CHELAN COUNTY LEAD ENTITY

DRAFT LEAD ENTITY STRATEGY

July 16, 2004

A report to the Salmon Recovery Funding Board

TABLE OF CONTENTS

CHELAN COUNTY LEAD ENTITY OVERVIEW
- PURPOSE OF THE STRATEGY
- GEOGRAPHIC AREA
- SPECIES INCLUDED
- RELATION TO OTHER DOCUMENTS

PROJECT RANKING PROCESS
- ROLES OF THE REGIONAL TECHNICAL TEAM AND CITIZEN COMMITTEE
- REGIONAL TECHNICAL TEAM RATING PROCESS
- CITIZEN COMMITTEE RANKING PROCESS
- WATERSHED PLANNING UNIT INVOLVEMENT
- UPPER COLUMBIA SALMON RECOVERY BOARD ENDORSEMENT

DEFINING SIGNIFICANT SUBWATERSHEDS

WATERSHED CATEGORY STATUS

BIOLOGICAL PRIORITIES IN HABITAT ACTIVITIES
- HABITAT PROTECTION
- HABITAT RESTORATION & ENHANCEMENT

OBJECTIVES BY SUBBASIN
- WENATCHEE (WRIA 45)
  - INCLUDES WHITE RIVER, LITTE WENATCHEE RIVER, LAKE WENATCHEE, WENATCHEE RIVER, NASON CREEK, CHIWAWA RIVER, ICICLE CREEK, CHUMSTICK CREEK, PESHASTIN CREEK AND MISSION CREEK
  - WATERSHED PLANNING UNIT INVOLVEMENT
  - BIOLOGICAL OBJECTIVE
  - COMMUNITY INTERESTS
  - OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
  - INCREASING THE OVERLAP
  - LINKING THE PROJECT LIST TO THE STRATEGY
  - DATA GAPS & NEW INFORMATION
  - IMPLEMENTATION AND EFFECTIVENESS MONITORING
- ENTIAT (WRIA 46)
  - INCLUDES ENTIAT RIVER AND MAD RIVER
  - WATERSHED PLANNING UNIT INVOLVEMENT
  - BIOLOGICAL OBJECTIVES
  - COMMUNITY INTERESTS
  - OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
  - INCREASING THE OVERLAP
  - LINKING THE PROJECT LIST TO THE STRATEGY
  - DATA GAPS & NEW INFORMATION
  - IMPLEMENTATION AND EFFECTIVENESS MONITORING
- STEMILT/SQUILCHUCK (WRIA 40A)
  - INCLUDES STEMILT CREEK AND SQUILCHUCK CREEK
  - WATERSHED PLANNING UNIT INVOLVEMENT
  - BIOLOGICAL OBJECTIVES
  - COMMUNITY INTERESTS
  - OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
  - INCREASING THE OVERLAP
  - LINKING THE PROJECT LIST TO THE STRATEGY

DATA GAPS & NEW INFORMATION
IMPLEMENTATION AND EFFECTIVENESS MONITORING

LAKE CHELAN (PORTION OF WRIA 47)
- CHELAN RIVER
BIOLOGICAL OBJECTIVES
COMMUNITY INTERESTS
OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
INCREASING THE OVERLAP
LINKING THE PROJECT LIST TO THE STRATEGY
DATA GAPS & NEW INFORMATION
IMPLEMENTATION AND EFFECTIVENESS MONITORING

MAINSTEM COLUMBIA RIVER
- WESTERN SHORELINE WITHIN CHELAN COUNTY ???
BIOLOGICAL OBJECTIVES
COMMUNITY INTERESTS
OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
INCREASING THE OVERLAP
LINKING THE PROJECT LIST TO THE STRATEGY
DATA GAPS & NEW INFORMATION
IMPLEMENTATION AND EFFECTIVENESS MONITORING

REFERENCES

CHELAN COUNTY LEAD ENTITY OVERVIEW

The Chelan County Lead Entity is a voluntary organization under contract with the Washington State Department of Fish and Wildlife (WDFW). In Chelan County, the Salmon Recovery Coordinator is the Lead Entity representative. The Lead Entity representative works with the Upper Columbia Salmon Recovery Board, Regional Technical Team, Citizen Committee, Wenatchee Watershed Planning Unit and Entiat Planning Unit to gather local biological information and community interests related to salmon recovery in the Chelan County Lead Entity area. The Lead Entity works with past and potential project sponsors applying for funding through the Salmon Recovery Funding Board (SRFB).

PURPOSE OF THE STRATEGY

The Chelan County Lead Entity Strategy will be used as a guide to protect, restore and enhance salmon habitat in Chelan County. The Strategy sets priorities for habitat protection, restoration and enhancement based on available biological information and the professional judgment of fisheries biologists and citizens familiar with the area. Specific recommendations for each of the watersheds in the Chelan County Lead Entity area are listed in this Strategy. This document is biologically-based on "*A biological strategy to protect and restore salmonid habitat in the Upper Columbia Region*", developed by the Regional Technical Team (RTT), which was established by the Upper Columbia Salmon Recovery Board (UCSRB). This approach to Strategy development is consistent across the Upper Columbia region and is being used by the Okanogan/Colville Lead Entity as well as the Foster Creek/Moses Coulee Lead Entity. The Strategies from all three Upper Columbia Lead Entities will be integrated into a Coordinated Upper Columbia Lead Entity Strategy. The Chelan County Lead Entity Strategy includes community interests and additional information collected through Wenatchee and Entiat Watershed Planning efforts.

The Chelan County Lead Entity Strategy will be used for the following purposes:

- Document biological and community priorities for salmon habitat projects
- Serve as the habitat component of Subbasin Plans
- Guide project selection for the Salmon Recovery Funding Board
- Serve as habitat component of Watershed Plans
- Guide project selection for spending HCP Tributary Fund dollars
- Contribute to Regional Salmon Recovery Plans for ESA listed species
- Generate additional funding to support priority projects
- Provide information for the Habitat Work Schedule

This Strategy is based on the best science that is currently available. As watershed conditions change and new scientific information is developed, the Strategy will be reviewed and revised to ensure that it continues to reflect the best available science. The Strategy also takes into account community values of the watershed and includes a public outreach effort to increase community support for the actions that science indicates can have the greatest benefits for salmon. As values and policies shift over time, the strategy will be revised to incorporate additional projects that have community support and that will provide high benefits to salmon.

GEOGRAPHIC AREA

The Chelan County Lead Entity area includes the Wenatchee Watershed (WRIA 45), the Entiat Watershed (WRIA 46), Stemilt/Squilchuck (WRIA 40a), a portion of Lake Chelan (WRIA 47) and the Mainstem Columbia River. The Lead Entity area is consistent with the boundary of Chelan County.

SPECIES INCLUDED

The species included in the Chelan County Lead Entity Strategy include chinook salmon (*Oncorhynchus tshawytscha*), sockeye salmon (*O. nerka*), steelhead (*O. mykiss*), westslope cutthroat trout (*O. clarki*) and bull trout (*Salvelinus confluentus*), although other species will benefit from the recommended priorities.

RELATION TO OTHER DOCUMENTS

This Strategy complements the Habitat Limiting Factors Analyses (LFA) conducted by the Washington Conservation Commission. It uses the information in the completed LFA reports for the Wenatchee and Entiat WRIA's. As this strategy develops, it will incorporate findings of individual WRIA's under the state's Watershed Planning Act (RCW 90.82). This strategy considers the biological priorities set in the Spirit of the Salmon Recovery Plan by the Columbia River Intertribal Fish Commission and the Tributary Assessment of the Mid-Columbia Mainstem Conservation Plan, and is intended to complement the Subbasin Plans under the Northwest Power and Conservation Council's Provincial Rolling Review. The integration of tribal, local, state and federal watershed planning and salmon recovery efforts into this Strategy illustrates the coordinated and comprehensive approach of the Upper Columbia Salmon Recovery Board.

PROJECT RANKING PROCESS

ROLES OF THE REGIONAL TECHNICAL TEAM AND CITIZEN COMMITTEE

The Regional Technical Team (RTT) and the Citizen Committee perform important, unique and complementary roles. The RTT is often the most knowledgeable about watershed, habitat and fish conditions. Their expertise is invaluable to ensure priorities and projects are based on ecological conditions and processes. They also can be the best judges of the technical merits and certainty of project technical success. Citizen Committee members are critical to ensure that priorities and projects have the necessary community support for success. They are often the best judges of current levels of community interests in salmon recovery and how to increase community support over time with the implementation of habitat projects. The complementary role of the RTT and the Citizen Committee is essential to ensure the best projects are proposed for salmon recovery and that the projects will increase the technical and community support for an expanded and ever increasing effectiveness of Lead Entities at both the local and regional level.

REGIONAL TECHNICAL TEAM

The RTT reviews the technical merits of project applications from the Chelan County Lead Entity being considered for funding by the State Salmon Recovery Funding Board (SRFB). The UCSRB directed the RTT to establish a scientific framework for this process, with the premise that it will enable them to identify projects that will best contribute to the recovery of salmonids in the Upper Columbia region.

The RTT membership includes:

- Bureau of Land Management
- Chelan County Public Utility District
- Colville Confederated Tribes
- Douglas County Public Utility District
- Governor's Salmon Recovery Office
- NOAA Fisheries
- Private consultants
- U.S. Fish and Wildlife Service
- U.S. Forest Service

- Washington Conservation Commission
- Washington Department of Ecology
- Washington Department of Fish and Wildlife
- Yakama Nation

REGIONAL TECHNICAL TEAM RATING PROCESS

The RTT looks at each application and addresses the following elements and questions in order to rate each project as "high", "medium", "low" or "needs more information":

Elements addressed on all projects

1. **Biological strategy** - Is the project location or assessment within a significant subwatershed or, does it address the priority recommendation in a Category 3 watershed?
2. **Ecosystem processes** - How well does the project or assessment address a recommendation cited in the draft Biological Strategy?

Elements addressed on all projects except Assessments

3. **Habitat connectivity** - Is the project designed within a reach (or other appropriate hydrologic unit) context to maintain or increase stream channel migration, complexity, and floodplain function?
4. **Native species abundance and distribution** - Will the project connect fragmented habitats, restore the historical range of native fish, or contribute toward those needs?
5. **Life history diversity** - Will the project promote life history diversity and/or abundance of native species?
6. **Project monitoring** - Does the project have a monitoring component that is appropriate for the project objectives, including well defined implementation, timing, and reporting formats?

Elements addressed on Assessments only

7. **Ability to fill data gaps** – Will the assessment increase our understanding of the biological or physical processes discussed in criteria 1 through 6, or does it improve our levels of certainty addressed in the draft Biological Strategy?
8. **Management actions** - Will the derived information be readily usable for management actions?

Each RTT member rates the merits of all projects with each element being rated from 1 – 5. Implementation projects are evaluated using questions 1 through 6 (with a maximum score of 30) and assessments will be evaluated using criteria 1, 2, 7 and 8 (with a maximum score of 20). If scores for a particular project merit vary too widely between members, the team will discuss their rational and the reasons for the divergence, which may or may not influence an individual's change of scoring. The RTT chairperson will compile values from the individual final evaluation sheets to give the RTT a "final master evaluation review." The individual and final master evaluation review will be submitted to the Lead Entity, Citizen Committee, SRFB and UCSRB.

CHELAN COUNTY CITIZEN COMMITTEE

The Citizen Committee is responsible under state law for developing the final prioritized project list and submitting it to the SRFB for funding consideration. Citizen Committee members are critical to ensure that priorities and projects have the necessary community support for success. They are often the best judges of current levels of community interests in salmon recovery and how to increase community support over time with the implementation of habitat projects.

Chelan County Lead Entity Citizen Committee membership includes:

- Entiat Watershed Planning Unit members
- Interested citizens
- Irrigation Districts
- Landowners
- Local jurisdictions
- Orchardists
- Watershed Council members
- Wenatchee Watershed Planning Unit members

CHELAN COUNTY CITIZEN COMMITTEE RANKING PROCESS

Citizen Committee members review the ratings submitted by the RTT, using them to assist with guiding their rankings related to the technical merits of each project. Each Citizen Committee member then ranks all of the project applications using the following criteria and questions:

Expected Benefits

- What are the anticipated results of the project?
- What species and life history stages will be affected?
- What type of habitat will be affected and how?

Technical Processes

- What is the recommendation from the Regional Technical Team?
- Does the project address documented habitat limiting factors as outlined in the Limiting Factors Analysis or other document?
- Were other alternatives considered for achieving the project outcome and, if so, why is the proposed alternative the most appropriate?
- Why is it important to do this project now?

Community Support

- How well does the project build community support for salmon recovery efforts by considering not just good science but also good public policy?
- How well does the project include the participation and support of the public and interest groups?
- How well does the project involve cooperative efforts of several agencies or organizations?

Certainty of Success

- What are the certainties and uncertainties inherent in this type of project?
- Describe any technical and/or timing obstacles concerning this project. How does the project design address these?
- Is the cost of the project appropriate as it is currently outlined?

Manageability (Projects and Acquisitions)

- How adequate is the sponsor's ability to provide project management, administration, oversight, accountability and technical assistance?
- Who has responsibility to manage and maintain the project site?
- What responsibility does the landowner/facility owner have to manage and maintain the project site?
- Describe the on-going maintenance and operation for this project. Is there funding available for this purpose?

Land Evaluation (Acquisitions only)

- What portion of the property directly benefits salmon?
- What regulatory controls currently exist to maintain properly functioning salmon habitat?
- Does the proposed acquisition provide more protection than existing regulatory controls? If so, please describe.
- Is there an imminent threat to the property proposed for protection? (I.e. currently for sale, preliminary subdivision approval, forest practices permit approval, infrastructure developed, etc.)
- Does the applicant have an appropriate management plan for the property?

Project Identification (Studies Only)

- How will the project lead to the identification, design, and siting of future habitat restoration and protection projects?
- Will the identified future projects address documented and/or prioritized habitat factors?

Design (Projects and Studies only)

- Is the project design or scope of work complete?
- What standards or guidelines have been or will be used?

The Citizen Committee reviews the applications using these questions and rates each project. Each rating criteria is worth 10 points, with the maximum score of 60 points for each project. The projects are ranked in a final list based on numerical score, which is then submitted to the UCSRB for endorsement. The final list is submitted to the SRFB for funding consideration.

WATERSHED PLANNING UNIT INVOLVEMENT

The Watershed Planning Unit's in both the Wenatchee Watershed and the Entiat Watershed assist with Lead Entity Strategy development and project solicitation. It is anticipated that the Stemilt/Squilchuck Planning Unit will serve in this role as well. After the RTT and Citizen Committee members have rated and ranked the Chelan County Lead Entity list, it is submitted to each of the Planning Unit's for review. Involvement in the Lead Entity process by the Planning Unit's is used to ensure project support at the local level and increase coordination across the Chelan County Lead Entity area.

UPPER COLUMBIA SALMON RECOVERY BOARD

The Upper Columbia Salmon Recovery Board (UCSRB) is a partnership among Chelan, Douglas, and Okanogan counties, the Yakama Nation and the Colville Confederated Tribes in cooperation with local, state and federal partners. The UCSRB strives to ensure that actions taken to protect and restore salmonid habitat in the region are based on sound scientific principles and interests of the local community. The UCSRB uses these principles to develop salmon recovery strategies that address the needs of salmon in a socially and economically viable manner.

The UCSRB Board of Directors (BOD) includes:

- Chelan County Commissioner
- Douglas County Commissioner
- Okanogan County Commissioner
- Yakama Nation representative
- Colville Tribe representative

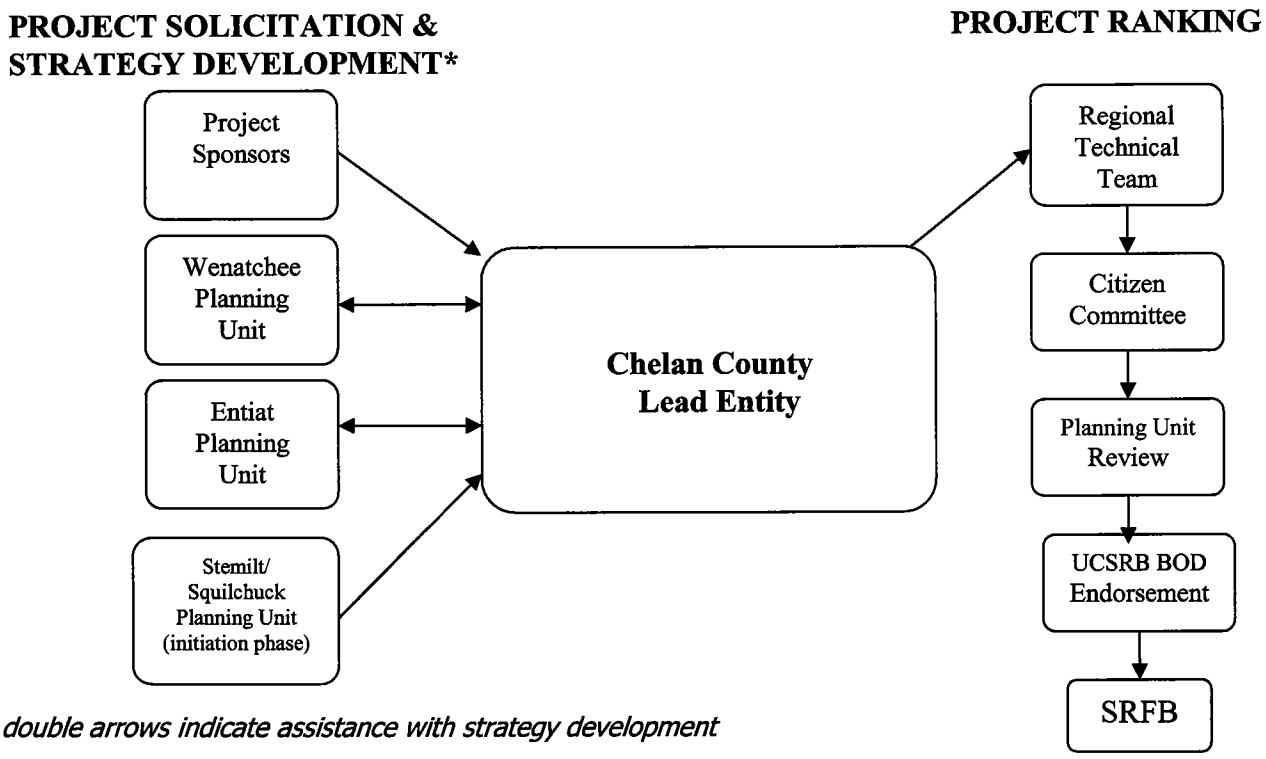
Mission Statement of the UCSRB

To restore viable and sustainable populations of salmon, steelhead and other at-risk species through collaborative, economically sensitive efforts, combined resources and wise resource management of the Upper Columbia region.

UCSRB BOD ENDORSEMENT OF LEAD ENTITY PROCESS

After the RTT and Citizen Committee members have rated and ranked the Chelan County Lead Entity list and the process has been reviewed by the Planning Unit's, it is submitted to the Upper Columbia Salmon Recovery Board BOD for endorsement. The UCSRB BOD is not able to change the ranking of the project list that the Citizen Committee develops. Endorsement of the Lead Entity process by the UCSRB BOD is used to ensure project support at the regional level and increase coordination across the three Lead Entities of the Upper Columbia region.

Chelan County Lead Entity SRFB Process



** double arrows indicate assistance with strategy development*

DEFINING SIGNIFICANT SUBWATERSHEDS

Threatened, endangered and unlisted salmonids are found in the Chelan County Lead Entity area. In order to help guide protection and restoration programs, the RTT considered a subwatershed to be significant if any one of the following criteria was met:

1. It was identified as a stronghold for the species in the Interior Columbia Basin Assessment.
2. It provides the primary spawning and/or rearing habitat within the watershed.
3. It represents the only known occupied habitat within a watershed and is fairly isolated from populations in other watersheds, and thus is significant from a distribution standpoint.
4. It contributes toward the genetic integrity of a species. One of the problems facing many native fish populations is genetic introgression. Relatively pure populations, which may be very important to the evolutionary legacy of a species, may be limited. Recently genetic information has become available for some populations in the Upper Columbia Region. Populations judged to be "pure," "essentially pure," or "good" based upon genetic analysis were considered to be significant.
5. It is known or strongly suspected to support a stable, strong population of a species.

WATERSHED CATEGORY STATUS

Protection and restoration efforts would be best focused on maintaining the remaining examples of biological integrity, connectivity and diversity. This will allow the populations to stabilize in abundance and productivity over the long term. It may be likely however, that current core populations have inadequate diversity and spatial distribution to ensure population resiliency.

To provide a framework to set priorities consistent with this strategy, each watershed is classified in the Chelan County Lead Entity area into four categories, based on the functionality of the aquatic ecosystems in those watersheds and the capability of the ecosystem to protect against ecological catastrophe for endemic populations. The mainstem Columbia River is designated as separate category (Category 5) because of its unique features. In general, Category 1 watersheds should receive priority allocation of financial and management resources. Subsequent allocation of resources can then be given to Categories 2 and 3, in that order, once Category 1 refuge habitats for the target species are protected and secure. *This does not mean however, that specific actions should not occur in Category 2 and 3 watersheds until all activities in Category 1 watersheds are completed.* Any project within those watersheds that increase the range, life history diversity or age cohorts of one or more species would contribute to the overall strategy of making them more robust to disturbances within and outside the region. As salmon recovery progresses, founder populations from core areas would colonize many watersheds that are suitable, yet unoccupied. Restoration of Category 4 watersheds need to be considered in the regional recovery planning process, but immediate actions would not be a priority.

COMPARISON OF KEY INDICATORS FOR WATERSHED CATEGORIES USED TO IDENTIFY PRIORITY ACTIONS FOR PROTECTION AND RESTORATION

Category	Significant Subwatersheds	Habitat Fragmentation	Exotic Species	Listed Species	Principle Actions
1	Yes	Low	Low	Two or more	Protection
2	Yes	Medium	Medium	One or more	Protection/Restoration
3	Possible	High	High	Possible	Restoration
4	No	High	High	Possible	Restoration
5	No	High	High	Two or more	Protection/Restoration

Category 1:

These watersheds represent systems that most closely resemble natural, fully functional aquatic ecosystems. In general, they comprise large, often continuous blocks of high-quality habitat and

subwatersheds supporting multiple populations. Connectivity among subwatersheds and through the mainstem river corridor is good and more than two species of federally listed fish are known to occur. Exotic species may be present but are not dominant. Protecting the functioning ecosystems in these watersheds is a priority.

Category 2:
These watersheds support important aquatic resources for one or more populations throughout. The most important difference between Category 1 and Category 2 is an increased level of fragmentation that has resulted from habitat disturbance or loss. These watersheds have a substantial number of subwatersheds where native populations have been lost or are at risk for a variety of reasons. At least one federally listed fish species can be found within the watershed. Connectivity among subwatersheds may still exist or could be restored within the watershed so that it is possible to maintain or rehabilitate life history patterns and dispersal. Restoring ecosystem functions and connectivity within these watersheds are priorities.

Category 3:
These watersheds may still contain subwatersheds that support salmonids. In general, however, these watersheds have experienced substantial degradation and are strongly fragmented by extensive habitat loss, most notably through loss of connectivity with the mainstem corridor. At this time, there are limited opportunities for restoring full expression of life histories for multiple populations found within the watershed. The priority for funding in these watersheds is to rectify the primary factor that is causing the habitat degradation.

Category 4:
These watersheds contain both functional and non-functional habitats that historically supported populations of one or more federally listed species. Exotic species may now be dominant in one or more subwatersheds; native species are typically not present in sustainable numbers.

Category 5:
The Upper Columbia River is a migration and movement corridor for anadromous and inland species, and has documented spawning, rearing and overwinter habitat for several species. Hydroelectric dams primarily affect habitat quality and use in the mainstem, but shoreline management also influences salmonid habitat use. Protection of shoreline areas are the a priority. Restoration needs to be considered if it will yield sustainable and reasonable improvements to productivity of salmonids in the Upper Columbia Region.

BIOLOGICAL PRIORITIES IN HABITAT ACTIVITIES

HABITAT PROTECTION

Based on the best available scientific information, the RTT concluded that the highest priority for protecting biological productivity is to allow unrestricted stream channel migration, complexity and flood plain function. The principal means to meet this objective is to protect riparian habitat in Category 1 and 2 subwatersheds. Predetermined riparian protection measures (such as buffer strip widths) for each site may not be biologically effective. Riparian function depends on site-specific considerations including channel type, floodplain character, presence of wetlands or off-channel features, and the potential for channel migration. Some areas have more acute needs, because they may be within significant population areas, or may be at risk to habitat degradation, and should be given greater emphasis. Actions to protect remaining functioning habitat are recommended throughout all of the watersheds.

Stream flows have been identified in many areas as a limiting factor; protection of existing stream flows is important to maintaining biological productivity. Currently, the primary means to protect existing flows are regulatory in nature. Additionally, some streams need increased flows to address chronic sources of mortality to salmonids; inadequate flows may be natural or human-caused. Diversion of water for out-of-stream uses (principally for irrigation and municipalities) is the most tangible impact to instream flow needs for fish. In addition, degradation of floodplain (and some upland) habitats exacerbates seasonal flows in all subbasins; this strongly reduces the productivity and expression of diverse life histories in the region. The full effects of upland habitat degradation on peak flows are not understood and should be assessed. The means to increase flows are discussed in the section on habitat restoration.

HABITAT RESTORATION AND ENHANCEMENT

The highest priority for increasing biological productivity is to restore the complexity of the stream channel and floodplain. There are a range of strategies for habitat restoration, based on a fundamental emphasis of promoting habitat diversity, instream flows and water quality throughout the watershed. Most of these efforts will likely be on the lower stream reaches and aggradation zones, typically areas of low stream gradient where deposition of substrate materials occurs. Restoration in these areas would benefit a broad range of species and populations. Examples of restoration measures would include, but not be limited to:

1. Provide fish access to disconnected stream sections or oxbows.
2. Remove dikes (or similar structures) that prevent stream channel migration.
3. Change the points of origin for problematic water withdrawals to less sensitive site(s).
4. Screen water intakes to prevent impingement or stranding of juvenile fish.
5. Manipulate stream flows at critical periods through various means.
6. Provide alternative sources of irrigation and domestic water to mitigate impacts of problematic surface water diversions.
7. Remove passage barriers.
8. Use mechanical means to encourage natural development of riparian areas.
9. Implement upland management practices that reduce sediment delivery to streams.
10. Use engineering techniques to increase complexity of permanently altered habitats.

Structural manipulation of the stream channel (such as boulder or log placements) should not be used unless (1) it is designed at the reach level or context and (2) those factors that are causing the habitat degradation cannot be corrected within a reasonable time. Remedial measures to rectify the effects of improper land use practices can have more benefits to biological productivity, may be economically more efficient, and be more permanent than measures that require active management of the stream channel. The simple alteration of physical features in the stream channel does not necessarily restore biological productivity when improper riparian or upland management practices continue to exert their effects on the aquatic ecosystem. Attempts to restore habitat are likely to fail if structures are placed in the stream channel without addressing those activities that are causing habitat degradation. For example, some short-term habitat benefits might be achieved by adding large woody debris (LWD) to streams, but the benefits can only be temporary from an ecological perspective unless riparian management practices ensure the long-term recruitment of LWD from the riparian zone.

In some isolated situations, restoration projects may be accomplished with both short-term and long-term objectives. For example, LWD may be secured to stabilize erosive banks, allowing interim stream bank protection and salmon habitat, while passive restoration and revegetation will ensure proper functioning riparian conditions for the long term. These projects are biologically effective when the initiation of the short-term strategy has been integrated with the long-term strategy. Each active restoration project should be reviewed on a case-by-case basis.

CATEGORIES OF WATERSHEDS WITHIN THE CHELAN COUNTY LEAD ENTITY AREA

Subbasin	Watershed	Category	Significant subwatersheds
Wenatchee	White River	1	5
	Little Wenatchee River	1	5
	Lake Wenatchee	1	- -a
	Mainstem Upper Wenatchee	1	2
	Mainstem Middle Wenatchee	1	2
	Mainstem Lower Wenatchee	2	1
	Nason Creek	2	3
	Chiwawa River	1	6
	Icicle Creek	2	4
	Chumstick Creek	3	0
	Peshastin Creek	2	3
	Mission Creek	3	3
Entiat	Mainstem Upper Entiat	1	2
	Mainstem Lower Entiat	2	0
	Mad River	1	3
Squilchuck	Squilchuck Creek	4	0
	Stemilt Creek	4	0
Lake Chelan	Chelan River	?	0
Columbia	Mainstem Columbia River	5	- -a

OBJECTIVES BY SUBBASIN

THE WENATCHEE SUBBASIN (WRIA 45)

The Wenatchee River is unique among subbasins in the Upper Columbia Region in that it supports the greatest diversity of populations and overall abundance of salmonids, yet is facing the greatest risk of habitat loss and degradation. State highways, railroads and housing development have substantially diminished the overall function of the stream channel and floodplain. This has impaired stream complexity, wood and gravel recruitment, floodwater desynchronization and retention, late summer flows and water quality.

There are core populations of sockeye salmon, steelhead, bull trout and both spring and summer chinook salmon in the upper Wenatchee Subbasin that are relatively strong, when compared to other populations in the Columbia Basin. The highest regional priority should be the protection of this salmonid community. The immediate strategy should be to protect the watersheds that contain these core populations so that they are robust to normal environmental disturbances, and then to expand their range to adjacent watersheds. Priority watersheds within the Wenatchee Subbasin are White River, Chiwawa River and the upper and middle mainstem Wenatchee River (including Lake Wenatchee). These watersheds are well connected and support a diverse assemblage of native species. Efforts should be made to connect Category 1 and 2 watersheds (Nason Creek, Middle Mainstem Wenatchee River and Icicle Creek), which would enable a fuller expression of life history strategies and increase population resilience.

a The criteria for designation of significance does not apply to Lake Wenatchee or the mainstem Columbia River, yet each contain important habitats.

Recent research indicates that the mainstem Wenatchee River provides important habitat for many life stages of spring and summer chinook salmon, steelhead and bull trout. The mainstem at this time is most vulnerable to riparian and instream habitat degradation. All remaining intact areas on the mainstem should be protected and flood plain function should be restored, particularly from the Mission Creek confluence downstream to the Columbia River confluence. This could primarily be done with passive restoration. Since this reach has the highest discharge in the subbasin, the extent of riparian vegetation needed to restore flood plain function would be larger than the tributaries. Benefits of this action would be numerous to anadromous and inland salmonids, as well as a myriad of wildlife species.

Recent studies done in the Wenatchee Watershed include the Channel Migration Zone study on the lower Wenatchee River and the lower portion of Nason Creek. This study was funded by the SRFB in the 2nd Round and has resulted in several project ideas that are well supported by both existing and recent technical studies as well as community members from the Planning Unit and residents around the study area.

WENATCHEE WATERSHED PLANNING UNIT

There is a strong interest in the Wenatchee Watershed at the local level to participate in water resource management. Watershed Planning began under the Watershed Planning Act, Chapter 90.82 RCW, in the Wenatchee in 1999. In addition to the required water quantity element, the Planning Unit decided to address the instream flow, water quality, and habitat elements as well. There are technical committees that address each element, as well as a committee working on public outreach strategies. The Planning Unit is made up of a diverse group of stakeholders representing interests such as local governments, tribes, state and federal agencies, irrigation, agriculture, forestry, community groups, conservation groups, economic development, recreation, and individual landowners.

The Planning Unit has developed the following mission, goal, objectives and strategies

Mission Statement

To collaboratively develop a management plan for sustaining and improving our watershed and community health.

Goal

Implementation of a management plan for water and habitat protection and use that balances the educational, economic and recreational values associated with a healthy community.

Objectives

1. Assess water supply and use, and develop strategies for meeting current and future needs for both in-stream and out-of-stream objectives.
2. Protect and enhance habitat of threatened and endangered species throughout the Wenatchee watershed, thus improving overall habitat function and connectivity.
3. Address polluted water bodies that do not meet state and federal water quality standards.

Strategies

1. Fully engage all stakeholders through an open, accessible, and collaborative process.
2. Develop clear objectives, decision-making and evaluation procedures, and planning products to assure accountability for implementation.

3. Integrate the watershed planning process and ensuing plan with other programs, initiatives, and activities affecting the Wenatchee watershed.
4. Use credible scientific information to understand, protect, and restore the most critical aspects of a healthy watershed.

BIOLOGICAL OBJECTIVES

The assessments for each watershed provide biological objectives for protection, restoration and enhancement of salmonid habitat. In these assessments, priorities are identified within and across the watersheds. The table of each subwatershed provides greater detail: they outline the status of each watershed, classify them by category, identify significant subwatersheds, recommend priority approaches and lay the foundation for a region-wide effectiveness monitoring program.

COMMUNITY INTERESTS

The community interests table for each watershed identifies areas of concern for local citizens and residents familiar with the area. In the summer of 2003, a series of tours were held in all watersheds of the Wenatchee subbasin. Through these tours, community information was documented and collected on each watershed.

WHITE RIVER WATERSHED ASSESSMENT	
Native species: Sockeye salmon, spring chinook salmon, steelhead, bull trout.	Drainage area: 99,956 acres

STATUS: Category 1.
- Designated as Key Watershed in Northwest Forest Plan.
- Critical spawning and rearing habitat for many species.

SIGNIFICANT SUBWATERSHEDS:
Headwaters White, Upper White, Lower White, Napeequa Creek, Panther Creek

FACTORS AFFECTING HABITAT CONDITION:
- Past riparian harvest and log drives have altered woody debris accumulations and channel morphometry.
- Habitat is intact and contiguous, but development pressures place a critical need to protect and maintain stream channel and floodplain integrity

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LEVEL OF CERTAINTY:
- Field habitat analysis has been completed on public lands, enabling high confidence in assessment.
- Field analyses are incomplete on private lands, yet reviews of aerial photographs in combination with field reviews have allowed strong inferences on habitat needs.
- There is a high level of concern about impacts of land development on this stream, which leads to a strong consensus among RTT members on the priority of this watershed in the region.

RECOMMENDATIONS (IN PRIORITY):
1. Protect stream channel, riparian and floodplain function: focus on Panther Creek downstream to mouth.
2. Restore wetland complexes that connect to stream channel
3. Protect shorelines along Lake Wenatchee near White River mouth
4. Initiate public information efforts to discourage harassment of spawning spring chinook, sockeye salmon, and bull trout.
5. Manage recreation areas to reduce impacts to riparian cover.

WHITE RIVER WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: September 12, 2003	**TOUR(S) LEAD BY:** Dave Klinger
AREAS VISITED: Boulder Creek, White River Falls campground, Slide overlook, Tall Timbers Ranch, Napeequea crossing, White River Auto Tour – stop #2, Sears Creek brigde, USFS #6404, USFS #6 and Lake Wenatchee Ranger station.	
OVERALL COMMENTS: ▪ Fish barrier at White River falls and on Panther Creek ▪ There are many important, undeveloped wetland and floodplain areas that need protection in this watershed. This is an important sockeye spawning habitat. ▪ There are many areas in this watershed that frequently flood, would be best not to build on	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ White River Oxbow restoration area beyond the end of USFS #6404 ▪ All the way to the Pacific Crest Trail ▪ A closer look at the wetlands – may need to access by boat from the lake	
ADDITIONAL INFORMATION AVAILABLE: ▪ Chelan-Douglas Land Trust ▪ USFS wooden log-jam project information ▪ USFS Ware Pond - oxbow restoration project information	
RECOMMENDATIONS: ▪ There are many important, undeveloped wetland and floodplain areas that need protection in this watershed. This is an important sockeye spawning habitat.	

Looking at spawning sockeye near the Napeequa
September 12, 2003

LITTLE WENATCHEE WATERSHED ASSESSMENT	
Native species: Sockeye salmon, spring chinook salmon, steelhead, bull trout.	Drainage area: 75,329 acres

STATUS: Category 1

- Designated as Key Watershed in Northwest Forest Plan.
- Critical spawning and rearing habitat for many species.
- Bull trout numbers above the waterfalls are extremely low.

SIGNIFICANT SUBWATERSHEDS:

Headwaters Little Wenatchee, Upper Little Wenatchee, Lower Little Wenatchee, Rainy Creek, Lake Creek

FACTORS AFFECTING HABITAT CONDITION:

- Past riparian harvest and log drives below the waterfalls may have affected stream channel morphometry and function.
- Habitat above the waterfalls is intact and relatively pristine: essentially need to protect and maintain stream channel and floodplain integrity.
- The lower Little Wenatchee is on the state 303(d) list for water temperature.

LEVEL OF CERTAINTY:

- Field habitat analysis has been completed on public lands, enabling high confidence in assessment.
- Field analyses are incomplete on private lands, yet reviews of aerial photographs in combination with field reviews have allowed strong inferences on habitat needs.
- Some uncertainty exists on effects of logging and road management on stream channel function, water temperature, flow, and possible input of large woody debris.

RECOMMENDATIONS (IN PRIORITY):

1. Protect stream channel, riparian and floodplain function: focus on Little Wenatchee River falls downstream to mouth.
2. Address road impacts in the drainage, emphasis on Rainy Creek and Little Wenatchee between Hidden Creek and Fir Creek.
3. Restore wetland complexes that connect to stream channel.
4. Manage recreation areas to reduce impacts to riparian cover.
5. Initiate public information efforts to discourage harassment of spawning salmonids.

LITTLE WENATCHEE RIVER WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: July 31, 2003	**TOUR(S) LEAD BY:** Dave Klinger Jennifer Jerabek
AREAS VISITED: Little Wenatchee River Road #6500, Lake Creek campground, Little Wenatchee gaging station, Rainy Creek staff gage, Rainy Creek campground, USFS road #6702, Little Wenatchee River falls, Old CCC camp area, Hidden Creek road, Two Rivers Sand and Gravel and Lake Wenathcee Ranger Station.	
OVERALL COMMENTS: ▪ While the character of the valley bottom has changed due to the pre 1949 logging of cedar, there appears to be sufficient large woody debris available, creating a healthy river. ▪ Two Rivers gravel pit is the only one in Chelan County and will expand in size in the future since the gravel deposits extend for a great distance on Two Rivers land. ▪ Important to carefully consider recreation areas in the riparian zones. ▪ Need to consider potential for blow out on roads vs. the benefit of leaving it alone.	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Some major tributaries, especially those impacted heavily by logging (e.g. Rainy Creek)	
ADDITIONAL INFORMATION AVAILABLE: ▪ Coho reintroduction information from the Yakama Nation	
RECOMMENDATIONS: ▪ Important to carefully consider recreation areas in the riparian zones. ▪ Need to consider potential for blow out on roads vs. the benefit of leaving it alone.	

Learning about the history of Indian Crossing trailhead
July 31, 2003

LAKE WENATCHEE ASSESSMENT	
Native species: Sockeye salmon, spring chinook salmon, steelhead, bull trout.	Drainage area:
STATUS: Category 1. ▪ Necessary adult holding and juvenile rearing area for sockeye salmon and bull trout.	
SIGNIFICANT SUBWATERSHEDS: Not applicable.	
FACTORS AFFECTING HABITAT CONDITION: ▪ Shoreline development. Bulkheads change dynamics of near shore wave action, affecting invertebrate production, gravel deposition, and habitat use.	
LEVEL OF CERTAINTY: ▪ Quantified field analyses have not been conducted, yet reviews of aerial photographs in combination with field reviews have allowed strong inferences on habitat needs.	
RECOMMENDATION: ▪ Protect remaining near shore habitat, and develop a means to reduce impacts of bulkheads.	

LAKE WENATCHEE WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: October 17, 2003 February 26, 2004	**TOUR(S) LEAD BY:** Dave Klinger Jennifer Jerabek
AREAS VISITED: Glacier View campground, Lake Wenatchee State Park – north and south entrances , Kane residence and Lake Wenatchee PUD Sewer Plant.	
OVERALL COMMENTS: ▪ Recreation interests and activities are numerous in this area, consider them in actions ▪ Residential impacts on lake – development, septic systems, docks, vegetation removal.	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Little Wenatchee and White River wetlands	
ADDITIONAL INFORMATION AVAILABLE: ▪ Water Storage Feasibility Study ▪ Historical information on Wenatchee Indians ▪ There are many books written on this area with historical and cultural information.	
RECOMMENDATIONS: ▪ Recreation interests and activities are numerous in this area, consider them in actions	

Lake Wenatchee and Dirty Face peak from the State Park
October 17, 2003

MAINSTEM UPPER WENATCHEE RIVER (LAKE WENATCHEE TO TUMWATER CANYON) ASSESSMENT	
Native species: Sockeye salmon, spring and summer chinook salmon, steelhead, bull trout.	Drainage area:

STATUS: Category 1

- Important passage corridor for many species.
- Important spawning habitat for summer chinook salmon and steelhead.
- The mainstem from Lake Wenatchee to the Chiwawa River confluence is designated as a Key Watershed in the Northwest Forest Plan (NWFP).

SIGNIFICANT SUBWATERSHEDS:

Upper Wenatchee, Lake Wenatchee

FACTORS AFFECTING HABITAT CONDITION:

- The state highway, railroad, and private land development affect woody debris recruitment, channel migration, and gravel recruitment.
- The state highway cut off a large oxbow near Nason Creek confluence.
- Historical log drives and resultant loss of wood recruitment has reduced channel complexity.
- Fecal coliform and water temperatures are slightly elevated.

LEVEL OF CERTAINTY:

- Extensive field surveys and analysis of aerial photographs provide strong evidence of impacts to stream channel function.
- There is some uncertainty about the most appropriate means to restore floodplain function, given the existing constraints.
- There is some uncertainty of the extent to which oxbows are disconnected, and what efforts should be done to provide access to the mainstem.
- There is a high level of concern about impacts of land development on this stream reach, which leads to a strong consensus among RTT members on the priority of this watershed in the region.

RECOMMENDATIONS (IN PRIORITY):

1. Protect remaining floodplain and riparian habitat.
2. Restore channel migration to resemble historical function.
3. If restoration is not possible, improve fish access to oxbows and historical side channels that have been cut off from main channel.
4. Initiate public information efforts to discourage harassment of spawning summer chinook salmon.
5. Reduce nonpoint pollution from septic tanks and livestock.
6. Initiate public information efforts to encourage protection of riparian habitat.

MAINSTEM UPPER WENATCHEE RIVER (LAKE WENATCHEE TO TUMWATER CANYON) - COMMUNITY INTERESTS	
DATE(S) VISITED: October 17, 2003 February 26, 2004	**TOUR(S) LEAD BY:** Dave Klinger
AREAS VISITED: Glacier View Campground, South Shore, Kane Residence, Lake Wenatchee State Park (North + South entrances), PUD Sewer Plant and the Cove Resort on Fish Lake.	
OVERALL COMMENTS: ▪ Slides are a concern for residents on both shores of the Lake – difficult to approve County permits ▪ The Lake has high flow flooding events that are a concern for residents with waterfront property ▪ Residents wanted more information on the Lake Wenatchee Water Storage Feasibility Study	
AREAS TO VISIT ON NEXT TOUR: ▪ River Road near Plain - heavy development and dumping in small tributary ▪ Fish Lake drainage area ▪ loChiwaukum Creek area ▪ Little Wenatchee and White River wetlands ▪ USFS Fire reduction activities on Natapoc	
ADDITIONAL INFORMATION AVAILABLE: ▪ Historical information on Great Northern Powerhouse site ▪ Historical information on Lake Wenatchee site ▪ Personal records and photographs from the Kane Residence	
RECOMMENDATIONS: see overall comments noted above	

Sally Kane talking about past floods on Lake Wenatchee
October 17, 2003

MAINSTEM MIDDLE WENATCHEE (TUMWATER CANYON) ASSESSMENT	
Native species: Sockeye salmon, spring and summer chinook salmon, steelhead, bull trout.	Drainage area:
STATUS: Category 1 ▪ Important passage corridor. Important spawning habitat for summer chinook salmon and steelhead.	
SIGNIFICANT SUBWATERSHEDS: Tumwater Canyon, Chiwaukum Creek	
FACTORS AFFECTING HABITAT CONDITION: ▪ Coarse sedimentation impacts from fire. ▪ The state highway negatively affects gravel and LWD recruitment.	
LEVEL OF CERTAINTY: ▪ Recent USFWS bull trout surveys provide higher level of certainty.	
RECOMMENDATIONS (IN PRIORITY): 1. Protect existing riparian habitat 2. Address passage barriers at Skinney Creek near mouth	

MAINSTEM MIDDLE WENATCHEE (TUMWATER CANYON) - COMMUNITY INTERESTS	
DATE(S) VISITED: October 17, 2003 February 26, 2004	**TOUR(S) LEAD BY:** Dave Klinger
AREAS VISITED: Tumwater Campground, Swift Water, Tumwater Dam (Lake Jolanda)	
OVERALL COMMENTS: ▪ Swift Water area is a good representative view of the river in Tumwater Canyon. ▪ Benefits noticed from the 4-H trail constructed the previous summer. ▪ Tumwater Dam is used strictly as a fish counter ▪ Need to look at recreational uses and scenic issues along Tumwater Canyon ▪ Opportunities for interpretive signs along highway ▪ The information sign at Tumwater Dam needs to be updated, fix typographical errors	
AREAS TO VISIT ON NEXT TOUR: ▪ Additional highway pull offs - picnic and campground areas	
ADDITIONAL INFORMATION AVAILABLE: ▪ Historical information on Great Northern Powerhouse site ▪ Stevens Pass Greenway Association	
RECOMMENDATIONS: ▪ Need to look at recreational uses and scenic issues along Tumwater Canyon ▪ Opportunities for interpretive signs along highway	

Tour group looking at the 4-H trail along Tumwater Canyon
October 17, 2003

MAINSTEM LOWER WENATCHEE RIVER (TUMWATER TO MOUTH) ASSESSMENT	
Native species: Sockeye salmon, spring and summer chinook salmon, steelhead, bull trout.	Drainage area:

STATUS: Category 2

- Important passage corridor for many species.
- Spawning and rearing habitat for summer chinook salmon and steelhead.

SIGNIFICANT SUBWATERSHEDS:

Lower Wenatchee

FACTORS AFFECTING HABITAT CONDITION:

- Land development, state highway and railroad affect channel migration, woody debris recruitment, and gravel recruitment.
- Riparian habitat and off-channel habitat have been significantly lost or degraded in this reach.
- Late summer instream flows are often critically low throughout this reach.
- Floodplain function has been impaired by development, causing extremes in the peaks and nadir of the hydrograph.
- Stream temperatures often exceed standards, which is contributed to by riparian habitat loss and low instream flows.
- There is a high level of concern about impacts of land development on this stream reach, which leads to a strong consensus among RTT members on the priority of this watershed in the region.

LEVEL OF CERTAINTY:

- Field and aerial surveys give strong indication of channel constriction and riparian habitat loss. Historical photos indicate loss of floodplains.
- The relation of fish habitat and instream flow in this reach was studied in 1980s; this assessment needs to be refined.
- The relative extent to which irrigation withdrawal and riparian loss affect water temperature is not known.

RECOMMENDATIONS (IN PRIORITY):

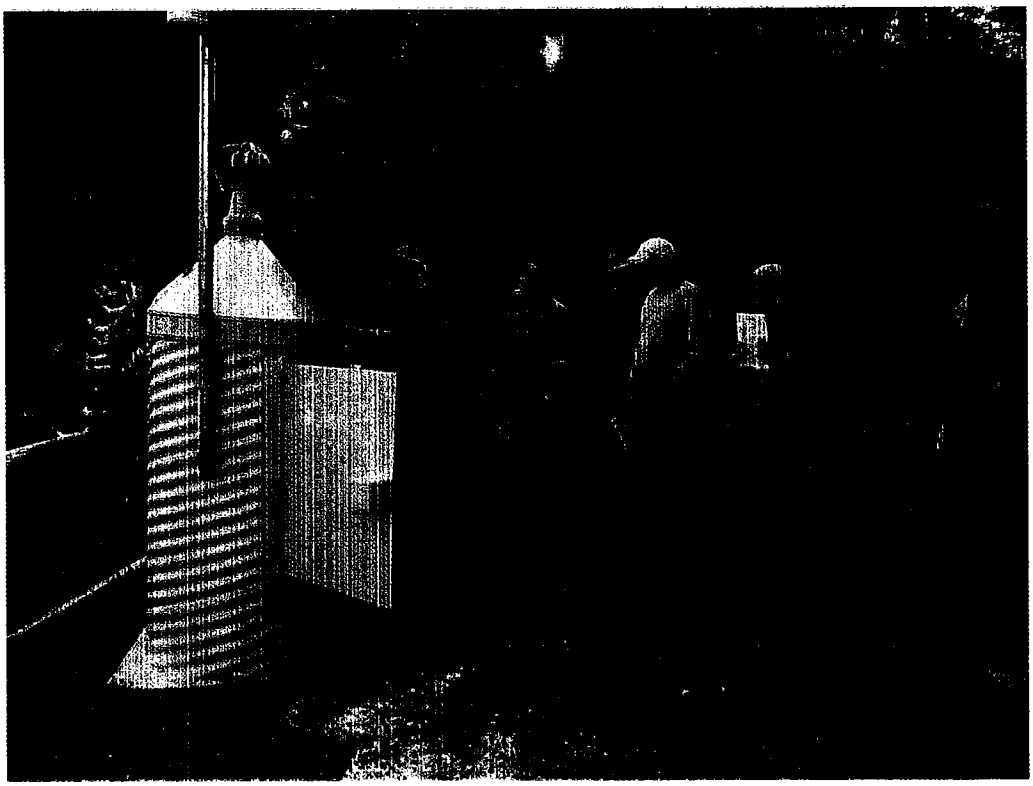
1. Protect existing riparian habitat and channel migration floodplain function.
2. Restore channel migration to normative function.
3. If restoration is not possible, improve fish access to oxbows and historical side channels
4. Increase late summer flows.

MAINSTEM LOWER WENATCHEE RIVER (TUMWATER TO MOUTH) - COMMUNITY INTERESTS	
DATE(S) VISITED: October 31, 2003	**TOUR(S) LEAD BY:** Jennifer Jerabek
AREAS VISITED: WSDOT site in Peshastin, WDFW site on Josephine Avenue, WDFW public fishing site in Dryden, riverside stops near Monitor and Confluence State Park	
OVERALL COMMENTS: ▪ The Channel Migration Zone Study has produced some very interesting work products ▪ It was reassuring to the tour group that there are many upcoming beneficial projects ▪ The coordination between agencies was apparent and will be necessary for these projects ▪ It was fascinating to learn about all of the various bird species observed in Confluence State Park	
AREAS TO VISIT ON NEXT TOUR: ▪ PUD fish ladder at the WDFW site in Peshastin ▪ City of Leavenwoth – Enchantment Park, Blackbird Island, logging history of that area ▪ New Audubon Center and how they may use Barn Beach area, projects, etc ▪ Wenatchee Reclamation District	
ADDITIONAL INFORMATION AVAILABLE: ▪ Channel Migration Zone Study – Phase II results ▪ Birding list from Confluence State Park ▪ Information from the Wenatchee Reclamation District ▪ Information on the Dryden Fish Enhancement Project – Chelan County PUD	
RECOMMENDATIONS: ▪ Enhance and improve access to off-channel habitat ▪ Implement projects identified in the CMZ study- specifically Dryden, Irwin and Gagnon sites ▪ Conduct instream flow study and assessment to determine needed flows for fish ▪ Improve and increase fish passage at barriers, specifically at the Jones-Shotwell diversion	

An Osprey perched above the Wenathcee River, Confluence State Park
October 31, 2003

NASON CREEK WATERSHED ASSESSMENT	
Native species: Spring chinook salmon, steelhead, bull trout.	Drainage area: 69,000 acres
STATUS: Category 2	
SIGNIFICANT SUBWATERSHEDS: Headwaters Nason, Upper Nason, Lower Nason	
FACTORS AFFECTING HABITAT CONDITION: ▪ The state highway, railroad, and private land development affect woody debris recruitment, channel migration, and gravel recruitment. ▪ Lower Nason Creek is on the state 303(d) list for water temperature.	
LEVEL OF CERTAINTY: ▪ Extensive field surveys and analysis of aerial photographs provide strong evidence of impacts to stream channel function. There is some uncertainty about the most appropriate means to restore floodplain function, given the existing constraints. The recently funded channel migration study should assist in this assessment. ▪ There is some uncertainty of the extent to which oxbows are disconnected, and what efforts should be done to provide access to Nason Creek. ▪ The cumulative effects of timber harvest, development, and road densities on stream channel function and sediment delivery is not fully known, but of concern.	
RECOMMENDATIONS (IN PRIORITY): 1. Protect remaining floodplain and riparian habitat. 2. Restore channel migration to historical function. 3. If restoration is not possible, improve fish access to oxbows and historical side channels. 4. Initiate public information efforts to discourage harassment of spawning salmonids.	

NASON CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: September 26, 2003	**TOUR(S) LEAD BY:** Dave Klinger Mary Jo Sanborn
AREAS VISITED: Yodelin, Bygone Byways, Berne, White Pine Creek, Merritt, Butcher Creek acclimation pond, Nason Creek kids fishing pond, Nason Creek campground and confluence with the Wenatchee River.	
OVERALL COMMENTS: ▪ This watershed is heavily impacted by the highway and railroad ▪ Lots of interesting historical information is available on this watershed ▪ Changes in logging practices have shaped watershed influences ▪ There are many homes built in and along the floodplain in this watershed ▪ Homeowners have used rip-rap to stabilize banks and prevent erosion in many locations	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Kahler Glen	
ADDITIONAL INFORMATION AVAILABLE: ▪ Bygone Byways historical brochure ▪ Stevens Pass Greenway brochure ▪ Stevens Pass Sewer District Facility information ▪ WSDOT maps and information	
RECOMMENDATIONS: see overall comments listed above	



Talking with Department of Ecology about the telemetered stream flow gage
September 26, 2003

CHIWAWA RIVER WATERSHED ASSESSMENT	
Native species: Spring chinook salmon, steelhead, and migratory bull trout.	Drainage area: 117,000 acres

STATUS: Category 1

- Designated as Key Watershed in Northwest Forest Plan.
- Critical spawning and rearing habitat for multiple species.

SIGNIFICANT SUBWATERSHEDS:

Headwaters Chiwawa, Upper Chiwawa, Middle Chiwawa, Lower Chiwawa, Rock Creek, Chikamin Creek

FACTORS AFFECTING HABITAT CONDITION:

- Most of this watershed is in public ownership and protected as Wilderness Area or under the Northwest Forest Plan. Habitat within these areas is essentially pristine.
- There is limited housing development in private parcels on the lower Chiwawa River. Loss of riparian vegetation in these reaches may influence water temperatures and hiding cover.
- Water withdrawals in the lower Chiwawa River may affect rearing habitat in low flow years.

LEVEL OF CERTAINTY:

- The effect of water withdrawals on lower Chiwawa River salmonid habitat is not known.
- There is concern over the potential impacts of development in Chikamin Creek on salmonid productivity and water temperatures.

RECOMMENDATIONS (IN PRIORITY):

1. Protect remaining floodplain and riparian habitat, particularly around Chikamin Flats.
2. Investigate the role of surface and well water withdrawals on instream flows and habitat use. Develop strategies with water users to reduce effects, if any.
3. Initiate public information efforts to discourage harassment of spawning spring chinook salmon and bull trout.
4. Manage recreation areas to reduce or avoid impacts to riparian habitats.

CHIWAWA CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: August 29, 2003	**TOUR(S) LEAD BY:** Dave Klinger Jon Soest
AREAS VISITED: Schaefer Creek campground, Rock Creek bridge, Schaefer Creek trailhead, Huckleberry campground, Road 62 bridge, Chiwawa Irrigation District, Burgess residence, Old Bridge at Plain and Chiwawa River Pines.	
OVERALL COMMENTS: ▪ There is high quality (but under utilized) spawning and rearing habitat in the Chiwawa. ▪ Good example of thinning for fire reduction in Chikamin flats ▪ Growth patterns in this area are striking	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Trinity, heavy mining impact ▪ Goose Creek campground ▪ Meadow Creek campground – heavy off-road motorbike use, heavy camping damage	
ADDITIONAL INFORMATION AVAILABLE: ▪ Chiwawa Valley Auto Tour brochure	
RECOMMENDATIONS: see overall comments listed above	

View of growth in Plain
August 29, 2003

ICICLE CREEK WATERSHED ASSESSMENT	
Native species: Steelhead, bull trout, cutthroat trout, redband trout	Drainage area: 136,960 acres

STATUS: Category 2

- Relatively good habitat
- Inland fish are present and of concern.
- Designated as Key Watershed in Northwest Forest Plan.

SIGNIFICANT SUBWATERSHEDS:

Upper Icicle Creek, Jack Creek, French Creek, Headwaters Icicle Creek.

FACTORS AFFECTING HABITAT CONDITION:

- Land development downstream of Leavenworth Hatchery has affected stream channel migration, recruitment of large woody debris, and off channel habitat.
- There are barriers to migration on Icicle Creek at Leavenworth Hatchery and possibly in the boulder field near Snow Creek
- Water withdrawals in Icicle Creek (primarily between Rat Creek and the hatchery) likely contribute to low flows and high summer temperatures in lower Icicle Creek.
- The Icicle Road upstream of Chatter Creek at places may confine the stream channel and affect floodplain function.
- The 1994 Rat Creek fire caused increased sedimentation and water temperature in the middle and lower Icicle drainage.

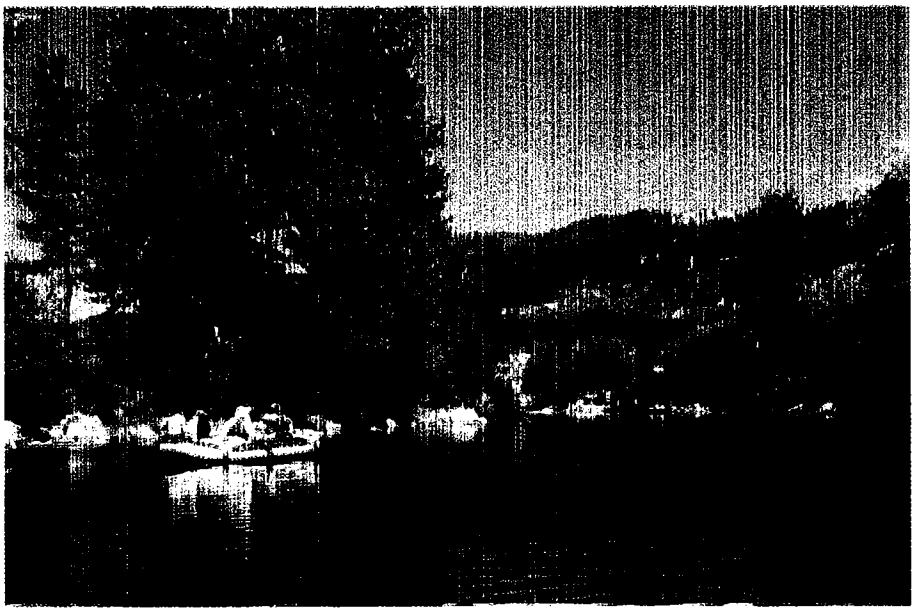
LEVEL OF CERTAINTY:

- Field and aerial reconnaissance of lower Icicle Creek provide strong certainty of need for stream channel protection and restoration.
- The adult passage conditions at boulder field near Snow Creek is not known.

RECOMMENDATIONS (IN PRIORITY):

1. Protect remaining floodplain and riparian habitat downstream of Chatter Creek. Emphasis should be placed on habitat downstream of Leavenworth Hatchery.
2. Rectify human-made passage barriers.
3. Restore flow conditions on Icicle Creek downstream of Rat Creek.
4. Investigate the role of surface and well water withdrawals on instream flows and habitat use. Develop strategies with water users to reduce effects, if any.
5. Initiate public information efforts to discourage harassment of spawning salmonids.
6. Manage recreation areas to reduce impacts to riparian cover.

ICICLE CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: July 10, 2003 February 26, 2004	**TOUR(S) LEAD BY:** Mary Jo Sanborn Dick Reiman Tom Kahler
AREAS VISITED: Upper Icicle near Icicle Creek trailhead, Jack Creek, Ida Creek campground, Cable drop, Irrigation diversions, Boulder Drop, Leavnworth National Fish Hatchery, Icicle Creek Restoration project and a float trip with Osprey Rafting from the Hatchery to the confluence with the Wenatchee River	
OVERALL COMMENTS: ▪ The Restoration project is a good example of community group getting involved and dedicating their time and energy to a project through completion. ▪ Note the influence of tributary input to water localized temperatures in Icicle Creek ▪ Talked about campsites along upper reaches impacts river bank, look at working with the Forest Service to move some campsites further off the river to protect banks. ▪ Need to investigate Boulder Drop status as a barrier ▪ Significant amount of bank armoring along the road interferes with floodplain functions and transfers problems downstream. ▪ Construction within the floodplain is the ultimate factor influencing vegetation removal and subsequent bank armoring.	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Next phase of restoration project on historic channel	
ADDITIONAL INFORMATION AVAILABLE: ▪ Aerial photographs ▪ Icicle Creek Restoration Project map and information	
RECOMMENDATIONS: ▪ Need to investigate Boulder Drop status as a barrier ▪ See overall comments listed above	



River rafters floating along the lower Icicle River
July 10, 2003

CHUMSTICK CREEK WATERSHED ASSESSMENT	
Native species: Steelhead.	Drainage area: 47,000 acres

STATUS: Category 3

- Chumstick Creek was historical steelhead habitat.
- Likely, it was very important coho salmon habitat, although few records exist.

SIGNIFICANT SUBWATERSHEDS: None

FACTORS AFFECTING HABITAT CONDITION:

- Private land development and high road density affects sediment delivery.
- Channel migration affected by state highway, the railroad, multiple water crossing structures, and private land development.
- Fecal coliform and water temperature levels are elevated, mostly a result of livestock and improper septic tanks.
- Passage is impeded at the North Road and numerous smaller culverts upstream.
- Riparian habitat has been degraded or lost from Little Chumstick Creek to mouth.

LEVEL OF CERTAINTY:

- This watershed is only accessible to steelhead at this time, yet it is unknown whether it is accessible to other species.
- The loss of riparian vegetation in Chumstick Creek is readily observable, yet cumulative effects on instream habitat, channel function, and water quality are not quantified.
- Constraint of the stream channel by human-made structures is readily observable; the means to address these effects are not established.
- Field inventory and assessment of barriers enable a high level of certainty of habitat degradation.
- Consistent yearly water quality monitoring provides certainty on fecal coliform and temperature.
- The extent of the effect of private and public roads on stream channel function and sediment delivery is not fully assessed, but of concern.
- The potential for impacts from unscreened water diversions is not known. An inventory and assessment are required.
- The cumulative effects of surface water diversions and ground water withdrawal from wells on low flows is not known, but of concern.

RECOMMENDATIONS (IN PRIORITY):

1. Restore passage for anadromous and inland fish. This should be done in a comprehensive, coordinated strategy, rather than a piecemeal approach.
2. Protect remaining floodplain and riparian habitat
3. Increase stream flow.
4. Restore riparian habitat, primarily from Eagle Creek to Suntisch Canyon.
5. Reduce road densities.
6. Restore stream channel migration.
7. Reduce nonpoint pollution from septic tanks and livestock.
8. Reduce fine sediment input from roads and some land management activities.

CHUMSTICK CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: June 20, 2003 February 26, 2004	**TOUR(S) LEAD BY:** Dave Klinger Kate Terrell John Monahan
AREAS VISITED: County gravel pit, North Road culvert, Ott residence, Raymond residence, Longview Fibre logging operation, Isenhardt residence, beaver dam on Eagle Creek, Tiedeman residence, past sheep grazing area up Eagle Creek, and USFS water point at closed road junction.	
OVERALL COMMENTS: ▪ The North Road Culvert is a major blockage to fish migration. ▪ Nine bridges/culverts have been installed but funding for the rest were held up because of the lack of action on the North Road Culvert Project ▪ There is a great concern of the government by many residents in this area. ▪ Need for fencing to keep livestock out of creek in many areas, however this poses some property loss and financial issues for residents ▪ There are water quality concerns in this area	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Areas that dry up in late summer ▪ Visit areas of poor water quality	
ADDITIONAL INFORMATION AVAILABLE: ▪ Watershed Community Alliance ▪ Information from local residents Dave Klinger and Lisi Ott	
RECOMMENDATIONS: ▪ The North Road Culvert is a major blockage to fish migration – find a way to fund this ▪ Complete entire culvert replacement project	

Looking downstream on Chumstick Creek below the North Road culvert
June 20, 2003

PESHASTIN CREEK WATERSHED ASSESSMENT	
Native species: Spring chinook salmon, steelhead, bull trout.	Drainage area: 78,780 acres

STATUS: Category 2

- Important steelhead spawning and rearing habitat, both in the mainstem and subwatersheds.

SIGNIFICANT SUBWATERSHEDS:

Upper Peshastin, Lower Peshastin, Ingalls Creek

FACTORS AFFECTING HABITAT CONDITION:

- Channel migration, riparian habitat, floodplain function, stream sinuosity, and gravel recruitment are severely impacted by state highway.
- Low instream flows in lower Peshastin Creek impede upstream migration, reduce rearing habitat, and likely contribute to elevated water temperature.
- Loss of riparian habitat resulting from land development and state highway reduces quantity and quality of spawning and rearing habitat.
- .

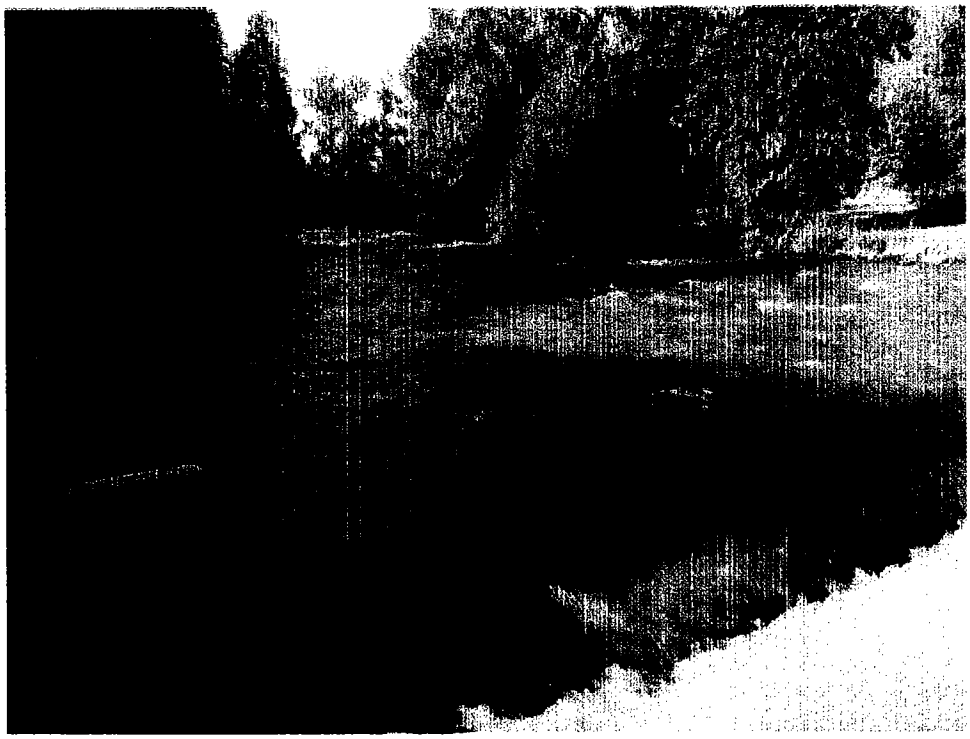
LEVEL OF CERTAINTY:

- Cumulative effects of current gold mining in tributaries on sediment delivery, water quality, and channel conditions are not fully understood, but are of concern.
- Cumulative effects of past timber harvest in tributaries on sediment delivery and water quality are not fully understood, but are of concern.
- There is uncertainty on the status of Ingalls Creek bull trout.

RECOMMENDATIONS (IN PRIORITY):

1. Increase stream sinuosity and floodplain function from Ingalls Creek to mouth.
2. Restore flow from Camas Creek to mouth.
3. Other projects should be delayed until stream sinuosity and flows are addressed.

PESHASTIN CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: June 6, 2003	**TOUR(S) LEAD BY:** Steve Kolk Carmen Andonaegui
AREAS VISITED: Peshastin Irrigation District, Peshastin headwaters, Shaser Creek confluence, Negro Creek, WSDOT gravel staging area, Ingalls Creek trailhead, Mill Creek, Pat Rasmussen riparian plantings, confluence with Wenatchee River and County bridge near mouth	
OVERALL COMMENTS: ▪ The confinement by the highway is the greatest limiting factor to healthy stream function. ▪ There are likely opportunities to improve riparian function on tributary streams. ▪ Human impact is very evident along Peshastin Creek	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Recreational mining in upper tributaries ▪ Thinning project near pass ▪ Recreational use, esp. in winter near pass – sediment problem?	
ADDITIONAL INFORMATION AVAILABLE: ▪ US Bureau of Reclamation ▪ Chelan County Natural Resource Program	
RECOMMENDATIONS: ▪ Address the fish passage issues at the Peshastin Irrigation District, this project is a first step to help solve contentious community issues	



Looking upstream from the Peshastin Irrigation District
June 6, 2003

MISSION CREEK WATERSHED ASSESSMENT	
Native species: Spring chinook salmon, steelhead.	Drainage area: 59,609 acres
STATUS: Category 3	
SIGNIFICANT SUBWATERSHEDS: Sand Creek, Devils Gulch, Lower Mission	
FACTORS AFFECTING HABITAT CONDITION: ▪ Low or non-existent flows with associated high instream temperatures in lower Mission Creek disrupt distribution and abundance of native species, particularly in summer. ▪ Channelization of lower Mission, Brender and Yaksum creeks. ▪ Degraded water quality and loss of riparian habitat, road construction, urban/residential and agricultural development, especially in the floodplains, grazing, and soil compaction have changed channel function. ▪ There are several culverts throughout the watershed that are passage barriers when flows are available. ▪ Loss of channel sinuosity and floodplain function in the Mission Creek watershed.	
LEVEL OF CERTAINTY: ▪ Watershed surveys by USFS and Chelan Conservation District provide high level of certainty of watershed conditions and causal mechanisms.	
RECOMMENDATIONS (IN PRIORITY): 1. Increase stream flow. 2. Reduce nonpoint pollution from septic tanks and livestock. 3. Restore channel sinuosity and floodplain function upstream of Yaksum Creek confluence. 4. Other projects should be delayed until flow and water quality are addressed.	

MISSION CREEK WATERSHED - COMMUNITY INTERESTS	
DATE(S) VISITED: May 20, 2003	**TOUR(S) LEAD BY:** Cameron Thomas Bob Rose
AREAS VISITED: East Fork Mission Creek, East Fork Mission Road, Devil's Gulch, Mainstem and Mission Creek at river miles 2 and 8.5	
OVERALL COMMENTS: ▪ Thin soil, erodable sandstone in basin produces naturally high levels of fines. ▪ Need to be aware of how landowners are approached when talking about solutions to problems in this watershed, work with them to come up with creative solutions. ▪ There was discussion on the issue of strategies in Mission Creek. If we are looking at the lower portion, we may be more concerned about Spring Chinook. If we're looking higher up in the watershed, we would want to focus on steelhead. This would impact how we approach projects. Perhaps we could focus on the upper portion of the watershed first (steelhead rearing), and hold off on the lower until we do more outreach. ▪ More outreach is needed, especially in lower Mission.	
IDEAS AND AREAS TO VISIT ON NEXT TOUR: ▪ Focus on water quality issues and projects ▪ Outreach for water quality ▪ Get local high school students involved through Kevin Powers ▪ Walk further up the Devils Gulch trail	
ADDITIONAL INFORMATION AVAILABLE: ▪ USFS information from Cameron Thomas	
RECOMMENDATIONS: ▪ Get local high school students involved through Kevin Powers, 4-H program ▪ More outreach is needed, especially in lower Mission.	

Looking at Mission Creek from the Devil's Gulch bridge
May 20, 2003

OVERLAP OF BIOLOGICAL OBJECTIVES & COMMUNTIY INTERESTS

This section is still in development. At this time, the watershed assessment tables and community interest tables are being used to assist in determining the overlap between biological objectives and community interests.

INCREASING THE OVERLAP

This section is still in development. At this time, the watershed assessment tables and community interest tables are being used to assist in finding ways of increasing the overlap between biology and community interests. Tours within the Wenatchee watershed have been successfully used to engage local technical experts and community members in discussions to come up with creative solutions to issues facing salmonids in this area. Watershed Planning efforts have been instrumental in bringing local experts and community members together to discuss ways in which to meld biological and community objectives.

LINKING THE PROJECT LIST TO THE STRATEGY

This section is still in development. Information from the watershed assessment tables and community interest tables are currently being used to provide information that supports the project list. The Regional Technical Team and the Citizen's Committee use the Lead Entity Strategy during their reviews in order to ensure that each project demonstrates a clear link to both technical needs and community interests that have been identified in each watershed.

DATA GAPS AND NEW INFORMATION

There is concern that some active restoration projects in the Upper Columbia Region may be undertaken without a solid understanding of the geomorphic and hydrologic processes in the watersheds. This may result in projects that are not biologically effective—or potentially counter-productive. We recommend that the following assessments be undertaken to improve our understanding of salmonid habitat and productivity. All assessments should address the levels of certainty within one or more watersheds and should lead to projects or management decisions within a reasonable time frame. We have not assigned priorities to these information needs.

Fluvial processes in many Upper Columbia streams are not fully understood, particularly in the lower Wenatchee River. Stream channels in these reaches are constrained by railroads, highways, dikes and development, causing reduced channel sinuosity, flood attenuation, gravel recruitment, large woody debris recruitment and connection to side channels. Information needs include historical and current channel migration rates, factors affecting migration rates, means to restore floodplain function and the appropriate types and locations of restoration.

More information is needed on the water balance and the relation of surface and groundwater in Upper Columbia streams. A hydrologic assessment should identify critical ground water recharge areas and determine locations where groundwater contributes to surface water. This assessment should include measuring interactions between groundwater management and surface water flows during critical periods. The role of upslope forest and range management on water balance and hyporheic flows needs to be further understood.

Barrier inventories are now completed in the Wenatchee subbasin, yet full assessments of these structures may be required to correct the barriers in a systematic and strategic order. We recommend that

the UCSRB develop a comprehensive strategy to address barriers in the region using the information garnered from the completed surveys.

An understanding of habitat/productivity relations in Upper Columbia streams would help guide land and water management decisions contributing to recovery of salmonids in the region. Upstream/downstream salmonid migrant trapping, parr production surveys and spawning ground surveys in selected index streams (such as the Chiwawa River) would greatly contribute to our knowledge base, and lead to more appropriate resource allocation decisions. Indicator streams should be established.

The extent of salmonid rearing in small-order tributaries to the Columbia River is not known. Many streams (such as Stemilt and Squilchuck creeks) may be rearing or overwinter refuges when flows are present, which could be important to the population structure and dispersal patterns of salmonids in the region. The presence of redband trout in these streams should be determined.

IMPLEMENTATION AND EFFECTIVENESS MONITORING

All projects undertaken to protect and restore salmonid habitat in the Upper Columbia Region must be monitored for implementation. However, not all projects should be monitored for effectiveness. A series of standardized indicators of habitat condition (with data quality guidelines) should be set for selected watersheds within each subbasin. Collection of indicator data for these watersheds should be coordinated at the regional level and based on state and federal guidelines. The RTT will submit a companion document in late 2003 to set the foundation for an effectiveness monitoring strategy for the Upper Columbia Region. This report will build upon our previous outline (RTT 2002b) and will be consistent with standards and guidelines established through the State Comprehensive Monitoring Strategy.

NOTE: THIS SECTION WILL BE UPDATED TO INCORPORATE PROPOSED RTT MONITORING STRATEGY.

THE ENTIAT SUBBASIN (WRIA 46)

The Entiat River has been affected by upland management activities throughout the subbasin and construction of flood control dikes in the lower mainstem. To encourage properly functioning and stable habitats in the subbasin, four actions should be approached simultaneously:

1. Protect core subwatersheds in the upper subbasin and upper Mad River.
2. Continue restoration of highly erosive upland areas in Fox, McCree, Brenegan, Preston and Mud creeks, Crum Canyon and the mainstem Entiat between Fox and Stormy creeks.
3. Restore habitat diversity and channel function in the lower Entiat River.
4. Increase late summer instream flows in the lower Entiat and lower Mad rivers

The Entiat is naturally flow limited, actual water use has been documented, along with conservation opportunities and changing the shape of the container is more of the solution than increasing flows.

Upland erosion is a severe chronic problem in the Entiat Watershed, yet substantial restoration efforts are underway in the Wenatchee National Forest to address this problem. Erosion on private lands contributes little to the overall problem of sediment delivery to the stream.

Low stream channel complexity is the primary limitation to productivity of salmonids on the lower 20-km of the mainstem Entiat River. Stream sinuosity is low, with very few point bars for gravel accumulation. Instream habitat diversity is also low, with few pools, glides, pocket waters or LWD accumulations. As a result, there are very few resting areas for both adult and juvenile salmon through

this important migration corridor. Efforts to improve stream sinuosity and channel forming processes in the lower reach should be considered.

The most feasible means to restore habitat in the lower Entiat River is primarily in structure placement as an immediate improvement, and floodplain restoration as the long-term solution. This approach is the most pragmatic restoration practice available for the lower Entiat River. Initially, managers should actively restore the lower Entiat River to increase stream habitat complexity, encourage thalweg development and deposition of spawning gravels. The long-term approach should be to restore riparian and floodplain habitat in the lower Entiat River. Such measures would also be feasible in the lower Mad River.

A multi-disciplinary team of fishery biologists, hydrologists and fluvial geomorphologists should provide specific recommendations on the types of structures that would work best, based upon channel configuration. Active restoration projects should be reviewed on a case-by-case basis. We caution that these approaches to increase productivity are short-term, and will likely require maintenance. The lower Entiat River is one of the few watersheds in the Upper Columbia Region where active manipulation of the stream channel is appropriate, and should only be done with a strategy in place to restore floodplain function on a permanent basis.

The most pressing needs on the lower Entiat River are the lack of instream complexity and riparian cover, yet there are other factors that adversely affect salmonids. It is our opinion that instream flows limit salmonid production in the lower Entiat River, but not to the chronic and severe extent seen in other subbasins of the Upper Columbia Region. This is partly a result of the natural characteristics of the watershed, upland slope condition, irrigation water withdrawals and stream channel modifications in lower Entiat River. Projects that increase late summer flows in the lower Entiat River should be a subbasin priority.

The fifth round SRFB application for the Entiat subbasin is a proposal for Phase I of a full 1.2 mile reach - the Bridge-to-Bridge reach (~RM 3.2 to RM 4.4) - restoration project in the lower Entiat River. The Bridge-to-Bridge reach is the highest priority restoration area in the entire Entiat subbasin and this 3-phase project, developed via 10 years of planning, is fully supported by the EWPU. The restoration effort will address lack of off-channel rearing habitat, temperature extremes and habitat simplicity. It will restore geomorphology, floodplain function, habitat complexity/diversity, off-channel habitat, and shading, benefiting adult & juvenile Chinook, steelhead & coho. At the end of Phase 3, the reach will be restored to its geomorphic potential (e.g. now 0.3 pools/mi, restored to 9 pools/mi). Actions proposed are based on geomorphic, biologic, hydrologic & thermal analyses.

Funding for Phase 1 will be used to: (a) restore ~1000 contiguous ft. of riparian vegetation to improve stream temperatures, bank condition, cover, nutrient inputs; (b) enhance juvenile off-channel rearing habitat via rock/LWD placement in ~700 ft. irrigation ditch; (c) install 2 instream structures to direct flow to the off-channel habitat and restore resting pools in the lowest portion of the reach. A ditch outfall structure will also be added. Appropriate sites and landowner partners necessary for implementation of instream structures have already been identified by a multidisciplinary team. The overall project will help achieve reach-scale restoration objectives for the lower Entiat River that are supported by the community.

ENTIAT WATERSHED PLANNING UNIT

In 1993 a small planning group of local landowners and representatives of the CCCD, NRCS and USFS Entiat RD secured support from the Entiat Chamber of Commerce for a watershed planning effort for the

Entiat and Mad River watersheds. The group organized using the Coordinated Resource Management Plan (CRMP) framework, and outlined a planning process, identified stakeholders and crafted the following mission statement:

Mission Statement

To *voluntarily* bring people together in a collaborative setting to improve communication, reduce conflicts, address problems, reach consensus and implement actions to improve coordinated natural resource management on private and public lands in the Entiat Water Resource Inventory Area (WRIA 46). Our strategy is to complete a science based watershed management plan using watershed specific information ultimately leading towards compliance with the Federal Endangered Species and Clean Water Acts. Our end products will reflect a balance between existing natural resources and human uses and will capitalize on opportunities to improve these values.

The specific goals to move forward towards this vision under the Watershed Planning Act are as follows:

(1) Optimize quantity and quality of water to achieve a balance between natural resources and human use both current and projected.
(2) Provide for coexistence of people, fish and wildlife while sustaining lifestyles through planned community growth, and maintaining and/or improving habitats.
(3) No avoidable human-caused mortality of State and Federal Threatened, Endangered and Candidate species.
(4) Develop and implement an adaptive action plan to address priority issues, emphasizing local customs, culture and economic stability in balance with natural resources. All actions will comply with existing laws and regulations. However, changes to existing laws and regulations will be recommended as needed to attain our common vision and avoid one-size-fits-all solutions.

Recognizing the significance of the roles of limiting factors outside of the watershed and natural events within the watershed, the long-term goal is to have the Entiat River's existing and future habitats contribute to the recovery of listed species and to eventually provide harvestable and sustainable populations of fishes and other aquatic resources.

A Landowner Steering Committee (LSC), for representation of local priorities and interests, and input of local knowledge, and Technical Advisory Committee (TAC), for scientific and policy support of the citizen based effort, were formed. The CRMP group made significant progress between 1994 and 1998; the Draft Entiat Coordinated Resource Management Plan (CCCD 1999) documented the progress made. Passage of the Watershed Planning Act in 1998 provided additional funding for the locally led resource planning effort that had been initiated by Entiat participants in 1993.

Today, LSC representatives of the original Entiat CRMP group continue to participate in watershed planning as members of the EPU. The group has developed a comprehensive watershed plan for WRIA 46 that includes strategic salmon habitat restoration projects. Two EPU landowners are members of the Chelan County Lead Entity Citizen's Committee; this overlap in representation provides continuity and helps assure that SRFB funding requests for Entiat projects are aligned with the scientific, community-supported habitat restoration proposals contained in the Final Draft WRIA 46 Management Plan.

BIOLOGICAL OBJECTIVES

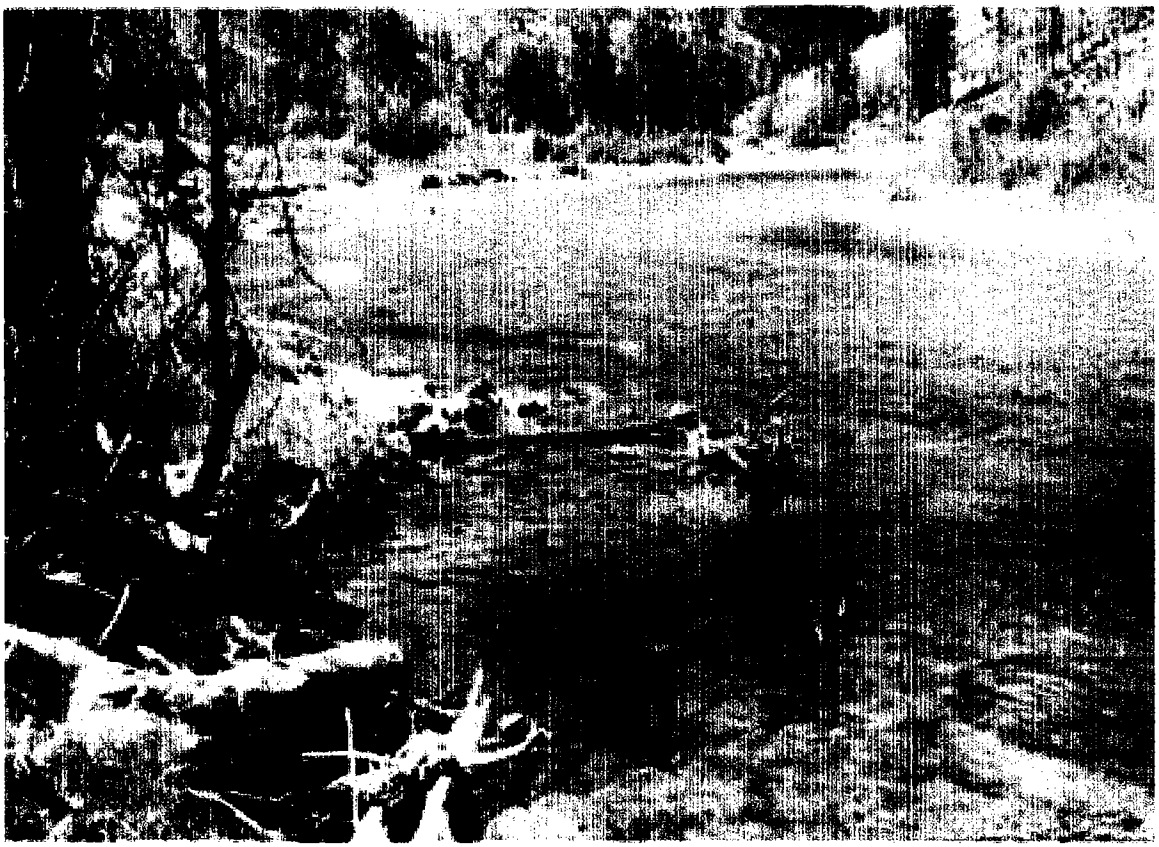
The assessments for each watershed provide biological objectives for protection, restoration and enhancement of salmonid habitat. In these assessments, priorities are identified within and across the watersheds. The table of each subwatershed provides greater detail: they outline the status of each watershed, classify them by category, identify significant subwatersheds, recommend priority approaches and lay the foundation for a region-wide effectiveness monitoring program.

COMMUNITY INTERESTS

The community interests table for each watershed identifies areas of concern for local citizens and residents familiar with the area. In the Entiat subbasin, the watershed planning efforts and public involvement over the last 10 years have produced a wealth of information on local community interests.

MAINSTEM ENTIAT FROM ENTIAT FALLS TO POTATO MORAINE ASSESSMENT	
Native species: Critical habitat for spring chinook salmon, steelhead, bull trout.	Drainage area:
STATUS: Category 1 ▪ Designated as Key Watershed in Northwest Forest Plan	
SIGNIFICANT SUBWATERSHEDS: Upper Mid-Entiat, Lower Mid-Entiat	
FACTORS AFFECTING HABITAT CONDITION: ▪ Surface erosion and sediment delivery hazard is high. ▪ Fluvial processes are now good within this reach, but they are at risk from development pressure in bottomlands. ▪ Past stream clean-outs and salvage logging activities after major fire events have affected stream channel complexity.	
LEVEL OF CERTAINTY: Field habitat analysis has been completed on most areas, providing a high confidence in assessment. ▪ The status of bull trout in the upper Entiat is not well understood. ▪ There is a high level of concern about the impact of land development on this reach. There is a strong consensus among RTT members on the need to protect stream channel function.	
RECOMMENDATIONS (IN PRIORITY): 1. Protect fluvial processes and floodplain function from the falls to the moraine. 2. Continue road closure and reforestation in highly erosive uplands, particularly Fox, McCree, Brenegan, Preston, and Mud creeks, and the mainstem Entiat between Fox and Stormy creeks. 3. Initiate public information efforts to discourage harassment of spawning salmonids.	

MAINSTEM ENTIAT FROM ENTIAT FALLS TO POTATO MORAINE WATERSHED - COMMUNITY INTERESTS
OVERALL COMMENTS: ▪ Upper reaches are protected through USFS ownership ▪ Not a lot of full-time residents in this reach, mostly seasonal
ADDITIONAL INFORMATION AVAILABLE: ▪ Entiat Management Plan (May 17, 2004) ▪ Chelan-Douglas Land Trust
RECOMMENDATIONS: ▪ Implement the recommendations in the Entiat Management Plan (May 17, 2004) ▪ Investigate alternative options of protecting properly functioning habitat, such as conservation easements and leases, rather than outright property acquisition in order to preserve community tax base ▪ Work to develop a watershed resource management program

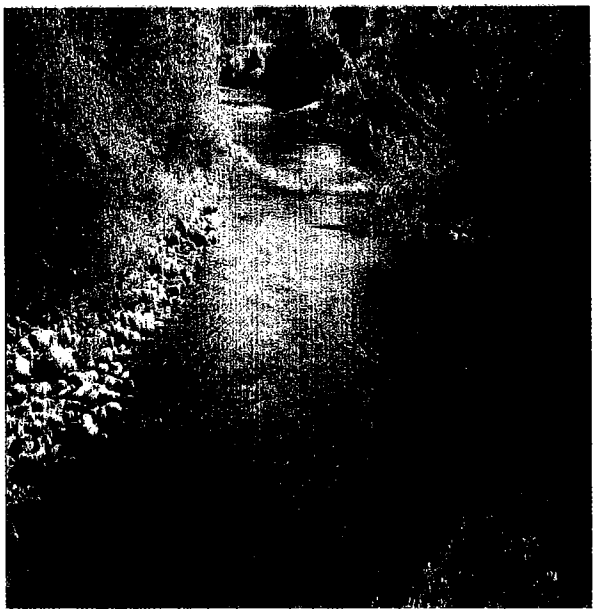


The stillwaters of the Entiat River

LOWER ENTIAT (FROM MORAINE DOWNSTREAM TO MOUTH) ASSESSMENT	
Native species: Spring and summer chinook salmon, steelhead, bull trout.	Drainage area:
STATUS: Category 2 ▪ Migration corridor for spring chinook salmon, steelhead and bull trout. Spawning and rearing habitat for steelhead and summer chinook salmon.	
SIGNIFICANT SUBWATERSHEDS: None	
FACTORS AFFECTING HABITAT CONDITION: ▪ Loss of channel complexity and lateral migration ▪ Loss of riparian habitats and floodplain connectivity ▪ Loss of gravel recruitment ▪ Sediment delivery from Potato Creek and Mud Creek	
LEVEL OF CERTAINTY: ▪ Extent of irrigation water withdrawal on instream flows and temperature is not known. ▪ Extent of riparian cover and channel shape on anchor ice formation is not known.	
RECOMMENDATIONS (IN PRIORITY): 1. Restore stream channel complexity and lateral migration. 2. Protect existing riparian and floodplain habitats. 3. Restore degraded riparian habitats.	

LOWER ENTIAT (FROM MORAINE DOWNSTREAM TO MOUTH) - COMMUNITY INTERESTS
OVERALL COMMENTS: ▪ Active restoration work should be focused on in this reach
ADDITIONAL INFORMATION AVAILABLE: ▪ Entiat Management Plan (May 17, 2004)
RECOMMENDATIONS: ▪ Implement the recommendations in the Entiat Management Plan (May 17, 2004) ▪ Continue active restoration work in the Bridge to Bridge reach to capitalize on connectivity to existing instream habitat restoration sites and proceed upstream from there. ▪ Continue to monitor and protect water quality ▪ Continue to work with community and growers to improve irrigation efficiency and water conservation ▪ Work to develop a watershed resource management program

Engineered Log Jam, installed fall of 2001



Rock Vanes, installed in 2001 in Bridge to Bridge reach

MAD RIVER WATERSHED ASSESSMENT	
Native species: Spring chinook salmon, steelhead, bull trout, cutthroat trout.	Drainage area:

STATUS: Category 1
- Designated as Key Watershed in Northwest Forest Plan

SIGNIFICANT SUBWATERSHEDS:
Upper Mad River, Middle Mad River, Lower Mad River

FACTORS AFFECTING HABITAT CONDITION:
- Historical sheep grazing and timber harvest practices have increased upland erosion and sediment delivery to the stream, and has impacted snow melt runoff and resultant streamflow.
- Road constricts channel on mainstem from Pine Flat campground downstream to mouth.
- Anchor ice formations associated with loss of riparian cover and changes in channel.

LEVEL OF CERTAINTY:
- Field habitat analysis has been completed on most areas, providing a high confidence in assessment.
- Mad River is considered a stronghold for bull trout, but their habitat use outside the watershed is not well understood.

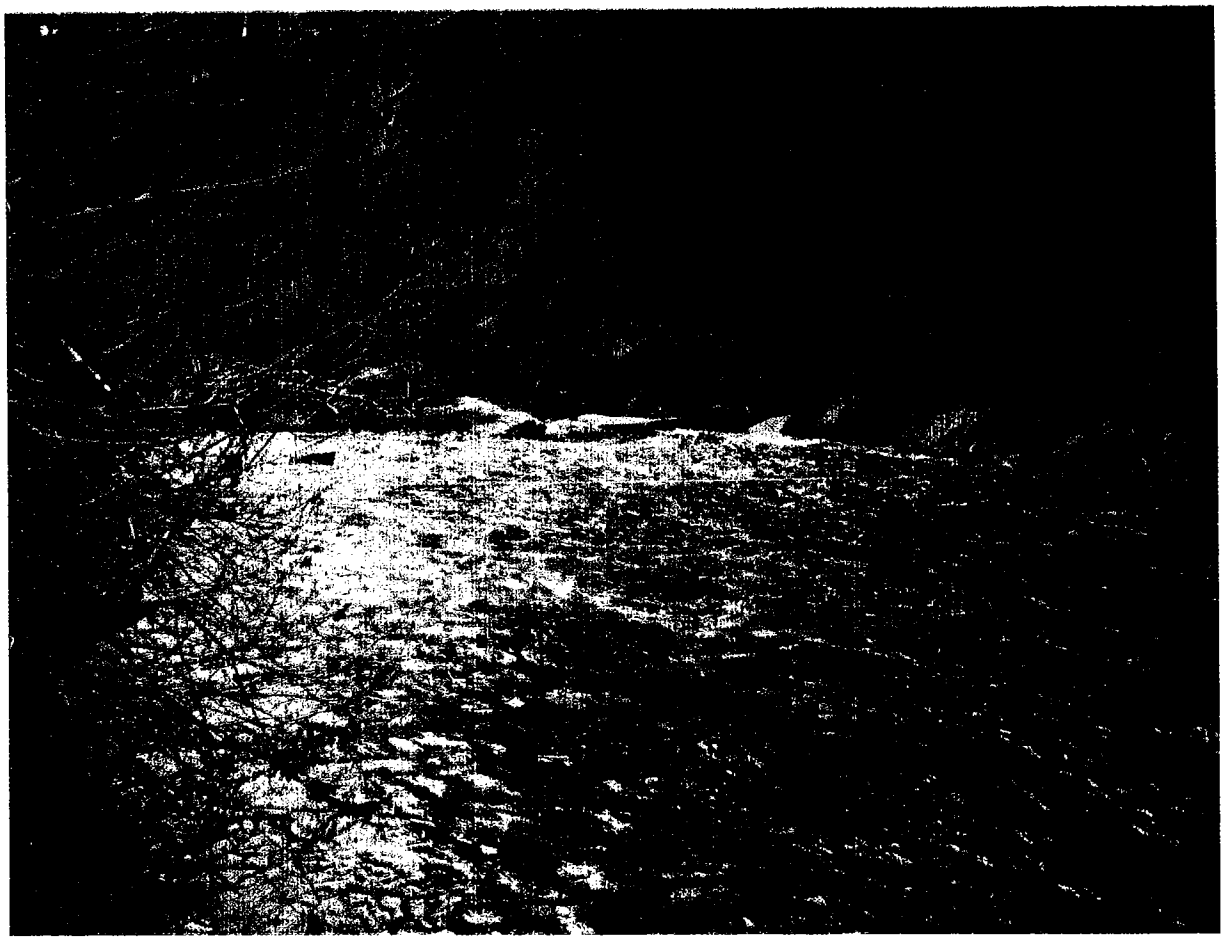
RECOMMENDATIONS (IN PRIORITY):
1. Protect fluvial processes and floodplain function.
2. Continue reforestation in highly erosive uplands.
3. Initiate public information efforts to discourage harassment of bull trout.
4. Reduce impacts from roads in floodplains, and relocate where appropriate. Restore riparian areas in lower Mad River.

MAD RIVER - COMMUNITY INTERESTS

OVERALL COMMENTS:
- Bank stability in the Mad is naturally really good
- Flows are naturally limited and human water use is minimal

ADDITIONAL INFORMATION AVAILABLE:
- USFS
- Entiat Management Plan (May 17, 2004)

RECOMMENDATIONS:
- Implement the recommendations in the Entiat Management Plan (May 17, 2004)
- Continue to protect existing habitat for steelhead and bull trout
- Continue to try and restore natural fire disturbance regime
- All but lower 2 miles of the river is federally owned. There are not any significant issues that have been identified at this time, therefore community interests have focused on the Entiat River.



Riffles on the Mad River

OVERLAP OF BIOLOGICAL OBJECTIVES & COMMUNTIY INTERESTS

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INCREASING THE OVERLAP

This section is still in development. At this time, the watershed assessment tables and community interest tables are being used to assist in finding ways of increasing the overlap between biology and community interests. Tours and site visits within the Entiat watershed have been successfully used to engage local technical experts and community members in discussions to come up with creative solutions to issues facing salmonids in this area. Watershed Planning efforts have been instrumental in bringing local experts and community members together to discuss ways in which to meld biological and community objectives.

LINKING THE PROJECT LIST TO THE STRATEGY

This section is still in development. Information from the watershed assessment tables and community interest tables are currently being used to provide information that supports the project list. The Regional Technical Team and the Citizen's Committee use the Lead Entity Strategy during their reviews in order to ensure that each project demonstrates a clear link to both technical needs and community interests that have been identified in each watershed.

DATA GAPS AND NEW INFORMATION

There is concern that some active restoration projects in the Upper Columbia Region may be undertaken without a solid understanding of the geomorphic and hydrologic processes in the watersheds. This may result in projects that are not biologically effective—or potentially counter-productive. We recommend that the following assessments be undertaken to improve our understanding of salmonid habitat and productivity. All assessments should address the levels of certainty within one or more watersheds and should lead to projects or management decisions within a reasonable time frame. We have not assigned priorities to these information needs.

Fluvial processes in many Upper Columbia streams are not fully understood, particularly in the lower Entiat river. Stream channels in these reaches are constrained by railroads, highways, dikes and development, causing reduced channel sinuosity, flood attenuation, gravel recruitment, large woody debris recruitment and connection to side channels. Information needs include historical and current channel migration rates, factors affecting migration rates, means to restore floodplain function and the appropriate types and locations of restoration.

More information is needed on the water balance and the relation of surface and groundwater in Upper Columbia streams. A hydrologic assessment should identify critical ground water recharge areas and determine locations where groundwater contributes to surface water. This assessment should include measuring interactions between groundwater management and surface water flows during critical periods. The role of upslope forest and range management on water balance and hyporheic flows needs to be further understood.

The Entiat has had two hydrograph separation analyses performed on it, and a gain-loss analysis. WRIA 46 Plan stipulates data show direct surface-ground water connectivity throughout alluvial aquifer area of Entiat valley.

Barrier inventories are now completed in the Entiat subbasin, yet full assessments of these structures may be required to correct the barriers in a systematic and strategic order. We recommend that the UCSRB develop a comprehensive strategy to address barriers in the region using the information garnered from the completed surveys.

An understanding of habitat/productivity relations in Upper Columbia streams would help guide land and water management decisions contributing to recovery of salmonids in the region. Upstream/downstream salmonid migrant trapping, parr production surveys and spawning ground surveys in selected index streams (such as the Chiwawa River) would greatly contribute to our knowledge base, and lead to more appropriate resource allocation decisions. Indicator streams should be established.

The extent of salmonid rearing in small-order tributaries to the Columbia River is not known. Many streams (such as Stemilt and Squilchuck creeks) may be rearing or overwinter refuges when flows are present, which could be important to the population structure and dispersal patterns of salmonids in the region. The presence of redband trout in these streams should be determined.

IMPLEMENTATION AND EFFECTIVENESS MONITORING

All projects undertaken to protect and restore salmonid habitat in the Upper Columbia Region must be monitored for implementation. However, not all projects should be monitored for effectiveness. A series of standardized indicators of habitat condition (with data quality guidelines) should be set for selected watersheds within each subbasin. Collection of indicator data for these watersheds should be coordinated at the regional level and based on state and federal guidelines. The RTT will submit a companion document in late 2003 to set the foundation for an effectiveness monitoring strategy for the Upper Columbia Region. This report will build upon our previous outline (RTT 2002b) and will be consistent with standards and guidelines established through the State Comprehensive Monitoring Strategy.

NOTE: THIS SECTION WILL BE UPDATED TO INCORPORATE PROPOSED RTT MONITORING STRATEGY.

SQUILCHUCK (WRIA 40A)

Stemilt and Squilchuck creeks support small numbers of spring chinook salmon and steelhead, yet little is known about their abundance and productivity. Passage barriers and intermittent stream flows may limit the distribution of anadromous salmonids and likely isolate populations of inland trout.

The immediate strategy for these Category 4 streams would be twofold:

1. Increase late summer instream flows, if it can be shown to contribute to sustainable habitat conditions
2. Develop and implement an approach to correct passage barriers, if it can be shown that sufficient flows will be available for sustainable spawning and rearing in the newly accessible habitats.

Both of these actions require a fundamental information base on habitat conditions and the current (and potential) distribution of anadromous and resident salmonids. These data should be collected before any restoration projects begin. A survey should be done on the population and genetic structure of inland trout, as it is likely that fragmented populations of redband trout (*O. mykiss gairdneri*) may persist in these streams.

WATERSHED PLANNING UNIT INVOLVEMENT

Watershed planning in WRIA 40A is expected to begin sometime in late 2004 or early 2005. Once the planning unit forms and gets established, they will be instrumental in assisting with identifying updates to the Lead Entity Strategy and helping identify biological objectives and community interest information.

BIOLOGICAL OBJECTIVES

The assessments for each watershed provide biological objectives for protection, restoration and enhancement of salmonid habitat. In these assessments, priorities are identified within and across the watersheds. The table of each subwatershed provides greater detail: they outline the status of each watershed, classify them by category, identify significant subwatersheds, recommend priority approaches and lay the foundation for a region-wide effectiveness monitoring program.

COMMUNITY INTERESTS

The community interests table for each watershed identifies areas of concern for local citizens and residents familiar with the area. This section is in development and will be further refined with input from the watershed planning unit, once it is established.

SQUILCHUCK WATERSHED ASSESSMENT	
Native species: steelhead.	Drainage area:
STATUS: Category 4	
FACTORS AFFECTING HABITAT CONDITION: ▪ Low stream flows and passage barriers limit distribution and abundance of salmonids. ▪ Upstream populations are likely isolated by fragmented habitats in lower reaches.	
LEVEL OF CERTAINTY: ▪ Distribution and status of salmonids in streams are not well known. ▪ Low flows and passage barriers are readily apparent, but no formal surveys have been made to assess benefits of restoration practices in these streams. ▪ There is likelihood that there are isolated populations of redband trout in these streams.	
RECOMMENDATIONS (IN PRIORITY): ▪ Assess the distribution, abundance, and genetic structure of salmonids in these streams. ▪ Identify habitat conditions that limit their productivity, and develop a protection and restoration plan accordingly.	

SQUILCHUCK WATERSHED - COMMUNITY INTERESTS
OVERALL COMMENTS: ▪ Need to address barrier issues
ADDITIONAL INFORMATION AVAILABLE: ▪ This table will be further developed by the newly established watershed planning unit
RECOMMENDATIONS: ▪ Develop and implement an approach to address barriers

Squilchuck Creek

STEMILT WATERSHED ASSESSMENT This section has not been developed yet for this watershed.	
Native species:	Drainage area:
STATUS: Category 4	
FACTORS AFFECTING HABITAT CONDITION: ▪	
LEVEL OF CERTAINTY: ▪	
RECOMMENDATIONS (IN PRIORITY): ▪	

STEMILT WATERSHED - COMMUNITY INTERESTS This section has not been developed yet for this watershed.
OVERALL COMMENTS: ▪
ADDITIONAL INFORMATION AVAILABLE: ▪
RECOMMENDATIONS:

OVERLAP OF BIOLOGICAL OBJECTIVES & COMMUNTIY INTERESTS

This section has not been developed yet for this watershed.

INCREASING THE OVERLAP

This section has not been developed yet for this watershed.

LINKING THE PROJECT LIST TO THE STRATEGY

This section has not been developed yet for this watershed.

DATA GAPS AND NEW INFORMATION

This section will be further developed as information becomes available through watershed planning efforts that have yet to begin in this watershed.

IMPLEMENTATION AND EFFECTIVENESS MONITORING

All projects undertaken to protect and restore salmonid habitat in the Upper Columbia Region must be monitored for implementation. However, not all projects should be monitored for effectiveness. A series of standardized indicators of habitat condition (with data quality guidelines) should be set for selected watersheds within each subbasin. Collection of indicator data for these watersheds should be coordinated at the regional level and based on state and federal guidelines. The RTT will submit a companion document in late 2003 to set the foundation for an effectiveness monitoring strategy for the Upper Columbia Region. This report will build upon our previous outline (RTT 2002b) and will be consistent with standards and guidelines established through the State Comprehensive Monitoring Strategy.

NOTE: REWORD THIS SECTION TO REFLECT RECENT CHANGES IN RTT MONITORING STRATEGY.

LAKE CHELAN (PORTION OF WRIA 47)

BIOLOGICAL OBJECTIVES

This section has not been developed yet for this watershed.

COMMUNITY INTERESTS

This section has not been developed yet for this watershed.

CHELAN RIVER ASSESSMENT This section has not been developed yet for this watershed.
Native species:
STATUS: ▪
FACTORS AFFECTING HABITAT CONDITION: ▪
LEVEL OF CERTAINTY: ▪
RECOMMENDATIONS (IN PRIORITY):

CHELAN RIVER - COMMUNITY INTERESTS This section has not been developed yet for this watershed.
OVERALL COMMENTS: ▪
ADDITIONAL INFORMATION AVAILABLE: ▪
RECOMMENDATIONS:

Chelan River
July 2000

OVERLAP OF BIOLOGICAL OBJECTIVES AND COMMUNTIY INTERESTS
This section has not been developed yet for this watershed.

INCREASING THE OVERLAP
This section has not been developed yet for this watershed.

DATA GAPS & NEW INFORMATION
This section has not been developed yet for this watershed.

IMPLEMENTATION AND EFFECTIVENESS MONITORING
This section has not been developed yet for this watershed.

MAINSTEM COLUMBIA RIVER

The mainstem Columbia River is an upstream and downstream migration corridor and a spawning habitat for summer and fall chinook salmon. It is likely used as an overwintering habitat for many species and various age groups. Hydroelectric dams have inundated habitats and impaired passage conditions. Habitat degradation and loss on shorelines from land development and road construction may affect salmonids at some life history stages. Stormwater and agricultural runoff contribute to water quality degradation.

BIOLOGICAL OBJECTIVES
The priorities in this watershed are to protect any remaining riparian habitat, evaluate potential for impacts to salmonids from shoreline management and develop recommendations to lessen those impacts.

COMMUNITY INTERESTS
This community in this area is excited about restoration projects and working with local groups to implement projects that will benefit salmonid habitat. There is tremendous community

support for the Beebe Springs Restoration project being proposed by the Sportsmen's Association.

MAINSTEM COLUMBIA RIVER ASSESSMENT
Native species: spring, summer, and fall chinook salmon, steelhead, sockeye salmon, coho salmon, bull trout.
STATUS: Category 5 ▪ Upstream and downstream migration corridor, and a documented spawning habitat in some areas for summer and fall chinook salmon. Likely overwinter habitat for many species and age groups.
FACTORS AFFECTING HABITAT CONDITION: ▪ Hydroelectric dams inundated habitats and impaired passage conditions. ▪ Habitat degradation and loss on shorelines from land development and road construction may affect salmonids at some life history stages. ▪ Stormwater and agricultural runoff contribute to water quality degradation.
LEVEL OF CERTAINTY: ▪ Hydropower impacts are well studied. ▪ Impacts to salmonids from Columbia River shoreline management are inferred from studies on smaller-order streams.
RECOMMENDATIONS (IN PRIORITY): 1. Hydropower impacts are an obvious concern, but are not addressed in this assessment. 2. Protect any remaining riparian habitat. 3. Evaluate potential for impacts to salmonids from shoreline management: develop recommendations to lessen impacts, as appropriate.

MAINSTEM COLUMBIA RIVER - COMMUNITY INTERESTS
OVERALL COMMENTS: ▪ Work with local groups to implement restoration projects that will benefit salmonid habitat
ADDITIONAL INFORMATION AVAILABLE: ▪ Sportsmen's Association
RECOMMENDATIONS: ▪ Pursue implementation of the Beebe Springs Restoration project

Rocky Reach Dam

Apple Capitol Loop Trail

OVERLAP OF BIOLOGICAL OBJECTIVES & COMMUNTIY INTERESTS

This section is still in development. At this time, the watershed assessment tables and community interest tables are being used to assist in determining the overlap between biological objectives and community interests.

INCREASING THE OVERLAP

This section is still in development. At this time, the watershed assessment tables and community interest tables are being used to assist in finding ways of increasing the overlap between biology and community interests. Efforts by the Sportsmen's Association have been instrumental in bringing local experts and community members together to discuss ways in which to meld biological and community objectives.

LINKING THE PROJECT LIST TO THE STRATEGY

This section is still in development. Information from the watershed assessment tables and community interest tables are currently being used to provide information that supports the project list. The Regional Technical Team and the Citizen's Committee use the Lead Entity Strategy during their reviews in order to ensure that each project demonstrates a clear link to both technical needs and community interests that have been identified in each watershed.

DATA GAPS AND NEW INFORMATION

There is concern that some active restoration projects in the Upper Columbia Region may be undertaken without a solid understanding of the geomorphic and hydrologic processes in the watersheds. This may result in projects that are not biologically effective—or potentially counter-productive. We recommend that the following assessments be undertaken to improve our understanding of salmonid habitat and productivity. All assessments should address the levels of certainty within one or more watersheds and should lead to projects or management decisions within a reasonable time frame. We have not assigned priorities to these information needs.

Fluvial processes in many Upper Columbia streams are not fully understood, particularly in the lower Entiat river. Stream channels in these reaches are constrained by railroads, highways, dikes and development, causing reduced channel sinuosity, flood attenuation, gravel recruitment, large woody debris recruitment and connection to side channels. Information needs include historical and current channel migration rates, factors affecting migration rates, means to restore floodplain function and the appropriate types and locations of restoration.

More information is needed on the water balance and the relation of surface and groundwater in Upper Columbia streams. A hydrologic assessment should identify critical ground water recharge areas and determine locations where groundwater contributes to surface water. This assessment should include measuring interactions between groundwater management and surface water flows during critical periods. The role of upslope forest and range management on water balance and hyporheic flows needs to be further understood.

An understanding of habitat/productivity relations in Upper Columbia streams would help guide land and water management decisions contributing to recovery of salmonids in the region. Upstream/downstream salmonid migrant trapping, parr production surveys and spawning ground surveys in selected index streams (such as the Chiwawa River) would greatly contribute to our knowledge base, and lead to more appropriate resource allocation decisions. Indicator streams should be established.

The extent of salmonid rearing in small-order tributaries to the Columbia River is not known. Many streams may be rearing or overwinter refuges when flows are present, which could be important to the

population structure and dispersal patterns of salmonids in the region. The presence of redband trout in these streams should be determined.

IMPLEMENTATION AND EFFECTIVENESS MONITORING

All projects undertaken to protect and restore salmonid habitat in the Upper Columbia Region must be monitored for implementation. However, not all projects should be monitored for effectiveness. A series of standardized indicators of habitat condition (with data quality guidelines) should be set for selected watersheds within each subbasin. Collection of indicator data for these watersheds should be coordinated at the regional level and based on state and federal guidelines. The RTT will submit a companion document in late 2003 to set the foundation for an effectiveness monitoring strategy for the Upper Columbia Region. This report will build upon our previous outline (RTT 2002b) and will be consistent with standards and guidelines established through the State Comprehensive Monitoring Strategy.

NOTE: THIS SECTION WILL BE UPDATED TO INCORPORATE PROPOSED RTT MONITORING STRATEGY.

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