation.

Conditions:

- Several large unstable areas are contributing volumes of sediment into the stream during the winter months. Turbidity may be the highest in the Illinois system. Also, extensive logging and road building have impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

- The USFS is investigating methods to stabilize the natural slide areas and are protecting them, where possible, from development or other impacts.

Section IV. Implementation Process

A. Prioritization of Actions.

	Enhancement Priority Level	
Project Action	Immediate	On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	
Control sedimentation	X	X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, with the presently identified critical reaches.
- Maintaining adult spawning surveys established in the winter of 1994.
- Conducting stream inventories on a 10-year return cycle.
- Establishing a smolt trap on the lower reach of Althouse Creek. Monitor to determine annual relative abundance of down stream migration.
- Continuing to monitor and maintain all existing habitat improvements.
- Remeasuring cross-sections after each peak streamflow that equals or exceeds a five-year return frequency.
- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Althouse Creek watershed has been designated by the natural resource agencies as a Crucial Watershed. The USFS has developed a Watershed Analysis and Management Plan for the system that outlines a long and short term habitat improvement program. This is a high priority watershed.

The Illinois Watershed Council is extremely active and is coordinated with the local Soil and Water Conservation District. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Illinois River watershed the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spend considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
East Fork Illinois River - Illinois River Subbasin

Section I. East Fork Illinois River Watershed Analysis

The East Fork Illinois River watershed consists of about 58,000 acres, and makes up 10 percent of the 628,000 acre Illinois River basin. The Illinois River basin, in turn, makes up 20 percent of the 3.3 million acre Rogue River basin.

The East Fork flows in a southerly direction for about 22 miles before joining the Illinois River at River Mile 56 near the town of Cave Junction.

The watershed provides for many beneficial uses. Water from the watershed is appropriated for irrigation, livestock, industrial and domestic use.

The Siskiyou Wilderness sits in the upper headwaters of the East Fork. USFS lands, historically managed for multiple use, are below the wilderness. The city of Cave Junction is located near the mouth with the town of Takilma situated at River Mile 10. Much of the basin from Takilma to Cave Junction has been developed for homes, agriculture, livestock and other private uses. Some private lands are managed as woodlots and commercial forest. The East Fork is a major source of water to the mainstem Illinois River.

The most important tributary is the seven mile long Dunn Creek, which lies entirely in California. Four miles of Dunn Creek are accessible to anadromous fish.

Physical Qualities

The East Fork watershed is located near the geographic center of the Klamath Mountains geologic province. Elevations range between 1,200 feet near Cave Junction to just over 6,300 feet at Youngs Peak and Lookout Mountain.

Approximately 250 miles of perennial streams are included in the watershed. The climate and geology are major factors in the stream, riparian and overall watershed condition. The climate is characterized by hot, dry summers, and moist, cool winters.

The gradient averages about 5 percent throughout much of the stream length. The quality of available spawning gravel is generally good. The shade canopy ranges from 85 percent in the headwaters to about 10 percent above Dunn Creek. Large woody debris is lacking in the lower reaches of both Dunn Creek and the East Fork.

In the early 1990's the Longwood fire burned over 10,000 acres, mostly within the East Fork watershed. The riparian areas did not burn as intensely as the upslope areas in the fire, but many trees and shrubs were killed along streams in the fire area.

The 1964 flood triggered landslides, denuded riparian vegetation, and scoured streambanks throughout the watershed. The effects of the storm are still evident today. During the 1994-95 season heavy winter rains brought substantial flooding and damage in the Dunn Creek drainage.

Water Resources

The basin is used for domestic and agricultural water supply. Numerous diversions and ditches occur on the privately owned land. The flow of the East Fork and its tributaries above the Forest Service boundary is unregulated. Logging, road construction, the 1964 storm, riparian area clearing, agriculture, and other development have probably increased water temperatures and intermittent turbidity. Moderately-high summer water temperatures in the lower reaches are due to a wide shallow channel, open riparian area, and low summer flows.

Temperature data from the gage on the East Fork 0.3 miles below Dunn Creek and at the mouth of Dunn Creek indicate summer average highs in the low 70's. Average daily discharge from 1942 through 1987 varied from 13 cfs in late summer to 375 cfs in January.

The upper reaches provide cool summer temperatures, but anadromous fish may not be able to go that far upstream. Much of the sandy sediment from 1964 has been washed from the system, but remaining boulders and large woody material provide some structure in the aggregated reaches.

Some water withdrawn for irrigation returns to the stream channel, either overland or subsurface. The quantity of this return flow has not been measured but water temperatures are also impacted by these return flows.

Fish Barriers

There are no natural barriers to migrating fish below River Mile 17, however, a number of "push up" dams for diverting irrigation water and several stream crossing culverts have been identified as limiting or restricting fish passage.

Anadromous barriers do exist in the East Fork about one mile above Chicago Creek, and up Dunn Creek, about one-quarter mile above Poker Creek.

Land Uses

The 58,000 acres, or about 70 percent, in the East Fork watershed are primarily under USFS ownership. This ownership is located primarily in the upper reaches of the watershed.

Mining, agriculture, timber harvesting and recreation have had a dramatic impact on the watershed since its settlement in the mid-1800s. Conflicts between different uses and values continue, despite many efforts at resolution.

Mining occurred during Oregon's gold rush in the late 1900's. Some of the earliest gold discoveries in Josephine County were at Sailor's Gulch, Allen Gulch and Scotch Gulch. Hydraulic ditches were constructed along the East Fork and some tributaries. The gold was derived from an ancient gravel deposit on the ridge between Takilma and Waldo. Several historic, but relatively small, gold placers were explored along lower Dunn Creek.

Numerous claims exist on the lower reaches of both the East Fork and Dunn Creek. Suction dredging operations occur on three Dunn Creek claims currently.

Soon after gold was discovered, small farms began to provide produce to the miners. Water rights for the farms were established between 1853 and 1934. Limited summer streamflow remains an issue within the watershed.

Timber harvest occurred on a small scale in the watershed between 1851 and 1945. After 1945, it increased dramatically because of demand and mechanized equipment. The harvest of federal lands was reduced sharply in 1990, when the northern spotted owl became protected under the Endangered Species Act. The reduction in federal timber harvest has encouraged harvest on private land which is currently at its highest level ever.

Fishery Conditions

Anadromous and resident salmonid fish are native to the watershed. Anadromous species include fall chinook, coho, and winter steelhead. Resident salmonid species are rainbow and cutthroat. Other native fish species found within the watershed include Pacific lamprey and sculpin. Redside shiner and eastern brook trout are present but are not native to the watershed.

The lower reaches of the East Fork and Dunn Creek provide spawning and rearing habitats essential to the survival of wild anadromous salmonids in the Illinois River system. For the most part, the upper stream segments are of value as a cool-water refugia.

Anadromous fish stocks endemic to the East Fork and its tributaries (winter steelhead, coho, chinook) are currently at depressed population levels. Both coho and steelhead have been proposed for listing under the Endangered Species Act.

Table 1. Coho Life-Cycle Use Model for the East Fork of the Illinois River.

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. East Fork Illinois River Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Impacted b y 1964 flood. Some areas still sparse.	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability * ≥90% stable	Good, vegetated	Good, some cattle grazing in the lower reaches	Improving	Acceptable	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Spawning gravel *	Presumed good	Fair, but probably not a limiting factor	Stable	Acceptable	Maintain and enhance supply
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment ≤5% *	Presumed low	Variable, but fairly high	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ≥20 pieces/100 meters **	High	Moderate to low. Floods wash out accumulated material	Stable	Limiting	Need large conifers, structures
Side channels ≥5 mile *	Probably good, good sinuosity	Few and of limited quantity. Much of system in steep canyon.	Stable	Limiting	Promote natural meandering of stream channel where possible.
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ≥50% **	Good	Good pool-riffle ratio - 50%	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Limited. Gradient steep in most of upper reaches	Stable	Limiting	Promote natural meandering of channels where possible
Alcoves *	Good	Fair	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Improving	Limiting	Develop some use on tributaries and educate landowners
Mining	None	Heavily mined for gold.	Improving	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, impacted by flooding	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	No Permanent structures. Waterfalls above Chicago Creek limit access to upper 4 miles.	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Limiting	Reduce impact upon fish passage
Push-up dams	None	Variable, seasonal	Improving	Limiting	Evaluate for effect, provide alternative water supply.
Culverts *	None	Needs evaluation	Unknown	Unknown	Provide passage
Water Quality					
Temperature ** $\leq$64· degrees	Less than 64 degrees	Often over 65 degrees in summer, high of 75 measured in lower end.	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen $\geq$8 PPM	Good	Unknown	Unknown	Acceptable	Improve to 5 PPM
Turbidity *	Good	Occasional high levels	Unknown	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** $\geq$10CFS	Flows probably adequate to good	Low flows a problem in summer	Stable	Limiting	Reduce Ag. diversions
Diversions	None	Numerous, particularly in lower reaches. Oversubscribed.	Stable	Limiting	Eliminate unused rights, acquire rights for in stream use.
Release regime	N.A.	No change identified	stable	Acceptable	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Erosion *	Minimal	Timber harvest and mining	Improving	Acceptable	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increased ag use	Improving	Acceptable	Restore controlled burning
Road density * ≤2miles/sq.mile	None	Excessive	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate, farms and ranches in lower reaches. Increasing development.	Deteriorating	Acceptable	Limit adverse effects
Return flows	None	Moderate	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Unknown	Unknown	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the East Fork of the Illinois River watershed the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 5 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future. The USFS has already placed a number of structures into Dunn Creek.
- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream. The Illinois Watershed Council has sponsored and coordinated extensive tree planting projects for the entire Illinois River basin for the past several years.

2. **Mining**

Condition:

- Impacts of past mining are extensive. Stream morphology, riparian habitat, and general physical condition of the watershed have been dramatically modified by many years of unrestricted mining. A considerable amount of recreational mining and a few commercial operations still exist.

Actions:

- Current mining regulations prohibit the destructive hydraulic mining that was prevalent for many years. Recreational and commercial mining are now closely regulated by several state agencies.
- Plans are underway to restore many of the most heavily impacted areas. Most of this activity will be on USFS land but the Watershed Council is negotiating with several private landowners to initiate habitat improvement projects.

3. **Lack of Riparian diversity and density.**

Condition:

- Riparian habitat in some areas, particularly in the upper reaches, is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade and for bank stabilization.

4. **High summer water temperatures.**

Condition:

- Temperature monitoring has consistently recorded temperatures above 65 degrees F. during the warmest summer months with temperatures over 75 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.
- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

5. **Low summer flows.**

Condition:

- Summer flows are extremely low in the East Fork due to lack of riparian habitat and extensive water withdrawals. Flows in Dunn Creek are generally adequate for rearing fish during the summer, except during drought periods.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

- The resource agencies and Watershed Council will focus on education of water users, water conservation, more efficient irrigation systems, enforcement of current laws and more restrictive laws. They will also work on getting locking headgates on ditches to control flow and incentives for increased efficiency.

6. Poor winter habitat

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

7. Roads and culverts

Condition:

- Road density is moderate but there are a number of culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

8. Bank stability and sedimentation.

Conditions:

- Extensive logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, within the presently identified critical reaches.

- Establishing additional critical reaches where necessary and snorkel surveying on an annual basis.

- Maintaining adult spawning surveys established in the winter of 1994.

- Conducting stream inventories on a 10-year return cycle.

- Establishing a smolt trap on the lower reach of the East Fork. Monitor to determine annual relative abundance of down stream migration.

- Continuing to monitor and maintain all existing habitat improvements.

- Remeasuring cross-sections after each peak streamflow that equals or exceeds a five-year return frequency.

- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The upper reaches of the East Fork of the Illinois River watershed has been designated by the USFS as a Key Watershed. The USFS has developed a Watershed Analysis and Management Plan for the system that outlines a long and short term habitat improvement program. This is a high priority watershed and the upper reaches offer some of the better quality habitat in the Illinois basin.

The Illinois Watershed Council is extremely active and is coordinated with the local Soil and Water Conservation District. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Illinois River watershed, the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Elk Creek - Illinois Subbasin

Section I. Elk Creek Watershed Analysis

Elk Creek is a major tributary to the West Fork of the Illinois River. It joins the West Fork at stream mile 13. The West Fork meets the East Fork to form the mainstem Illinois River at river mile 56. Four stream miles of Elk Creek lie in California. The Elk Creek watershed drains approximately 12 square miles in Oregon and 18 in California. Tributaries of Elk Creek include Broken Kettle, Maple, Brushy creeks and the West and East forks of Elk Creek.

Physical Qualities

The Elk Creek valley is broad except for the first and last sections where it is narrowed due to hillslope encroachment. Elevations within Elk Creek range from 3,200 feet at the headwaters to 1,700 feet at the Oregon border. Stream gradient averages 2-4 per cent.

The channel type is classified as riffle dominated with infrequent pools with cobble dominating the substrate. Low gradient riffles make up 37 percent of the total stream area while runs make up 26 percent and mid-channel pools accounted for 14 percent. The pool:riffle:flatwater ratio is nearly 1:1:1. The most numerous types of pools are mid-channel pools, channel confluence pools, lateral scour bedrock formed pools and plunge pools. Depths of pools range from 1.3 feet to 7.5 feet.

Within the last three decades large amounts of timber have been harvested along the West Fork. Before logging, the stream was surrounded by old growth conifers and probably contained desired amounts of large woody material. Today, an average of 25 pieces of large woody material and 39 pieces of small wood per mile were observed.

The canopy on Elk Creek averages 80 percent, which is considered optimum on south coast streams. Deciduous trees comprise more than 70 per cent of the canopy. The large percentage of deciduous trees on riparian areas undoubtedly contributes to the low amount of large woody debris in the stream. Less than 37 per cent of the instream cover in Elk Creek is provided by large woody debris. Coniferous trees are sparse along the banks of Elk Creek.

Pacific giant salamanders, frogs, crayfish, deer, bear, beaver, raccoon and otter inhabit the watershed.

Water Resources

Water flows have not been measured on Elk Creek, however, there does not appear to be a summer low flow problem during normal flow years. No dry channel stream sections existed at the time of the stream survey. Braided stream channels were common in the lower reaches of Elk Creek. Water temperatures taken during stream surveys range from 46 degrees in March to 56 degrees in August. The 1995 stream habitat survey identified a number of erosion sites. The sites produced a significant sediment load that consisted of fine sand to baseball sized cobble. Bank vegetation ranged from 70 to 85 per cent.

Fish Barriers

A 6 foot high by 13 foot long bedrock chute located above the confluence of the East Fork Elk Creek is a potential barrier to salmon. Several accumulations of woody debris on bedrock in the upper reaches of Elk Creek could hinder fish passage, but suitable habitat above is limited. A culvert, 1000 feet above the end of the habitat survey, 8 feet in diameter and 20 feet long with no jump pool for the 3 foot jump, poses another potential fish barrier.

Land Uses

The primary land uses in the Elk Creek watershed are rural residential, small farms and timber management. The largest landowner is the Simpson Timber Company, owning 9 square miles and managing it for timber production. The U. S. Forest Service and other private interests own the remainder of the watershed. Highway 199 provides the primary access to Elk Creek, with private roads providing vehicle access to the rest of the basin

Fishery Conditions

A habitat inventory was conducted on Elk Creek from June through August of 1995. It assessed spawning and rearing habitat for anadromous fish. Surveys done by various agencies since 1984 indicate that Elk Creek and its tributaries provide suitable habitat for anadromous salmonids, including coho and chinook salmon, steelhead, cutthroat and rainbow trout. From those fish surveys identifying species of fish, 50-60 per cent were identified as coho. Large numbers of coho salmon were observed on Brushy Creek, a tributary of Elk Creek. Rainbow trout were also identified in several tributaries.

Table 1. Coho Life-Cycle Use Model for Elk Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Elk Creek (Illinois) Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Heavily logged but growing back. Canopy fairly good.	Improving	Acceptable	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply. Overstory primarily deciduous. Conifers = 4%	Stable	Limiting	Needs conifers and species diversity. Increase conifers to at least 50%.
Bank stability ≥90% stable *	Good, vegetated	Fairly good, some cattle grazing in the lower reaches.	Improving	Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	good	Stable	Acceptable	Maintain water quality. Improve riparian habitat diversity.
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment ≤5% *	Presumed low	Generally low	Improving	Acceptable	Control identified bank erosion locations
Instream LWD ≥20 pieces/100 meters **	High	Low	Deteriorating	Limiting	Need large conifers, structures. Improve to 80 pieces per mile.
Side channels ≥5 mile *	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ≥50% **	Good	Fair good pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Fair in mainstem. Some tributaries are channelized in areas	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Fairly good in lower reaches.	Improving	Acceptable	Create new where possible. Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Very few	Stable	Limiting	Develop some use on tributaries and educate landowners
Mining	None	Some gold mining historically. No current mining.	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None on the main stem. A few small barriers exist on upper tributaries.	Stable	Acceptable	Improve passage if habitat above warrants
Diversions	None	Some but impacts minor	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No Action.

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Existing culverts have not been identified as passage problems	Stable	Acceptable	Monitor
<u>Water Quality</u>					
Temperature ≤64· degrees **	Less than 64 degrees	Good - Summer Averages range from 54-64 degrees.	Stable	Acceptable	Maintain and improve by increasing canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Adequate	Unknown	Acceptable	Maintain
Turbidity *	Good	Occasional high levels	Stable	Acceptable	Reduce streambank erosion and run-off effect
Chem. Pollution	None	No significant problems identified	Stable	Acceptable	Institute Best Management Practices
<u>Water Quantity</u>					
Flow - low period ≥10CFS **	Flows probably adequate to good	Flows low in summer but not severe	Stable	Acceptable	Monitor Ag. diversions
Diversions	None	Moderate number in lower reaches. Little impact upstream	Stable	Acceptable	Eliminate unused rights. Create in stream rights, Monitor diversions.
Release regime	N.A.	Unknown	Unknown	Unknown	No Action
<u>Predator Condition</u>					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
<u>Fishery Condition</u>					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
<u>Upland Conditions</u>					
Erosion *	Minimal	Primarily from timber harvest and road construction	Improving	Acceptable	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Disturbance history	Frequent-fire	Restrictive fire management. Increasing agricultural use. Intensively logged some years ago.	Improving	Acceptable	Monitor forest practices
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Moderate. Numerous farms and ranches in lower reaches.	Deteriorating	Limiting	Limit adverse effects
Return flows	None	Minor	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Minor	Improving	Acceptable	Monitor, and evaluate use

Section III. Limiting Conditions

At any point in time some condition or conditions in a stream may limit the maximization of the stream's potential. The matrix for watershed habitat conditions for Elk Creek cites seven limiting factors. Several of the conditions are closely related, thus addressing one condition will have an impact on improving another. The most critical limiting factors for coho production for Elk Creek are:

1. Lack of large woody debris the stream.

Condition:

- Deciduous trees are the dominant bank composition type on Elk Creek, making up more than 70 per cent of riparian forest vegetation. Large woody debris contributed less than 37 per cent of the cover within all six reaches of Elk Creek. No large woody debris was observed in two of the reaches.

Actions:

- Plant conifers to provide large woody debris for cover in the stream and provide erosion control on the streambank.
- Provide a buffer zone of 150+ feet for protection of new plantings of conifers and riparian area.
- Place large logs instream until conifer plantings mature to the point of naturally providing large woody debris.

2. Adverse affects of Agriculture

Condition:

- Numerous farms and ranches on the lower reaches of Elk Creek have contributed to channelization and degradation of the riparian zone.

Actions:

- Work with the landowners within the Elk Creek watershed, who were reported as "cooperative and extremely interested in the Elk Creek watershed conditions" in the habitat inventory survey, to fence cattle out of the stream or provide alternate watering sources.

- Educate landowners on the benefits to their operations in returning streams to their natural state by allowing the streams to resume their historic meandering.

- Solicit farm/ranch landowners to serve on the Illinois Valley Watershed Council as a means of getting their involvement and support.

Additional Conditions of Concern:

Few side channels; side channels present are of limited quality
Few beaver ponds and wetland connections
Bank stability impaired in some areas due to cattle on stream banks

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation	X	
Improve roads and culverts	X	
Maintain a minimum 150 foot buffer	X	X
Livestock control with landowners	X	X
Return streams to natural state	X	X
Solicit landowners to support WS Council	X	X

B. Milestones for Assessing Progress

Effectiveness of the actions will be monitored through:

- Planting conifers such as Douglas Fir along Elk Creek

- Policy or regulation establishing a buffer zone of 150+ feet along Elk Creek
  Enforcement of policy or regulation

- Placement of large logs instream

- Recording miles of fencing completed along Elk Creek by landowners

- Number of sessions held, materials given out or commitments made by landowners to allow streams on their property to return to natural state

- Record of farm/ranch landowners serving on Illinois Valley Watershed Council

C. Implementation Plan

The Illinois Watershed Council is extremely active and is coordinated with the local Soil and Water Conservation District. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Funding may be a barrier to implementing some of the actions. Illinois Valley Watershed Council's close relationship with the Jackson County Soil and Water Conservation District provides it with an opportunity to receive technical help and notice of funds as they become available.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Grayback/Sucker Creek - Illinois River Subbasin

Section I. Grayback/Sucker Creek Watershed Analysis

The Grayback/Sucker creeks watershed consists of about 62,000 acres, and makes up 10 percent of the 628,000 acre Illinois River basin. The Illinois River basin, in turn, makes up 20 percent of the 3.3 million acre Rogue River basin.

Sucker Creek flows in a southwesterly direction for about 25 miles before entering the lower reach of the East Fork of the Illinois River. The East Fork enters the Illinois River at river mile 56 near the town of Cave Junction. Grayback Creek is a seven mile long tributary of Sucker Creek in the upper part of the watershed.

The watershed provides for many beneficial uses. Water from the watershed is appropriated for irrigation, livestock, industrial and domestic use. The forests are among the most productive in the Illinois basin. Sucker Creek is the principal producer of salmonid fish in the Upper Illinois. Developed recreation and tourism are higher in this watershed than any other in the basin. The watershed provides habitat for many plant and animal species valued for their commercial, aesthetic, or intrinsic worth.

Physical Qualities

The Grayback/Sucker creeks watershed is located near the geographic center of the Klamath Mountains geologic province. The watershed is unusual for its limited amount of serpentine geology (compared to other Illinois River watersheds), and the presence of marble caves. Elevations range between 1,400 feet at the mouth of Sucker Creek to 7,000 feet on the Applegate Divide. The high ridges are snow-covered for several months each winter.

Water Resources

Water quantity and temperature are significant issues in the Grayback/Sucker creeks watershed, especially because summer low flows are associated with temperatures that are lethal for salmonids.

Sediment deposited from the 1964 flood, channel widening from early placer mining, salvage of large wood, straightening of channels with bulldozers, construction of berms for water diversions, removal of riparian vegetation, streambed disturbance from mining, removal of instream structure and removal of gravel bars near bridges contribute to a broader, shallower channel in the lower reaches of Sucker Creek. This has all contributed to an increase in water temperatures.

Summer low flows in Sucker Creek are not adequate to provide for all needs. That has been apparent since 1934, when the State Engineer withdrew the stream from further water rights because of insufficient flow. As of 1994, there are consumptive water rights for 47 cfs on Sucker Creek, and 3 cfs on its tributaries. As flows decrease through the summer, water use is cut back to the earliest dated right. In 1994, water use was cut back to 1865 rights (about 15 cfs). Some water withdrawn for irrigation returns to the stream channel, either overland or subsurface. The quantity of this return flow has not been measured but water temperatures are also impacted by these return flows.

Fish Barriers

There are no natural barriers to migrating fish, however, a number of "push up" dams for diverting irrigation water and several stream crossing culverts have been identified as limiting or restricting to fish passage.

Land Uses

The 62,000 acres in the Grayback/Sucker creeks watershed are primarily under USFS ownership (42,000 acres). This ownership is located entirely in the upper reaches of the watershed. All of the Grayback system is in USFS ownership. Private land comprise 12,000 acres, with BLM - 6,000 acres, Cave National Monument - 500 acres and the state and county - 300 acres, making up the rest.

Mining, agriculture, timber harvesting and recreation have had a dramatic impact on the watershed since its settlement in the mid-1800s. Conflicts between different uses and values continue, despite many efforts at resolution.

The discovery of gold was the catalyst for development of the watershed. There were two rushes to Sucker Creek - one in 1853, and one in 1856 - attracting about 2,000 people during the height of activity. Mining has been sporadic since that time. One larger-scale operation exists on Sucker Creek today. Most of the other operations that occur over the estimated 500 claims are small. The effects of historic, large scale mining on riparian and aquatic habitat remain.

Soon after gold was discovered, small farms began to provide produce to the miners. Water rights for the farms were established between 1853 and 1934. Limited summer streamflow remains an issue within the watershed.

Timber harvest occurred on a small scale in the watershed between 1851 and 1945. After 1945, it increased dramatically because of demand and mechanized equipment. The harvest of federal lands was reduced sharply in 1990, when the northern spotted owl became protected under the Endangered Species Act. The reduction in federal timber harvest has encouraged harvest on private land which is currently at its highest level ever.

Fishery Conditions

Anadromous and resident salmonid fish are native to the watershed. Anadromous species include: fall chinook, coho, and winter steelhead. Resident salmonid species are rainbow and cutthroat. Other native fish species found within the watershed include Pacific lamprey and sculpin. Redside shiner and eastern brook trout are present but are not native to the watershed.

The lower reaches of Grayback and Sucker Creeks are critical fish production areas, however, some critical habitat types are limiting. The number of pools and the amount of large wood in the stream is less than needed. Side channels have been reduced from historic levels and summer water temperatures are critical to salmonids in the lower reaches of Sucker Creek.

Table 1. Coho Life-Cycle Use Model for Grayback/Sucker Creeks .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Sucker/Grayback Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** $\geq$75%	Probably good, large conifers	Grayback - Good Sucker - Poor	Improving	Grayback - acceptable Sucker - Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Both - Limiting	Needs conifers and species diversity
Bank stability * $\geq$90% stable	Good, vegetated	Grayback - good, forested Sucker - poor, mining and ag. use	Improving	Grayback - Acceptable Sucker - Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health $\geq$80% High $\leq$40 % severe low	Presumed good	Medium	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Generally good, not a limiting factor	Stable	Both - Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Both - Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Grayback - Acceptable Sucker - Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Low, 2-4 per mile	Stable	Both - Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Both - Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Grayback - fairly good Sucker - fair at best	Possibly improving	Both - Acceptable	Maintain, increase summer flows
Pool frequency * ≥50%	Good	Low - about 20/80	Stable	Both - Limiting	Protect from sedimentation, add LWD
Sinuosity	Good	Poor. Mainstem and some tributaries have been channelized.	Stable	Both - Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Both - Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Very few	Deteriorating	Both - Limiting	Develop some use on tributaries and educate landowners
Mining	None	Grayback - minimal Sucker - very extensive gold mining	Improving	Grayback - Acceptable Sucker - Limiting	Limit through permit enforcement. Rehabilitation needed
Wetland connection *	Good	Marginal, many cut off areas	Stable	Both - Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	No permanent structures	Stable	Both - Acceptable	No action
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Both - Limiting	Reduce impact upon fish passage

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Push-up dams	None	Numerous	Improving	Grayback - Acceptable Sucker - Limiting	Work with landowners to develop alternatives.
Culverts *	None	Several problem sites	Improving	Both - Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Grayback - Usually under 65 degrees. Sucker - often over 65 degrees in summer. High of 80 measured in lower Sucker	Improving	Grayback - Acceptable Sucker - Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Marginal, DEQ list concerns on Sucker Creek	Unknown	Unknown	Improve to 5 PPM
Turbidity *	Good	Occasional high levels	Stable	Grayback - Acceptable Sucker - Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Severe low flows	Deteriorating	Grayback - Acceptable Sucker - Limiting	Reduce Ag. diversions
Diversions	None	Extensive irrigation withdrawals from Sucker	Stable	Grayback - Acceptable Sucker - Limiting	Eliminate unused rights Acquire water rights for in stream use.
Release regime	N.A.	Peak flows are occurring higher, and earlier in year	Deteriorating	Both - Limiting	Revegetate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Both - Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Both - Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Specie competition	Normal	Lower Sucker Creek invaded by red-sided shiners and suckers	Deteriorating	Upper - Acceptable Lower - Limiting	Take actions to reduce water temperatures and increase flows
Upland Conditions					
Erosion *	Minimal	Timber harvest, mining and cattle induced erosion on Sucker	Improving	Grayback - Acceptable Sucker - Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir. Extensive deciduous	Improving	Both Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management. Increased agricultural use Extensive logging and mining	Improving	Grayback - Acceptable Sucker - Limiting	Restore controlled burning. Improve forest practices and control mining activity
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Both - Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Farms and ranches frequent in lower Sucker. Residential use is increasing. Grayback is forested	Deteriorating	Grayback - Acceptable Sucker - Limiting	Limit adverse effects
Return flows	None	Extensive in Sucker. Temperatures are a problem	Deteriorating	Grayback - Acceptable Sucker - Limiting	Monitor, evaluate and develop solutions
Chemical use on lands	None	Moderate	Unknown	Unknown	Monitor, and evaluate use

Section III. Limiting Conditions.

In the Grayback/Sucker Creek watershed the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 5 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future. The USFS has already placed a number of structures into Grayback Creek

- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream. The Illinois Watershed Council has sponsored and coordinated extensive tree planting projects for the entire Illinois River basin for the past several years.

2. **Mining**

Condition:

- Impacts of past mining are extensive. Stream morphology, riparian habitat, and general physical condition of the watershed have been dramatically modified by many years of unrestricted mining. A considerable amount of recreational mining and a few commercial operations still exist.

Actions:

- Current mining regulations prohibit the destructive hydraulic mining that was prevalent for many years. Recreational and commercial mining are now closely regulated by several state agencies.

- Plans are underway to restore many of the most heavily impacted areas. Most of this activity will be on USFS land but the Watershed Council is negotiating with several private landowners to initiate habitat improvement projects.

3. **Low Pool-Riffle ratio**

Condition:

- The Pool-Riffle ratio on Grayback/Sucker Creek is only 20:80. A 50:50 or 60:40 ratio would provide better rearing habitat for coho.

Actions:

- Specific placement of logs and boulders to create pools will help move the Pool-Riffle ratio closer to 50:50.

4. **Lack of Riparian diversity and density.**

Condition:

- Riparian habitat area in some areas, particularly on Sucker Creek, is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade and for bank stabilization.

5. **High summer water temperatures.**

Condition:

- Temperature monitoring has consistently recorded temperatures near 75 degrees F. during the warmest summer months with temperatures over 80 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.
- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

6. **Low summer flows.**

Condition:

- Summer flows are extremely low in Sucker Creek due to lack of riparian habitat and extensive water withdrawals. Flows in Grayback Creek are generally adequate for rearing fish during the summer, except during drought periods.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

7. **Poor winter habitat**

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

8. **Roads and culverts**

Condition:

- Road density is moderate but there are a number of culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

9. **Bank stability and sedimentation.**

Conditions:

- Extensive logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, within the presently identified critical reaches.

- Establishing an additional critical reach on the lower gradient segment of the main-stem Sucker Creek above the confluence with Bolan Creek. Snorkel survey on an annual basis.

- Maintaining adult spawning surveys established on both Sucker and Grayback creeks in the winter of 1994.

- Conducting stream inventories on a 10-year return cycle.

- Establishing a smolt trap on the lower reach of Sucker Creek. Monitor to determine annual relative abundance of downstream migration.

- Continuing to monitor and maintain all existing habitat improvements.

- Remeasuring cross-sections after each peak streamflow that equals or exceeds a five-year return frequency.

- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Grayback/Sucker Creek watershed has been designated by the USFS as a Key Watershed. The USFS has developed a Watershed Analysis and Management Plan for the system that outlines a long and short term habitat improvement program. This is a high priority watershed and the upper reaches offer some of the highest quality habitat in the Illinois basin while some of the lower reaches provide some of the worst.

The Illinois Watershed Council is extremely active and is coordinated with the local Soil and Water Conservation District. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Illinois River watershed the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spend considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Shasta Costa Creek - Lower Rogue River Subbasin

Section I. Shasta Costa Creek Watershed Analysis

The Shasta Costa Creek watershed is located in Curry County and is about 23,400 acres. The entire watershed, except 20 acres of private and State of Oregon lands is managed by the Siskiyou National Forest.

The USFS is managing the watershed primarily as Late-Successional Reserves (92 percent). Seven percent is in supplemental Resource, one percent is Botanical and less than one percent (57 acres) is in Wilderness.

Physical Qualities

Shasta Costa Creek flows in a westerly direction for about 12 miles before entering the Rogue River about a mile above the town of Agness, about River Mile 29.

Landslides within the steep inner gorges of Shasta Costa Creek and its tributaries are common. These typically deliver relatively small amounts of sediment and wood to streams.

Water Resources

The Shasta Costa watershed receives an average of 110 inches of precipitation per year. About 13 percent is within the snowpack zone (above 4,000 feet), where precipitation is stored through the winter and released to streams in the spring, combining with spring rainfall to increase peak flows.

Streamflow measurements in August and September have found lower flows in Shasta Costa Creek than in neighboring watersheds. There is no evidence of variation in precipitation that would cause this. The hydrology network may be flashier in Shasta Costa than in neighboring watersheds. The watershed has large, dry channels that seem to flow only during storms, with a little precipitation retained as groundwater/baseflow.

Known flood events since 1940 occurred in 1955, 1964, 1972, and 1983. Although the 1964 event was larger in the Pacific Northwest as a whole, coastal portions of the Siskiyou National Forest experienced greater effects from high flows in 1955.

Stream temperatures near the mouth of Shasta Costa Creek are warmer than optimum for salmonids. Seven-day average maximum temperatures ranged from 67 to 75 degrees F. between 1989 and 1995. Temperature modeling estimated that maximum temperatures were 1.5 degrees lower in 1940 than in 1989. Factors that would have contributed to this increase are storm events that caused landslides, bank scour, removal of riparian shade vegetation, and wider, shallower channels. Streamside vegetation has since grown back along harvested tributaries, and it is estimated that temperatures in these streams have returned to pre-harvest levels.

Fish Barriers

Fish passage was improved by blasting a fish ladder at stream mile 1.5 in 1985. There are no other significant fish passage problems within the area of suitable habitat for anadromous fish.

Land Uses

The 23,400 acres in the Shasta Costa watershed are almost entirely under USFS ownership. Approximately 2,557 acres of timber have been harvested since 1960. With the current land allocations, there is no programmed timber harvest in the watershed, except for some commercial thinning and possibly salvage logging if necessary.

Road construction, timber harvest, and fuels treatment are the principal management activities with the potential to increase sediment to the stream. These activities have added to the naturally high levels of sediment delivery since 1962 when timber management began. They increased the role of surface erosion in the sediment delivery process over what occurred naturally. These activities may also have increased debris flow and mass delivery rates.

The upper portion of the watershed receives a moderate amount of personal use, primarily Christmas tree harvest. Commercial collection of special forest products has been limited by no road access and remoteness to markets. Impacts on resources have been minimal.

Mining has occurred in the past, but no significant minerals have been produced. There are three known mining prospects, two for copper and one for coal. While there may still be claims and prospecting within the watershed, there is no known mining activity.

Grazing probably began in the watershed in the 1850's and was first permitted by the Forest Service in 1919. There were 720 Animal Unit Months (AUMs) allocated in 1919, with a maximum of 1200 AUMs in 1922. Grazing declined to 60 AUMs in 1937 and remained at that level through 1965. Since then the grazing allotments have been phased out. Currently there are no allotments in the watershed, and none are planned for the future.

Currently, there are about 56 miles of roads in the watershed.

Fishery Conditions

Anadromous and resident salmonid fish are native to the watershed. Anadromous species include: fall chinook, coho, and winter steelhead. Resident salmonid species include rainbow and cutthroat trout. Other native fish species found within the watershed are Pacific lamprey, stickleback and sculpin. Reside shiner are present but are not native to the watershed.

The lower reach may be temperature limiting for macroinvertebrates and possibly for salmonids at times. Pool depths are good throughout the stream system. Overhead and instream cover is excellent overall, and instream structure has been enhanced by placement of logs in the lower reach. Low gradient habitats were widened and made shallow during the 1955 flood. The lower reach is an important area for juvenile salmon rearing and adult salmon spawning. The upper reach has excellent rearing and spawning habitat for both resident trout and winter steelhead.

Spawning habitat is good in the mainstem, with high spawning densities in the lower reach in spite of fine sediments and embeddedness.

There are approximately 10.6 miles of habitat for resident rainbow and resident coastal cutthroat; 9.2 miles for winter steelhead; 3.3 miles for coho salmon, fall chinook salmon, migratory coastal cutthroat and sculpins; and 1.4 miles for threespine stickleback and reside shiner. Klamath Mountain Province steelhead and coho salmon are currently proposed for Federal listing on the Threatened and Endangered Species List. Fall chinook and coastal cutthroat are "at risk". Fish population surveys since 1986 show a declining trend for fall chinook.

Table 1. Coho Life-Cycle Use Model for Shasta Costa Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Shasta Costa Creek Watershed Habitat Conditions

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** $\geq$75%	Probably good, large conifers	Excellent	Stable	Acceptable	Protect from future logging activity
LWD Wood sources **	Good, abundant source material	Good	Stable	Acceptable	Maintain where needed
Bank stability * $\geq$90% stable	Good, vegetated	Generally good but natural landslides create periodic problems	Deteriorating	Limiting	Minimize manmade influences
Macroinvertebrate Health $\geq$80% High $\leq$40 % severe low	Presumed good	Probably good. Study completed in 1992 but results still not available	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas during natural landslides	Deteriorating	Limiting	Minimize manmade influences
In stream LWD ** ≥20 pieces/100 meters	High	Good. Lower reach enhanced with added logs	Stable	Acceptable	Add large conifers, structures when needed
Side channels * ≥5 mile	Probably good, good sinuosity	Natural conditions - some available	Stable	Acceptable	Protect and enhance where feasible
Rearing areas **	Presumed good	Fairly good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Good pool-riffle ratio - 50%	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Fairly good, natural	Stable	Acceptable	Maintain and enhance
Alcoves *	Good	Generally good	Stable	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Stable	Acceptable	Encourage use.
Mining	None	Some recreational gold mining. Historically mining was extensive	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Natural, not impacted by man	Stable	Acceptable	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	None	Stable	Acceptable	No action
Push-up dams	None	None	Stable	Acceptable	no action
Culverts *	None	No problem sites identified	Stable	Acceptable	Future construction must provide adequate passage

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Summer temperatures are higher than desired, reaching 75 degrees on occasion.	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Acceptable	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels after landslides	Stable	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Possibly some from timber management practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Flows low in summer but not limiting	Stable	Acceptable	Maintain or enhance
Diversions	None	None	Stable	Acceptable	Eliminate unused rights, to in stream rights, reconstruct diversion headgate
Release regime	N.A.	No change	Stable	Acceptable	No action
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Problems caused by natural landslides	Improving	Acceptable	Use proper land use practices
Forest seral stage	Normal/mature	Basically unharvested	Stable	Acceptable	Protect from extensive timber harvest

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Disturbance history	Infrequent fires	Currently unharvested	Stable	Acceptable	Protect from timber harvest
Road density ≤2miles/sq.mile	None	Very few	Stable	Acceptable	Maintain unroaded condition
Agriculture	Minor Indian use	Primarily forest land in public ownership	Stable	Acceptable	Limit adverse effects
Return flows	None	None	Stable	Acceptable	Monitor, and evaluate
Chemical use on lands	None	Moderate use for forest management	Improving	Acceptable	Monitor, and evaluate u

Section III. Limiting Conditions.

In the Shasta Costa Creek watershed the following are the most critical limiting factors for coho production:

1. High summer water temperatures.

Condition:

- Temperature monitoring has consistently recorded temperatures near 70 degrees F. during the warmest summer months in the lower reach of Shasta Costa Creek with temperatures over 75 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.
- This stream has been targeted by the resource agencies and the Watershed Council for future tree planting projects.

2. Poor winter habitat

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- The lower end of Shasta Costa Creek has received a number of large wood structures to improve instream habitat. Additional large wood and boulder structures will be placed into the stream in the future to provide spawning gravel, pools and shelter for fish during high flow periods.

3. Bank stability and sedimentation.

Conditions:

- Flooding and natural slides, along with some minor logging and road construction has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area. No logging is planned for the Shasta Costa watershed in the foreseeable future.

- New road building is being kept to a minimum and unused roads stabilized and closed.

- Unstable soils and eroded banks will be seeded and planted. Several projects have been identified by the USFS

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, with the presently identified Critical Reaches.

- Conducting stream inventories on a 10-year return cycle.

- Continuing to monitor and maintain all existing habitat improvements.

- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Shasta Costa Creek watershed has been designated by the USFS as a Key Watershed. The USFS has developed a Watershed Analysis and Management Plan for the system that outlines a long and short term habitat improvement program. This is a high priority watershed and this system offers some of the highest quality habitat in the Rogue basin.

The Lower Rogue Watershed Council is extremely active. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Since the USFS is committed to improving fish habitat in the Shasta Costa Creek watershed the only barrier might be funding. Since this is a Key Watershed, the USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Silver Creek - Lower Rogue River Subbasin

Section I. Silver Creek Watershed Analysis

The Silver Creek watershed is approximately 6,170 acres and lies within 20 miles of the Pacific Ocean. Silver Creek flows in a southerly direction for about 4 miles before entering the Rogue River approximately 14 river miles northeast of the community of Gold Beach.

Average annual precipitation varies from 85 to 135 inches occurring primarily between October and May. Coastal fog during the summer months often extends inland to elevations near 1,500 feet, blanketing the lower one-third of the Silver Creek watershed. This maritime influence often ends at the ridge on the eastern portion of the watershed.

Physical Qualities

Silver Creek and its tributaries are rich in sediment and large wood, with sufficient flow to organize the material into pools and riffles, depending on the gradient. Throughout the system, natural landslides bring in sediment and large wood, and create side channels for fish during winter high flows. The substrate ranges from gravel to large boulders and bedrock, with a predominance of cobbles.

Water Resources

Silver Creek and its tributaries have considerable stream power with high transport capacity. Annual precipitation in the watershed is 85 to 135 inches, primarily from rainfall. Timber harvest and roads may have affected streamflow in the past. There are 37 miles of road in the basin. Road densities are very heavy.

Summer stream temperatures in the lower mainstem of Silver Creek are warm, approaching the tolerance limit for salmonids. In 1993 the 7-day average high stream temperature recorded at the mouth was 67 degrees F. Nearly half the length of non-fish-bearing perennial streams has been altered by harvest.

Although less than 15 percent of the fish-bearing stream length throughout the watershed has been altered by harvest, much of the length of fish-bearing streams has a north to south orientation and broad enough channel to be exposed to the sun during midday regardless of vegetation.

Fish Barriers

With the possible exception of a few culverts in the upper reaches, there are no significant passage problems to anadromous fish.

Land Uses

The 6,170 acres in the Silver Creek watershed are primarily under private ownership (85 percent). Ten percent is owned by BLM and the remaining 5 percent is under USFS ownership. The watershed has been allocated to the following management uses: Late Successional Reserves - 33 percent, Matrix - 67 percent.

Timber harvest and road construction in the Silver Creek watershed began in 1958. Private land within the basin is heavily roaded and has seen intensive timber harvest activities. Prior to this time, the physical stresses of the watershed resulted from natural events.

Numerous small perennial streams in the watershed have had increased sediment delivery due to timber harvest and road construction. Much of the timber on private land was harvested with tractors which can increase risk of sediment delivery to these streams. Although these small streams have been affected, it is not apparent that man's activities have had any significant effect on the mainstem of Silver Creek.

Historically, mining within the watershed lasted from the end of the nineteenth century through the 1940's. It is one of the most visible of the historic activities which occurred in the watershed. Evidence of mining can be found within the drainage. Currently, there are no active mines within the Silver Creek watershed.

Fishery Conditions

Silver Creek provides habitat for a variety of salmonid fishes. These include: fall chinook salmon, coho salmon, winter steelhead, rainbow trout and both migratory and resident coastal cutthroat trout. Other fish that occur in the watershed include: sticklebacks, sculpins and redside shiners.

Fish distribution in Silver Creek is as follows: fall chinook - 1 mile; coho - 3 miles; winter steelhead - 3 miles; sea-run cutthroat - 3 miles; resident trout - 4 miles.

Habitat conditions for anadromous fish are generally good. Pools are abundant and deep enough to provide adequate rearing for coho. The supply of large wood and structures in the stream appears adequate. A number of large woody debris structures were placed in the stream by the USFS in the early 1980's. Spawning gravel is abundant and the stream is well shaded.

Table 1. Coho Life-Cycle Use Model for Silver Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Silver Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Generally good. Upper reaches impacted by fire but recovering.	Improving	Acceptable	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Fairly good	Stable	Acceptable	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Good	Improving	Acceptable	Stabilize banks where needed
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Unknown	Unknown	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Good, 60-80 pieces per mile	Stable	Acceptable	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Fairly good	Stable	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Good	Stable	Acceptable	Maintain, increase summer flows
Pool frequency ** ≥50%	Good	Good pool-riffle ratio - 50%	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Good, little impact by man	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Good, little impact by man	Stable	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Fair. Some moderate beaver use	Stable	Limiting	Encourage use
Mining	None	Extensive gold mining historically. Mining opportunities limited to the lower 0.5 miles of the stream.	Improving	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Fairly good, little impact by man	Stable	Acceptable	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	None	Stable	Acceptable	No action
Push-up dams	None	None	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Some problem sites exist, need inventory	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature $\leq 64^{\circ}$ degrees **	Less than 64 degrees	Generally good. Temperature seldom exceeds 60 degrees	Stable	Acceptable	Maintain canopy and riparian cover
D.Oxygen ≥ 8 PPM	Good	Good	Stable	Acceptable	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels due to natural landslides	Deteriorating	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from timber management practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥ 10CFS **	Flows probably adequate to good	Low flows during the summer months are a concern	Stable	Acceptable	Improve timber management practices
Diversions	None	None	Stable	Acceptable	Establish in stream water rights
Release regime	N.A.	Probably no change from historical regime	Stable	Acceptable	No Action
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Some timber harvest and natural landslide induced erosion	Improving	Limiting	Improve land use practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested.	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Restrictive fire management, but increasing timber harvest.	Improving	Acceptable	Monitor timber harvest practices. Protect from wild fire
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Minor Indian use	Essentially none. Forested	Stable	Acceptable	No Action
Return flows	None	None	Stable	Acceptable	No action
Chemical use on lands	None	Moderate use for forest management	Improving	Acceptable	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Silver Creek watershed the following are the most critical limiting factors for coho production:

1. High summer water temperatures.

Condition:

- Temperature monitoring has consistently recorded temperatures near 65 degrees F. during the warmest summer months with temperatures near 70 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream, particularly in the upper reaches, will be on improving the canopy in areas where the riparian vegetation is sparse.

2. Poor winter habitat

Condition:

- The lack of side channels and alcoves in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Additional large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

- Opportunities for creating side channels and alcoves will be investigated.

3. Roads and culverts

Condition:

- Road density is heavy but there are several culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

- Working through the Forest Practices Act and with cooperation from the private landowners efforts will be made to repair or replace problem culverts and stabilize roads.

4. Bank stability and sedimentation.

Conditions:

- Logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions.

	Enhancement Priority Level	
Project Action	Immediate	On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	
Improve private land data base	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, with the presently identified Critical Reaches.

- Maintaining adult spawning surveys established in the winter of 1994.

- Conducting stream inventories on a 10-year return cycle.

- Continuing to monitor and maintain all existing habitat improvements.

- Remeasuring cross-sections after each peak streamflow that equals or exceeds a five-year return frequency.

- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Silver Creek watershed has been designated by the resource agencies as an important anadromous fish watershed. The USFS has developed a Management Plan for the system that outlines a long and short term habitat improvement program.

The Lower Rogue Watershed Council is extremely active and is coordinated with the local, state and federal resource agencies. They have completed an integrated action plan that is updated periodically. Silver Creek is included in that plan.

D. Requirements for Achieving Success.

Since the USFS is committed to improving fish habitat in important anadromous fish watersheds the only barrier might be funding. State funding is limited, so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
South Fork Lobster Creek - Lower Rogue River Subbasin

Section I. South Fork Lobster Creek Watershed Analysis

The South Fork of Lobster Creek watershed consists of 16,130 acres. The whole Lobster Creek watershed contains 44,252 acres. The South Fork flows south and west for about eight miles before joining the North Fork to create the main stem of Lobster Creek. The main stem flows another nine miles south before its confluence with the Rogue River at River Mile 11.

The Lobster Creek basin has undergone significant changes due to timber harvest within the last 50 years. Yet, with the exception of the Illinois system, Lobster creek is probably the most important anadromous fish producing tributary on the lower Rogue River.

Physical Qualities

Lobster Creek is located in the coastal rain dominated zone. Approximately 17 percent of the basin lies within the snow zone which could experience rapid snow melt during rain on snow events.

Water Resources

Precipitation in the Lobster Creek watershed ranges from 90-130 inches a year, primarily in the form of rain. The South Fork of Lobster makes up approximately 60 percent of the entire stream flow while the North fork contributes about 40 percent to the system.

Water quantity and temperature are significant issues in the Lobster Creek watershed. Recent temperature studies on Lobster Creek found that the maximum stream temperatures in 1990-92 and 1994-95 were above the optimum for fish. Temperatures in 1993 were lower than the average by more than 3 degrees F.

Stream temperatures were taken at the mouth of the South Fork during 1994 and 1995. The temperatures were 66.8 and 66.6 degrees, respectively. Apparently, a high amount of warming occurs in the area of the South Fork from Ol'Diggins Bridge, where the measurements were taken, to the mouth of the South Fork.

Sediment deposited from floods, channel widening from early placer mining, salvage of large wood, straightening of channels with bulldozers, removal of riparian vegetation, streambed disturbance from mining, removal of instream structure and removal of gravel bars near bridges contribute to a broader, shallower channel in the lower reaches of Lobster Creek. This has all contributed to an increase in water temperatures.

Fish Barriers

There are no natural barriers to migrating fish.

Land Uses

The 16,130 acres in the South Fork Lobster Creek watershed are under USFS ownership.

Timber harvest began in the Lobster Creek basin in 1955.A total of 799 acres (29%) of the National Forest Land in the Lobster Creek basin has been harvested. Since 90 percent of the private lands have been logged, then 81 percent of the Lobster Creek basin has been harvested

Much of the inner riparian zone has been logged and is now vegetated with sapling poles to small trees. Very few large trees exist in the riparian zone.

Road construction in the lower basin is quite dense with a large number of low and mid-slope roads. Road construction in the upper basin is less dense and they are typically located on ridges. The large number of roads allow for the potential of large sediment imputs from road failures in a large storm event. There are 4.19 miles of road per square mile located in the mainstem. This includes both USFS roads and private roads, however, there are many "cat" roads that are not mapped.

Fishery Conditions

Lobster Creek is an important anadromous fish stream. It provides spawning and rearing habitat for steelhead, chinook salmon, coho salmon, sea-run cutthroat, as well as resident cutthroat and rainbow trout.

Recent habitat surveys found that the highest population densities of salmonids occurred in pools with complex cover. Wood and substrate offered the best quality cover for salmonids. Sedimentation from the extensive logging and a number of natural landslides is a significant problem in the Lobster Creek watershed.

Stream habitat in the South Fork is better than the rest of the watershed because it has not been as extensively logged. Basically, stream temperatures range from fair to good, woody material is lacking in the stream channel, the width/depth ration is good, the pools/mile ratio is less than desired, road density is high, there is little opportunity for recruitment of large wood to the stream, and the complexity in the stream is below optimum conditions due to the lack of large wood complexes.

There is a history of flash floods and debris torrents causing landslides. The frequency of this has been increased by timber harvest and road-building activities.

Large amounts of algae were noted in several areas. Algae may indicate a high pH which is detrimental for salmonids. Algae is usually found in areas that are wide and shallow, have simple habitat, bedrock bottoms, and increased nutrient runoff due to removal of vegetation. The areas where the algae was present fit the above criteria with the exception of a bedrock bottom.

Table 1. Coho Life-Cycle Use Model for South Fork Lobster Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. South Fork Lobster Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** $\geq 75\%$	Probably good, large conifers	Heavily harvested, narrow riparian zone, thin density	Improving slowly	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability * $\geq 90\%$ stable	Good, vegetated	Fair, impacted extensively by logging and road construction	Improving	Limiting	Stabilized exposed banks, enhance riparian areas
Macroinvertebrate Health $\geq 80\%$ High ≤ 40 % severe low	Presumed good	Unknown, study began in 1992 but results not available	Unknown	Unknown	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Fairly good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Deteriorating	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low . Averages 23 pieces per mile.	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good summer habitat Winter habitat may be limiting	Stable	Acceptable	Increase summer flows. Improve winter habitat
Pool frequency ** ≥50%	Good	Good pool-riffle ratio - 44/56	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Poor, in mainstem and some tributaries are channelized in areas	Stable, confined	Limiting	Promote natural meandering of channels
Alcoves *	Good	Fair, some impacted by logging	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	None	Stable	Limiting	Develop some use on tributaries and educate landowners
Mining	None	Some limited gold mining	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Very few wetlands exist	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	none	Stable	Acceptable	No action
Push-up dams	None	None	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	Several problem sites exist. Need inventory	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Fairly good. Seven-day summer average is 60 degrees.	Improving	Acceptable	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Acceptable	Maintain above 5 PPM
Turbidity *	Good	Frequent high levels due to extensive timber harvest	Improving	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Possibly some from timber management practices	Improving	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Low summer flows	Stable	Limiting	Improve watershed protection
Diversions	None	None	Stable	Acceptable	No action
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Timber harvest induced erosion	Improving	Limiting	Improve land use and forest practices
Forest seral stage	Normal/mature	Harvested.	Improving	Acceptable	Thin/plant to encourage natural diversity

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Disturbance history	Frequent-fire	Extensive timber harvest	Improving	Limiting	Improve forest practices
Road density * ≤2miles/sq.mile	None	Severe problem	Improving	Limiting	Close Roads
Agriculture	None	None	Stable	Acceptable	No action
Return flows	None	None	Stable	Acceptable	No action
Chemical use on lands	None	Some use for timber management	Unknown	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the South Fork Lobster Creek watershed the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 5 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future. The target is to place large wood material in all reaches to create more habitat complexity and increase the number of pools/mile. Pieces longer than twice the bankfull width and a mix of large and small wood will be used to create this complexity.

- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. **Lack of Riparian diversity and density.**

Condition:

- Riparian habitat in some areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade and for bank stabilization. The goal is a desired future condition of 85 percent conifer and 15 percent hardwoods.

3. **High summer water temperatures.**

Condition:

- Temperature monitoring have consistently recorded temperatures near 65 degrees F. during the warmest summer months.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse.

- Place temperature monitoring devices in different areas in the South Fork of Lobster Creek to determine the location of warmer water entering the stream.

4. **Low summer flows.**

Condition:

- Summer flows are low in Lobster Creek due to extensive logging in the watershed and sparse riparian habitat. Flows in the South Fork are better but occasionally are limiting.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

5. **Poor winter habitat**

Condition:

- The lack of structure in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

- Existing wood in the stream will be protected and the stream energy at all flow levels will be dissipated.

6. Roads and culverts

Condition:

- Road density is high and there are a number of culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

7. Bank stability and sedimentation.

Conditions:

- Extensive logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area.

- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level	
	Immediate	On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, with the presently identified Critical Reaches.

- Maintaining adult spawning surveys established on Lobster Creek in 1986.

- Conducting stream inventories on a 10-year return cycle.

- Continuing to monitor and maintain all existing habitat improvements.

- Establishing and maintaining periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Lobster Creek watershed has been designated by the resource agencies as a Crucial Watershed. The USFS has developed a cumulative effects analysis from 1990 and will prepare a Watershed Analysis in the fall or winter of 1997. This is a high priority watershed that offers some of the most critical salmonid in the lower Rogue basin.

The Lower Rogue Watershed Council is extremely active. They have completed an integrated action plan that is updated periodically. A number of specific actions have been completed.

D. Requirements for Achieving Success.

Since the state and federal agencies are committed to improving fish habitat in the Rogue River watershed the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Quosatana Creek - Lower Rogue River Subbasin

Section I. Quosatana Creek Watershed Analysis

The Quosatana Creek watershed is approximately 16,400 acres and lies within 20 miles of the Pacific Ocean. Quosatana Creek flows in a northerly direction for about 6 miles before entering the Rogue River approximately 14 river miles northeast of the community of Gold Beach.

Average annual precipitation varies from 85 to 135 inches occurring primarily between October and May. Coastal fog during the summer months often extends inland to elevations near 1,500 feet, blanketing the lower one-third of the Quosatana watershed. This maritime influence often ends at Wildhorse Ridge on the eastern portion of the watershed.

Physical Qualities

The Quosatana Creek Watershed is located near the geographic center of the Klamath Mountains geologic province. The elevation ranges from 70 feet at the confluence with the Rogue River to 3,512 feet at Signal Buttes. The terrain is moderate with slopes in the western portion of the watershed averaging 8 to 30 percent and slopes in the center and east averaging 30 to 60 percent. About 10 percent of the watershed has slopes greater than 60 percent.

Quosatana Creek is a powerful stream in the winter. However, the combination of the alteration of local base level and the eddy effect has caused the mouth of Quosatana Creek to aggrade to the point where summer flows are inadequate to maintain surface flow.

The stream channel becomes more confined at Stream Mile 2.5 but still shows some signs of aggradation. In addition landslide activity seems to have increased. The lower two miles of stream show what appears to be bedrock meanders. These meanders could be a result of fault action or possibly changes in bedrock composition.

Quosatana Creek and its forks have an abundance of sediment and large wood, with sufficient flow to organize the material into pools and riffles, depending on the gradient. Throughout the system, natural landslides bring in sediment and large wood, and create side channels for fish during winter high flows. The substrate ranges from gravel to large boulders and bedrock, with a predominance of cobbles.

The mouth of Quosatana Creek goes subsurface by July in most years, and traps juvenile anadromous salmonids. This condition appears to be natural, and is caused by a fault that parallels the first reach in Quosatana Creek. This subsurface flow condition has negative effects for both juvenile and adult anadromous salmonids. Apparently, juvenile fall chinook and steelhead concentrate in the lower pools of Quosatana Creek during the summer months because of this subsurface condition resulting in decreased growth rates.

The subsurface flow condition also delays spawning adults from entering Quosatana Creek which has had negative effects during drought years. Lower Rogue fall chinook are considered tributary spawners. During some of these drought years, there was not enough precipitation to bring stream flows up until December. The peak spawning time for Quosatana Creek is usually in late November. Consequently, the peak spawning period had already passed when stream flows allowed access to the stream.

Water Resources

Quosatana Creek and its forks have considerable stream power with high transport capacity. Annual precipitation in the watershed is 85 to 135 inches, primarily from rainfall.

Timber harvest and roads may have affected streamflow in the past. Thirty seven percent of the watershed has been harvested since 1958. Approximately 7 percent of the watershed was harvested within the transient snow zone. Road densities average 2.4 miles per square mile over the watershed.

Summer stream temperatures in the lower mainstem of Quosatana Creek are warm, approaching the tolerance limit for salmonids. Nearly half the length of non-fish-bearing perennial streams has been altered by harvest. Some shading has been restored by vegetation growth and some has been provided by topography. The upper West Fork is still largely unshaded, but its temperature is 1.5 degrees cooler than the East Fork at their confluence.

Although less than 15 percent of the fish-bearing stream length throughout the watershed has been altered by harvest, much of the length of fish-bearing streams has a north to south orientation and broad enough channel to be exposed to the sun during midday regardless of vegetation. Stream temperatures show an increase of one degree in the mainstem from the forks to river mile 2.5, the beginning of the aggraded reach. Efforts to improve shade on tributaries may have little effect on mainstem temperature, because most of the summer flow and heating are in this exposed reach. Between 1991 and 1995 the seven-day maximum average high temperatures ranged between 66 and 69 degrees.

Fish Barriers

A partial anadromous blockage occurs in Reach 2. The blockage is natural and is a waterfall and log jam. In 1983 and 1987, dynamite was used to facilitate passage through this blockage. Currently this blockage still impedes, or sometimes fully blocks, the migration of salmon and possibly cutthroat, but steelhead can negotiate the barrier.

Land Uses

The 16,400 acres in the Quosatana Creek watershed are primarily under USFS ownership (13,763 acres). The remaining 2,652 acres is privately owned. The USFS has allocated their ownership to the following management uses: Late Successional Reserves - 8,509 acres, Matrix - 3,319 acres, Riparian Reserves - 977 acres, Supplemental Resource - 429 acres, Unique Interest - 405 acres, Special Wildlife - 110 acres and Partial Retention Visuals - 14 acres.

Timber harvest and road construction in the Quosatana watershed began in 1958. Prior to this time, the physical stresses of the watershed resulted from natural events. Since 1958, 6,112 acres have been harvested and almost 59 miles of road have been constructed.

Numerous small perennial streams in the watershed have had increased sediment delivery due to timber harvest and road construction. Much of the timber on private land was harvested with tractors which can increase risk of sediment delivery to these streams. Although these small streams have been affected, it is not apparent that man's activities have had any effect on the mainstem or the main forks of Quosatana Creek.

Historically mining within the watershed lasted from the end of the nineteenth century through the 1940's. It is one of the most visible of the historic activities which occurred in the watershed. Evidence of mining or prospecting for gold, nickel and chrome all can be found within the drainage. Currently, there are no active mines within the Quosatana Creek watershed. In the early 1990's one company had extensive claims but they were apparently unproductive and all have now lapsed. Future mining possibilities are unknown and would be dependent on market conditions. The only mineral resources that have been developed within the watershed are several rock quarries that are used by the USFS.

The Quosatana watershed has been grazed since the 1800's, first permitted by the USFS. Small grazing allotments still exist within the watershed.

Fishery Conditions

Quosatana Creek provides habitat for a variety of salmonid fishes. These include: fall chinook salmon, coho salmon, winter steelhead, rainbow trout and both migratory and resident coastal cutthroat trout. Other fish that occur in the watershed include: sticklebacks, sculpins and redside shiners.

Habitat conditions for anadromous fish are excellent. Pools are abundant and deep enough to provide adequate rearing for coho. The supply of large wood and structures in the stream appears adequate. A number of large woody debris structures were placed in the stream by the USFS in the early 1980's. Spawning gravel is abundant and parts of the stream are well shaded.

Table 1. Coho Life-Cycle Use Model for Quosatana Creek .

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Quosatana Creek Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Watershed heavily harvested but generally good buffers remain	Improving	Acceptable	Protect canopy from future logging. Designate Riparian Reserve.
LWD Wood sources **	Good, abundant source material	Fairly good supply	Stable	Acceptable	Protect large conifers and maintain species diversity
Bank stability * ≥90% stable	Good, well vegetated	Good in mainstem. Some of tributaries heavily logged.	Improving	Acceptable	Protect tributaries from future logging activities
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Probably good. Study recently completed.	Stable	Acceptable	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Stable, some embeddedness	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some tributary areas.	Probably improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Good, ample supply available	Stable	Acceptable	Maintain large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Fairly good.	Stable	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good, particularly in upper reaches.	Stable	Acceptable	Maintain, increase rearing habitat in lower reaches.
Pool frequency ** ≥50%	Good	Good pool-riffle ratio overall, but most pool in upper reaches and riffles below.	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Natural, has not been channelized	Stable	Acceptable	Promote natural meandering of channels
Alcoves *	Good	Some available. Additional alcoves needed for coho	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Very few	Stable	Limiting	Encourage use
Mining	None	Some gold mining historically, none at present.	Stable	Acceptable	Limit through permit enforcement
Wetland connection *	Good	Relatively natural. Some impacts from logging	Stable	Acceptable	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	None	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Push-up dams	None	None	Stable	Acceptable	No action
Culverts *	None	Some problem areas exist, need inventory.	Stable	Acceptable	Continue reconstruction.
Water Quality					
Temperature ** ≤ 64 degrees	Less than 64 degrees	Generally good but on the warm end of tolerance.	Improving	Acceptable	Increase canopy and riparian cover
D.Oxygen ≥ 8 PPM	Good	Good	Stable	Acceptable	Maintain above 5 PPM
Turbidity *	Good	Occasional high levels after natural landslides.	Stable	Limiting	Reduce streambank erosion and run-off effect where possible
Chem. Pollution	None	Essentially none	Stable	Acceptable	Institute Best Management Practices
Water Quantity					
Flow - low period ** ≥ 10CFS	Flows probably adequate to good	Flows adequate - high in the winter and naturally low in the summer	Stable	Acceptable	No action
Diversions	None	none	Stable	Acceptable	No action
Release regime	N.A.	No change	Stable	Acceptable	No action
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Some from timber harvest	Improving	Acceptable	Improve land use practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Watershed dominated by timber harvest	Improving	Acceptable	Restore controlled burning
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	none	None, timber harvest is major activity	Stable	Acceptable	Limit adverse effects
Return flows	None	None	Stable	Acceptable	No action
Chemical use on lands	None	Some for timber management	Improving	Acceptable	Monitor, and evaluate use
<u>Other</u>					

Section III. Limiting Conditions.

In the Quosatana Creek watershed the following are the most critical limiting factors for coho production:

1. High summer water temperatures.

Condition:

- Temperature monitoring has consistently recorded temperatures near 65 degrees F. during the warmest summer months with temperatures near 70 degrees occasionally recorded.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream, particularly the West Fork, will be on improving the canopy in areas where the riparian vegetation is sparse.

2. Fish passage.

Condition:

- A natural waterfall limits fish passage, particularly for salmon in Reach 2. Efforts to improve passage have not been completely successful. Access into the stream at the mouth due to subsurface flows have impacted access and may have limiting rearing success.

Actions:

- Efforts to further improve passage over the waterfall are being considered by the USFS.
- The problem of subsurface flows at the mouth during certain times of the year is being evaluated and alternatives to improve passage are being developed.

3. Poor winter habitat

Condition:

- The lack of side channels and alcoves in the stream and high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Additional large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.
- Opportunities for creating side channels and alcoves will be investigated.

4. Roads and culverts

Condition:

- Road density is moderate but there are a few culverts that limit fish passage, particularly juvenile fish movement upstream during the winter months.

Actions:

- The USFS is focusing a portion of their future habitat budget toward closing unused roads and improving or eliminating problem culverts.

5. Bank stability and sedimentation.

Conditions:

- Logging and road building has impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Plan to provide wider buffers and a more stable and diverse riparian area.
- New road building is being kept to a minimum and unused roads stabilized and closed.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Improve roads and culverts	X	
Improve fish passage	X	

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Continuing annual summer snorkel surveys, established in 1992, with the presently identified Critical Reaches.

- Maintaining adult spawning surveys established in 1966.

- Conducting stream inventories on a 10-year return cycle.

- Continuing to monitor and maintain all existing habitat improvements.

- Remeasuring cross-sections after each peak streamflow that equals or exceeds a five-year return frequency.

- Continuing periodic stream water temperature and low flow measurements at critical locations.

C. Implementation Plan

The Quosatana watershed has been designated by the USFS as a Key Watershed.
The USFS has developed a Watershed Analysis and Management Plan for the system that outlines a long and short term habitat improvement program. This is a high priority watershed that offers some of the highest quality habitat in the Rogue basin.

The Lower Rogue Watershed Council is extremely active and is coordinated with the local, state and federal resource agencies. They have completed an integrated action plan that is updated periodically. One specific action is currently planned.

D. Requirements for Achieving Success.

Since the USFS is committed to improving fish habitat in the Key watersheds the only barrier might be funding. State funding is limited, so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Elk-Sixes Watershed - South Coast Subbasin

Section I. Elk - Sixes Watershed Analysis

The Elk Creek - Sixes Watershed is located at the northern edge of the Klamath Mountain province in southwestern Oregon. It encompasses 161 anadromous stream miles draining 224 square miles (143,360 acres) between Port Orford and Langlois on the South Coast. Elevations range from sea level to slightly over 4,000 feet.

Physical Qualities. Geological forces in the Elk - Sixes watershed have created a rugged, steep terrain. Landslides and surface erosion are natural occurrences in this furrowed landscape. Numerous small debris slides and slumps, triggered by heavy rainfall on saturated slopes transport large wood and sediment to incised stream channels.

Sitka spruce, Port Orford cedar and red cedar are native to the alluvial valleys and coastal wetlands. Huckleberry, salal, rhododendron, azalea, sword fern, sedges and rushes are common understory vegetation. Douglas fir, western hemlock, grand fir, red alder, myrtlewood, big leaf maple and shore pine are also found in the Elk - Sixes watershed. Douglas fir is the primary conifer on private woodlands.

The diversity of the landscape and vegetation of the area fosters a diverse wildlife population. Marine mammals, shorebirds and waterfowl are found in the coastal areas. Bears, cougars, bobcats, coyotes, blacktail deer, squirrels, elk, otter, martin, raccoon and numerous small mammals inhabit the Elk - Sixes watershed.

Water Resources. Average annual rainfall in this coastal region is over 120 inches. Water temperatures on Elk River have reached 70 degrees F. On the Sixes, temperatures were recorded as high as 64.4 degrees F. General water quality is judged excellent, however, sediment and high water temperatures may be limiting fish production.

Most private land within the watershed has been managed for logging. Most landowners protect the riparian area fairly well. Conifers extend to the edge of the deflation plain, providing some habitat diversity. Large woody debris comes primarily from upstream sources.

Fish Barriers. There are no fish barriers of sufficient dimensions to hinder fish passage on the Elk or Sixes Rivers and their tributaries.

Land Use .Most development in the Elk - Sixes watershed is along the river banks. The rural residential area is located in the northern part of Curry County. Private land within the watershed is a mix of rural residential on the floodplain and forested uplands. Private parcels tend to be 100 acres or more and used for timber production, dairying, cattle and sheep ranching.

In the Elk river drainage, 79% of the 59,520 acres are under Forest Service management, 17 percent private lands, 4% Bureau of Land Management, and less than one percent under state management.

In the Sixes River drainage, 70 percent of the land is in private ownership with several large timber companies and pioneer family ranches accounting for a large percentage of the private holdings. The Siskiyou National Forest comprises 27 percent of the Sixes basin. Bureau of Land Management and State of Oregon managed lands make up three percent of the area.

Cranberries have become the leading agricultural crop in the watershed due to the availability of water, favorable soil and climatic conditions. Floral greenery, including evergreen boughs, salal, huckleberry, ferns and bear grass, is increasing in economic importance. During mushroom season, high value mushrooms bring pickers to the area.

Currently, there are more than 500 miles of roads in the Elk - Sixes watershed.

Fishery Conditions.

The Elk and Sixes rivers and their tributaries provide spawning and rearing habitats for fall chinook, coho salmon, winter steelhead, anadromous cutthroat trout, freshwater, estuarine and marine fish. The Elk River is believed to produce more fish per mile than any Oregon river. Fall chinook are the most abundant fish with an annual average of nearly 5,000 naturally spawning adults. Spawning distribution is affected by adult populations and water flow. Most of the spawning occurs in the mainstem. In 1984, the November Port Orford commercial offshore chinook catch was 28,000 pounds. This was 30 per cent of the entire 1984 commercial catch at Port Orford and 87 per cent of the November chinook catch for the entire Oregon coast. Elk River sustains a returning population of 1,000 to 2,000 adult winter steelhead.

ODFW researchers have identified self-sustaining populations of resident cutthroat trout and wild rainbow trout in remote reaches of Elk River. The peak spawning count of fall chinook on the Sixes River in 1995 was 50 adults per mile as compared to a 1994 peak count of 46 adults per mile.

Table 1. Coho Life-Cycle Use Model for Elk and Sixes River.

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Elk River Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Harvested, narrow riparian zone, thin density, particularly in lower agricultural areas	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Fair, considerable cattle grazing in lower reaches. Logging in upper	Improving	Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Unknown	Unknown	Unknown	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Generally good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Some embeddedness. Sedimentation a problem in lower reaches	Stable	Acceptable	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good except for low flows and sedimentation	Stable	Acceptable	Maintain, increase summer flows and reduce sedimentation
Pool frequency ** ≥50%	Good	Fair pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Poor, in mainstem and some tributaries are channelized in areas	Stable	Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Improving	Limiting	Develop some use on tributaries and educate landowners
Mining	None	Limited recreational gold mining. Some extensive commercial work.	Deteriorating	Limiting	Limit through permit enforcement
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	Multiple - withdrawals varies with season and water supply	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	A number of problem sites identified. Additional inventory needed.	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Occasionally over 65 degrees in summer. A high of 70 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Frequent high levels	Increasing	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural and forest practices	Improving	Unknown	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Low flows during the summer months	Deteriorating	Limiting	Reduce Ag. diversions. Improve riparian habitat
Diversions	None	Numerous withdrawals in the lower reaches.	Stable	Limiting	Eliminate unused rights. Monitor withdrawals
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds and marine mammals	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Extensive erosion from timber harvest and agricultural practices.	Deteriorating	Limiting	Improve land use practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested.	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Extensive timber harvest and ag. use	Improving	Acceptable	Improve forest practices
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Acceptable	Close roads and reconstruct drainage, vegetate.
Agriculture	Extensive Indian use	Moderate number of farms and ranches in lower end. About 80 percent is forest land.	Stable	Acceptable	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate agricultural and forestry use	Improving	Unknown	Monitor, and evaluate use

Table 3. Sixes River Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ** ≥75%	Probably good, large conifers	Heavily harvested, narrow riparian zone, thin density, particularly in lower agricultural areas	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Bank stability * $\geq 90\%$ stable	Good, vegetated	Considerable cattle grazing in lower reaches. Logging in upper areas.	Deteriorating	Limiting	Limit cattle access, enhance riparian areas
Macroinvertebrate Health $\geq 80\%$ High ≤ 40 % severe low	Presumed good	Unknown	Unknown	Unknown	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel	Presumed good	Generally good, not a limiting factor	Stable	Acceptable	Maintain and enhance supply
Substrate condition. * $\leq 20\%$ over natural delivery	Presumed good	Some embeddedness. Sedimentation a problem in lower reaches	Stable	Limiting	Reduce sedimentation
Sediment * $\leq 5\%$	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥ 20 pieces/100 meters	High	Moderate to low	Stable	Limiting	Need large conifers, structures
Side channels * ≥ 5 mile	Probably good, good sinuosity	Few and of limited quantity	Stable	Limiting	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Fairly good except for low flows and sedimentation	Stable	Acceptable	Maintain, increase summer flows and reduce sedimentation
Pool frequency ** $\geq 50\%$	Good	Fair pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Poor in mainstem. Some tributaries are channelized in areas	Stable	Limiting	Promote natural meandering of channels
Alcoves *	Good	Poor, few remain	Improving	Limiting	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Few	Improving	Limiting	Develop some use on tributaries and educate landowners
Mining	None	Limited recreational gold mining	Stable	Acceptable	Limit through permit enforcement

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Wetland connection *	Good	Marginal, many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	Extensive withdrawals	Deteriorating	Limiting	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action
Culverts *	None	A number of problem sites identified. Additional inventory needed.	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature $\leq 64^{\circ}$ degrees **	Less than 64 degrees	Occasionally over 65 degrees in summer. A high of 80 measured	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥ 8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Frequent high levels	Increasing	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural and forest practices	Improving	Unknown	Institute Best Management Practices
Water Quantity					
Flow - low period ≥ 10CFS *	Flows probably adequate to good	Low flows during the summer months	Deteriorating	Limiting	Reduce Ag. diversions. Improve riparian habitat
Diversions	None	Fairly extensive throughout. May be over appropriated.	Stable	Limiting	Eliminate unused rights. Monitor withdrawals
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds and marine mammals	Stable	Acceptable	No change

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Extensive erosion from timber harvest and agricultural practices.	Deteriorating	Limiting	Improve land use practices
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Deteriorating	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Extensive timber harvest and ag. use	Deteriorating	Limiting	Improve forest practices
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Extensive Indian use	Numerous farms and ranches in lower end. About 70 percent is in private ownership. Increasing residential development.	Stable	Limiting	Limit adverse effects
Return flows	None	Unknown	Stable	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate ag. and forestry use	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Elk and Sixes watersheds the following are the most critical limiting factors for coho production:

1. Lack of large woody debris.

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 25 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future.

- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. Bank stability and sedimentation.

Conditions:

- Extensive logging, agricultural practices and residential development have impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Bill to provide wider buffers and a more stable and diverse riparian area.

- Comparative agreements with landowners, resource agencies and the Watershed Councils are being developed to construct fences limiting livestock access to the streams and developing alternative water sources.

3. **Low incidence of side channels, alcoves and beaver dams.**

Condition:

- Development of residences and modifying adjacent agricultural land for more efficient utilization as pasture has resulted in the loss of many side channels and alcoves. A considerable amount of the lower reaches of the streams in this watershed have been channelized. Beaver use was once abundant but conflicts with human activities has prompted the control of beavers and their dams.

Actions:

- Resource agencies and the local Watershed Councils are working with landowners in locating sites for construction of side channels and alcoves. A number have already been completed with several more planned.

- An educational program has been initiated to promote protection of beavers and assist landowners in dealing with some of the conflicts with the construction of beaver dams.

4. **Lack of Riparian diversity and density.**

Condition:

- The riparian area in many areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade.

5. **High summer water temperatures.**

Condition:

- Temperature monitoring has recorded temperatures near 80 degrees F. during the warmest summer months on the Sixes River.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse. Focus will be on tributaries that tend to heat up rapidly.

- This watershed has been targeted by the resource agencies and the Watershed Council for extensive tree planting projects.

6. Low summer flows.

Condition:

- Summer flows are low, particularly in the smaller tributaries. Fish distribution is limited to a few deep holes requiring juvenile salmonids to move downstream to locate suitable habitat.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.

- The OWRD is evaluating water use in the entire Elk-Sixes watershed to establish a more efficient water management program that may result in more water being left in the stream.

7. Poor winter habitat

Condition:

- The lack of structures, alcoves and side channels in the stream combined with high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.

- ODFW and the Watershed Councils will work with landowners to reestablish side channels, where feasible.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Research side channel locations		X
Evaluate water use in the watershed		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing monitoring stations above and below project sites and evaluate before and after project completion.
- Updating stream surveys at least every five years.
- Conducting periodic spawning ground counts.
- Conducting a regular temperature monitoring program.
- Conducting a juvenile sampling program.

C. Implementation Plan

Most of the Elk River watershed is managed for timber harvest by both USFS and private timber companies. The USFS has committed to restoring fish habitat in the entire Elk Creek watershed since they have been designated as a Key Watershed. A five-year management plan includes considerable habitat work in the Elk River drainage.

The Sixes River system is primarily privately owned with a high percentage in agricultural use. Several landowners have committed to cooperate with resource agencies in modifying their livestock management to minimize impacts on the stream and to assist in improving habitat.

D. Requirements for Achieving Success.

Since the state and federal agencies and a number of landowners are committed to improving fish habitat in the Elk and Sixes River watersheds, the only barrier might be funding. State funding is limited so work coordinated by the state must include assistance from the Watershed Council and other volunteer groups. The USFS is committed to spending considerable funds in the drainage with several projects completed, some underway and many more being planned. Several private landowners have also committed considerable resources to improve fish habitat in the watershed.

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE
Recovery Plan for Core Salmonid Habitat Areas
Floras Creek/New River/Fourmile Creek - South Coast Subbasin

Section I. Floras Creek/New River/Fourmile Creek Watershed Analysis

The Floras Creek/New River/Fourmile Creek system is 53 linear river miles in length, draining 125 square miles (80,000 acres) in the north end of the South Coast watershed. The New River - Floras Creek subbasin is interconnected and share a single outlet to the ocean. New River was created by the 1890 flood as an extension of Floras Creek. Unlike much of the Rogue Basin and South Coast basins, 94 percent of the Floras Creek - New River watershed is privately owned. The Bureau of Land Management controls five percent of the watershed while one percent is in State ownership. Privately managed lands are used predominately for logging, agriculture and residential development.

Fourmile Creek enters the ocean just north of the Floras Creek-New River system and has a similar land ownership pattern.

Physical Qualities.

The Floras Creek/ New River/Fourmile Creek watershed has deeply incised streams in narrow canyons, rocky ridges, steep slopes, cliffs, lowland terraces, alluvial floodplain and numerous landslides. Erosion is severe on steep slopes that have been logged or burned.

Wildlife is abundant and varied, ranging from deer and elk to raccoons, skunks, shorebirds, waterfowl and marine mammals. Vegetation is predominately Sitka spruce, Port Orford and red cedar in the alluvial valleys and coastal wetlands. Alder, willow and brush common to coastal areas are abundant.

Water Resources.

The average rainfall in the watershed varies from 70 to 80 inches along the coast to 90 to 110 inches at the highest elevations. Most of the precipitation occurs from November through March in relatively intense, short storms, with less than 10 per cent of the annual rainfall occurring during the summer months. Large stream flow fluctuations are caused by these weather patterns. Flash floods can occur when intense storms inundate the watershed with heavy rains over a short period of time.

Fish Barriers.

Artificial barriers have reduced accessibility to some tributaries. Floras Creek - New River are bar bound where they flow into the ocean during low flow months.

Land Uses.

Timber harvesting has been a primary industry in the area. International Paper and Moore Mill are the major landowners of forest lands. Although spruce and pine were historically the dominant species, Douglas fir is most commonly used for reforestation. Ten to fifteen per cent of the watershed is used predominately for livestock grazing. Other agricultural uses are for cranberry bogs, small wood lots, irrigated and non-irrigated crop and pasture land.

Fishery Conditions

A diversity of fish habitats exists in the Floras/ New River//Fourmile watershed. The Department of Environmental Quality lists "water quality conditions affecting fish" as "severe, with data" due to low dissolved oxygen levels and low flow measurements. Turbidity, temperature and sediment are cited as severe. Channelization, sedimentation and temperature increases due to decreased canopy cover and shallower water flows have contributed to decreased potential for coho production. Water temperatures over 70 degrees were prevalent in 1995 in much of the available summer habitat in New River.

Floras Creek has limited spawning habitat for coho with spawning below road mile 7. Tributaries of Floras Creek below the barrier at road mile 7 generally have steep gradient and are not accessible to coho, the exception being Joe Cox Creek. Except for Willow Creek, very few coho spawn downstream of Highway 101 in any of the New River/Floras Creek tributaries.

Chinook salmon are native to the Floras/New River/Fourmile basin. Chinook spawn in five miles of Floras and Willow Creeks from November to mid January. Spawning surveys conducted annually have recorded a five year average of 47 adults per mile. Chinook rear throughout lower Floras Creek and New River.

Winter steelhead spawn in Floras, Willow, Morton, Butte, Bethel, Davis, Fourmile creeks and their tributaries between February and April. The population status of cutthroat trout is unknown in Floras Creek - New River. Cutthroat trout have been sampled throughout New River and are frequently caught in the recreational fishery. Cutthroat are known to spawn in Floras and Willow creeks.

Native to the Floras/New River/Fourmile basin, coho salmon spawn and rear in Fourmile, Bethel, Butte, Morton, Willow Creeks, and, to a lesser extent in Floras, Davis and Langlois creeks. Fourmile, Bethel and Butte contain the best spawning and rearing habitat for coho and support the highest density of coho. For the years 1990-92 the estimated spawning escapement for coho in Floras Creek - New River was 400 coho for each year. The 1993 estimated spawning escapement was 850 adult coho as compared to a 1995 escapement of 300. Coho are currently using 20 miles of spawning and rearing habitat with another 20 miles of rearing habitat. With current habitat conditions, ODFW estimates spawning escapement to be 200 to 1200 adults. A juvenile survey on New river in 1995 increased known coho distribution to 21.5 miles. Outside of the Rogue basin, this system is the best producer of coho in the south coast.

Table 1. Coho Life-Cycle Use Model for Floras Creek, New River, and Fourmile Creek.

Life-Cycle Stage	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept
Adult Migration		X	X	X								
Adult Spawning		X	X	X								
Eggs/Fry Emerge				X	X	X	X					
Fingerlings/Rearing	X✔	X	X	X	X	X	X	X	X	X✔	X✔	X✔
Juvenile migration						X	X	X	X✔	X✔		
Smolt out migration							X	X	X✔	X✔		

X Indicates presence at the life-cycle month stage.
✔ Indicates *Severe Limiting Factor* condition in the life-cycle month stage.
Determination by Technical Committee

Section II. Current Habitat Indicators.

The watershed habitat conditions identified below are developed from stream surveys, watershed analyses, and anecdotal information provided by area stakeholders and residents. As such, they represent a summary consensus from best available sources of existing information. Judgements about current conditions are made after referencing 'ideal' standards, then adjusting them to fit local environmental conditions.

Table 2. Floras and Fourmile Creeks and New River Watershed Habitat Conditions.

** Limiting Factors of Region Wide Concern.
* Limiting Factors of Site Specific Concern

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Riparian Zone					
Canopy/shade ≥75% **	Probably good, large conifers	Harvested, narrow riparian zone, thin density, particularly in lower agricultural areas	Improving	Limiting	Improve species diversity, and canopy to 80+%
LWD Wood sources **	Good, abundant source material	Marginal source supply	Stable	Limiting	Needs conifers and species diversity
Bank stability ≥90% stable *	Good, vegetated	Fair, considerable cattle grazing in lower reaches. Logging in upper	Improving	Acceptable	Limit cattle access, enhance riparian areas
Macroinvertebrate Health ≥80% High ≤40 % severe low	Presumed good	Unknown	Unknown	Unknown	Abundant population, greater than 80%
Physical Habitat					
Spawning gravel *	Presumed good	Fair, could be limiting in some systems	Stable	Limiting	Maintain and enhance supply

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Substrate condition. ≤20% over natural delivery	Presumed good	Sedimentation a problem in lower reaches	Stable	Limiting	Reduce sedimentation
Sediment * ≤5%	Presumed low	Variable, moderate to high in some areas	Improving	Limiting	Reduce sediment load, control bank erosion
In stream LWD ** ≥20 pieces/100 meters	High	Moderate to low	Stable	limiting	Need large conifers, structures
Side channels * ≥5 mile	Probably good, good sinuosity	Fairly abundant in most areas	Stable	Acceptable	Promote natural meandering of stream channel
Rearing areas **	Presumed good	Very good except for low flows and sedimentation	Stable	Acceptable	Maintain, increase summer flows and reduce sedimentation
Pool frequency ** ≥50%	Good	Fair pool-riffle ratio - 40/60	Stable	Acceptable	Protect from sedimentation, add LWD
Sinuosity	Good	Fair, channelized in some areas.	Stable	Limiting	Promote natural meandering of channels
Alcoves *	Good	Good	Improving	Acceptable	Enhance with LWD, boulders
Beaver ponds	Good, key feature of area	Fairly abundant	Improving	Acceptable	Develop some use on tributaries and educate landowners
Mining	None	None	Stable		Limit through permit enforcement
Wetland connection *	Good	Fair, but many cut off areas	Stable	Limiting	Protect and enhance wetland areas
Fish Passage					
Dams	None	None	Stable	Acceptable	No action
Diversions	None	Multiple - withdrawals varies with season and water supply. Withdrawal by pumps.	Stable	Acceptable	Reduce impact upon fish passage
Push-up dams	None	None	Stable	Acceptable	No action

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Culverts *	None	A number of problem sites identified. Additional inventory needed.	Improving	Limiting	Continue reconstruction.
Water Quality					
Temperature ≤64· degrees **	Less than 64 degrees	Frequently over 65 degrees in summer. A high of 70 measured.	Improving	Limiting	Increase canopy and riparian cover
D.Oxygen ≥8 PPM	Good	Unknown	Unknown	Unknown	Maintain above 5 PPM
Turbidity *	Good	Frequent high levels	Increasing	Limiting	Reduce streambank erosion and run-off effect
Chem. Pollution	None	Some from agricultural and forest practices	Improving	Limiting	Institute Best Management Practices
Water Quantity					
Flow - low period ≥10CFS **	Flows probably adequate to good	Low flows during the summer months	Deteriorating	Limiting	Reduce Ag. diversions. Improve riparian habitat
Diversions	None	Extensive. Streams are over appropriated	Stable	Limiting	Eliminate unused rights. Monitor withdrawals
Release regime	N.A.	Unknown	Unknown	Unknown	Revegatate uplands, enhance ground water storage
Predator Condition					
Birds/fish/animal	Normal/moderate	Normal/birds and marine mammals	Stable	Acceptable	No change
Fishery Condition					
Timing of run	Normal	Normal	Stable	Acceptable	No action
Specie competition	Normal	Normal	Stable	Acceptable	No action
Upland Conditions					
Erosion *	Minimal	Extensive erosion from timber harvest and agricultural practices.	Improving	Limiting	Improve land use practices

Habitat Indicator (Ideal standard)	Historic Condition	Current Condition (Consensus based)	Trend	Status	Near Term Vision (1-10 Years)
Forest seral stage	Normal/mature	Harvested, converted from pine to Doug Fir	Improving	Acceptable	Thin/plant to encourage natural diversity
Disturbance history	Frequent-fire	Extensive timber harvest and ag. use	Improving	Acceptable	Improve forest practices
Road density * ≤2miles/sq.mile	None	Moderate problem	Improving	Limiting	Close roads and reconstruct drainage, vegetate.
Agriculture	Extensive Indian use	Moderate. Dairy farms and ranches abundant in lower end.	Stable	Limiting	Limit adverse effects
Return flows	None	Unknown	Unknown	Unknown	Monitor, and evaluate
Chemical use on lands	None	Moderate ag. and forestry use	Improving	Unknown	Monitor, and evaluate use
Other					

Section III. Limiting Conditions.

In the Floras Creek, New River and Fourmile Creek watersheds, the following are the most critical limiting factors for coho production:

1. **Lack of large woody debris.**

Condition:

- Stream surveys indicate that high winter flows have flushed out any available woody debris and there is a lack of large conifers close enough to the stream to provide a viable source. There is an average of about 35 pieces of large wood per mile of stream.

Actions:

- A variety of wood and boulder structures are being designed to be placed into the stream by both state and federal agencies in the near future.
- Tree planting projects planned for next year will include a high percentage of conifers designed to provide a future source of large wood in the stream.

2. **Bank stability and sedimentation.**

Conditions:

- Extensive logging, agricultural practices and residential development have impacted stream banks causing erosion that increases sedimentation and accelerates the loss of riparian habitat.

Actions:

- Logging practices are being modified through the Forest Practices Act and the Federal Forest Management Bill to provide wider buffers and a more stable and diverse riparian area.
- Comparative agreements with landowners, resource agencies and the Watershed Councils are being developed to construct fences limiting livestock access to the streams and developing alternative water sources.

3. **Channelization and the reduction of side channels and wetlands.**

Condition:

- Development of residences and modifying adjacent agricultural land for more efficient utilization as pasture has resulted in channelization of much of the main stem and the reduction of several side channels and wetlands. This system still has the best coho rearing habitat in the south coast basin but it appears to be deteriorating due to increasing development.

Actions:

- Resource agencies and the local Watershed Councils are working with landowners in locating sites for construction of side channels and reestablishing wetlands. Several projects have already been completed with several more planned.

- An educational program has been initiated to promote protection of beavers and assist landowners in dealing with some of the conflicts with the construction of beaver dams.

4. **Lack of Riparian diversity and density.**

Condition:

- The riparian area in many areas is sparse, lacks diversity and provides limited shade.

Actions:

- Reestablishing conifers into the riparian area will help provide diversity and improve the source for large wood recruitment into the stream. Focus for additional planting will be areas needing shade.

5. **High summer water temperatures.**

Condition:

- Temperature monitoring has recorded temperatures over 70 degrees F. during the warmest summer months on several streams in the watershed.

Actions:

- Emphasis for reestablishing vegetation adjacent to the stream will be on improving the canopy in areas where the riparian vegetation is sparse. Focus will be on tributaries that tend to heat up rapidly.

- This watershed has been targeted by the resource agencies and the Watershed Council for extensive tree planting projects.

6. Low summer flows.

Condition:

- Summer flows are low, particularly in the smaller tributaries. Fish distribution during the summer is primarily limited to the lower reaches where better rearing habitat exists and in the estuary.

Actions:

- Reestablishment of the riparian habitat through tree planting and leaving much larger buffers along the stream during future timber management activities will improve shade and flows.
- The OWRD is evaluating water use in the entire Elk-Sixes watershed to establish a more efficient water management program that may result in more water being left in the stream.

7. Poor winter habitat

Condition:

- The lack of structures, alcoves and side channels in the stream combined with high, flushing flows during the winter limit the habitat available for juvenile salmonids to rear in the stream during heavy freshets.

Actions:

- Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods.
- ODFW and the Watershed Councils will work with landowners to reestablish side channels, where feasible.

Section IV. Implementation Process

A. Prioritization of Actions.

Project Action	Enhancement Priority Level: Immediate	Enhancement Priority Level: On-going
Place large woody debris instream		X
Monitor temperatures		X
Plant riparian vegetation		X
Reestablish side channels and wetlands		X
Investigate culverts for fish passage		X
Research side channel locations		X
Evaluate water use in the watershed		X

B. Milestones for Assessing Progress.

Effectiveness of the actions will be monitored through:

- Establishing monitoring stations above and below project sites and evaluate before and after project completion.
- Updating stream surveys at least every five years.
- Conducting periodic spawning ground counts.
- Conducting a regular temperature monitoring program.
- Conducting a juvenile sampling program.

C. Implementation Plan

The local Watershed Councils are initiating a comprehensive and coordinated program to maintain and improve fish habitat in these drainages. Most of the efforts are being directed toward the private landowners who are using the stream adjacent land and riparian areas for agricultural purposes. The first thrust is education but the program is already expanding to develop habitat improvement projects on some of the most accessible areas.

D. Requirements for Achieving Success.

Since a number of landowners are committed to improving fish habitat in the Floras and New River watersheds, the only barrier might be funding. Most of the effort must include assistance from the Watershed Councils and other volunteer groups. Several private landowners have committed considerable resources to improve fish habitat in the watersheds.

REFERENCES
CORE STREAM EVALUATIONS

1. Althouse Creek (Illinois) Watershed Analysis, USFS, 1994
2. Applegate Watershed Council Action Plan, 1993
3. Cheney/Slate Watershed Analysis, BLM, 1996
4. Coho Management Plan, ODFW, 1990
5. East Fork and Tributaries Eligibility Study, BLM, 1995
6. East Fork Illinois Interim Watershed Analysis, BLM, 1995
7. Elk Creek (Illinois) Habitat Inventory Report, USFS, 1995
8. Elk Creek Watershed Analysis, BLM, 1996
9. Elk River Watershed Analysis, USFS, 1994
10. Environmental History of the Evans Creek Watershed, BLM, 1995
11. Evans Watershed Council Action Plan, 1993
12. Illinois Watershed Council Action Plan, 1993
13. Little Butte Watershed Council Action Plan, 1993
14. Lobster Creek Stream Survey, Level II, USFS, 1995
15. Lower Rogue Watershed Council Action Plan, 1993
16. Middle Rogue Watershed Council Action Plan, 1993
17. Quosatana Creek Watershed Analysis, USFS, 1996
18. Rogue Basin Fish Management Plan, ODFW, 1992
19. Shasta Costa Creek Watershed Analysis, USFS, 1996
20. South Coast District Management Reviews, ODFW, 1991, 1992, 1993, 1994, 1995, 1996
21. South Fork Little Butte Watershed Analysis, BLM, 1995
22. South Fork Watershed Council Action Plan, 1993
23. Southwest Oregon Late-Successional Reserve Assessment, USFS, BLM, 1995
24. Stream Survey Reports, USFS, ODFW, 1990-96
25. Upper Rogue Above Galice Watershed Analysis, USFS, 1995
26. Upper Rogue District Management Reviews, ODFW, 1991, 1992, 1993, 1994, 1995, 1996
27. Upper Rogue Watershed Council Action Plan, 1993
28. West Evans Watershed Assessment, BLM, 1995
29. Williams Creek Watershed Assessment, BLM, 1996

Appendix 2. FEDERAL, STATE AND LOCAL AGENCY ACTIONS FOR THE PROTECTION, MAINTENANCE AND RESTORATION OF COHO CORE AREAS

Abstract: **In keeping with the Coastal Salmon Restoration Initiative goals of local involvement and cooperation with Federal, State and local agencies, a series of meetings were held during August to explain the "Coho Core Area" designations and to obtain information from agencies regarding the actions they were taking for protection and restoration of coho. On August 15, 1996 a meeting with federal agencies was held at the US Fish and Wildlife Forensics Laboratory in Ashland. On August 16, in Medford, a meeting with state and local agencies was held with Jim Martin. Martin explained the basis for the Coastal Salmon Restoration Initiative, actions needed and the actions expected to be taken by the National Marine Fisheries Service and the implications of an Endangered Species listing. On August 19, in Grants Pass, Mike Golden presented to the Rogue Basin watershed councils the salient factors and implications of the designations of the core coho areas. Later in the week Marc Prevost and Mark Grenbemer met with the South Coast councils to inform them of the coho core areas and the process to be used in developing a plan for the protection, maintenance and restoration of coho core habitat and the coho population.**

As a result of these meetings, Federal, State, county, local agencies and watershed councils forwarded their coho core area assessments with action plans and assurances to the Salmon Restoration Technical Team at Rogue Valley Council of Governments for inclusion in this report. The tables below summarize the work agencies and watershed councils plan to do to protect, maintain and restore coho populations.

Regional goals were established to address coho core area limiting factors and concerns. Habitat restoration actions Federal, State, local agencies and watershed councils have in place or proposed were categorized according to the goals they addressed. These data are presented below.

These data have been entered into a computer database to enable sorting by goal, action, agency, targeted area or limiting factor. The database will be updated as data is received. Analysis of the data will be done periodically to ascertain progress toward goals established to protect, maintain and restore coho populations.

Limiting Factor or Specific Condition:	Goal:	Planning Action:	Action Code:	Action in Place or Proposed	Lead Management Agency / Organization	Region, Core Area, or Watershed Targeted Area:
1. Water temperature	A. Maximize stream shading	1. Increase canopy cover	1.A.1	Vegetation around bridges will be managed so as not to reduce shading of streams	Jackson County Roads and Park Department	Jackson County
			1.A.1	Revegetate along Allen Creek	ODOT in consultation with ODFW and /or DSL	Allen Creek
		2. Increase riparian zone size and density	1.A.2	Foster riparian growth and development through the use of management practices which protect critical vegetation. Limit forest harvest to create riparian buffer zones of adequate size.	Applegate Watershed Council	Williams Creek
		3. Manage riparian zone for multi-layered canopy	1.A.3	Monitor riparian management areas under Forest Practices Act	Oregon Department of Forestry	South Coast
	B. Maximize stream complexity	1. Increase pool depth and quantity	1.B.1	Encourage greater pool formation and depth through placement of LWD	Little Butte Watershed Council	Little Butte Creek
		2. Increase quantity of off-channel areas	1.B.2	Promote the development of off channel alcoves and pools	Applegate Watershed Council	Slate/Cheney creeks
		3. Increase hiding cover	1.B.3			
	C. Maintain instream flows at levels which support coho spawning and rearing	1. Increase instream flows during dry season	1.C.1	Increase instream flows through reduced diversion	Applegate Watershed Council	Williams Creek
		2. Increase dry season ground water levels	1.C.2	Increase subsurface water storage upslope to increase natural inflow in summer months	Applegate Watershed Council	Williams Creek
	D. Eliminate higher temperature irrigation return flows	1. Decrease irrigation return flows	1.D.1	Limit irrigation return flows	Little Butte Watershed Council	Little Butte Creek
		2. Monitor return flows and determine problem areas	1.D.2	Place an electronic thermograph in the lower reach	Upper Rogue Watershed Council	West Fork Trail Creek
	E. Address water temperature as a regional issue	1. Monitor and address water temperatures through interagency and community-wide cooperation	1.E.1			

2. Low stream flow	A. Maintain instream flows necessary for coho spawning and rearing	1. Increase instream base flows during dry season	2.A.1	Propose issuance of pending instream water rights to increase flows	Oregon Water Resources Department	Southwest Oregon streams
		2. Increase dry season groundwater levels	2.A.2	Increase subsurface water storage upslope to increase natural inflow during the summer months	Little Butte Watershed Council	Little Butte Creek
		3. Manage water withdrawals for maximum efficiency and conservation	2.A.3	Feasibility study for Phoenix, Talent, Ashland Intertie project to eliminate Talent's withdrawal of water from Bear Creek by connecting to Medford water system	City of Phoenix, Oregon	Bear Creek
		4. Encourage water rights transfers/leases for instream use	2.A.4	Obtain instream water rights/leases	Oregon Water Resources Department	Little Butte Creek
			2.A.4	Obtain instream water rights/leases	Oregon Water Resources Department	Illinois River
			2.A.4	Obtain instream water rights/leases	Oregon Water Resources Department	Applegate River
			2.A.4	Obtain instream water rights/leases	Oregon Water Resources Department	Evans Creek
		5. Establish instream water rights	2.A.5	Protect instream flows by acquiring instream water rights	Oregon Department of Fish and Wildlife Habitat Conservation Division working with State Parks Department	Rogue Basin streams

3. Riparian quality	A. Maximize riparian size and density	1. Increase riparian zone to a minimum size of 150-300 feet	3.A.1	Provide buffer zone of 150-300 feet for protection of riparian area	Little Butte Watershed Council	Little Butte Creek
		2. Increase the vegetation density and diversity of plant species	3.A.2	No vegetation will be removed from road rights-of-way within 50 feet of streams unless hazardous to motorists. Vegetation around bridges will be managed so as not to reduce shading of streams	Jackson County Roads and Park Department	Jackson County
		3. Manage riparian vegetation for a multi-layered canopy	3.A.3	Riparian planting, road decommissioning, culvert replacement and decommissioning	Siskiyou National Forest	Siskiyou National Forest
		4. Increase multi-channel stream courses	3.A.4			
		5. Limit development intrusions within riparian zone	3.A.5	Riparian Set-Back Ordinance #751; enforced by City of Phoenix Planning Department	City of Phoenix, Oregon	Phoenix
		6. Increase side-channel alcoves and refuges for coho spawning/rearing	3.A.6	Instream structure work, riparian fencing, plantings through Habitat Restoration Jobs program and Landowner Incentives and Demonstration program	ODA, NRCS, SWCDs	Sixes River HUC
			3.A.6	Instream structure work, riparian fencing, plantings through Habitat Restoration Jobs program and Landowner Incentives and Demonstration program	ODA, NRCS, SWCDs	Illinois HUC
	B. Monitor effectiveness of OFPA riparian rules in maintaining, enhancement and protection of fish habitat, water quality, and wildlife habitat.	1. Monitor all coho production areas.				

4. Lack of instream structures	A. Maximize logs and boulders in the streams, where appropriate. Attach a minimum of 80 pieces of larger wood per mile	1. Increase large woody debris and boulders in streams	4.A.1	Storage and disposal of woody debris for use in stream enhancement	Oregon Department of Transportation in cooperation with watershed councils, USFS, BLM, ODFW	Jackson County
			4.A.1	Storage and disposal of woody debris for use in stream enhancement	Oregon Department of Transportation in cooperation with watershed councils	Jackson County
	B. Provide for long-term recruitment of large woody debris	1. Plant conifers in riparian zone	4.B.1	Plant native mixed conifers and hardwoods in riparian zone where appropriate.	Upper Rogue Watershed Council	West Fork Trail Creek
		2. Protect existing large wood sources in riparian areas	4.B.2	Study pre and post harvest effects on riparian zone of leaving trees during harvest for long and near -term large woody debris	COF, Boise Cascade Corperation	Rogue Basin
			4.B.2	Thin around conifers where beneficial to increase the growth rate of the conifers for shade and future large woody debris	Upper Rogue Watershed Council	West Fork Trail Creek

5. Pool frequency	A. Protect pools from sedimentation	2. Maintain a riparian buffer zone of 150-300 feet	5.A.1	Provide buffer zone of 150-300 feet for protection of riparian area	Little Butte Watershed Council	Little Butte Creek
		2. Revegetate stream banks, riparian areas and upland exposed areas	5.A.2			
		3. Revegetate unused roads	5.A.3			
		4. Limit access of livestock from riparian zone	5.A.4	Studies are underway to evaluate cattle use adjacent to streams and develop fencing programs and alternative methods for providing water to livestock away from the stream	Upper Rogue Watershed Council	West Branch Elk Creek
	B. Create new pools with placement of instream structures	1. Specifically place logs and boulders to create pools	5.B.1	Instream structure work, riparian fencing, plantings through Habitat Restoration Jobs program and Landowner Incentives and Demonstration program	ODA, NRCS, SWCDs, USFS, BLM	Sixes River HUC
		1. Specifically place logs and boulders to create pools	5.B.1	Instream structure work, riparian fencing, plantings through Habitat Restoration Jobs program and Landowner Incentives and Demonstration program	ODA, NRCS, SWCDs	Illinois HUC
		2. Add large woody debris to create scouring, damming and plunge pools	5.B.2	Add wood to streams to enhance fish habitat	Bureau of Land Management	Grants Pass area: Deer and Elliot creeks
			5.B.2	Add wood to streams to enhance fish habitat	Bureau of Land Management	Butte Falls area: Elk Creek
		3. Open or create side channels and/or alcoves to increase pool area	5.B.3	Add wood instream, repair log and rock weirs, restore channel and do riparian plantings	Bureau of Land Management	Ninemile Creek
			5.B.3	Add wood instream, repair log and rock weirs, restore channel and do riparian plantings	Bureau of Land Management	Star Gulch Creek
			5.B.3	Add wood instream, repair log and rock weirs, restore channel and do riparian plantings	Bureau of Land Management	Forest Creek
			5.B.3	Add wood instream, repair log and rock weirs, restore channel and do riparian plantings	Bureau of Land Management	South Fork Little Butte Creek

6. Canopy Cover	A. Improve species diversity	1. Plant sufficient conifers to provide a 50% mixture of conifers and deciduous trees, where growing conditions permit	6.A.1			
		2. Limit forest harvest in and near riparian	6.A.2	Monitoring of riparian management areas under Forest Practices Act	Oregon Department of Forestry	South Coast
		3. Plant trees along the stream to increase canopy cover	6.A.3	Plant trees and forbs along the waterway to increase canopy cover	Little Butte Watershed Council	Little Butte Creek
		4. Foster riparian growth and development through exclusions to protect critical vegetation	6.A.4	Promote habitat protection	Oregon Department of Fish and Wildlife Habitat Conservation Division, Fish Division, Southwest Region, South Coast and Upper Rogue Fish Districts	Rogue River Basin

7. Coho population size	A. Establish an average number of yearly successful adult spawners as a minimum target level that will prevent further population decline	1. Use 8,000 successful adult coho spawners as the presumed minimum average yearly population	7.A.1			
	B. Establish a lower population limit to genetic variability which the yearly successful adult spawners should never drop below	1. Use 2,000 successful adult coho spawners as the presumed lower limit to maintaining genetic viability	7.B.1			

8. Coho harvest levels	A. Limit harvest levels and incidental take to maintain or exceed the minimum average wild coho population size	1. Provide input to appropriate agencies who negotiate to set ocean harvest rates for coho	8.A.1			
		2. Provide input to ODFW who sets freshwater coho harvest regulations	8.A.2			
		3. OSP will enforce regulations and assist in educational outreach projects to inform communities in fish identification and issues surrounding taking and possession of listed fish stocks of concern.	8.A.3	Provide an effective enforcement program in situations where cooperative efforts are unsuccessful	Oregon State Police: Fish and Wildlife Division	Rogue and South Coast basins
	B. Monitor population size to determine appropriate harvest rate	1. Coordinate coho salmon surveys throughout the region to assist in designing a long term sampling program	8.B.1	Solicit volunteers through sportsman's clubs, watershed councils, school groups, STEP and other sources to assist with habitat surveys, culvert surveys and spawning surveys	Oregon Department of Fish and Wildlife	Rogue River Basin
		2. Develop sampling program to consistently monitor population size and trends	8.B.2			
		3. Develop sampling and models program to determine both ocean and freshwater harvest rates and percentage of harvest of Rogue and South Coast stock	8.B.3	Monitor marine survival of wild coho produced in Rogue River Basin	ODFW Fish Division working with watershed councils, STEP volunteers and other volunteers, private landowners	Huntley Park
		4. Maintain Huntley Park seining and Gold Ray Dam fish counting programs to estimate adult coho escapement into the Rogue River	8.B.4	Monitor marine survival of wild coho produced in Rogue River Basin	ODFW Fish Division working with watershed councils, STEP volunteers and other volunteers, private landowners	Gold Ray Dam
			8.B.4	Monitor marine survival of wild coho produced in Rogue River Basin	ODFW Fish Division working with watershed councils, STEP volunteers, other volunteers and private landowners	Huntley Park
			8.B.4	Monitor marine survival of wild coho produced in Rogue River Basin	ODFW Fish Division working with watershed councils, STEP volunteers and other volunteers, private landowners	Rogue River and tributaries

9. Watershed productivity levels	A. Establish for each watershed a minimum number of successful adult spawners as its proportion of coho population that utilizes the watershed	1. Evaluate productivity and habitat availability of each watershed and compare it to other watersheds in the basin	9.A.1			
		2. Each watershed is assigned a target population that serves as a baseline to monitor change	9.A.2			

10. Hatchery practices	A. Monitor hatchery practices and results in relation to restoration of wild coho population	1. Review and revise objectives and genetic guidelines for the Rogue coho program at Cole Rivers Hatchery	10.A.1	Review and revise objectives and genetic guidelines for the Rogue coho program at Cole Rivers Hatchery	Oregon Department of Fish and Wildlife	Cole Rivers Hatchery on Rogue River
		2. Conduct sampling, expansion and mathematical modeling for abundance, trends and status of coho	10.A.2	Sampling, expansion and mathematical modeling for abundance, trends and status of coho	Oregon Department of Fish and Wildlife Harvest Management, District and Research staffs	Rogue River Basin
		3. Develop harvest opportunities on Rogue hatchery produced coho while minimizing impact on wild coho stock	10.A.3	Develop harvest opportunities on Rogue hatchery produced coho while minimizing impact on wild coho stock	PFMC, NMFS, ODFW Fish Division and Wildlife Commission	Rogue River estuary and in-river
		4. Externally mark all hatchery coho released into the Rogue River for easy identification to promote effective broodstock management	10.A.4	Externally mark all hatchery coho released into the Rogue River for easy identification to promote effective broodstock management	ODFW Fish Division and Southwest Region	Cole River Fish Hatchery on Rogue River
		5. Evaluate value of hatchery coho broodstock as a source to assist in restoring coho stocks consistently below the minimum viable populations	10.A.5			

11. Fish passage	A. Improve coho fish passage where appropriate	1. BOR continues to implement its Fish Facilities Improvement Program for design and construction of fish passage structures at Reclamation-owned facilities. Extend to non-Reclamation owned facilities on federal and private lands	11.A.1	Design and construct fish passage facilities	Bureau of Reclamation	Bureau of Reclamation facilities
			11.A.1	Design and construct fish passage facilities	Bureau of Reclamation	Non-Reclamation facilities located on federal lands and on non-federal diversions on private land
		2. Provide technical assistance and funds for removal of push-up dams and design alternatives	11.A.2	Technical assistance for removal of push-up dams and design of alternatives	Bureau of Reclamation	Southern Oregon
		3. Provide technical assistance to Savage Rapids Dam Task Force for evaluating alternatives for fish passage	11.A.3	Technical assistance to Savage Rapids Dam Task Force to evaluate alternatives for improving fish passage	Bureau of Reclamation	Savage Rapids Dam
		4. Modify culverts restricting fish passage	11.A.4	Jobs in the Woods projects such as culvert replacement	US Fish and Wildlife Service	Pacific Northwest
			11.A.4	Replacement and modification of culverts hindering fish passage	Oregon Department of Transportation in cooperation with ODFW, GWEB, watershed councils	Jackson, Josephine, Curry, Coos counties
		5. Remove dam on Evans Creek	11.A.5	Remove instream dam; construct instream culvert for fish passage	Bureau of Land Management	East Fork Evans Creek, West Fork Evans Creek in Butte Falls area
		6. Remove artificial fish barriers or minimize their impact on fish passage	11.A.6	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DSL, DOF, OSP, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Antelope Creek-Rogue River Basin
			11.A.6	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DSL, DOF;, OSP, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Savage Rapids Dam-Rogue River Basin

			11.A.6	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DSL, DOF, OSP, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Elk Creek Dam - Rogue River Basin
			11.A.6	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DSL, DOF, OSP, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Little Butte Creek, North and South Forks-Rogue River Basins
			11.A.6	Remove artificial fish barriers or minimize their impact on fish passage	ODFW , OWRD, DSL, DOF, OSP, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Bear Creek-Rogue River Basin

12. Habitat loss	A. Maintain or increase present coho habitat	1. Monitor riparian management areas under Forest Practices Act	12.A.1	Monitor riparian management areas under Forest Practices Act	Oregon Department of Forestry	South Coast
		2. Develop and test approaches to timber practices which restore and maintain the quality of riparian habitat	12.A.2	Development and testing of approaches to timber practices which restore and maintain quality of riparian habitat	DEQ in cooperation with watershed councils and federal, state and local agencies for implementation	Rogue Basin
		3. Monitor trees along Type N streams for 25% requirements[1]	12.A.3	Monitoring of trees along Type N streams for 25 per cent requirement	Oregon Department of Forestry	South Coast
		4. Remove push-up dams	12.A.4	Elimination of push-up dams	Oregon State Police in cooperation with DSL, ODFW, OWRD, DEQ, ODA, SWCD, RVCOG, BOR, NRCS;, Illinois Valley Watershed Council	Illinois River HUC
		5. Remove artificial fish barriers or minimize their impact on fish passage	12.A.5	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DOF, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Antelope Creek-Rogue River Basin
			12.A.5	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DOF, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Little Butte Creek-North and South Forks
			12.A.5	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, ODF, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Bear Creek-Rogue River Basin
			12.A.5	Remove artificial fish barriers or minimize their impact on fish passage	ODFW, OWRD, DOF, ODOT, BLM, USACE, NRCS, watershed councils, irrigation districts, landowners	Elk Creek Dam-Rogue River Basin
		6. Provide wetland enhancement areas	12.A.6	Development of a wetland enhancement area	City of Phoenix, Oregon	City park adjacent to Bear Creek

[1] The Department of Forestry developed a stream classification format which designated Type N stream (non-fish bearing), Type F (fish bearing), and Type D (domestic use).

			12.A.6	Provide comments for US Corps of Engineers for Wetland Field permits	US Fish and Wildlife Service	Nationwide
		7. Use Hire the Fishermen and Jobs in the Woods programs to protect and enhance coho habitat	12.A.7	Hire the Fishermen projects such as fencing streams, stabilizing stream banks	National Marine Fisheries Service	Pacific Northwest
			12.A.7	Jobs in the Woods projects such as culvert replacement	US Fish and Wildlife Service	Pacific Northwest
		8. Restore areas heavily impacted by mining	12.A.8	Plans are underway to restore many of the most heavily impacted mining areas. Most of this activity will be on USFS land, but the Watershed Council is negotiating with several private landowners to initiate habitat improvement projects	Illinois Watershed Council	Illinois River watershed

13. Wintering habitat	A. Provide in-channel structures to prevent flushing winter flows	1. Large wood and boulder structures will be placed or secured in streams to provide shelter	13.A.1	Large wood and boulder structures will be placed into the stream to provide spawning gravel, pools and also provide shelter for fish during high flow periods	Middle Rogue Watershed Council	Quartz Creek
	B. Maintain or create side-channel habitat to shelter coho during high winter flows	1. Open existing backwater channels that have filled with sediment.	13.B.1	Open existing backwater channels that have been filled with sediment to provide preferred coho habitat	Upper Rogue Watershed Council	West Fork Trail Creek
		2. Create side channels with equipment such as backhoes	13.B.2	A cooperative instream enhancement project has been developed between ODFW, BLM, USFS and Boise Cascade Corporation. The project will include installing large wood structures and boulders and creating side channels with equipment as needed	Boise Cascade, ODFW, BLM, USFS	West Branch Elk Creek

14. Water quantity management	A. Maintain stream flows of sufficient quantity throughout the year to provide optimum spawning and rearing conditions for coho	1. Install measuring devices to accurately assess instream flows	14.A.1	Install 20 staff gages on priority streams and near critical habitat areas identified in MOU. Add telemetry to gaging stations to enhance Department capability to monitor instream flows on coastal streams. Develop a mechanism to distribute flow information to other agencies.	Oregon Water Resources Department	Coastal basins
		2. Install headgates with measuring devices to regulate irrigation withdrawals	14.A.2	Installation of headgates, measuring devices	Oregon Water Resources Department	Little Butte Creek
			14.A.2	Work on getting locking headgates on irrigation ditches to control flow and provide incentives for increased efficiency	Illinois River Watershed Council	East Fork Illinois River
		3. Review and revise water management practices to maximize stream flows	14.A.3	Continue to provide assistance for irrigation districts in developing and implementing water conservation plans through the Field Services Program	Bureau of Reclamation	Rogue River Basin
			14.A.3	Work with water users to implement irrigation block water management and cooperate in a general water conservation evaluation of the Bear Creek drainage. Continue assistance for irrigation districts in developing and implementing water conservation plans through the Field Services Program.	Bureau of Reclamation	Rogue River Basin
		4. Obtain instream water rights to increase and/or maintain optimum stream flows	14.A.4	Protect instream flows by acquiring instream water rights	Oregon Department of Fish and Wildlife Habitat Conservation Division	Rogue Basin streams
		5. Negotiate purchase or lease of existing water rights in conjunction with Oregon Water Trust	14.A.5	Obtain instream water rights/leases	Oregon Water Resources Department, Oregon Water Trust, Oregon Department of Fish and Wildlife	Little Butte Creek, Evans Creek, Applegate River, Illinois River
		6. Reduce or eliminate cities and irrigation districts withdrawal of water from streams with low flows	14.A.6	Feasibility study for Phoenix, Talent, Ashland Intertie project to eliminate Talent's withdrawal of water from Bear Creek by connecting to Medford water system	City of Phoenix	Bear Creek
		7. Assist irrigation districts in planning and implementing monitoring programs	14.A.7	Assist irrigation districts in planning and implementing monitoring programs	Bureau of Reclamation	Irrigation districts
		8. Develop a hydrologic model for water management	14.A.8	Hydrologic model for water management	Bureau of Reclamation	Bear Creek drainage; Illinois River watershed

		9. Assess water management practices and evaluate conservation potential	14.A.9	Assess water management practices and evaluate conservation potential	Bureau of Reclamation, Natural Resources Conservation Service	Irrigated areas
14. Water quantity management	A. Maintain stream flows of sufficient quantity throughout the year to provide optimum spawning and rearing conditions for coho	10. Digitize water maps for all coastal basins to aid in regulation and water use monitoring	14.A.10	Digitize water maps for all coastal basins to aid in regulation and water use monitoring	Oregon Water Resources Department	All coastal basins

15. Water quality	A. Monitor water quality parameters for optimum coho habitat	1. Sample water to meet TMDL requirements on a regular schedule	15.A.1	Sampling to meet TMDL requirements	City of Phoenix, Oregon	DMAs bordering Bear Creek within Phoenix boundary
		2. Assess waterways for pollution, hazardous materials, industrial wastes, pesticides, point and non-point source pollution	15.A.2	Assessment of waterway pollution, hazardous materials violations, industrial waste violations, pesticide use violations, point and non-point source pollution	Oregon State Police Fish and Wildlife Division, Department of Environmental Quality	Rogue Basin
	B. Promote actions which will provide optimum production and survival conditions for coho	1. Cities will reduce debris going into storm drains by using street sweepers and marking those drains leading directly to the streams	15.B.1	Storm Master Drain Plan	City of Phoenix, Oregon	Phoenix, Oregon
			15.B.1	Purchase streetsweeper to reduce debris going into storm drains	City of Phoenix, Oregon	Phoenix, Oregon
		2. Non-renewal of aggregate site permits located in or along streams	15.B.2	Nonrenewal of aggregate site permits located in or along streams	Oregon Department of Transportation, Division of State Lands	Josephine, Jackson, Curry, Coos counties
		3. Reduce herbicide use on road shoulders. Use registered herbicides near waterways	15.B.3	Reduction of herbicide use on road shoulders in core coho areas. Herbicide use will be limited to those registered for use in water	Jackson County Roads and Park Department	Jackson County
		4. Use registered herbicides near waterways	15.B.4	Herbicide use will be limited to those registered for use in water	Jackson County Roads and Park Department	Jackson County
		5. Revise mine reclamation plans to include fish friendly methods	15.B.5	Revise mine reclamation plans to include fish friendly methods	Department of Geology and Mineral Industries	Most coastal watersheds
		6. Close waters to removal-fill actions	15.B.6	Inform ODFW, DOGAMI, ODF, DEQ, ODA, OWRD, OSMB, ODOT, EDD, local governments that they may request OWRD to close specified waters to removal-fill	Division of State Lands	Specified waters

16. Stream complexity	A. Increase side channels, alcoves, sinuosity, beaver dams and braided streams to provide more habitat and shelter for coho	1. Work with landowners to locate sites for construction of side channels and alcoves	16.A.1	Resource agencies and the local watershed councils are working with landowners in locating sites for construction of side channels and reestablishing wetlands. Several projects have already been completed with several more planned.	South Coast Watershed Council	Elk and Sixes rivers
		2. Cooperate with landowners, watershed councils and state and federal agencies to fund and construct side channels and alcoves	16.A.2			
		3. Initiate an educational program to promote protection of beavers and to deal with results of beaver dams	16.A.3	An educational program has been initiated to promote protection of beavers and assist landowners in dealing with some of the conflicts with the construction of beaver dams.	South Coast Watershed Council	Elk and Sixes rivers
		4. Install large woody debris in the waterway to maintain and enhance pool structure	16.A.4	Install large woody debris in the waterway to maintain and enhance pool structure	Applegate Watershed Council	Slate/Chaney creeks
		5. Educate landowners on the benefits in returning streams to their natural state by allowing natural meandering and riparian development	16.A.5	Educate landowners on the benefits to their operations in returning streams to their natural state by allowing the streams to resume their historic meandering	Illinois River Watershed Council	Elk Creek

17. Erosion, sediment and turbidity	A. Best Management Practices will be used to reduce and curtail causes of erosion which lead to sediment and turbidity in streams	1. Fence streams and use alternative methods for providing water to livestock away from streams	17.A.1	Studies are underway to evaluate cattle use adjacent to streams and develop fencing programs and alternative methods for providing water to livestock away from the stream	Upper Rogue Watershed Council	West Branch Elk Creek
		2. Enforce timber harvest practices that protect watershed from erosion for use selective harvesting, helicopter logging, buffer zones and develop logging road specifications	17.A.2	Watershed monitoring	Oregon Department of Forestry	Sixes River watershed
		3. Close and revegetate unused roads	17.A.3	New road building is being kept to a minimum and unused roads stabilized and clossed	US Forest Service	Grayback/Sucker Creeks
		4. Enforce mining regulations	17.A.4	Monitor mine reclamation plans for fish friendly methods with inspections	Department of Geology and Mineral Industries	South Coast ESU
			17.A.4	Old mining ditch walls that traverse across stream channels will be broken open to prevent water diversions to new locations on hillslopes	US Forest Service	Althouse Creek
		5. Build silt fences, sediment barriers, check dams	17.A.5	Erosion control through use of silt fences, sediment barriers, check dams, spill prevention, revegetation of riparian areas	Oregon Department of Transportation	Dutton Road to Linn Road on Crater Lake Highway
		6. Promote planting of riparian areas	17.A.6	Riparian plantings	Bureau of Land Management	Forest Creek in Ashland area
		7. Revegetate exposed upland areas	17.A.7			
		8. Establish and enforce standards to control erosion from commercial and residential development	17.A.8			
	B. Develop a region-wide program to reduce and eliminate causes of watershed erosion	1. Distribute to all pertinent agencies the Integrated Vegetation Management Plan for roads, rights-of-way,	17.B.1	Integrated Vegetation Management Plan for road rights-of-way	Jackson County, Oregon Department of Transportation, Federal Highway Administration, ODOT	Jackson County
		2. Pertinent agencies will follow Standards and Criteria for Stream Road Crossings	17.B.2	Replacement, rennovation of culverts, bridges in core salmonid areas as needed as shown by results of inventory with ODFW Standards and Criteria for Stream Road Crossings	Jackson County Roads and Park Department	Core salmonid areas in Jackson County
		3. Pertinent agencies will work with ODOT in producing an erosion control handbook and in implementing the handbook practices	17.B.3	Produce an erosion control handbook	Oregon Department of Transportation	Statewide

18. Interagency cooperation	A. Create a formal coordinating body for agencies to share information	1. Expand model and role of Regional Ecosystem Office in developing a data base, in conjunction with FS, BLM and FWS to facilitate sharing of fishery information	18.A.1	Develop database to facilitate sharing of species information among agencies	Regional Ecosystem Office in conjunction with FS, BLM, PNW and FWS	South Coast ESU
	B. Develop a means whereby agencies can cooperate and coordinate their efforts on projects to benefit coho	1. Use models of cooperation for removal of fish passage barriers, e.g., OSP in removing push-up dams	18.B.1	Elimination of push-up dams	Oregon State Police in cooperation with DSL, ODFW, OWRD, DEQ, ODA, SWCD, RVCOG, BOR, NRCS, Illinois Valley Watershed Council	Illinois River HUC
			18.B.1	Remove artificail fish barriers or minimize their impact on fish passage	ODFW Habitat Conservation Division, OWRD, DSL, DOF, OSP, ODOT, BLM, COE, NRCS, watershed councils, irrigation districts, landowners	Savage Rapids Dam-Rogue River Basin
			18.B.1	Remove artificial fish barriers or minimize their impact on fish passage	ODFW Habitat Conservation Division, OWRD, DSL, DOF, OSP, ODOT, BLM, COE, NRCS, watershed councils, irrigation districts, landowners	Elk Creek Dam-Rogue River Basin
			18.B.1	Remove artificial barriers or minimize their impact on fish passage	ODFW Habitat Conservation Division, OWRD, DSL, DOF, OSP, ODOT, BLM, COE, NRCS, watershed councils, irrigation districts, landowners	Antelope Creek-Rogue River Basin
			18.B.1	Remove artificial barriers or minimize their impact on fish passage	ODFW Habitat Conservation Division, OWRD, DSL, DOF, OSP, ODOT, BLM, COE, NRCS, watershed councils, irrigation districts, landowners	North and South Forks of Little Butte Creek-Rogue River Basin
			18.B.1	Remove artificial barriers or minimize their impact on fish passaage	ODFW Habitat Conservation Division, OWRD, DSL, DOF, OSP, ODOT, BLM, COE, NRCS, watershed councils, irrigation districts, landowners	Bear Creek-Rogue River Basin
		2. Use a Cooperative Enforcement Planning process.	18.B.2	Develop action plans and prioritize law enforcement efforts.	OSP	South Coast and Rogue Basins

	C. Use existing laws and regulations to protect coho habitat.	1. Agencies with enforcement powers coordinate activities	18.C.1	Enforce existing laws and regulations pertaining to water quality, water diversions, fill and removal, forest practices, and land use.	OSP, ODFW,OWRD, DSL, ODF, ODA, DEQ, NMFS, EPA, USFS, BLM, USFWS,USBR,COE,	South Coast and Rogue Basins

19. Public education	A. Develop and implement a region-wide program to explain the life history and habitat needs of coho	1. Continue the annual Water Festival on the Upper Rogue to inform area residents about the life cycle of salmonids and habitat needs	19.A.1	Water Festival	Upper Rogue Watershed Council	McGregor Park at Jess (Lost Creek) Dam
		2. Continue and expand to other councils the activities of the Bear Creek Watershed Education Partners	19.A.2	Training of teachers and students in water quality monitoring, habitat restoration	Bear Creek Watershed Education Partners	Bear Creek watershed
		3. Expand the STEP, macroinvertebrate study and Adopt-a-Stream programs	19.A.3	Involve more schools and classrooms in STEP, Adopt-a-Stream, stream clean-up and macroinvertebrate study programs	Bear Creek Watershed Education Partners	Bear Creek watershed
	B. Develop and implement an educational program to inform workers, students and citizens of the impacts affecting coho and actions that can be used to maintain and restore the coho populations	1. Government resource agencies and watershed councils work cooperatively to teach rules, regulations and alternative methods of resource utilization	19.B.1	Work cooperatively with government resource agencies and watershed councils to teach rules, regulations and alternative methods of resource utilization	OSP Fish and Wildlife Division	Upper Rogue HUC: Trail/Canyon, Elk, Sugar Pine, Little Butte, Soda, Lake creeks
			19.B.1	Work cooperatively with government resource agencies and watershed councils to teach rules, regulations and alternative methods of resource utilization	OSP Fish and Wildlife Division	Middle Rogue HUC: Evans, Salt, Battle, Rock, Coal creeks
			19.B.1	Work cooperatively with government resource agencies and watershed councils to teach rules, regulations and alternative methods of resource utilization	OSP Fish and Wildlife Division	Lower Rogue HUC: Lobster, Quosatana, Limpy, Quartz, Silver creeks
			19.B.1	Work cooperatively with government resource agencies and watershed councils to teach rules, regulations and alternative methods of resource utilization	OSP Fish and Wildlife Division	Applegate HUC: Slate, Waters, Chaney, Williiams creeks
			19.B.1	Work cooperatively with government resource agencies and watershed councils to teach rules, regulations and alternative methods of resource utilization	OSP Fish and Wildlife Division	Illinois HUC: Sucker, Grayback, Elk, Althouse, Broken Kettle creeks, Illinois River
		2. Train pertinent agency workers in fish passage requirements in road construction and maintenance	19.B.2	Training in fish passage requirements in road construction and maintenance	Oregon Department of Transportation	Sixes HUC: Crystal, Edson, Dry, Murphy, Canyon creeks

19. Public education	B. Develop and implement an educational program to inform workers, students and citizens of the impacts affecting coho and actions that can be ussed to maintain and restore the coho populations	2. Train pertinent agency workers in fish passage requirements in road construction and maintenance	19.B.2	Training in fish passage requirements in road construction and maintenance	Oregon Department of Transportation	Coos, Curry, Jackson and Josephine counties
		3. Promote use of existing curriculum and conduct school and public education on riparian rehabilitation	19.B.3	Public education on riparian rehabilitation with schools being involved	Jackson County roads and Parks	Jackson County: Shady Cove and Bear Creek Greenway sites
		4. Promote workshops for road crews on fish friendly culverts	19.B.4	Workshop on fish friendly culverts for Roads and Park staff	Jackson County Roads and Park Department	Jackson County
		5. Develop a restoration guide based on research and monitoring	19.B.5	Development of a restoration guide based on prior research and monitoring	Oregon Department of Fish and Wildlife	Rogue River Basin
		6. Provide technical assistance for watershed councils on dimensions of Coastal Salmon Restoration Initiative.	19.B.6	Technical assistance for watershed councils; inform coordinators and council members regarding Coastal Salmon Restoration Initiative dimensions on regional projects	Watershed Health Program; Governor's Watershed Enhancement Board	Rogue River and South Coast basins
		7. Educate bridge mainenance crews on ways to minimize impacts upon fish	19.B.7	Educate bridge maintenance crews on ways to minimize impacts upon fish	Oregon Department of Transportation	Grants Pass
		8. Produce a video to increase agency workers' and public's awareness of salmon issues	19.B.8	Produce 32 minute video to increase ODOT employees' awareness of salmon issues	Oregon Department of Transportation	Statewide

20. Assessment, monitoring and research	A. Develop and implement inventory programs to assess and monitor coho populations and their habitat	1. Promote research in developing sampling programs that will effectively evaluate coho populations and harvest rates	20.A.1	Conduct spawning surveys to establish standard survey areas for stratified random survey methodology on coho producing streams throughout the Rogue Basin to design a long term sampling plan	Oregon Department of Fish and Wildlife	Rogue River Basin
		2. Develop database to facilitate sharing of species information among agencies	20.A.2	Develop database to facilitate sharing of species information among agencies	Regional Ecosystem Office in conjuction with FS, BLM, PNW FWS	South Coast ESU
	B. Encourage and support research to expand knowledge about coho life cycle needs, habitat and propagation	1. Conduct smolt monitoring at all core areas. Develop basin production models	20.B.1			
		2. Develop approaches to timber management practices which restore and maintain quality riparian habitat	20.B.2	Development and testing of approaches to timber practices which restore and maintain quality of riparian habitat	DEQ in cooperation with watershed councils and federal, state and local agencies for implementation	Rogue River Basin
		3. Monitor marine survival of Rogue River coho	20.B.3	Monitor marine survival of wild coho produced in Rogue River Basin	ODFW Fish Division	Huntley Park, Gold Ray Dam; rogue River and tributaries
		4. Fund studies and projects proposed by watershed councils	20.B.4	Fund studies and technical assistance	Bureau of Reclamation	Bureau of Reclamation areas

APPENDIX 3: COHO DISTRIBUTION MILES, BY WATERSHED

*Denotes "High Density Coho Streams"

Upper Rogue Watershed

*Elk Creek	16.9 miles
Bitter Lick	6.5
*West Branch Elk Creek	4.1
Trail Creek	9.1
West Fork Trail Creek	6.8
*Canyon Creek	1.3
Walpole Creek	1.3
Rogue River	31.2
Indian Creek	2.6
Reese Creek	7.8
Big Butte Creek	16.9
McNeil Creek	7.8
*Sugarpine Creek	3.9
	137.2 miles (220.8 km)

Little Butte Watershed

North Fork Little Butte Creek	7.8
Little Butte Creek	19.5
*South Fork Little Butte Creek	27.0
Soda Creek	1.3
Lake Creek	4.0
Yankee Creek	2.6
Antelope Creek	9.1
	71.3 miles (114.7 km)

Bear Creek Watershed

Bear Creek	37.7
Ashland Creek	6.5
Coleman Creek	1.3
Larson Creek	1.0
	46.5 miles (74.8 km)

Middle Rogue Watershed

Rogue River	57.2
Savage Creek	1.0
Fruitdale Creek	1.0
Gilbert Creek	.5
Sand Creek	1.3
Strait Creek	2.6
*Limpy Creek	.5
Dutcher Creek	1.3
Harris Creek	1.3
Louse Creek	11.7
Jump-off Joe Creek	10.4
*Quartz Creek	5.7
Ewe Creek	0.5
Taylor Creek	3.9
Galice Creek	3.9
Grave Creek	18.2
Whisky Creek	1.3
Howard Creek	1.3
Windy Creek	2.6
Jenny Creek	.5
Missouri Creek	1.3
Bronco Creek	.5
Bunker Creek	.8
Kelsey Creek	1.3
Ditch Creek	.4
Mule Creek	5.2
	136.2 miles (219.2 km)

Applegate Watershed

Applegate River	67.6
Little Applegate River	10.4
Thompson Creek	5.2
*Williams Creek	15.0
Powell Creek	.8
Munger Creek	4.0
Murphy Creek	6.5
Grays Creek	1.3
Iron Creek	.6
Jackson Creek	3.9
*Cheney Creek	5.4
*Waters Creek	3.8
Slate Creek	8.7
Butcher Knife Creek	1.0
Cove Creek	.5
Salt Creek	2.0
Newt Creek	1.0
Forest Creek	5.2
Beaver Creek	7.8
Palmer Creek	5.2
	155.9 miles (250.9 km)

Illinois Watershed

Illinois River	97.5
Deer Creek	20.8
*Althouse Creek	12.2
East Fork Illinois River	22.3
*Sucker Creek	17.4
*Grayback Creek	2.5
Thompson Creek	9.1
South Fork Deer Creek	5.2
North Fork Deer Creek	3.9
Crooke Creek	6.5
Reeves Creek	1.3
Josephine Creek	6.5
Six Mile Creek	2.6
Fall Creek	2.6
Brush Creek	6.5
Secret Creek	4.0
Onion Creek	1.3
Swede Creek	2.6
Horse Creek	6.5
Pine Creek	2.6
Silver Creek	6.8
Indigo Creek	6.5
Lawson Creek	3.9
*Dunn Creek	2.9
	254.0 (408.8 km)

Evans Creek Watershed

Evans Creek	26.0
Sams Creek	6.5
Queens Creek	1.3
Ditch Creek	5.2
Pleasant Creek	7.8
East Fork Evans Creek	16.9
*West Fork Evans Creek	14.3
Battle Creek	5.8
Salt Creek	2.6
Rock Creek	3.9
Sardine Creek	2.6
Sand Creek	1.0
	91.3 miles (146.9 km)

Lower Rogue Watershed

Rogue River	84.5
Silver Creek	4.1
Shasta Costa Creek	5.5
Foster Creek	1.3
Billings Creek	1.3
Lobster Creek	6.8
Quosatana	3.9
	107.4 miles (172.8 km)

Chetco Watershed

Hunter Creek	22.1
Pistol River	24.7
Chetco River	72.8
Emily Creek	7.8
Jack Creek	9.1
Mill Creek	1.3
Windchuck River	16.9
Wheeler Creek	10.4
Bear Creek	6.5
Fourth of July Creek	6.5
	178.1 miles (286.8 km)

Sixes River Watershed

Elk River	37.0
Bald Mountain Creek	9.1
Butler Creek	1.3
Rock Creek	.2
Anvil Creek	.3
Sixes River	41.0
Crystal Creek	5.0
Edson Creek	2.7
Dry Creek	5.5
Elephant Rock Creek	1.3
South Fork Sixes River	3.6
Middle Fork Sixes River	2.6
	109.6 miles (176.4 km)

Grand Total **1287.5 Miles (2,072 km)**

SOUTHWEST OREGON SALMON RESTORATION INITIATIVE

A Planning Effort in Support of the
COASTAL SALMON RECOVERY INITIATIVE

Phase 1: A Plan to Stabilize the Native Coho Population From Further Decline

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APPENDIX 4

SUMMARY OF PUBLIC REVIEW AND COMMENT

Prepared for:
Rogue Basin Steering Committee
South Coast Coordinating Watershed Council
Rogue Valley Council of Governments

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Planning Context

In early 1996, the Governor of Oregon committed the natural resource agencies to meeting the objectives of the National Marine Fisheries Service (NMFS) in formulating a decision concerning the listing of Oregon Coast, Klamath Province, and California Coast Coho Salmon. The Coastal Salmon Recovery Initiative was formed to prepare a plan to submit to the Pacific Northwest Division of NMFS.

Regional governments and watershed councils in the Rogue and South Coast Basins in S.W. Oregon requested to be involved in the state planning process to represent local and regional concerns. The state invited the Rogue Valley Council of Governments (representing the collective watershed councils and local governments) to conduct a habitat assessment of 27 core coho habitat areas within the Rogue and South Coast basins and submit a coho restoration plan for S.W. Oregon. The plan was submitted to NMFS as the coho restoration plan for the Oregon side of the Klamath Mountains Province Coho Evolutionary Significant Unit. The plan identified distinct biological qualities of Rogue and South Coast basin coho.

A watershed habitat assessment and planning process was designed to develop a plan for restoration of core coho habitat areas. The process was to operate from the bottom up, be locally directed, and actions implemented by local stakeholders. Both the State Government and NMFS have strongly supported the regional planning process and restoration plan. The first phase - that of stabilizing the coho population in S.W. Oregon from further decline - will be followed by Guidance Plans for habitat restoration at both the basin and subbasin (watershed) levels.

The habitat assessments collected stream surveys and local anecdotal data on 37 habitat parameters, compared current conditions to reference parameters, then identified limiting factors for habitat areas affecting coho salmon productivity. Restoration plans were developed to address the limiting factors, which were then categorized into "immediate," and "longer-term" action plans. Although the action plans will include federal lands, most of the coho habitat and restoration actions targeted by the watershed councils will be on private lands. A production target of 8,000 returning coho spawners was identified as needed to stabilize the population in the Rogue and South Coast basins.

The planning process, habitat assessments, and recommended habitat restoration goals are described in Phase 1: A Plan to Stabilize the Native Coho Population From Further Decline, a document prepared in support of the Oregon State Coastal Salmon Recovery Initiative. A draft has been submitted to the state CSRI and NMFS for formal review. Copies were also distributed to federal, state, and local government entities, watershed councils, and other interested organizations, stakeholders, and persons, beginning October

28, 1996 (see distribution list in Appendix 1). Copies of the report were deposited with city and county governments, watershed councils, regional libraries, and the press. Over 300 copies of the report (both printed and on computer disc) have been distributed. The formal public comment period was 30 days beginning November 1, 1996, however, the technical team continues to process comments as received.

Purpose and Use of the Phase 1 Plan

The Phase 1 plan is intended to be conceptual in nature, providing a process for watershed councils to evaluate salmonid habitat quality in their subbasin, and develop plans for protection and restoration of habitat conditions. The plan has no direct or indirect mandates or mechanisms for forcing action in any form. All standards and goals are proposed for reference and/or discussion, not presented for adoption and/or enforcement. Participation in corresponding programs and actions by watershed councils and stakeholders is purely voluntary and self-initiated. The role of the RVCOG Technical Team is to service the Rogue Basin Steering Committee, the South Coast Coordinating Watershed Council, and local governments in preparing information collection and planning actions. The role of the Technical Team is coordination, information, planning, and liaison to regional, state, and federal entities. Ultimately, nearly all actions will be undertaken by local government and watershed councils.

The state CSRI conducted a related process with its plan documents, and comments on the respective documents were exchanged by the respective agencies.

Disposition of Comments

All comments received by the RVCOG Technical Team have been retained, compiled, and evaluated for incorporation into the final Phase 1 Plan. Statements that were editorial in nature were incorporated directly into the revision process, without further comment. Public comments addressing a research question, interpretation, conclusions, or recommendation within the report were set aside for the preparation of specific written responses from the team. This report constitutes part of the record of disposition of public comments. The letters received, along with the Technical Team response and disposition, are presented in Appendix 4.

Addendum 1 -- Mailing-distribution list

(((Note: The addendum of comments is still open for comment. A complete document will be available by February 20, 1997, and available upon request from the RVCOG offices.